1. **Maximum output of 2400 W**

   Six 400 W single-axis robots or three 750 W single-axis robots can be operated simultaneously.

2. **Capable of driving one to six axes**

   A maximum of six axes can be operated complementarily using only one controller unit. Six axes are operated with a single program allowing easy programming.

3. **Controlling SCARA robots (4 axes) plus 2 additional axes**

   The X-SEL-QX can control SCARA robots plus up to two axes in a combination of single-axis and/or cartesian robots (total wattage: 2400 W) (*1). If the SCARA robot has an arm length of 500/600, two 750 W axes can be operated together.

   (*1) Single-axis robots may not be connectable depending on the type of SCARA robot. For details, refer to the notes under “Models.”

4. **“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. The large-capacity global types Q and QX conform to the ANSI and CE Mark standard.

5. **Conveyor tracking function (Optional)**

   The QX can be configured to detect works on the conveyor using a vision system and handle them synchronously with the conveyor movement. The conveyor tracking function will surely improve the work efficiency of your equipment.

   (Note) The conveyor tracking function is effective only if the actuator has an arm length of 500/600. Also, this function may not be supported under certain operating conditions. If you are considering adding the conveyor tracking option, consult IAI’s Sales Department.

6. **Compact, high performance and CE-compliant**

   - Approx. 40% slimmer than IAI’s conventional controllers X-SEL-KE/KET/KETX.
   - Significantly faster than IAI's conventional controllers (the command processing time is around half).
   - Connectable to DeviceNet, CC-Link, Ethernet, Profibus and other networks.
   - Conforming to the CE Mark standard.

7. **ROBO Cylinder Gateway Function**

   - Up to 16 ROBO Cylinder axes can be additionally operated via serial communication using the gateway function.
   - ROBO Cylinders can be operated using SEL language programs. You can also change the position data of your ROBO Cylinder or read the current ROBO Cylinder position.
X-SEL Series Product Lineup

<table>
<thead>
<tr>
<th>X-SEL-KE</th>
<th>X-SEL-KET</th>
<th>X-SEL-KETX</th>
<th>X-SEL-P</th>
<th>XSEL-Q</th>
<th>XSEL-QX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Actuator Type</td>
<td>Global Actuator Type (Safety Category 4)</td>
<td>Global SCARA Type (Safety Category 4)</td>
<td>Large-capacity Standard Actuator Type</td>
<td>Large-cap. Global Actuator Type (Safety Category 4)</td>
<td>Large-cap. Global SCARA Type (Safety Category 4)</td>
</tr>
</tbody>
</table>

**Operating method**
- Program operation

**Programs**
- 64 programs (6000 steps)
- 128 programs (9999 steps)

**Number of positions**
- 3000 positions
- 20000 positions

**Maximum number of connectable axes**
- 4 axes
- 6 axes

**Maximum output**
- 1.6 kW
- 1.6 kW / 2.4 kW

**Power supply**
- Single-phase 100VAC / Single-phase 230VAC
- Single-phase 230VAC / Three-phase 230VAC

**Safety category**
- B
- CE, ANSI (*1)

**Safety standard**
- CE
- CE, ANSI (*1)

*1 To support ANSI, the ANSI-compatible teaching pendant (SEL-TD or IA-T-XA) is required.

Larger Program Data Capacity of new X-SEL-P/Q/QX Generation

The program data capacity of the XSEL controller has increased as follows:

<table>
<thead>
<tr>
<th>Programs</th>
<th>Current Model</th>
<th>Enhancement Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Programs</td>
<td>64</td>
<td>128</td>
</tr>
<tr>
<td>Number of Program Steps</td>
<td>6000</td>
<td>9999</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position Data</th>
<th>Current Model</th>
<th>Enhancement Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Positions (Positions that can be backed up by the battery)</td>
<td>4000 (4000)</td>
<td>20000 (10000)</td>
</tr>
</tbody>
</table>

| Number of Error Records | 100 | 200 |

**ROBO Cylinder Gateway Function**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum number of connectable ROBO Cylinder axes</td>
<td>16</td>
</tr>
<tr>
<td>Maximum number of axes operable by XSEL controller</td>
<td>6</td>
</tr>
<tr>
<td>Supported ROBO Cylinder series</td>
<td>ERC2/RCP2/RCP3/RCA/RCA2/RCRS</td>
</tr>
<tr>
<td>Connectable controllers</td>
<td>ERC2/PCCN/ACDN/SCON/ROBONET</td>
</tr>
<tr>
<td>Communication protocol</td>
<td>Modbus</td>
</tr>
</tbody>
</table>

