

# Controller

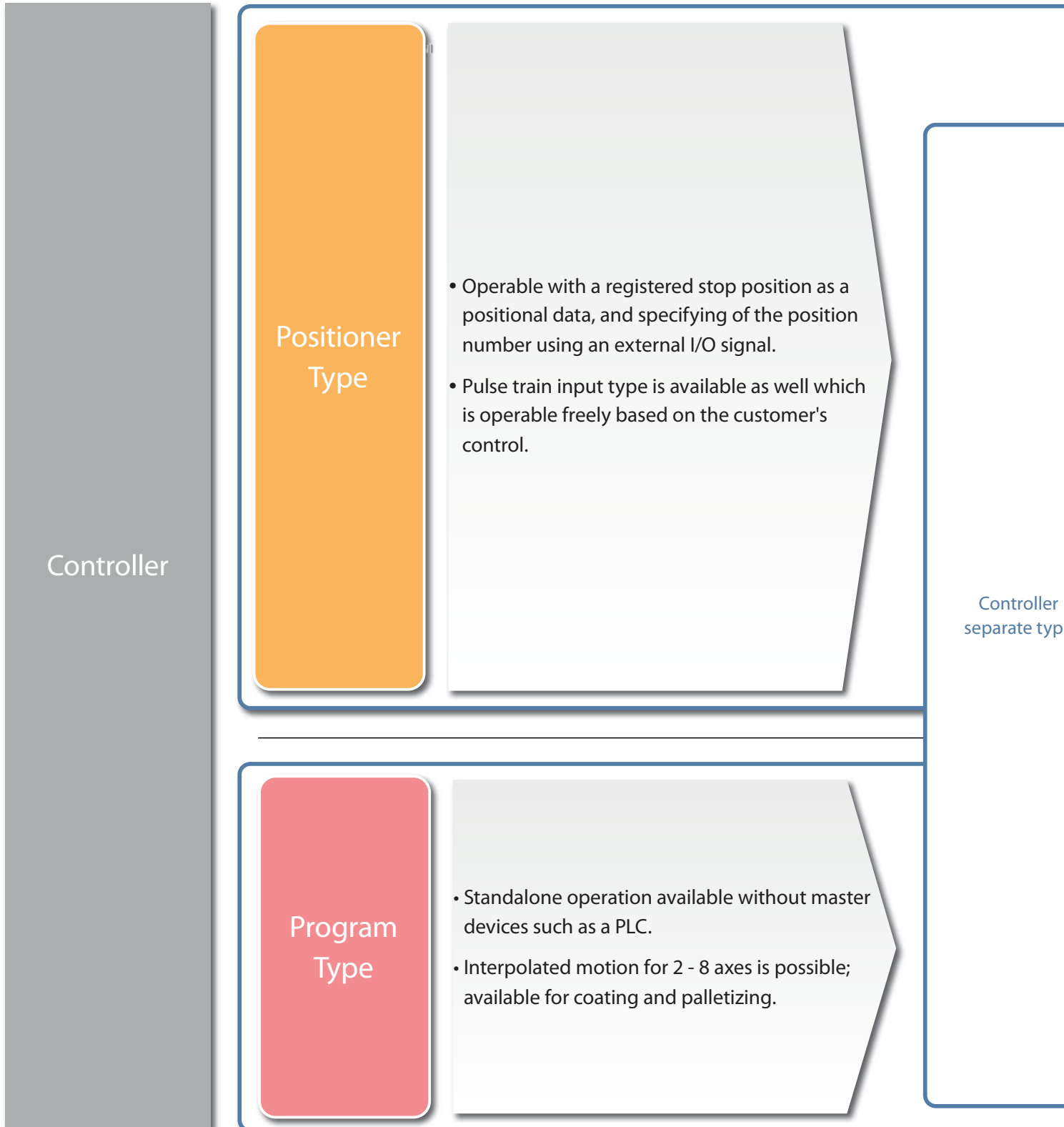
## IAI General Catalogue Volume 7

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# Controller Overview

The controller model can be selected from an ultra-simple type, which is operable with the same controller as a solenoid valve, to a high functionality type that enables program control. A variety of models are available according to the customer's usage.

Controller types can be categorized according to the 3 groups below based on their operations.



Controller integrated type



EleCylinder



Gateway for network connection

REC

Controller for single axis



Position controller 24VDC/AC230V type

PCON/ACON/DCON/SCON



Position controller 24VDC type

MCON



Position controller AC230V type

MSCON

R-unit Series



Unit-linkage system position controller 24VDC/230VAC types

RCON

Controller for multi-axes



Program controller AC230V type

MSEL/SSEL/XSEL



Unit-linkage system program controller 24VDC/230VAC types

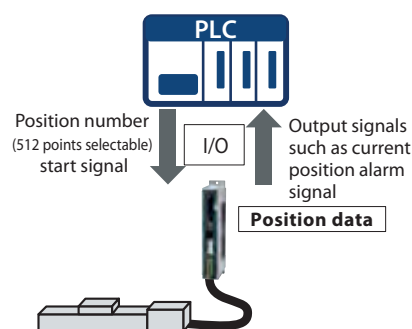
RSEL

# Positioner Type

The positioner type stores positions to which the actuator is moved by specifying a target position number. Integration with existing devices is easy because existing air cylinder control signals can be used.

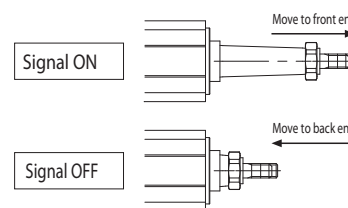
### 1 No programming needed

The positioner type controller operates by selecting the target position number externally using I/O after teaching the position data. Therefore, no operation programming is needed, allowing for immediate operation directly after mounting the equipment.



### 2 Operation using the same signal as solenoid valve possible (PCON/ACON/DCON/SCON controllers)

Same as single solenoid valve, traveling between front/back ends is possible only by the single ON/OFF.



### 3 Reasonable price

A reasonable price range is offered for the pulse motor type controllers which maintain the effective functionality of a servo motor.



### 4 Wide range of variations with full of functions

A wide range of variations offers the optimum type that best suits the usage, from a 2-point positioning band type that operates using the same signal as air cylinder's, to a 512-point positioning band type and a space-saving type that can connect up to 8 axes in one controller.

In addition, the actuator can provides its best performance thanks to the smart tuning and maintenance functions.

PCON/ACON/DCON/SCON/RCON/MCON/MSCON Controllers

- Positioning is possible for up to 512 points (Except for RCON, MCON and MSCON).
- Compatible with pulse train input control (Except for RCON, MCON and MSCON).
- PCON-CB, RCON and MCON provide 1.5 times of max. speed and 2 times of payload compared to conventional models when combined with RCP6, RCP5 and RCP4.
- ACON, SCON and MSCON provide max. 2G of acceleration/deceleration thanks to the off-board tuning function.
- MCON can accommodate max. 8 axes of actuators inside the compact cabinet.
- RCON is a unit connection system and can operate up to 16 axes of actuators.
- Setting of an absolute specification by PCON, ACON, SCON, MCON, RCON or MSCON, thereby requiring no home return.  
 Battery-less absolute type, absolute type using a battery and incremental type actuators can be used in a same way as an absolute type.  
 Simple absolute type is available (battery needed).
  - The absolute type varies depending on the controller type. Please refer to the relevant controller page.

|  |                                 |  |                       |   |                       |
|--|---------------------------------|--|-----------------------|---|-----------------------|
|  <p><b>PCON</b></p>  | <p>See<br/>P7-137</p>           |  <p><b>ACON / DCON</b></p> | <p>See<br/>P7-163</p> |  <p><b>SCON</b></p>   | <p>See<br/>P7-187</p> |
|  <p><b>RCON</b></p> | <p>See<br/>P7-25/<br/>P7-59</p> |  <p><b>MCON</b></p>       | <p>See<br/>P7-117</p> |  <p><b>MSCON</b></p> | <p>See<br/>P7-231</p> |

## Program Type

The program type controller executes programs that are loaded to it.

The programs loaded to the controller are used to perform various tasks such as operating the actuator and communicating with external equipment. Ideal for small systems whether a PLC is not required which leads to cost savings.

### 1 High-level control available using simple language

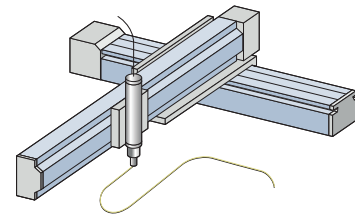
A program is generated for the program type controller using the simple and easy Super SEL Language to execute operation of the actuator and communication between peripheral equipment. Expert knowledge is not needed to use the Super SEL Language, so it's easy to create programs even for beginners.

| No. | B | E | R | Cmd  | Cond | Operand 1 | Operand 2 |
|-----|---|---|---|------|------|-----------|-----------|
| 1   |   |   |   | HOME |      | 100       |           |
| 2   |   |   |   | HOME |      | 11        |           |
| 3   |   |   |   | VEL  |      | 200       |           |
| 4   |   |   |   | WTON |      | 1         |           |
| 5   |   |   |   | MOVL |      | 1         |           |
| 6   |   |   |   | OTON |      | 301       |           |
| 7   |   |   |   | WTON |      | 2         |           |
| 8   |   |   |   | BTOF |      | 301       |           |
| 9   |   |   |   | MOVL |      | 2         |           |
| 10  |   |   |   | BTON |      | 302       |           |

### 2 Interpolation possible up to 8 axes

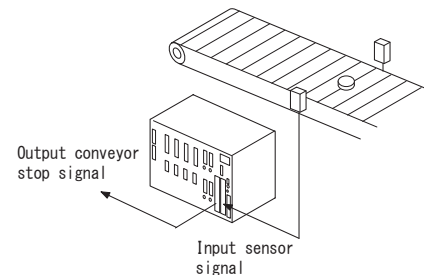
Simultaneous operations of actuators are possible for up to 2 axes for SSEL controller, up to 4 axes for MSEL controller and up to 8 axes for RSEL/XSEL controller, respectively.

Depending on the program, interpolation is available to easily perform dispensing.



### 3 Controlling external equipment is possible

Multi-purpose I/O signals are available for the controller which makes communication with peripheral equipment possible. Therefore, receiving signals from sensors and such through the controller or outputting signals from the controller to lamps or moving equipment, etc. to operate them is possible.



### 4 No homing needed for absolute type

Homing is not needed for the following combinations of the actuator and controller.

RSEL

\* Battery-less absolute type actuator + controller (battery-less absolute specification).

\* Incremental type actuator + simple absolute unit + controller.

SSEL/XSEL

\* Battery-less absolute type actuator + controller (battery-less absolute).

\* Absolute type actuator + controller (absolute spec)

MSEL

\* Incremental type actuator + battery box + controller (simple absolute spec)

\* Battery-less absolute type actuator + controller (battery-less absolute spec)

## RSEL Controller

- Highly functional controller that enables simultaneous operations up to 8 axes.
- Different types of drivers can be combined thanks to the unit-linkage system.
- Driver unit can be shared with RCON.
- Supports control of cartesian type 6-axis robots.
- Possible to register positioning points up to 36000.
- Supports battery-less absolute encoder, simple abso unit, incremental encoder and quasi-abso encoder.



See  
P7-27/  
P7-61

## SSEL Controller

- Program controller with reasonable price and compact body.
- Interpolation of up to 2 axes is possible which is applicable for dispensing jobs.
- By selecting the positioner mode, it can be used in the same manner as the position controller.
- Communication via PC USB port and direct USB cable is possible with integrated USB port.
- Possible to register positioning points up to 20000.
- Absolute type available for ASEL/SSEL controllers can be set up as a battery-less type which requires no battery, or as an absolute type that uses a battery.
- Controller power supply is single-phase AC230V for SSEL.



See  
P7-243

## MSEL Controller

- Actuator with built-in pulse motor can control up to 4 axes.
- Actuator with built-in battery-less absolute is compatible with RCP6, RCP5, RCP4 and IXP series.
- Positioning points is up to 30000 points.
- I/O (input/output) signals can be expanded up to 32 points.



See  
P7-257

## XSEL Controller

- High-function controller with up to 8 axes that can be simultaneously controlled.
- Precise dispensing jobs are possible through high velocity uniformity and tracking accuracy.
- Absolute type available for selection.
- 55000 points can be stored for positioning.
- Expansion I/O is available up to a maximum of 384 points.



See  
P7-271

## Network Compatibility

Compatible with the majority of main field networks widely used over the world.  
It is also highly compatible with FA devices such as PLCs and touch panels.

### 1 Compatible with main field networks

Direct connection is possible with main field networks such as DeviceNet or CC-Link, etc.

A position controller is available for an operation defined by movement specified with position number and direct coordinate value using the network.

(When defining coordinate values directly, there is no restriction for the number of positioning points.)



### Compatible network and functions

| Controller series                 |   | Ellipsis | Position controller |             |             |              |   |             |            |        |       | Program controller |        |       |        |              |                |       |
|-----------------------------------|---|----------|---------------------|-------------|-------------|--------------|---|-------------|------------|--------|-------|--------------------|--------|-------|--------|--------------|----------------|-------|
|                                   |   |          | PCON<br>-CB         | ACON<br>-CB | SCON<br>-CB | SCON<br>-CAL | SCON-CB<br>(servo press<br>specification) | DCON<br>-CB | MCON<br>-C | MSCON  | RCON  | SSEL               | TTA    | RSEL  | MSEL   | XSEL<br>-P/Q | XSEL<br>-RA/SA |       |
| Field network type                | DeviceNet   | DV       | ●                   | ●           | ●           | ●            | ●   | ●           | ●          | ●      | ●     | ●                  | ●      | ●     | ●      | ●            | ●              |       |
|                                   | CompoNet  | CN       | ●                   | ●           | ●           | ●            | ●   | ●           | ●          | ●      | —     | —                  | —      | —     | —      | —            | —              |       |
|                                   | EtherCAT  | EC       | ●                   | ●           | ●           | ●            | ●   | ●           | ●          | ●      | ●     | —                  | ●      | ●     | ●      | —            | ●              |       |
|                                   | EtherCAT Motion                                       | ECM      | —                   | —           | ●           | —            | —   | —           | ●          | —      | ●     | —                  | —      | —     | —      | —            | —              |       |
|                                   | EtherNet/IP   | EP       | ●                   | ●           | ●           | ●            | ●   | ●           | ●          | ●      | ●     | ●                  | ●      | ●     | ●      | ●            | ●              |       |
|                                   | CC-Link   | CC       | ●                   | ●           | ●           | ●            | ●   | ●           | ●          | ●      | ●     | ●                  | ●      | ●     | ●      | ●            | ●              |       |
|                                   | CC-Link IE<br>Field CIE                               | CIE      | ●                   | ●           | ●           | —            | ●   | ●           | ●          | —      | ●     | —                  | —      | ●     | —      | —            | —              |       |
|                                   | —   | —        | —                   | —           | —           | —            | —   | —           | —          | —      | —     | —                  | —      | —     | —      | —            | —              |       |
|                                   | —   | —        | —                   | —           | —           | —            | —   | —           | —          | —      | —     | —                  | —      | —     | —      | —            | —              |       |
|                                   | —   | —        | —                   | —           | —           | —            | —   | —           | —          | —      | —     | —                  | —      | —     | —      | —            | —              |       |
|                                   | PROFIBUS-<br>DP                                       | PR       | ●                   | ●           | ●           | ●            | ●   | ●           | ●          | ●      | ●     | ●                  | ●      | ●     | ●      | ●            | ●              |       |
|                                   | PROFINET IO   | PRT      | ●                   | ●           | ●           | ●            | ●   | ●           | ●          | ●      | ●     | —                  | —      | ●     | ●      | —            | —              |       |
| —                                 | —   | —        | —                   | —           | —           | —            | —   | —           | —          | —      | —     | —                  | —      | —     | —      | —            |                |       |
| Number of positioning points (*1) |   |          | 768                 |             |             |              |   |             | 256        |        |       | 128                | 20000  | 30000 | 36000  | 30000        | 20000          | 55000 |
| Operating<br>method               | Position No.<br>Movement by specifying positions      |          | ●                   | ●           | ●           | ●            | ●   | ●           | ●          | ●      | ●     | ●                  | ●      | ●     | ●      | ●            | ●              |       |
|                                   | Direct number<br>Movement by specifying direct values |          | ●                   | ●           | ●           | ●            | —   | ●           | ●          | ●      | ●     | —                  | —      | —     | —      | —            | —              |       |
| Reference page<br>for controllers |   |          | P7-137              | P7-163      | P7-187      | P7-217       | P7-203                                    | P7-163      | P7-117     | P7-231 | P7-25 | P7-243             | P7-615 | P7-27 | P7-257 | P7-271       | P7-289         |       |

(\*1) When it is operated by movement by specifying direct values, the number of positioning points is unlimited.  
(\*2) Able to cope with EtherNet (TCP/IP: message communication) when switching the parameters for EtherNet/IP.  
(\*3) It corresponds to Ethernet (TCP/IP: message communication) only for standard Ethernet.



## Network

### 3 Vision system

The XSEL controller can directly be connected to major vision systems to easily take in coordinate values and operate.

(1) Able to directly connect with major vision systems

It is possible to easily use sophisticated vision systems of specialized suppliers such as Omron, Cognex and Keyence.



| Manufacturer | Applicable model                                   | Communication method |
|--------------|--|----------------------|
| OMRON        | FH series  | RS232C               |
| COGNEX       | In-Sight5000 series<br>In-Sight EZ series          | Ethernet             |
| Keyence      | CV-5000 series<br>XG-7000 series<br>XG-8000 series | RS232C<br>Ethernet   |

\* Please contact us for connection with vision systems other than listed above.

(2) No communication programs needed

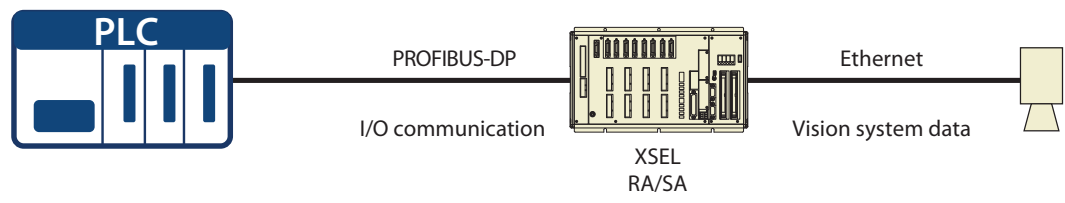
Coordinate values from the camera are stored as position data in the robot controller by dedicated instruction. Communication programs are not necessary.



(3) While communicating with a vision system via Ethernet, communication with another network is possible.

The XSEL-RA/SA type can communicate via DeviceNet, CC-Link or PROFIBUS-DP, while communicating via either EtherNet/IP or EtherCAT. It can be used for communication with a vision system via Ethernet, and with peripheral devices via PROFIBUS-DP using I/Os.

\* XSEL-P/Q type can select one of the networks shown above.



# Safety Category Compliant Types

<Compliance of controllers with the Safety category>

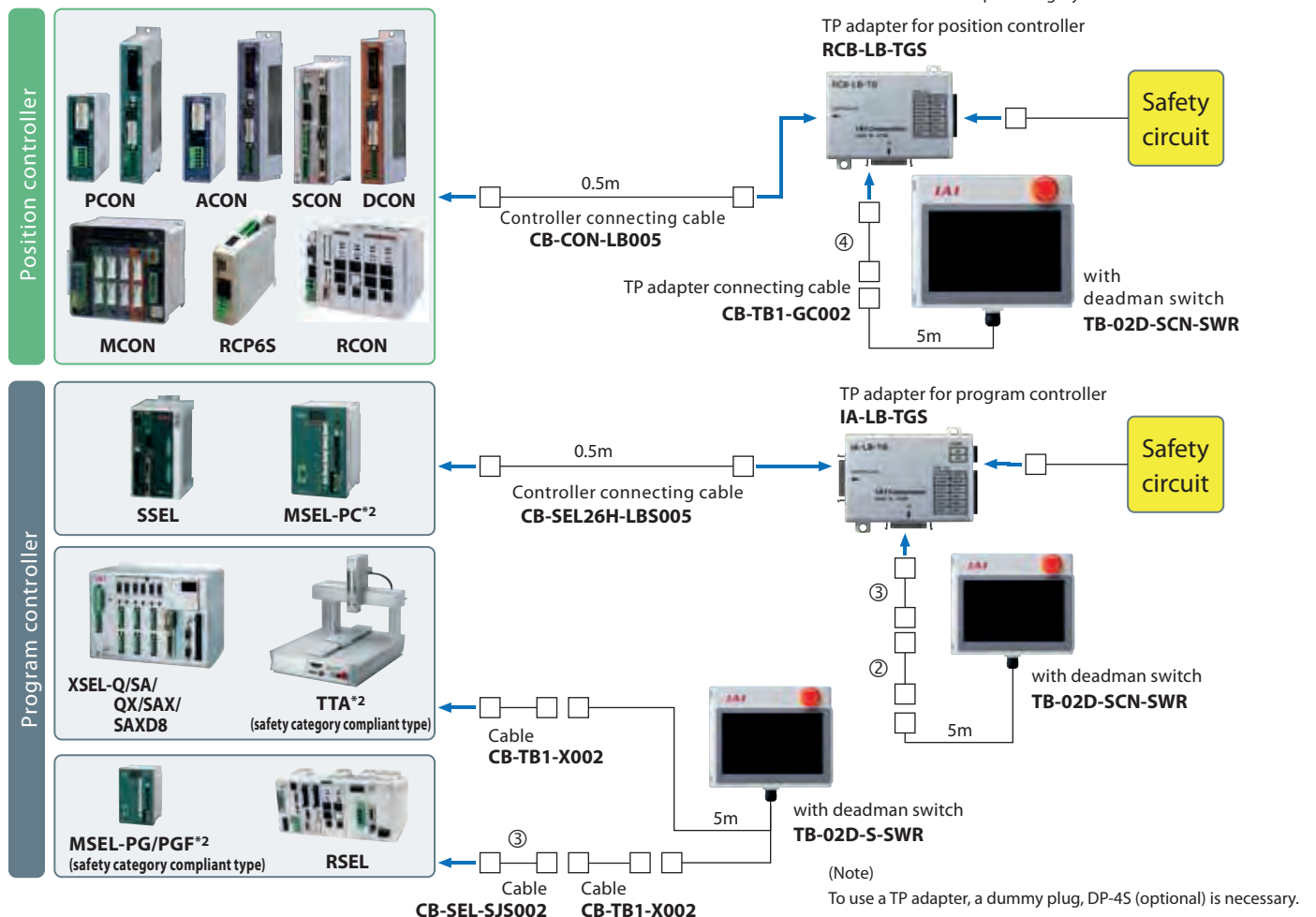
When building a system in compliance with the safety category (ISO 13849-1), use a touch panel teaching pendant (TB-02D) and a TP adapter (RCB-LB-TGS, IA-LB-TGS).

By changing the wiring of the system I/O connector, the safety category of up to B~4 (partially B~3) can be achieved.

| Controller type             | Safety category | ISO standard |
|-----------------------------|-----------------|--------------|
| RCP6S                       | B~4             | ISO13849-1   |
| RCON-GWG                    | B~4             |              |
| MCON-C/CG/LC/LCG            | B~4             |              |
| PCON-CB/CGB/CFB/CGFB        | B~4             |              |
| ACON-CB/CGB                 | B~4             |              |
| DCON-CB/CGB                 | B~4             |              |
| SCON-CB/CGB/CAL/CGAL/LC/LCG | B~4             |              |
| RSEL-G                      | B~4             |              |
| SSEL-CS                     | B~4             |              |
| MSEL-PC/PG/PGF              | B~3             |              |
| XSEL-Q/SA/QX/SAX/SAXD8      | B~4             |              |
| TTA                         | B~3             |              |

■ The following chart shows the safety category compliance. Compliant with Safety Category of up to B~4 \*1\*2.

\*1 Compliant with Category 4 when the dummy plug is attached.  
 \*2 MSEL and TTA are up to category 3.



# R-unit

Unit-linkage type controller



Positioner Type

## RCON



# R-unit



Program Type

## RSEL



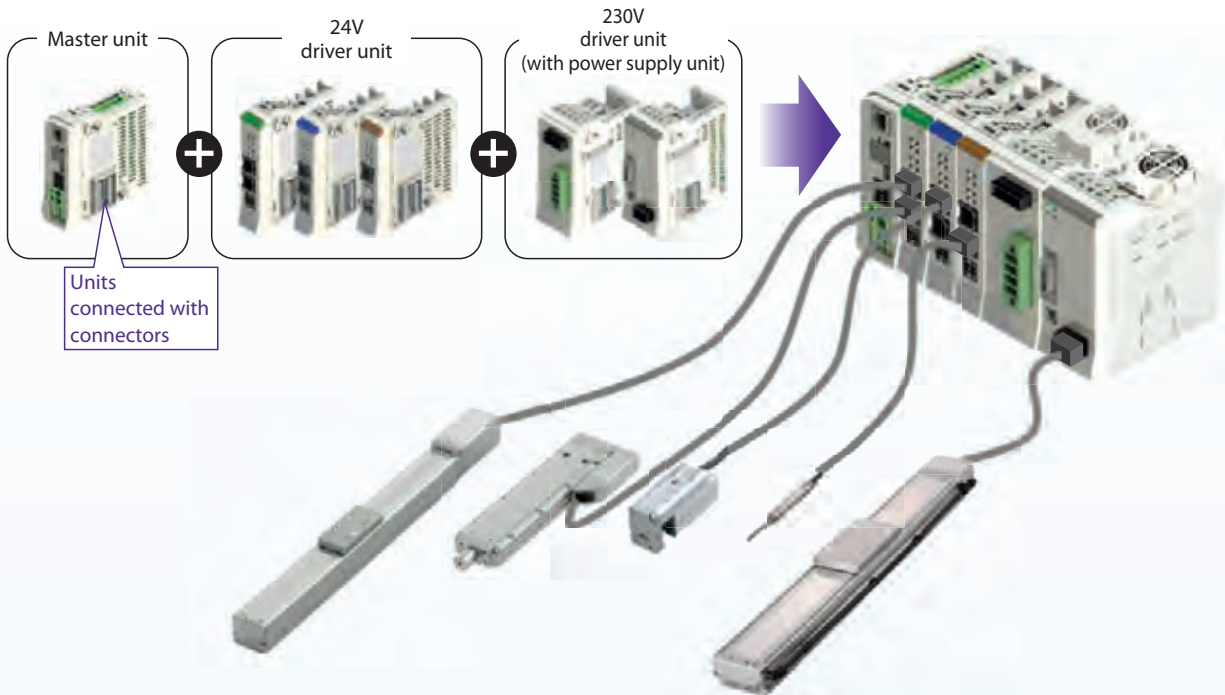
EleCylinder Drive Unit

## REC

## Unit-connecting controllers support a wide array of combinations!

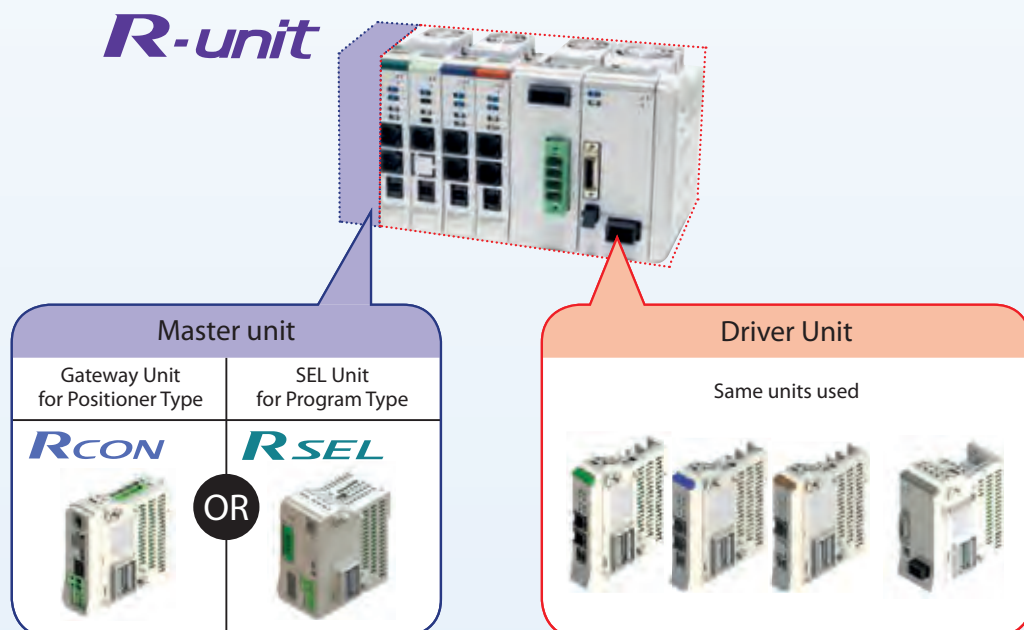
Combine a driver unit with the exact number of required axes for a more compact controller and reduced installation space.

This allows for mixed control of an actuator with both a 24V motor and 230V motor.



## Use the same driver units

The system can be changed just by switching out the master unit based on the control method. This allows the same driver units to be used.



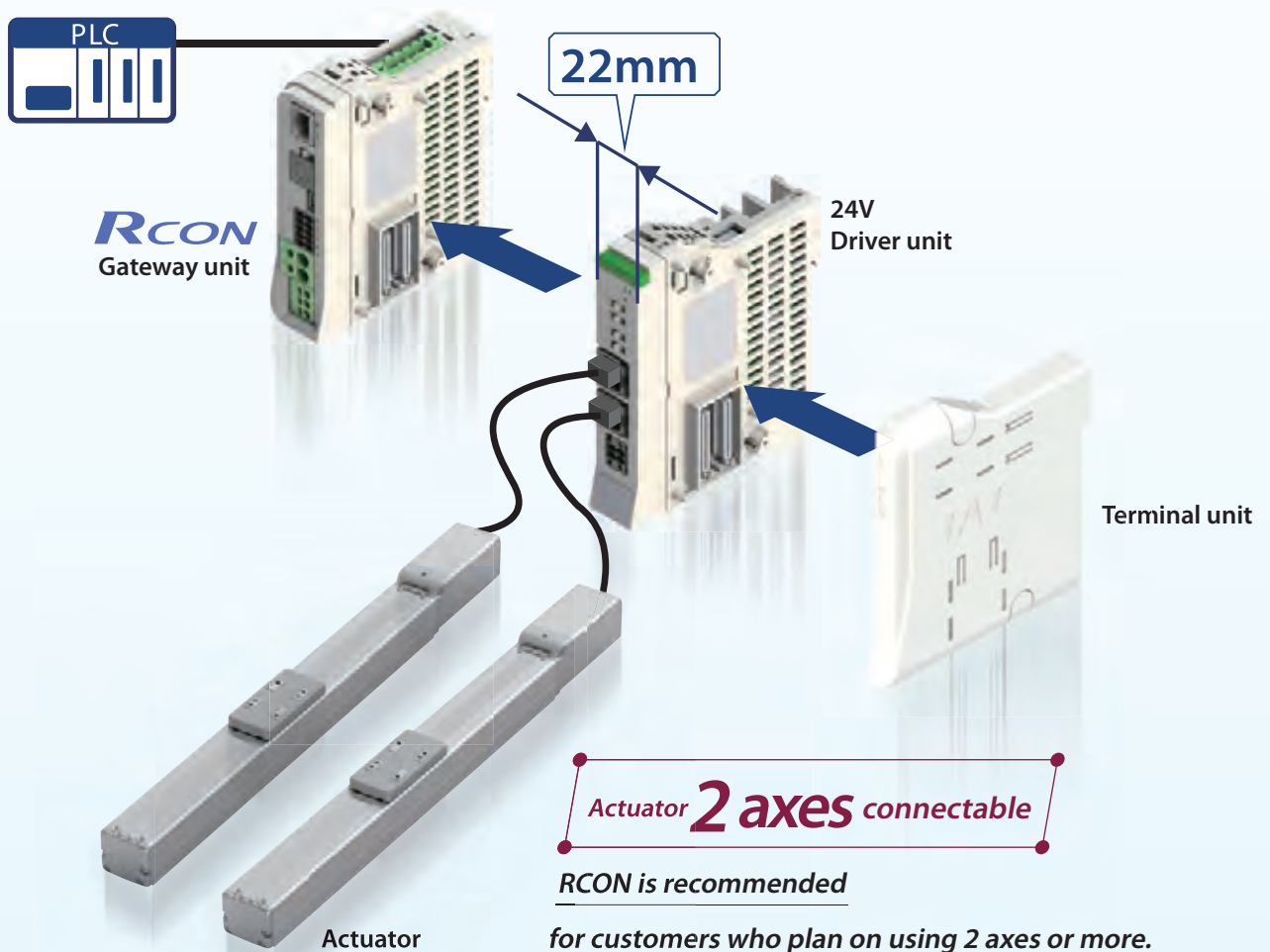
Saves space  
inside the control panel



## RCON

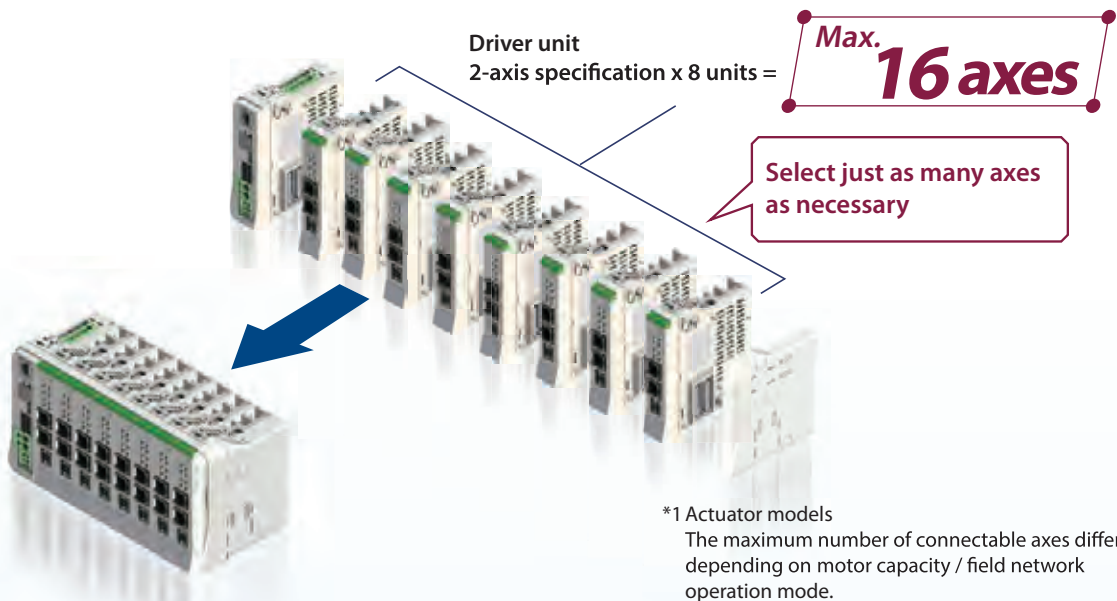
**RCON is recommended for actuators with two axes or more.**

Up to 2 axes of actuators can be connected to one driver unit with 22mm width, making it ideal for saving space in the control panel.



Up to 16 axes\*1 of actuators can be connected.

There will be no wasted space as only the necessary driver units will be added.



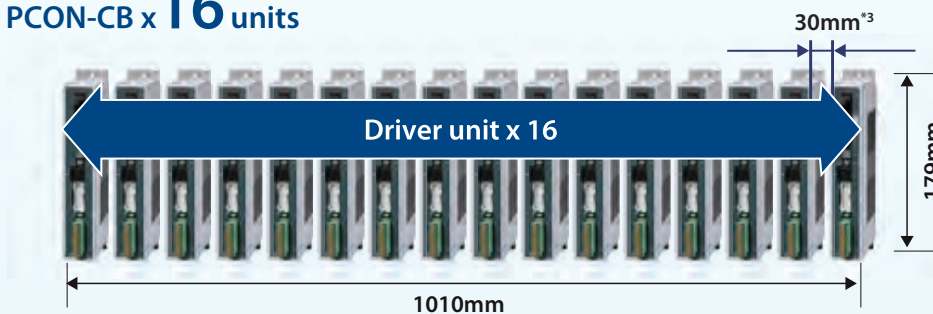
Saves up to 85%\*2 of control panel space and reduces costs by as much as 60%.

\*2 IAI product comparison

Up to about 85% of control panel space can be saved, compared with models that connect a 1-axis actuator to a single driver unit.

The conventional type (Comparison example below) requires network options installed to match the number of controllers. RCON can control driver units for up to 16 axes of actuators with a single gateway, allowing cost reductions up to 60%. It is especially recommended when using multiple axes.

PCON-CB x 16 units



PCON-CB  
PROFINET IO specification x 16 units

\*3 Minimum distance required for natural heat dissipation of the controller

**60% cost reduction**

RCON x 16-axis connection specification

**85% Space saving**

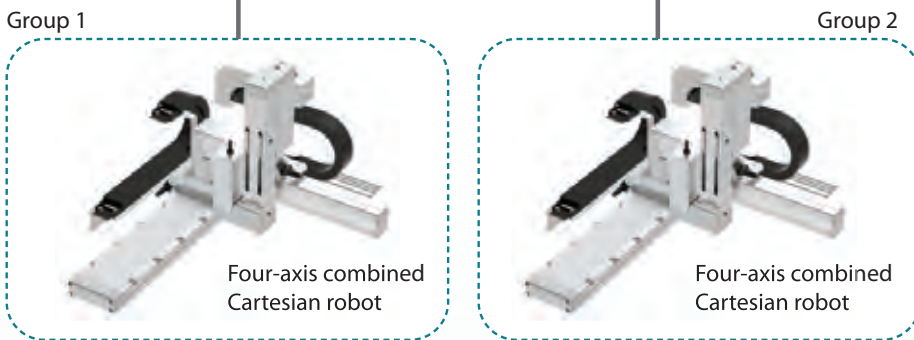
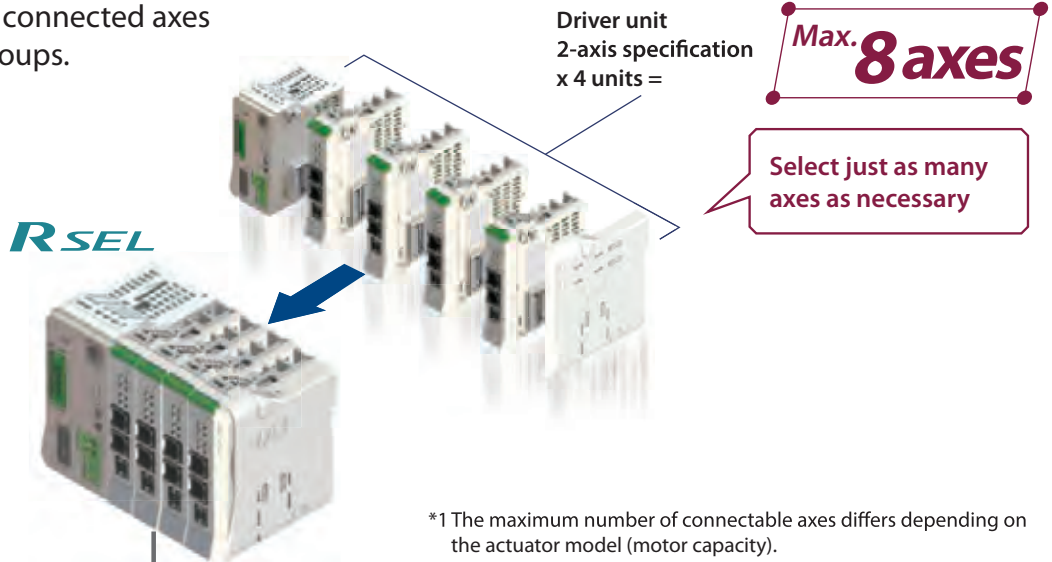


**RCON**  
PROFINET IO specification  
pulse motor 16 axes

# RSEL

Compact program controller that connects up to 8 axes\*1 of actuators

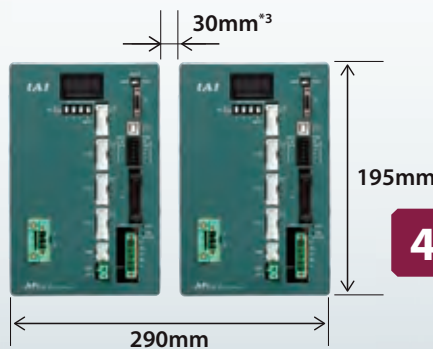
Supports both linear and arc interpolation operations.  
Also allows control of connected axes to be split into two groups.



Max. 67%\*2 space savings inside the control panel \*2 IAI product comparison

Up to about 67% of control panel space can be saved, compared with models that connect a 4-axis actuator to a single driver unit.

MSEL x 2 units (8-axis connection)



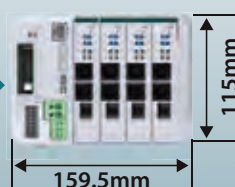
MSEL PROFINET IO specification  
8 axes (4 axes x 2 units)

**43% cost reduction**

\*3 Minimum distance required for natural heat dissipation of the controller

RSEL x 8-axis connection specification

67%  
Space saving

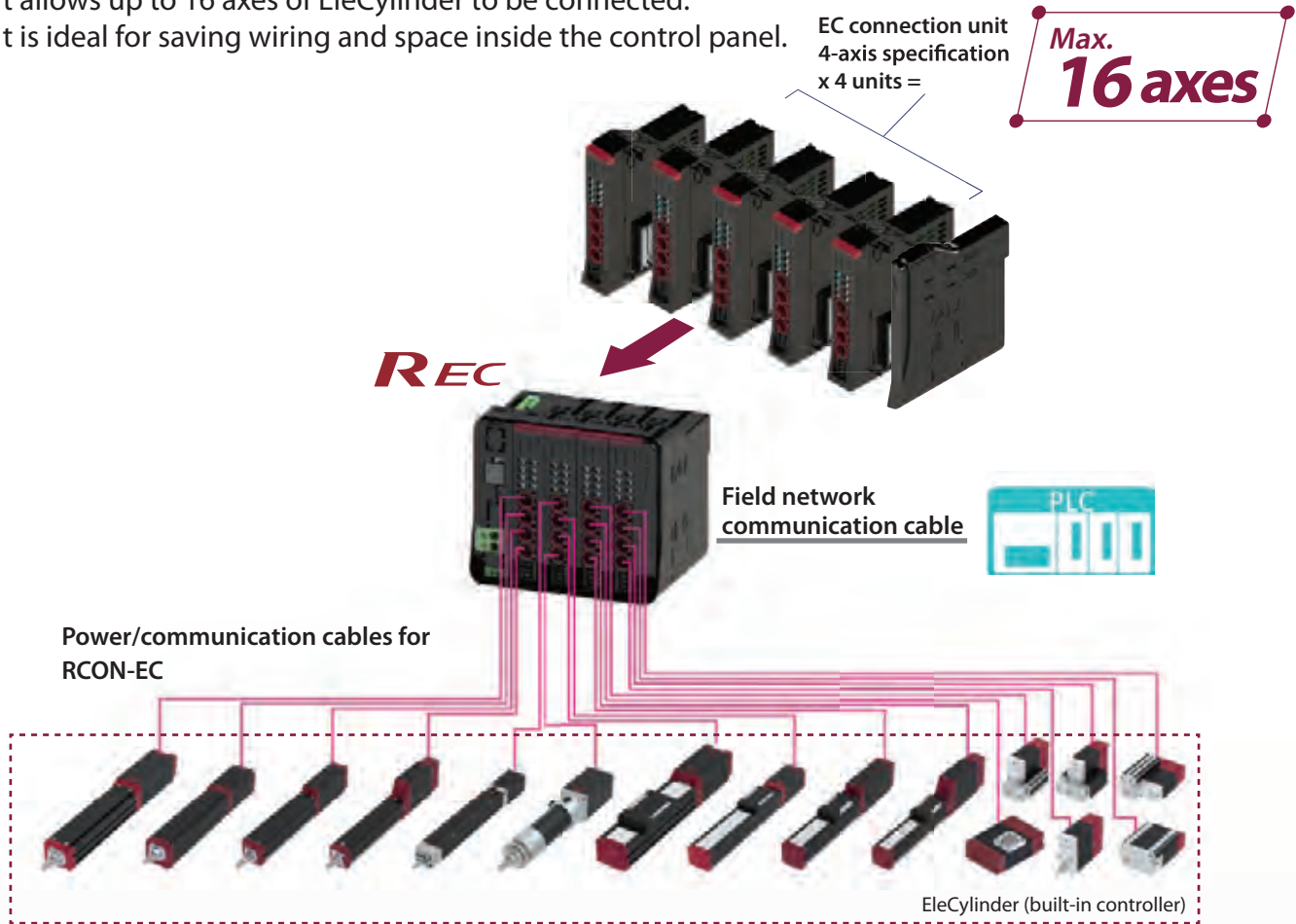


RSEL PROFINET IO specification  
pulse motor 8 axes

# REC

## Connect EleCylinder to a field network

This field network connection unit is specifically for use with EleCylinder. It allows up to 16 axes of EleCylinder to be connected. It is ideal for saving wiring and space inside the control panel.



