IAI
Quality and Innovation

Controller

IAI General Catalogue Volume 7

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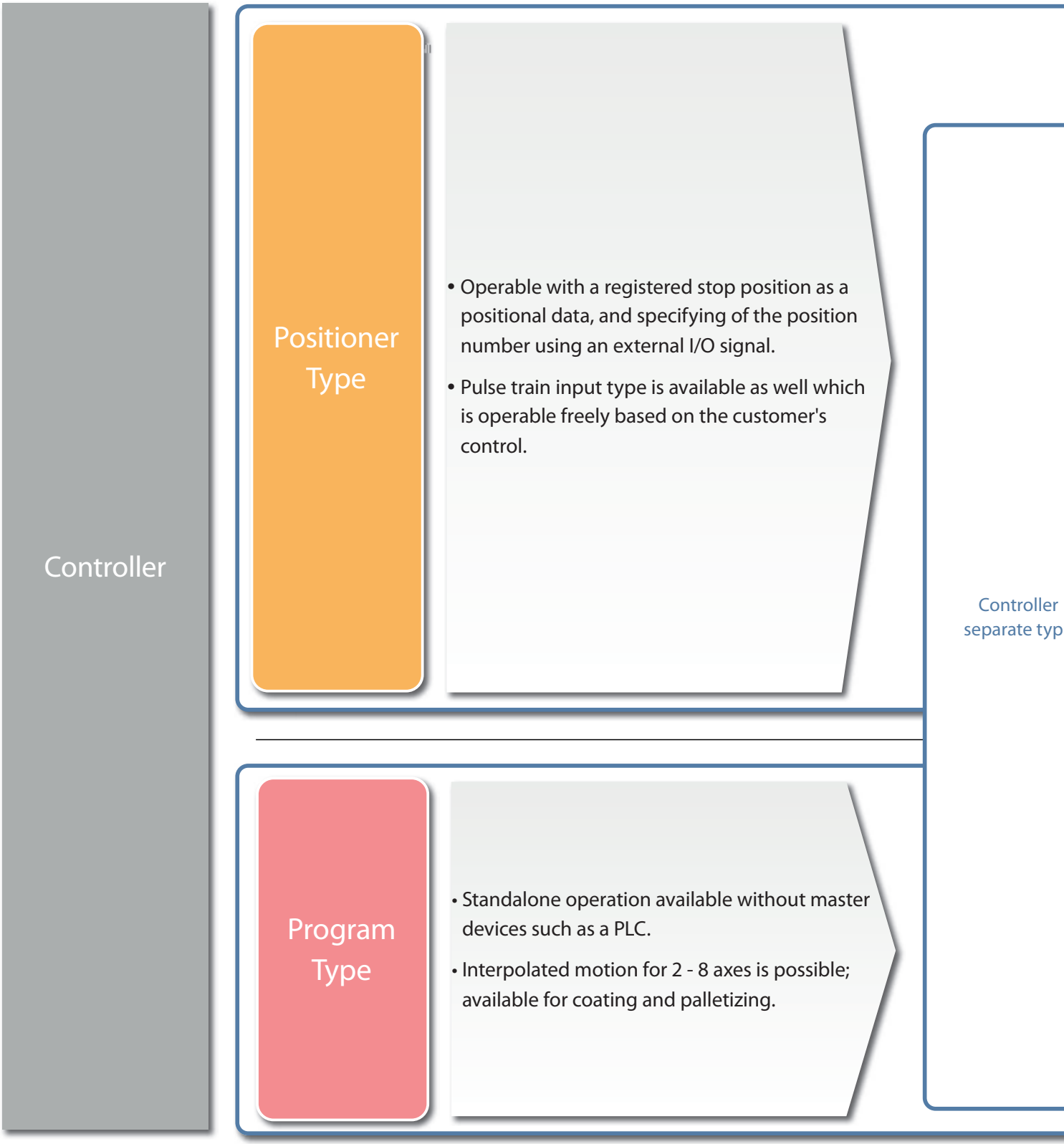
Controller Overview

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

Controller for single axis

Position controller
24VDC/AC230V type
PCON／ACON／DCON／SCON

Controller for multi-axes

Position controller
24VDC type
MCON

Position controller
AC230V type
MSCON

Program controller
AC230V type
MSEL／SSEL／XSEL

R-unit Series

Gateway for network connection
REC

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

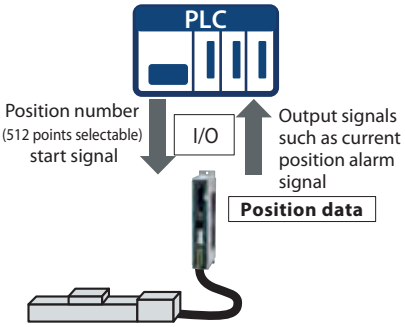
Unit-linkage system program controller
24VDC/230VAC types
RSEL

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.

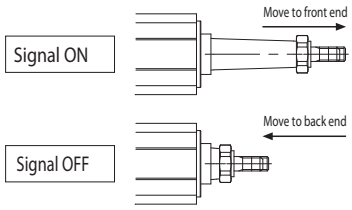
1 No programming needed

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.

PCON

See P7-137

ACON／DCON

See P7-163

SCON

See P7-187

RCON

See P7-25/ P7-59

MCON

See P7-117

MSCON

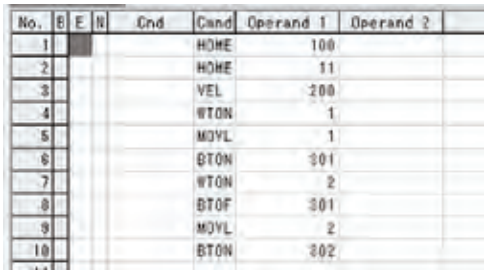
See P7-231

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

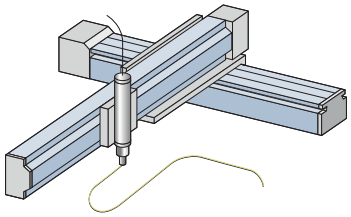
A program is generated for the program type controller using the simple and easy Super SEL Language to execute operation of the actuator and communication between peripheral equipment.
Expert knowledge is not needed to use the Super SEL Language, so it's easy to create programs even for beginners.



No.	B	E	N	Cnd	Cmnd	Operand 1	Operand 2
1					HOME	100	
2					HOME	11	
3					VEL	200	
4					WTON	1	
5					MOVL	1	
6					BTON	301	
7					WTON	2	
8					BTOF	301	
9					MOVL	2	
10					BTON	302	

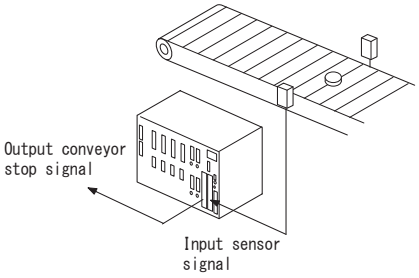
2 Interpolation possible up to 8 axes

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)
* Baterry-less absolute type actuator + controler (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.)

DeviceNet™ PROFIBUS® CompoNet™ PROFINET® EtherCAT® CC-Link EtherNet/IP™ CC-Link IE Field

■Compatible network and functions

Controller series		Ellipsis	Position controller									Program controller					
			PCON -CB	ACON -CB	SCON -CB	SCON -CAL	SCON-CB (servo press specification)	DCON -CB	MCON -C	MSCON	RCON	SSEL	TTA	RSEL	MSEL	XSEL -P/Q	XSEL -RA/SA
Field network type	DeviceNet	DV	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	CompoNet	CN	●	●	●	●	●	●	●	●	—	—	—	—	—	—	—
	EtherCAT	EC	●	●	●	●	●	●	●	●	●	—	●	●	●	—	●
	EtherCAT Motion	ECM	—	—	●	—	—	—	●	—	●	—	—	—	—	—	—
	EtherNet/IP	EP	●	●	●	●	●	●	●	●	●	●	● (*2)	●	● (*2)	● (*2)	● (*3)
	CC-Link	CC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	CC-Link IE Field CIE	CIE	●	●	●	—	●	●	●	—	●	—	—	●	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	PROFIBUS-DP	PR	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	PROFINET IO	PRT	●	●	●	●	●	●	●	●	●	—	—	●	●	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Number of positioning points (*1)			768						256		128	20000	30000	36000	30000	20000	55000
Operating method	Position No. Movement by specifying positions		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Direct number Movement by specifying direct values		●	●	●	●	—	●	●	●	●	—	—	—	—	—	—
Reference page 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 In-Sight EZ series	Ethernet
Keyence	CV-5000 series XG-7000 series XG-8000 series	RS232C Ethernet

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

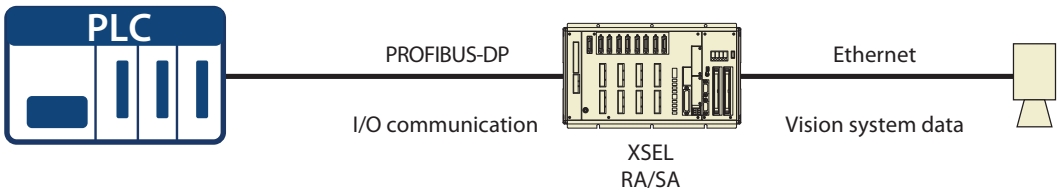
(2) No communication programs needed

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

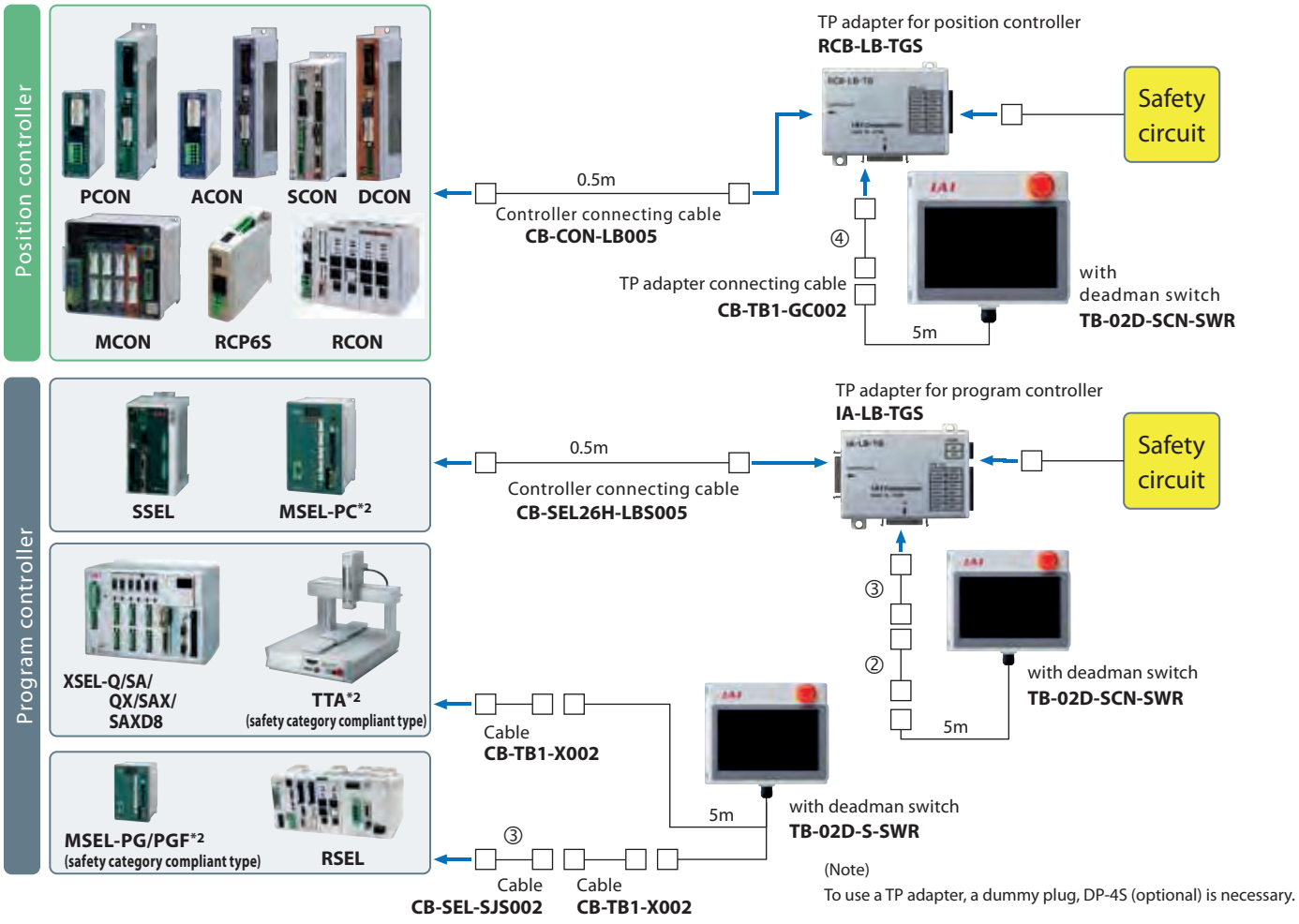
<Compliance of controllers with the Safety category>

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.



(Note)
To use a TP adapter, a dummy plug, DP-4S (optional) is necessary.

R-unit

Unit-linkage type controller

Positioner Type

RCON

R-unit

Program Type

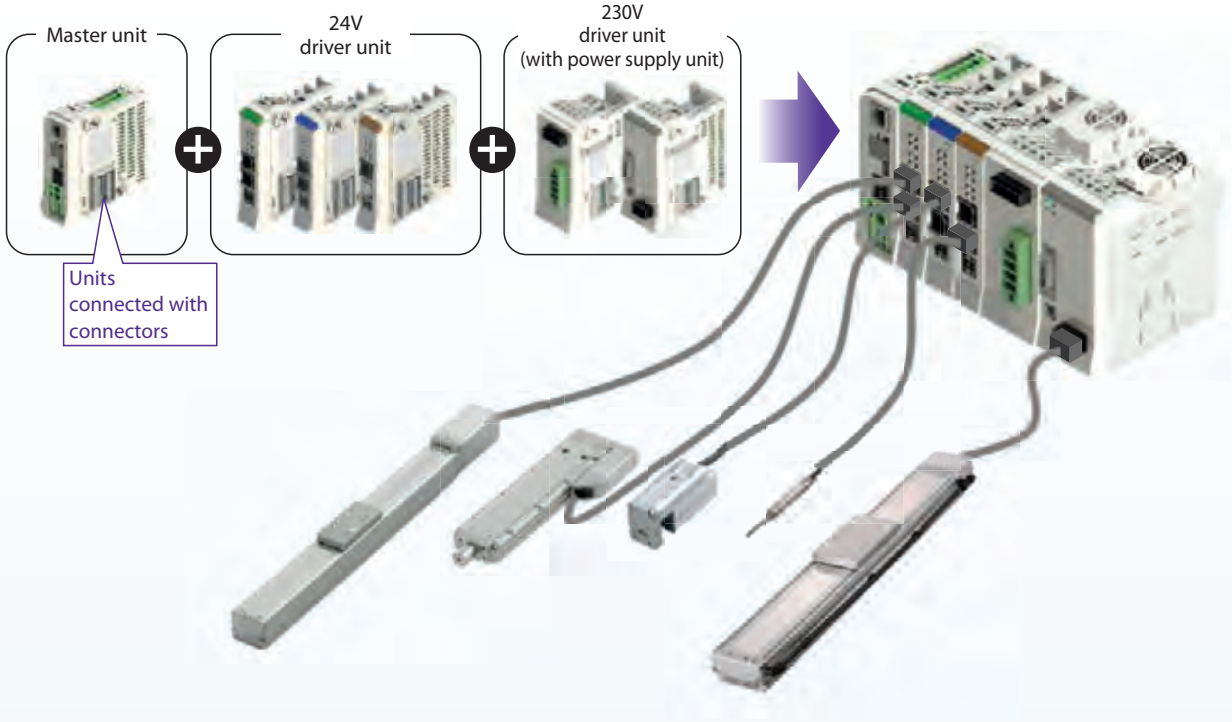
RSEL

EleCylinder Drive Unit

REC

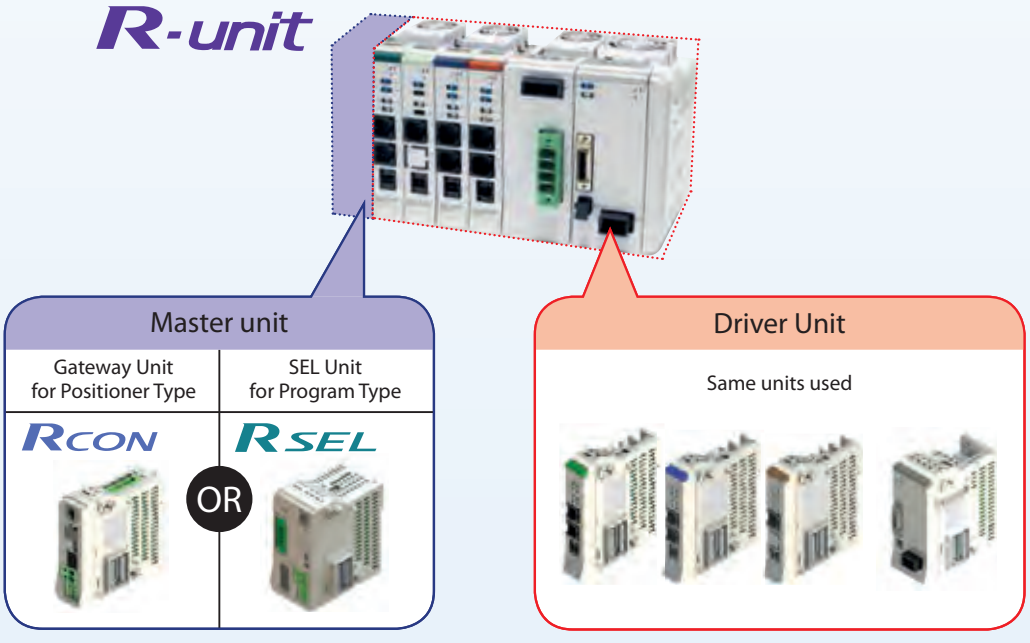
Unit-connecting controllers support a wide array of combinations!