The ROBO Cylinder gateway function controls ROBO Cylinders from an XSEL controller via serial communication. Use of the gateway function significantly reduces the hassle of wiring compared to the PIO control method, and you can also operate ROBO Cylinders using SEL language programs from your XSEL controller.

**Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hassle of Wiring</td>
<td>PIO Control</td>
</tr>
<tr>
<td>Many cables must be wired</td>
<td>Only two cables need to be wired</td>
</tr>
<tr>
<td>Control Method</td>
<td>PIO Control</td>
</tr>
<tr>
<td>ON/OFF control of I/Os only</td>
<td>Programs can be used</td>
</tr>
<tr>
<td>Moving Positions</td>
<td>Gateway Function</td>
</tr>
<tr>
<td>Positions must be input to the controller before hand</td>
<td>Positions can be instructed from an XSEL controller</td>
</tr>
<tr>
<td>Current chuck position</td>
<td>Current position can be checked numerically</td>
</tr>
</tbody>
</table>

Examples of Use (Example of replacing a PIO-controlled system with a gateway system)

Operate a SCARA robot chuck consisting of a ROBO Gripper using the gateway function.

While the PIO-controlled system had to measure loads in the previous process and sort them based on their size to transfer accordingly, the gateway system allows length measurement to be performed by the ROBO Gripper. As a result, the process has become shorter.

**Connected Units**

The following units are needed to use the ROBO Cylinder gateway function. (Contact IAI for the wiring method and other details)

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS232 conversion unit</td>
<td>RCB-CV-GW</td>
<td>One RS232 conversion unit is required for one XSEL controller</td>
</tr>
<tr>
<td>Communication cable</td>
<td>CB-RCB-500050</td>
<td>One communication cable is required for one XSEL controller</td>
</tr>
<tr>
<td>Controller link cable</td>
<td>CB-RCB-CTL001</td>
<td>The number of controller link cables must be the same as the number of ROBO Cylinder controllers connected</td>
</tr>
</tbody>
</table>
**ACTOR MODELS**

### XSEL - P - 3 - 400AL - 200AL - 60ABL - PR - P1 - EEE - 2 - 2

| Models | XSEL - QX6 - NNN5020 - 750AL - 750ABL - PR - P1 - EEE - 2 - 3 |

### Specifications

**Large-capacity Actuator type**

- **P4 / Q4**
- **P5 / P6 / Q5 / Q6**
- **QX4**
- **QX5**
- **QX6**

**Large-capacity Scara type**

- **QX5 / QX6**

<table>
<thead>
<tr>
<th>Total output when number of axes is connected</th>
<th>Large-capacity Actuator type</th>
<th>Large-capacity Scara type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2400 W (three-phase 230 VAC)</td>
<td>1600 W (single-phase 230 VAC)</td>
<td>3625 VA (1)</td>
</tr>
</tbody>
</table>

### Controller type

1. **Series**: Indicate the series name.
2. **Controller type**: Indicate the controller type.
   - **P1-6**: Large-capacity, 1-6-axis ACTUATOR specification
   - **Q1-6**: Large-capacity, 1-6-axis ACTUATOR specification conforming to safety category 4 (global version)
   - **QX4**: Large-capacity, dedicated SCARA specification (3 axes)
   - **QX5**: Large-capacity, 5-axis (SCARA + 1 axis) specification conforming to safety category 4 (global version)
   - **QX6**: Large-capacity, 6-axis (SCARA + 2 axes) specification conforming to safety category 4 (global version)
3. **Number of axes or IX robot model**: Indicate the actuator axes or the SCARA type to be operated.

#### Notes

- If the SCARA robot has an arm length of 700/800, the QX connects up to 5 axes (SCARA + 1 axis).
- The high-speed type connects up to 4 axes (SCARA only).