## EC connection unit can be connected with other driver units connected to RCON

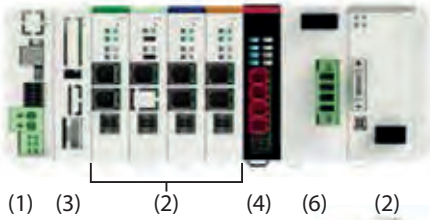
Connect to RCON to allow mixed connections with RoboCylinder and single axis robots.





## Model Specification Items

### RCON



(1) (3) (2) (4) (6) (2)

### RSEL



(1) (3) (2) (6) (2)

### REC



(1) (4)



(5)



(5)

## (1) Master unit

**RCON** - [ ] - [ ] - [ ]

Series                      Type                      I/O type                      Options

|     |                           |
|-----|---------------------------|
| GW  | Standard type             |
| GWG | Safety category spec type |

|     |   |
|-----|---|
| CC  | CC-Link connection specification          |
| CIE | CC-Link IE Field connection specification |
| DV  | DeviceNet connection specification        |
| EC  | EtherCAT connection specification         |
| ECM | EtherCAT Motion connection specification  |
| EP  | EtherNet/IP connection specification      |
| PR  | PROFIBUS-DP connection specification      |

|     |   |
|-----|---|
| ET  | Ethernet-equipped   |
| FU□ | Fan unit mounting (□: Specify the number of units, 1 ~ 8) |
| TRN | Without terminal unit                                     |

\* For fan units, this is the number connected to the 24V driver unit.  
 · A terminal unit is required during operation.  
 However, when connecting/ordering an RCON-SC, connect the terminal unit supplied with the 230V power supply unit.

|     |                                      |
|-----|--------------------------------------|
| PRT | PROFINET IO connection specification |
|-----|--------------------------------------|

**RSEL** - **G** - [ ] - [ ] - [ ]

Series                      Type                      I/O type                      I/O Cable Length                      Options

|     |  |
|-----|--|
| E   | Not used   |
| NP  | PIO specification (NPN16/16)                                       |
| PN  | PIO specification (PNP16/16)                                       |
| CC  | CC-Link connection specification                                   |
| CC2 | CC-Link connection specification (bifurcated connector supplied)   |
| CIE | CC-Link IE Field connection specification                          |
| DV  | DeviceNet connection specification                                 |
| DV2 | DeviceNet connection specification (bifurcated connector supplied) |
| EC  | EtherCAT connection specification                                  |
| EP  | EtherNet/IP connection specification                               |
| PR  | PROFIBUS-DP connection specification                               |
| PRT | PROFINET IO connection specification                               |

|   |               |
|---|---------------|
| 0 | Without cable |
| 2 | 2m (Standard) |
| 3 | 3m            |
| 5 | 5m            |

\*If a specification other than PIO was selected for the I/O type, this will be "0 (without cable)".

|     |   |
|-----|---|
| FU□ | Fan unit mounting (□: Specify the number of units, 1 ~ 5) |
| TRN | Without terminal unit                                     |

\* For fan units, this is the number connected to the master unit and 24V driver unit.  
 · A terminal unit is required during operation.  
 However, when connecting/ordering an RCON-SC, connect the terminal unit supplied with the 230V power supply unit.

**REC** - **GW** - [ ] - [ ]

Series                      Type                      I/O type                      Options

|     |   |
|-----|---|
| CC  | CC-Link connection specification          |
| CIE | CC-Link IE Field connection specification |
| DV  | DeviceNet connection specification        |
| EC  | EtherCAT connection specification         |
| EP  | EtherNet/IP connection specification      |
| PR  | PROFIBUS-DP connection specification      |
| PRT | PROFINET IO connection specification      |

|     |                       |
|-----|-----------------------|
| TRN | Without terminal unit |
|-----|-----------------------|

\* A terminal unit is required during operation.

## (2) Driver unit

RCON - [ ] - [ ]  
 Series                      Type                      Number of Axes

|     |                         |
|-----|-------------------------|
| PC  | Pulse motor             |
| PCF | High thrust pulse motor |
| AC  | AC servo motor          |
| DC  | DC brush-less motor     |
| SC  | 230V AC servo motor     |

|   |                      |
|---|----------------------|
| 1 | 1-axis specification |
| 2 | 2-axis specification |

\*Type: Only 1-axis can be selected for PCF

### 24V specification

|  |      |                                   |
|--|------|-----------------------------------|
| Type: PC<br>1.2A motor<br>1 axis<br>2 axes | 20P  | 20□ pulse motor                   |
|  | 20SP | 20□ pulse motor (For RA2AC/RA2BC) |
|  | 28P  | 28□ pulse motor                   |
|  | 35P  | 35□ pulse motor                   |
|  | 42P  | 42□ pulse motor                   |
|  | 42SP | 42□ pulse motor (For RCP4-RA5C)   |
| Type: PCF<br>4A motor<br>1 axis            | 56P  | 56□ pulse motor                   |
|  | 56SP | 56□ high thrust pulse motor       |
| Type: PCF<br>4A motor<br>1 axis            | 60P  | 60□ high thrust pulse motor       |
|  | 86P  | 86□ high thrust pulse motor       |

|   |     |  |
|---|-----|--|
| Type: AC<br>2-30W motor<br>1 axis<br>2 axes | 2   | 2W servo motor                         |
|   | 5   | 5W servo motor                         |
|   | 10  | 10W servo motor                        |
|   | 20  | 20W servo motor                        |
|   | 20S | 20W servo motor (For RCA2-5A4/RCA-RA3) |
|   | 30  | 30W servo motor                        |

|  |    |                          |
|--|----|--------------------------|
| Type: DC<br>3D motor<br>1 axis<br>2 axes | 3D | 2.5W DC brush-less motor |
|--|----|--------------------------|

### 230V specification

|                                     |      |                           |
|-------------------------------------|------|---------------------------|
| Type: SC<br>60-750W motor<br>1 axis | 60   | 60W servo motor           |
|                                     | 100  | 100W servo motor          |
|                                     | 150  | 150W servo motor          |
|                                     | 200  | 200W servo motor          |
|                                     | 200S | 200W servo motor (for DD) |
|                                     | 400  | 400W servo motor          |
|                                     | 600  | 600W servo motor          |
|                                     | 750  | 750W servo motor          |

## (3) Expansion unit

RCON - [ ] - [ ]  
 Series                      Expansion                      I/O Cable Length

|        |  |
|--------|--|
| EXT    | SCON expansion                             |
| EXT-NP | PIO/SIO/SCON expansion (NPN specification) |
| EXT-PN | PIO/SIO/SCON expansion (PNP specification) |
| NP     | PIO (NPN specification)                    |
| PN     | PIO (PNP specification)                    |

|   |               |
|---|---------------|
| 0 | No cable      |
| 2 | 2m (Standard) |
| 3 | 3m            |
| 5 | 5m            |

\*No I/O cable length selection required if SCON expansion (EXT) is selected.

## (4) EC connection unit

RCON - EC - 4  
 Series                      Type                      Number of Axes

\* EC without ACR option cannot be connected to RCON-EC even though the cable for RCON-EC connection is used.

## (5) Simple absolute unit

RCON - ABU - [ ]  
 Series                      Absolute Unit                      Type

|   |                |
|---|----------------|
| P | Pulse motor    |
| A | AC servo motor |

## (6) 230V power supply unit

RCON - PS2 - 3 - [ ]  
 Series                      Type                      Power supply voltage                      Options

|   |                               |     |                       |
|---|-------------------------------|-----|-----------------------|
| 3 | Three-phase/single-phase 230V | TRN | Without terminal unit |
|---|-------------------------------|-----|-----------------------|

Only one RCON-PS2-3 can be used per RCON/RSEL.

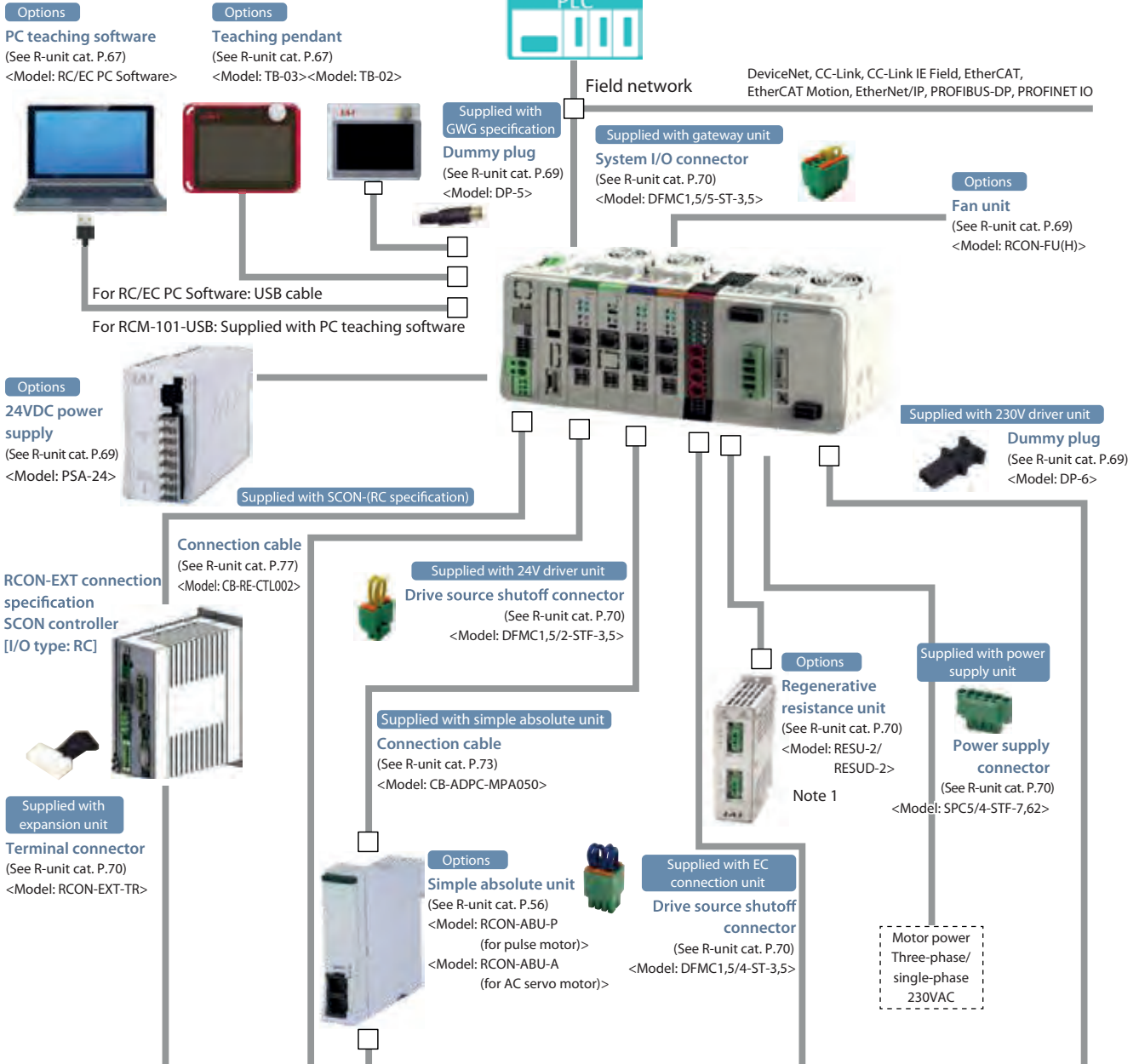
## (7) SCON controller (RCON-EXT connection specification)

SCON - [ ] - [ ] - [ ] - [ ] - RC - 0 - [ ]  
 Type                      Motor type                      Encoder Type                      Options                      I/O type                      I/O Cable Length                      Power supply voltage

Contact IAI for model selection items

## System Configuration

# RCON



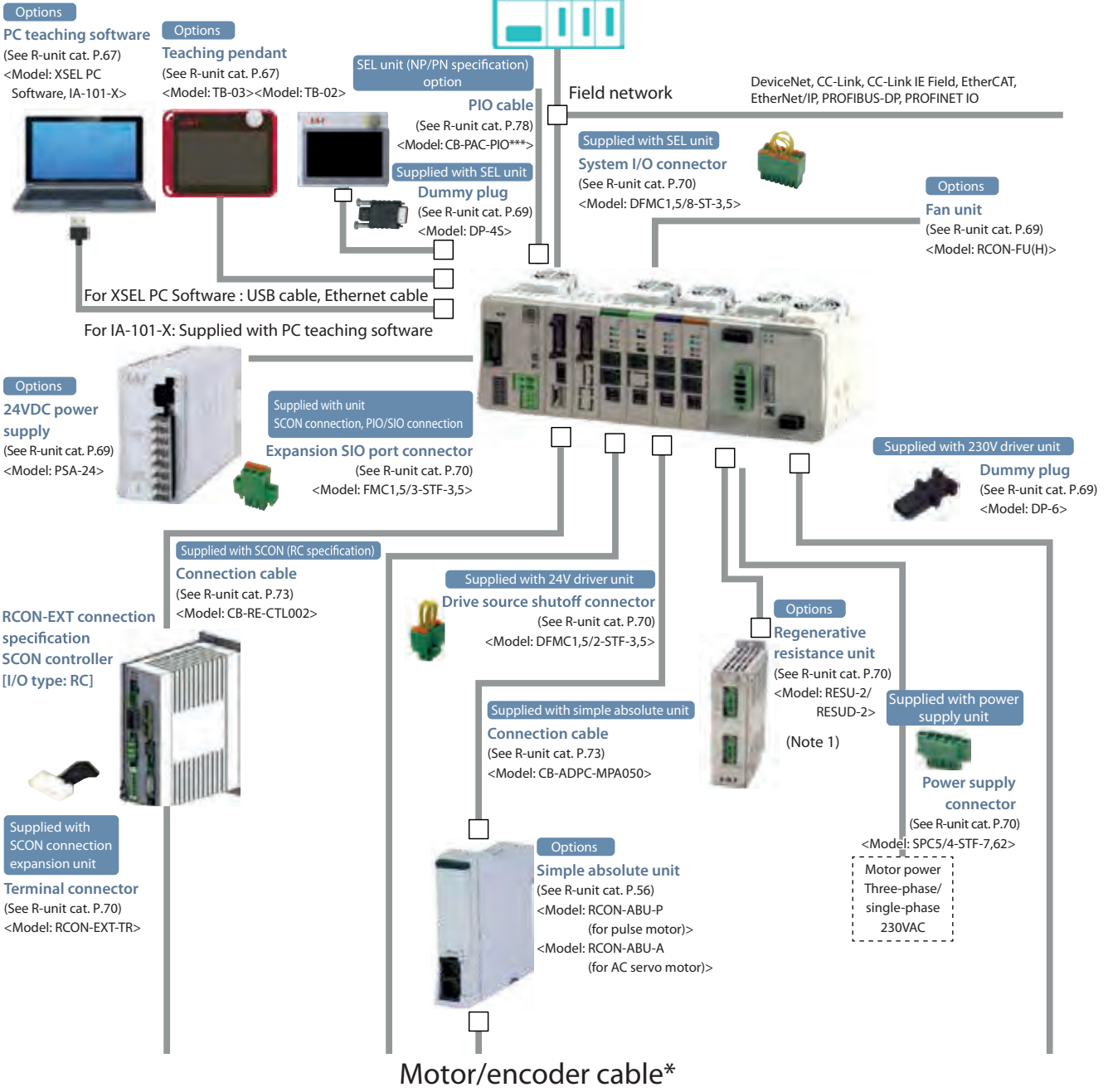
### Motor-encoder cables / power/communication cables (EC connection)\*



\* The motor/encoder cable is supplied with the actuator.  
 The motor/encoder cables are different according to the actuator type to be connected.  
 Prepare power/communication cables separately for the number of connected axes.  
 See R-unit cat. P.71 for information on ordering single cables.

Note 1: A 60W regenerative resistor is built-in both RCON-SC and RCON-PS2.  
 There is generally no need for regenerative resistance. However, if there is insufficient regenerative resistance, use the external "regenerative resistance unit".

## System Configuration



Connectable actuators

**Connection with "expansion unit"**

RCS2/3/4 Series  
IS(D)B Series  
SSPA Series  
DD(A) Series

\*See R-unit cat. P.42 for actuators that cannot be connected.

**Connection with "24V driver unit"**

RCP2/3/4/5/6 Series  
WU Series

RCA/2 Series

RCD Series

**Connection with "230V driver unit"**

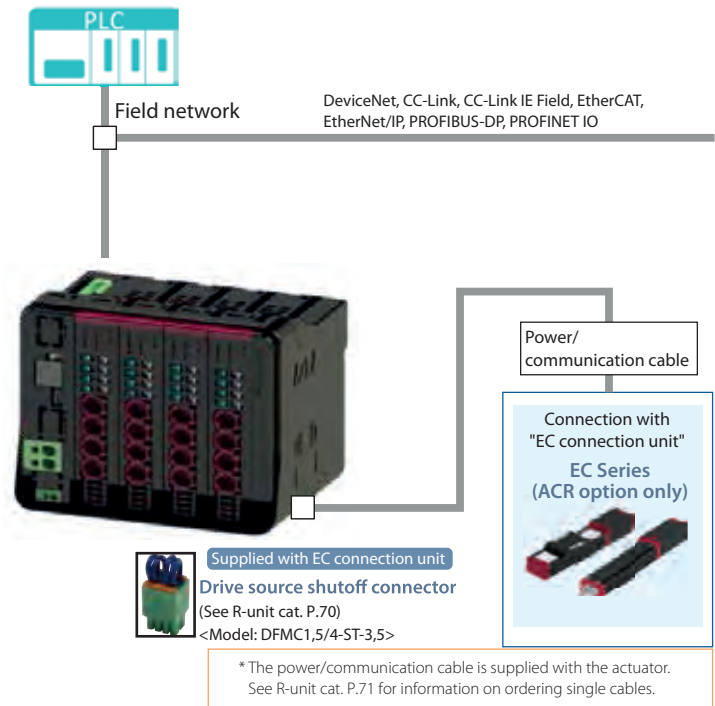
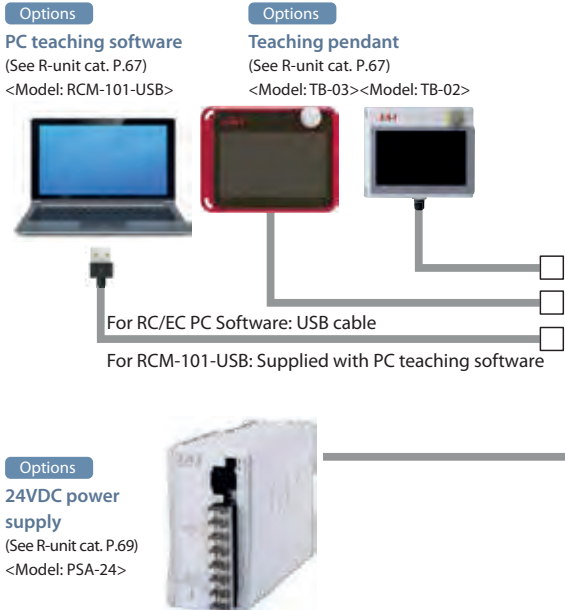
(60W~750W equipped actuator)  
RCS2/3/4 Series  
IS(D)B Series  
SSPA Series  
DD(A) Series

\*See R-unit cat. P.42 for actuators that cannot be connected.

\* The motor/encoder cable is supplied with the actuator. The motor/encoder cables are different according to the actuator type to be connected. See R-unit cat. P.71 for information on ordering single cables.

Note 1: A 60W regenerative resistor is built-in both RCON-SC and RCON-PS2. There is generally no need for regenerative resistance. However, if there is insufficient regenerative resistance, use the external "regenerative resistance unit".

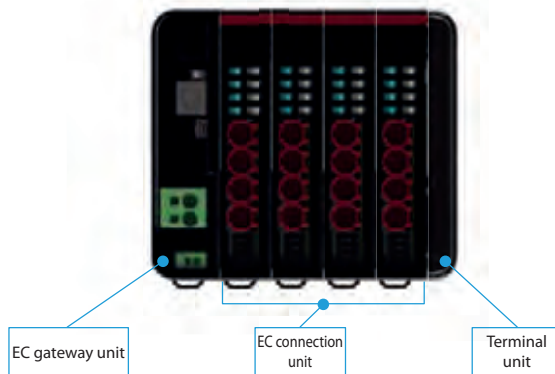
## System Configuration



## Unit Configuration

The REC has a unit-connecting configuration. Every unit has the same connector and locking configuration. However, there are restrictions on unit arrangement. Connect each unit with these restrictions in mind. Connect each prepared unit in order starting from the left, with the EC gateway unit serving as the standard unit when looking at the front surface.

\* The system will not operate normally if units are not connected in the following order.



| Unit name          | Number of connected units | Additional information  |
|--------------------|---------------------------|---|
| EC gateway unit    | 1                         | Placed at far left  |
| EC connection unit | (Max.) 4                  | Can be rearranged within the unit area (max. number of connectable axes is 16 axes) |
| Terminal unit      | 1                         | Placed at far right   |

| Product name                    |   | Model       | Reference page  |
|---------------------------------|---|-------------|-----------------|
| Master unit/<br>EC gateway unit | CC-Link connection specification          | REC-GW-CC   | R-unit cat. P46 |
|                                 | CC-Link IE Field connection specification | REC-GW-CIE  | R-unit cat. P47 |
|                                 | DeviceNet connection specification        | REC-GW-DV   | R-unit cat. P45 |
|                                 | EtherCAT connection specification         | REC-GW-EC   | R-unit cat. P49 |
|                                 | EtherNet/IP connection specification      | REC-GW-EP   | R-unit cat. P50 |
|                                 | PROFIBUS-DP connection specification      | REC-GW-PR   | R-unit cat. P48 |
|                                 | PROFINET IO connection specification      | REC-GW-PRT  | R-unit cat. P51 |
| EC connection unit              | EC connection unit 4-axis specification   | RCON-EC-4   | R-unit cat. P56 |
| Terminal unit                   | For REC                                   | RCON-GW-TRE | R-unit cat. P57 |

# RCP6S with Built-in Controller

Built-in controller for RCS6S



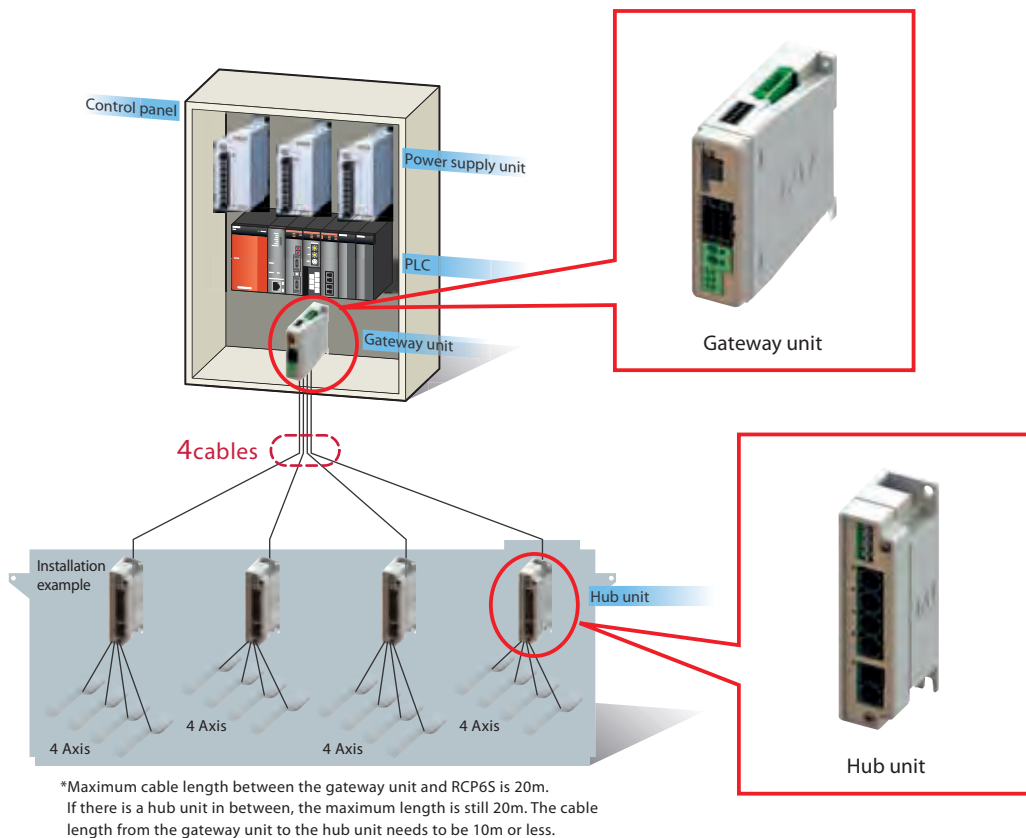
## Features

By using the gateway unit, a maximum of 16 axes\* of RCP6S (relayed through a hub unit) can be operated via a field network with less wiring.

Hub unit allows us to keep the cable connected to the actuator of each axis short, and motor power supply and control signal lines can be connected as one cable between the hub unit and the RCP6S.

\* The number of connectable axes will vary depending on the type of field network and its mode. Please refer to P7-105 for details.

### Control Panel for the RCP6S Built-in Controller Actuator



### RCP 6S peripheral equipment

Gateway unit is required in order to operate RCP6S.

- Gateway unit: This unit is used in order to connect RCP6S to the field network. -> See P7-105
- Hub unit: This unit can expand the number of axes connected to the gateway unit. -> See P7-109
- PLC connection unit: This unit is used to connect RCP6S directly to the PLC using serial communication. -> See P7-110

## Gateway Unit (RCM-P6GW)

### Features:

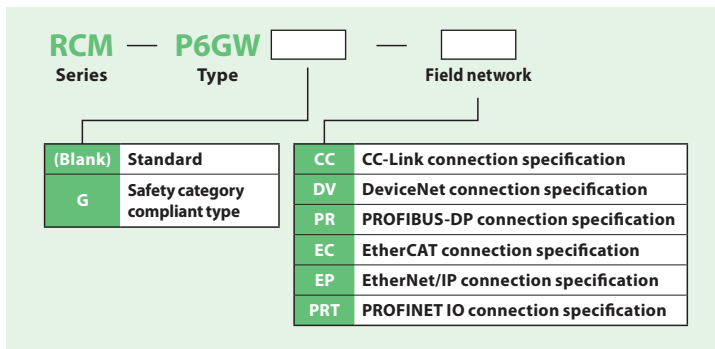
This unit is used in order to connect RCP6S to the field network.

Details:

- Compatible with many field networks. (Applicable networks: CC-Link, DeviceNet, PROFIBUS-DP, EtherCAT, EtherNet/IP, PROFINET-IO)
- Motor power and control power for all of the connected axes can be supplied through the gateway unit.
- Monitoring during AUTO is possible.
- A mini-USB connection comes standard.
- Each channel has MPO/MPI for drive source cutoff.
- Brake can be forcibly released by supplying power to the brake release input terminal for each channel. (In the case that the actuator is directly connected)
- When RCP6S is directly connected to the gateway unit, the communication time is 10msec. When RCP6S is connected to the gateway unit through the hub unit, the communication time is 40msec. The communication time does not become longer even if the connected axes increase.



### Model Configuration

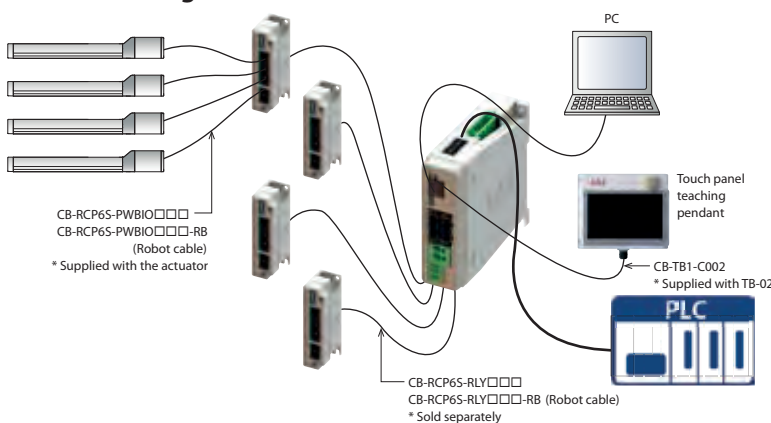


### Available Models

| Models                                    |
|---|
| CC-Link specification                     |
| DeviceNet specification                   |
| PROFIBUS-DP specification                 |
| EtherCAT specification                    |
| EtherNet/IP specification                 |
| PROFINET IO specification                 |
| Safety category CC-Link specification     |
| Safety category DeviceNet specification   |
| Safety category PROFIBUS-DP specification |
| Safety category EtherCAT specification    |
| Safety category EtherNet/IP specification |
| Safety category PROFINET IO specification |

\* Dummy plug DP-5 is supplied with the safety category specification.

### Connection Image



Up to 16 axes (\*1) of RCP6S can be connected per gateway unit with hub units. (\*2) Because both the motor power and control power for all the axes connected to the gateway unit can be supplied together, the required wiring for RCP6S can be connected as one cable between the hub and RCP6S. Also RCP6S can be directly connected to the gateway unit.

(\*1) The number of connectable axes varies depending on the type of the field network. Please see "Number of connectable axes" table for details.

(\*2) Hub unit: See P7-109.

### The Number of Connectable Axes:

Maximum connectable axes are as shown below

|             | Direct value mode | Simple direct value mode | Positioner 1 | Positioner 2 | Positioner 3 | Positioner 5 |
|-------------|-------------------|--------------------------|--------------|--------------|--------------|--------------|
| CC-Link     | 16                | 16                       | 16           | 16           | 16           | 16           |
| DeviceNet   | 8                 | 16                       | 16           | 16           | 16           | 16           |
| PROFIBUS-DP | 8                 | 16                       | 16           | 16           | 16           | 16           |
| EtherCAT    | 8                 | 16                       | 16           | 16           | 16           | 16           |
| EtherNet/IP | 8                 | 16                       | 16           | 16           | 16           | 16           |
| PROFINET IO | 8                 | 16                       | 16           | 16           | 16           | 16           |

### Hub Unit (RCM-P6HUB)

The hub unit cannot be used alone.  
It must be used with a gateway unit.

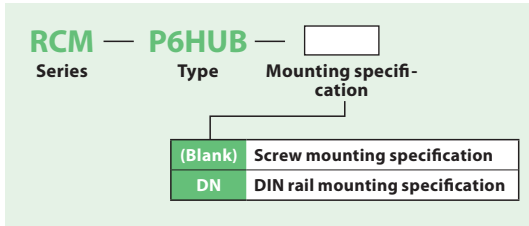


#### Features:

The connection between gateway unit - hub unit and hub unit - RCP6S can be established using serial communication. By using a gateway unit with hub units, up to 16 axes can be controlled.

\* The number of connectable axes will vary depending on the type of field networks and its mode.  
Please refer to P7-105 for details and confirm the "Number of connectable axes".

#### Model Configuration

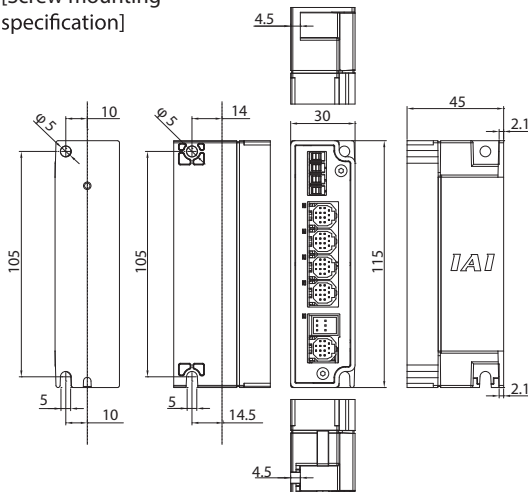


#### Specification

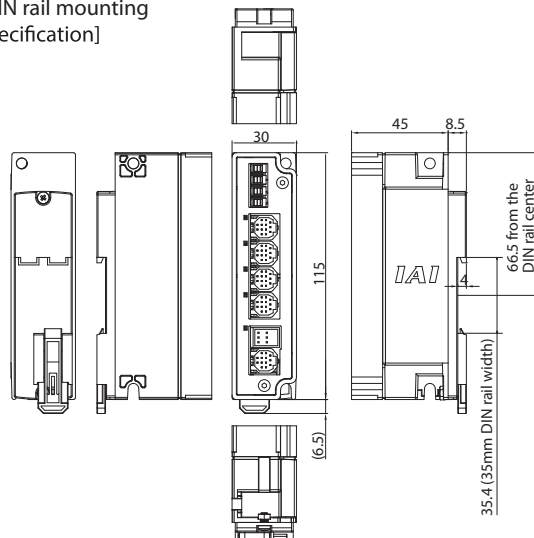
| Specification                                    | Description                                  |
|--|--|
| Number of controlled axes                        | 4 axes max.                                  |
| Power supply voltage                             | 24VDC±10%                                    |
| Control power capacity                           | 0.3A (single hub unit)                       |
| Motor power capacity                             | 12.8A max. from connected axes               |
| Emergency stop input                             | None   |
| Enable input                                     | None   |
| LED display                                      | SYS LED × 1 (RUN/ALM) AXIS LED × 4 (RUN/ALM) |
| Electromagnetic braking forced release mechanism | External brake release switch × 4            |
| Electric shock protection mechanism              | Class 1, basic insulation                    |
| Insulation withstanding voltage                  | 500VDC 10MΩ                                  |
| Contamination                                    | Contamination 2                              |
| Weight   | 80g  |
| External dimensions                              | 35W × 115H × 45D                             |
| Overseas Accreditations                          | CE, cUL (Both Acquired)                      |

#### External Dimensions

[Screw mounting specification]



[DIN rail mounting specification]



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### PLC Connection Unit (RCB-P6PLC)

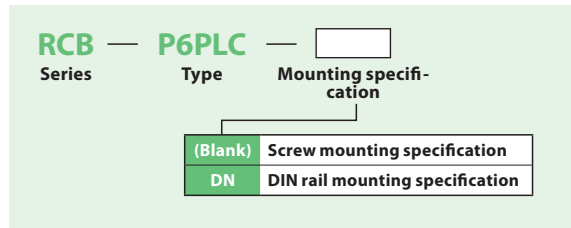
#### Features:

This is a terminal block used to connect the RCP6S and the PLC using serial communication.

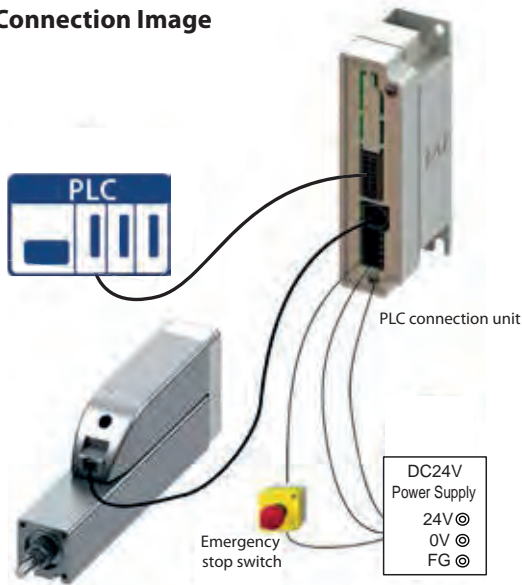
The RCP6S and the PLC connection unit can be easily connected with a cable.

\* It cannot be connected to the gateway unit, hub unit or RCP6S gateway controller.

#### Model Configuration



#### Connection Image

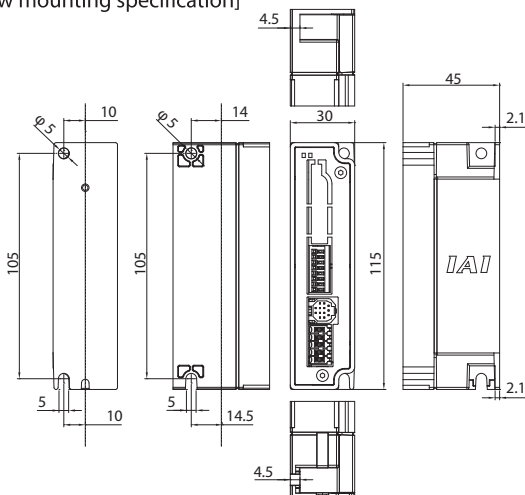


#### Specification

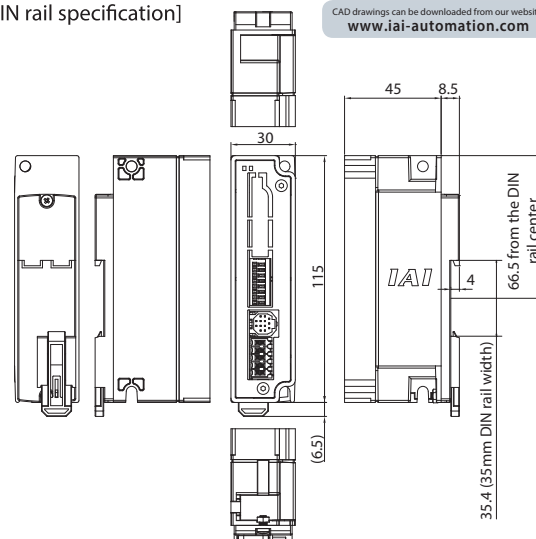
| Specification                                    | Description  |
|--|--|
| Number of controlled axes                        | 1-axis   |
| Power supply voltage                             | 24VDC ± 10%  |
| Control power capacity                           | 0A for single PLC connection unit<br>0.3A for connected PLC units + RCP6S built-in driver<br>• For brake types, 0.7A for 0.2 sec is required for releasing brake |
| Motor power capacity                             | Depending on RCP6S built-in driver   |
| Emergency stop input                             | B contact input  |
| Enable input                                     | None   |
| LED display                                      | None   |
| Electromagnetic braking forced release mechanism | External brake release signal input (24VDC)  |
| Electric shock protection mechanism              | Class 1, basic insulation  |
| Insulation withstanding voltage                  | 500VDC 10MΩ  |
| Contamination                                    | Contamination 2  |
| Weight   | 65g  |
| External dimensions                              | 35W × 115H × 45D   |
| Overseas Accreditations                          | CE, cUL (Both Acquired)  |

#### External Dimensions

[Screw mounting specification]



[DIN rail specification]



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# MCON-C/CG

Multi-axis CON Series  
Position Controller

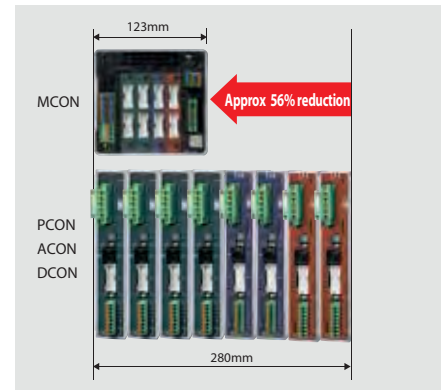


## Features

### Common to MCON-C / CG, MCON-LC / LCG

## 1 Saves space and reduces cost

It saves space in the control panel and significantly reduces the total cost by combining 8 controllers into one.

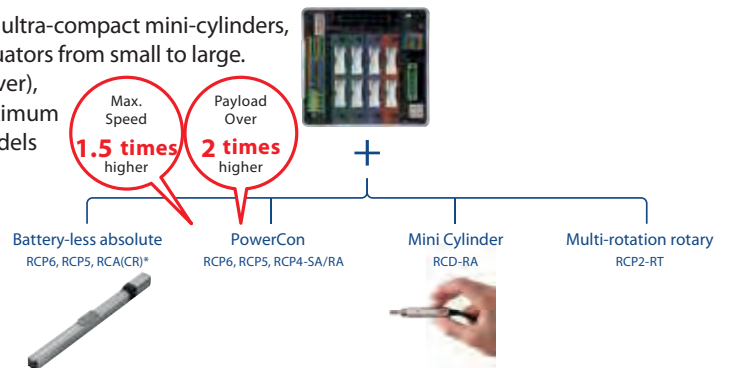


## 2 Accommodates a wide range of actuators

It corresponds to actuators with battery-less absolute encoders, ultra-compact mini-cylinders, multi-rotation rotaries and the like, expanding the operable actuators from small to large. In addition, it is equipped with the PowerCon (high-output driver), and achieves the maximum speed of 1.5 times higher and maximum load capacity of over 2 times higher than the conventional models by using in combination with the RCP5/RCP4.

### Allows the installation of 7 types of driver boards

- ① Battery-less absolute/incremental driver boards for pulse motor
- ② Simple absolute driver board for pulse motor
- ③ Battery-less absolute/incremental driver boards for PowerCon
- ④ Simple absolute driver board for PowerCon
- ⑤ Battery-less absolute/incremental driver boards for AC servo motor
- ⑥ Simple absolute driver board for AC servo motor
- ⑦ Incremental driver board for brush-less DC motor



\* Some models are excluded.  
For more information, please refer to the catalog "AC Servo Motor RoboCylinder with Battery-less Absolute Encoder".

## 3 Many useful functions

### Function of servo monitoring in the AUTO mode.

- The AUTO mode status monitoring and servo monitoring can now be performed using multi-axis controllers. In addition, the monitoring can start from the moment that the condition of a selected signal changed. (Trigger function)

### The calendar function

- With the addition of the clock function, the alarm history is displayed with the time of occurrence, making it easier for the alarm to be analyzed.

### Smart tuning function

- The optimum acceleration and deceleration are set according to the payload to be conveyed.

### Off-board tuning function (for AC servo motor)

- The optimum gain is set according to the payload.

### Vibration control function (for AC servo motor)

- It reduces the shaking (vibration) of the workpiece attached to the slider.

### Acceleration/deceleration mode specification

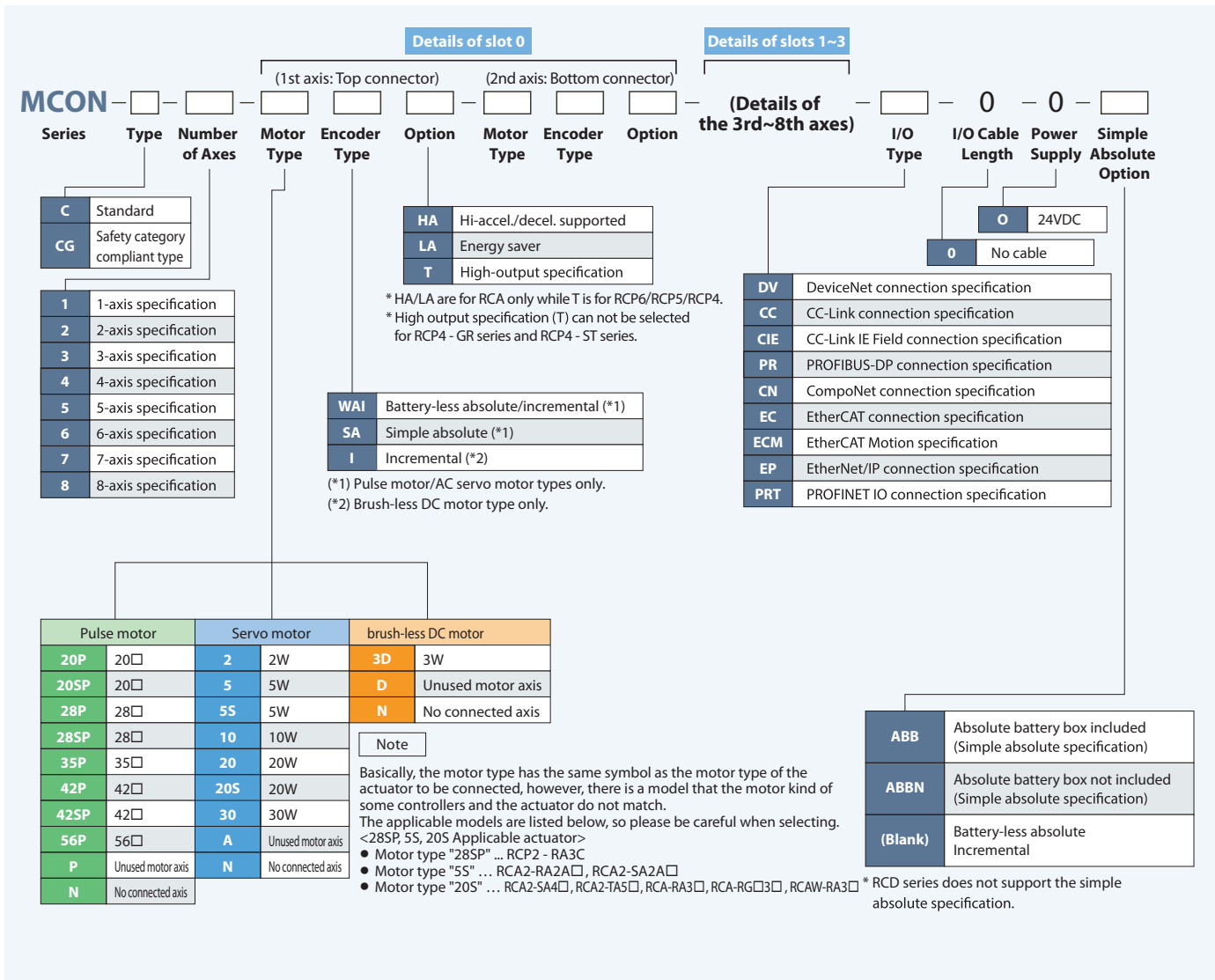
- The acceleration and deceleration patterns can be specified from the trapezoid pattern, first-order delay filter and S-shaped motion.