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.

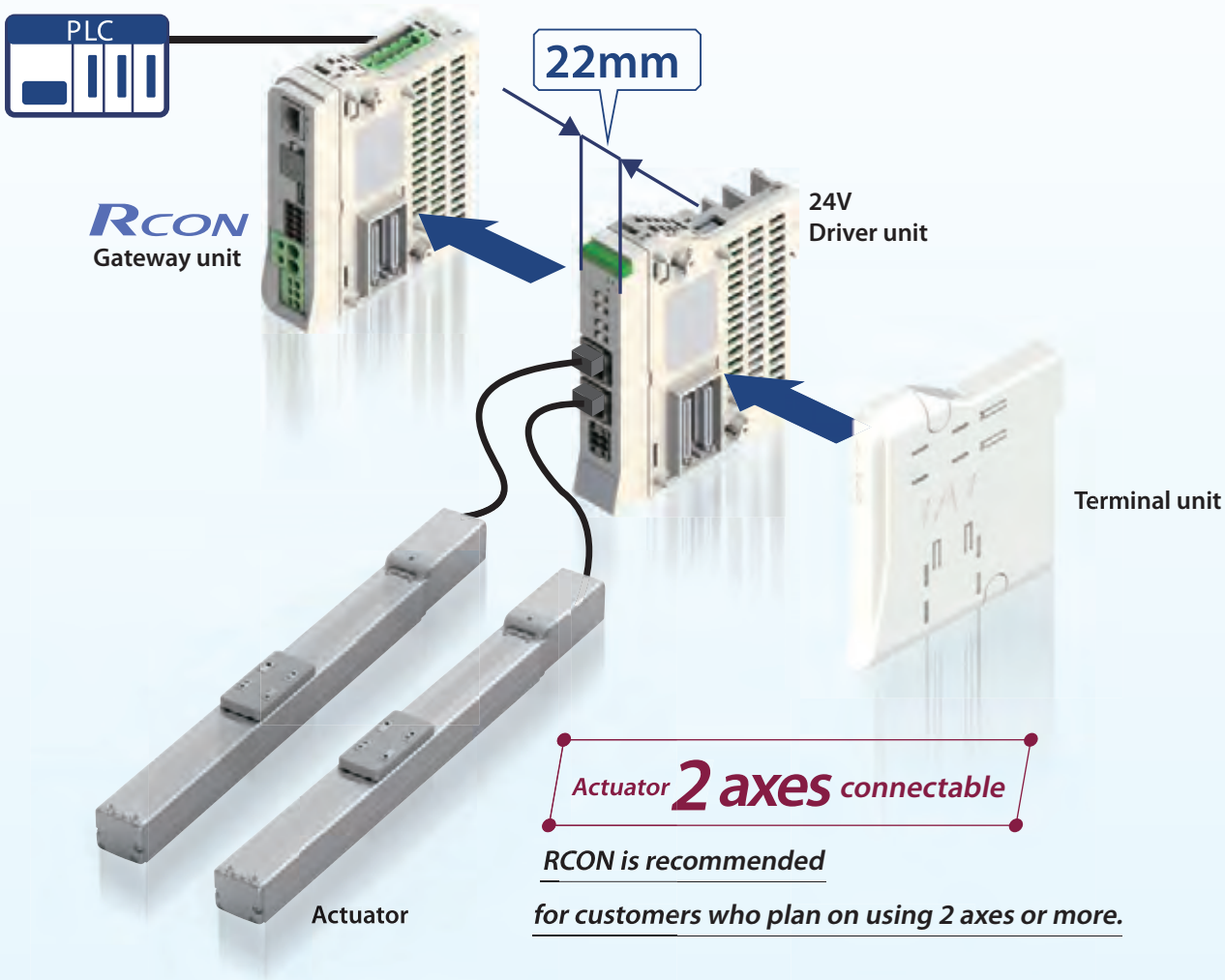


Saves space inside the control panel

RCON

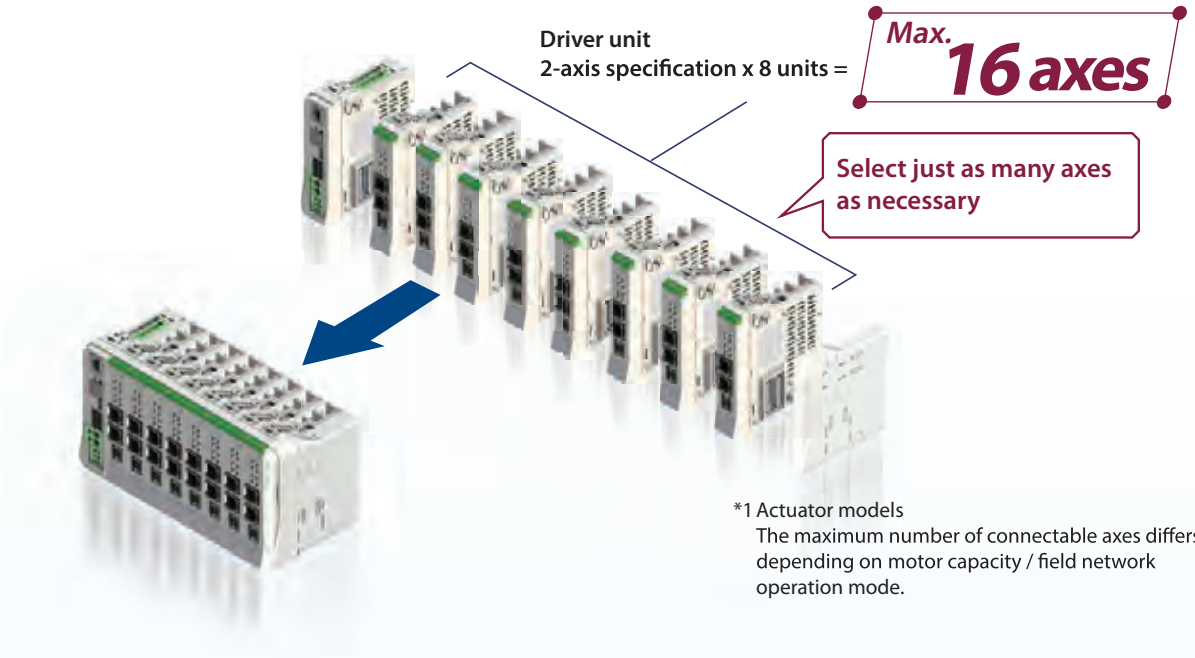
RCON is recommended for actuators with two axes or more.

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.



*1 Actuator models
The maximum number of connectable axes differs depending on motor capacity / field network operation mode.

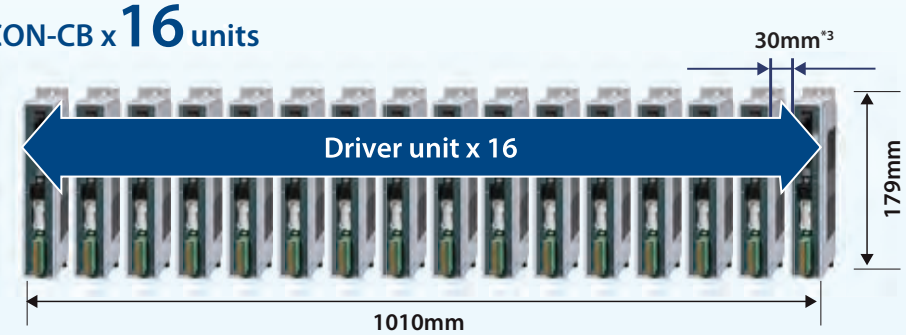
Saves up to 85%*2 of control panel space and reduces costs by as much as 60%.

*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



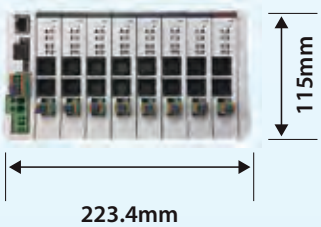
PCON-CB
PROFINET IO specification x 16 units

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

60% cost reduction

RCON x 16-axis connection specification

85% Space saving

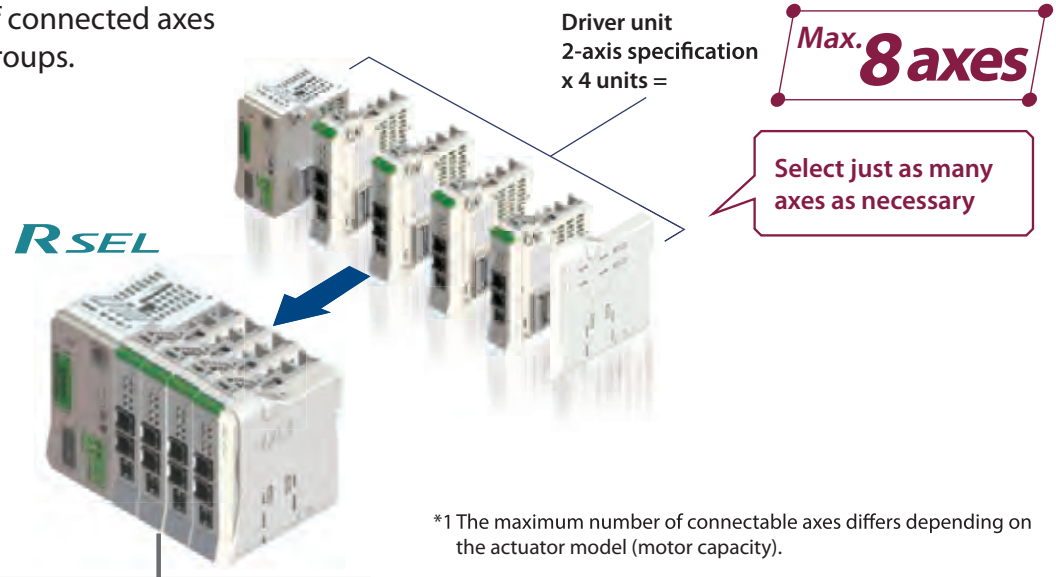


RCON
PROFINET IO specification
pulse motor 16 axes

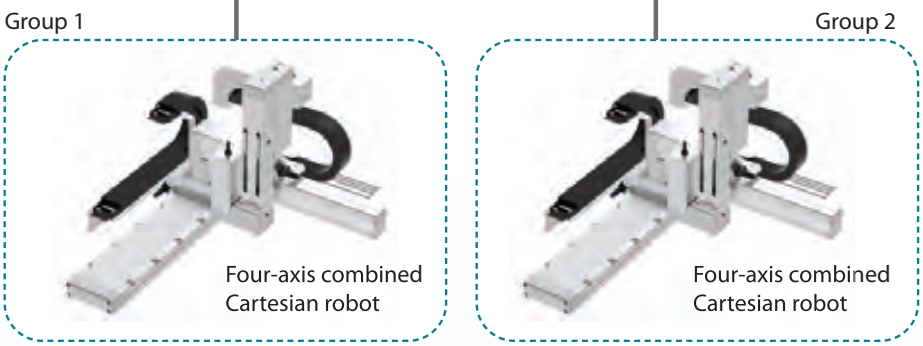
RSEL

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.



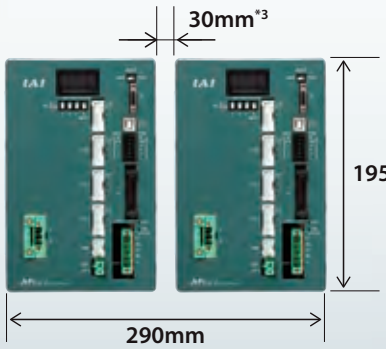
*1 The maximum number of connectable axes differs depending on the actuator model (motor capacity).



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)



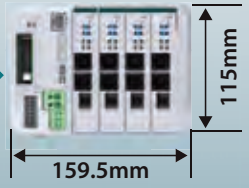
*3 Minimum distance required for natural heat dissipation of the controller

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

43% cost reduction

RSEL x 8-axis connection specification

67% Space saving

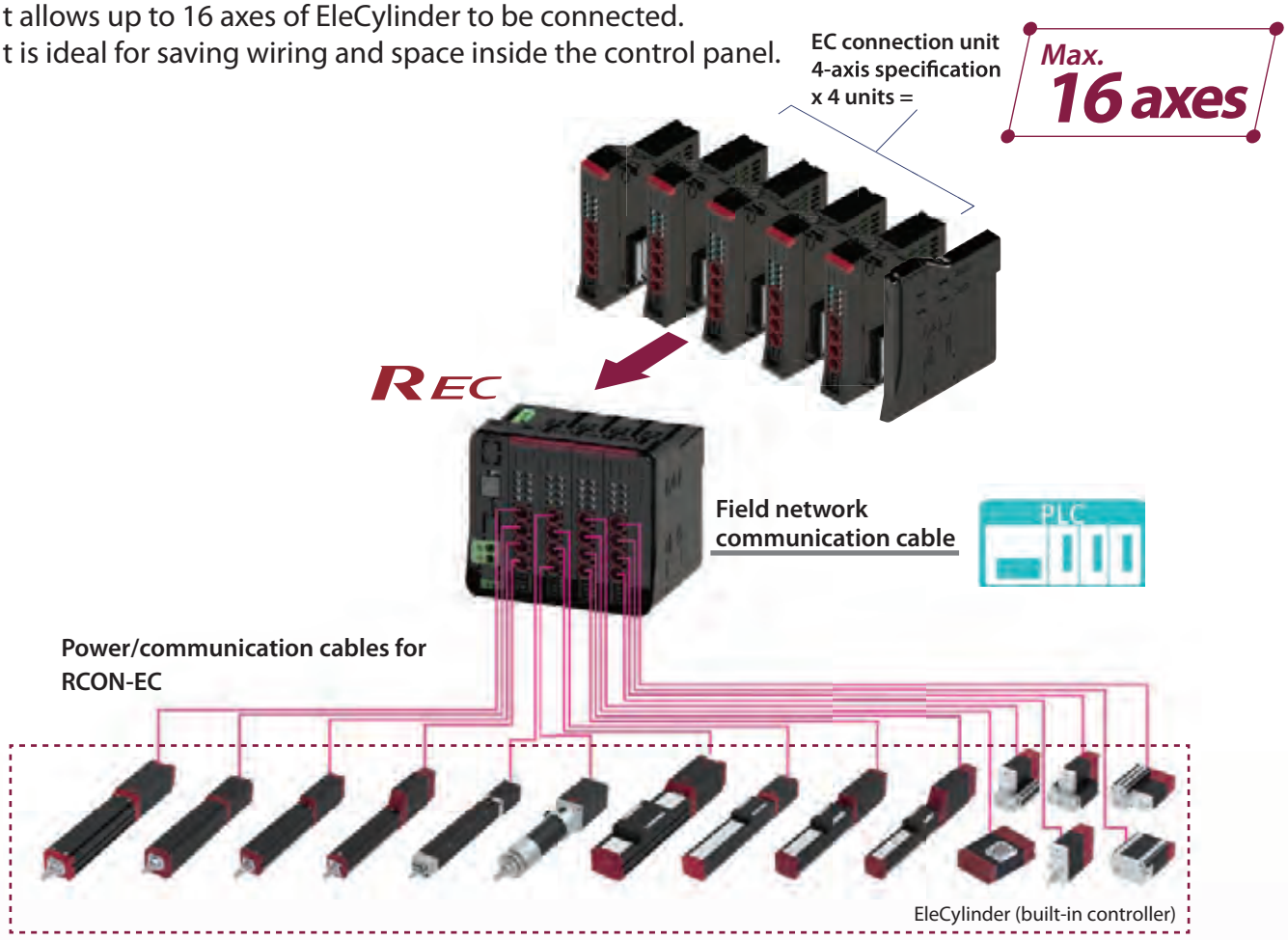


RSEL
PROFINET IO specification
pulse motor 8 axes

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.

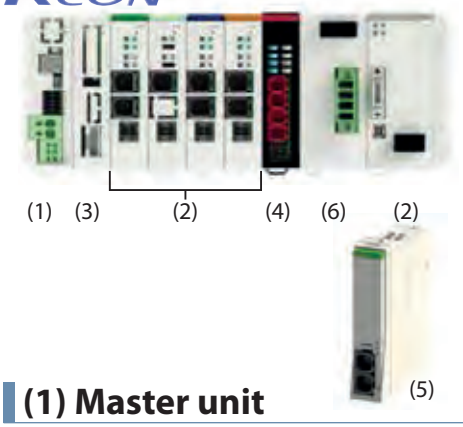


EC connection unit can be connected with other driver units connected to RCON

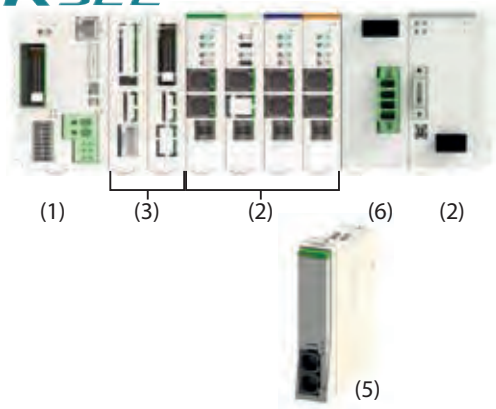
Connect to RCON to allow mixed connections with RoboCylinder and single axis robots.

Model Specification Items

RCON



RSEL



REC

(1) Master unit

RCON – [ ] – [ ] – [ ]

Series / Type / I/O type / Options

Type	
GW	Standard type
GWG	Safety category spec type

I/O 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
PRT	PROFINET IO connection specification

Options	
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.

RSEL – G – [ ] – [ ] – [ ]

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

I/O type	
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

I/O Cable Length	
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)".