#### Motor output of axis 1 or 5 (single-axis robot)

Indicate the motor output of axis 1 of a multi-axis SCARA robot or of the single-axis robot connected as axis 5 of the QX5/QX6. If you are ordering your controller without options, enter only the encoder type code.

- **Encoder type A**: Absolute / E: Incremental
- **Options B**: Brake / C: Creep sensor
- **Limit switch**: L: Limit switch
- **M**: Master-axis designation in synchronized operation
- **S**: Slave-axis designation in synchronized operation
- Leave the space blank for the QX4.

#### Motor output of other or axis 6 (single-axis robot)

Indicate the motor output of axis 2-6 of multi- or other single-axis robot or of the single-axis robot connected as axis 6 of the QX6. The content of **E** conforms to the same explanation for axis 5. Leave the space blank for the QX4.

### Expansion I/O

- **Expansion I/O (Slots 2 to 4)**: Indicate the specification of the expansion slots (slots 2 to 4).
- **I/O flat cable length**: Indicate the length of the signal wires connecting each I/O board and the PLC.
- **I/O flat cable length**: Indicate the applicable network if you want to connect the P/QX to DeviceNet, CC-Link, Profibus or Ethernet.

### Dedicated network slot

Indicate an applicable network if you want to connect the P/QX to DeviceNet, CC-Link, Profibus or Ethernet.

### Power-supply voltage

Indicate the voltage of the main controller power supply.

---

*1 When a SCARA robot of 700/800 arm length is operated.
*2 The maximum limit varies depending on the actuator type.
*3 The maximum limit varies depending on the controller type.
*4 The controller weight includes the absolute battery, brake mechanism and expansion I/O box.
*5 Based on the maximum wattage of each connected axis.\n
---

### Controller type

- **P1-6**: Large-capacity, 1-6-axis ACTUATOR specification
- **Q1-6**: Large-capacity, 1-6-axis ACTUATOR specification conforming to safety category 4 (global version)
- **QX4**: Large-capacity, dedicated SCARA specification (3 axes)
- **QX5**: Large-capacity, 5-axis (SCARA + 1 axis) specification conforming to safety category 4 (global version)
- **QX6**: Large-capacity, 6-axis (SCARA + 2 axes) specification conforming to safety category 4 (global version)

### Number of axes or IX robot model

- **Series**: Indicate the series name.
- **Controller type**: Indicate the controller type.
- **Number of axes or IX robot model**: Indicate the actuator axes or the SCARA type to be operated.

---

### Specifications

- **Large-capacity Actuator type**
- **Large-capacity Scara type**

- **Total output when number of axes is connected**: 2400 W (three-phase 230 VAC) / 1600 W (single-phase 230 VAC)
- **Motor power input**: 2.4 kW type: three-phase 230VAC (-10%, +10%) / 1.6 kW type: Single-phase 230VAC (-15%, +10%)
- **Max. Power capacity (%)**: 4878 VA (600 W x 4 axes) / 4998 VA (400 W x 4 axes)
- **Safety circuit configuration**: Redundant configuration not supported / Redundant configuration supported
- **Drive-power cut-off method**: P type: Internal cutoff relay / Q type: External safety circuit
- **Enable input**: P type: Contact-B input (internal power supply type) / Q type: Redundant (external power supply type, redundant)
- **Position detection method**: Incremental encoder / absolute encoder
- **Speed setting (m/sec)**: 1mm/sec-2000mm/sec
- **Accel/deceleration setting (m/sec²)**: 0.01G-1G
- **Programming language**: Super SEL Language
- **Number of program steps**: 9999 steps (total)
- **Number of positions**: 20000 positions (total; 10000 positions can be backed up by the battery)
- **Number of programs**: 128 programs
- **Operating temperature/humidity**: 0~40°C, 10~95% (non-condensing)

---

### Motor output of axis 1 or 5 (single-axis robot)

Indicate the motor output of axis 1 of a multi-axis SCARA robot or of the single-axis robot connected as axis 5 of the QX5/QX6. If enter codes corresponding to the encoder type and desired option(s): * If you are selecting multiple options, enter the corresponding codes in alphabetical order after the encoder type code.