### Axis name display function

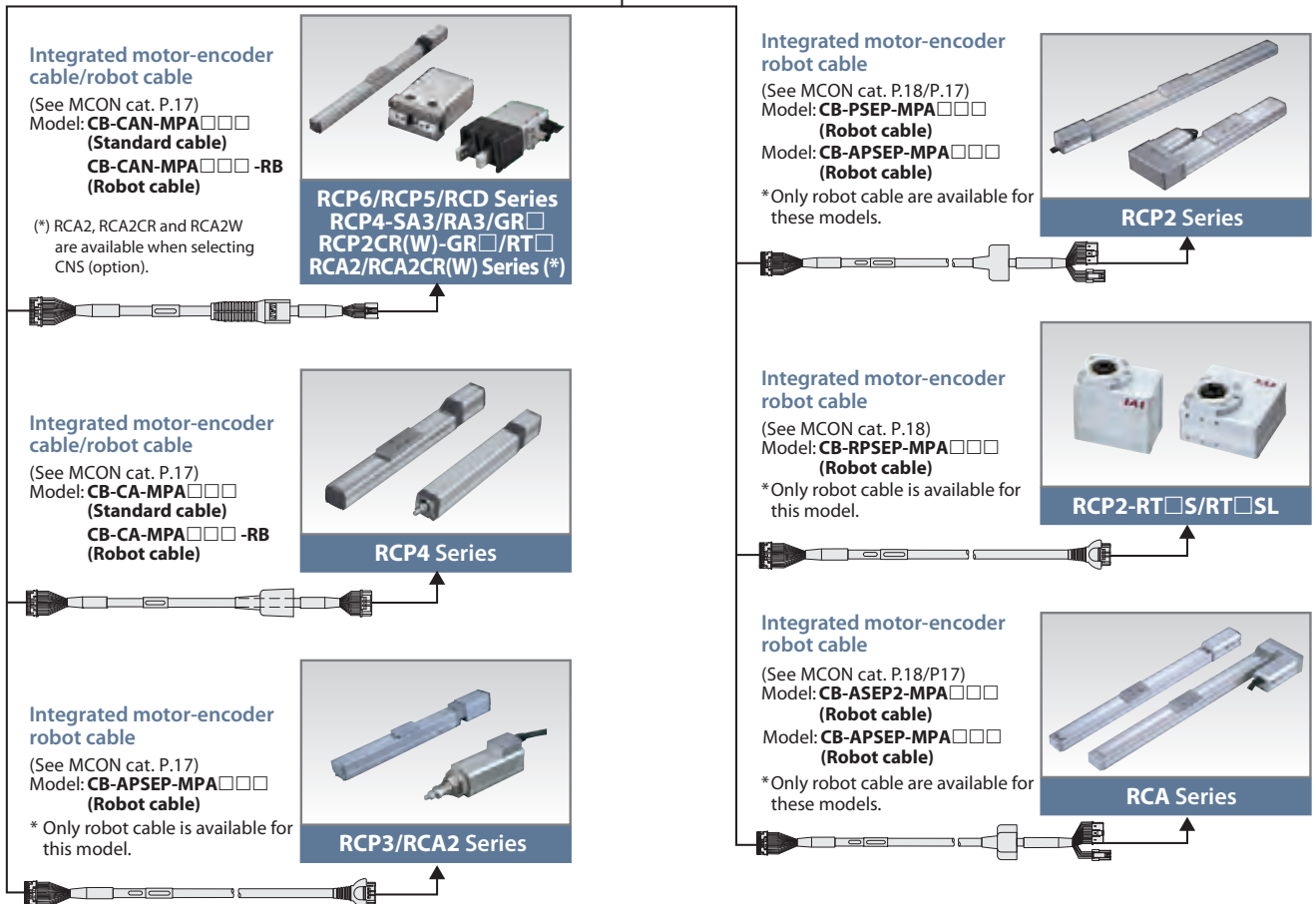
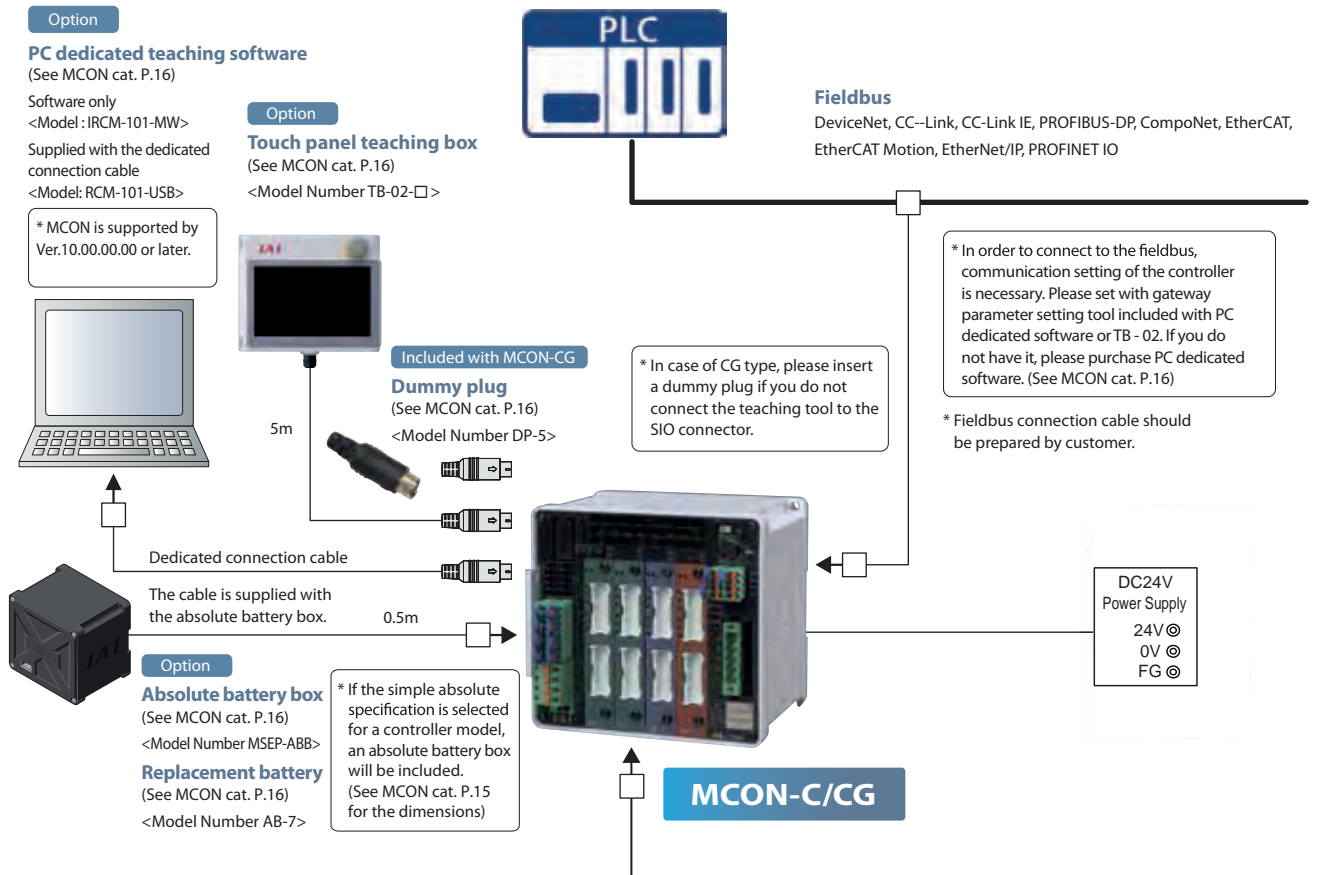
- The axis name can be displayed in the PC dedicated software and touch panel teaching pendant.

\* Some functions are not available depending on the network. Please refer to the instruction manual.

Model



## System Configuration



# PCON-CB/CFB



The Position Controllers for RCP6/RCP5/RCP4 (PowerCon Type)  
Position Controller for RCP3/RCP2



## Features

### 1 High resolution Battery-less Absolute Encoder type

The RCP6 equipped with a high-resolution battery-less absolute encoder is supported. Since no battery is needed to retain position data, less space is required in the control panel, which in turn leads to lower cost of your equipment. The resolution is increased from 800 pulses /rev to 8192 pulses/rev.

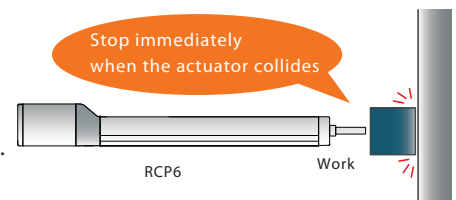


### 2 PowerCon Equipped

PowerCon (high-output driver) which can enable the stepper motor to perform at its maximum capacity is now installed. By using PowerCon, the output of the pulse motor is increased by 50%. It contributes to cycle time reduction and productivity improvement.

### 3 Collision Detection Function Equipped

This function stops the operation immediately when the actuator comes into contact with an object. The actuator stops without crashing, so that damage to the actuator can be minimized.



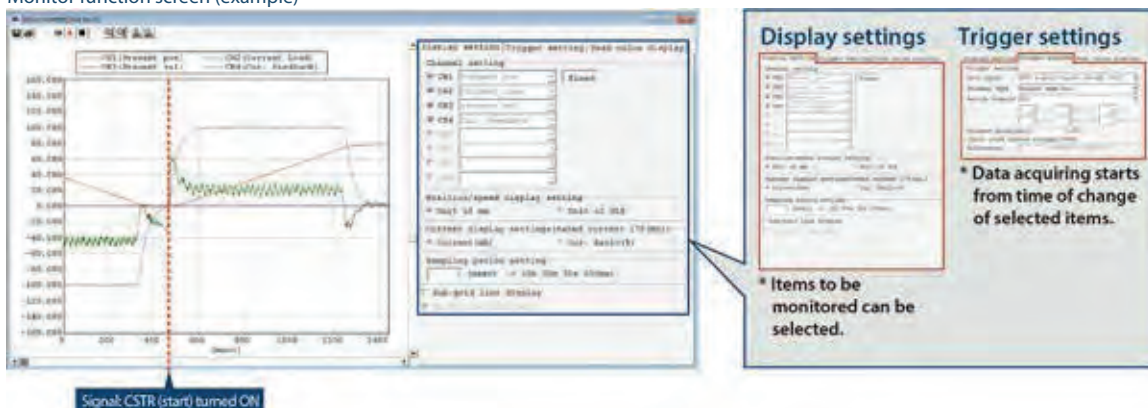
### 4 Enhanced Monitor Functions

The PC dedicated software can display information about the actuator and controller in operation as waveforms.


\*Information that can be displayed: Command current value, current speed/position, and PIO signals (start, positioning completion, alarm, etc.)

Using the trigger function, the end user can specify a particular moment, either a change in PIO signals or a designated moment during the actuator's operation time, to begin displaying the waveforms.

Monitor function screen (example)



## List of Models

| Model number          |                                     | PCON-CB•CGB/CFB•CGFB  |                  |                    |         |   |             |          |   |   |          |             |             |   |
|-----------------------|-------------------------------------|---|------------------|--------------------|---------|---|-------------|----------|---|---|----------|-------------|-------------|---|
| External view         |                                     |  |                  |                    |         |   |             |          |   |   |          |             |             |   |
| I/O type              |                                     | Positioner type   | Pulse-train type | Field network type |         |   |             |          |   |   |          |             |             |   |
|                       |                                     |   |                  | DeviceNet          | CC-Link | CC-Link IE Field connection specification | PROFIBUS DP | CompoNet | - | - | EtherCAT | EtherNet/IP | PROFINET IO |   |
| I/O type model number |                                     | NP/PN   | PLN/PLP          | DV                 | CC      | CIE                                       | PR          | CN       | - | - | EC       | EP          | PRT         |   |
| PCON-CB/CGFB          | Battery-less absolute specification | O   | O                | O                  | O       | O   | O           | O        | - | - | O        | O           | O           |   |
|                       | Simple absolute spec.               | With absolute battery   | O                | -                  | O       | O   | O           | O        | O | - | -        | O           | O           | O |
|                       |                                     | With absolute battery unit  | O                | -                  | O       | O   | O           | O        | O | - | -        | O           | O           | O |
|                       |                                     | Without absolute battery  | O                | -                  | O       | O   | O           | O        | O | - | -        | O           | O           | O |
| PCON-CFB/CGFB         | Battery-less absolute specification | O   | O                | O                  | O       | O   | O           | O        | - | - | O        | O           | O           |   |

## Model Specification Items

**PCON** — [ ] — [ ] — [ ] — [ ] — [ ] — 0 — [ ] — [ ]

**Series**      **Type**      **Motor Type**      **Encoder Type**      **I/O Type**      **I/O Cable Length**      **Power Supply Voltage**      **Simple Absolute Specification**      **Controller Mounting Specification**

|      |   |  |  |                                    |         |   |  |
|------|---|--|--|------------------------------------|---------|---|--|
| CB   | Standard  | WAI Battery-less absolute specification<br>Incremental specification<br>SA Simple absolute spec. | NP PIO (NPN)<br>PLN Pulse train (NPN)<br>PN PIO (PNP)<br>PLP Pulse train (PNP)<br>DV DeviceNet<br>CC CC-Link<br>CIE CC-Link IE Field connection specification<br>PR PROFIBUS-DP<br>CN CompoNet<br>EC EtherCAT<br>EP EtherNet/IP<br>PRT PROFINET IO | 0 No cable<br>2 2m<br>3 3m<br>5 5m | 0 24VDC | (Blank) Battery-less absolute specification<br>Incremental specification<br>AB Simple absolute spec.<br>(With absolute battery. No battery unit included)<br>ABU Simple absolute spec.<br>(With absolute battery and battery unit)<br>ABUN Simple absolute spec.<br>(Without absolute battery and battery unit) | (Blank) Screw mounting specification<br>DN DIN rail mounting specification |
| CGB  | Safety category compliant type                              |  |  |                                    |         |   |  |
| CFB  | 56SP/60P/86P motor-compliant type                           |  |  |                                    |         |   |  |
| CGFB | Safety category compliant 56SP/60P/86P motor-compliant type |  |  |                                    |         |   |  |

|      |     |      |     |
|------|-----|------|-----|
| 20P  | 20□ | 42SP | 42□ |
| 20SP | 20□ | 56P  | 56□ |
| 28P  | 28□ | 56SP | 56□ |
| 28SP | 28□ | 60P  | 60□ |
| 35P  | 35□ | 86P  | 86□ |
| 42P  | 42□ |      |     |

(E.g.) 20P: 20□ pulse motor supported

**Note**  
 In principle, the same type of motor as the type of motor of the actuator to be connected should be entered, but there are some models where the motor type of some controllers and actuators do not match. Be sure to check the corresponding models listed below during selection.  
 <28SP target actuator>  
 • Controller motor type [285P]  
 RCP2-RA3C

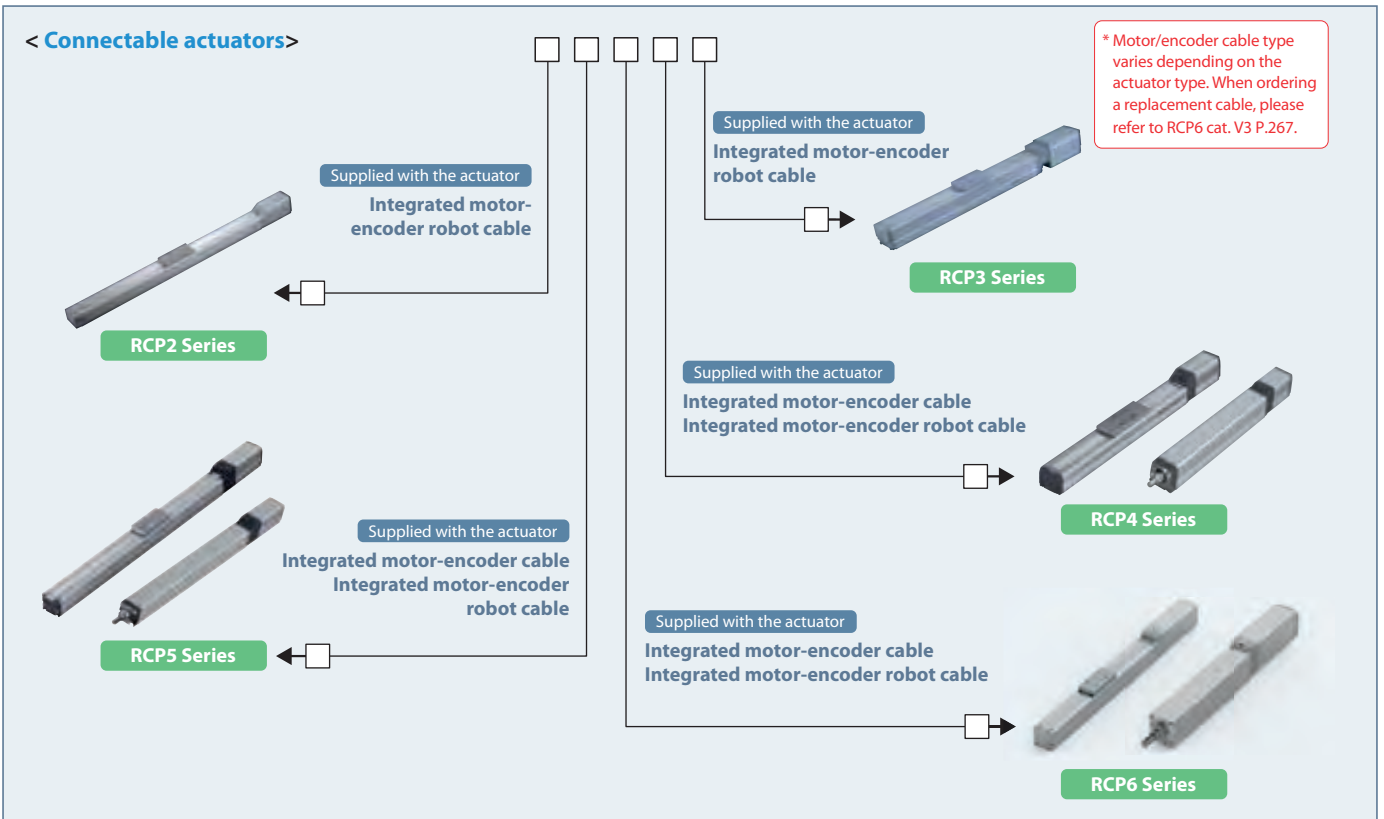
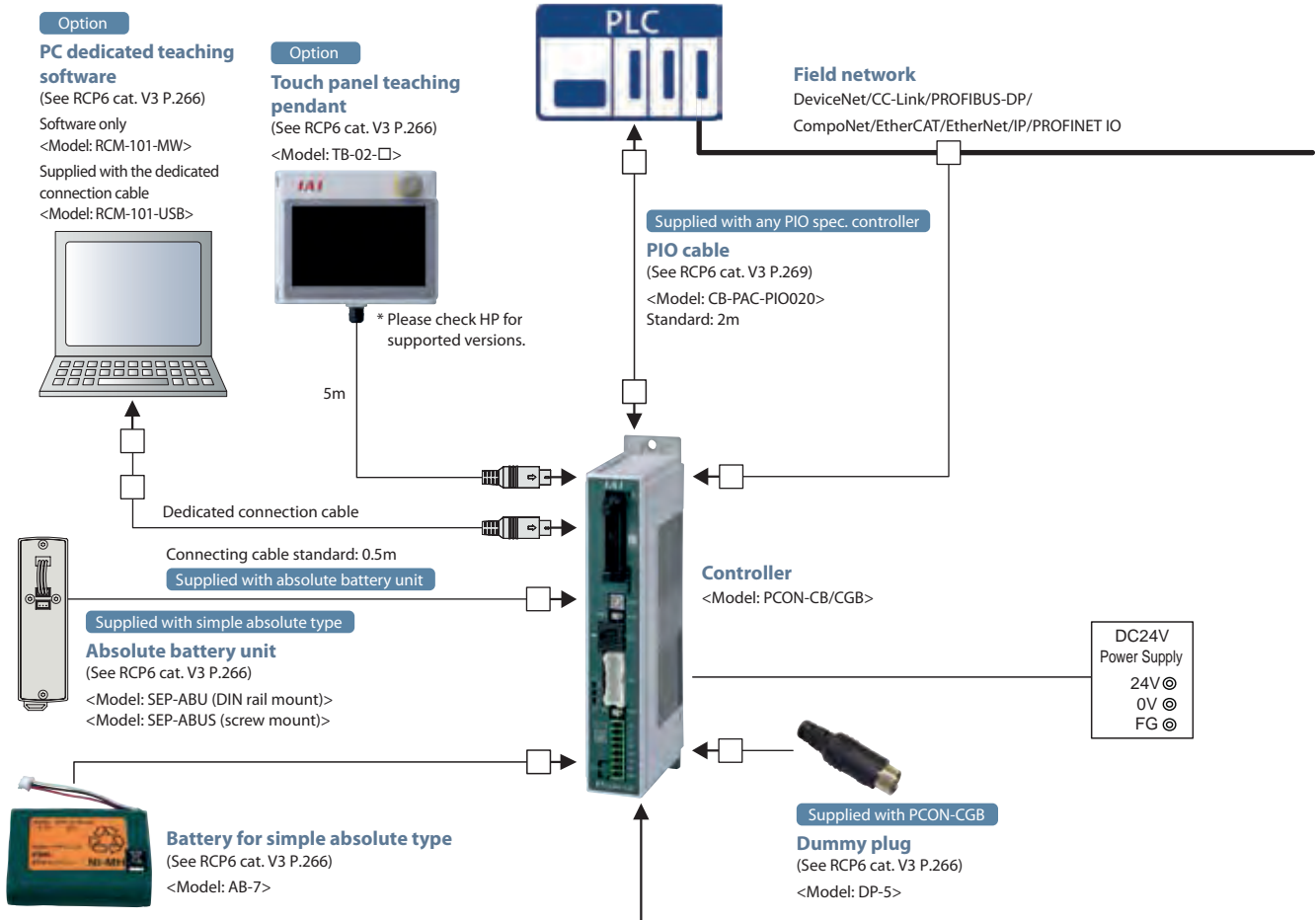
\* When a field network specification is selected, the I/O cable length is "0".

\* PCON-CFB/CGFB does not support a simple absolute specification.

\* The mounting type (screw or DIN rail) of the absolute battery unit and the controller must be the same.

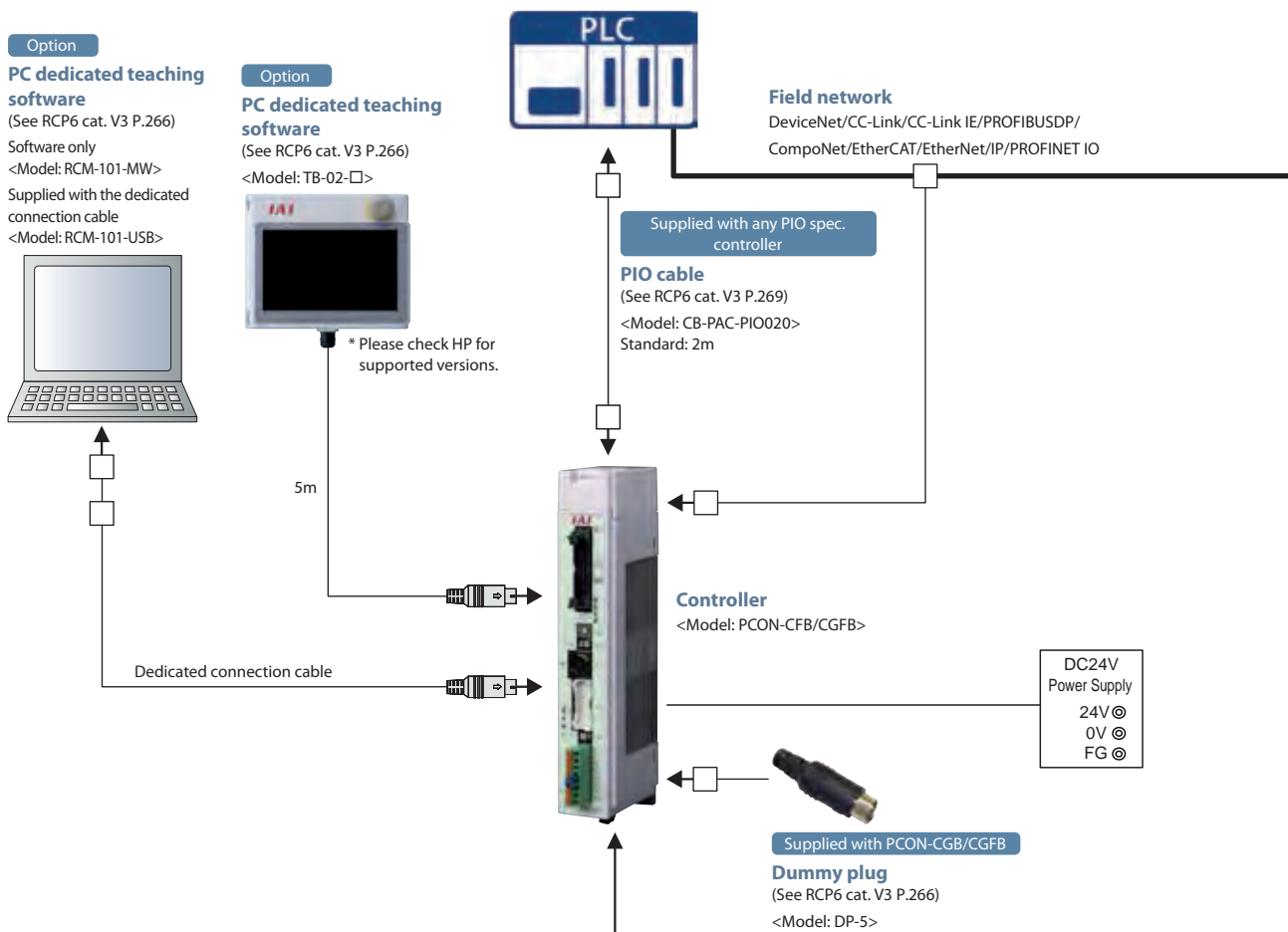
## System Configuration

### PowerCon150 <PCON-CB/CGB>



## System Configuration

### ■ 56SP/60P/86P Motor Compatible <PCON-CFB/CGFB>



### < Connectable actuators >

\* Motor/encoder cable type varies depending on the actuator type. When ordering a replacement cable, please refer to RCP6 cat. V3 P.267.

Supplied with the actuator  
**Integrated motor-encoder cable**  
**Integrated motor-encoder robot cable**

**RCP2 Series**



Supplied with the actuator  
**Integrated motor-encoder cable**  
**Integrated motor-encoder robot cable**

**RCP4 Series**



Supplied with the actuator  
**Integrated motor-encoder cable**  
**Integrated motor-encoder robot cable**

**RCP5 Series**



Supplied with the actuator  
**Integrated motor-encoder cable**  
**Integrated motor-encoder robot cable**

**RCP6 Series**

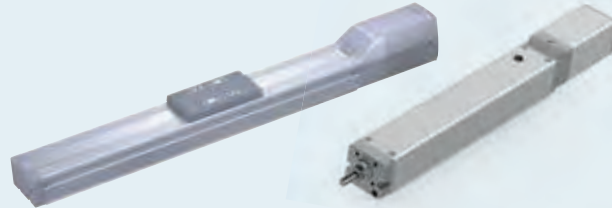




# PCON-CYB/PLB/POB



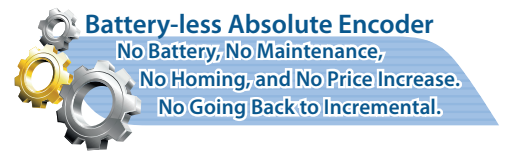
**Position Controller  
for RoboCylinder**



## Features

### 1 For products with battery-less absolute encoder

Battery maintenance is not required, since it does not need a battery. Home return is not required during the initial setting, after emergency stop output, or when the device is restarted after failure. Down time can be shortened, and manufacturing costs can be reduced.



### 2 PowerCon type

All controllers are compatible with the high-output driver "PowerCon" that can improve the performance of pulse motor output. It can shorten the cycle time and improve the productivity of the equipment.

### 3 Equipped with Smart tuning function

Supports the smart tuning function, allowing optimal setting of the speed and acceleration/deceleration values based on the payload. (\*)

(\*) When using the smart tuning function, PC dedicated software or TB-02 (touch panel teaching pendant) is required.

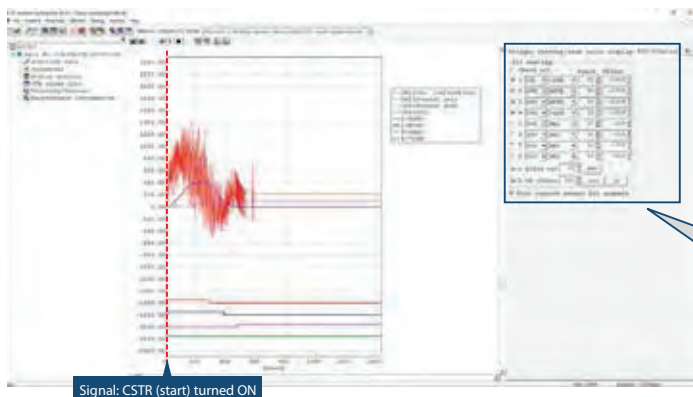
### 4 Enhanced Monitor Functions

The PC dedicated software can display information about the actuator and controller in operation as waveforms.

\*Information that can be displayed: Command current value, current speed/position, and PIO signals (start, positioning completion, alarm, etc.)

Using the trigger function, the end user can specify a particular moment, either a change in PIO signals or a designated moment during the actuator's operation time, to begin displaying the waveforms.

Monitor function screen (example)



Signal: CSTR (start) turned ON

**Display settings**

Items to be monitored can be selected.

**Trigger settings**

\* Data acquiring starts from time of change of selected items.

### 5 Low price


It is possible to achieve a low price by limiting it to the function that I often use.

| Product model |             | PowerCon<br>(High output driver) | High resolution<br>battery-less absolute | Simple<br>absolute | Calendar<br>function | Maintenance<br>function | I/O point                 | Positioning point                     | Field<br>network |
|---------------|-------------|----------------------------------|--|--------------------|----------------------|-------------------------|---------------------------|---------------------------------------|------------------|
| PCON          | CYB/PLB/POB | ○                                | ○  | -                  | -                    | ○                       | Non insulated<br>8IN/8OUT | Standard 16 points<br>Max. 64 points  | -                |
|               | CB          | ○                                | ○  | ○                  | ○                    | ○                       | Insulated<br>16IN/16OUT   | Standard 64 points<br>Max. 512 points | ○                |

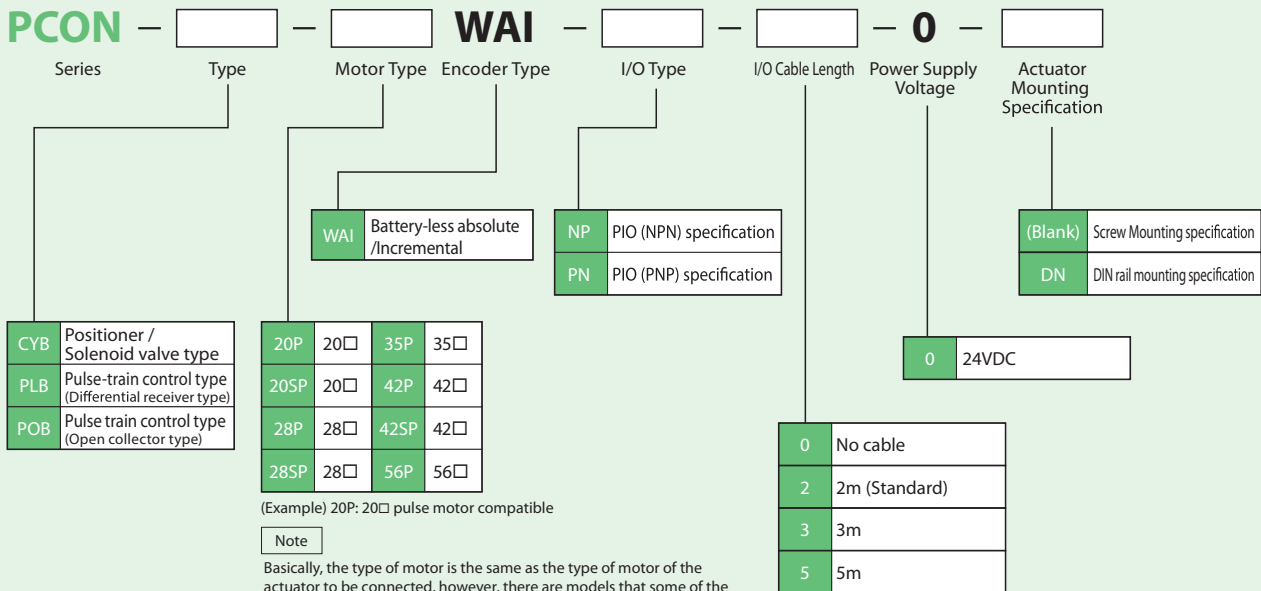
# PCON-CYB/PLB/POB Controller

## List of Models

Positioner Controller that can operate RoboCylinder. Lineup for 3 types that can support various control.

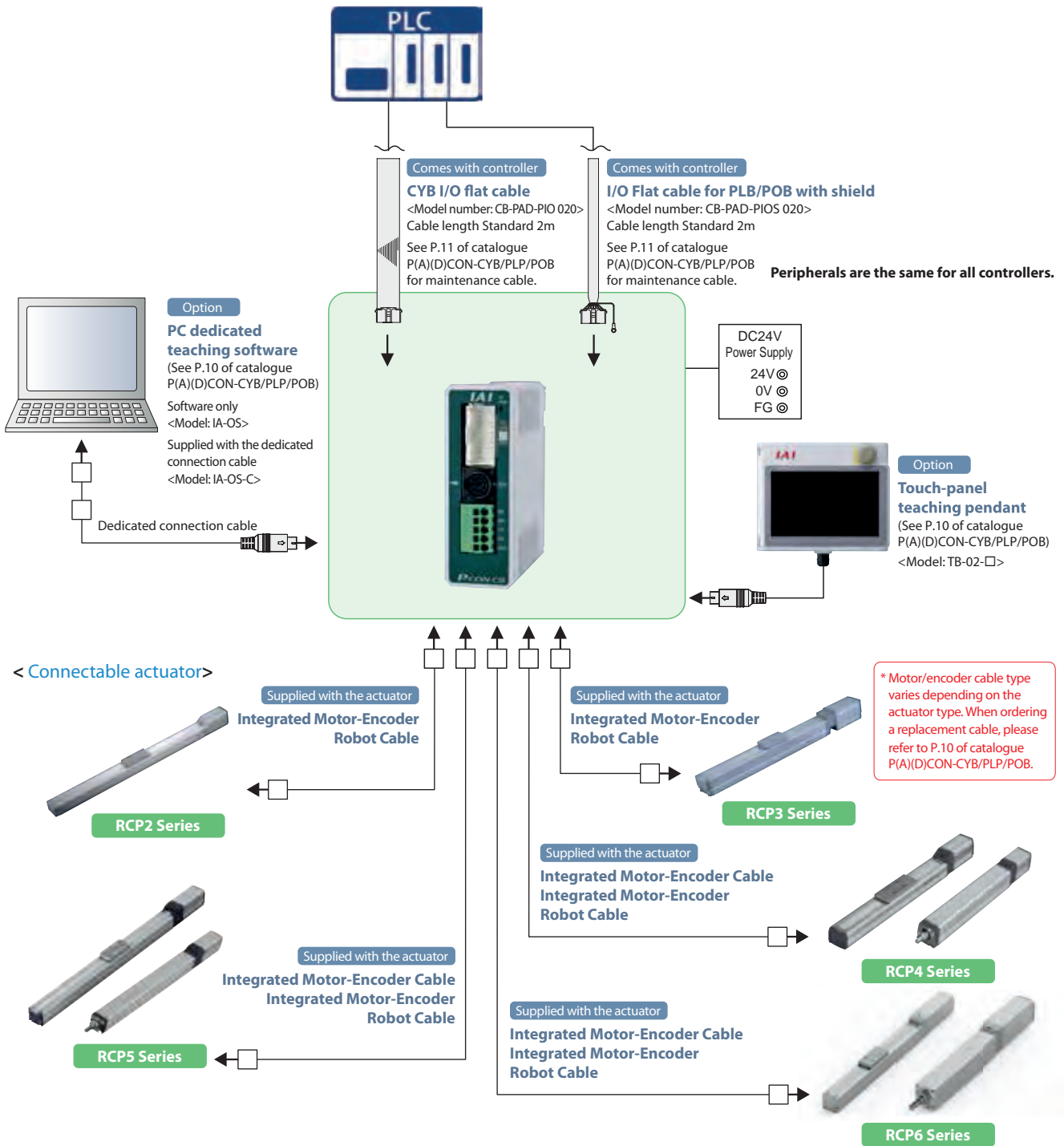
| Model               | CYB   | PLB / POB                |
|---------------------|---|--------------------------|
| Type                | Positioner/ Solenoid valve type   | Pulse-train control type |
| External view       |  |                          |
| Number of positions | 64  | —                        |

## Model number



\*The POB type has a maximum cable length of 2m.

## System configuration



# ACON-CB

Position Controller  
for RoboCylinder

CE RoHS

---

# DCON-CB

Position Controller  
for Mini RoboCylinder

CE RoHS

**Features**

## 1 Compatible with Battery-less Absolute Encoder \*ACON-CB only

RCA equipped with a battery-less absolute encoder is supported. Since no battery is needed to retain position data, less space is required in the control panel, which in turn leads to lower both initial and maintenance costs of your equipment.



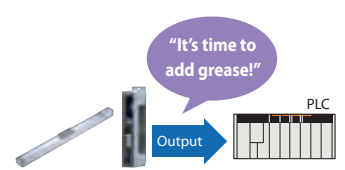
## 2 Compatible with Many Major Field Networks

Compatible with DeviceNet, CC-Link, CC-Link IE Field, PROFIBUS-DP, PROFINET IO, CompoNet, EtherCAT and EtherNet/IP. Field network connection allows for less-wiring, direct numerical commands, position number commands, current position reading, and more.



## 3 Maintenance Timings Can Be Checked Using the Traveled Distance Calculation Function

The total distance traveled by the actuator is calculated and recorded in the controller. If the preset distance is exceeded, a signal is output from the controller. This function can be used to check when to add grease or perform the next periodic inspection.



A signal is automatically output to the PLC when the preset maintenance/inspection timing (number of operations or distance traveled) is reached.

## 4 The Calendar Function Can Retain Alarm Timestamps


The built-in calendar function (clock function) records alarms and other events with timestamps, which helps analyze the causes of troubles should they occur.



## 5 Equipped with the Offboard Tuning Function \*ACON-CB only

Supports Off-board tuning function, allowing optical setting of the gain based on the transport load.