Options	
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

I/O type	
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

Options	
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 1.2A motor 1 axis 2 axes	20P 20SP 28P 35P 42P 42SP 56P	20□ pulse motor 20□ pulse motor (For RA2AC/RA2BC) 28□ pulse motor 35□ pulse motor 42□ pulse motor 42□ pulse motor (For RCP4-RA5C) 56□ pulse motor
Type: PCF 4A motor 1 axis	56SP 60P 86P	56□ high thrust pulse motor 60□ high thrust pulse motor 86□ high thrust pulse motor
Type: AC 2-30W motor 1 axis 2 axes	2 5 10 20 20S 30	2W servo motor 5W servo motor 10W servo motor 20W servo motor 20W servo motor (For RCA2-SA4/RCA-RA3) 30W servo motor
Type: DC 3D motor 1 axis 2 axes	3D	2.5W DC brush-less motor

230V specification

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

Options
PC teaching software
(See R-unit cat. P.67)
<Model: RC/EC PC Software>

Options
Teaching pendant
(See R-unit cat. P.67)
<Model: TB-03><Model: TB-02>

PLC

Field network

DeviceNet, CC-Link, CC-Link IE Field, EtherCAT, EtherCAT Motion, EtherNet/IP, PROFIBUS-DP, PROFINET IO

Supplied with GWG specification
Dummy plug
(See R-unit cat. P.69)
<Model: DP-5>

Supplied with gateway unit
System I/O connector
(See R-unit cat. P.70)
<Model: DFMC1,5/5-ST-3,5>

Options
Fan unit
(See R-unit cat. P.69)
<Model: RCON-FU(H)>

For RC/EC PC Software: USB cable

For RCM-101-USB: Supplied with PC teaching software

Options
24VDC power supply
(See R-unit cat. P.69)
<Model: PSA-24>

Supplied with SCON-(RC specification)

Supplied with 230V driver unit
Dummy plug
(See R-unit cat. P.69)
<Model: DP-6>

Connection cable
(See R-unit cat. P.77)
<Model: CB-RE-CTL002>

RCON-EXT connection specification SCON controller [I/O type: RC]

Supplied with 24V driver unit
Drive source shutoff connector
(See R-unit cat. P.70)
<Model: DFMC1,5/2-STF-3,5>

Supplied with simple absolute unit
Connection cable
(See R-unit cat. P.73)
<Model: CB-ADPC-MPA050>

Options
Regenerative resistance unit
(See R-unit cat. P.70)
<Model: RESU-2/ RESUD-2>
Note 1

Supplied with power supply unit
Power supply connector
(See R-unit cat. P.70)
<Model: SPC5/4-STF-7,62>

Supplied with expansion unit
Terminal connector
(See R-unit cat. P.70)
<Model: RCON-EXT-TR>

Options
Simple absolute unit
(See R-unit cat. P.56)
<Model: RCON-ABU-P (for pulse motor)>
<Model: RCON-ABU-A (for AC servo motor)>

Supplied with EC connection unit
Drive source shutoff connector
(See R-unit cat. P.70)
<Model: DFMC1,5/4-ST-3,5>

Motor power
Three-phase/ single-phase 230VAC

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

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.

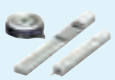
Connection with "24V driver unit"
RCP2/3/4/5/6 Series

RCA/2 Series

RCD Series

Connection with "EC connection unit"
EC 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.
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

RSEL

PLC

Options
PC teaching software
(See R-unit cat. P.67)
<Model: XSEL PC Software, IA-101-X>

Options
Teaching pendant
(See R-unit cat. P.67)
<Model: TB-03><Model: TB-02>

SEL unit (NP/PN specification) option
PIO cable
(See R-unit cat. P.78)
<Model: CB-PAC-PIO***>

Supplied with SEL unit
Dummy plug
(See R-unit cat. P.69)
<Model: DP-4S>

Field network
DeviceNet, CC-Link, CC-Link IE Field, EtherCAT, EtherNet/IP, PROFIBUS-DP, PROFINET IO

Supplied with SEL unit
System I/O connector
(See R-unit cat. P.70)
<Model: DFMC1,5/8-ST-3,5>

Options
Fan unit
(See R-unit cat. P.69)
<Model: RCON-FU(H)>

For XSEL PC Software : USB cable, Ethernet cable

For IA-101-X: Supplied with PC teaching software

Options
24VDC power supply
(See R-unit cat. P.69)
<Model: PSA-24>

Supplied with unit
SCON connection, PIO/SIO connection
Expansion SIO port connector
(See R-unit cat. P.70)
<Model: FMC1,5/3-STF-3,5>

Supplied with 230V driver unit
Dummy plug
(See R-unit cat. P.69)
<Model: DP-6>

Supplied with SCON (RC specification)
Connection cable
(See R-unit cat. P.73)
<Model: CB-RE-CTL002>

Supplied with 24V driver unit
Drive source shutoff connector
(See R-unit cat. P.70)
<Model: DFMC1,5/2-STF-3,5>

Options
Regenerative resistance unit
(See R-unit cat. P.70)
<Model: RESU-2/ RESUD-2>
(Note 1)

RCON-EXT connection specification
SCON controller
[I/O type: RC]

Supplied with simple absolute unit
Connection cable
(See R-unit cat. P.73)
<Model: CB-ADPC-MPA050>

Supplied with power supply unit
Power supply connector
(See R-unit cat. P.70)
<Model: SPC5/4-STF-7,62>

Motor power
Three-phase/ single-phase
230VAC

Supplied with SCON connection expansion unit
Terminal connector
(See R-unit cat. P.70)
<Model: RCON-EXT-TR>

Options
Simple absolute unit
(See R-unit cat. P.56)
<Model: RCON-ABU-P (for pulse motor)>
<Model: RCON-ABU-A (for AC servo motor)>

Motor/encoder cable*

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.

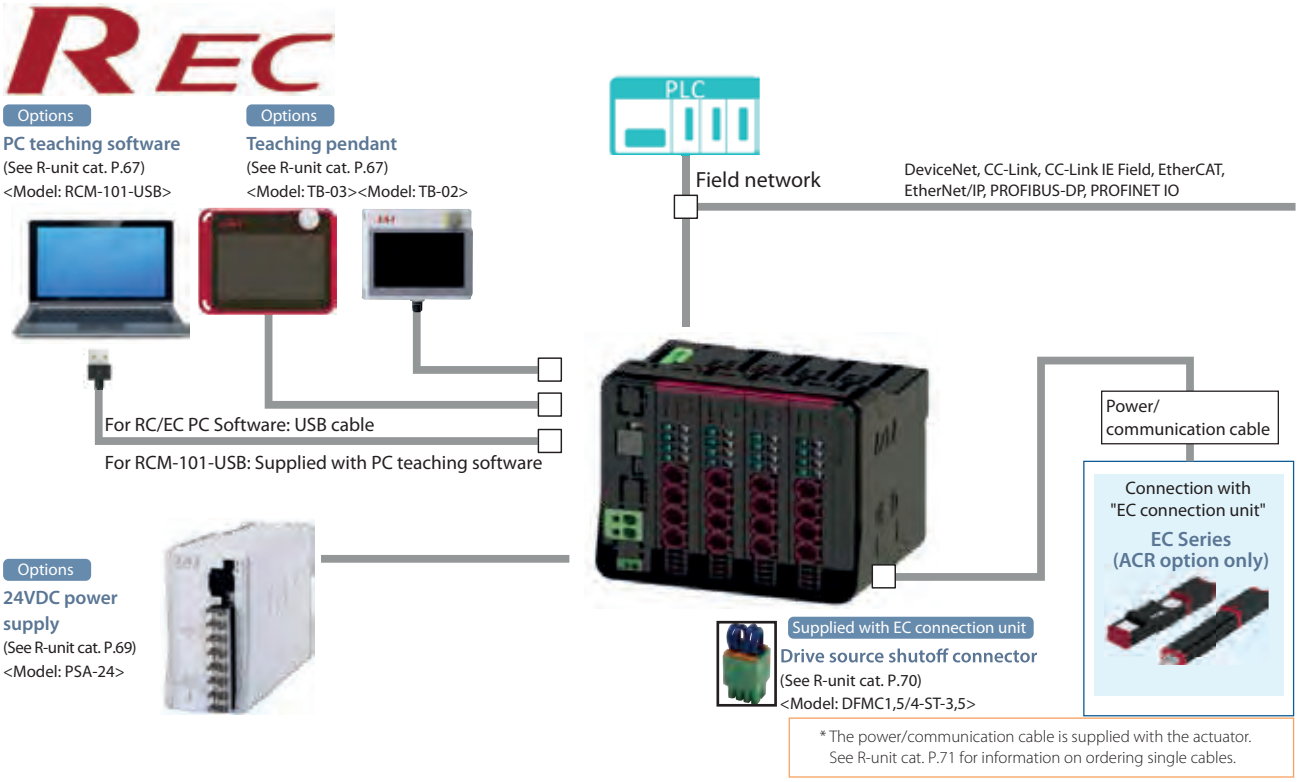
Connection with "24V driver unit"
RCP2/3/4/5/6 Series
WU Series
RCA/2 Series
RCD Series

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.

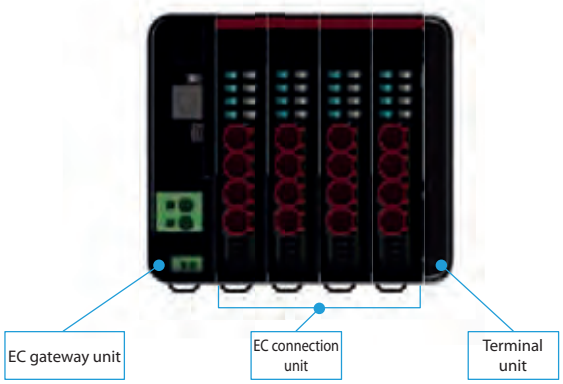
Note 1: A 60W regenerative resistor is built-in both RCON-SC and RCON-PS2. There is generally no need for regenerative resistance. However, if there is insufficient regenerative resistance, use the external "regenerative resistance unit".

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/ 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

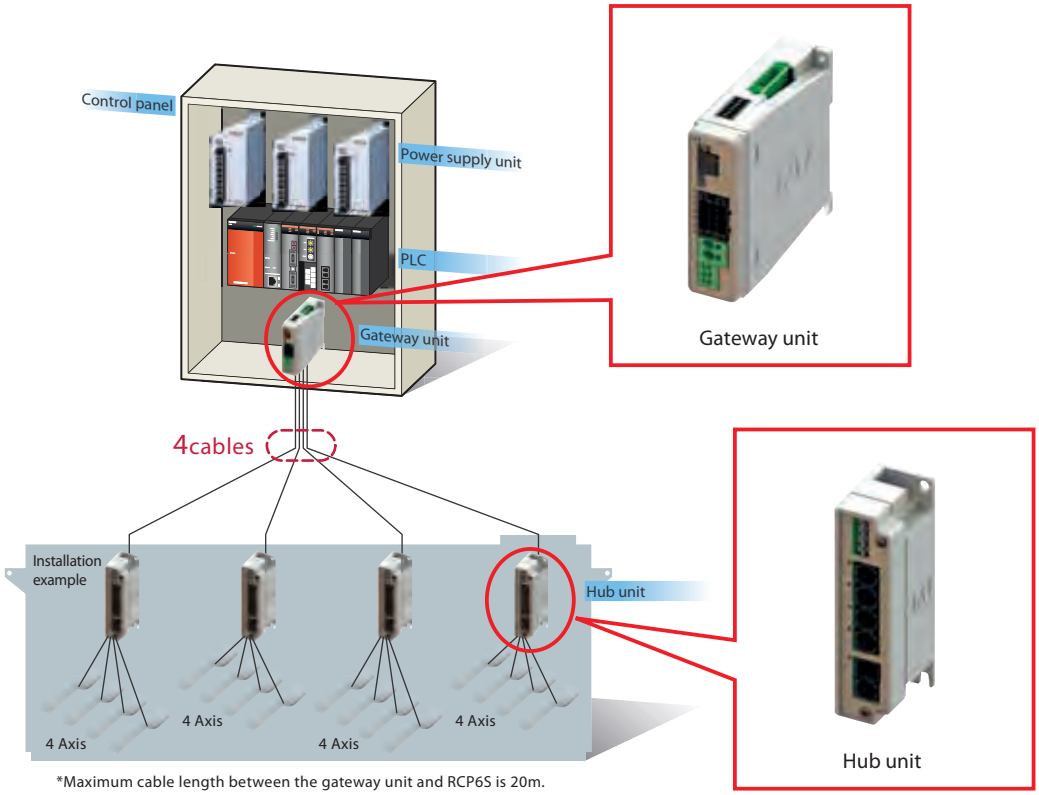
CE RoHS

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



*Maximum cable length between the gateway unit and RCP6S is 20m.
If there is a hub unit in between, the maximum length is still 20m. The cable length from the gateway unit to the hub unit needs to be 10m or less.

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

Option

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

RCM — P6GW □ — □

RCM: Series

P6GW: Type

(Blank)	Standard
G	Safety category compliant type

Field network

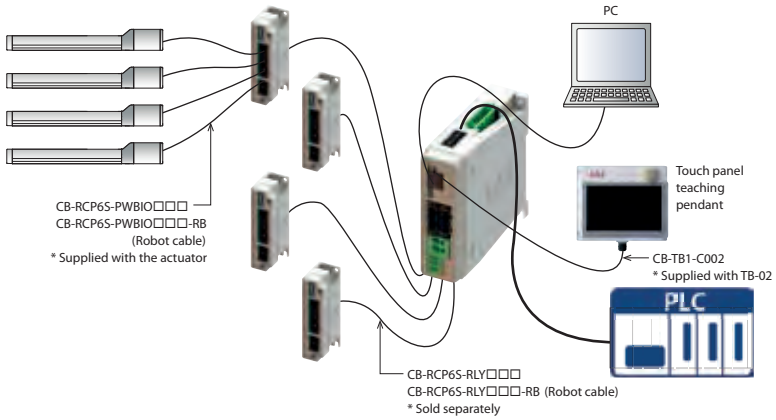
CC	CC-Link connection specification
DV	DeviceNet connection specification
PR	PROFIBUS-DP connection specification
EC	EtherCAT connection specification
EP	EtherNet/IP connection specification
PRT	PROFINET IO connection specification

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

Option

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

RCM — P6HUB — □

RCM	P6HUB	□
Series	Type	Mounting specification

(Blank)	Screw mounting specification
DN	DIN rail mounting specification

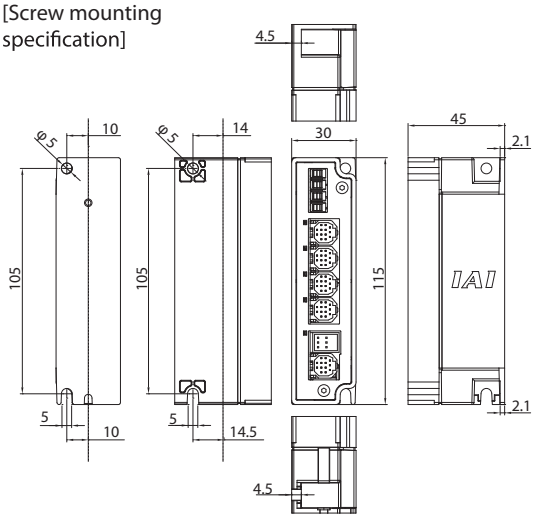
Specification

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)

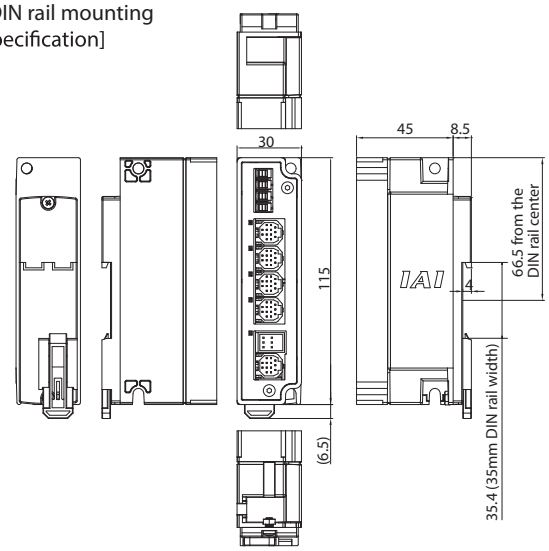
External Dimensions

CAD drawings can be downloaded from our website. www.iai-automation.com 2D CAD 3D CAD

[Screw mounting specification]



[DIN rail mounting specification]



Option

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.