- **Encoder type A**: Absolute / E: Incremental
- **Options B**: Brake / C: Creep sensor
- **Limit switch**: L: Limit switch
- **M**: Master-axis designation in synchronized operation
- **S**: Slave-axis designation in synchronized operation
- Leave the space blank for the QX4.

### Motor output of other or axis 6 (single-axis robot)

Indicate the motor output of axis 2-6 of multi- or other single-axis robot or of the single-axis robot connected as axis 6 of the QX6. The content of **E** conforms to the same explanation for axis 5. Leave the space blank for the QX4.

---

### Expansion I/O

- **Expansion I/O (Slots 2 to 4)**: Indicate the specification of the expansion slots (slots 2 to 4).
- **I/O flat cable length**: Indicate the length of the signal wires connecting each I/O board and the PLC.
- **I/O flat cable length**: Indicate an applicable network if you want to connect the P/QX to DeviceNet, CC-Link, Profibus or Ethernet.

---

### Dedicated network slot

Indicate an applicable network if you want to connect the P/QX to DeviceNet, CC-Link, Profibus or Ethernet.

---

### Power-supply voltage

Indicate the voltage of the main controller power supply.

---

<table>
<thead>
<tr>
<th>Controller type</th>
<th>Number of axes or IX robot model</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1-6</td>
<td>P2-5 (standard actuator 4-axis type)</td>
</tr>
<tr>
<td>Q1-6</td>
<td>Q2-6 (standard actuator 5-axis type)</td>
</tr>
<tr>
<td>QX4</td>
<td>QX5 (global SCARA 4-axis type)</td>
</tr>
<tr>
<td>QX6</td>
<td>QX7 (global SCARA 5-axis type)</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Specifications</th>
<th><strong>P4 / Q4</strong></th>
<th><strong>P5 / P6 / Q5 / Q6</strong></th>
<th><strong>QX4</strong></th>
<th><strong>QX5 / QX6</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Control power input</td>
<td>2.4 kW type: three-phase 230VAC (-10%, +10%)</td>
<td>1.6 kW type: Single-phase 230VAC (-15%, +10%)</td>
<td>3625 VA (1)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Motor power input</td>
<td>4878 VA (600 W x 4 axes)</td>
<td>4998 VA (400 W x 4 axes)</td>
<td>5005 VA (2)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Max. Power capacity (%)</td>
<td>Redundant configuration not supported</td>
<td>Redundant configuration supported</td>
<td>5005 VA (2)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Safety circuit configuration</td>
<td>P type: Internal cutoff relay</td>
<td>Q type: External safety circuit</td>
<td>5005 VA (2)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Drive-power cut-off method</td>
<td>P type: Contact-B input (internal power supply type)</td>
<td>Q type: Redundant (external power supply type, redundant)</td>
<td>5005 VA (2)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Enable input</td>
<td>Incremental encoder / absolute encoder</td>
<td>Incremental encoder / absolute encoder</td>
<td>5005 VA (2)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Speed setting (m/sec)</td>
<td>1mm/sec-2000mm/sec</td>
<td>1mm/sec-2000mm/sec</td>
<td>5005 VA (2)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Acceleration/deceleration setting (m/sec²)</td>
<td>0.01G-1G</td>
<td>0.01G-1G</td>
<td>5005 VA (2)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Programming language</td>
<td>Super SEL Language</td>
<td>Super SEL Language</td>
<td>5005 VA (2)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Number of program steps</td>
<td>9999 steps (total)</td>
<td>9999 steps (total)</td>
<td>5005 VA (2)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Number of positions</td>
<td>20000 positions (total; 10000 positions can be backed up by the battery)</td>
<td>20000 positions (total; 10000 positions can be backed up by the battery)</td>
<td>5005 VA (2)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Number of programs</td>
<td>128 programs</td>
<td>128 programs</td>
<td>5005 VA (2)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Operating temperature/humidity</td>
<td>0<del>40°C, 10</del>95% (non-condensing)</td>
<td>0<del>40°C, 10</del>95% (non-condensing)</td>
<td>5005 VA (2)</td>
<td>5005 VA (2)</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>5.2 kg</td>
<td>4.5 kg</td>
<td>5.2 kg</td>
<td>5.0 kg</td>
</tr>
</tbody>
</table>
**System Configuration**

**Teaching Pendant**

- **Model:** SEL-T (Standard)
- **SEL-TD** (With deadman switch)
- **IA-T-XA** (ANSI/CE Mark compliant type)

This teaching device supports program/position input, test operation, monitoring, etc.