## List of Models

| Model number           |                                     | ACON-CB/CGB · DCON-CB/CGB   |                          |                          |                          |   |                          |                          |                          |                          |                          |                          |                          |
|------------------------|-------------------------------------|---|--------------------------|--------------------------|--------------------------|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| External view          |                                     |  |                          |                          |                          |   |                          |                          |                          |                          |                          |                          |                          |
| I/O type               |                                     | Positioner type   | Pulse-train type         | Field network type       |                          |   |                          |                          |                          |                          |                          |                          |                          |
|                        |                                     |   |                          | DeviceNet                | CC-Link                  | CC-Link IE Field connection specification | PROFIBUS DP              | CompoNet                 | —                        | —                        | EtherCAT                 | EtherNet/IP              | PROFINET IO              |
| I/O type model number  |                                     | NP/PN   | PLN/PLP                  | DV                       | CC                       | CIE                                       | PR                       | CN                       | —                        | —                        | EC                       | EP                       | PRT                      |
| ACON-CB-CGB            | Battery-less absolute specification | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|                        | Simple absolute spec.               | With absolute battery   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|                        |                                     | With absolute battery unit  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|                        |                                     | Without absolute battery  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Absolute specification |                                     | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| DCON-CB-CGB            | Incremental specification           | <input type="checkbox"/>  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

## Model Specification Items

**ACON** — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ]

Series    Type    Motor Type    Encoder Type    Option    I/O Type    I/O Cable Length    Power Supply Voltage    Simple Absolute Specification    Controller Mounting Specification

|     |                                |                        |     |   |    |                                |  |         |  |  |
|-----|--------------------------------|------------------------|-----|---|----|--------------------------------|--|---------|--|--|
| CB  | Standard                       |                        | WAI | Battery-less absolute                     | HA | Hi-accel./decel. specification |  | 0       | 24VDC  |  |
| CGB | Safety category compliant type |                        | A   | Incremental                               | LA | Energy saver specification     |  | (Blank) | Battery-less absolute specification<br>Incremental specification<br>Absolute Specification |  |
|     |                                | 2    2W    10    10W   | NP  | PIO (NPN)                                 |    |                                |  | AB      | Simple Absolute Specification<br>(With absolute battery)                                   |  |
|     |                                | 5    5W    20    20W   | PN  | PIO (PNP)                                 |    |                                |  | ABU     | Simple Absolute Specification<br>(With absolute battery unit)                              |  |
|     |                                | 5S    5W    20S    20W | PLN | Pulse train (NPN)                         |    |                                |  | ABUN    | Simple Absolute Specification<br>(Without absolute battery)                                |  |
|     |                                |                        | PLP | Pulse train (PNP)                         |    |                                |  | (Blank) | Screw Mounting specification   |  |
|     |                                |                        | DV  | DeviceNet                                 |    |                                |  | DN      | DIN rail mounting specification  |  |
|     |                                |                        | CC  | CC-Link                                   |    |                                |  |         |  |  |
|     |                                |                        | CIE | CC-Link IE Field connection specification |    |                                |  |         |  |  |
|     |                                |                        | PR  | PROFIBUS-DP                               |    |                                |  |         |  |  |
|     |                                |                        | CN  | CompoNet                                  |    |                                |  |         |  |  |
|     |                                |                        | EC  | EtherCAT                                  |    |                                |  |         |  |  |
|     |                                |                        | EP  | EtherNet/IP                               |    |                                |  |         |  |  |
|     |                                |                        | PRT | PROFINET IO                               |    |                                |  |         |  |  |

(E.g.) 2: 2W servo motor supported

Note  
In principle, the same type of motor as the type of motor of the actuator to be connected should be entered, but there are some models where the motor type of some controllers and actuators do not match. Be sure to check the corresponding models listed below during selection.  
 <5S/20 S target actuator>  
 ● Controller Motor type "5S"  
 ...RCA2-RA2A□, RCA2-SA2A□  
 ● Controller Motor type "20S"  
 ...RCA2-SA4□, RCA2-TA5□, RCA-RA3□, RCA-RG□3□, RCAW-RA3□

I/O Cable Length options: 0 (No cable), 2 (2m), 3 (3m), 5 (5m)

\* If you choose a field network specification, the length of I/O cable will be "0"

**DCON** — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ]

Series    Type    Motor Type    Encoder Type    I/O Type    I/O Cable Length    Power Supply Voltage    Controller Mounting Specification

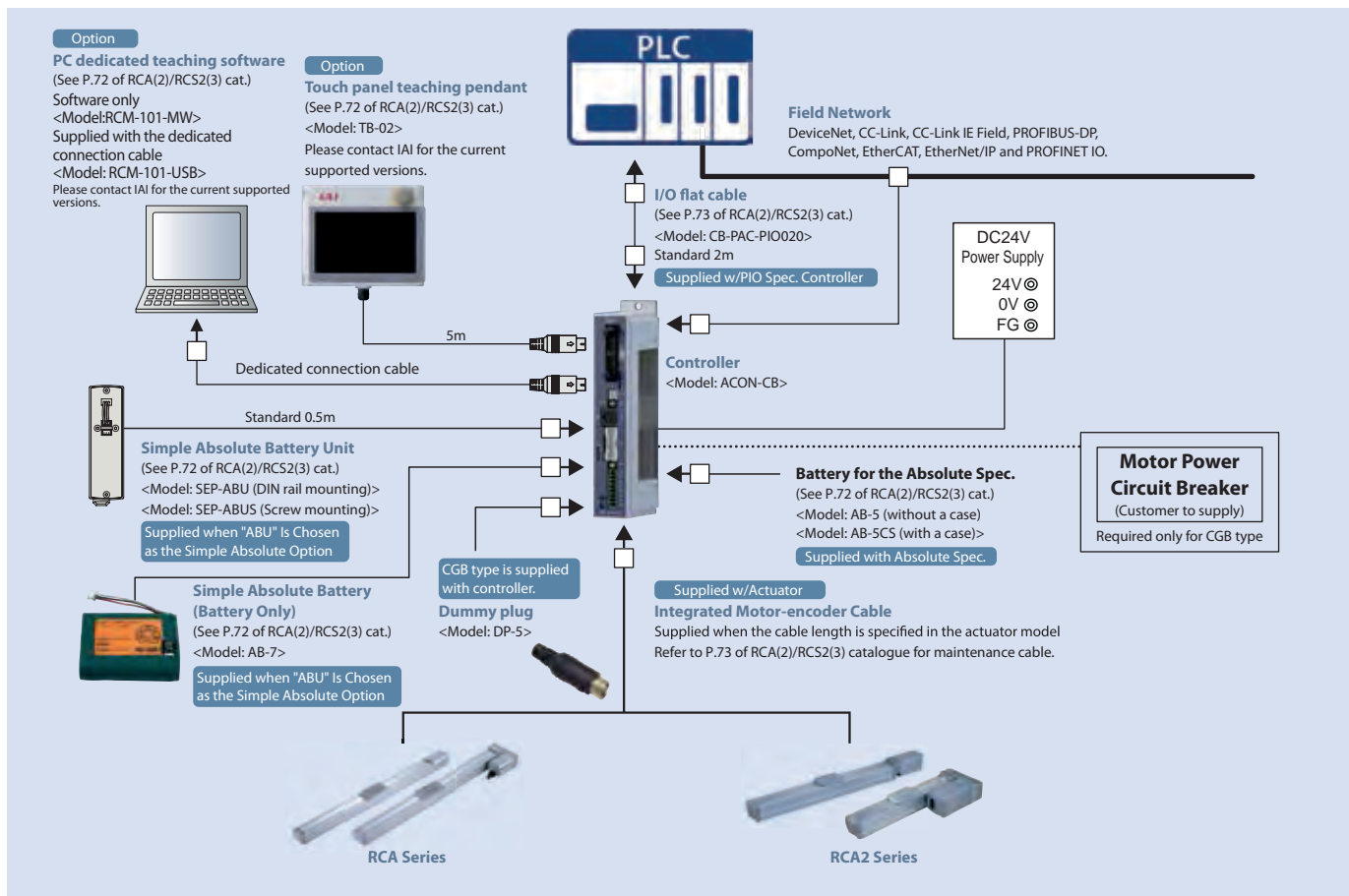
|     |                                |         |     |   |  |  |  |         |                                 |  |
|-----|--------------------------------|---------|-----|---|--|--|--|---------|---------------------------------|--|
| CB  | Standard                       |         | I   | Incremental                               |  |  |  | 0       | 24VDC                           |  |
| CGB | Safety category compliant type |         | NP  | PIO (NPN)                                 |  |  |  | (Blank) | Screw Mounting specification    |  |
|     |                                | 3    3W | PN  | PIO (PNP)                                 |  |  |  | DN      | DIN rail mounting specification |  |
|     |                                |         | PLN | Pulse-train (NPN)                         |  |  |  |         |                                 |  |
|     |                                |         | PLP | Pulse-train (PNP)                         |  |  |  |         |                                 |  |
|     |                                |         | DV  | DeviceNet                                 |  |  |  |         |                                 |  |
|     |                                |         | CC  | CC-Link                                   |  |  |  |         |                                 |  |
|     |                                |         | CIE | CC-Link IE Field connection specification |  |  |  |         |                                 |  |
|     |                                |         | PR  | PROFIBUS-DP                               |  |  |  |         |                                 |  |
|     |                                |         | CN  | CompoNet                                  |  |  |  |         |                                 |  |
|     |                                |         | EC  | EtherCAT                                  |  |  |  |         |                                 |  |
|     |                                |         | EP  | EtherNet/IP                               |  |  |  |         |                                 |  |
|     |                                |         | PRT | PROFINET IO                               |  |  |  |         |                                 |  |

I/O Cable Length options: 0 (No cable), 2 (2m), 3 (3m), 5 (5m)

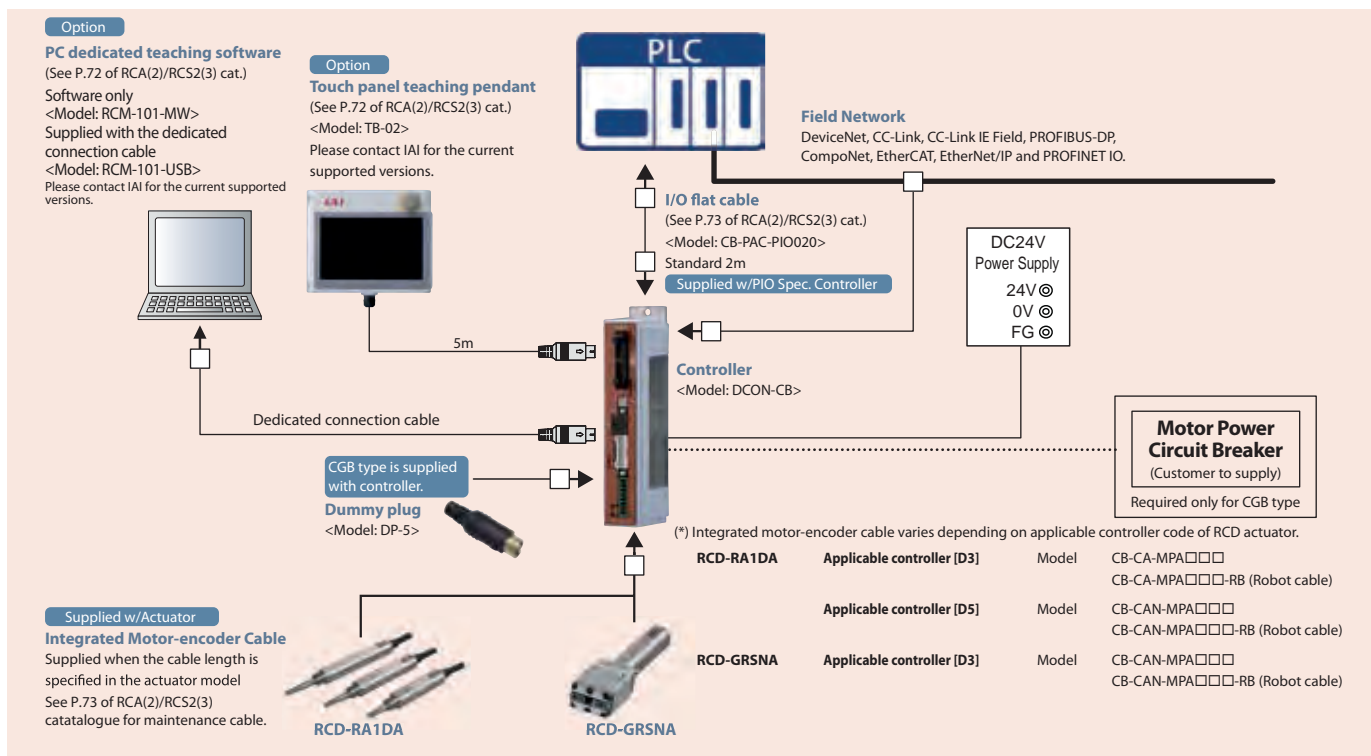
\* If you choose a field network specification, the length of I/O cable will be "0"

## System Configuration

### <ACON-CB/CGB>



### <DCON-CB/CGB>



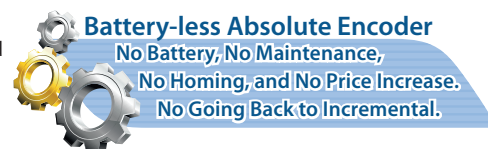


## Features

### 1 For products with battery-less absolute encoder (ACON only)

Battery maintenance is not required, since it does not need a battery. Home return is not required during the initial setting, after emergency stop output, or when the device is restarted after failure.

Down time can be shortened, and manufacturing costs can be reduced.

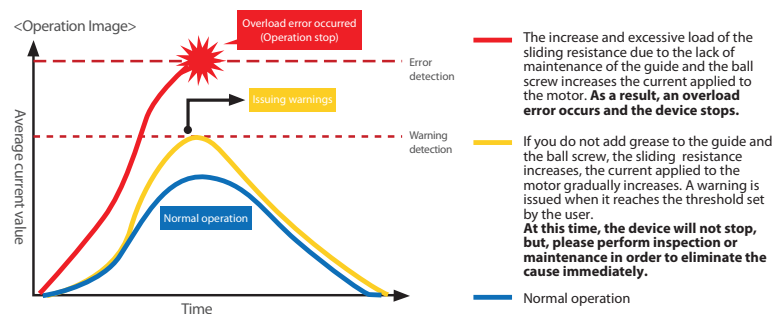


### 2 Equipped with Smart tuning function (ACON only)

Supports the smart tuning function, allowing optimal setting of the speed and acceleration/deceleration values based on the payload.

### 3 Preventative maintenance

Warning is issued before an overload error is generated from a change in the average current value.



- By using predictive maintenance function, it enables you to prevent urgent stops in your system.
- It effectively reduces labor costs because maintenance personnel can be minimized to the minimum required amount.


### 4 Low price

It is possible to achieve a low price by limiting it to the function that I often use.

| Product model |             | High resolution battery-less absolute | Simple absolute | Calendar function | Maintenance function | I/O point              | Positioning point                     | Field network |
|---------------|-------------|---------------------------------------|-----------------|-------------------|----------------------|------------------------|---------------------------------------|---------------|
| ACON          | CYB/PLB/POB | O                                     | -               | -                 | O                    | Non insulated 8IN/8OUT | Standard 16 points<br>Max. 64 points  | -             |
|               | CB          | O                                     | O               | O                 | O                    | Insulated 16IN/16OUT   | Standard 64 points<br>Max. 512 points | O             |

## List of Models

Positioner Controller that can operate RoboCylinder. Lineup for 3 types that can support various control.

| Model               | CYB  | PLB / POB                          |
|---------------------|--|------------------------------------|
| Type                | Positioner/ Solenoid valve type  | Pulse-train control type           |
| External view       |  |                                    |
| Details             | Operable with control similar to air cylinder                                      | Controller for Pulse-train control |
| Number of positions | 64   | -                                  |

## Model number

**ACON** — [ ] — [ ] **WAI** [ ] — [ ] — [ ] — **0** — [ ]

Series      Type      Motor Type      Encoder Type      Option      I/O Type      I/O Cable Length      Power Supply Voltage      Controller Mounting Specification

|            |   |                 |   |  |  |                |  |
|------------|---|-----------------|---|--|--|----------------|--|
| <b>CYB</b> | Positioner / Solenoid valve type                      | 2 2W    20 20W  | <b>WAI</b> Battery-less absolute/ Incremental<br><small>* Absolute specification of RCA actuator can not be operated. Please use ACON-CB or ASEL to operate the Absolute specification.</small> | <b>HA</b> Hi-accel./decel. supported<br><b>LA</b> Energy saver | <b>NP</b> PIO(NPN) specification<br><b>PN</b> PIO(PNP) specification | <b>0</b> 24VDC | <b>(Blank)</b> Screw Mounting specification<br><b>DN</b> DIN rail mounting specification |
| <b>PLB</b> | Pulse-train control type (Differential receiver type) | 5 5W    20S 20W |   |  |  |                |  |
| <b>POB</b> | Pulse-train control type (Open collector type)        | 5S 5W    30 30W |   |  |  |                |  |
|            |   | 10 10W          |   |  |  |                |  |

(Example) 2: 2W Servo motor compatible

**Note**  
 Basically, the type of motor is the same as the type of motor of the actuator to be connected, however, there are models that some of the controllers and the motors of the actuators do not match. The applicable models are listed below, so please note when selecting.  
 <5S/20S target actuator>  
 ● Controller Motor type "5S" ... RCA2 - RA2A□, RCA2 - SA2A□  
 ● Controller Motor type "20S" ... RCA2 - SA4□, RCA2 - TA5□, RCA - RG□3□, RCAW - RA3□

|          |          |
|----------|----------|
| <b>0</b> | No cable |
| <b>2</b> | 2m       |
| <b>3</b> | 3m       |
| <b>5</b> | 5m       |

\* The POB type has a maximum cable length of 2m.

**DCON** — [ ] — **3** **I** — [ ] — [ ] — **0** — [ ]

Series      Type      Motor Type      Encoder Type      I/O Type      I/O Cable Length      Power Supply Voltage      Controller Mounting Specification

|            |   |             |                      |  |                |  |
|------------|---|-------------|----------------------|--|----------------|--|
| <b>CYB</b> | Positioner / Solenoid valve type                      | <b>3</b> 3W | <b>I</b> Incremental | <b>NP</b> PIO(NPN) specification<br><b>PN</b> PIO(PNP) specification | <b>0</b> 24VDC | <b>(Blank)</b> Screw Mounting specification<br><b>DN</b> DIN rail mounting specification |
| <b>PLB</b> | Pulse-train control type (Differential receiver type) |             |                      |  |                |  |
| <b>POB</b> | Pulse-train control type (Open collector type)        |             |                      |  |                |  |

\* DC Brushless motor compatible

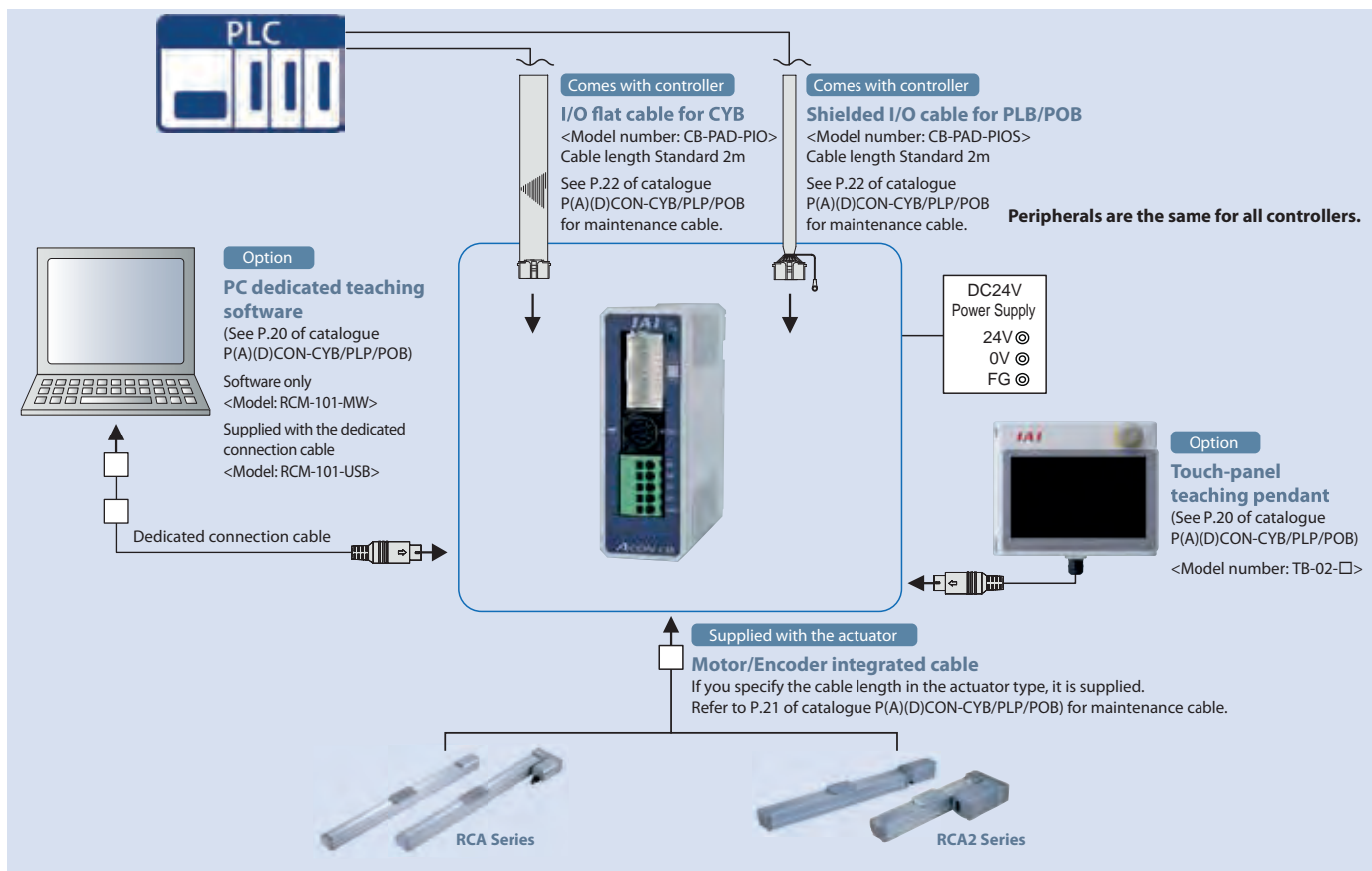
|          |          |
|----------|----------|
| <b>0</b> | No cable |
| <b>2</b> | 2m       |
| <b>3</b> | 3m       |
| <b>5</b> | 5m       |

\* The POB type has a maximum cable length of 2m.

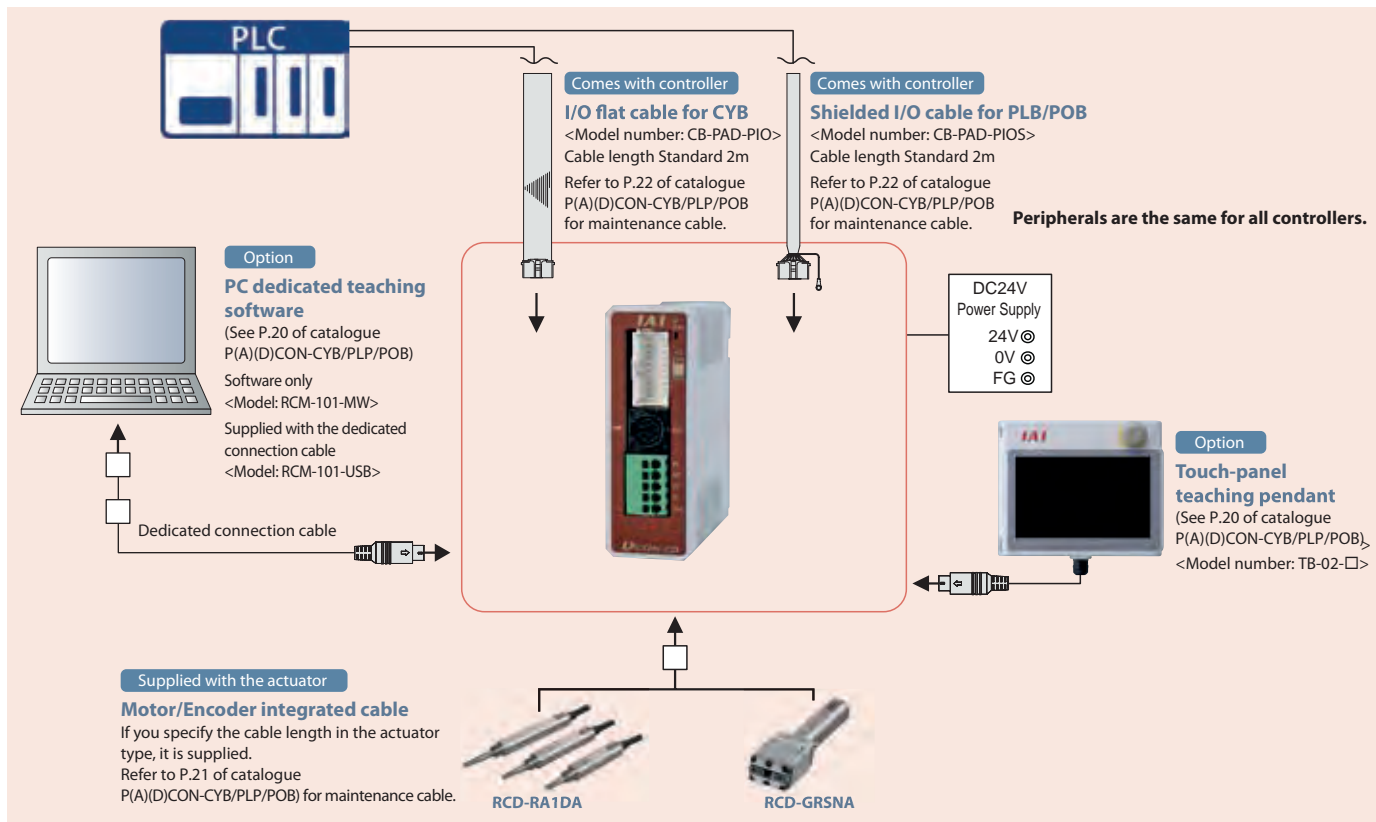


## System configuration

### <ACON-CYB/PLB/POB>



### <DCON-CYB/PLB/POB>



# SCON-CB

Position Controller for Single-axis robot / Cartesian robot /  
RoboCylinder RCS2/RCS3/RCS4



(\*) 3000 and 3300W types are not compliant with UL standard.

## Features

### 1 Compatible with Battery-less Absolute Encoder

The RCS2, RCS3, RCS4, ISB and ISDB equipped with a battery-less absolute encoder are supported. Since no battery is needed to retain position data, less space is required in the control panel, which contributes to saving initial cost and maintenance cost.



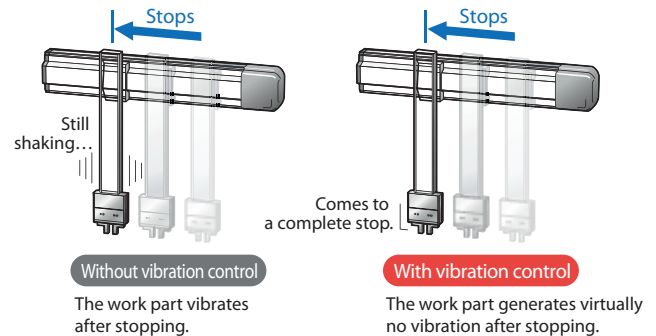
### 2 Supporting Major Field Networks <Optional Function>

In addition to DeviceNet, CC-Link, CC-Link IE Field and PROFIBUS-DP, direct connections are now possible to CompoNet, EtherCAT, EtherCAT Motion, EtherNet/IP and PROFINET IO. The actuator can also be operated by specifying coordinate values directly via a field network.



### 3 Vibration Control Function <Optional Function>

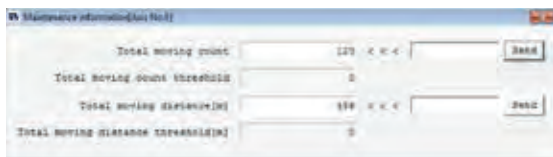
A vibration control function is equipped that suppresses vibration of the work part installed on the slider when the actuator's slider moves. This function shortens the time the actuator waits for vibration to settle, and consequently shortens the cycle time.



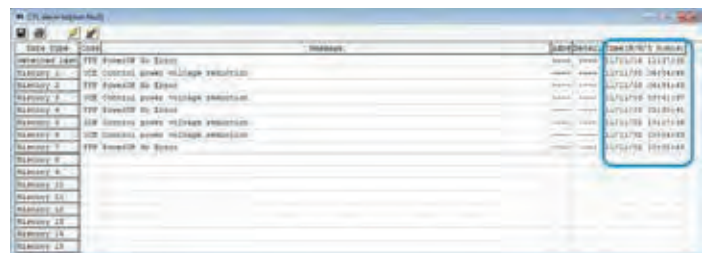
### 4 Capable of Predictive Maintenance <Optional Function>

- Equipped with a feature to detect motor overload and issue warning. By monitoring the motor temperature, abnormal changes can be detected before a malfunction or failure occurs.
- Fully equipped with a monitoring function. Like an oscilloscope, waveforms of position and speed can be acquired from the moment that the condition of a selected signal is changed. Signal status of positioning complete, alarm and so on can also be acquired.
- With smart tuning and o-board tuning, it is possible to adjust the acceleration/deceleration and gain depending on the payload.
- Using the counter function, the exact number of actuator movements and total distance traveled are calculated. This function can be used to output a signal when maintenance is required.
- The calendar function enables to retain the history of alarm occurrence.

<Maintenance information>



<Calendar function>



## 5 Supports the Safety Function STO/SS1-t <Optional function>

Supports the STO (Safe Torque Off) / SS1-t (Safe Stop 1 - time controlled) function.

The STO / SS1-t function is to shut off the energy supply to the motor by electric circuit in the controller.

For the SCON-CB, two specification are available; STO and SS1-t specification. For applications of the vertical axis, SS1-t specification that has a long reaction time can prevent workpiece from dropping due to the time lag of brake operation when the safety torque shut off function is activated.



| Specification | Description  | Remarks  |
|---------------|--|--|
| STO           | Reacting to input signals, the energy supply to the motor is shut off after a reaction time (8ms or shorter) by shut-off circuit in the controller.                        |  |
| SS1-t         | Reacting to input signals, brake is applied and the energy supply to the motor is shut off after a reaction time (500ms or shorter) by shut-off circuit in the controller. | This braking operation is not included in the safety function. |

The energy supply to the servo motor can be shut off safely by connecting an external safety-related device and the I/O connector for safety function.

I/O connector for safety function (for STO/SS1-t specification only)



In addition, the STO/SS1-t function is compliant with the following safety standards:

- ISO/EN ISO 13849-1 category 3 PLe
- IEC 61508 SIL3
- IEC/EN61800-5-2
- IEC/EN62061 SIL CL3

(Note) An engineer with expert knowledge in relevant safety standards should read and understand the descriptions stated in the instruction manual before designing a safety system using this function.

### List of Models

| Model                   |                | SCON-CB  |  |   |     |    |    |   |    |     |    |     |    |  |
|-------------------------|----------------|--|--|---|-----|----|----|---|----|-----|----|-----|----|--|
| External view           |                |  |  |   |     |    |    |   |    |     |    |     |    |  |
| I/O type                |                | Standard specification   | Field network type (*1)  |   |     |    |    |   |    |     |    |     |    |  |
|                         |                | PIO connection specification (*1)  | DeviceNet connection specification<br>CC-Link connection specification<br>CC-Link IE Field connection specification<br>PROFIBUS-DP connection specification<br>CompoNet connection specification<br>-<br>-<br>EtherCAT connection specification<br>EtherCAT Motion connection specification<br>EtherNet/IP connection specification<br>PROFINET IO connection specification<br>RCON connection specification |   |     |    |    |   |    |     |    |     |    |  |
| I/O type code           |                | NP/PN  | DV   | CC  | CIE | PR | CN | - | EC | ECM | EP | PRT | RC |  |
| Applicable encoder type |                | Battery-less absolute<br>Incremental<br>Quasi-absolute<br>Index absolute | Absolute<br>Multi-Rotation<br>Absolute   | Battery-less absolute/Incremental/Absolute/Quasi-absolute |     |    |    |   |    |     |    |     |    |  |
| SCON-CB                 | 12~150W        | o  | o  |   |     |    |    |   |    |     |    |     |    |  |
|                         | 200W           | o  | o  |   |     |    |    |   |    |     |    |     |    |  |
|                         | 100S/200S/300S | o  | o  |   |     |    |    |   |    |     |    |     |    |  |
|                         | 300~400W       | o  | o  | o   | o   | o  | o  | - | o  | o   | o  | o   | o  |  |
|                         | 600W           | o  | o  |   |     |    |    |   |    |     |    |     |    |  |
|                         | 750W           | o  | o  |   |     |    |    |   |    |     |    |     |    |  |
|                         | 3000~3300W     | o  |  |   |     |    |    |   |    |     |    |     |    |  |

(\*1) Note that communication with PIO and pulse-train cannot be performed in the network type.

## Model

SCON - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

Series      Type      Motor Type      Encoder Type      Option      I/O Type      I/O Cable Length      Power Supply Voltage      Safety type

|     |                                |
|-----|--------------------------------|
| CB  | High-function type             |
| CGB | Safety category compliant type |

\* For RCS3 - RA 15 R / 20R, only CGB can be chosen.

|      |      |      |       |
|------|------|------|-------|
| 12   | 12W  | 200  | 200W  |
| 20   | 20W  | 200S | 200W  |
| 30D  | 30W  | 300S | 300W  |
| 30R  | 30W  | 400  | 400W  |
| 60   | 60W  | 600  | 600W  |
| 100  | 100W | 750  | 750W  |
| 100S | 100W | 3000 | 3000W |
| 150  | 150W | 3300 | 3300W |

(Example) 12: 12 W Servo motor compatible

### Note

Basically, the type of motor is the same as the type of motor of the actuator to be connected, however, there are models that some of the controllers and the motors of the actuators do not match. The applicable models are listed below, so please note when selecting.  
<30D•30R•200S applicable actuator>

- Controller Motor type "30D" 30W actuator other than RS
- Controller Motor type "30R" RS
- Controller Motor type "200S" DD-LT18□      DDCR-LT18□  
DDA-LT18C      DDACR-LT18C  
\* For 200S, the housing of the controller will be 400W.

|    |                                |
|----|--------------------------------|
| HA | Hi-accel./decel. specification |
|----|--------------------------------|

\* High acceleration / deceleration specification is available to choose only when the high acceleration / deceleration option has been chosen for the actuator.  
<High-acceleration/deceleration compatible actuator>  
RCS2-SA4C/SA5C/SA6C/  
SA7C/RA4C/RA5C/RGS4C/  
RGS5C/RGD4C/RGD5C

|     |                                   |
|-----|-----------------------------------|
| WAI | Battery-less absolute Incremental |
| A   | Absolute                          |
| AI  | Index absolute *1                 |
| AM  | Multi-Rotation Absolute *1        |

\*1 DD motor operation mode is added.

|               |               |
|---------------|---------------|
| Not specified | Standard type |
| STO           | STO type      |
| SS            | SS1-t type    |

\* Only the standard type is selectable for RCS3-RA15R/20R.

|   |                      |
|---|----------------------|
| 1 | Single phase AC 115V |
| 2 | Single phase AC 230V |
| 3 | Three phase AC 230V  |

\* Please check the power supply voltage that can be selected on the page of the actuator.

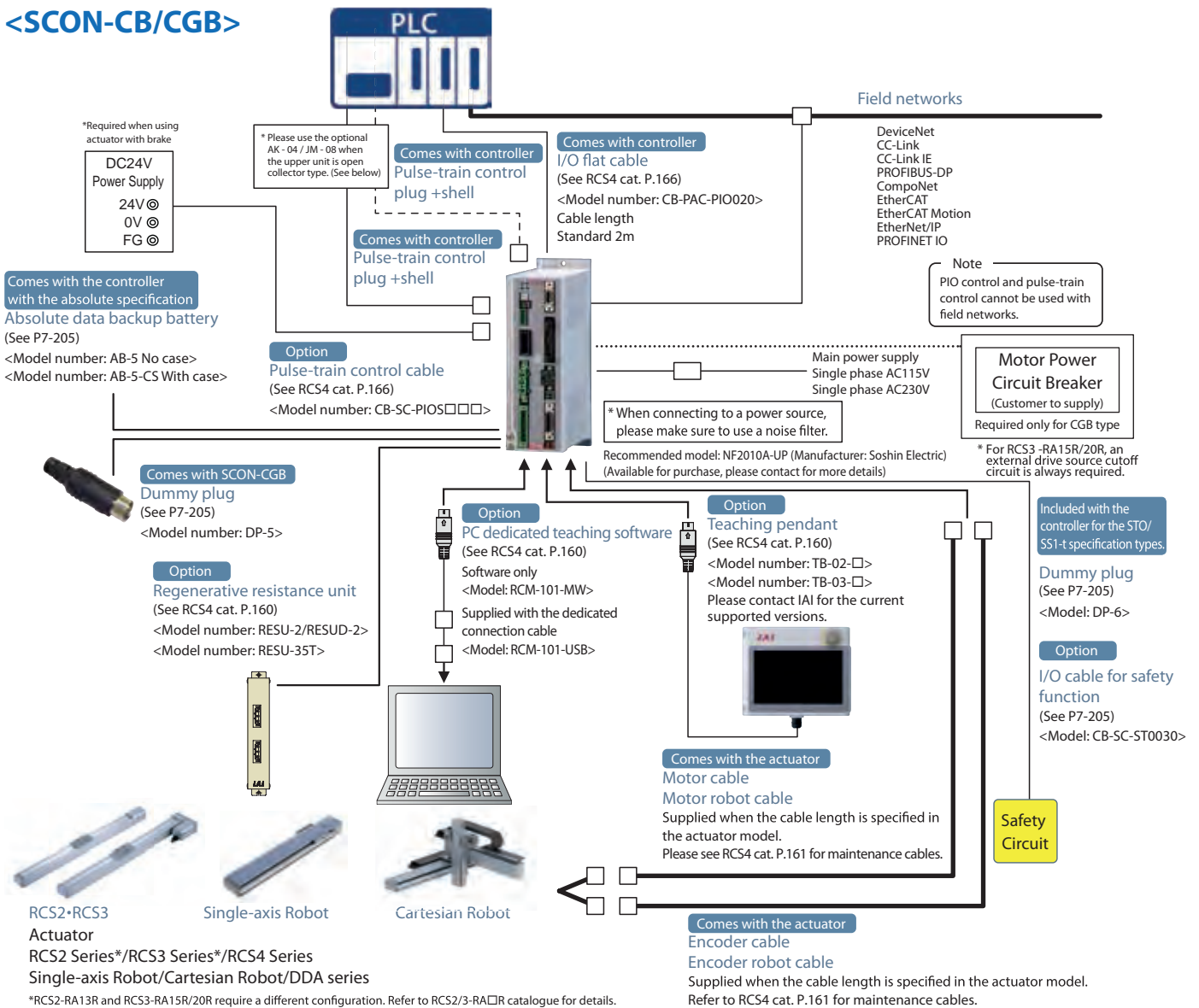
|     |   |
|-----|---|
| NP  | PIO NPN (standard)                        |
| PN  | PIO PNP                                   |
| DV  | DeviceNet connection                      |
| CN  | CompoNet connection                       |
| CC  | CC-Link connection                        |
| CIE | CC-Link IE Field connection specification |
| PR  | PROFIBUS-DP                               |
| EC  | EtherCAT                                  |
| ECM | EtherCAT Motion                           |
| EP  | EtherNet/IP                               |
| PRT | PROFINET IO                               |
| RC  | RCON connection specification             |

|   |               |
|---|---------------|
| 0 | No cable      |
| 2 | 2m (standard) |
| 3 | 3m            |
| 5 | 5m            |

\* If you choose a field network specification, the length of the I/O cable will be 0'.

## System configuration

### <SCON-CB/CGB>

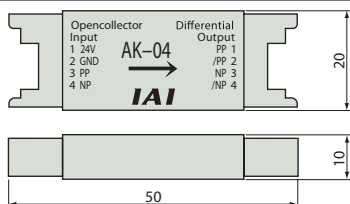


### ■ Pulse Converter: Model number AK-04

Open-collector command pulses are converted to differential command pulses. Use this converter if the host controller outputs open-collector pulses.

#### ■ Specification

| Item               | Specification  |
|--------------------|--|
| Input power supply | 24VDC±10% (Max.50mA)   |
| Input pulse        | Open-collector (Collector current: 12mA max.)                                    |
| Input frequency    | 200kHz or less   |
| Output pulse       | Differential output (10mA max.) (26C31 or equivalent)                            |
| Mass               | 10g or less (excluding cable connectors)   |
| Accessories        | 3M's 37104-3122-000FL (e-CON connector), 2 pieces<br>Suitable wire: AWG No.24~26 |

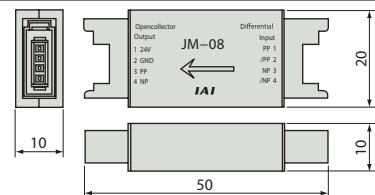


### ■ Pulse Converter: Model number JM-08

Converts differential pulses to the open-collector specification. Please use this converter if the host controller uses open-controller specification for pulse input.

#### ■ Specification

| Item               | Specification  |
|--------------------|--|
| Input power supply | 24VDC±10% (Max.50mA)   |
| Input pulse        | Differential input (10mA max.) (conforming to RS422)                         |
| Input frequency    | 500kHz or less   |
| Output pulse       | 24-VDC open-collector (Collector current: 25mA max.)                         |
| Mass               | 10g or less (excluding cable connectors)                                     |
| Accessories        | 37104-3122-000FL (e-CON connector)(by 3M) × 2<br>Suitable wire: AWG No.24~26 |





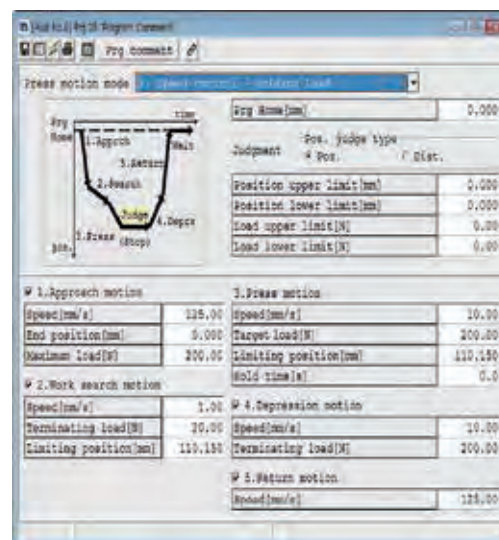
(\*) 3000 and 3300W types are not compliant with UL standard.

**Features**

**1 Equipped Dedicated Press Program**

There are 9 types of press-operation modes to choose from

|  |                              |
|--|------------------------------|
| <b>Speed control</b><br>After arriving at the target position, stops while maintaining the <b>position</b> at the time of arrival. | Position stop                |
|  | Distance stop                |
|  | Load stop                    |
|  | Incremental load stop        |
| <b>Force control</b><br>After arriving at the target position, stops while maintaining the <b>force</b> at the time of arrival.    | Position stop/Position stop2 |
|  | Distance stop                |
|  | Load stop                    |
|  | Incremental load stop        |



**Simple program input**

Simply operate the program by inputting the values into the screen for each press-operation mode that you are using. Also, because the input increment for position is 0.001mm, it is now possible to input more precise settings. This allows the user to make more microscopic adjustments in the positioning process.

**A judgment function has also been added**

Setting the judgment range with the press program judges whether or not the position and load fall within the specified range

**2 Assignment of I/O Signals Specialized for the Servo Press Functions**

The assignment of servo press dedicated I/O signals is completely different than the former PIO pattern.

**3 Predictive Maintenance Functions**

- A function that issues a warning when a motor overload is detected has been included  
Monitoring changes in the temperature of the motor makes it possible to detect abnormalities before the occurrence of a breakdown or a malfunction.
- Improvement of monitoring functions  
Similar to the trigger function of an oscilloscope, it is now possible to acquire the waveforms of the current position, current speed, etc. from the instant the state of the selected signal changes. Also, it is possible to acquire the signal states of positioning completion, alarms, etc.
- A function that integrates the number of cycles with the distance covered makes it possible to check maintenance timing.
- The calendar function makes it possible to keep a timetable of the alarms that have been generated.

## 4 Supports the Safety Function STO/SS1-t <Optional function>

Supports the STO (Safe Torque Off) / SS1-t (Safe Stop 1 - time controlled) function. The STO / SS1-t function is to shut off the energy supply to the motor by electric circuit in the controller.

For the SCON-CB, two specification are available; STO and SS1-t specification.

For applications of the vertical axis, SS1-t specification that has a long reaction time can prevent workpiece from dropping due to the time lag of brake operation when the safety torque shut off function is activated.



| Specifications | Description  | Remarks  |
|----------------|--|--|
| STO            | Reacting to input signals, the energy supply to the motor is shut off after a reaction time (8ms or shorter) by shut-off circuit in the controller.                        |  |
| SS1-t          | Reacting to input signals, brake is applied and the energy supply to the motor is shut off after a reaction time (500ms or shorter) by shut-off circuit in the controller. | This braking operation is not included in the safety function. |

The energy supply to the servo motor can be shut off safely by connecting an external safety-related device and the I/O connector for safety function.

I/O connector for safety function (for STO/SS1-t specification only)



In addition, the STO/SS1-t function is compliant with the following safety standards:

- ISO/EN ISO 13849-1 category 3 Pl e
- IEC 61508 SIL3
- IEC/EN61800-5-2
- IEC/EN62061 SIL CL3

(Note) An engineer with expert knowledge in relevant safety standards should read and understand the descriptions stated in the instruction manual before designing a safety system using this function. Beware of potential injuries and failures.

### List of Models

| Model number           | SCON-CB/CGB                       |  |  |  |  |  |   |  |  |  |
|------------------------|-----------------------------------|--|--|--|--|--|---|--|--|--|
| External view          |                                   |  |  |  |  |  |   |  |  |  |
| I/O type               | Standard specification            | Network connection specification (option) (*2)                           |  |  |  |  |   |  |  |  |
|                        | PIO connection specification (*1) | DeviceNet connection specification<br>DeviceNet connection specification | CC-Link connection specification<br>CC-Link connection specification | CC-Link IE Field connection specification<br>CC-Link IE Field connection specification | PROFIBUS-DP connection specification<br>PROFIBUS-DP connection specification | CompoNet connection specification<br>CompoNet connection specification | – | EtherCAT connection specification<br>EtherCAT connection specification | EtherNet/IP connection specification<br>EtherNet/IP connection specification | PROFINET IO connection specification<br>PROFINET IO connection specification |
| I/O type model number  | NP/PN                             | DV   | CC   | CIE  | PR   | CN   | – | EC   | EP   | PRT  |
| Supported encoder type | Battery-less absolute             |  |  |  |  |  |   |  |  |  |
| SCON-CB                | 30W                               | o  |  |  |  |  |   |  |  |  |
|                        | 60W・100W                          | o  |  |  |  |  |   |  |  |  |
|                        | 200W                              | o  |  |  |  |  |   |  |  |  |
|                        | 400W                              | o  | o  | o  | o  | o  | o | –  | o  | o  |
|                        | 750W                              | o  |  |  |  |  |   |  |  |  |
|                        | 3000W                             | o  |  |  |  |  |   |  |  |  |
| 3300W                  | o                                 |  |  |  |  |  |   |  |  |  |

(\*1) Pulse-train control is not available.

(\*2) Communication with PIO or pulse-train is not available.