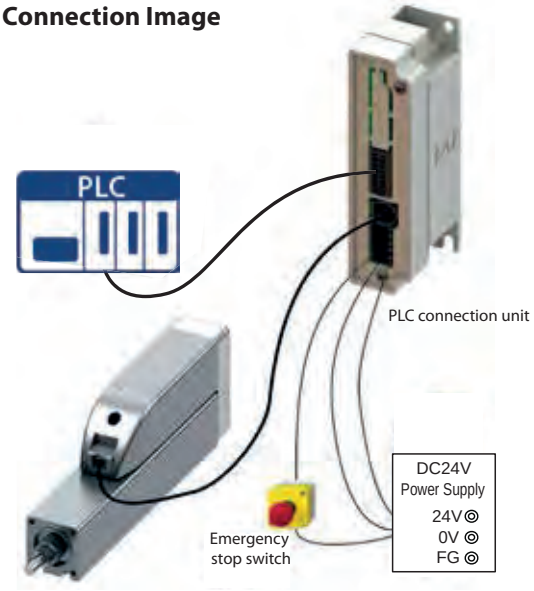
Model Configuration

RCB — P6PLC — □

	Series	Type	Mounting specification

(Blank)	Screw mounting specification
DN	DIN rail mounting specification

Connection Image

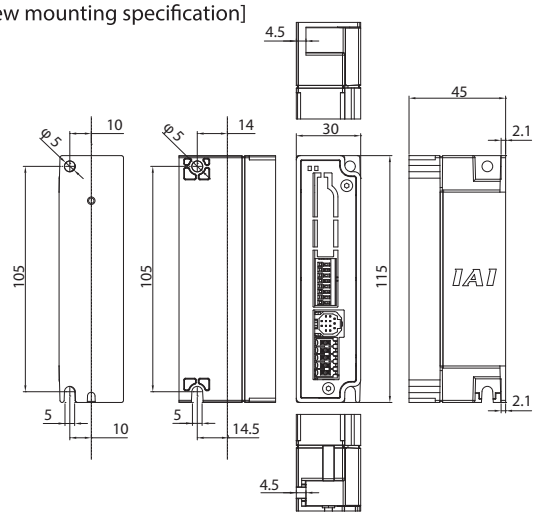


Specification

Specification	Description
Number of controlled axes	1-axis
Power supply voltage	24VDC ± 10%
Control power capacity	0A for single PLC connection unit 0.3A for connected PLC units + RCP6S built-in driver • 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)

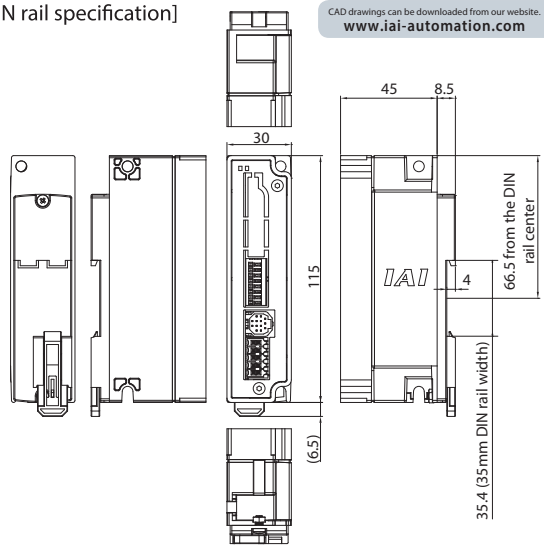
External Dimensions

[Screw mounting specification]



[DIN rail specification]

CAD drawings can be downloaded from our website. www.iai-automation.com 2D CAD 3D CAD



MCON-C/CG

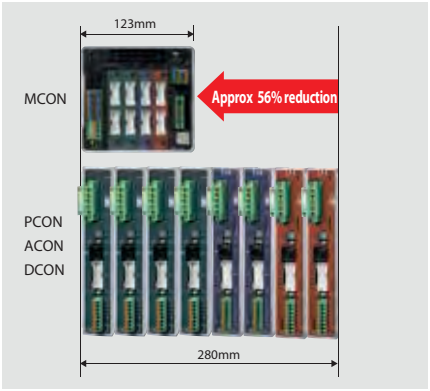
Multi-axis CON Series
Position Controller

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.

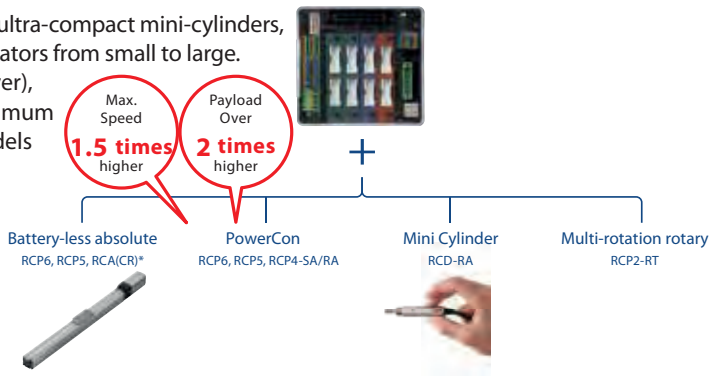


2 Accommodates a wide range of actuators

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

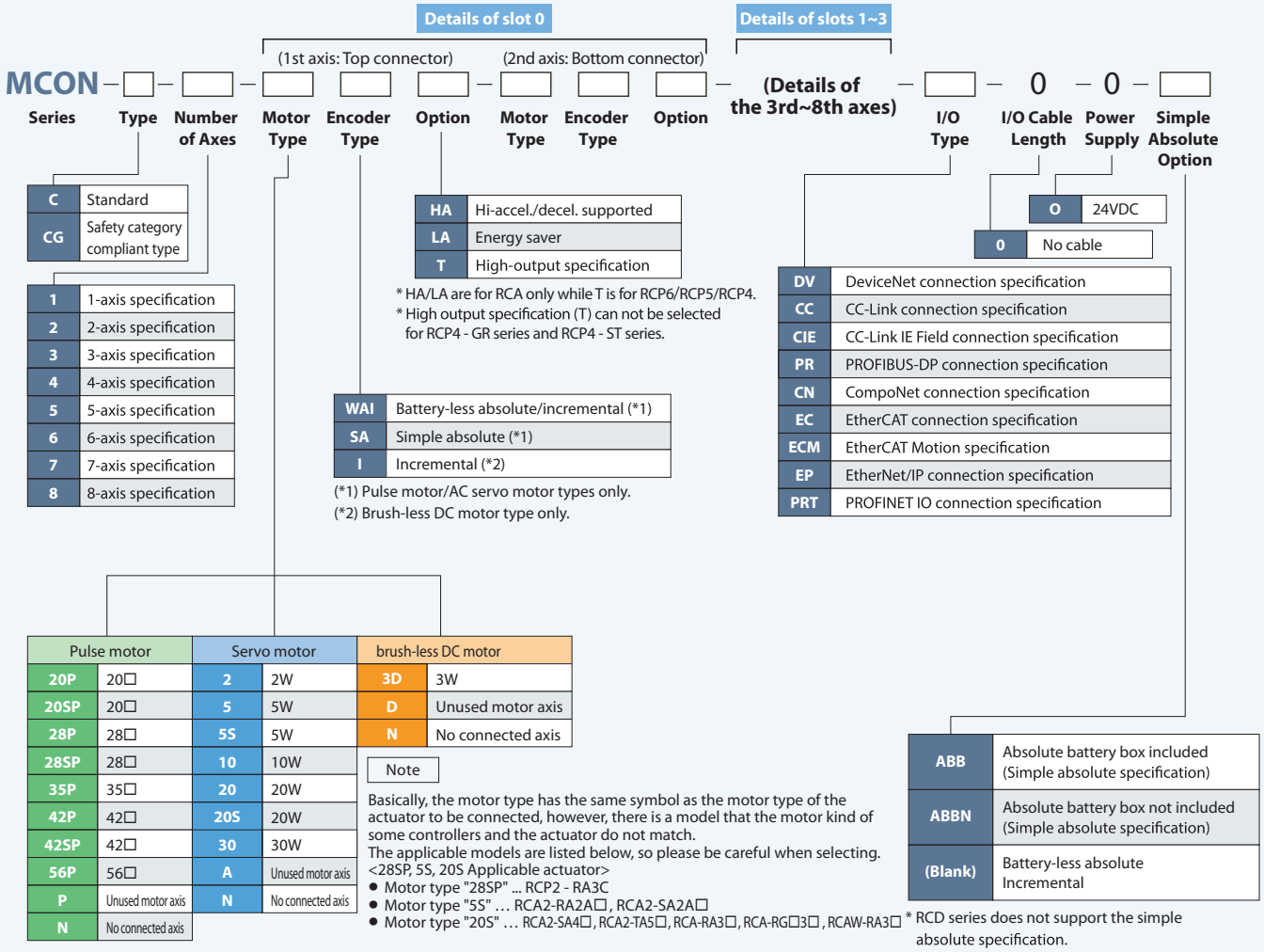
- The acceleration and deceleration patterns can be specified from the trapezoid pattern, first-order delay filter and S-shaped motion.

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


Details of slot 0
(1st axis: Top connector)
(2nd axis: Bottom connector)
Details of slots 1~3
MCON – □ – □ – □ □ □ – □ □ □ – (Details of the 3rd~8th axes) – □ – 0 – 0 – □
Series
Type
Number of Axes
Motor Type
Encoder Type
Option
Motor Type
Encoder Type
Option
I/O Type
I/O Cable Length
Power Supply
Simple Absolute Option
C Standard
CG Safety category compliant type
1 1-axis specification
2 2-axis specification
3 3-axis specification
4 4-axis specification
5 5-axis specification
6 6-axis specification
7 7-axis specification
8 8-axis specification
HA Hi-accel./decel. supported
LA Energy saver
T High-output specification
* HA/LA are for RCA only while T is for RCP6/RCP5/RCP4.
* High output specification (T) can not be selected for RCP4 - GR series and RCP4 - ST series.
WAI Battery-less absolute/incremental (*1)
SA Simple absolute (*1)
I Incremental (*2)
(*1) Pulse motor/AC servo motor types only.
(*2) Brush-less DC motor type only.
O 24VDC
0 No cable
DV DeviceNet connection specification
CC CC-Link connection specification
CIE CC-Link IE Field connection specification
PR PROFIBUS-DP connection specification
CN CompoNet connection specification
EC EtherCAT connection specification
ECM EtherCAT Motion specification
EP EtherNet/IP connection specification
PRT PROFINET IO connection specification
Pulse motor
20P 20□
20SP 20□
28P 28□
28SP 28□
35P 35□
42P 42□
42SP 42□
56P 56□
P Unused motor axis
N No connected axis
Servo motor
2 2W
5 5W
5S 5W
10 10W
20 20W
20S 20W
30 30W
A Unused motor axis
N No connected axis
brush-less DC motor
3D 3W
D Unused motor axis
N No connected axis
Note
Basically, the motor type has the same symbol as the motor type of the actuator to be connected, however, there is a model that the motor kind of some controllers and the actuator do not match.
The applicable models are listed below, so please be careful when selecting.
<28SP, 5S, 20S Applicable actuator>
● Motor type "28SP" ... RCP2 - RA3C
● Motor type "5S" … RCA2-RA2A□, RCA2-SA2A□
● Motor type "20S" … RCA2-SA4□, RCA2-TA5□, RCA-RA3□, RCA-RG□3□, RCAW-RA3□
ABB Absolute battery box included (Simple absolute specification)
ABBN Absolute battery box not included (Simple absolute specification)
(Blank) Battery-less absolute Incremental
* RCD series does not support the simple absolute specification.

System Configuration

Option

PC dedicated teaching software
(See MCON cat. P.16)

Software only
<Model : IRCM-101-MW>

Supplied with the dedicated connection cable
<Model: RCM-101-USB>

* MCON is supported by Ver.10.00.00.00 or later.

Option

Touch panel teaching box
(See MCON cat. P.16)
<Model Number TB-02-□>

PLC

Fieldbus
DeviceNet, CC--Link, CC-Link IE, PROFIBUS-DP, CompoNet, EtherCAT, EtherCAT Motion, EtherNet/IP, PROFINET IO

* In order to connect to the fieldbus, communication setting of the controller is necessary. Please set with gateway parameter setting tool included with PC dedicated software or TB - 02. If you do not have it, please purchase PC dedicated software. (See MCON cat. P.16)

* Fieldbus connection cable should be prepared by customer.

Included with MCON-CG

Dummy plug
(See MCON cat. P.16)
<Model Number DP-5>

* In case of CG type, please insert a dummy plug if you do not connect the teaching tool to the SIO connector.

5m

Dedicated connection cable

The cable is supplied with the absolute battery box.

0.5m

DC24V
Power Supply
24V
0V
FG

Option

Absolute battery box
(See MCON cat. P.16)
<Model Number MSEP-ABB>

Replacement battery
(See MCON cat. P.16)
<Model Number AB-7>

* If the simple absolute specification is selected for a controller model, an absolute battery box will be included. (See MCON cat. P.15 for the dimensions)

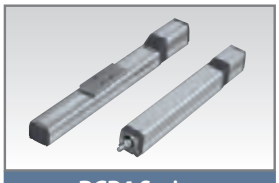
MCON-C/CG

Integrated motor-encoder cable/robot cable
(See MCON cat. P.17)
Model: **CB-CAN-MPA□□□**
(Standard cable)
CB-CAN-MPA□□□ -RB
(Robot cable)

(*) RCA2, RCA2CR and RCA2W are available when selecting CNS (option).

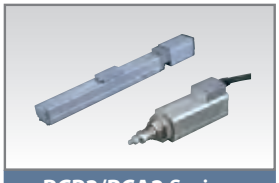
RCP6/RCP5/RCD Series
RCP4-SA3/RA3/GR□
RCP2CR(W)-GR□/RT□
RCA2/RCA2CR(W) Series (*)

Integrated motor-encoder cable/robot cable
(See MCON cat. P.17)
Model: **CB-CA-MPA□□□**
(Standard cable)
CB-CA-MPA□□□ -RB
(Robot cable)



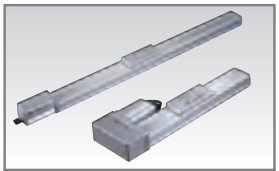
RCP4 Series

Integrated motor-encoder robot cable
(See MCON cat. P.17)
Model: **CB-APSEP-MPA□□□**
(Robot cable)
* Only robot cable is available for this model.



RCP3/RCA2 Series

Integrated motor-encoder robot cable
(See MCON cat. P.18/P.17)
Model: **CB-PSEP-MPA□□□**
(Robot cable)
Model: **CB-APSEP-MPA□□□**
(Robot cable)
*Only robot cable are available for these models.

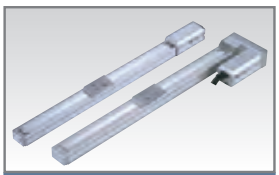


RCP2 Series

Integrated motor-encoder robot cable
(See MCON cat. P.18)
Model: **CB-RPSEP-MPA□□□**
(Robot cable)
*Only robot cable is available for this model.

RCP2-RT□S/RT□SL

Integrated motor-encoder robot cable
(See MCON cat. P.18/P17)
Model: **CB-ASEP2-MPA□□□**
(Robot cable)
Model: **CB-APSEP-MPA□□□**
(Robot cable)
*Only robot cable are available for these models.



RCA Series

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

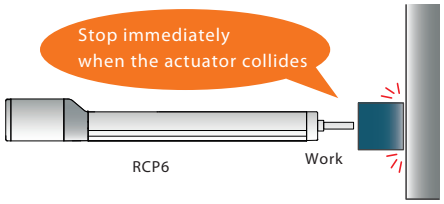
The RCP6 equipped with a high-resolution battery-less absolute encoder is supported. Since no battery is needed to retain position data, less space is required in the control panel, which in turn leads to lower cost of your equipment. The resolution is increased from 800 pulses /rev to 8192 pulses/rev.

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.



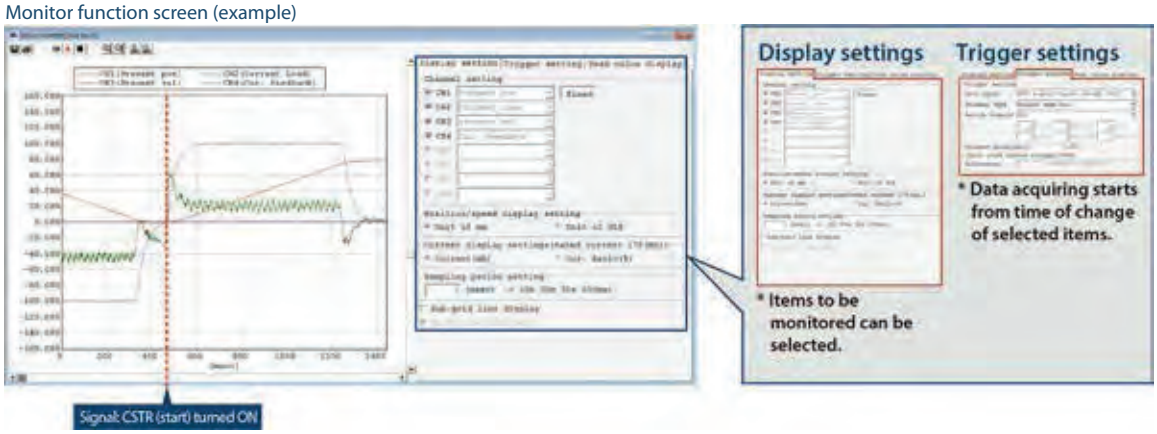
4 Enhanced Monitor Functions

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	PROFIBUS	CompoNet	–	–	EtherCAT	EtherNet/IP	PROFINET
					DeviceNet	CC-Link	CC-Link IE Field connection specification	PROFIBUSDP	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/CGB	Battery-less absolute specification Incremental 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 Incremental specification		O	O	O	O	O	O	O	–	–	O	O	O

Model Specification Items

PCON — [Series] — [Type] — [Motor Type] — [Encoder Type] — [I/O Type] — [I/O Cable Length] — **0** [Power Supply Voltage] — [Simple Absolute Specification] — [Controller Mounting Specification]

Type

CB	Standard
CGB	Safety category compliant type
CFB	56SP/60P/86P motor-compliant type
CGFB	Safety category compliant 56SP/60P/86P motor-compliant type

Motor 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 [28SP]
  RCP2-RA3C

Encoder Type

WAI	Battery-less absolute specification Incremental specification
SA	Simple absolute spec.