* SEL-T/TD of version 1.0.0 or older and IA-T-XA of version 1.4.3 or older cannot be used with the P/Q/QX controllers.

**Options**

**Regeneration Unit**

- **Model:** REU-1

This unit converts to heat the regenerative current produced when the motor decelerates.

<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>

**External Dimensions**

- **RS232 cable:** 5m (Supplied with the PC software)
- **Regeneration unit cable:** 1m (Supplied with regeneration unit)

**PC Software**

- **Model:** IA-101-X/XXA-CW (XA: Q/QX type)

- With a PC link cable (equipped with a D-sub, 9-pin connector on the PC end)
- IA-101-X-USBMW

This software is a startup support tool offering the functions needed to input programs/positions and perform debugging.

* Program versions older than 7.2.0 cannot be used with the enhanced P/Q/QX controllers.

**ISDA Series**

- **ISDA Series**
- **ISDACR Series**
- **ISDACR ESD**
- **NS Series**
- **LSA Series**
- **IF Series**
- **FS Series**
- **RS Series**
- **RCS2 Series**
- **SCARA Robot**
- **RoboCylinder**
- **ISPA Series**
- **ISA Series**
- **ISDACR Series**
- **IDACR ESD**
- **RB+**
- **RB-**
- **RB OUT**
- **RB+**
- **RB-**
- **RB IN**
- **Connectable Actuator**
- **External Equipment**
- **Regeneration Unit**
- **Control Power Supply**
- **Motor Drive Power Supply**
- **System I/O**
- **Expansion I/O**
- **Various Field Network Connections**
- **ProfiBus, DeviceNet, CC-Link, Ethernet**
- **External Dimensions**

* Applicable to the global Q/QX type only (not required for the standard P type).
External Dimensions

The external dimensions of X-SEL-P/Q/QX controllers vary depending on the number of connected axes, the type (arm length) of connected SCARA robot, use/non-use of expansion I/O, and types of direct-coupled axes. In the table below, select the controller specification meeting your specific requirements and refer to the drawing of the corresponding number.

<table>
<thead>
<tr>
<th>X-SEL-P 1.6/2.4 kW type</th>
<th>X-SEL-Q/QX 1.6 kW type</th>
<th>X-SEL-Q/QX 2.4 kW type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4 axes (P/Q-1/2/3/4) or SCARA only (QX4)</td>
<td>1-4 axes (Q-1/2/3/4) or SCARA only (QX4)</td>
<td>5-6 axes (Q-5/6) or SCARA + direct-coupled axes (QX6)</td>
</tr>
</tbody>
</table>

### ACTUATOR CONTROLLER SPECIFICATIONS

*P type (1-phase), 2.4 kW Q type (3-phase)*

**With absolute battery/brake unit**

- External dimensions
  - 1-4 axes (P/Q-1/2/3/4) or SCARA only (QX4)
  - 1-4 axes (Q-1/2/3/4) or SCARA only (QX4)
  - 5-6 axes (Q-5/6) or SCARA + direct-coupled axes (QX6)

**With I/O expansion base**

- External dimensions
  - 1-4 axes (P/Q-1/2/3/4) or SCARA only (QX4)
  - 1-4 axes (Q-1/2/3/4) or SCARA only (QX4)
  - 5-6 axes (Q-5/6) or SCARA + direct-coupled axes (QX6)

**With I/O expansion base + absolute battery/brake unit**

- External dimensions
  - 1-4 axes (P/Q-1/2/3/4) or SCARA only (QX4)
  - 1-4 axes (Q-1/2/3/4) or SCARA only (QX4)
  - 5-6 axes (Q-5/6) or SCARA + direct-coupled axes (QX6)

---

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

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

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

(1) Measurement data is for an SCARA robot with the same height. For more information, refer to the drawing of the corresponding number.

(2) When expansion I/O is added.

(3) With absolute battery or brake, or absolute battery with brake, plus expansion I/Os.

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