## Model

**SCON** - [ ] - [ ] [ ] **F** - [ ] - [ ] - [ ] - [ ]

Series      Type      Motor Type      Encoder Type      I/O Type      I/O Cable Length      Power Supply Voltage      Safety type

|     |                                |
|-----|--------------------------------|
| CB  | Standard                       |
| CGB | Safety category compliant type |

\* Only CGB can be selected for RCS3-RA15R/20R.

|     |      |      |       |
|-----|------|------|-------|
| 30D | 30W  | 400  | 400W  |
| 60  | 60W  | 750S | 750W  |
| 100 | 100W | 3000 | 3000W |
| 200 | 200W | 3300 | 3300W |

(Example) 60: 60 W servo motor compatible

|   |                               |
|---|-------------------------------|
| F | For servo press only (Note 1) |
|---|-------------------------------|

(Note 1) If you do not use the press program, it will be blank. (Excluding 3000 W, 3300 W)

|     |                                   |
|-----|-----------------------------------|
| WAI | Battery-less Absolute Incremental |
|-----|-----------------------------------|

|               |               |
|---------------|---------------|
| Not specified | Standard type |
| STO           | STO type      |
| SS            | SS1-t type    |

\* Only the standard type is selectable for RCS3-RA15R/20R.

|   |                     |
|---|---------------------|
| 1 | Single phase AC115V |
| 2 | Single phase AC230V |
| 3 | Three phase AC230V  |

\* Please check the power supply voltage that can be selected on the page of the actuator.

|     |   |
|-----|---|
| NP  | PIO NPN (standard)                        |
| PN  | PIO PNP                                   |
| DV  | DeviceNet connection                      |
| CN  | CompoNet connection                       |
| CC  | CC-Link connection                        |
| CIE | CC-Link IE Field connection specification |
| PR  | PROFIBUS-DP                               |
| EC  | EtherCAT                                  |
| EP  | EtherNet/IP                               |
| PRT | PROFINET IO                               |

|   |               |
|---|---------------|
| 0 | No cable      |
| 2 | 2m (standard) |
| 3 | 3m            |
| 5 | 5m            |

\* When a field network specification is selected, the I/O cable length is "0".

**Note**

In principle, the same type of motor as the type of motor of the actuator to be connected should be entered, but there are some models where the motor type of some controllers and actuators do not match. Be sure to check the corresponding models listed below during selection.

<30D · 750S Applicable actuator>

- Controller Motor type "30D" RCS3-RA4R
- Controller Motor type "750S" RCS2 - RA13 R When option LCT is selected

## Options

### Absolute Data Backup Battery

**Features** This is an absolute data backup battery for an actuator with absolute specification.

**Model** **AB-5 (Battery only)**  
**AB-5-CS (With a case)**  
**AB-5-CS3 (With a case)**  
 \* For 3000W·3300W



### Dummy plug (Safety category specification)

**Features** This plug is required when the safety category specification (SCON-CGB) is used.

**Model** **DP-5**



### Dummy plug (STO/SS1-t specification)

**Features** Necessary when STO/SS1-t function is not used.

**Model** **DP-6**



## Spare Parts

### Model **CB-SC-STO 030**



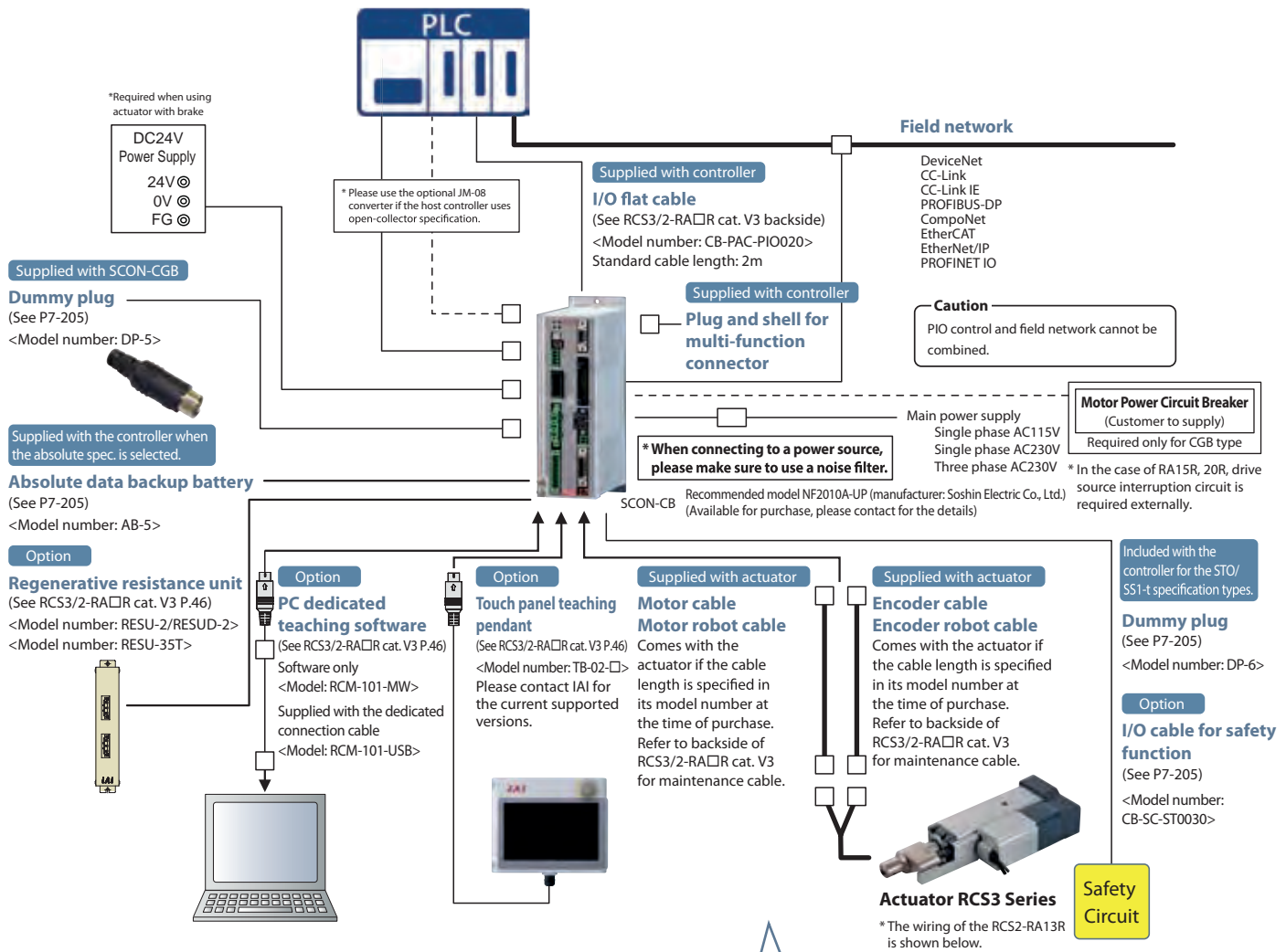
| Wiring      | Color  | Signal | No. |
|-------------|--------|--------|-----|
| —           | —      | —      | 1   |
| —           | —      | —      | 2   |
| Black       | /SRI1- | —      | 3   |
| Black/White | /SRI1+ | —      | 4   |
| Red         | /SRI2- | —      | 5   |
| Red/White   | /SRI2+ | —      | 6   |
| Green       | EDM-   | —      | 7   |
| Green/White | EDM+   | —      | 8   |

Shield is connected to the cable clamp.

\* Wire color: (ex.) Black/white represents white lines on the black insulator.



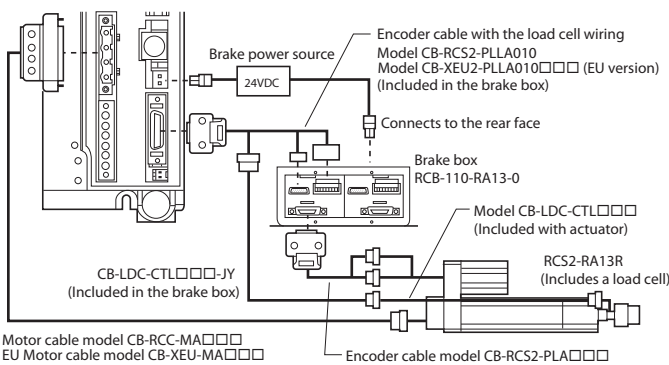
## System Configuration



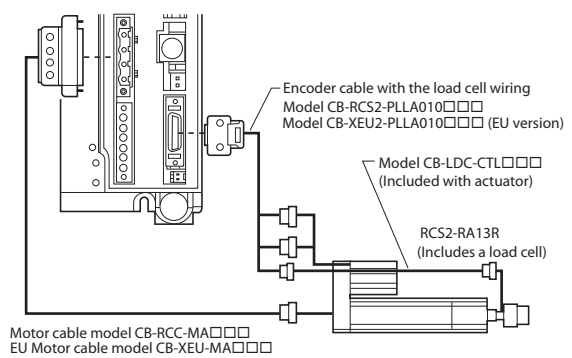
### RCS2-RA13R wiring

RCS2-RA13R option: If the brake "BN" (No brake box) is selected and used as the second axis of the brake box, "CB-LDC-CTL□□-JY", CB-RCS2-PLA010 should be purchased separately.

#### With a Brake



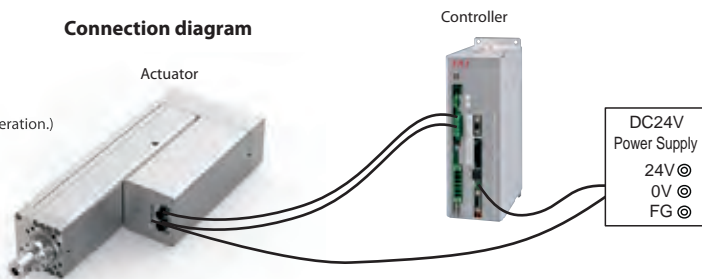
#### Without a Brake



### RCS3-RA15R/20R (with brake) wiring

The brake circuit of RCS3-RA15R/20R is built into the actuator.  
 Enter a 24VDC ± 10% voltage on the actuator.  
 (If the input voltage is low, the brake cannot be released.)  
 Please supply power with the voltage drop of the wiring in consideration.)  
 24VDC supply is required for both actuators and controllers.

#### Connection diagram



The cable is to be prepared by the user. The connector is included.  
 \* For details, please refer to the instruction manual.

# SCON-CAL

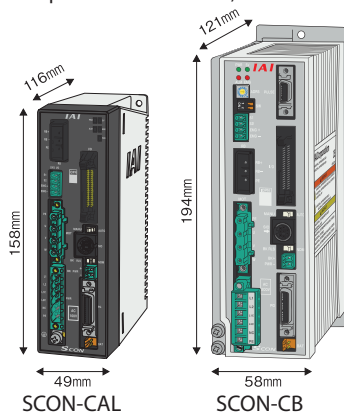


Position Controller for Single-axis Robot/Cartesian Robot/RoboCylinder  
RCS2/RCS3/RCS4



## 1 Miniaturization realized

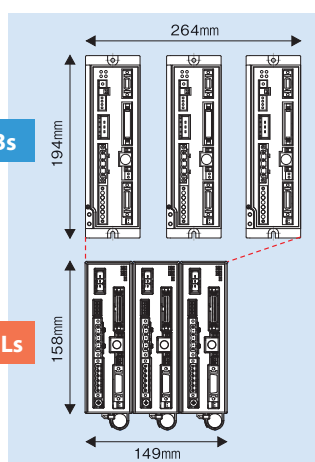
Compared with SCON-CB, the volume ratio has been reduced to 34%. It contributes to the space saving of the control panel.



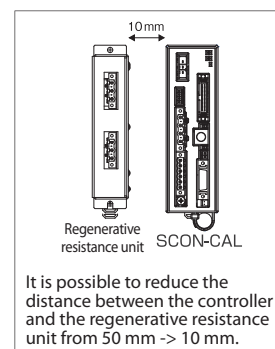
Smaller in volume 34%

Installing 3 SCON-CBs

Installing 3 SCON-CALs



Installation space: Approx. 53% less  
Installation width: Approx. 43% less



## 2 Improve maintenance

- When the absolute battery voltage or fan speed drops, the "WRG (warning)" LED turns on to alert the situation. With this function, you are informed visually when to replace each maintenance part. (The controller can also be set up to output a warning signal.)
- The total number of actuator movements and the total distance travelled are calculated and recorded in the controller, and when the predetermined count or distance is exceeded, a signal is output to an external device. You can use this function to check when the actuator needs re-greasing or periodic inspection. Past alarms are displayed to facilitate the analysis of the alarms because the time and date of each alarm that has occurred is now shown on the alarm history screen.

WRG



## 3 Function comparison with SCON-CB


|                              | SCON-CB  | SCON-CAL   |
|------------------------------|--|--|
| ① Supported encoders         | Incremental<br>Battery-less absolute encoder<br>Absolute<br>ABZ (UVW) parallel encoder | Incremental<br>Battery-less absolute encoder<br>Absolute |
| ② Pulse train control        | ○  | -  |
| ③ Servo monitor function     | ○  | -  |
| ④ Offboard tuning            | ○  | △<br>Unable to analyze with servo monitor                |
| ⑤ Vibration control function | ○  | △<br>Unable to analyze with servo monitor                |

(Note) Depending on the actuator, some models can not be connected to SCON - CAL. Please refer to P7-219 for details.

<<Explanation of Functions>>

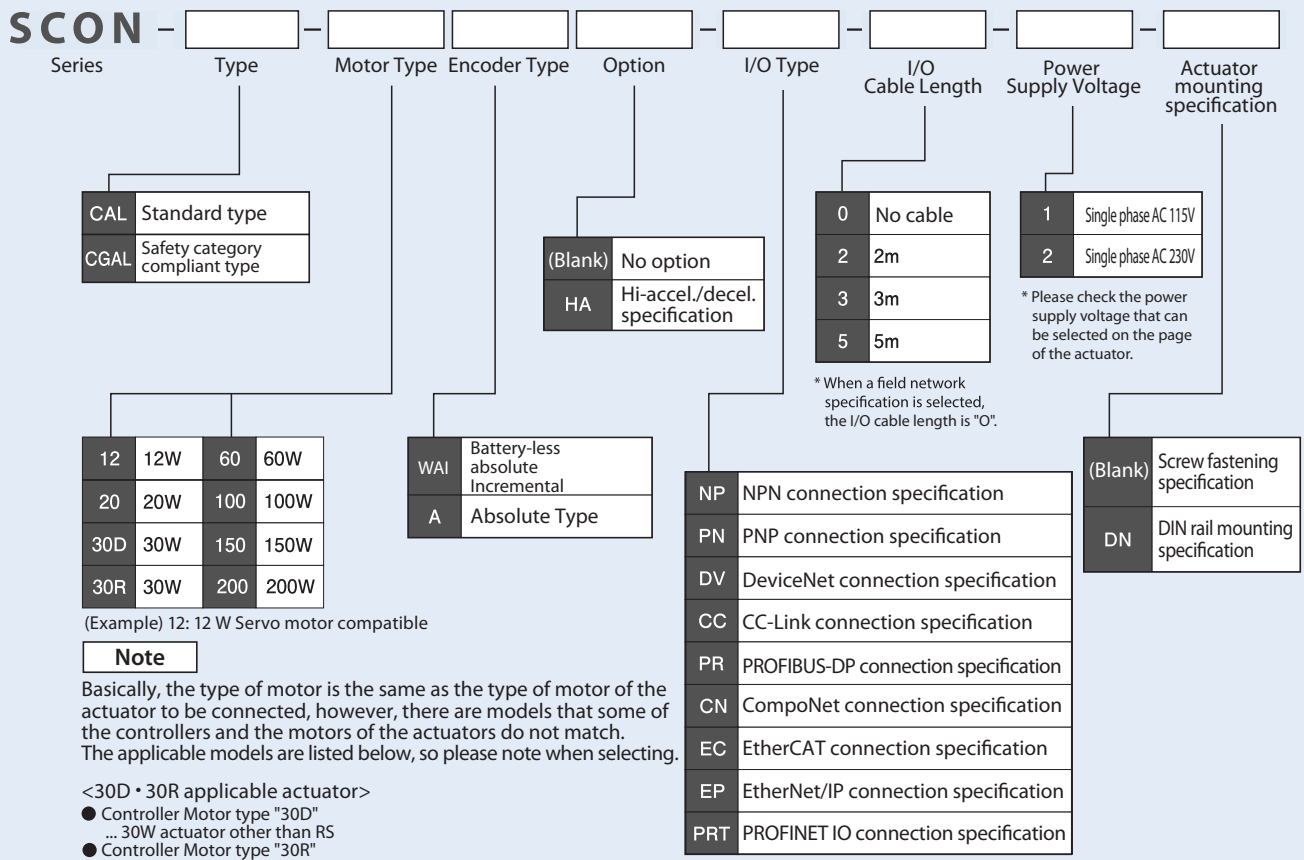
- ③ Servo monitor function: You can check the current speed, position, etc.
- ④ Offboard tuning: An optimal servo gain is calculated according to the load.
- ⑤ Vibration control function: When the actuator slider moves, oscillation (vibration) of the work installed on the slider is suppressed.

## List of Models

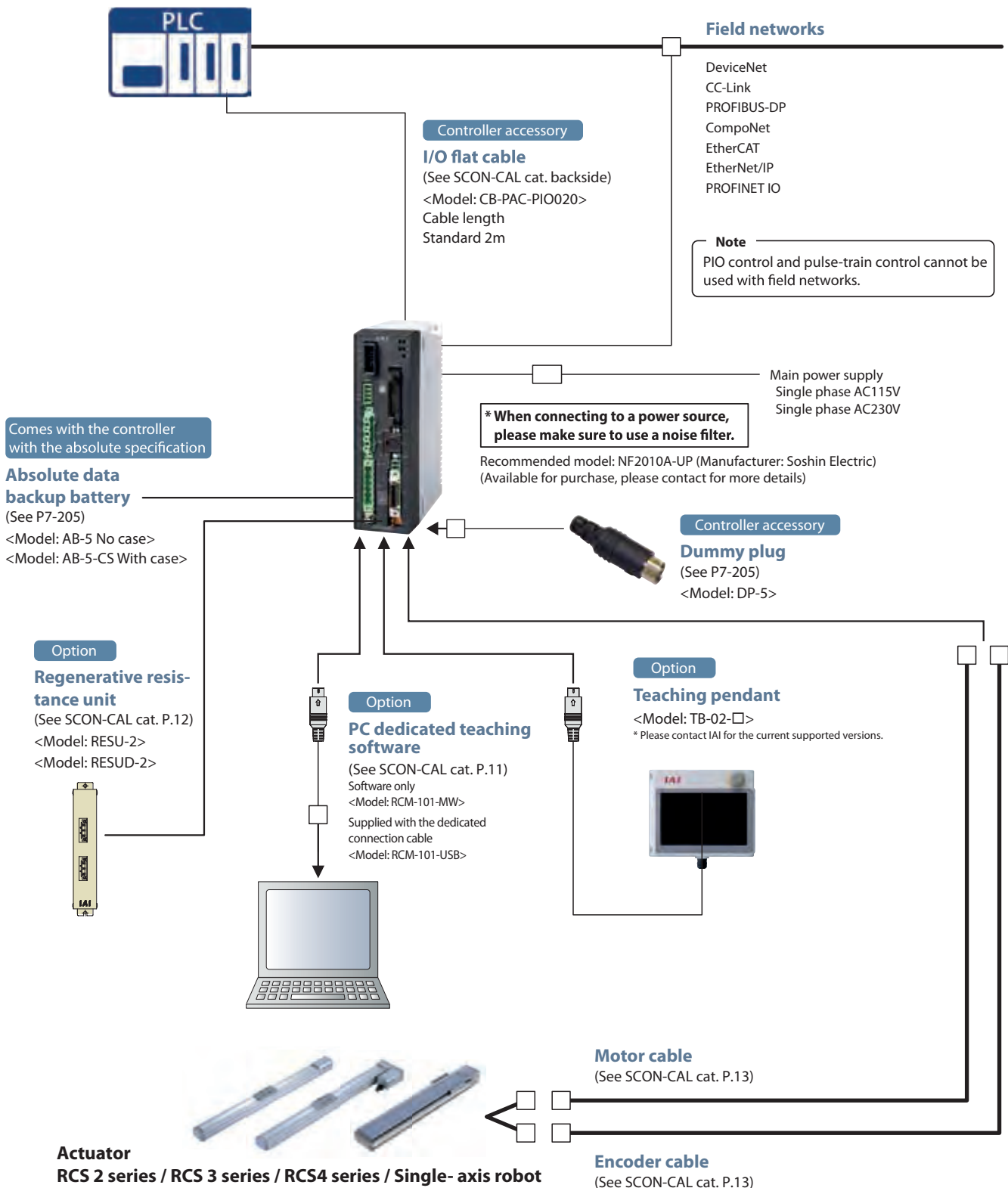
| Model number            | SCON-CAL / CGAL   |          |   |                                  |                                      |                                   |   |                                   |                                      |                                      |
|-------------------------|---|----------|---|----------------------------------|--------------------------------------|-----------------------------------|---|-----------------------------------|--------------------------------------|--------------------------------------|
| External view           |  |          |   |                                  |                                      |                                   |   |                                   |                                      |                                      |
| I/O type                | Standard specification  |          | Network connection specification (Option)*1 |                                  |                                      |                                   |   |                                   |                                      |                                      |
| I/O type specification  | PIO connection specification  |          | DeviceNet connection specification          | CC-Link connection specification | PROFIBUS-DP connection specification | CompoNet connection specification | – | EtherCAT connection specification | EtherNet/IP connection specification | PROFINET IO connection specification |
| I/O type code           | NP/PN   |          | DV  | CC                               | PR                                   | CN                                | – | EC                                | EP                                   | PRT                                  |
| Applicable encoder type | Battery-less absolute<br>Incremental  | Absolute | Battery-less absolute/ Incremental/Absolute |                                  |                                      |                                   |   |                                   |                                      |                                      |
| SCON-CAL/CGAL           | ○   | ○        | ○   | ○                                | ○                                    | ○                                 | – | ○                                 | ○                                    | ○                                    |

\*1 If a network specification is selected, PIOs are not available.  
 \* This product does not support pulse train control.

## Model



## System configuration



(Note) The actuators which cannot be connected to SCON-CAL

- Actuators which motor wattage is greater than 200 W
  - DD(A) Series
- Incremental types of the following models:
- NS-S types: • RCS2-SRA7BD, SRGD7BD, SRGS7BD
  - Mini RoboCylinder: RCS2-RN5N, RP5N, GS5N, GD5N, SD5N, TCA5N, TWA5N, TFA5N

# MSCON



**Position Controller for Single-axis Robot /  
Cartesian Robot / RoboCylinder RCS2/RCS3/RCS4  
SCON Series, 6-axis Type**



## Features

### 1 Space-saving, low-cost, and easy to use

Six controllers (SCON-CB) are combined into one unit to save the installation space and achieve significant reduction in total cost.



### 2 Movement by numerical specification via Field network

#### Substantially shorter transmission time

MSCON controllers can be connected directly to key field networks such as DeviceNet, CC-Link, PROFIBUS-DP, PROFINET IO, CompoNet, EtherCAT and EtherNet/IP.

#### Features of Network Specification

- 256 positioning points per axis
- Moving the actuator after numerically specifying the position to move to, and the speed
- Checking the current position in real time
- Significantly shorter communication time within the controller (approx. one-sixth compared to conventional controllers)

DeviceNet™



CompoNet™



EtherNet/IP™











### 3 Offboard tuning function to enhance actuator payload capacity

The offboard tuning function increases the acceleration/deceleration speed when the load is small, and decreases the acceleration/deceleration when the load is large, to ensure optimal operation settings according to the load. In addition, this function also adjusts the servo characteristics.

### 4 Vibration control function for shorter cycle time

The vibration control function has been added to prevent the work from shaking (vibrating) on the actuator slider as the slider moves. The wait time for vibration to stabilize is shorter and the cycle time can also be shortened.

## Model List

| Model                             |                        | MSCON-C  |   |   |   |  |  |  |
|-----------------------------------|------------------------|--|---|---|---|--|--|--|
| External view                     |                        |  |   |   |   |  |  |  |
| I/O type                          |                        | DeviceNet connection specification   | CC-Link connection specification  | PROFIBUS connection specification   | CompoNet connection specification   | PROFINET connection specification  | EtherCAT connection specification  | EtherNet/IP connection specification   |
|                                   |                        |   |  |  |                        |   |   |   |
| I/O type model code               |                        | DV   | CC  | PR  | CN  | PRT  | EC   | EP   |
| Applicable encoder type           |                        | Battery-less absolute / Incremental / Absolute                                     |   |   |   |  |  |  |
| Field network type specifications | Communication Protocol | DeviceNet 2.0  | CC-Link 1.1 or 2  | Profibus-DP   | CompoNet specialized protocol   | IEC61158 (IEEE802.3), IEC61784   | IEC61158 type 12   | IEC61158 (IEEE802.3)   |
|                                   | Baud Rate              | Automatically follows the master   | 10M/5M/2.5M/625K/156kbps  | Automatically follows the master  | Automatically follows the master  | 100Mbps  | Automatically follows the master   | 10BASE-T/100BASE-T (Autonegotiation setting is recommended)                          |
|                                   | Communications Cable   | Use the dedicated cable  | Use the dedicated cable   | STP cable AWG18   | Round-type cable (JIS C3306, VCTF2 conductors) Flat cable I (with no sheathed) Flat cable II (sheathed) | Category 5e or higher (Double shielded cable braided with aluminum foil recommended) | Category 5e or higher (Double shielded cable braided with aluminum foil recommended) | Category 5e or higher (Double shielded cable braided with aluminum foil recommended) |
|                                   | Connector              | MSTBA2.5/5-G-5.08-ABGY AU (Manufactured by PHOENIX CONTACT or equivalent)          | MSTBA2.5/5-G-5.08 AU (Manufactured by PHOENIX CONTACT or equivalent)              | 9 pin female D-sub Connector  | XW7D-PB4-R (Manufactured by OMRON or equivalent)  | RJ45 Connector x1pc (per connector)  | RJ45 Connector x 2pc (Input x1, Output x1)   | RJ45 Connector x1pc (per connector)  |

## Model

(Specs for 1st axis)      (Specs for axis 2 - 6)

MSCON Series — C — [ ] — [ ] — [ ] — [ ] — ( [ ] [ ] [ ] ) — [ ] — 0 — [ ]

Series      Type      Number of axes      Motor      Encoder      Option      Motor      Encoder      Option      I/O type      I/O cable length      Power/voltage

|   |                   |                  |  |    |  |  |  |  |     |  |            |
|---|-------------------|------------------|--|----|--|--|--|--|-----|--|------------|
| 1 | Single-axis model | 12 12W 60 60W    |  | HA |  |  |  |  | DV  |  | 1 AC115V   |
| 2 | 2-axis model      | 20 20W 100 100W  |  | WA |  |  |  |  | CC  |  | 2 AC230V   |
| 3 | 3-axis model      | 30D 30W 150 150W |  | A  |  |  |  |  | PR  |  |            |
| 4 | 4-axis model      | 30R 30W 200 200W |  |    |  |  |  |  | CN  |  |            |
| 5 | 5-axis model      |                  |  |    |  |  |  |  | PRT |  |            |
| 6 | 6-axis model      |                  |  |    |  |  |  |  | EC  |  |            |
|   |                   |                  |  |    |  |  |  |  | EP  |  | 0 No cable |

**Note**  
Basically, the type of motor is the same as the type of motor of the actuator to be connected, however, there are models that some of the controllers and the motors of the actuators do not match.  
The applicable models are listed below, so please note when selecting.  
<30D•30R applicable actuator>  
● Controller Motor type "30D" ... 30W actuator other than RS  
● Controller Motor type "30R" ... RS

\* Encoder type can be specified for each axis.

\* Please check the power supply voltage that can be selected on the page of the actuator.

\* The MSCON is available only in network specifications and does not come with I/O cables.

## System configuration

**Option**

**PC dedicated teaching software**

(See MSCON cat. V2 P.9)

Software only

<Model: RCM-101-MW>

Supplied with the dedicated connection cable

<Model: RCM-101-USB>

**Option**

**Touch panel teaching pendant**

<Model: TB-02-□>



Included with PC dedicated teaching software

**Comm. cable**

<Model: CB-RCA-SIO050>

(See MSCON cat. V2 P.9)

**Option**

**Regenerative resistance unit**

(See MSCON cat. V2 P.9)

<Model: RESU-2>

<Model: RESU-2>

**Motor cable**

**Motor robot cable**

Supplied when the cable length is specified in the actuator model.

Refer to MSCON cat. V2 P.10 for maintenance cable.

**Comes with the actuator**

**Absolute data backup battery**

(See MSCON cat. V2 P.9)

<Model: AB-5 No case>

<Model: AB-5 With case>



**Field networks**

DeviceNet  
CC-Link  
PROFIBUS-DP  
CompoNet  
EtherCAT  
EtherNet/IP  
PROFINET IO

**\* To connect to a field network, the gateway parameter setting tool supplied with the PC dedicated software must be used to set up communication for the controller.**

**Motor drive power supply**

AC 115V  
AC 230V  
One of the above is supplied. (selectable)

**\* When connecting to a power source, please make sure to use a noise filter.**  
Recommended model: NBC 10-472 (Manufacturer: COSEL)  
(Available for purchase, please contact for more details)

**Control power supply**

DC24V  
Power Supply  
24V ⊕  
0V ⊖  
FG ⊕

**Brake power supply**

DC 24V is supplied.

**Slider type/Rod type**

**Encoder cable**

**Encoder robot cable**

Supplied when the cable length is specified in the actuator model.

Refer to MSCON cat. V2 P.10 for maintenance cable.

**Comes with the actuator**

**Rotary/Limit switch option type**

**Encoder cable**

**Encoder robot cable**

Supplied when the cable length is specified in the actuator model.

Refer to MSCON cat. V2 P.11 for maintenance cable.

**Comes with the actuator**



**Actuator**

RCS2 series / RCS3 series / RCS4 series / Single-axis robot / Cartesian robot

**Notes** Please note that the following models are not supported by the MSCON:

- RCS2-RN5N/RP5N/GS5N/GD5N/SD5N/TCA5N/TWA5N/TFA5N/SRA7BD/SRGS7BD/SRGD7BD, NS-SXM□/SZM□ (both incremental specifications only)
- DD(A) series
- Actuator with more than 200W motor

# SSEL



Program Controller for Single-axis robot / Cartesian robot / RoboCylinder RCS2/RCS3/RCS4



## List of models

Program controller for operating 230V servo actuators. One unit can handle various controls.

| Type            | CS  |   |
|-----------------|---|---|
| Name            | Program mode  | Positioner mode   |
| External view   |   |   |
| Description     | Both the actuator operation and communication with external equipment can be handled by a single controller. When two axes are connected, arc interpolation, path operations, and synchronization can be performed. | Up to 20000 positioning points are supported. Push-motion operations and teaching operations are also possible. |
| Position points | 20000 points  |   |

|        |                                   |          | 20~150W | 200W                              | 300~400W | 600W | 750W |
|--------|-----------------------------------|----------|---------|-----------------------------------|----------|------|------|
|        |                                   |          | 1 axis  | Battery-less absolute Incremental | ○        | ○    | ○    |
|        |                                   | Absolute | ○       | ○                                 | ○        | ○    | ○    |
| 2 axis | Battery-less absolute Incremental |          | ○       | ○                                 | ○        | ○    | ○    |
|        |                                   | Absolute | ○       | ○                                 | ○        | ○    | ○    |

## Model

\* 2nd axis specs not applicable to the single-axis model.

**SSEL - CS -** [ ] - [ ] [ ] [ ] - ( [ ] [ ] [ ] ) - [ ] - [ ] - [ ]

Series      Type      Number of axes      (Specs for 1st axis)      (Specs for 2nd axis)      I/O type      I/O cable length      Power voltage

Motor      Encoder      Option      Motor      Encoder      Option

**CS** Standard type

1 Single-axis model  
2 2-axis model

|      |      |      |      |
|------|------|------|------|
| 12   | 12W  | 150  | 150W |
| 20   | 20W  | 200  | 200W |
| 30D  | 30W  | 200S | 200W |
| 30R  | 30W  | 300S | 300W |
| 60   | 60W  | 400  | 400W |
| 100  | 100W | 600  | 600W |
| 100S | 100W | 750  | 750W |

(Ex.) 12: compatible with 12W servo motor

Note

Basically, the motor has the same alphanumeric code as the connecting actuator motor, though some controllers and actuator motors have different codes. When ordering, please pay attention to such types listed below:  
<30D, 30R compatible actuators>

- Controller motor type "30D" ...30W actuators except for RS
- Controller motor type "30R" ...RS

WAI Battery-less absolute incremental  
A Absolute

B Brake  
C Creep sensor  
HA High accel./decel.  
L Home sensor/LS-compatible  
M Master axis spec

WAI Battery-less absolute incremental  
A Absolute

B Brake  
C Creep sensor  
HA High accel./decel.  
L Home sensor/LS-compatible  
S Master axis spec

|      |      |      |      |
|------|------|------|------|
| 12   | 12W  | 150  | 150W |
| 20   | 20W  | 200  | 200W |
| 30D  | 30W  | 200S | 200W |
| 30R  | 30W  | 300S | 300W |
| 60   | 60W  | 400  | 400W |
| 100  | 100W | 600  | 600W |
| 100S | 100W | 750  | 750W |

(Ex.) 12: compatible with 12W servo motor

1 Single-phase AC115V  
2 Single-phase AC230V

\* Please confirm that the power supply voltage is compatible with the actuator you are selecting.

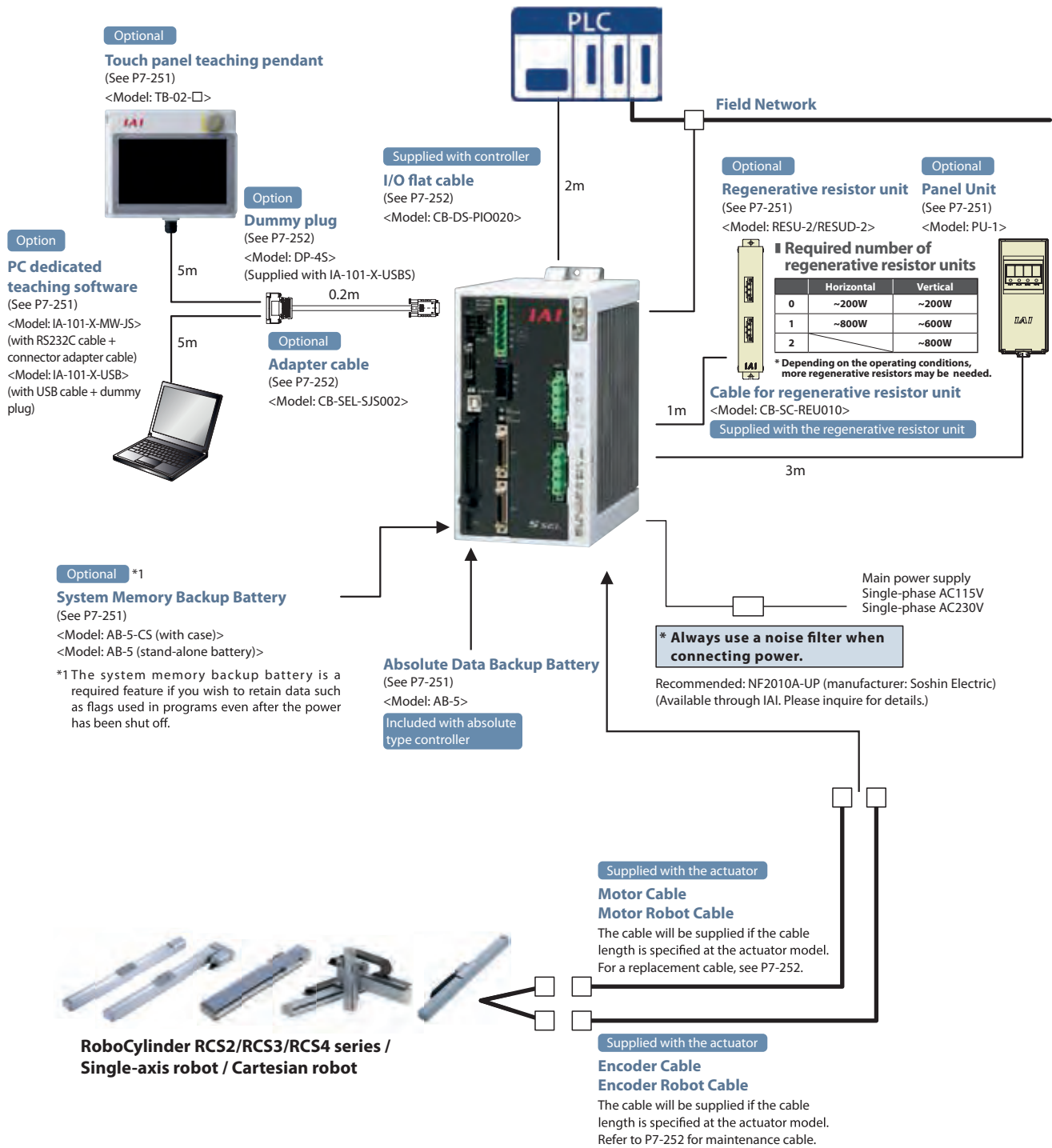
0 No cable  
2 2m  
3 3m  
5 5m

\* The I/O cable length is "0" if a field network specification is selected.

|    |                    |
|----|--------------------|
| NP | PIO NPN (standard) |
| PN | PIO PNP            |
| DV | DeviceNet          |
| CC | CC-Link            |
| PR | PROFIBUS-DP        |
| EP | EtherNet/IP        |



System Configuration



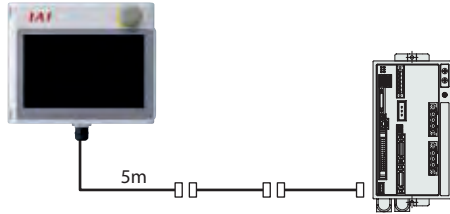
Options

## Touch Panel Teaching Pendant

**Features** This is a teaching device that provides information on functions such as position input, test runs, and monitoring.

**Model** TB-02-□

**Configuration**



**Specifications**

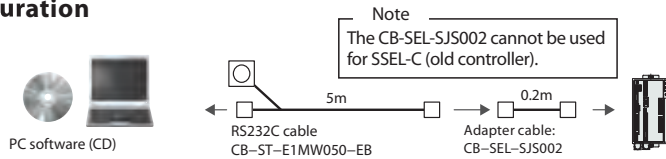
|                                 |                                    |
|---------------------------------|------------------------------------|
| Rated voltage                   | 24V DC                             |
| Power consumption               | 3.6W or smaller (150mA or smaller) |
| Ambient operational temperature | 0 to 40°C                          |
| Ambient operational humidity    | 20 to 85% RH (non-condensing)      |
| Protection class                | IP20                               |
| Weight                          | 470g (TB-02 only)                  |

## PC dedicated teaching software (Windows only)

**Features** A startup support software for entering programs/positions, performing test runs, and monitoring. More functions have been added for debugging, and improvements have been made to shorten the start-up time.

**Model** IA-101-X-MW-JS (with RS232C cable + adapter cable)

**Configuration**

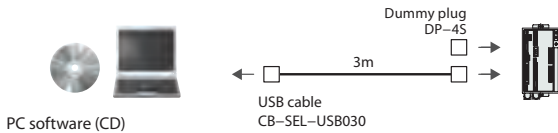


Compatible with Windows ver.: 7/8/8.1/10



**Model** IA-101-X-USBS (with USB cable)

**Configuration**



Note  
Dummy plug DP-4S cannot be used for SSEL-C (old controller).

Note  
Only versions 7.0.0.0 and later can be used with the SSEL controller.

## Regenerative Resistor Unit

**Features** A unit that converts the regenerative current, generated during the acceleration/ deceleration of the motor, into heat. In the table on the right, check the total power output of the actuator to see if a regenerative resistor is needed.

**Model** RESU-2 (standard)  
RESUD-2 (DIN rail mount)

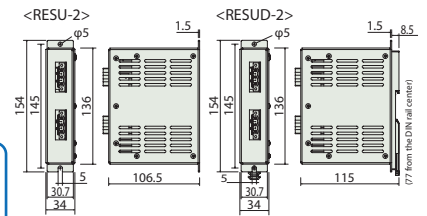
| Model                            | RESU-2         | RESUD-2           |
|----------------------------------|----------------|-------------------|
| Weight of main unit              | approx 0.4kg   |                   |
| Internal regenerative resistance | 235Ω 80W       |                   |
| Installation                     | Screw mounting | DIN rail mounting |
| Connection cable                 | CB-SC-REU010   |                   |

**Required number of units** **External dimensions**

|   | Horizontal | Vertical |
|---|------------|----------|
| 0 | ~200W      | ~200W    |
| 1 | ~800W      | ~600W    |
| 2 | ~800W      | ~800W    |

\* Depending on the operating conditions, more regenerative resistors may be needed.

\* When two regenerative units are required, please use one RESU-2 and one RESU-1. (See Page 7-287)



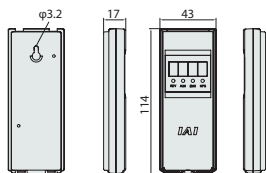
CAD drawings can be downloaded from our website.  
www.iai-automation.com



### Panel Unit

**Features** Display device that shows the error code from the controller or the currently running program number.

**Model** PU-1 (cable length: 3m)



### Absolute Data Backup Battery

**Features** Battery for saving absolute data, when operating an actuator with an absolute encoder. Same as the battery used for system memory backup.

**Model** AB-5



### System Memory Backup Battery

**Features** This battery is required when you are using global flags in the program and you want to retain your data even after the power has been turned OFF.

**Model** AB-5-CS (with case)  
AB-5 (stand-alone battery)



## Options

### Dummy Plug

**Features** When connecting the SSEL controller to a computer with a USB cable, this plug needs to be connected to the touch panel teaching port connector to shut off the enable circuit.  
(PC dedicated teaching software IA-101-X-USB includes this plug.)

**Model** DP-4S

\* Cannot be used for SSEL-C.



### USB Cable

**Features** A cable for connecting the controller to the USB port to a computer.  
A controller with no USB port (e.g. XSEL) can be connected to the USB port of a computer by connecting an RS232C cable to the USB cable via a USB adapter. (See PC software IA-101-X-USBMW) Refer to the PC dedicated teaching software IA-101-X-USBMW.

**Model** CB-SEL-USB030 (cable length: 3m)

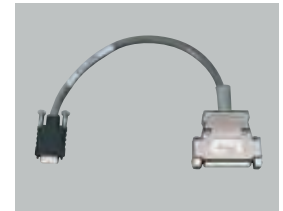


### Adapter Cable

**Features** This conversion cable is used to connect the D-sub, 25 pin connector of the touch panel teaching pendant or PC dedicated teaching software to the teaching connector (half pitch) of the SSEL controller.

**Model** CB-SEL-SJS002 (cable length: 0.2m)

\* Cannot be used for SSEL-C.



## Spare Parts

When you need spare parts after purchasing the product, such as when replacing a cable, refer to the list of models below.