I/O Type

NP	PIO (NPN)
PLN	Pulse train (NPN)
PN	PIO (PNP)
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

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

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

Power Supply Voltage

0	24VDC

Simple Absolute Specification

(Blank)	Battery-less absolute specification Incremental specification
AB	Simple absolute spec. (With absolute battery. No battery unit included)
ABU	Simple absolute spec. (With absolute battery and battery unit)
ABUN	Simple absolute spec. (Without absolute battery and battery unit)

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

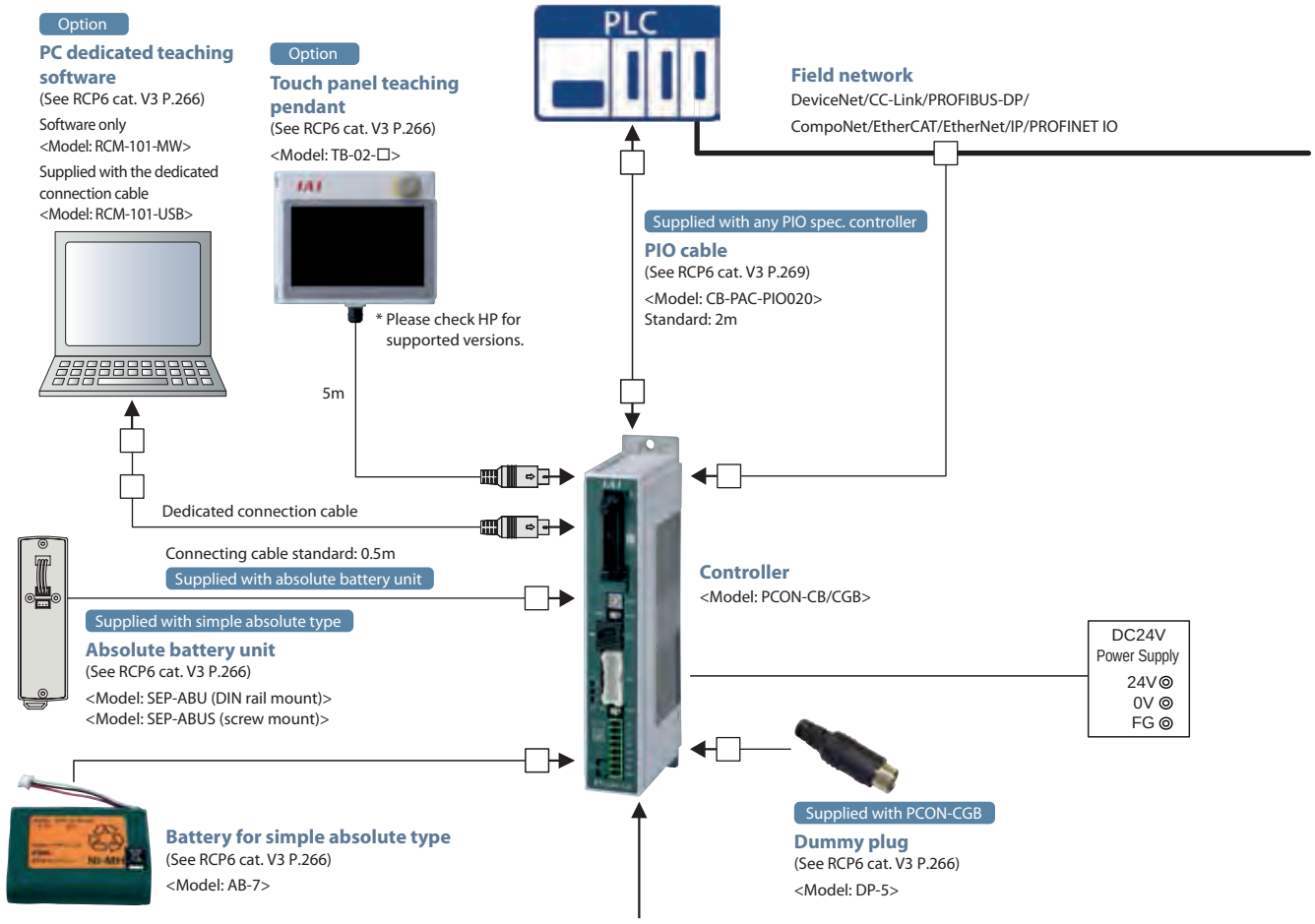
Controller Mounting Specification

(Blank)	Screw mounting specification
DN	DIN rail mounting specification

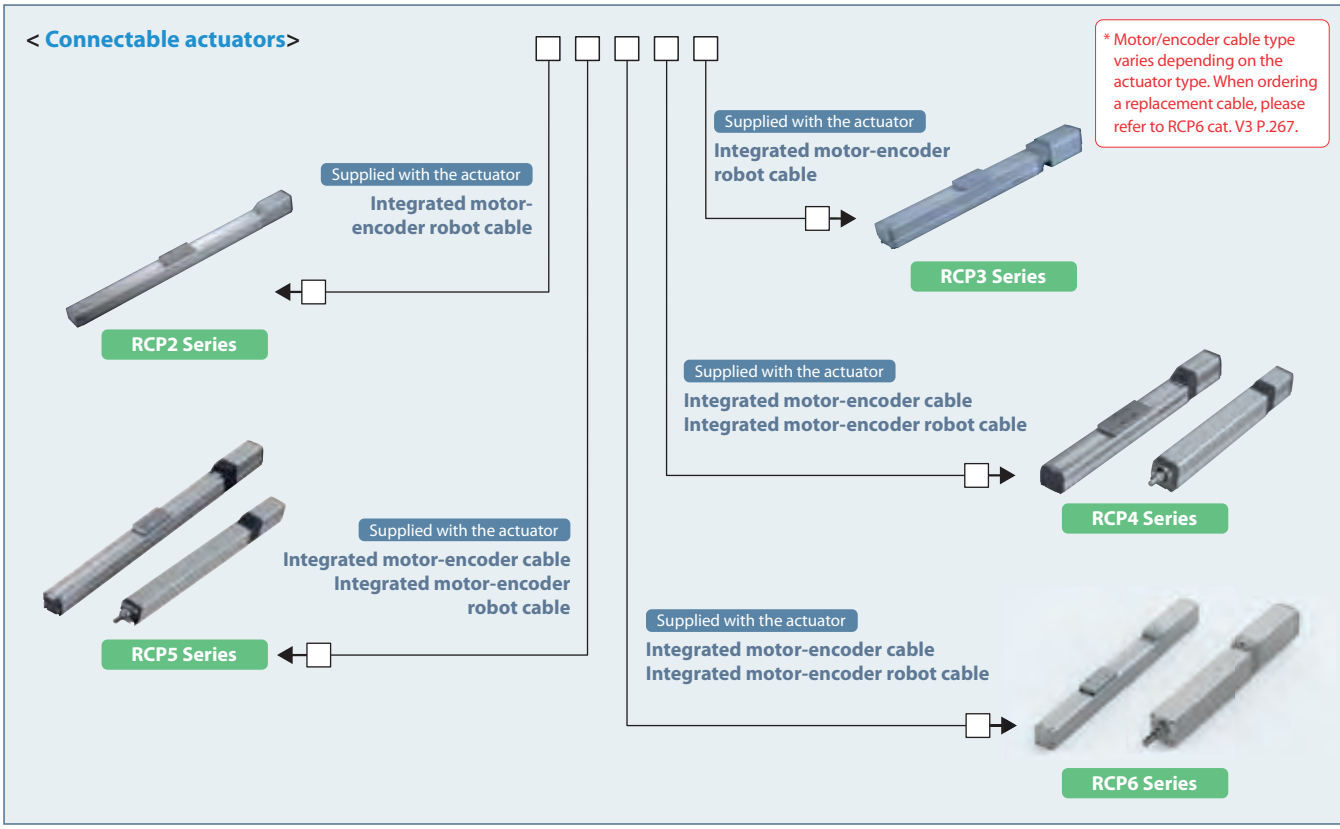
* The mounting type (screw or DIN rail) of the absolute battery unit and the controller must be the same.

System Configuration

■ PowerCon150 <PCON-CB/CGB>

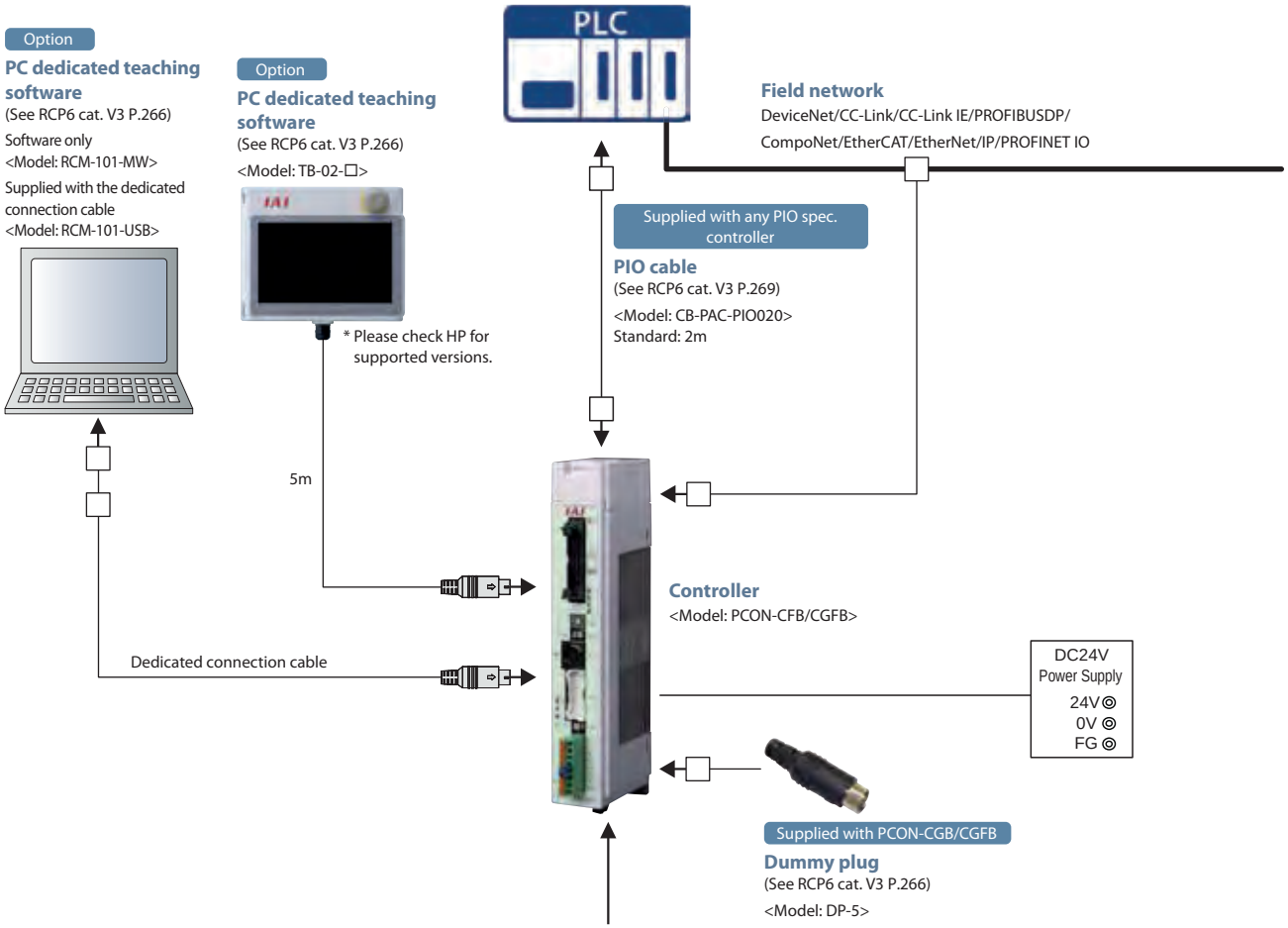


< Connectable actuators>



System Configuration

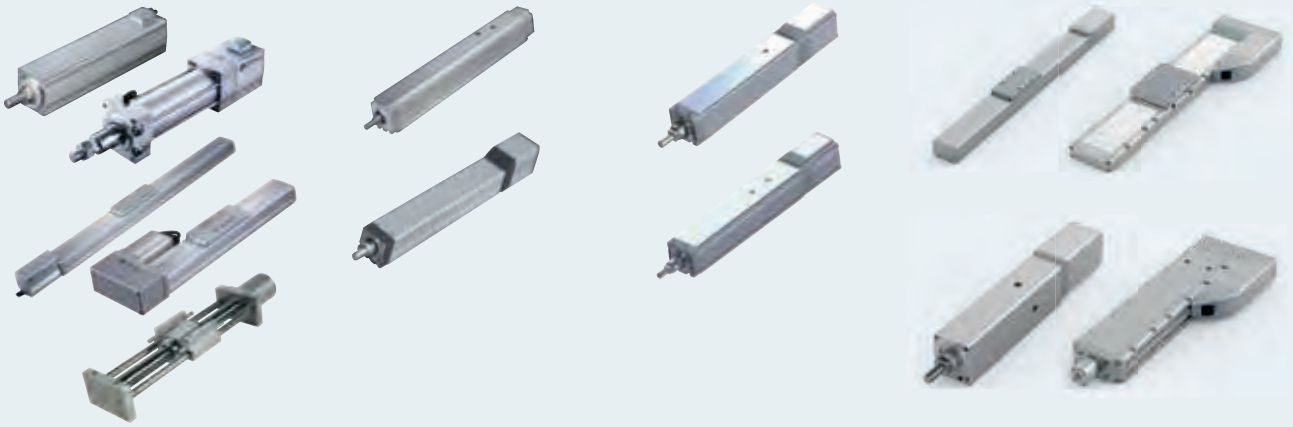
■ 56SP/60P/86P Motor Compatible <PCON-CFB/CGFB>



< Connectable actuators>

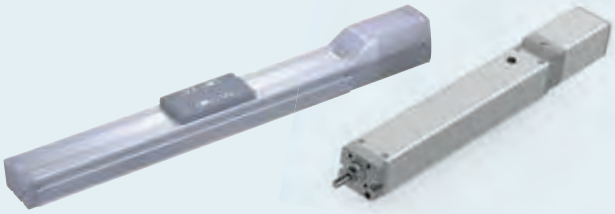
* Motor/encoder cable type varies depending on the actuator type. When ordering a replacement cable, please refer to RCP6 cat. V3 P.267.

RCP2 Series	RCP4 Series	RCP5 Series	RCP6 Series
Supplied with the actuator Integrated motor-encoder cable Integrated motor-encoder robot cable	Supplied with the actuator Integrated motor-encoder cable Integrated motor-encoder robot cable	Supplied with the actuator Integrated motor-encoder cable Integrated motor-encoder robot cable	Supplied with the actuator Integrated motor-encoder cable Integrated motor-encoder robot cable



PCON-CYB/PLB/POB

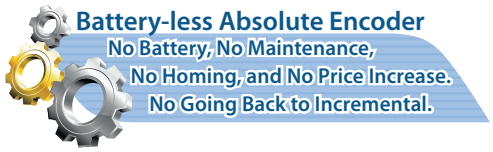
Position Controller
for RoboCylinder



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.

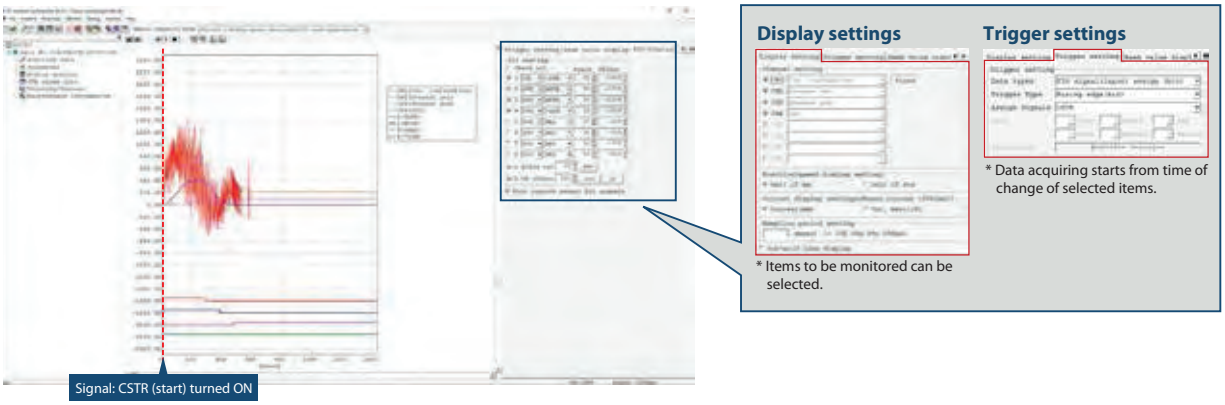
3 Equipped with Smart tuning function

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)



5 Low price

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

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

Model number

PCON – [Type] – [Motor Type] **WAI** – [I/O Type] – [I/O Cable Length] – **0** – [Actuator Mounting Specification]

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

CYB	Positioner / Solenoid valve type
PLB	Pulse-train control type (Differential receiver type)
POB	Pulse train control type (Open collector type)

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

(Example) 20P: 20□ pulse motor compatible

WAI	Battery-less absolute /Incremental

NP	PIO (NPN) specification
PN	PIO (PNP) specification

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

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

0	24VDC

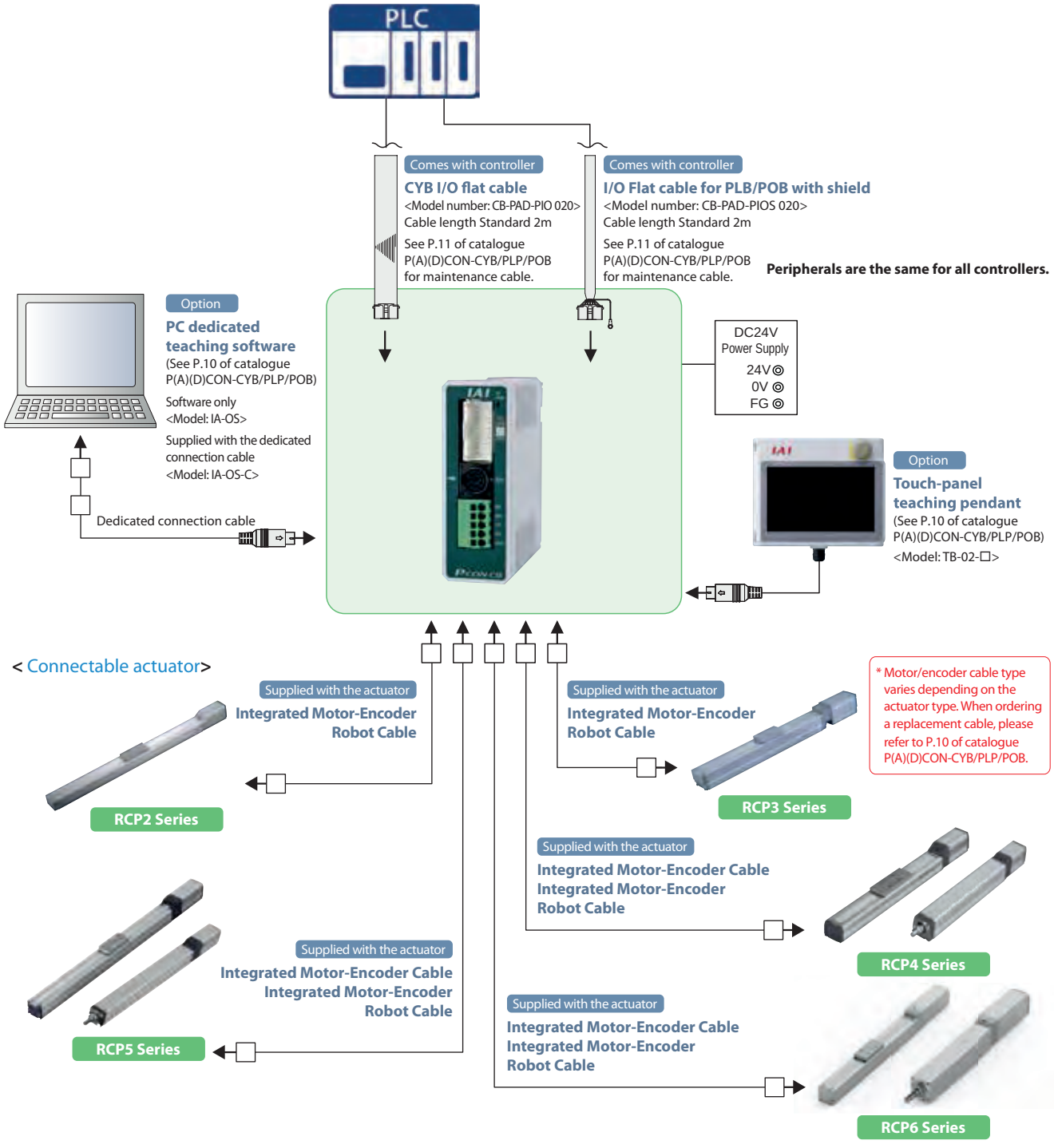
(Blank)	Screw Mounting specification
DN	DIN rail mounting specification

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.
<28 SP target actuator>

- Controller Motor type "28SP" ... RCP2 - RA3C

System configuration

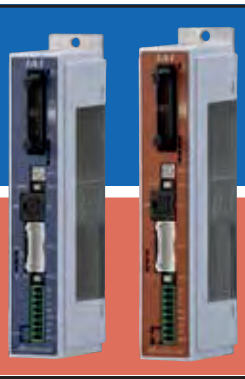


ACON-CB

Position Controller
for RoboCylinder

DCON-CB

Position Controller
for Mini RoboCylinder



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

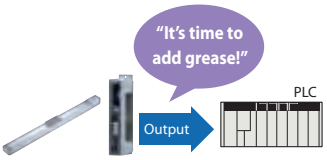
Compatible with DeviceNet, CC-Link, CC-Link IE Filed, PROFIBS-DP, PROFINET IO, CompoNet, EtherCAT and EtherNet/IP.
Field network connection allows for less-wiring, direct numerical commands, position number commands, current position reading, and more.