### Table of applicable cables

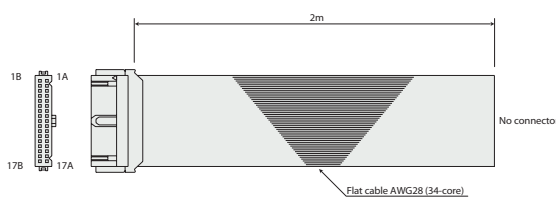
| Product model |  | Motor cable                                       | (EU) Motor robot cable                             | Encoder cable   | (EU) Encoder robot cable   |
|---------------|--|---|--|---|--|
| ①             | RCS2(CR/W)<br>RCS3(CR)                           | Models other than ② - ④ .                         | CB-RCC-MA□□□□<br><br>CB-XEU-MA□□□□<br>(EU version) | CB-RCS2-PA□□□□  | CB-X(EU)3-PA□□□□   |
| ②             | RCS2   | RT  |  | CB-RCS2-PLA□□□□   | CB-X(EU)2-PLA□□□□  |
| ③             |  | RA13R<br>(without load cell/<br>without brake) *2 |  | CB-RCS2-PLA□□□□   | CB-X(EU)2-PLA□□□□  |
| ④             |  | RA13R<br>(without load cell/<br>with brake) *2    |  | CB-RCS2-PLA□□□□<br>* Between controller and brake is<br>CB-RCS2-PLA□□□□ | CB-X(EU)2-PLA□□□□<br>* Between controller and brake is<br>CB-X(EU)2-PLA□□□□                                      |
| ⑤             |  | RCS4(CR)  |  | -   | CB-X(EU)1-PA□□□□   |
| ⑥             | NS   | without LS  | CB-X-MA□□□□<br>CB-XEU-MA□□□□<br>(EU version)       | -   | CB-X(EU)3-PA□□□□   |
| ⑦             |  | with LS   | -  | -   | CB-X(EU)2-PLA□□□□  |
| ⑧             | -  | -   | -  | -   | -  |
| ⑨             | -  | -   | -  | -   | -  |
| ⑩             | -  | -   | -  | -   | -  |
| ⑪             | IS(P)WA  | S/M/L   | CB-XEU-MA□□□□                                      | -   | CB-X1-PA□□□□-WC  |
| ⑫             | Models other than ① - ⑪ .                        |   | CB-X-MA□□□□<br><br>CB-XEU-MA□□□□<br>(EU version)   | -   | CB-X(EU)1-PA□□□□<br>(in case of 20m or shorter) *1<br><br>CB-X(EU)1-PA□□□□-AWG24<br>(in case of 21m or longer)   |
| ⑬             | Models other than ① - ⑪<br>with LS specification |   |  | -   | CB-X(EU)1-PLA□□□□<br>(in case of 20m or shorter) *1<br><br>CB-X(EU)1-PLA□□□□-AWG24<br>(in case of 21m or longer) |

\*1 Cables for other than the battery-less absolute specification are CB-X(EU)1-PA□□□□/CB-X(EU)1-PLA□□□□, even when the length is 20m or longer. \*2 For the RCS2-RA13R load cell specification cables, please contact IAI.

| Product model | PIO flat cable |
|---------------|----------------|
| ⑭ SSEL-CS     | CB-DS-PIO□□□□  |

### Model CB-DS-PIO□□□□

\* Specify the cable length in □□□□  
Maximum length is 10m. Ex.: 080=8m



| No. | Color    | Wire               | No. | Color    | Wire               |
|-----|----------|--------------------|-----|----------|--------------------|
| 1A  | Brown 1  | Flat cable crimped | 9B  | Gray 2   | Flat cable crimped |
| 1B  | Red 1    |                    | 10A | White 2  |                    |
| 2A  | Orange 1 |                    | 10B | Black 2  |                    |
| 2B  | Yellow 1 |                    | 11A | Brown-3  |                    |
| 3A  | Green 1  |                    | 11B | Red 3    |                    |
| 3B  | Blue 1   |                    | 12A | Orange 3 |                    |
| 4A  | Purple 1 |                    | 12B | Yellow 3 |                    |
| 4B  | Gray 1   |                    | 13A | Green 3  |                    |
| 5A  | White 1  |                    | 13B | Blue 3   |                    |
| 5B  | Black 1  |                    | 14A | Purple 3 |                    |
| 6A  | Brown 2  |                    | 14B | Gray 3   |                    |
| 6B  | Red 2    |                    | 15A | White 3  |                    |
| 7A  | Orange 2 |                    | 15B | Black 3  |                    |
| 7B  | Yellow 2 |                    | 16A | Brown-4  |                    |
| 8A  | Green 2  |                    | 16B | Red 4    |                    |
| 8B  | Blue 2   |                    | 17A | Orange 4 |                    |
| 9A  | Purple 2 |                    | 17B | Yellow 4 |                    |

# MSEL

**Program Controller**  
**for RCP6/RCP5/RCP4/RCP3/RCP2/IXP**  
**Wrist Unit WU**



## Features

### 1 Control Maximum of 4 Axes Available with Pulse Motor Mounted RoboCylinder

Actuators with pulse motor in the past were able to control only up to two axes with one program controller. By using MSEL, four axes will be available for control. It is also available for interpolation operations, which enhances the ways of use.

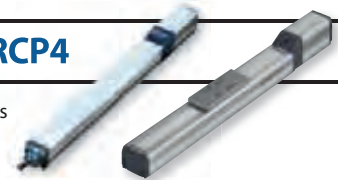
**Examples of Combinations**

|                                |      |                            |      |
|--------------------------------|------|----------------------------|------|
| 3-axis Cartesian (Pulse Motor) | RCP6 | IXP (3-axis specification) | RCP2 |
|                                | +    |                            | +    |
|                                |      |                            |      |

**Available to Connect up to 4 Axes**

### 2 Available to Connect RoboCylinders RCP6, RCP5 and RCP4

By applying to PowerCon, it is now possible to perform interpolation operations with RoboCylinders RCP6, RCP5 and RCP4, which are applicable for high-output driver, but were not feasible with the program controller PSEL in the past.



### 3 Cable Reduction and Space-saving

In the past, to control actuators of 4 axes, two 2-axis controllers (PSEL) and a 24V power supply were needed. Due to the built-in power source, one MSEL controller can control 4 axes.

**In case of controlling 4 axes of actuators**


|  |   |   |
|--|---|---|
| <p><b>Conventional product</b>    <b>2 PSEL units + 24V power supply</b></p> | <div style="background-color: red; color: white; padding: 10px; font-weight: bold; font-size: 1.2em;">                 Cable Reduction<br/>                 Applicable for AC100 to 230V<br/>                 built-in power source.<br/><br/>                 Cost Reduction<br/>                 Approx. 36% reduced             </div> | <p><b>New</b>    <b>1 MSEL unit</b></p> |
|--|---|---|

### 4 Equipped with Expansion I/O Slot

In addition to the standard I/O (IN 16 points / OUT 16 points), one slot is available as an expansion I/O slot. The expansion I/O is available to select from PIO (IN 16 points / OUT 16 points) or various field networks.

Table of Models

Program controller for operations of RCP6/RCP5/RCP4/RCP3/RCP2 Series actuators. It is applicable to various types of controls with one unit.

| Type                                 |        | PC   | PG                             |
|--------------------------------------|--------|--|--------------------------------|
| Name                                 |        | Standard type  | Safety category compliant type |
| External view                        |        |  |                                |
| Maximum controllable axes            |        | 4  |                                |
| Number of positions                  |        | 30000 points   |                                |
| Power supply                         |        | Single-phase AC100~230V  |                                |
| Safety category                      |        | B  | 3*1                            |
| Battery-less absolute<br>Incremental | 1-axis | ○  |                                |
|                                      | 2-axis | ○  |                                |
|                                      | 3-axis | ○  |                                |
|                                      | 4-axis | ○  |                                |
| Simple absolute specification        | 1-axis | ○  |                                |
|                                      | 2-axis | ○  |                                |
|                                      | 3-axis | ○  |                                |
|                                      | 4-axis | ○  |                                |

\*1: Compliance with the Safety Category requires the customer to install a safety circuit externally to the controller.

Model

MSEL — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — 4 — [ ] — [ ]

Series    Type    Number of axes    (Specs for 1st axis)    (Specs for axis 2 to 4)    Standard I/O    Expansion I/O    I/O cable length    Power voltage    Simple absolute unit    Mounting specification

|    |                                |  |  |  |  |  |  |  |  |  |  |
|----|--------------------------------|--|--|--|--|--|--|--|--|--|--|
| PC | Standard type                  |  |  |  |  |  |  |  |  |  |  |
| PG | Safety category compliant type |  |  |  |  |  |  |  |  |  |  |

|   |        |  |  |  |  |  |  |  |  |  |  |
|---|--------|--|--|--|--|--|--|--|--|--|--|
| 1 | 1-axis |  |  |  |  |  |  |  |  |  |  |
| 2 | 2-axis |  |  |  |  |  |  |  |  |  |  |
| 3 | 3-axis |  |  |  |  |  |  |  |  |  |  |
| 4 | 4-axis |  |  |  |  |  |  |  |  |  |  |

|      |          |      |          |  |  |  |  |  |  |  |  |
|------|----------|------|----------|--|--|--|--|--|--|--|--|
| 20P  | 20□      | 20P  | 20□      |  |  |  |  |  |  |  |  |
| 20SP | 20□      | 20SP | 20□      |  |  |  |  |  |  |  |  |
| 28P  | 28□      | 28P  | 28□      |  |  |  |  |  |  |  |  |
| 28SP | 28□      | 28SP | 28□      |  |  |  |  |  |  |  |  |
| 35P  | 35□      | 35P  | 35□      |  |  |  |  |  |  |  |  |
| 42P  | 42□      | 42P  | 42□      |  |  |  |  |  |  |  |  |
| 42SP | 42□      | 42SP | 42□      |  |  |  |  |  |  |  |  |
| 56P  | 56□      | 56P  | 56□      |  |  |  |  |  |  |  |  |
| WUS  | For WU-S | WUS  | For WU-S |  |  |  |  |  |  |  |  |
| WUM  | For WU-M | WUM  | For WU-M |  |  |  |  |  |  |  |  |

(Ex) 20P: 20□ Pulse motor compatible  
 \* WUS and WUM use 2 axes.  
 No need to specify encoder and options.

(Ex) 20P: 20□ Pulse motor compatible  
 \* WUS and WUM use 2 axes.  
 No need to specify encoder and options.

|     |                                   |     |                                   |
|-----|-----------------------------------|-----|-----------------------------------|
| WAI | Battery-less absolute Incremental | WAI | Battery-less absolute Incremental |
| SA  | Simple absolute specification     | SA  | Simple absolute specification     |

\* Battery-less absolute and incremental cannot be used together with simple absolute. When using simple absolute, all the axes need to be used in simple absolute.

\* Battery-less absolute and incremental cannot be used together with simple absolute. When using simple absolute, all the axes need to be used in simple absolute.

|   |       |   |       |
|---|-------|---|-------|
| B | Brake | B | Brake |
|---|-------|---|-------|

|    |     |    |     |
|----|-----|----|-----|
| NP | NPN | PN | PNP |
|----|-----|----|-----|

|   |           |
|---|-----------|
| 4 | AC100~230 |
|---|-----------|

|       |                |    |                |
|-------|----------------|----|----------------|
| Blank | Screw fixation | DN | DIN rail mount |
|-------|----------------|----|----------------|

|     |                           |      |                              |       |                             |
|-----|---------------------------|------|------------------------------|-------|-----------------------------|
| ABB | With absolute battery box | ABBN | Without absolute battery box | Blank | Battery-less or Incremental |
|-----|---------------------------|------|------------------------------|-------|-----------------------------|

\* Make sure to select ABB / ABBN when simple absolute type "SA" is selected.

|   |          |   |               |   |    |   |    |
|---|----------|---|---------------|---|----|---|----|
| 0 | No cable | 2 | 2m (standard) | 3 | 3m | 5 | 5m |
|---|----------|---|---------------|---|----|---|----|

|   |          |    |                           |    |                           |    |                 |     |  |    |               |     |                                      |    |                   |    |             |    |                        |     |             |     |        |     |       |
|---|----------|----|---------------------------|----|---------------------------|----|-----------------|-----|--|----|---------------|-----|--------------------------------------|----|-------------------|----|-------------|----|------------------------|-----|-------------|-----|--------|-----|-------|
| E | Not used | NP | Expansion PIO board (NPN) | PN | Expansion PIO board (PNP) | DV | DeviceNet board | DV2 | DeviceNet board (with 2-way connector) | CC | CC-Link board | CC2 | CC-Link board (with 2-way connector) | PR | PROFIBUS-DP board | EP | EtherNet/IP | EC | EtherCAT communication | PRT | PROFINET IO | SE1 | RS232C | SE2 | RS485 |
|---|----------|----|---------------------------|----|---------------------------|----|-----------------|-----|--|----|---------------|-----|--------------------------------------|----|-------------------|----|-------------|----|------------------------|-----|-------------|-----|--------|-----|-------|

\* If CC2 or DV2 is selected, a 2-way connector is supplied for branch wiring.

**NOTE**


Basically, the motor has the same alphanumeric sign as the connecting actuator motor, though some controllers and actuator motors have different signs.

1. When ordering, pay attention to such types listed below:  
 (Actuators for 28SP)  
 ● Controller motor "28SP"  
 ... RCP2-RA3C

2. One WU can be connected to one MSEL.

## For Connecting to Actuators with 56SP, 60P and 86P motors.

### List of Models

| Type                                | PCF  | PGF                                     |
|-------------------------------------|--|---|
| Name                                | 56SP/60P/86P Motor Type  | Safety Category 56SP/60P/86P Motor Type |
| External view                       |  |   |
| Number of maximum controllable axes | 4  |   |
| Number of positions                 | 30000 points   |   |
| Power supply                        | Single phase AC100-230V  |   |
| Safety category                     | B  | 3*1                                     |

\*1: Compliance with the Safety Category requires the customer to install a safety circuit externally to the controller.

### Model

**MSEL** - [ ] - [ ] - [ ] **WAI** [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] - **4** - [ ] - [ ]

Series    Type    Number of axes    Motor    Option    Motor    Encoder    Option    Motor    Encoder    Option    Standard I/O    Expansion I/O    I/O cable length    Power voltage    Simple absolute unit    Mounting specification

|            |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|------------|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <b>PCF</b> | 56SP/60P/86P motor type                           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>PGF</b> | Safety category compliant 56SP/60P/86P motor type |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|          |        |
|----------|--------|
| <b>1</b> | 1-axis |
| <b>2</b> | 2-axis |
| <b>3</b> | 3-axis |
| <b>4</b> | 4-axis |

|             |     |
|-------------|-----|
| <b>56SP</b> | 56□ |
| <b>60P</b>  | 60□ |
| <b>86P</b>  | 86□ |

(Ex) 20P: 20□ pulse motor compatible

|             |          |
|-------------|----------|
| <b>20P</b>  | 20□      |
| <b>20SP</b> | 20□      |
| <b>28P</b>  | 28□      |
| <b>28SP</b> | 28□      |
| <b>35P</b>  | 35□      |
| <b>42P</b>  | 42□      |
| <b>42SP</b> | 42□      |
| <b>56P</b>  | 56□      |
| <b>56SP</b> | 56□      |
| <b>60P</b>  | 60□      |
| <b>86P</b>  | 86□      |
| <b>WUS</b>  | For WU-S |
| <b>WUM</b>  | For WU-M |

(Ex) 20P: 20□ Pulse motor compatible  
\* WUS and WUM use 2 axes.  
No need to specify encoder and options.

|            |                                   |
|------------|-----------------------------------|
| <b>WAI</b> | Battery-less absolute Incremental |
| <b>SA</b>  | Simple absolute specification     |

\* The simple absolute cannot be selected when connecting 56SP, 60P and 86P actuators.

|            |                                   |
|------------|-----------------------------------|
| <b>WAI</b> | Battery-less absolute Incremental |
| <b>SA</b>  | Simple absolute specification     |

\* Battery-less absolute and incremental cannot be used together with simple absolute. When using simple absolute, all the axes need to be used in simple absolute.

|            |  |
|------------|--|
| <b>E</b>   | Not used                               |
| <b>NP</b>  | Expansion PIO board (NPN)              |
| <b>PN</b>  | Expansion PIO board (PNP)              |
| <b>DV</b>  | DeviceNet board                        |
| <b>DV2</b> | DeviceNet board (with 2-way connector) |
| <b>CC</b>  | CC-Link board                          |
| <b>CC2</b> | CC-Link board (with 2-way connector)   |
| <b>PR</b>  | PROFIBUS-DP board                      |
| <b>EP</b>  | EtherNet/IP board                      |
| <b>EC</b>  | EtherCAT communication                 |
| <b>PRT</b> | PROFINET IO                            |
| <b>SE1</b> | RS232C                                 |
| <b>SE2</b> | RS485                                  |

(Ex) CC2 or DV2 is selected, a 2-way connector is supplied for branch wiring.

|          |           |
|----------|-----------|
| <b>4</b> | AC100-230 |
|----------|-----------|

|              |                |
|--------------|----------------|
| <b>Blank</b> | Screw fixation |
| <b>DN</b>    | DIN rail mount |

|              |                              |
|--------------|------------------------------|
| <b>ABB</b>   | With absolute battery box    |
| <b>ABBN</b>  | Without absolute battery box |
| <b>Blank</b> | Battery-less or Incremental  |

\* Make sure to select ABB / ABBN when simple absolute type "SA" is selected.

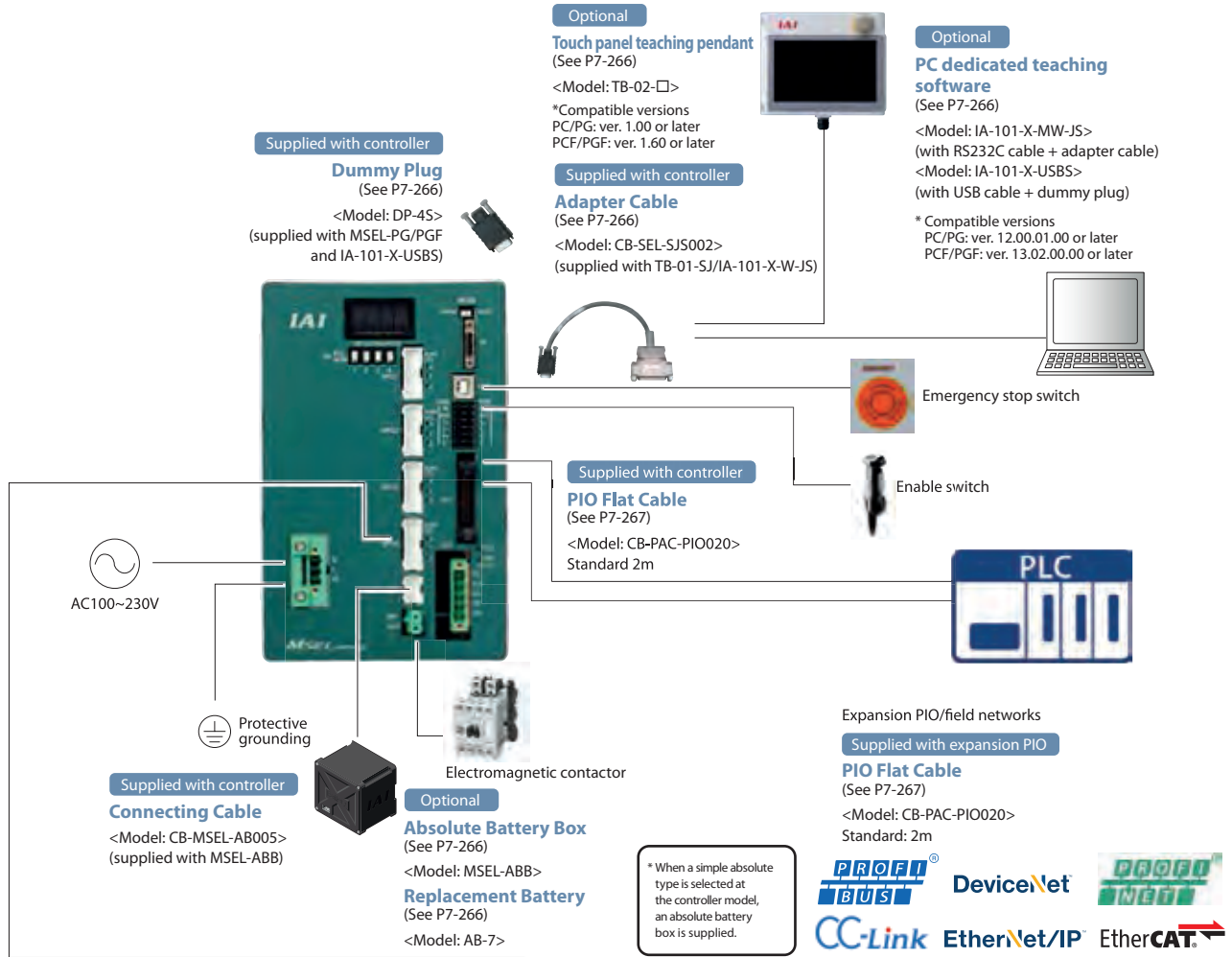
  

|          |               |
|----------|---------------|
| <b>0</b> | No cable      |
| <b>2</b> | 2m (standard) |
| <b>3</b> | 3m            |
| <b>5</b> | 5m            |

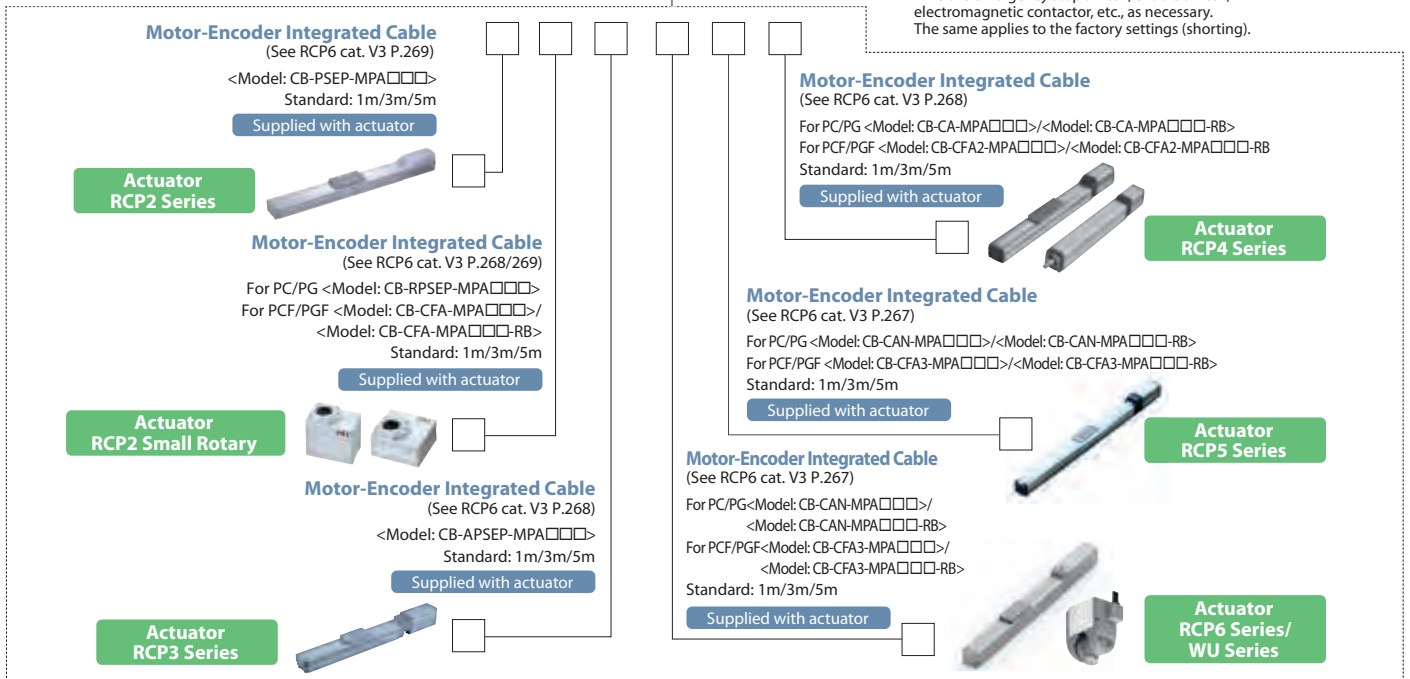
  

**NOTE**  
One WU can be connected to one MSEL.

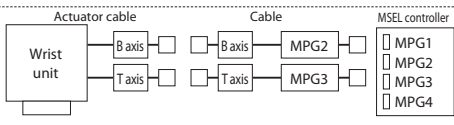
## System Configuration



### <Connectable Actuators>




**Note**  
 When using the wrist unit, wire it so that the symbols shown on the "actuator cable," "cable," and "controller" will coincide with each other. The drawing on the right shows an example of the wrist unit connecting to the 2nd and 3rd axes of the MSEL controller.



For IXP (PowerCon SCARA)

List of Models

| Name                | Controller for PowerCon SCARA   |                                  |  |                                  |
|---------------------|---|----------------------------------|--|----------------------------------|
| External view       |  |                                  |  |                                  |
| Type                | PCX3  | PGX3                             | PCX4   | PGX4                             |
| Classification      | 3-axis standard   | 3-axis safety category compliant | 4-axis standard  | 4-axis safety category compliant |
| Connected actuator  | IXP 3-axis specification  |                                  | IXP 3-axis specification + additional axis (including gripper specification)<br>IXP 4-axis specification |                                  |
| Standard I/O        | NPN, PNP (16IN/16OUT)   |                                  |  |                                  |
| Number of positions | 30000   |                                  |  |                                  |
| Power voltage       | Single-phase AC100 to 230V  |                                  |  |                                  |

Model

MSEL — [ ] — [ ] — WAI [ ] — [ ] — WAI [ ] — [ ] — [ ] — [ ] — [ ] — 4 — [ ]

Controller type    SCARA type    Encoder    Option    Motor    Encoder    Option    Standard I/O    Expansion I/O    PIO Cable    Power voltage    Mounting specification

\* The additional axis can be selected only when the controller type is a 4-axis, and the SCARA type is a 3-axis (without gripper).

|      |                                  |
|------|----------------------------------|
| PCX3 | 3-axis standard                  |
| PGX3 | 3-axis safety category compliant |
| PCX4 | 4-axis standard                  |
| PGX4 | 4-axis safety category compliant |

3N1808 IXP-3N1808  
4N1808 IXP-4N1808  
3N2508 IXP-3N2508  
4N2508 IXP-4N2508  
3N2508GM IXP-3N2508GM  
3 3515 IXP-3□3515  
4 3515 IXP-4□3515  
3N3515GM IXP-3N3515GM  
3N3510GL IXP-3N3510GL  
3 4515 IXP-3□4515  
4 4515 IXP-4□4515  
3N4515GM IXP-3N4515GM  
3N4510GL IXP-3N4510GL  
3 5520 IXP-3□5520  
4 5520 IXP-4□5520  
3N5515GL IXP-3N5515GL  
3N5515GW IXP-3N5515GW  
3 6520 IXP-3□6520  
4 6520 IXP-4□6520  
3N6515GL IXP-3N6515GL  
3N6515GW IXP-3N6515GW

20P 20□  
20SP 20□  
28P 28□  
28SP 28□  
35P 35□  
42P 42□  
42SP 42□  
56P 56□

(EX) 20P-20□ pulse motor compatible

Note

Basically, the motor has the same alphanumeric sign as the connecting actuator motor, though some controllers and actuator motors have different signs. When ordering, please pay attention to such types listed below: (Actuators for 28SP)  
● Controller motor type "28SP"  
...RCP2-RA3C

|       |           |
|-------|-----------|
| Blank | No option |
| B     | Brake     |

\* An arm length of 550 and 650 can only be selected. Make sure to select it when the workpiece is 4 kg or larger.

|    |     |
|----|-----|
| NP | NPN |
| PN | PNP |

|     |  |
|-----|--|
| E   | Not used                               |
| NP  | Expansion PIO board (NPN)              |
| PN  | Expansion PIO board (PNP)              |
| DV  | DeviceNet board                        |
| DV2 | DeviceNet board (with 2-way connector) |
| CC  | CC-Link board                          |
| CC2 | CC-Link board (with 2-way connector)   |
| PR  | PROFIBUS-DP board                      |
| EP  | EtherNet/IP board                      |
| EC  | EtherCAT                               |
| PRT | PROFINET IO                            |
| SE1 | RS232C                                 |
| SE2 | RS485C                                 |

\* If CC2 or DV2 is selected, a 2-way connector is supplied for branch wiring.

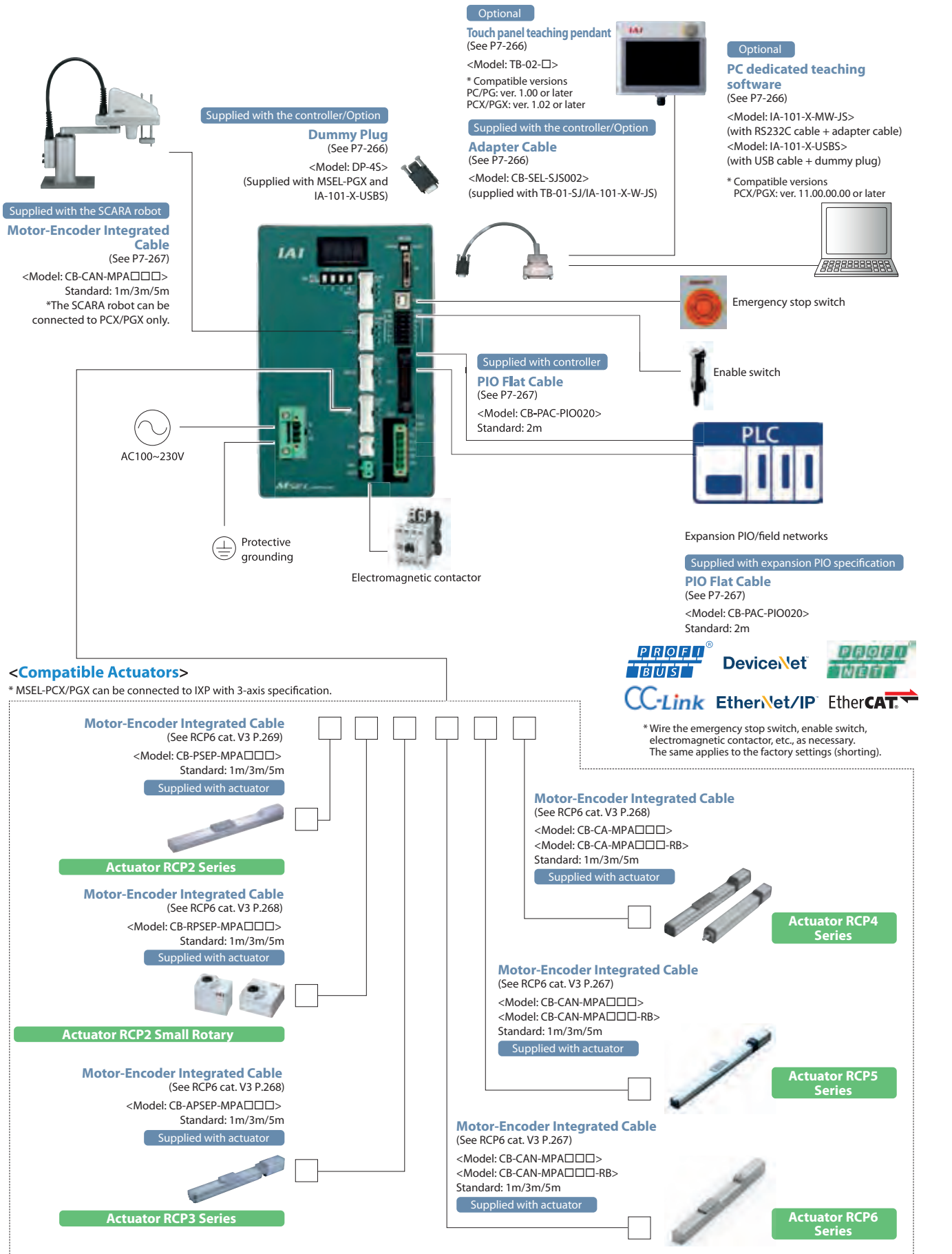
|       |                |
|-------|----------------|
| Blank | Screw fixation |
| DN    | DIN rail mount |

|   |               |
|---|---------------|
| 0 | No cable      |
| 2 | 2m (standard) |
| 3 | 3m            |
| 5 | 5m            |

\* The signs below are specified in the □:  
N: Standard specification  
C: Clean specification  
W: Dust- & splash-proof



System Configuration

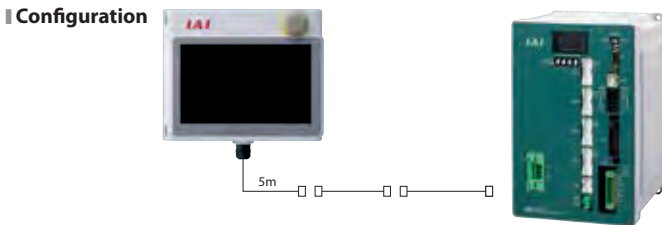


## Options

### Touch Panel Teaching Pendant

**Features** A teaching device offering program/position inputs, trial operations and monitoring functions.

**Model number** TB-02-□



#### Specifications

|                               |                                    |
|-------------------------------|------------------------------------|
| Rated voltage                 | 24V DC                             |
| Power consumption             | 3.6W or smaller (150mA or smaller) |
| Ambient operating temperature | 0~40°C                             |
| Ambient operating humidity    | 20~85%RH (No-condensing)           |
| Protective structure          | IP20                               |
| Weight                        | 470g (TB-02 unit only)             |

### Absolute Battery Box

**Outline** If the absolute position encoder specification is selected with code ABB, the absolute battery box is included with the controller. However, if the battery box is ordered as a separate unit, it does not include the battery. Purchase the battery separately if needed (model: AB-7).

**Model** MSEL-ABB (battery not included)

\*The cable to connect the absolute battery box and MSEL (Model CB-MSEL-AB005) are supplied with the absolute battery box. Simple absolute type (Model: ABB) can be selected only for the MSEL-PC/PG/PCF/PGF.



### Dummy Plug

**Features** This plug is required for the safety category compliant specification (MSEL-PG/PGX/PGF) and when the MSEL is operated using a USB cable. (Supplied with MSEL-PG/PGF type and PC dedicated teaching software IA-101-X-USBS.)

**Model number** DP-4S



### Adapter Cable

**Features** Converts the D sub 25 pin connector of the touch panel teaching pendant or RS232C cable to MSEL teaching connector. (Comes with TB-01-SJ and IA-101-X-MW-JS.)

**Model number** CB-SEL-SJS002



### Replacement Battery

**Features** The replacement battery for the absolute battery box.

**Model** AB-7

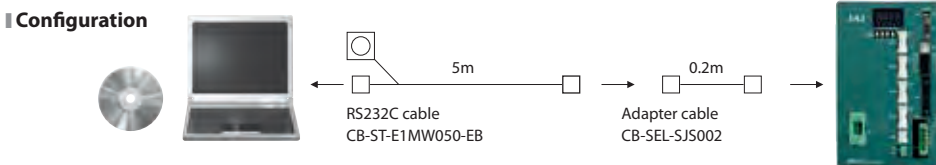
\* Same quantity of absolute battery units is required as the number of axes.



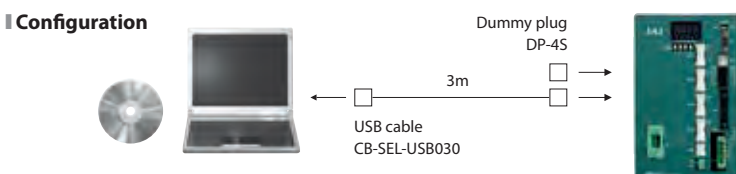
### PC dedicated teaching software

**Features** The startup support software provides program/position input, test operation and monitoring functions, among others. With its enhanced functions required for debugging, this software helps shorten the startup time.

**Model number** IA-101-X-MW-JS (with RS232C cable + Connector adapter cable)



**Model number** IA-101-X-USBS (with USB cable + dummy plug)



Compatible Windows: 7/8/8.1/10



The MSEL-PC/PG are supported by ver. 12.00.01.00 or later.

The RS232 standard cable CB-ST-E1MW050-EB cannot be used when "Building an enable system that uses a system I/O connector and external power supply" or "Building a redundant safety circuit." (The RS232 safety category cable CB-ST-A2MW050-EB must be used instead.)

Spare Parts

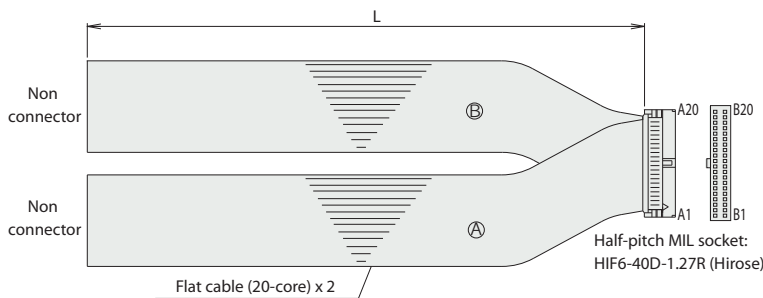
When you need spare parts after purchasing the product, such as when replacing a cable, refer to the list of models below.

Table of Applicable Cables

| Product Model |                         | Motor-Encoder Integrated Cable                        | Motor-Encoder Integrated Robot Cable                                 |
|---------------|-------------------------|---|--|
| ①             | RCP6<br>RCP6CR<br>RCP6W | SA8/WSA16<br>RA8/RRA8<br>WRA16                        | CB-CFA3-MPA□□□□  |
| ②             |                         | Models other than the above                           | CB-CAN-MPA□□□□   |
| ③             | RCP5<br>RCP5CR<br>RCP5W | RA8/RA10<br>RA7C High thrust type                     | CB-CFA3-MPA□□□□  |
| ④             |                         | Models other than the above                           | CB-CAN-MPA□□□□   |
| ⑤             | RCP4<br>RCP4CR<br>RCP4W | SA3/RA3<br>RCP4 Gripper<br>RCP4 Stopper cylinder      | CB-CAN-MPA□□□□   |
| ⑥             |                         | Models other than the above                           | CB-CA-MPA□□□□ (for MSEL-PC/PG)<br>CB-CFA2-MPA□□□□ (for MSEL-PCF/PGF) |
| ⑦             | RCP3                    |   | -  |
| ⑧             | RCP2                    | RTBS/RTBSL<br>RTCS/RTCSL                              | -  |
| ⑨             | RCP2CR<br>RCP2W         | GRS/GRM<br>GR3SS/GR3SM<br>RT8                         | CB-CAN-MPA□□□□   |
| ⑩             | RCP2<br>RCP2CR<br>RCP2W | GRSS/GRLS/GRST<br>GRHM/GRHB<br>SRA4R/SRGS4R<br>SRGD4R | -  |
| ⑪             |                         | HS8C/HS8R<br>SA16C<br>RA8C/RA8R<br>RA10C              | CB-CFA-MPA□□□□   |
| ⑫             |                         | Models other than the above                           | -  |

Model CB-PAC-PIO□□□□

\* Enter the cable length (L) into □□□. Compatible to a maximum of 10m.  
Ex.: 080=8m



HIF6-40D-1.27R

| No. | Signal | Cable color | Wiring                               | No. | Signal | Cable color | Wiring                               |
|-----|--------|-------------|--------------------------------------|-----|--------|-------------|--------------------------------------|
| A1  | 24V    | Brown-1     | Flat cable (A)<br>(Crimped)<br>AWG28 | B1  | OUT0   | Brown-3     | Flat cable (B)<br>(Crimped)<br>AWG28 |
| A2  | 24V    | Red-1       |                                      | B2  | OUT1   | Red-3       |                                      |
| A3  | -      | Orange-1    |                                      | B3  | OUT2   | Orange-3    |                                      |
| A4  | -      | Yellow-1    |                                      | B4  | OUT3   | Yellow-3    |                                      |
| A5  | IN0    | Green-1     |                                      | B5  | OUT4   | Green-3     |                                      |
| A6  | IN1    | Blue-1      |                                      | B6  | OUT5   | Blue-3      |                                      |
| A7  | IN2    | Purple-1    |                                      | B7  | OUT6   | Purple-3    |                                      |
| A8  | IN3    | Gray-1      |                                      | B8  | OUT7   | Gray-3      |                                      |
| A9  | IN4    | White-1     |                                      | B9  | OUT8   | White-3     |                                      |
| A10 | IN5    | Black-1     |                                      | B10 | OUT9   | Black-3     |                                      |
| A11 | IN6    | Brown-2     |                                      | B11 | OUT10  | Brown-4     |                                      |
| A12 | IN7    | Red-2       |                                      | B12 | OUT11  | Red-4       |                                      |
| A13 | IN8    | Orange-2    |                                      | B13 | OUT12  | Orange-4    |                                      |
| A14 | IN9    | Yellow-2    |                                      | B14 | OUT13  | Yellow-4    |                                      |
| A15 | IN10   | Green-2     |                                      | B15 | OUT14  | Green-4     |                                      |
| A16 | IN11   | Blue-2      |                                      | B16 | OUT15  | Blue-4      |                                      |
| A17 | IN12   | Purple-2    |                                      | B17 | -      | Purple-4    |                                      |
| A18 | IN13   | Gray-2      |                                      | B18 | -      | Gray-4      |                                      |
| A19 | IN14   | White-2     |                                      | B19 | 0V     | White-4     |                                      |
| A20 | IN15   | Black-2     |                                      | B20 | 0V     | Black-4     |                                      |

# X-SEL

**Program Controller**  
**for Single-axis robot / Cartesian robot /**  
**RCS4/RCS3/RCS2 series.**



(\*) Only SA, Q types are compliant with UL.

## List of models

Multi-axis program controller for operating servo motor actuators. Up to 8 axes can be simultaneously controlled.

| Type                              | RA   | SA  | P   | Q   |
|-----------------------------------|--|---|---|---|
| External view                     |  |   |   |   |
| Description                       | Standard specification   | Safety category compliant                       | Standard specification  | Safety category compliant                     |
| Maximum number of control axes    | 8 axes   |   | 6 axes  |   |
| Number of positions               | Maximum 55000 positions<br>(It varies depending on the number of axes.)                                      |   | 20000 positions   |   |
| Total number of programs          | 255  |   | 128   |   |
| Number of program steps           | 20000  |   | 9999  |   |
| Total number of connectable W     | Single-phase 1600W/3-phase 2400W   |   | Single-phase 1600W / 3-phase 2400W  |   |
| Motor power supply voltage        | Single-phase AC200V/230V ±10%<br>3-phase AC200V/230V ±10%  |   | Single-phase AC200V/230V ±10%<br>3-phase AC200V/230V ±10%   |   |
| Control power voltage             | Single-phase AC200V/230V ±10%  |   | Single-phase AC200V/230V ±10%   |   |
| Safety category (*)               | B  | 4-axis  | B   | 4-axis  |
| European standard                 | CE   |   | CE  |   |
| Extension motion control function | Up to 32 axes can be controlled.<br>(Only for the IAI controllers that are compatible with MECHATROLINK III) |   | Up to 16 axes can be controlled.<br>(Only for the IAI controllers that are compatible with pulse-train control) |   |
| Communication port                | Ethernet   | Equipped as standard: 10/100/1000BASE-T (RJ-45) |   | Option board compatible: 10/100BASE-T (RJ-45) |
|                                   | USB2.0   | Equipped as standard: USB2.0 (Mini-B)           |   | -   |
|                                   | General-purpose RS232C communication port  | 1 channel (max. 230.4 kbps)                     |   | 2 channels (max. 115.2 kbps)                  |

(\*) Compliance with the Safety Category requires the customer to install a safety circuit externally to the controller.

Model

[XSEL-RA/SA Type]

(Note) To specify multiple options, enter them in alphabetical order. (Example: Brake + Home sensor -> BL)

XSEL - [ ] - [ ] - [ ] [ ] [ ] - ([ ] [ ] [ ]) - [ ] [ ] - [ ] [ ] - [ ] [ ] - [ ] [ ]

Series    Type    Number of axes    Motor    Encoder    Option (Note)    (Motor    Encoder    Option (Note))    Network dedicated slot (slot 1) (slot 2)    I/O slot (slot 1) (slot 2)    I/O cable length    Power voltage

|    |                                |
|----|--------------------------------|
| RA | Standard type                  |
| SA | Safety category compliant type |

|   |             |   |             |
|---|-------------|---|-------------|
| 1 | 1-axis spec | 5 | 5-axis spec |
| 2 | 2-axis spec | 6 | 6-axis spec |
| 3 | 3-axis spec | 7 | 7-axis spec |
| 4 | 4-axis spec | 8 | 8-axis spec |

|     |      |     |      |
|-----|------|-----|------|
| 12  | 12W  | 150 | 150W |
| 20  | 20W  | 200 | 200W |
| 30D | 30W  | 400 | 400W |
| 30R | 30W  | 600 | 600W |
| 60  | 60W  | 750 | 750W |
| 100 | 100W |     |      |

|     |                                   |
|-----|-----------------------------------|
| WAI | Battery-less absolute incremental |
| A   | Absolute specification            |
| AI  | Index absolute                    |
| AM  | Multi-rotation absolute           |

|    |                           |
|----|---------------------------|
| B  | Brake                     |
| C  | Creep sensor              |
| HA | High accel./decel.        |
| L  | Home sensor/LS compatible |
| M  | Master axis spec          |
| S  | Slave axis spec           |

|    |             |
|----|-------------|
| E  | Not used    |
| EP | EtherNet/IP |
| EC | EtherCAT    |

|    |             |
|----|-------------|
| E  | Not used    |
| DV | DeviceNet   |
| CC | CC-Link     |
| PR | PROFIBUS-DP |

|    |                    |    |                    |
|----|--------------------|----|--------------------|
| E  | Not used           | P1 | IN 32/OUT 16 (PNP) |
| N1 | IN 32/OUT 16 (NPN) | P2 | IN 16/OUT 32 (PNP) |
| N2 | IN 16/OUT 32 (NPN) | P3 | IN 48/OUT 48 (PNP) |
| N3 | IN 48/OUT 48 (NPN) |    |                    |

|   |               |
|---|---------------|
| 0 | No cable      |
| 2 | 2m (standard) |
| 3 | 3m            |
| 5 | 5m            |

(\*) If an I/O board (N□/P□) is not selected at the I/O slot, specify the I/O cable length as 0 (no cable).

|   |                     |
|---|---------------------|
| 2 | Single-phase AC230V |
| 3 | 3-phase AC230V      |

(Ex) 12: 12W servo motor compatible

Note

Basically, the motor has the same alphanumeric sign as the connecting actuator motor, though some controllers and actuator motors have different signs.

When ordering, pay attention to such types listed below:  
(30D/30R compatible actuators)

- Controller motor type "30D"...30W actuator other than RS
- Controller motor type "30R"... RS

(\*) Network dedicated slots 1 and 2 are for specific network boards. Specify the right symbol from available ones.  
(\*) Network dedicated slots and I/O slots can be used together.

\* Note: When selecting a single-axis or Cartesian robots.

The total wattage for a single-axis and Cartesian robot that can be connected to XSEL-RA/SA type is 2400W for a 3-phase specification, and 1600W for a single-phase specification. The maximum wattage for one axis is 750W, but the total wattage of each axis should not exceed the specified wattage.

**NOTE XSEL-RA/SA type cannot be connected to the following models:**

- RCS2-SRA7/SRGS7/SRGD7
- RCS2-□□5N (Incremental)
- Servo press
- NS-SXM□/SZM□ (Incremental)
- RCS3-CT□

Example of the model by controller type

The following is examples of models by controller type.

For details of I/O slots, refer to the table of "Installable I/O specification by Controller" on P7-276.

[XSEL-RA/SA Type]

XSEL - RA - 4 - 200A - 100A - 60A - 30A - EPDV - N1E - 2 - 3

Series    Type    Number of axes    Connected actuator motor wattage, encoder    Network dedicated slots 1/2    Slot 1/2    I/O cable length    Power voltage

I/O slot description

[XSEL-P/Q Type]

XSEL - P - 4 - 200A - 100A - 60A - 30A - CC - N1 - N1N1E - 2 - 3

Series    Type    Number of axes    Connected actuator motor wattage, encoder    Network dedicated slots 1    Slot 1    Slot 2/3/4 \*    I/O cable length    Power voltage

I/O slot description

## Model

### [XSEL-P/Q]

(Note) To specify multiple options, enter them in alphabetical order. (Example: Brake + Home sensor -> BL)

Specifying axis 2-6 depends on the number of axes used.

**XSEL** - [ ] - [ ] - [ ] - [ ] - [ ] - ( [ ] [ ] [ ] ) - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

Series      Type      Number of connected axes      (Specs for 1st axis) (Note)      (Specs for axis 2-6) (Note)      Network dedicated slot      (Slot 1) Standard I/O      (Slot 2) Expansion I/O      (Slot 3) Expansion I/O      (Slot 4) Expansion I/O      I/O cable length      Power supply voltage

|   |                           |
|---|---------------------------|
| P | Standard type             |
| Q | Safety category compliant |

|   |             |   |             |
|---|-------------|---|-------------|
| 1 | 1-axis spec | 4 | 4-axis spec |
| 2 | 2-axis spec | 5 | 5-axis spec |
| 3 | 3-axis spec | 6 | 6-axis spec |

|    |                           |
|----|---------------------------|
| B  | Brake                     |
| C  | Creep sensor              |
| HA | High accel./decel.        |
| L  | Home sensor/LS compatible |
| M  | Master axis spec          |
| S  | Slave axis spec           |

|     |                                   |
|-----|-----------------------------------|
| WAI | Battery-less absolute incremental |
| A   | Absolute specification            |
| AI  | Index absolute                    |
| AM  | Multi-rotation absolute           |

|       |             |
|-------|-------------|
| Blank | Not used    |
| DV    | DeviceNet   |
| CC    | CC-Link     |
| PR    | PROFIBUS    |
| EP    | EtherNet/IP |

\*The EtherNet/IP specification is compatible with the EtherNet.

|   |                     |
|---|---------------------|
| 2 | Single-phase AC230V |
| 3 | 3-phase AC230V      |

|   |               |
|---|---------------|
| 0 | No cable      |
| 2 | 2m (standard) |
| 3 | 3m            |
| 5 | 5m            |

\* If the standard I/O board or expansion I/O (N□/P□) is not selected, specify the I/O cable length as 0 (no cable).

|     |     |     |      |      |       |
|-----|-----|-----|------|------|-------|
| 12  | 12W | 100 | 100W | 750  | 750W  |
| 20  | 20W | 150 | 150W | 1000 | 1000W |
| 30D | 30W | 200 | 200W |      |       |
| 30R | 30W | 400 | 400W |      |       |
| 60  | 60W | 600 | 600W |      |       |

(Ex) 12: 12W servo motor compatible

|     |     |     |      |      |       |
|-----|-----|-----|------|------|-------|
| 12  | 12W | 100 | 100W | 750  | 750W  |
| 20  | 20W | 150 | 150W | 1000 | 1000W |
| 30D | 30W | 200 | 200W |      |       |
| 30R | 30W | 400 | 400W |      |       |
| 60  | 60W | 600 | 600W |      |       |

(Ex) 12: 12W servo motor compatible

|    |                         |
|----|-------------------------|
| E  | Not used                |
| N1 | IN 32/OUT 16 (NPN)      |
| N2 | IN 16/OUT 32 (NPN)      |
| N3 | IN 48/OUT 48 (NPN)      |
| P1 | IN 32/OUT 16 (PNP)      |
| P2 | IN 16/OUT 32 (PNP)      |
| P3 | IN 48/OUT 48 (PNP)      |
| MC | Pulse I/O board (*)     |
| S  | Expansion I/O with base |

\* If an expansion I/O is not used, specify an "E" (not used) in slots 2 to 4.  
If an expansion I/O is used, specify an expansion I/O symbol from the left table in the slot position to be mounted.  
When an expansion I/O is specified, the controller enclosure becomes "with expansion I/O base".

\* Can be mounted up to 2 for one expansion I/O.  
\* When an expansion I/O is not installed but only an expansion I/O base, specifications are as shown in the right.

Note

Basically, the motor has the same alphanumeric sign as the connecting actuator motor, though some controllers and actuator motors have different signs.  
When ordering, pay attention to such types listed below:  
(30D/30R compatible actuators)

- Controller motor type "30D"...30W actuator other than RS
- Controller motor type "30R"... RS

|          |          |          |
|----------|----------|----------|
| S        | S        | S        |
| (Slot 2) | (Slot 3) | (Slot 4) |

 Expansion I/O

## NOTE

The 5th and 6th axes of the XSEL-P/Q cannot connect to the following models:

- RCS2-SRA7/SRGS7/SRGD7
- RCS2-□□5N (Incremental)
- NS-SXM□ /SZM□ (Incremental)
- Servo press

## System Configuration

### ■ XSEL-RA

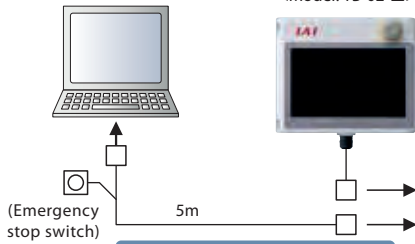
Optional

#### PC dedicated teaching software

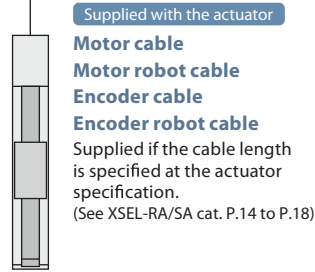
(See P7-288) \*Ⓟ=PC side, ⓒ=Controller side

- ⓅRS232-ⓒRS232
- <Model: IA-101-X-MW>
- ⓅUSB-ⓒRS232
- <Model: IA-101-X-USBMW>
- ⓅUSB-ⓒUSB/Ethernet
- <Model: IA-101-N>

Compatible with Ver. 13.00.00.00 or later



Included with PC dedicated teaching software  
**Communication cable**  
<Model: CB-ST-E1MW050-EB>



Supplied with the actuator  
**Motor cable**  
**Motor robot cable**  
**Encoder cable**  
**Encoder robot cable**  
Supplied if the cable length is specified at the actuator specification.  
(See XSEL-RA/SA cat. P.14 to P.18)

**Connectable Actuator**  
<Refer to the product page of each actuator>

Optional  
**Touch panel teaching pendant**  
(See P7-288)  
<Model: TB-02-□>



Supplied with the controller  
**Dummy Plug**  
(See P7-287)  
<Model: DP-2>

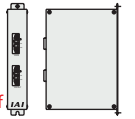


Supplied with the controller  
**PIO Cable**  
(See XSEL-RA/SA cat. P.18)  
<Model: CB-X-PIO020>  
Standard: 2m  
(Supplied with the PIO controller)

Supplied with the regenerative unit  
**Regenerative unit cable 1m**

**Regenerative Unit**

Please refer to P7-287 for the necessary number of regenerative units.



#### Field Network

- DeviceNet
  - CC-Link
  - PROFIBUS-DP
  - EtherCAT
  - EtherNet/IP
- EtherNet/IP is compatible with EtherNet

**Extended Motion**  
(Cable is supplied by the customer) □ PCON/ACON/  
SCON-CB  
MCON  
(MECHATROLINK Link III specification)

**Motor power supply**  
3-phase/single-phase  
AC200V/230V

**Control power supply**  
Single-phase  
AC200V/230V

**Brake release power**  
24VDC

**Power for I/O**  
24VDC

\* When connecting the power, make sure to mount the following filters or equivalent:

- Noise filter recommended model  
3-phase TAC-20-683 (maker: COSEL)  
Single-phase NBH-20-432 (maker: COSEL)
- Ring core recommended model  
ESD-R-25 (maker: NEC Tokin)
- Clamp filter recommended model  
Control power: ZCAT3035-133 (maker: TDK)  
Motor power RFC-H3 (maker: Kitagawa)
- Surge protector recommended model  
3-phase RAV-781BXZ-4  
Single-phase RAV-781BWZ-2A (maker: Okaya Electric)

### ■ XSEL-SA

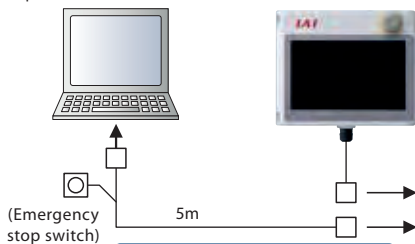
Optional

#### PC Software

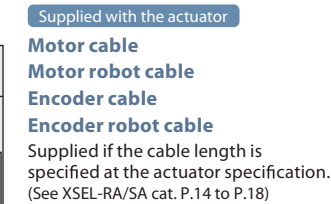
(See P7-288) \*Ⓟ=PC side, ⓒ=Controller side

- ⓅRS232-ⓒRS232
- <Model: IA-101-XA-MW>
- ⓅUSB-ⓒRS232
- <Model: IA-101-X-USBMW>
- ⓅUSB-ⓒUSB/Ethernet
- <Model: IA-101-N>

Compatible with Ver. 13.00.00.00 or later



Included with PC dedicated teaching software  
**Communication cable**  
<Model: CB-ST-A2MW050-EB>



Supplied with the actuator  
**Motor cable**  
**Motor robot cable**  
**Encoder cable**  
**Encoder robot cable**  
Supplied if the cable length is specified at the actuator specification.  
(See XSEL-RA/SA cat. P.14 to P.18)

**Connectable Actuator**  
<Refer to the product page of each actuator>

Optional  
**Touch panel teaching pendant**  
(See P7-288)  
<Model: TB-02-□>



Supplied with the controller  
**Dummy Plug**  
(See P7-287)  
<Model: DP-2>

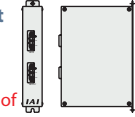


Supplied with the controller  
**PIO Cable**  
(See XSEL-RA/SA cat. P.18)  
<Model: CB-X-PIO020>  
Standard: 2m  
(Supplied with the PIO controller)

Supplied with the regenerative unit  
**Regenerative unit cable 1m**

**Regenerative Unit**

Please refer to P7-287 for the necessary number of regenerative units.



#### Field network

- DeviceNet
  - CC-Link
  - PROFIBUS-DP
  - EtherCAT
  - EtherNet/IP
- EtherNet/IP is compatible with EtherNet.

**Extended motion**  
(Cable is supplied by the customer) □ PCON/ACON/  
SCON-CB  
MCON  
(MECHATROLINK III specification)

**Motor power supply**  
3-phase/single-phase  
AC200V/230V

**Control power supply**  
Single-phase  
AC200V/230V

**Brake release power**  
24VDC

**Power for I/O**  
24VDC

**Drive power shut-off circuit**  
(supplied by customer) \* Contact us for the detail of the power shut-off circuit.

\* When connecting the power, make sure to mount the following filters or equivalent:

- Noise filter recommended model  
3-phase TAC-20-683 (maker: COSEL)  
Single-phase NBH-20-432 (maker: COSEL)
- Ring core recommended model  
ESD-R-25 (maker: NEC Tokin)
- Clamp filter recommended model  
Control power: ZCAT3035-133 (maker: TDK)  
Motor power RFC-H3 (maker: Kitagawa)
- Surge protector recommended model  
3-phase RAV-781BXZ-4  
Single-phase RAV-781BWZ-2A (maker: Okaya Electric)

## Connectable I/O Models by Controller Type

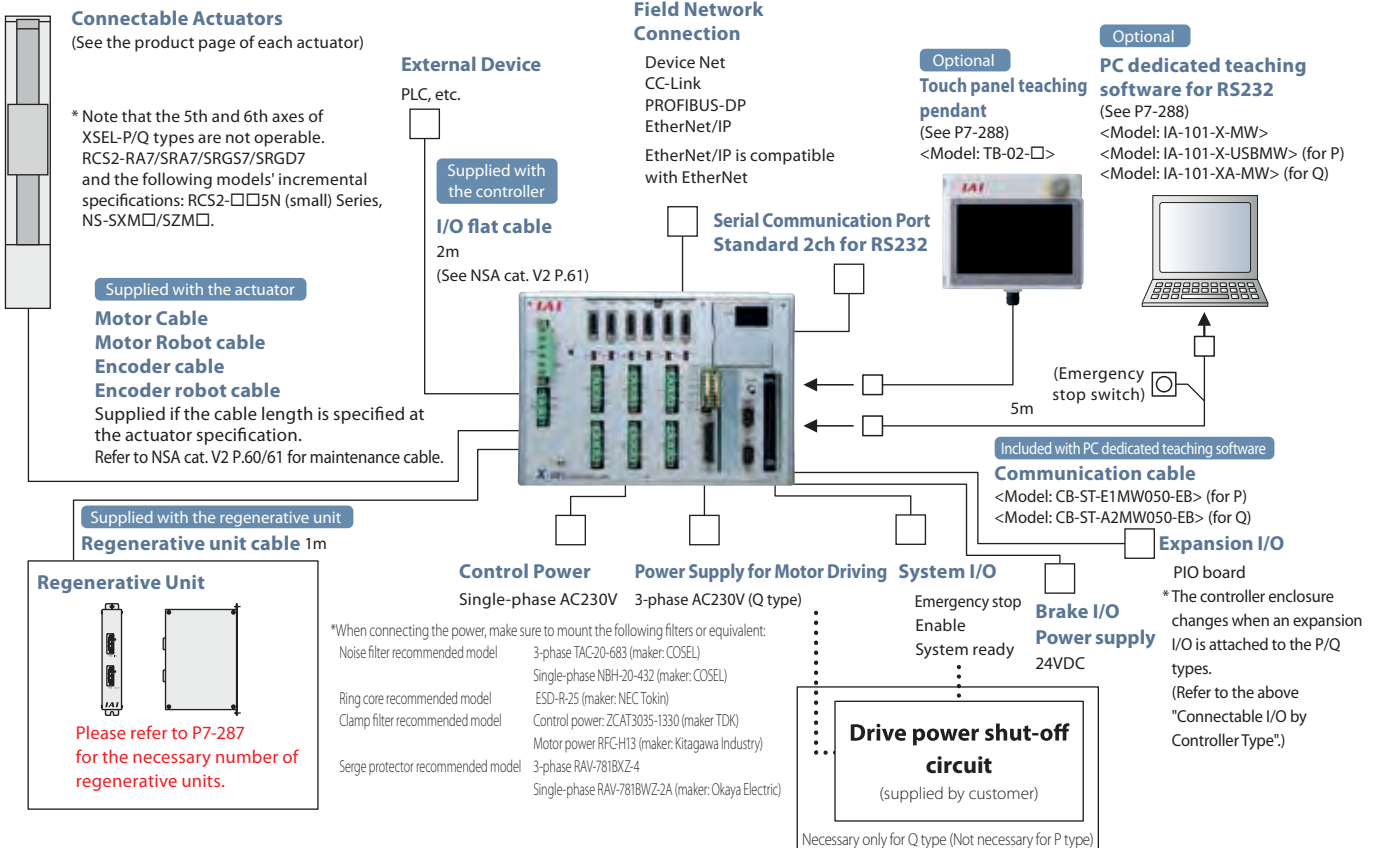
Specifications of the connectable I/O (input/output) vary according to the XSEL controller type.

\* Refer to each controller model regarding the symbols specified in the slot in the table below.

| Controller Type    | External view                         | Connectable I/O by I/O Slot |                          |                                       |  |  |  |
|--------------------|---------------------------------------|-----------------------------|--------------------------|---------------------------------------|--|--|--|
|                    |                                       | Network dedicated slot 1    | Network dedicated slot 2 | Slot 1                                | Slot 2                                     | Slot 3                                     | Slot 4                                     |
| RA type<br>SA type |                                       | E<br>EP<br>EC               | E<br>DV<br>CC<br>PR      | E<br>N1<br>N2<br>N3<br>P1<br>P2<br>P3 | E<br>N1<br>N2<br>N3<br>P1<br>P2<br>P3      | (not applicable)                           | (not applicable)                           |
| P type<br>Q type   | Standard specification<br>            | (not applicable)            | (not applicable)         | E<br>N1<br>N2<br>N3<br>P1<br>P2<br>P3 | (not applicable)                           | (not applicable)                           | (not applicable)                           |
|                    | With expansion slot specification<br> | (not applicable)            | (not applicable)         | E<br>N1<br>N2<br>N3<br>P1<br>P2<br>P3 | E<br>N1<br>N2<br>N3<br>P1<br>P2<br>P3<br>S | E<br>N1<br>N2<br>N3<br>P1<br>P2<br>P3<br>S | E<br>N1<br>N2<br>N3<br>P1<br>P2<br>P3<br>S |

## System Configuration

### ■ XSEL-P/Q





## Options

CAD drawings can be downloaded from our website.  
www.iai-automation.com



### Regenerative Resistance Unit

#### Model

**RESU-1** (Standard specification)  
**RESUD-1** (DIN rail mount specification)

#### Details

This unit converts to heat the regenerative current produced when the motor decelerates. Although the controller has a built-in regenerative resistor, its capacity may not be enough if the axis is positioned vertically and the load is large. In such a case, one or more regenerative units will be required. (Refer to the table at right)

#### Specifications

| Item                           | RESU-1         | RESUD-1        |
|--------------------------------|----------------|----------------|
| Main unit weight               | Approx. 0.4 kg |                |
| Built-in regenerative resistor | 235Ω 80W       |                |
| Unit mounting method           | Screw fixing   | DIN rail mount |
| Accessory                      | CB-ST-REU010   |                |

#### Installation standard

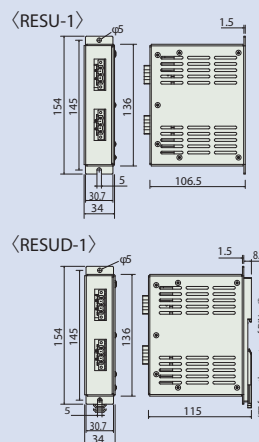
Determined by the total motor capacity of the connected axes.

##### Horizontal use

| Number of connecting units | P/Q/RA/SA Type |
|----------------------------|----------------|
| 0                          | ~100W          |
| 1                          | ~600W          |
| 2                          | ~1200W         |
| 3                          | ~1800W         |
| 4                          | ~2400W         |

##### Vertical use

| Number of connecting units | P/Q/RA/SA Type |
|----------------------------|----------------|
| 0                          | ~100W          |
| 1                          | ~600W          |
| 2                          | ~1000W         |
| 3                          | ~1400W         |
| 4                          | ~2000W         |
| 5                          | ~2400W         |



### Absolute Data Backup Battery (for XSEL-P/Q/RA/SA)

#### Model

**AB-5**

#### Features

Absolute data backup battery for operating actuators with absolute specification.



### Expansion PIO Board

#### Details

An optional board for adding I/O (input/output) points. With the general-purpose and large-capacity types, up to 3 expansion PIO boards can be installed in the expansion slots. (With the compact types, only one expansion PIO board can be installed in the expansion slot, provided that the controller is of 3- or 4-axis specification.)

### Field Network Connection Board

#### Model

**DV/CC/PR/EP/EC** (\* specified within the controller model)

#### Details

When specifying a field network option at the controller I/O, a field network board is installed in the I/O slot.

<Table of applicable networks>

|            | DeviceNet | CC-Link | PROFIBUS-DP | EtherNet/IP | EtherCAT |
|------------|-----------|---------|-------------|-------------|----------|
| XSEL-P/Q   | ●         | ●       | ●           | ● (Note 1)  | —        |
| XSEL-RA/SA | ●         | ●       | ●           | ● (Note 1)  | ●        |

(Note) The number of input/output points is input 256 points / output 256 points per one board (only one board can be installed).

(Note 1) The EtherNet/IP specification can cope with the Ethernet (PCP/IP: message communications) by setting parameters.

### Dummy Plug

#### Model

**DP-2**

#### Features

A dummy plug to be attached to the teaching connector when the touch panel teaching pendant is not connected.

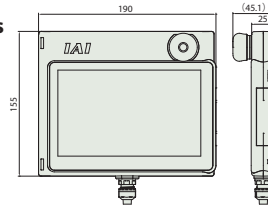
## Options

### Touch panel teaching pendant

**Features** A teaching device having functions of position inputs, trial operations, monitoring, etc.

**Model** **TB-02-□**

### External dimensions



### Specifications

|                               |                               |
|-------------------------------|-------------------------------|
| Rated voltage                 | 24V DC                        |
| Power consumption             | 3.6W or less (150mA or less)  |
| Operating ambient temperature | 0~40°C                        |
| Operating ambient humidity    | 20 to 85%RH (non-condensing)  |
| Protective class              | IP20                          |
| Weight                        | 470g (TB-02 single unit only) |

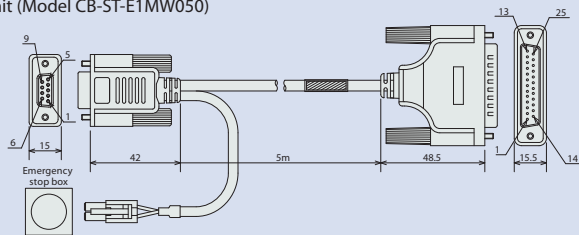
### PC dedicated teaching software (Windows only)

**Model** **IA-101-X-MW**

**Features** Startup support software for inputting programs/positions, performing test runs and monitoring. More functions are added for debugging, enabling the start-up time to shorten.

**Details** Software (CD-ROM), compatible Windows: XP SP2 or later/Vista 7/8/10  
PC connecting cable 5m + emergency stop box (Model CB-ST-E1MW050-EB)

PC connecting cable single unit (Model CB-ST-E1MW050)



#### Note

- \* Versions older than 3.0.0 cannot be used for the XSEL-P type.
- \* Versions older than 2.0.0 cannot be used for the SCARA type.
- \* Use IA-101-XA-MW if you use a safety category 4 compliant controller.
- \* Cannot be used for the XSEL-Q/QX/SA/SAX/SAXD types.
- \* When you separately order a PC connecting cable for a maintenance purpose, beware that the cable single unit model is CB-ST-E1MW050, but when ordering it together with the emergency stop box, the model is CB-ST-E1MW050-EB.

### Safety category 4 compliant PC dedicated software (for XSEL-Q/QX/SA/SAX)

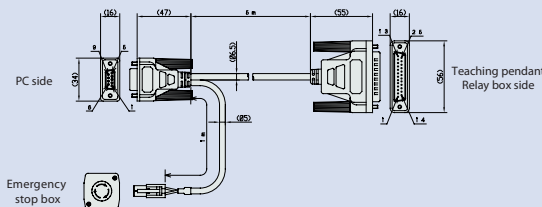
**Model** **IA-101-XA-MW**

\* Exclusive use for XSEL-Q/QX/SA/SAX.  
Cannot be used for other controllers.

**Features** A startup support software program offering program/position input function, test operation function, monitoring function, and more. The functions needed for debugging have been enhanced to help reduce the startup time. PC connecting cable is compatible to safety category 4 by duplicating the emergency stop circuits.

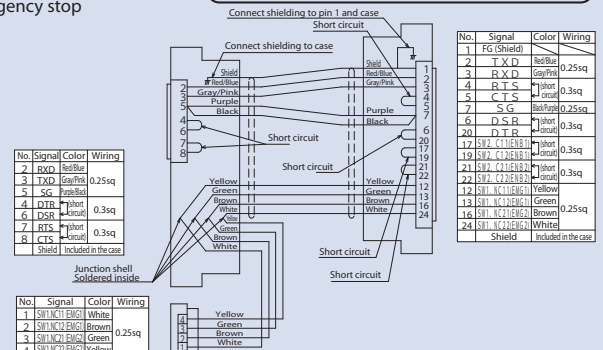
**Details** Software (CD-ROM)  
Compatible Windows: 7/8/8.1/10  
**(Accessories)** PC connecting cable 5m + emergency stop box (Model: CB-ST-A2MW050-EB)

**Dimensions** PC connecting cable (Model: CB-ST-A1MW050)



#### NOTE

When ordering a separate replacement PC cable the model number for the cable only is CB-ST-E1MW050, and for cable with the emergency stop box is CB-ST-E1MW050-EB. If a teaching tool is not used, connect the dummy plug DP-2 (supplied with the controller, to the teaching connector.

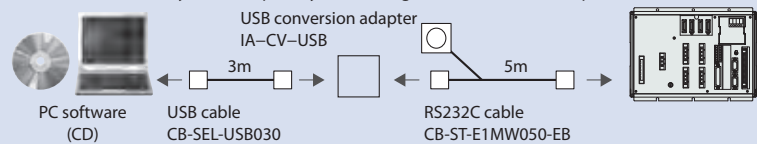


### USB-compatible PC software

**Model** **IA-101-X-USBMW**

**Features** Software available by PC's USB port by connecting a USB conversion adapter to a RS232C cable.

**Description** Software (CD-ROM)  
Compatible Windows: 7/8/8.1/10  
PC connecting cable 5m + emergency stop box +  
USB conversion adapter + USB cable 3m



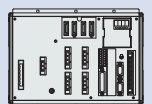
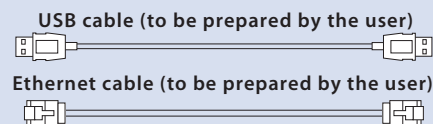
### PC dedicated teaching software (for XSEL-RA/SA/RAX/SAX)

**Model** **IA-101-N**

**Features** Contains only the PC dedicated teaching software (CD-ROM). Order only the software when connecting both the controller and PC sides by USB cable or Ethernet cable. The cable that meets the following specifications is supplied by the customer.

**Details** Software (CD-ROM), compatible Windows: XP SP2 or later/Vista 7/8/10

|                              |                           |                   |
|------------------------------|---------------------------|-------------------|
|                              | Controller side connector | Max. cable length |
| USB cable specification      | USB Mini-B                | 5m                |
| Ethernet cable specification | 10/100/1000BASE-T (RJ-45) | 5m                |



#### NOTE

When operating an actuator by USB connection, make sure to attach a stop switch to the system I/O connector. If an emergency switch cannot be prepared, use the "IA-101-X-USBMW" with an emergency stop.




# X-SEL

SCARA Robot  
Program Controller



## List of Models

Multi-Axes program controller enabling SCARA robot operation. Allows simultaneous control of up to 8 axes.

| Type name                          |  | RAX   | RAXD8                | SAX                                   | SAXD8                | PX   | QX   |
|------------------------------------|--|---|----------------------|---------------------------------------|----------------------|--|--|
| Connectable axes                   | IX   | One SCARA / Single-axis and Cartesian   | For two SCARA robots | One SCARA / Single-axis and Cartesian | For two SCARA robots | One SCARA / Single-axis and Cartesian  | For one SCARA robot / Single-axis and Cartesian robot                                |
|                                    | IXA  | One SCARA / Single-axis and Cartesian   |                      |                                       |                      | -  | -  |
| External view                      |  |                   |                      |                                       |                      |  |  |
| Type                               |  | Standard specification  |                      | Safety category compliant             |                      | Standard specification   | Safety category compliant  |
| Max. number of controlled axes     |  | 8-axis  |                      |                                       |                      | 6-axis   |  |
| No. of positions                   |  | (4-axis specification) Maximum 36666 positions<br>(Varies depending on the number of axes.)         |                      |                                       |                      | 20000 positions  |  |
| Number of programs                 |  | 255   |                      |                                       |                      | 128  |  |
| Number of program steps            |  | 20000   |                      |                                       |                      | 9999   |  |
| Total allowable wattage            |  | Three-phase 2400W   |                      |                                       |                      | Three-phase 2,400W   |  |
| Motor input power supply voltage   |  | Three-phase AC200V/230V ±10%  |                      |                                       |                      | Three-phase AC200V/230V ±10%   |  |
| Control power supply voltage       |  | Single phase AC200V/230V ±10%   |                      |                                       |                      | Single phase AC200V/230 ±10%   |  |
| Safety category (*1)               |  | B   |                      | Safety category 4 compatible          |                      | B  | Safety category 4 compatible   |
| European standard                  |  | CE  |                      |                                       |                      | CE   |  |
| RoboCylinder control function (*2) |  | Able to control up to 32 additional axes<br>(only IAI controllers compatible with MECHATROLINK-III) |                      |                                       |                      | Able to control up to 16 additional axes   |  |
| Communication port                 | Ethernet                                   | Equipped as standard: 10/100/1000BASE-T (RJ-45)   |                      |                                       |                      | Option board compliant: 10/100BASE-T (RJ-45)   |  |
|                                    | USB2.0                                     | Equipped as standard: USB2.0 (Mini-B)   |                      |                                       |                      | -  |  |
|                                    | General-purpose RS-232C communication port | 1 channel (maximum 230.4kbps)   |                      |                                       |                      | 2 channel (maximum 115.2kbps)  |  |

(\*1) To comply with the safety category, the customer will need to install a safety circuit external to the controller.

(\*2) Synchronous control is not available.

## ● For SCARA robot IXA

### Model

#### [XSEL-RAX/SAX Type]

(Additional axis content 5th~8th axes)

XSEL - [ ] - [ ] - ([ ] [ ] [ ]) - [ ] [ ] - [ ] [ ] - [ ] [ ] - [ ] [ ]

Series    Type    SCARA Robot Main Body Type    Motor Type    Encoder Type    Options    Network Dedicated Slot(s) (Slot 1) (Slot 2)    I/O Slot(s) (Slot 1) (Slot 2)    I/O Cable Length    Power Supply Voltage

|      |   |
|------|---|
| RAX3 | 3-axis SCARA  |
| RAX4 | [3-axis SCARA+1-axis] or [4-axis SCARA]                                       |
| RAX5 | [3-axis SCARA+2-axis] or [4-axis SCARA+ 1-axis]                               |
| RAX6 | [3-axis SCARA+3-axis] or [4-axis SCARA +2-axis]                               |
| RAX7 | [3-axis SCARA+4-axis] or [4-axis SCARA +3-axis]                               |
| RAX8 | 4-axis SCARA+4-axis   |
| SAX3 | 3-axis SCARA Safety category specification                                    |
| SAX4 | [3-axis SCARA+1-axis] or [4-axis SCARA] Safety category specification         |
| SAX5 | [3-axis SCARA+2-axis] or [4-axis SCARA+ 1-axis] Safety category specification |
| SAX6 | [3-axis SCARA+3-axis] or [4-axis SCARA +2-axis] Safety category specification |
| SAX7 | [3-axis SCARA+4-axis] or [4-axis SCARA +3-axis] Safety category specification |
| SAX8 | 4-axis SCARA+4-axis Safety category specification                             |

\* The case size varies depending on the type of SCARA robot to be connected and the additional axes connected. For details, refer to the external dimensions on each product page.

|     |                                   |
|-----|-----------------------------------|
| WAI | Battery-less absolute incremental |
| A   | Absolute                          |
| AI  | Index absolute                    |
| AM  | Absolute multi-rotation           |

|    |                                |
|----|--------------------------------|
| B  | Brake equipped specification   |
| C  | Creep sensor specification     |
| HA | Hi-accel./decel. specification |
| L  | Home sensor/LS compatible      |
| M  | Master axis specified          |
| S  | Slave axis specified           |

|    |             |
|----|-------------|
| E  | Not used    |
| DV | DeviceNet   |
| CC | CC-Link     |
| PR | PROFIBUS-DP |

|    |             |
|----|-------------|
| E  | Not used    |
| EP | EtherNet/IP |
| EC | EtherCAT    |

|    |                          |
|----|--------------------------|
| E  | Not used                 |
| N1 | Input 32/Output 16 (NPN) |
| N2 | Input 16/Output 32 (NPN) |
| N3 | Input 48/Output 48 (NPN) |
| P1 | Input 32/Output 16 (PNP) |
| P2 | Input 16/Output 32 (PNP) |
| P3 | Input 48/Output 48 (PNP) |

(\*) Selectable boards are fixed for the network dedicated slot.  
(\*) The network dedicated slot and I/O slot can be used together.

|     |                          |     |                  |
|-----|--------------------------|-----|------------------|
| 12  | 12W servo motor          | 150 | 150W servo motor |
| 20  | 20W servo motor          | 200 | 200W servo motor |
| 30D | 30W servo motor for RCS2 | 300 | 300W servo motor |
| 30R | 30W servo motor for RS   | 400 | 400W servo motor |
| 60  | 60W servo motor          | 600 | 600W servo motor |
| 100 | 100W servo motor         | 750 | 750W servo motor |

|   |               |
|---|---------------|
| 0 | No cable      |
| 2 | 2m (Standard) |
| 3 | 3m            |
| 5 | 5m            |

|   |                    |
|---|--------------------|
| 3 | 3 Three-phase 230V |
|---|--------------------|

|          |              |          |              |
|----------|--------------|----------|--------------|
| 3NNN1805 | IXA-3N□N1805 | 3N□N6018 | IXA-3N□N6018 |
| 4NNN1805 | IXA-4N□N1805 | 3N□N6033 | IXA-3N□N6033 |
| 3N□N3105 | IXA-3N□N3105 | 4N□N6018 | IXA-4N□N6018 |
| 3N□N3105 | IXA-3N□N3105 | 4N□N6033 | IXA-4N□N6033 |
| 4N□N4518 | IXA-4N□N4518 | 4NSW3515 | IXA-4NSW3015 |
| 4N□N4533 | IXA-4N□N4533 | 4NSW4518 | IXA-4NSW4518 |
| 3N□N4518 | IXA-3N□N4518 | 4NSW4533 | IXA-4NSW4533 |
| 4N□N4533 | IXA-4N□N4533 | 4NSW6018 | IXA-4NSW6018 |
| 4N□N4533 | IXA-4N□N4533 | 4NSW6033 | IXA-4NSW6033 |

□ is contains a symbol.  
N: Standard type  
S: High-speed type

(Example) 12:12W Servo motor type

Note  
Basically, the motor type is the same as the motor type of the actuator to be connected, but there are models that do not match the motor type of some controllers and actuators. Be sure to check the corresponding models listed below during selection.  
<30D • 30R>  
● Controller motor type [30D]: 30W actuator other than RS  
● Controller motor type [30R]: RS

### Non-connectable actuators (additional axes)

RCS2-□□5N (incremental specification), RCS2-SRA7BD/SRGS7BD/ SRGD7BD, NS-SXM□/SZM□ (both incremental specification only), RCS3-CT□, RCS2-RA13R (with load cell), RCS3-RA□□, DD/DDA (High-resolution specification)

### Limitations on additional axis connection

For SCARA controllers, there is a limit to the total motor wattage of the additional axis actuator motor that can be connected besides SCARA robots. Make sure that it does not exceed the "total wattage and max. number of connectable axes" specified in the table below.

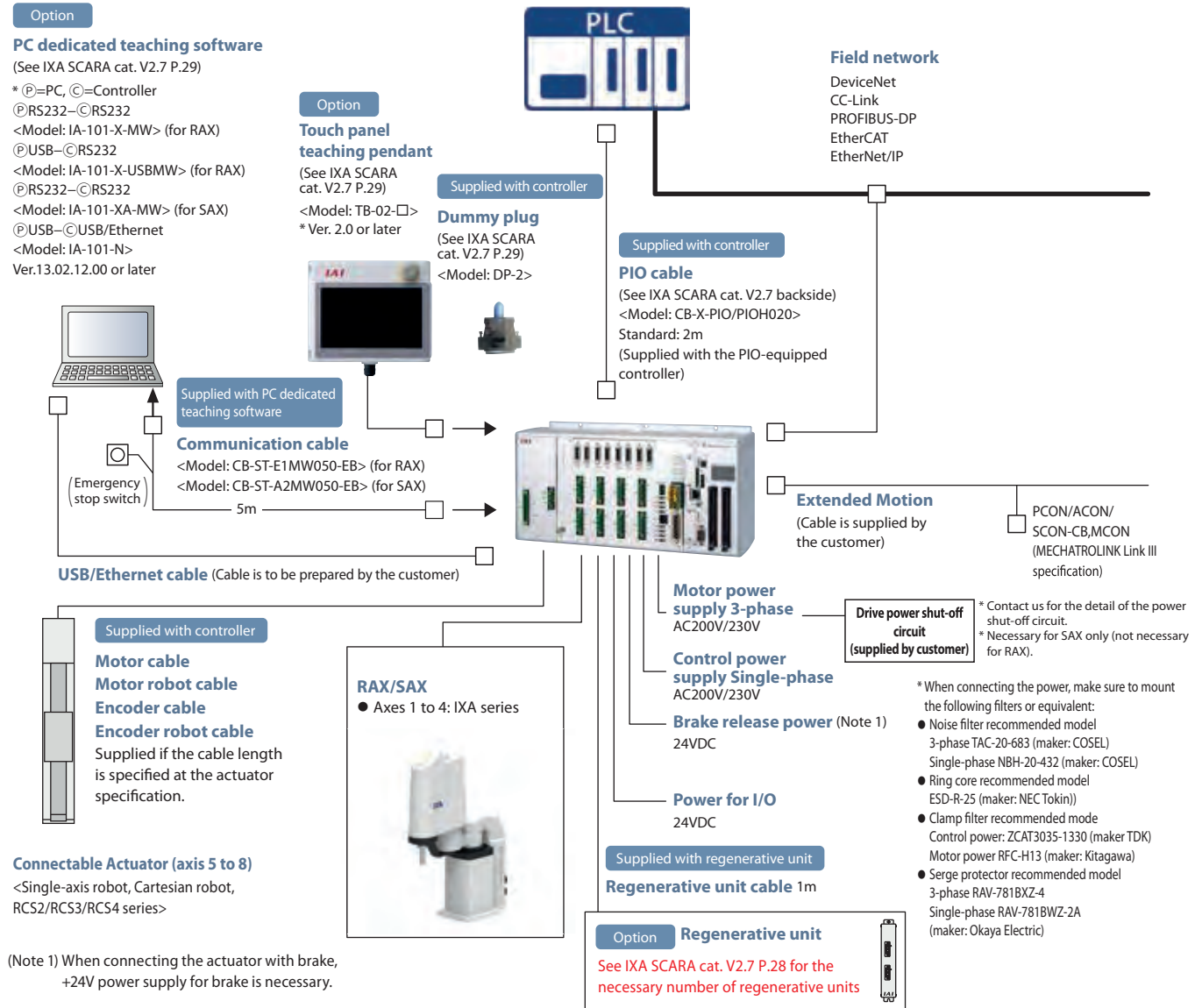
| SCARA robot model                    | Total wattage that can be connected to XSEL-RAX/SAX and the number of connectable axes . |  |
|--------------------------------------|--|--|
|                                      | Total wattage  | Number of connectable axes   |
| Standard type                        | IXA-3NNN1805<br>IXA-4NNN1805<br>IXA-3NNN3015   | Total 1500W or smaller (Max. 750W per axis)  |
|                                      | IXA-3NNN45□□<br>IXA-3NNN60□□<br>IXA-4NNN3015   | Total 700W or smaller (Max. 700W per axis)   |
|                                      | IXA-4NNN45□□<br>IXA-4NNN60□□   | Total 600W or smaller (Max. 600W per axis)   |
|                                      |  | Maximum 4 axes (from 5th to 8th axes)  |
|                                      |  | Maximum 3 axes (from 6th to 8th axes)  |
|                                      | High-speed type  | IXA-3NSN3015<br>IXA-3NSN45□□<br>IXA-3NSN60□□<br>IXA-4NSN3015<br>IXA-4NSN45□□<br>IXA-4NSN60□□ |
| Dust- and splash-proof specification | IXA-4NSW3015<br>IXA-4NSW45□□<br>IXA-4NSW60□□   |  |

- Note
- The high-speed type SCARA robot (including dust- and splash-proof spec.) cannot be connected with an additional axis.
  - The 4th axis of a 3-axis SCARA robot (IXA-3NN□□□□) cannot be connected with an additional axis. Connectable to the 5th to 8th axes of XSEL controller.

## ● For SCARA robot IXA

### System configuration

#### ■ XSEL-RAX/SAX types



(Note 1) When connecting the actuator with brake, +24V power supply for brake is necessary.

## ● For SCARA robot IX

### Model

#### [XSEL-RAX/SAX Type]

(Additional axis content 5th~8th axes)

**XSEL** - [ ] - [ ] - ([ ] [ ] [ ]) - [ ] [ ] - [ ] [ ] - [ ] - [ ]

Series    Type    SCARA Robot Main Body Type    Motor Type    Encoder Type    Options    Network Dedicated Slot(s) (Slot 1) (Slot 2)    I/O Slot(s) (Slot 1) (Slot 2)    I/O Cable Length    Power Supply Voltage

|      |                            |
|------|----------------------------|
| RAX4 | SCARA 1 unit               |
| RAX5 | SCARA +1-axis              |
| RAX6 | SCARA +2-axis              |
| RAX7 | SCARA +3-axis              |
| RAX8 | SCARA +4-axis              |
| SAX4 | SCARA 1-unit global spec.  |
| SAX5 | SCARA +1-axis global spec. |
| SAX6 | SCARA +2-axis global spec. |
| SAX7 | SCARA +3-axis global spec. |
| SAX8 | SCARA +4-axis global spec. |

|     |                                   |
|-----|-----------------------------------|
| WAI | Battery-less absolute incremental |
| A   | Absolute                          |
| AI  | Index absolute                    |
| AM  | Absolute multi-rotation           |

|    |                                |
|----|--------------------------------|
| B  | Brake equipped specification   |
| C  | Creep sensor specification     |
| HA | Hi-accel./decel. specification |
| L  | Home sensor/LS compatible      |
| M  | Master axis specified          |
| S  | Slave axis specified           |

|    |             |
|----|-------------|
| E  | Not used    |
| DV | DeviceNet   |
| CC | CC-Link     |
| PR | PROFIBUS-DP |

|    |             |
|----|-------------|
| E  | Not used    |
| EP | EtherNet/IP |
| EC | EtherCAT    |

|    |                          |
|----|--------------------------|
| E  | Not used                 |
| N1 | Input 32/Output 16 (NPN) |
| N2 | Input 16/Output 32 (NPN) |
| N3 | Input 48/Output 48 (NPN) |
| P1 | Input 32/Output 16 (PNP) |
| P2 | Input 16/Output 32 (PNP) |
| P3 | Input 48/Output 48 (PNP) |

(\*) Selectable boards are fixed for the network dedicated slot.  
 (\*) The network dedicated slot and I/O slot can be used together.

|                |  |                |                            |
|----------------|--|----------------|----------------------------|
| NNN1205~8040H  | Standard type                            | TNN3015H~3515H | Wall-mounting type         |
| NNN1205B~1805B | Standard ultra-compact type with brake   | UNN3015H~3515H | Wall-mounting inverse type |
| NSNS016H~6016H | High-speed type                          | HNN5020H~8040H | Ceiling-mounting type      |
| NNC1205~8040H  | Clean room type                          | INN5020H~8040H | Inverse type               |
| NNC1205B~1805B | Clean room ultra-compact type with brake |                |                            |
| NNW2515H~8040H | Splash-proof type                        |                |                            |

Note: When the brake option is selected with IX-NNN or NNC 1205/1505/1805, be sure to specify the model number of the IX type with the brake option (1205B/1505B/1805B).

|     |                          |     |                  |
|-----|--------------------------|-----|------------------|
| 12  | 12W servo motor          | 150 | 150W servo motor |
| 20  | 20W servo motor          | 200 | 200W servo motor |
| 30D | 30W servo motor for RCS2 | 300 | 300W servo motor |
| 30R | 30W servo motor for RS   | 400 | 400W servo motor |
| 60  | 60W servo motor          | 600 | 600W servo motor |
| 100 | 100W servo motor         | 750 | 750W servo motor |

(Example) 12:12W Servo motor type

|   |               |
|---|---------------|
| 0 | No cable      |
| 2 | 2m (Standard) |
| 3 | 3m            |
| 5 | 5m            |

|   |                    |
|---|--------------------|
| 3 | 3 Three-phase 230V |
|---|--------------------|

**Note**  
 In general, the motor specified in the controller model number should match the actuator's model number.  
 Be sure to check the corresponding models listed below during selection.  
 <30D・30R>  
 ● Controller motor type [30D]: 30W actuator other than RS  
 ● Controller motor type [30R]: RS

\* Note for selecting single-axis robots  
 Conditions for connectable single-axis is change based on the SCARA robot being operated.  
 For details, refer to the "unconnectable actuator" on P7-294.