DeviceNet PROFIBUS EtherCAT
CompoNet PROFINET
EtherNet/IP CC-Link CC-Link IE Field

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.

<Maintenance information>



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	PROFIBUSDP	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 Incremental 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
	Simple absolute spec. With absolute battery unit	O	—	O	O	O	O	O	—	—	O	O	O
	Simple absolute spec. Without absolute battery	O	—	O	O	O	O	O	—	—	O	O	O
	Absolute specification	O	—	O	O	O	O	O	—	—	O	O	O
DCON-CB -CGB	Incremental specification	O	O	O	O	O	O	O	—	—	O	O	O

Model Specification Items

ACON — Series — [ ] Type — [ ] Motor Type — [ ] Encoder Type — [ ] Option — [ ] I/O Type — [ ] I/O Cable Length — **0** Power Supply Voltage — [ ] Simple Absolute Specification — [ ] Controller Mounting Specification

Type	
CB	Standard
CGB	Safety category compliant type

Motor Type			
2	2W	10	10W
5	5W	20	20W
5S	5W	20S	20W
		30	30W

(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□

Encoder Type		Option	
WAI	Battery-less absolute	HA	Hi-accel./decel. specification
A	Incremental	LA	Energy saver specification

I/O Type	
NP	PIO (NPN)
PN	PIO (PNP)
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	
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"

Power Supply Voltage	
0	24VDC

Simple Absolute Specification	
(Blank)	Battery-less absolute specification Incremental specification Absolute Specification
AB	Simple Absolute Specification (With absolute battery)
ABU	Simple Absolute Specification (With absolute battery unit)
ABUN	Simple Absolute Specification (Without absolute battery)

* Simple absolute spec. can be chosen when the actuator's encoder type is incremental type.

Controller Mounting Specification	
(Blank)	Screw Mounting specification
DN	DIN rail mounting specification

DCON — Series — [ ] Type — **3** Motor Type — **I** Encoder Type — [ ] I/O Type — [ ] I/O Cable Length — **0** Power Supply Voltage — [ ] Controller Mounting Specification

Type	
CB	Standard
CGB	Safety category compliant type

Motor Type	
3	3W

Encoder Type	
I	Incremental

I/O Type	
NP	PIO (NPN)
PN	PIO (PNP)
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	
0	No cable
2	2m
3	3m
5	5m

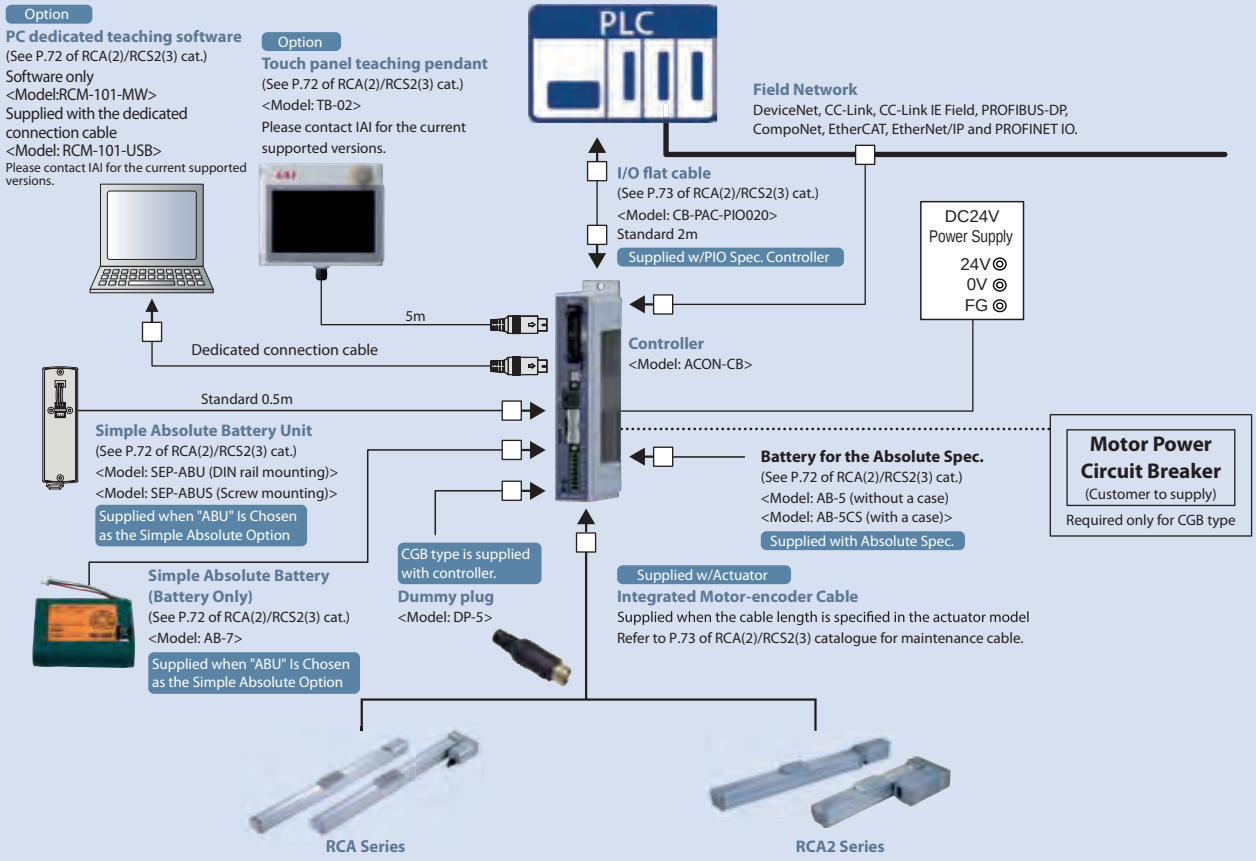
* If you choose a field network specification, the length of I/O cable will be "0"

Power Supply Voltage	
0	24VDC

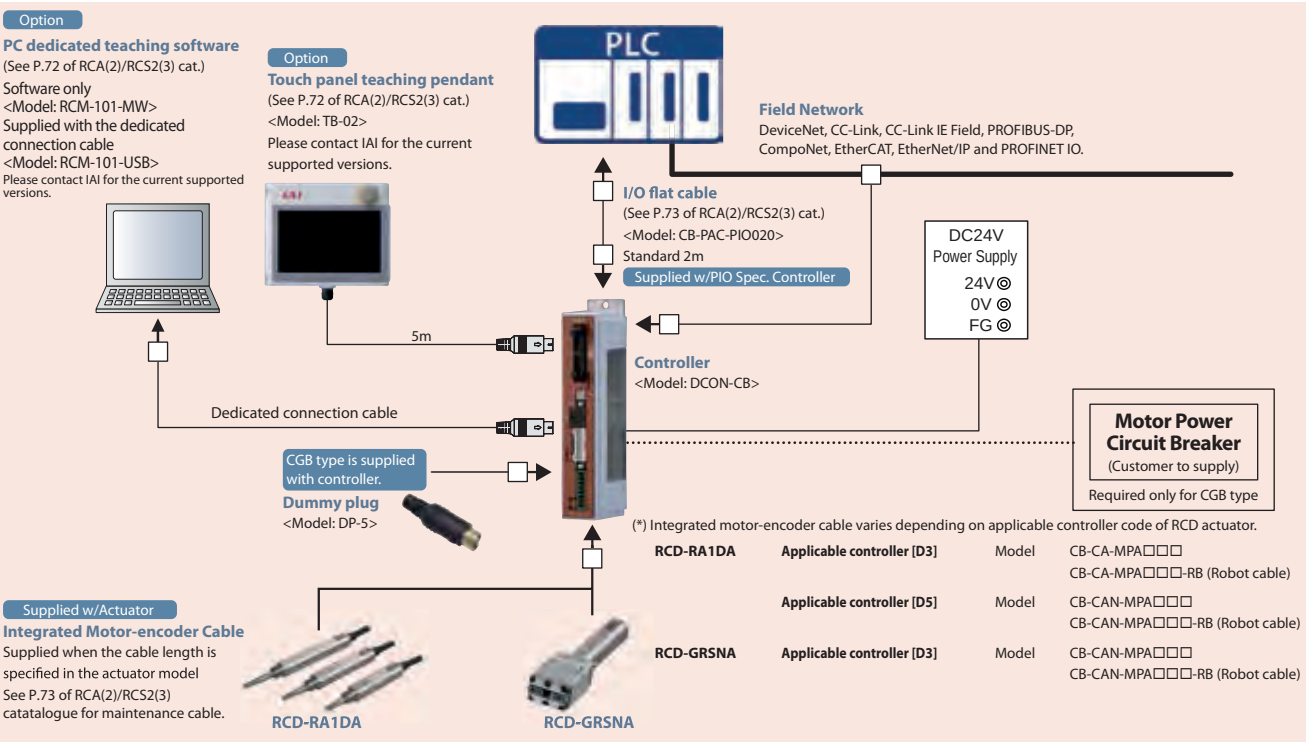
Controller Mounting Specification	
(Blank)	Screw Mounting specification
DN	DIN rail mounting specification

System Configuration

<ACON-CB/CGB>



<DCON-CB/CGB>



ACON-CYB/PLB/POB

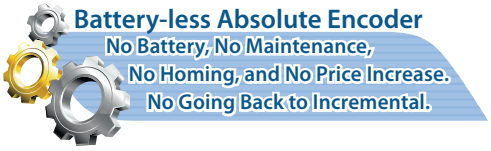
DCON-CYB/PLB/POB

Position Controller
for RoboCylinder

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.

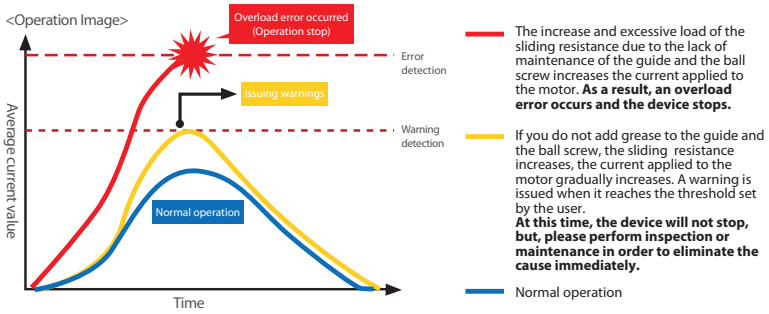


2 Equipped with Smart tuning function (ACON only)

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 Max. 64 points	–
	CB	O	O	O	O	Insulated 16IN/16OUT	Standard 64 points 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

Type:
- CYB: Positioner / Solenoid valve type
- PLB: Pulse-train control type (Differential receiver type)
- POB: Pulse-train control type (Open collector type)

Motor Type:
- 2: 2W
- 5: 5W
- 5S: 5W
- 10: 10W
- 20: 20W
- 20S: 20W
- 30: 30W

(Example) 2: 2W Servo motor compatible

Encoder Type:
- WAI: Battery-less absolute/ Incremental

* Absolute specification of RCA actuator can not be operated. Please use ACON-CB or ASEL to operate the Absolute specification.

Option:
- HA: Hi-accel./decel. supported
- LA: Energy saver

I/O Type:
- NP: PIO(NPN) specification
- PN: PIO(PNP) specification

I/O Cable Length:
- 0: No cable
- 2: 2m
- 3: 3m
- 5: 5m

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

Power Supply Voltage:
- 0: 24VDC

Controller Mounting Specification:
- (Blank): Screw Mounting specification
- DN: DIN rail mounting specification

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□

DCON – [ ] – **3** **I** – [ ] – [ ] – **0** – [ ]

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

Type:
- CYB: Positioner / Solenoid valve type
- PLB: Pulse-train control type (Differential receiver type)
- POB: Pulse-train control type (Open collector type)

Motor Type:
- 3: 3W

* DC Brushless motor compatible

Encoder Type:
- I: Incremental

I/O Type:
- NP: PIO(NPN) specification
- PN: PIO(PNP) specification

I/O Cable Length:
- 0: No cable
- 2: 2m
- 3: 3m
- 5: 5m

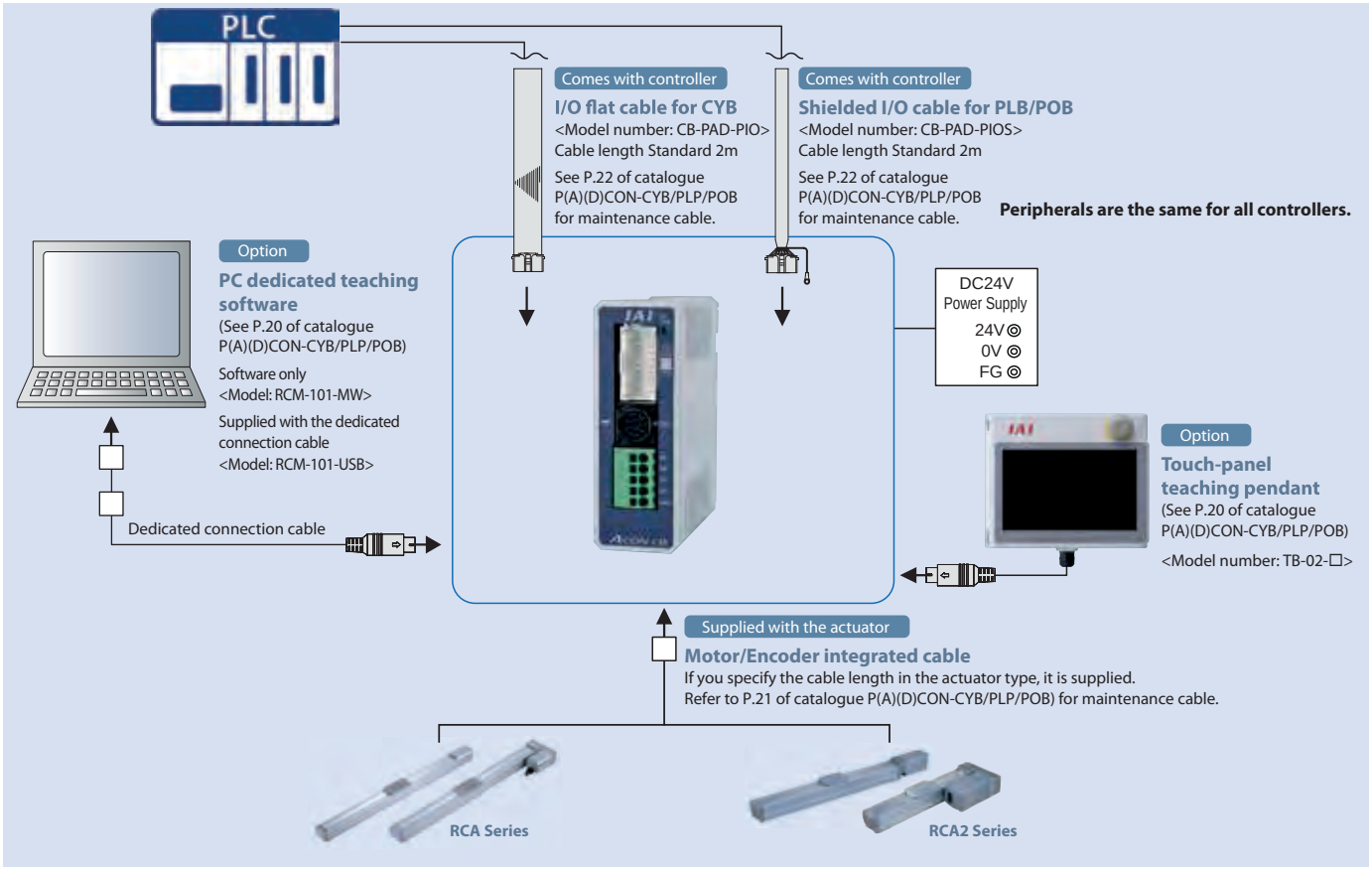
* The POB type has a maximum cable length of 2m.

Power Supply Voltage:
- 0: 24VDC

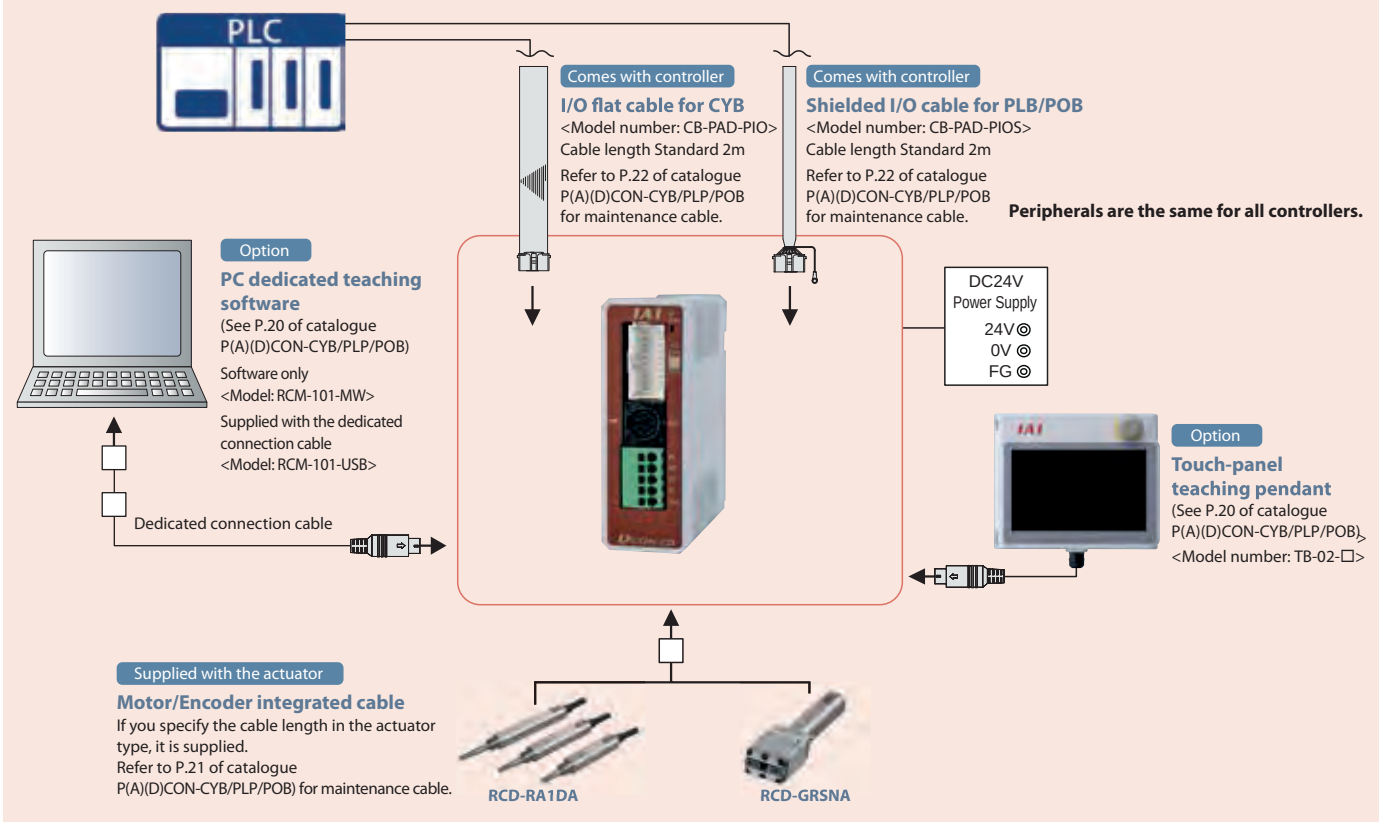
Controller Mounting Specification:
- (Blank): Screw Mounting specification
- DN: DIN rail mounting specification

System configuration

<ACON-CYB/PLB/POB>



<DCON-CYB/PLB/POB>



SCON-CB

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

CE RoHS cULus (*)

(*) 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>

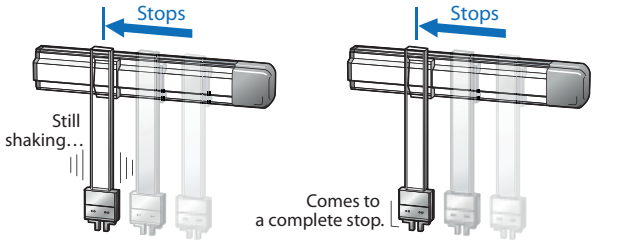
In addition to DeviceNet, CC-Link, CC-Link IE Field and PROFIBUS-DP, direct connections are now possible to CompoNet, EtherCAT, EtherCAT Motion, EtherNet/ IP and PROFINET IO.
The actuator can also be operated by specifying coordinate values directly via a field network.

DeviceNet™ CompoNet™ EtherNet/IP™ PROFINET

PROFIBUS® CC-Link CC-Link IE Field EtherCAT®

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.



Without vibration control
The work part vibrates after stopping.

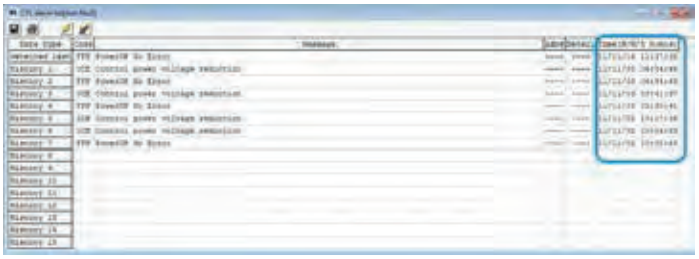
With vibration control
The work part generates virtually no vibration after stopping.

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	CC-Link	CC-Link IE Field	PROFIBUS-DP	CompoNet	–	EtherCAT	EtherCAT	EtherNet/IP	PROFINET IO	RCON
			DeviceNet connection specification	CC-Link connection specification	CC-Link IE Field connection specification	PROFIBUS-DP connection specification	CompoNet connection specification	–	EtherCAT connection specification	EtherCAT Motion connection specification	EtherNet/IP connection specification	PROFINET IO connection specification	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 Incremental Quasi-absolute Index absolute / Absolute Multi-Rotation Absolute	Battery-less absolute/ Incremental/Absolute/Quasi-absolute										
SCON-CB	12～150W	o / o	o	o	o	o	o	–	o	o	o	o	o
	200W	o / o											
	100S/200S/300S	o / o											
	300～400W	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 – [Type] – [Motor Type] [Encoder Type] [Option] – [I/O Type] – [I/O Cable Length] – [Power Supply Voltage] – [Safety type]

Series

Type

CB	High-function type
CGB	Safety category compliant type

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

Motor Type

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

Encoder Type

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

*1 DD motor operation mode is added.

Option

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

I/O Type

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

I/O Cable Length

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".

Power Supply Voltage

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.

Safety type

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

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

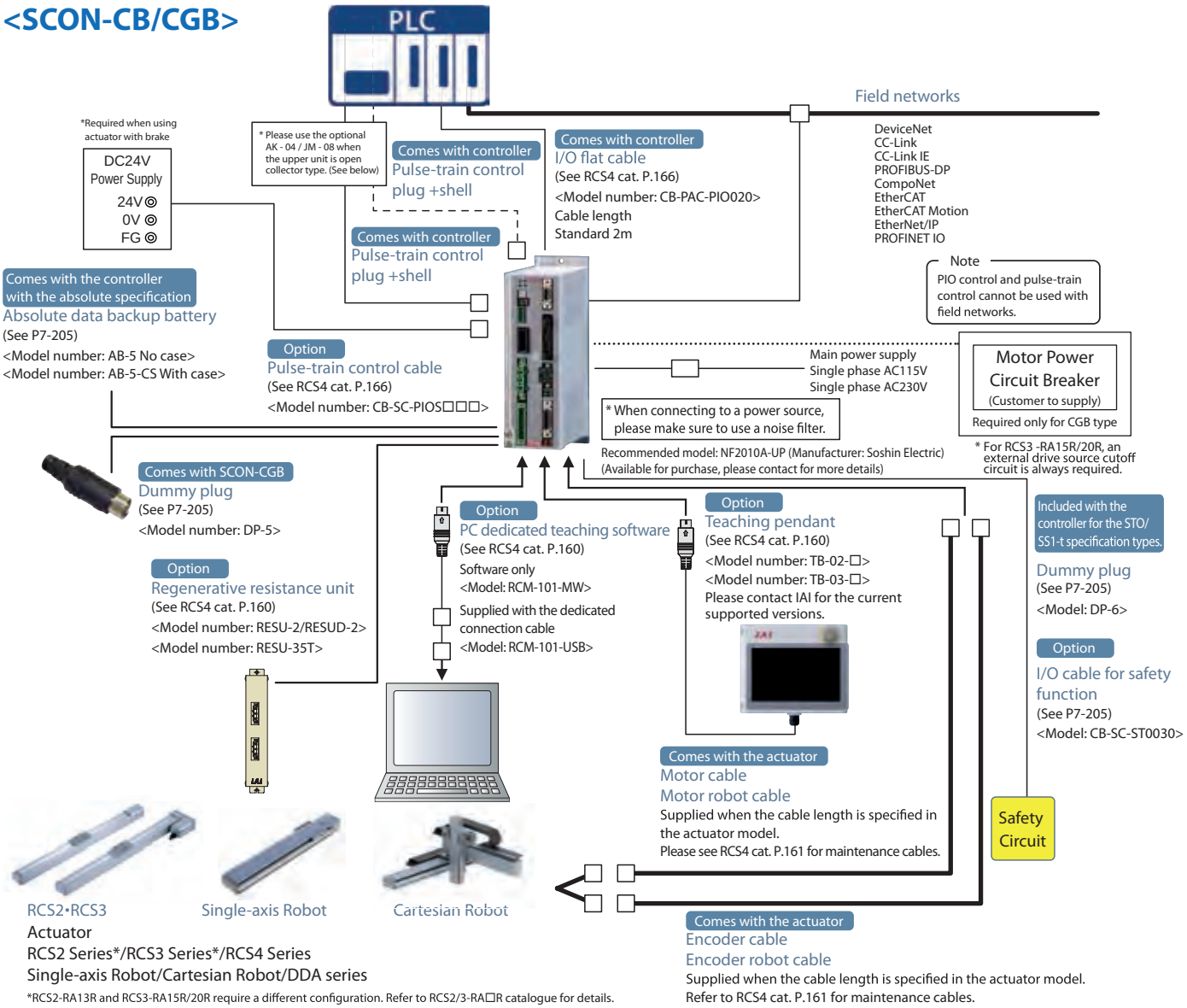
Note

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.

System configuration

<SCON-CB/CGB>

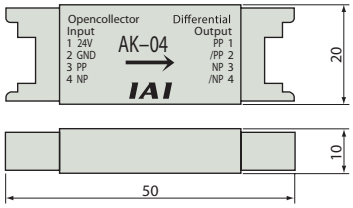


■ Pulse Converter: Model number AK-04

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 Suitable wire: AWG No.24~26

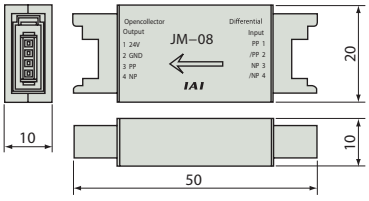


■ Pulse Converter: Model number JM-08

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 Suitable wire: AWG No.24~26



SCON-CB <Sero press specification>

Servo Press dedicated controller (SCON-CB F)

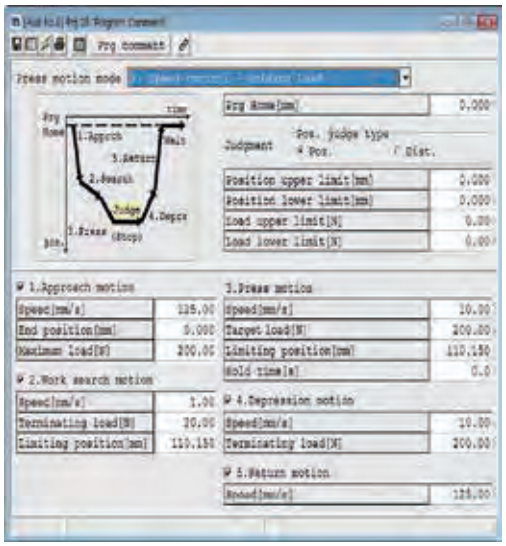
(*) 3000 and 3300W types are not compliant with UL standard.

Features

1 Equipped Dedicated Press Program

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

Speed control After arriving at the target position, stops while maintaining the position at the time of arrival.	Position stop
	Distance stop
	Load stop
	Incremental load stop
Force control After arriving at the target position, stops while maintaining the force 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 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. 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	CC-Link	CC-Link IE Field	PROFIBUS-DP	CompoNet	–	EtherCAT	EtherNet/IP	PROFINET
		DeviceNet connection specification	CC-Link connection specification	CC-Link IE Field connection specification	PROFIBUS-DP connection specification	CompoNet connection specification	–	EtherCAT connection specification	EtherNet/IP connection specification	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	o	o	o	o	o	–	o	o	o
SCON-CB 60W・100W	o									
SCON-CB 200W	o									
SCON-CB 400W	o									
SCON-CB 750W	o									
SCON-CB 3000W	o									
SCON-CB 3300W	o									

(*1) Pulse-train control is not available.
(*2) Communication with PIO or pulse-train is not available.

Model

SCON – [Type] – [Motor Type] [Encoder Type] F – [I/O Type] – [I/O Cable Length] – [Power Supply Voltage] – [Safety type]

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

WAI	Battery-less Absolute Incremental

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)

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.

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

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

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)

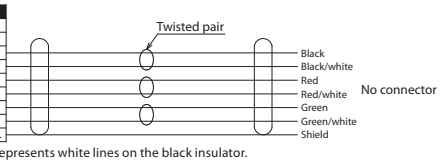
Features Necessary when STO/SS1-t function is not used.

Model **DP-6**

Spare Parts

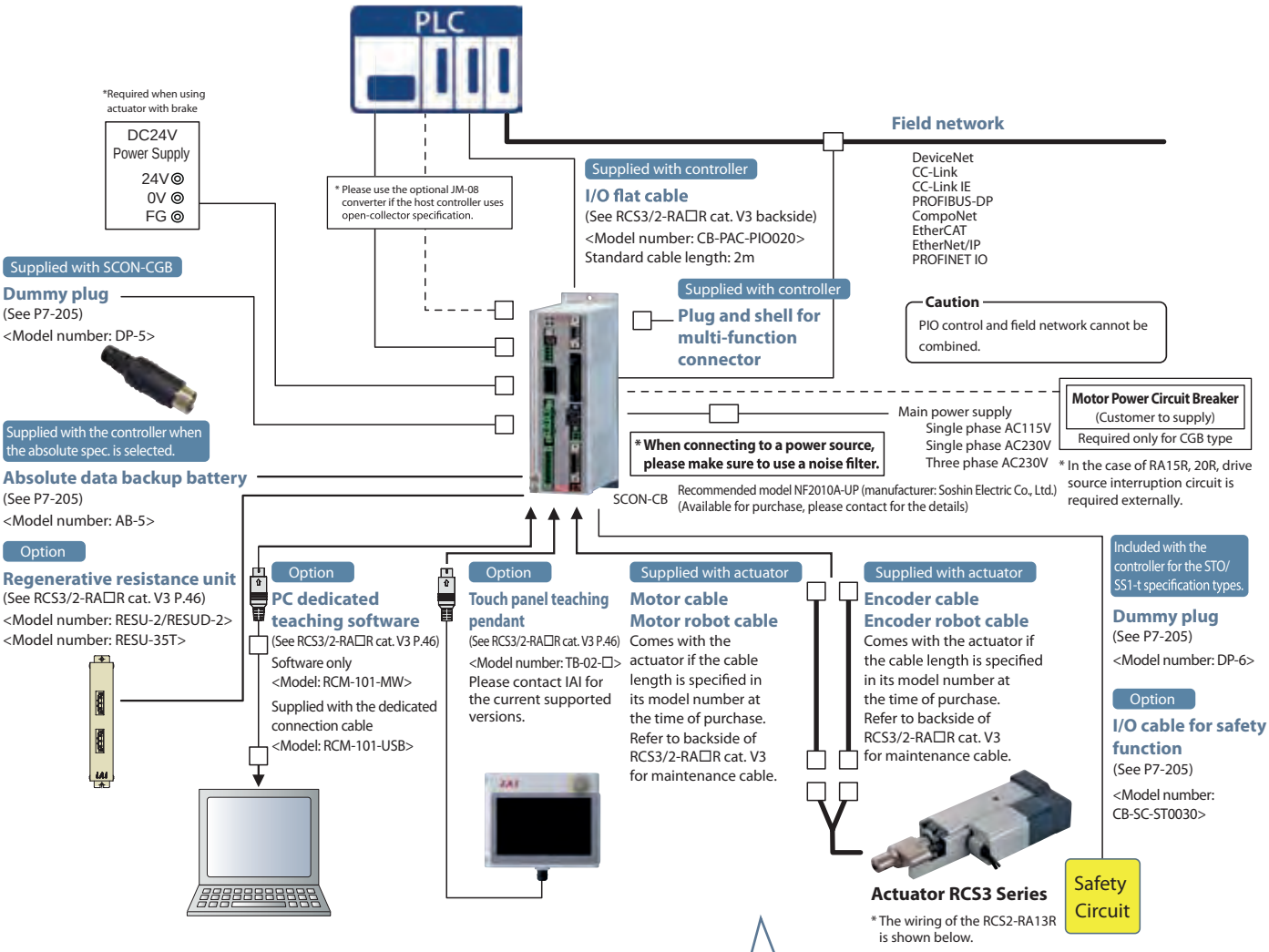
Model CB-SC-STO 030

Wiring	Color	Signal	No.
AWG26	—	—	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.