#### [XSEL-RAXD8/SAXD8 Type]

**XSEL** - [ ] - [ ] - [ ] - [ ] [ ] [ ] - [ ] [ ] - [ ] [ ] - [ ] - [ ]

Series    Type    SCARA Robot Main Body Type 1    SCARA Robot Main Body Type 2    Network Dedicated Slot(s) (Slot 1) (Slot 2)    I/O Slot(s) (Slot 1) (Slot 2)    I/O Cable Length    Power Supply Voltage

|       |                                   |
|-------|-----------------------------------|
| RAXD8 | SCARA 2-unit specification        |
| SAXD8 | SCARA 2-unit global specification |

|                |  |
|----------------|--|
| NNN1205~6030H  | Standard type                            |
| NNN1205B~1805B | Standard ultra-compact type with brake   |
| NNC1205~6030H  | Clean room type                          |
| NNC1205B~1805B | Clean room ultra-compact type with brake |
| NNW2515H~6030H | Splash-proof type                        |
| TNN3015H~3515H | Wall-mounting type                       |
| UNN3015H~3515H | Wall-mounting inverse type               |
| HNN5020H~6020H | Ceiling-mounting type                    |
| INN5020H~6020H | Inverse type                             |

|    |             |
|----|-------------|
| E  | Not used    |
| DV | DeviceNet   |
| CC | CC-Link     |
| PR | PROFIBUS-DP |

|    |             |
|----|-------------|
| E  | Not used    |
| EP | EtherNet/IP |
| EC | EtherCAT    |

|    |                          |
|----|--------------------------|
| E  | Not used                 |
| N1 | Input 32/Output 16 (NPN) |
| N2 | Input 16/Output 32 (NPN) |
| N3 | Input 48/Output 48 (NPN) |
| P1 | Input 32/Output 16 (PNP) |
| P2 | Input 16/Output 32 (PNP) |
| P3 | Input 48/Output 48 (PNP) |

(\*) Selectable boards are fixed for the network dedicated slot.  
 (\*) The network dedicated slot and I/O slot can be used together.

|   |               |
|---|---------------|
| 0 | No cable      |
| 2 | 2m (Standard) |
| 3 | 3m            |
| 5 | 5m            |

|   |                    |
|---|--------------------|
| 3 | 3 Three-phase 230V |
|---|--------------------|

Note: When the brake option is selected with IX-NNN or NNC 1205/1505/1805, be sure to specify the model number of the IX type with the brake option (1205B/1505B/1805B).

\* Note for selecting SCARA robots  
 There are limitations as to which SCARA robots can be connected together.  
 Please refer to "Non-connectable Actuators" on P7-294.

## ● For SCARA robot IX

### Model

#### [XSEL-PX/QX Type]

**XSEL** - [ ] - [ ] - ([ ] [ ] [ ]) - ([ ] [ ] [ ]) - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

Series    Type    IX Main Body Type    (Additional axis content 5th axes)    (Additional axis content 6th axes)    Network Dedicated Slots    (Slot 1) Standard I/O    (Slot 2) Expansion I/O    (Slot 3) Expansion I/O    (Slot 4) Expansion I/O    I/O cable length    Power Supply Voltage

|     |                                  |  |  |  |  |  |  |  |  |  |  |   |                    |
|-----|----------------------------------|--|--|--|--|--|--|--|--|--|--|---|--------------------|
| PX4 | 4-axis type                      |  |  |  |  |  |  |  |  |  |  | 3 | Three phase AC230V |
| PX5 | 5-axis type                      |  |  |  |  |  |  |  |  |  |  | 0 | No cable           |
| PX6 | 6-axis type                      |  |  |  |  |  |  |  |  |  |  | 2 | 2m                 |
| QX4 | 4-axis global specification type |  |  |  |  |  |  |  |  |  |  | 3 | 3m                 |
| QX5 | 5-axis global specification type |  |  |  |  |  |  |  |  |  |  | 5 | 5m                 |
| QX6 | 6-axis global specification type |  |  |  |  |  |  |  |  |  |  |   |                    |

|                |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| NNN1205~8040H  | Standard type                            |  |  |  |  |  |  |  |  |  |  |  |  |
| NNN1205B~1805B | Standard ultra-compact type with brake   |  |  |  |  |  |  |  |  |  |  |  |  |
| NSN5016H~6016H | High-speed type                          |  |  |  |  |  |  |  |  |  |  |  |  |
| NNC1205~8040H  | Clean room type                          |  |  |  |  |  |  |  |  |  |  |  |  |
| NNC1205B~1805B | Clean room ultra-compact type with brake |  |  |  |  |  |  |  |  |  |  |  |  |
| NNW2515H~8040H | Splash-proof type                        |  |  |  |  |  |  |  |  |  |  |  |  |
| TNN3015H~3515H | Wall-mounting type                       |  |  |  |  |  |  |  |  |  |  |  |  |
| UNN3015H~3515H | Wall-mounting inverse type               |  |  |  |  |  |  |  |  |  |  |  |  |
| HNN5020H~8040H | Ceiling-mounting type                    |  |  |  |  |  |  |  |  |  |  |  |  |
| INN5020H~8040H | Inverse type                             |  |  |  |  |  |  |  |  |  |  |  |  |

Note: When the brake option is selected with IX-NNN or NNC 1205/1505/1805, be sure to specify the model number of the IX type with the brake option (1205B/1505B/1805B).

|     |                               |  |  |  |  |  |  |  |  |  |  |  |  |
|-----|-------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|
| WAI | Battery-less abs. Incremental |  |  |  |  |  |  |  |  |  |  |  |  |
| A   | Absolute                      |  |  |  |  |  |  |  |  |  |  |  |  |
| AI  | Index absolute                |  |  |  |  |  |  |  |  |  |  |  |  |
| AM  | Multi-rotation abs.           |  |  |  |  |  |  |  |  |  |  |  |  |

|   |                              |  |  |  |  |  |  |  |  |  |  |  |  |
|---|------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|
| B | Brake equipped specification |  |  |  |  |  |  |  |  |  |  |  |  |
| C | Creep sensor specification   |  |  |  |  |  |  |  |  |  |  |  |  |
| L | Home sensor/LS compatible    |  |  |  |  |  |  |  |  |  |  |  |  |
| M | Master axis specified        |  |  |  |  |  |  |  |  |  |  |  |  |
| S | Slave axis specified         |  |  |  |  |  |  |  |  |  |  |  |  |

|    |                             |  |  |  |  |  |  |  |  |  |  |  |  |
|----|-----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|
| E  | Not used                    |  |  |  |  |  |  |  |  |  |  |  |  |
| N1 | Input 32/Output 16 (NPN)    |  |  |  |  |  |  |  |  |  |  |  |  |
| N2 | Input 16/Output 32 (NPN)    |  |  |  |  |  |  |  |  |  |  |  |  |
| N3 | Input 48/Output 48 (NPN)    |  |  |  |  |  |  |  |  |  |  |  |  |
| P1 | Input 32/Output 16 (PNP)    |  |  |  |  |  |  |  |  |  |  |  |  |
| P2 | Input 16/Output 32 (PNP)    |  |  |  |  |  |  |  |  |  |  |  |  |
| P3 | Input 48/Output 48 (PNP)    |  |  |  |  |  |  |  |  |  |  |  |  |
| S  | Equipped Expansion I/O base |  |  |  |  |  |  |  |  |  |  |  |  |

|       |                   |  |  |  |  |  |  |  |  |  |  |  |  |
|-------|-------------------|--|--|--|--|--|--|--|--|--|--|--|--|
| Blank | Not used          |  |  |  |  |  |  |  |  |  |  |  |  |
| DV    | DeviceNet board   |  |  |  |  |  |  |  |  |  |  |  |  |
| CC    | CC-Link board     |  |  |  |  |  |  |  |  |  |  |  |  |
| PR    | PROFIBUS-DP board |  |  |  |  |  |  |  |  |  |  |  |  |
| EP    | EtherNet/IP board |  |  |  |  |  |  |  |  |  |  |  |  |

\* If you selected DV, CC, PR, or EP instead of a standard or expansion I/O, select 0 (no cable) for the I/O cable length.

\* If expansion I/O will not be used, enter E (not used) for slots 2 to 4. If you are using expansion I/O, enter the expansion I/O code in the desired slot. If an expansion I/O is specified, the controller chassis will come with the expansion I/O base. If you will not be using the expansion I/O initially but will be adding it later, specify the chassis with I/O expansion board, but specify 5 for slots 2 to 4.

\* Ethernet/IP specification can support Ethernet.

e.g. Expansion I/O on slot 2, remaining slots unused  
XSEL-PX4-NNN1205-N1-N1EE-2-3  
Expansion I/O base attached, but not the expansion I/O  
XSEL-PX4-NNN1205-N1-SSS-2-3

|     |     |     |      |     |      |
|-----|-----|-----|------|-----|------|
| 12  | 12W | 60  | 60W  | 400 | 400W |
| 20  | 20W | 100 | 100W | 600 | 600W |
| 30D | 30W | 150 | 150W | 750 | 750W |
| 30R | 30W | 200 | 200W |     |      |

(Example) 12:12W Servo motor type

|     |     |     |      |     |      |
|-----|-----|-----|------|-----|------|
| 12  | 12W | 60  | 60W  | 400 | 400W |
| 20  | 20W | 100 | 100W | 600 | 600W |
| 30D | 30W | 150 | 150W | 750 | 750W |
| 30R | 30W | 200 | 200W |     |      |

(Example) 12:12W Servo motor compliant

**Note**

In general, the motor specified in the controller model number should match the actuator's model number, but there are some models where the motor type of some controllers and actuators do not match. Be sure to check the corresponding models listed below during selection.

<30D・30R>

- Controller motor type [30D]: 30W actuator other than RS
- Controller motor type [30R]: RS

\* Details of the 5th and 6th axes are filled in for PX5/QX5/PX6/QX6.

\* For arm length 700/800 and high-speed type, max. connectible axes is 4 (SCARA only).

## ● For SCARA robot IX

### Non-connectable actuators

For XSEL-PX/QX (5, 6 axes)

RCS2-□□5N (incremental specification), RCS2-SRA7BD/SRGS7BD/SPGD7BD,  
NS-SXM□/SZM□ (both incremental specification only), DDA Series

For XSEL-RAX/SAX (5 to 8 axes)

RCS2-□□5N (incremental specification), RCS2-SRA7BD/SRGS7BD/ SRGD7BD,  
NS-SXM□/SZM□ (both incremental specification only), RCS2-RA13R (with load cell), RCS3-RA□R

### Limitations on additional axis connection

#### ■ Limitations on additional axis actuator when connecting XSEL-RAX/SAX

For SCARA controllers, there is a limit to the total motor wattage of the additional axis actuator motors that can be connected besides SCARA robots. Make sure that it does not exceed the "total wattage and max. number of connectable axes" specified in the table below.

| SCARA type                 |  | Total wattage and max. number of connectable axes |
|----------------------------|--|---|
|                            |  | 3-phase specification                             |
| Ultra-compact type         | NN*1205 / NN*1505 / NN*1805                                      | 1500W 4 axes (max. 750W/axis)                     |
| Small high-power type      | NN*2515H / TNN3015H / UNN3015H<br>NN*3515H / TNN3515H / UNN3515H | 1500W 4 axes (max. 750W/axis)                     |
| Medium high-power type     | NN*50□□H / HNN5020H / INN5020H<br>NN*60□□H / HNN6020H / INN6020H | 600W 4 axes (max. 600W/axis)                      |
| Large high-power type      | NN*70□□H / HNN70□□H / INN70□□H<br>NN*80□□H / HNN80□□H / INN80□□H | Cannot be connected                               |
| High-speed high-power type | NSN5016H / NSN6016H  | Cannot be connected                               |

#### ■ Limitations on connectable SCARA robots when connecting XSEL-RAXD/SAXD

Controllers for SCARA can connect max. two SCARA robots, but there is a limitation for the combination. Please select a connectable combination.

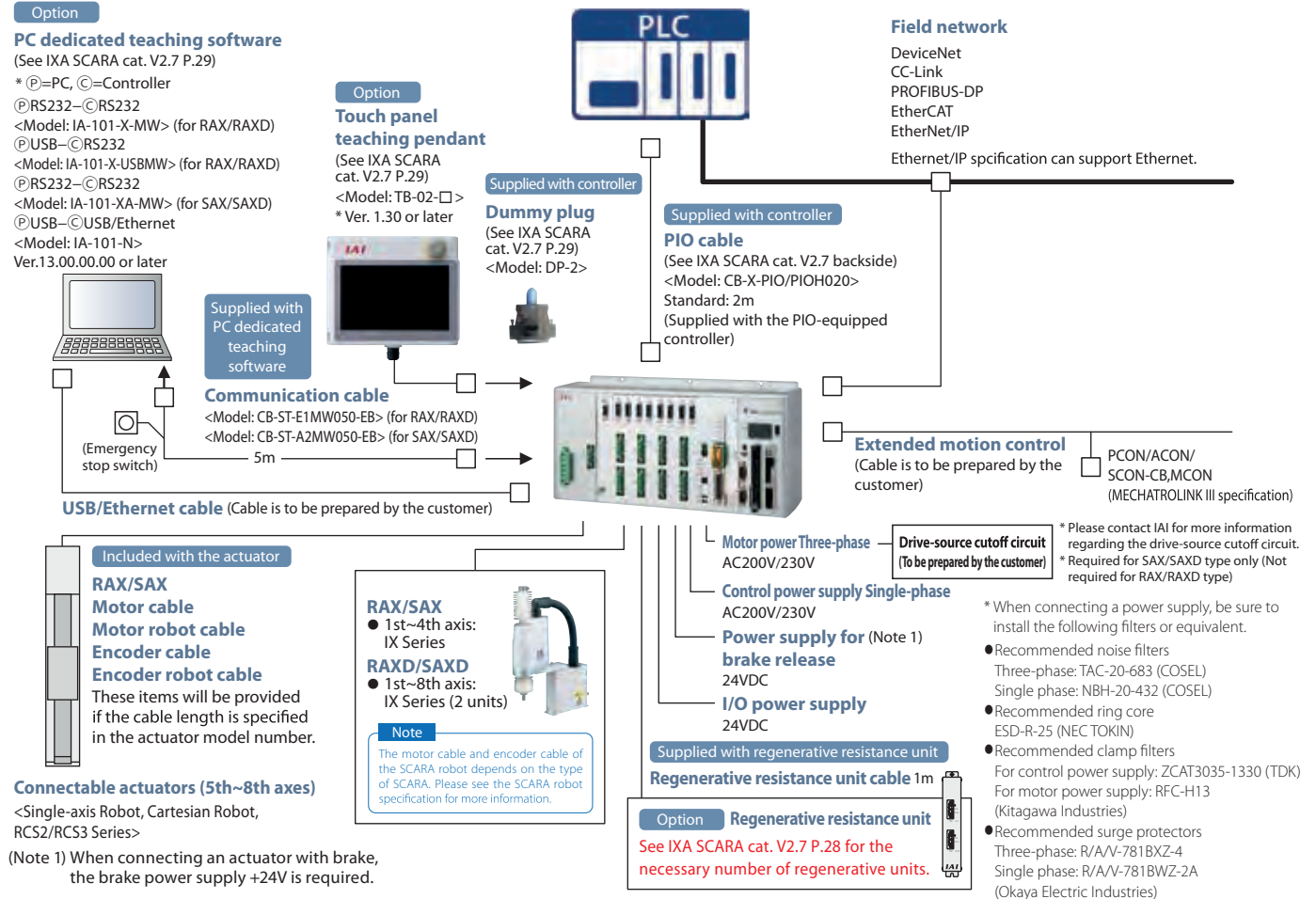
| SCARA robot model for 2 robot combinations |   |                     |                        |
|--|---|---------------------|------------------------|
| 1st robot                                  |   | 2nd robot           |                        |
| Ultra-compact type                         | NN*1205 / NN*1505 / NN*1805                                       | Ultra-compact type  | Medium high-power type |
| Small high-power type                      | NN*2515H / NN*3515H<br>TNN3015H / UNN3015H<br>TNN3515H / UNN3515H |                     | Small high-power type  |
| Medium high-power type                     | NN*50□□H / NN*60□□H<br>HNN5020H / INN5020H<br>HNN6020H / INN6020H |                     |                        |
| Large high-power type                      | NN*70□□H / NN*80□□H<br>HNN70□□H / INN70□□H<br>HNN80□□H / INN80□□H | Cannot be connected |                        |
| High-speed high-power type                 | NSN5016H / NSN6016H   | Cannot be connected |                        |



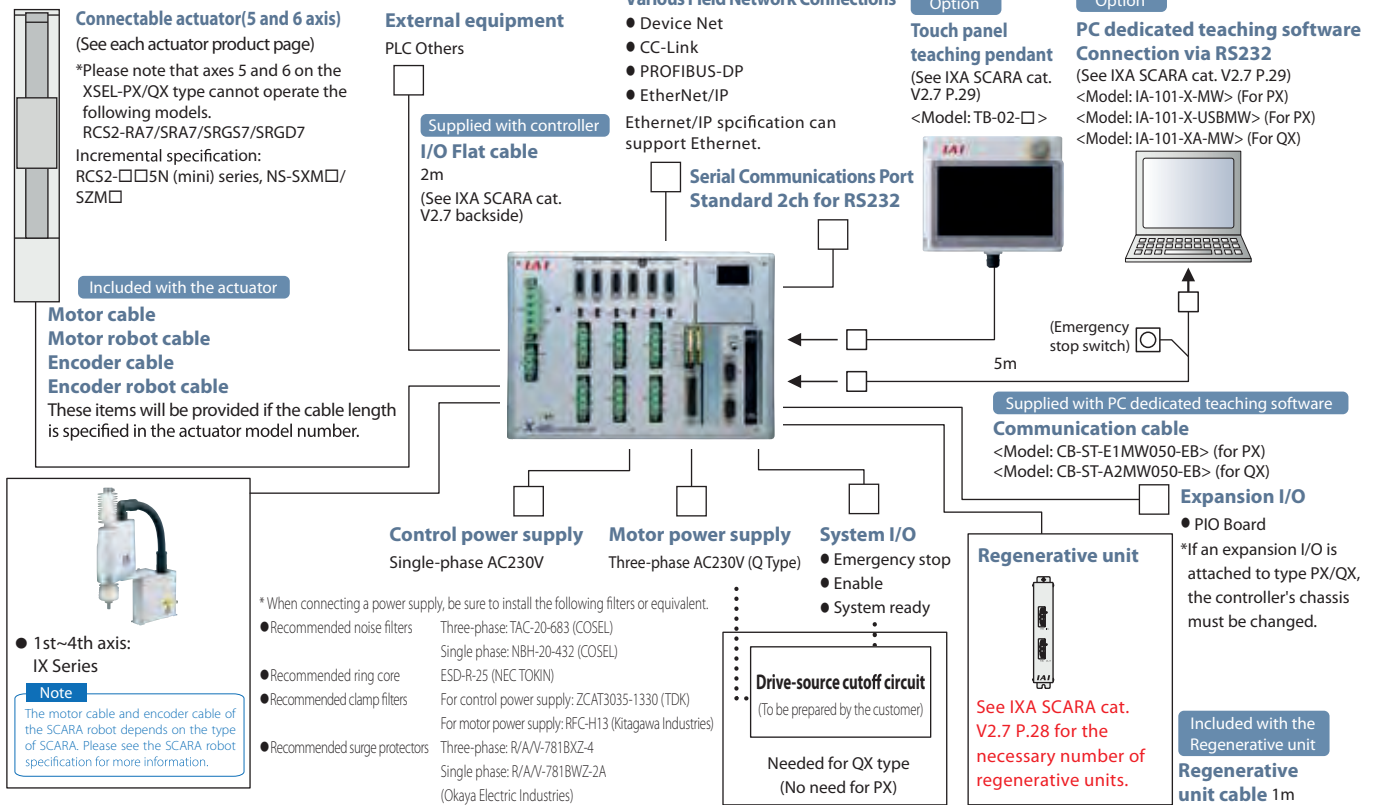
## ● For SCARA robot IX

### System Configuration

#### ■ XSEL-RAX/RAXD/SAX/SAXD Type



## ■ XSEL-PX/QX Type



# TB-02

**Universal for Position controller/Program controller  
Touch Panel Teaching Pendant TB-02**



## Features

- By equipping a 7" full color touch screen, the buttons and letters became easier to see, and operability improved.
- When used with a program controller, it has the same functions as the previous model. When used with position controllers, new functions, such as the guide function, have been installed, and it is easy to set the model using the interactive method.
- It can be used for both position controllers and program controllers.  
(Excludes models prior to RCP2 for the CON series and models prior to SEL-E/G)
- For the standard specification, a Thickness of 25mm has been achieved.
- Saving program/data into SD memory card.
- Screen shot function convenient for procedure manual creation and recording conditions has been equipped.

Various new functions for easy operation and enhanced support functions (2~13,18,19 are functions for position controllers)

|    |                             |  |
|----|-----------------------------|--|
| 1  | Main Menu                   | A menu screen that is easy to select visually with the use of icons.   |
| 2  | Position Editing Guide      | A function that guides through position data setting method using an interactive method.   |
| 3  | I/O Control Guide           | A function that guides through the I/O operation method of the position controller using an interactive method.                                    |
| 4  | Simple Program Setting      | A function through which the operation method, position, and speed can be input using an interactive method.                                       |
| 5  | Off-board Tuning            | A function for calculating the settings of the optimal control parameter (each type of gain) and cycle time by inputting the operation conditions. |
| 6  | Trouble Shooting            | A function that displays detailed alarm information when a problem occurs and the steps to deal with the trouble using an interactive method.      |
| 7  | Maintenance Parts List      | A function that display the time for regular maintenance and the maintenance parts list for parts exchange at the time malfunction.                |
| 8  | Startup Screen Setting      | A function for selecting the startup screen and hiding the guide function icon of the main menu.   |
| 9  | Pulse-train Control Setting | A function that makes input easy by putting together the setting for the pulse-train control related parameters on a special screen.               |
| 10 | Glossary of Terms           | A function that displays the explanation of terms from the catalog and terms related to position controller operation.                             |
| 11 | Gateway Setting/Monitoring  | A function for setting and monitoring the gateway unit in a gateway system for MCON/MSEP-C/RCP6S.  |
| 12 | Simple Program              | Function A function for performing easy program operations such as repeating position and setting stopping time.                                   |
| 13 | Servo Monitoring            | A monitoring function to check the actual operation condition with displays of waveforms.  |
| 14 | Teaching Update             | A function that lets you update software   |
| 15 | Screen shot                 | A function for saving a bmp file of the screen shot into SD card by pressing and holding the bottom right section of the screen.                   |
| 16 | Large Monitor               | By equipping a 7" full color touch panel, the buttons and letters became easier to see, and operability improved.                                  |
| 17 | Multi-language Compatible   | Compatible with English, Japanese, and Chinese.  |
| 18 | Network data                | Display I/O data between host PLC and controller when connecting single-axis of network specification  |
| 19 | Press program function      | Edit and conduct a test run for press program when connecting controller for servo press.  |

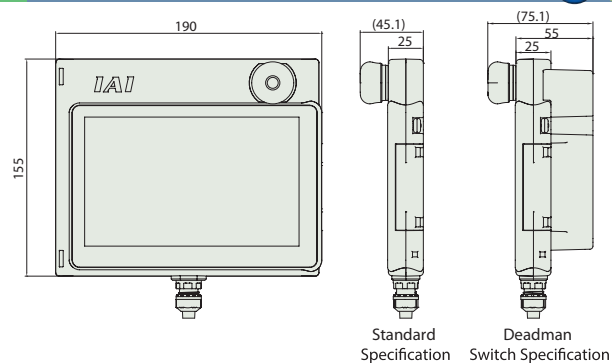
# TB-02

## Specifications

|                            |  |
|----------------------------|--|
| Rated voltage              | 24VDC                                      |
| Power consumption          | 3.6W or less (150mA or less)               |
| Ambient operating temp.    | 0 ~ 40°C                                   |
| Ambient operating humidity | 20 ~ 80%RH (Non-condensing)                |
| Environmental resistance   | IP20                                       |
| Overseas standard          | CE   |
| Mass                       | 470g (TB-02 box only) + 330g (5m cable)    |
|                            | 600g (TB-02D box only) + 330g (5m cable)   |
| Cable length               | 5m (Standard cable is attached to the box) |

## External Dimensions

CAD drawings can be downloaded from our website.  
www.iiai-automation.com



## Models

The teaching pendant is compatible with every controller on P. 7-318, but please select the cable according to the controller.

\* The recommended color of the emergency stop switch is gray when the controller is a standard specification, and is red (model: -SWR) when the controller is a safety category compliant specification.

### Teaching Pendant + Cable as a Set

| Type  | Model Number  | Specification                                   | Included Cable                |                                     |
|---|---------------|---|-------------------------------|-------------------------------------|
|   |               |   | For Position Controller       | For Program Controller              |
| Models universal for position and program controllers | TB-02-SC      | Standard specification (Gray stop switch)       | ①CB-TB1-C002                  | ②CB-TB1-X002<br>+<br>③CB-SEL-SJS002 |
|   | TB-02-SC-SWR  | Standard specification (Red stop switch)        |                               |                                     |
|   | TB-02D-SC     | Deadman switch specification (Gray stop switch) |                               |                                     |
|   | TB-02D-SC-SWR | Deadman switch specification (Red stop switch)  |                               |                                     |
| Models dedicated to position controllers              | TB-02-C       | Standard specification (Gray stop switch)       | ①CB-TB1-C002                  |                                     |
|   | TB-02-C-SWR   | Standard specification (Red stop switch)        |                               |                                     |
|   | TB-02D-C      | Deadman switch specification (Gray stop switch) |                               |                                     |
|   | TB-02D-C-SWR  | Deadman switch specification (Red stop switch)  |                               |                                     |
| Models dedicated to program controllers               | TB-02-S       | Standard specification (Gray stop switch)       | ②CB-TB1-X002 + ③CB-SEL-SJS002 |                                     |
|   | TB-02-S-SWR   | Standard specification (Red stop switch)        |                               |                                     |
|   | TB-02D-S      | Deadman switch specification (Gray stop switch) |                               |                                     |
|   | TB-02D-S-SWR  | Deadman switch specification (Red stop switch)  |                               |                                     |

\* You can specify the following at the end of the model number. Written in English when shipped: -ENG.

### Teaching Pendant Only (No Cable Included)

| Type  | Model Number   | Specification                                   |
|---|----------------|---|
| Models universal for position and program controllers | TB-02-SCN      | Standard specification (Gray stop switch)       |
|   | TB-02-SCN-SWR  | Standard specification (Red stop switch)        |
|   | TB-02D-SCN     | Deadman switch specification (Gray stop switch) |
|   | TB-02D-SCN-SWR | Deadman switch specification (Red stop switch)  |

### Individual Cable Only

| Type                                 | Model Number                    |
|--------------------------------------|---------------------------------|
| Position controller connection cable | ①CB-TB1-C002                    |
| Program controller connection cable  | ②CB-TB1-X002                    |
|                                      | ③CB-SEL-SJS002 (Adapter cable)* |
| TP adapter connection cable          | ④CB-TB1-GC002                   |

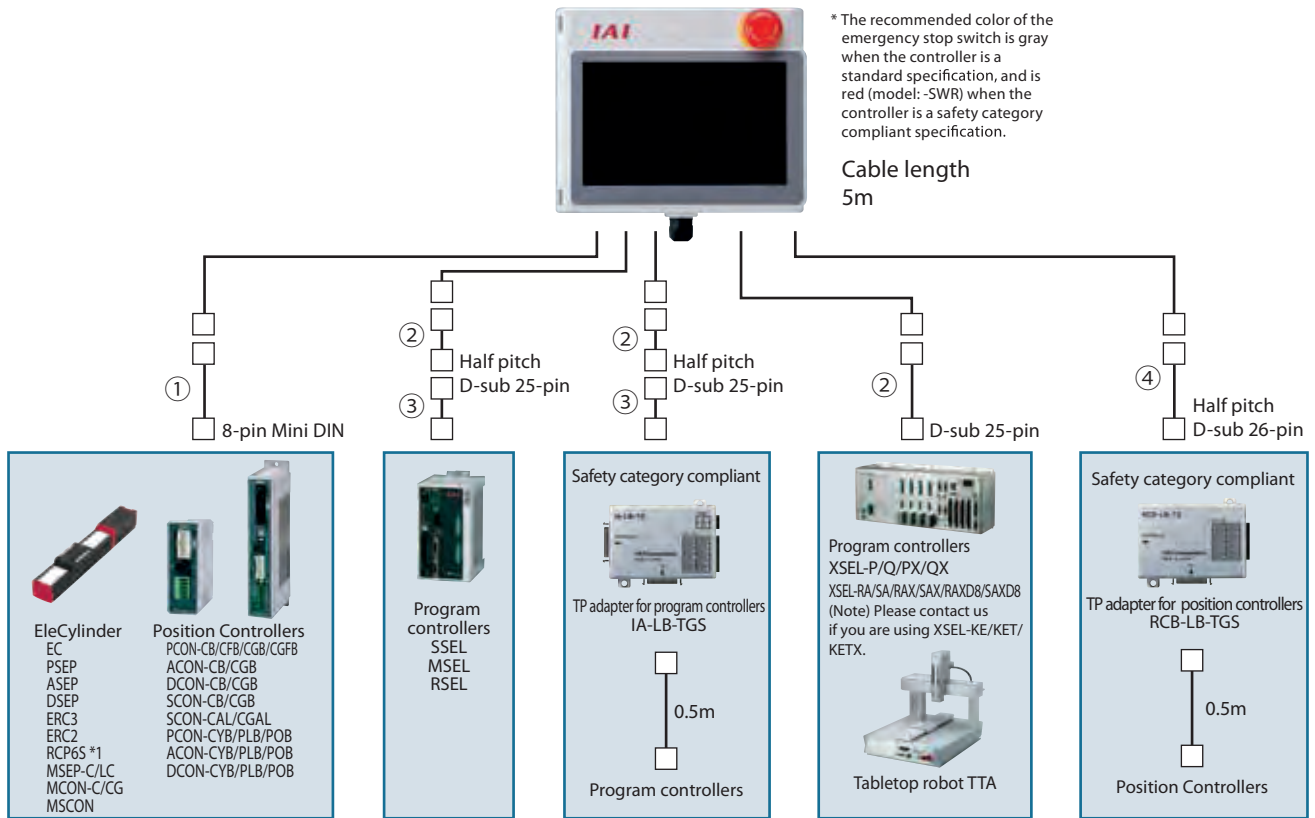
\* Use with CB-TB1-X002 when connecting to ASEL, PSEL, SSEL, and MSEL.

### Options

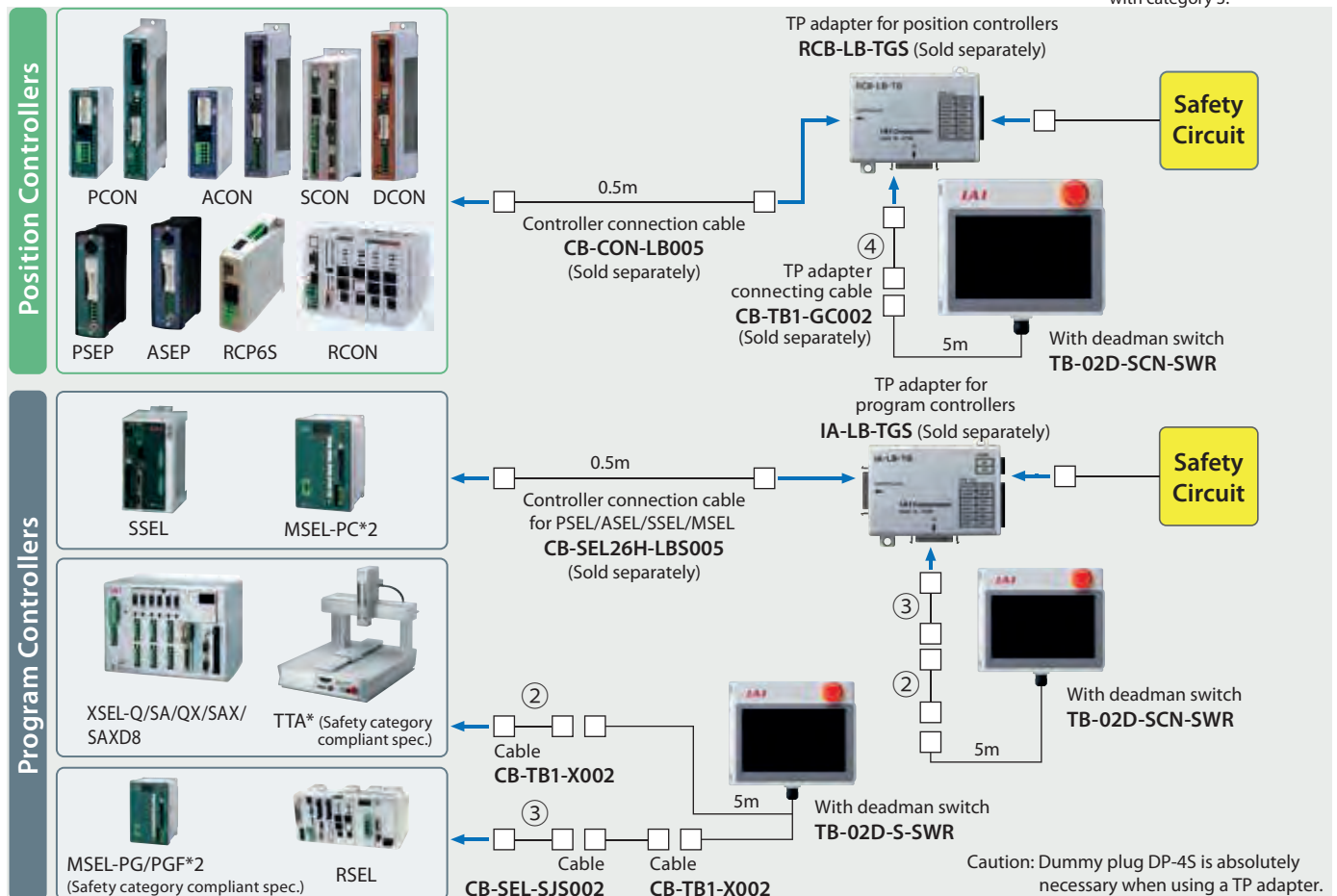
| Name        | Model Number | Description  |
|-------------|--------------|--|
| Strap       | STR-1        | Connected to the box.                                  |
| Grip belt   | GRP-1        | Safety belt to hold the box by left hand.              |
| Spiral cord | SIC-1        | A cord which connects the box and the provided stylus. |

(Note) Please contact us if you are using XSEL-KE/KET/KETX.

## Applicable Controllers/Safety category compliant



### Compatibility with safety category will be constituted as below. Compliant with up to Safety Category B~4. \*1 \*2



# TB-03

Universal for position controller / program controller  
 Touch panel teaching pendant TB-03

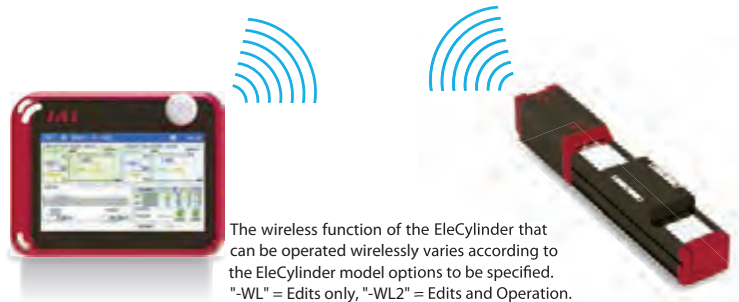


## Features

### 1 Set operating conditions with wireless connection

Position adjustments, operating conditions setting and actuator operations can be performed from outside the equipment, even without a cable connection to the EleCylinder actuators.

\* Stop switch is enabled only during "cable connection".  
 Please be careful that it is disabled during "wireless connection".



The wireless function of the EleCylinder that can be operated wirelessly varies according to the EleCylinder model options to be specified.  
 "-WL" = Edits only, "-WL2" = Edits and Operation.

### 2 Status monitoring makes daily maintenance easier and shortens trouble recovery time

TB-03 can monitor the operating status of up to 16 axes while receiving wireless data from the EleCylinder. Error recovery time also can be shortened by troubleshooting with wireless communication.

Status monitor screen



#### Axis Name Display

Can be configured (changed) arbitrarily according to customer applications.

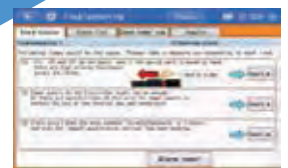
#### Status Monitor

Axis status check can be used for confirmation of maintenance timing.

|                                    |                               |  |                   |   |
|------------------------------------|-------------------------------|--|-------------------|---|
| EC2<br>S/N A70761788<br>Selectable | Servo<br>Cur. pos.<br>0.00 mm | Travel Cnt.<br>Travel Dist.<br>Over load Lv. | 52<br>1 m<br>12 % | Alarm Group - Barnin<br>Maintenance warning 1 |
|------------------------------------|-------------------------------|--|-------------------|---|

#### Error Status Monitor

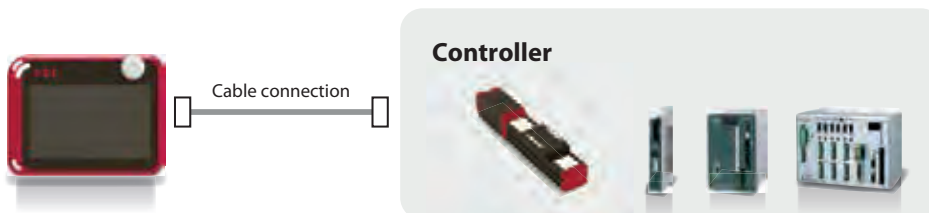
Alarms and warnings are displayed when generated.  
 Useful for troubleshooting.



Troubleshooting screen

### 3 Supports EleCylinder / Position Controller / Program Controller

Dedicated cables can connect the TB-03 to all the controllers. The same functions and operations of the previous TB-02 are available.



Wired or wireless of the EleCylinder can be selected at the EleCylinder model option.

# TB-03

## Model Number

One unit supports all controllers, although the cable must be selected in accordance with the controller to be connected. Select the AC adapter for charging the main unit according to the operating environment.

Model **TB-03** - **Cable** - **AC adapter**

### ● Body + cable + AC adapter set model

| Connected controller                                     | Model        |            | Cable                                   |  |
|--|--------------|------------|---|--|
|  | Body + cable | AC adapter | For EleCylinder/<br>position controller | For program controller                                   |
| EleCylinder<br>Position Controller                       | TB-03-C      | E          | ① CB-TB3-C050                           | -  |
|  |              | N *2       |   |  |
| Program Controller                                       | TB-03-S      | E          | -                                       | ② CB-TB3-S050 + ③ CB-SEL-SJS002                          |
|  |              | N *2       |   |  |
| EleCylinder<br>Position Controller<br>Program Controller | TB-03-SC     | E          | ① CB-TB3-C050                           | ② CB-TB3-S050 + ③ CB-SEL-SJS002<br>(conversion cable) *3 |
|  |              | N *2       |   |  |
|  | TB-03-SCN *1 | E          | -                                       | -  |
|  |              | N *2       |   |  |

\*1 No cable

\*2 No AC adapter

\*3 Use with the ② cable when connecting to ASEL, PSEL, SSEL, or MSEL

### ● Connection cable model number

| Connected controller               | Model                                 |
|------------------------------------|---------------------------------------|
| EleCylinder<br>Position Controller | ① CB-TB3-C050                         |
| Program Controller                 | ② CB-TB3-S050                         |
|                                    | ③ CB-SEL-SJS002 (conversion cable) *3 |

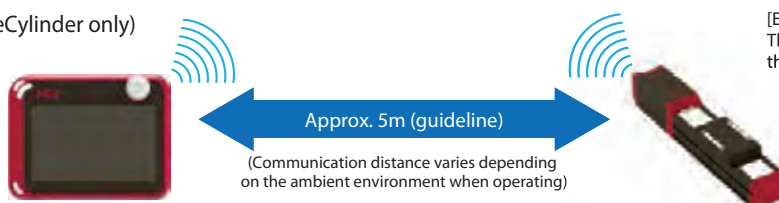
\*3 Use with the ② cable when connecting to ASEL, PSEL, SSEL, or MSEL

### ● AC adapter single product model number

| Connected controller                                     | Model | Specification | Single product model number |
|--|-------|---------------|-----------------------------|
| EleCylinder<br>Position Controller<br>Program Controller | E     | For Europe    | UNE318-5928                 |

## Connection

### ● Wireless connection (EleCylinder only)



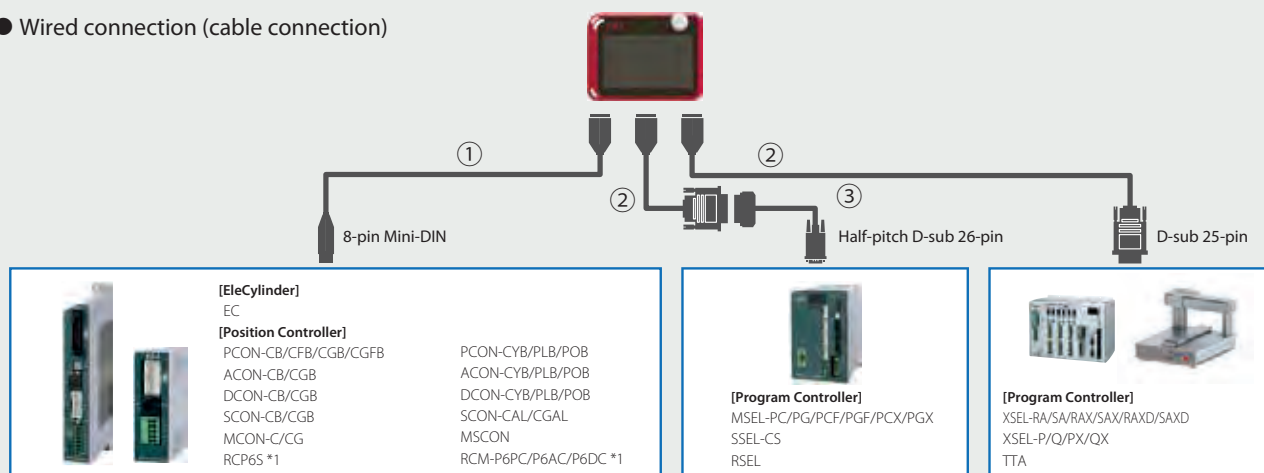
[EleCylinder model and wireless function]  
The wireless function varies depending on the model option to be specified.

"-WL" = Edits by wirelessly

"-WL2" = Edits and Operation wirelessly.

Caution: Certification issues limit the countries in which wireless communication can be used. Contact our sales personnel for details.

### ● Wired connection (cable connection)



\*1 To operate RCP6S and RCM-P6, a gateway unit or a PLC connecting unit is necessary.

**Reference & Summary**  
**IAI Controller**  
**Extract Cat. No. 0221-E**

The information contained in this catalog is subject to change without notice for the purpose of product improvement



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