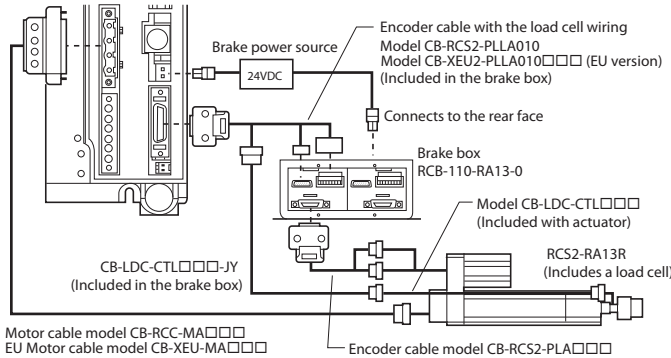
System Configuration



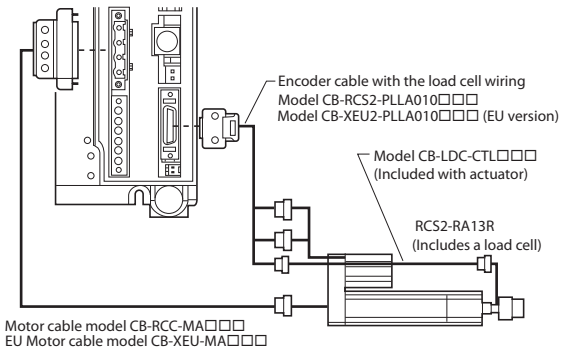
RCS2-RA13R wiring

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



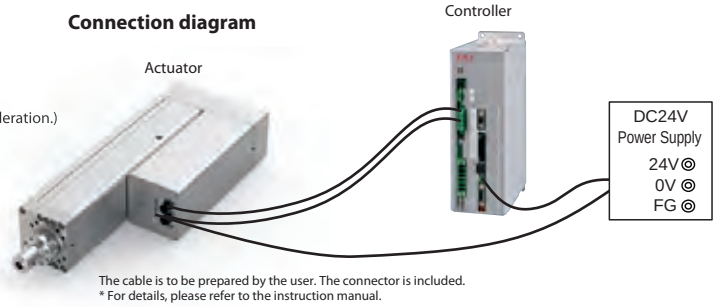
Without a Brake



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



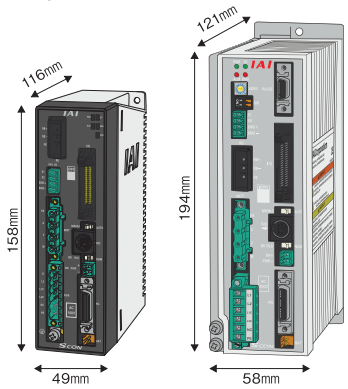
The cable is to be prepared by the user. The connector is included.
* For details, please refer to the instruction manual.

SCON-CAL

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

1 Miniaturization realized

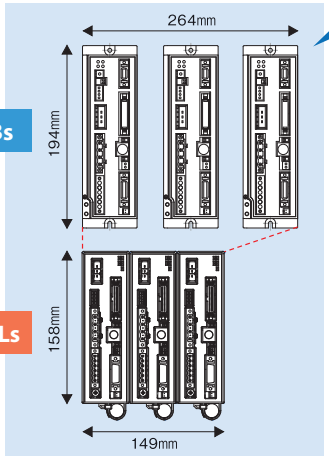
Compared with SCON-CB, the volume ratio has been reduced to 34%. It contributes to the space saving of the control panel.



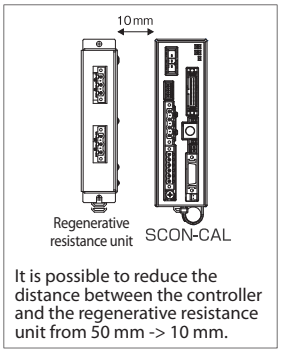
Smaller in volume 34%

Installing 3 SCON-CBs

Installing 3 SCON-CALs



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



It is possible to reduce the distance between the controller and the regenerative resistance unit from 50 mm -> 10 mm.

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.

3 Function comparison with SCON-CB

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

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

Model

SCON – [ ] – [ ] [ ] [ ] – [ ] – [ ] – [ ] – [ ]

Series / Type / Motor Type / Encoder Type / Option / I/O Type / I/O Cable Length / Power Supply Voltage / Actuator mounting specification

Type

CAL	Standard type
CGAL	Safety category compliant type

Motor Type

12	12W	60	60W
20	20W	100	100W
30D	30W	150	150W
30R	30W	200	200W

(Example) 12: 12 W Servo motor compatible

Encoder Type

WAI	Battery-less absolute Incremental
A	Absolute Type

Option

(Blank)	No option
HA	Hi-accel./decel. specification

I/O Type

NP	NPN connection specification
PN	PNP connection specification
DV	DeviceNet connection specification
CC	CC-Link connection specification
PR	PROFIBUS-DP connection specification
CN	CompoNet connection specification
EC	EtherCAT connection specification
EP	EtherNet/IP connection specification
PRT	PROFINET IO connection specification

I/O Cable Length

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

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

Power Supply Voltage

1	Single phase AC 115V
2	Single phase AC 230V

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

Actuator mounting specification

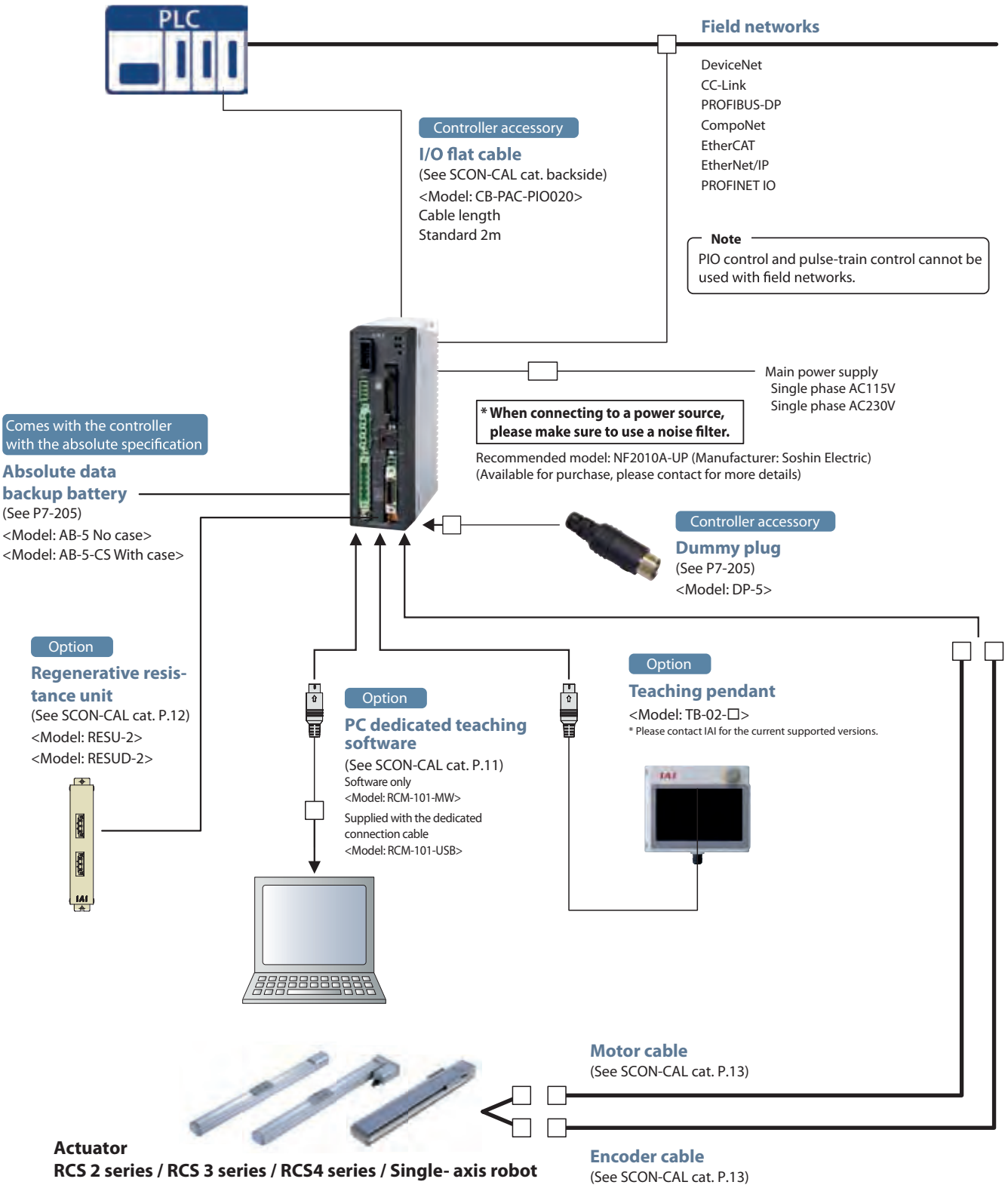
(Blank)	Screw fastening specification
DN	DIN rail mounting specification

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

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

CE RoHS

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.

DeviceNet™ PROFIBUS® CompoNet™ CC-Link EtherNet/IP™ EtherCAT® PROFINET®

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)

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 – C – [Number of axes] – [Motor] – [Encoder] – [Option] – ([Motor] – [Encoder] – [Option]) – [I/O type] – 0 – [I/O cable length] – [Power/voltage]

Series: MSCON

1	Single-axis model
2	2-axis model
3	3-axis model
4	4-axis model
5	5-axis model
6	6-axis model

Type: C

Number of axes / Motor

12	12W	60	60W
20	20W	100	100W
30D	30W	150	150W
30R	30W	200	200W

(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 applicable actuator>
● Controller Motor type "30D" ... 30W actuator other than RS
● Controller Motor type "30R" ... RS

Encoder / Option

WAI	Battery-less absolute/ Incremental
A	Absolute

* Encoder type can be specified for each axis.

HA	High acceleration/deceleration type

I/O type

DV	DeviceNet connection specification
CC	CC-Link connection specification
PR	PROFIBUS-DP connection specification
CN	CompoNet connection specification
PRT	PROFINET IO connection specification
EC	EtherCAT connection specification
EP	EtherNet/IP connection specification

I/O cable length

0	No cable

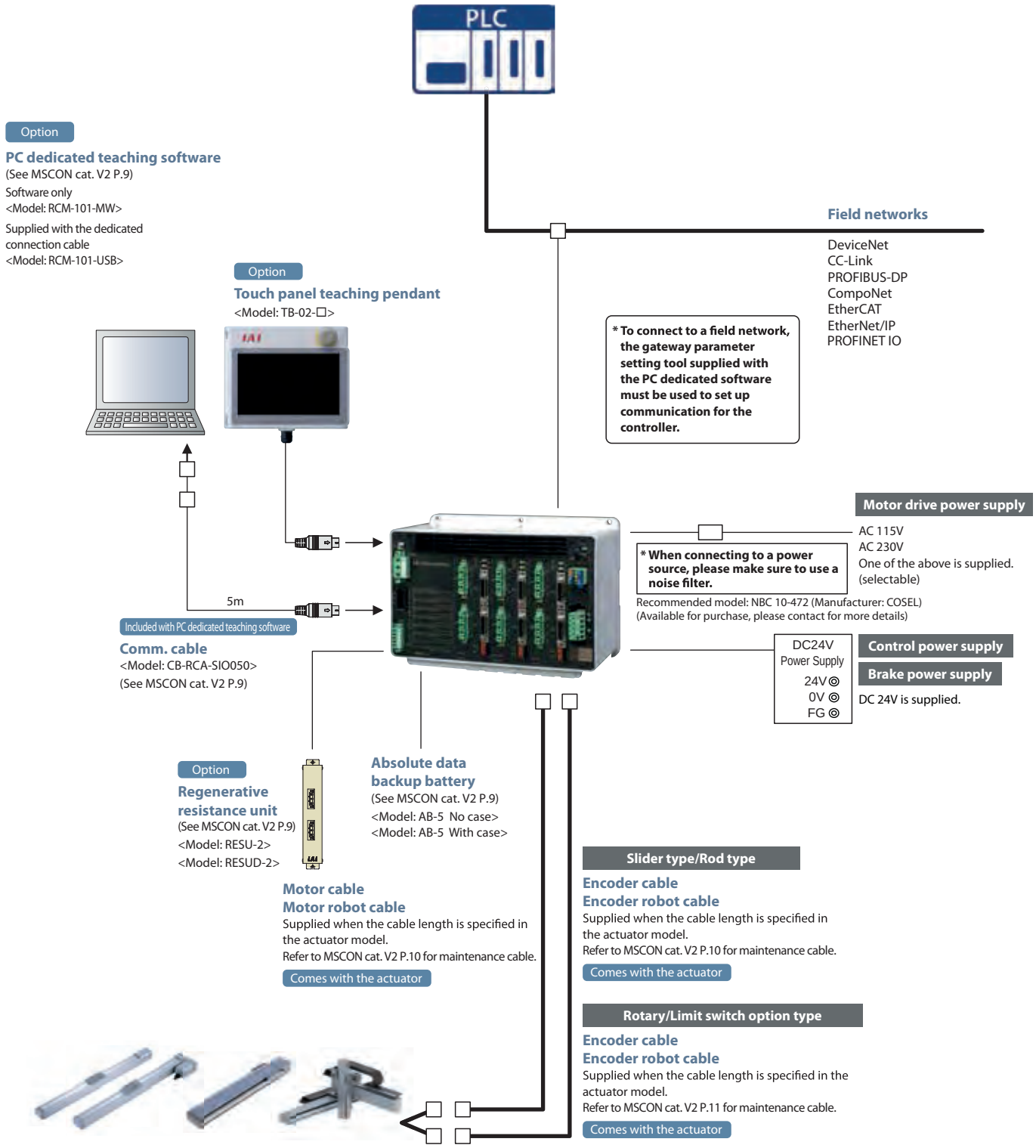
* The MSCON is available only in network specifications and does not come with I/O cables.

Power/voltage

1	AC115V
2	AC230V

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

System configuration



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) Motor, Encoder, Option / (Specs for 2nd axis) Motor, Encoder, Option / I/O type / I/O cable length / Power voltage

CS	Standard type

1	Single-axis model
2	2-axis model

WAI	Battery-less absolute incremental
A	Absolute

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

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

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

1	Single-phase AC115V
2	Single-phase AC230V

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

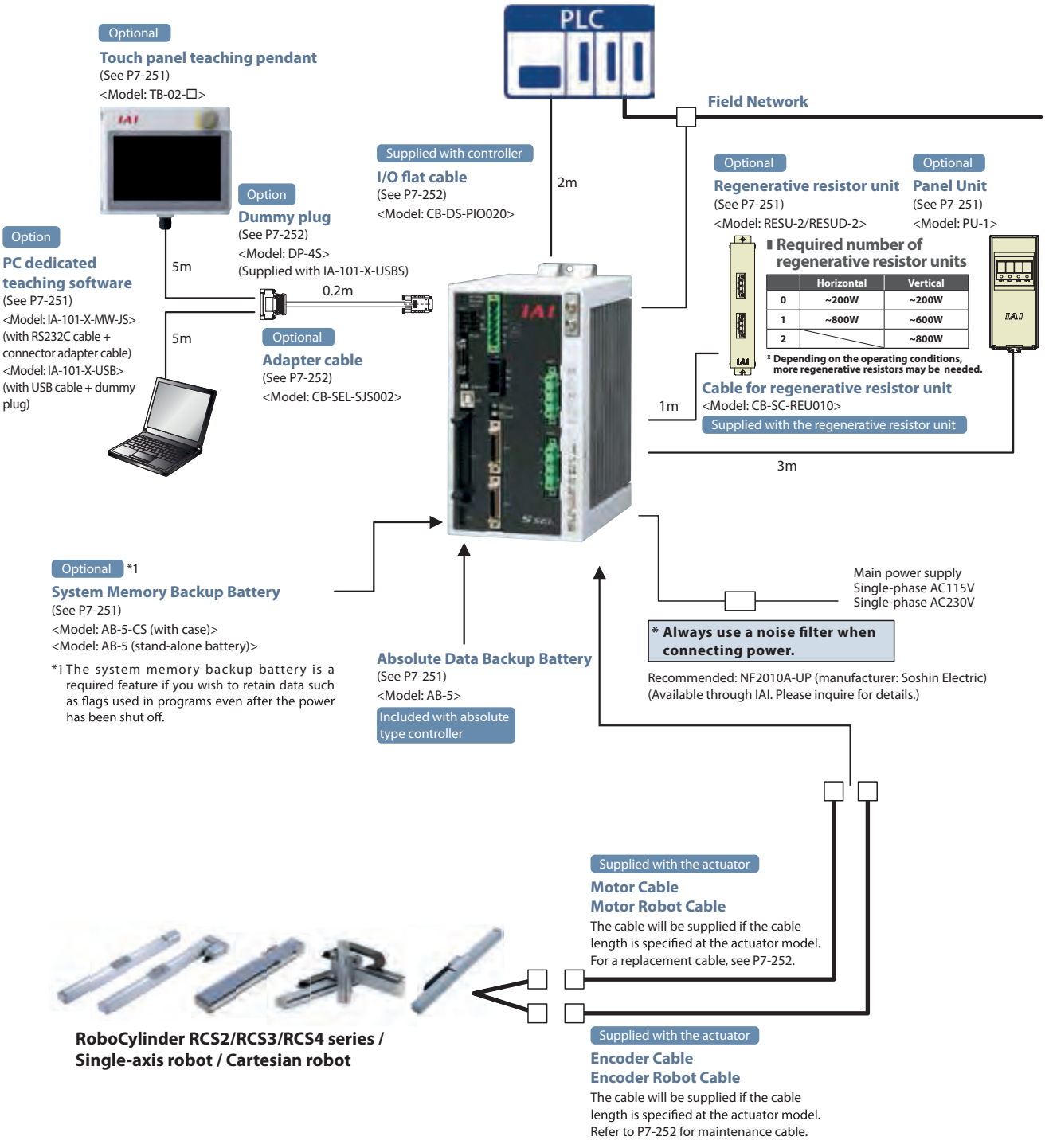
0	No cable
2	2m
3	3m
5	5m

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

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

System Configuration



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

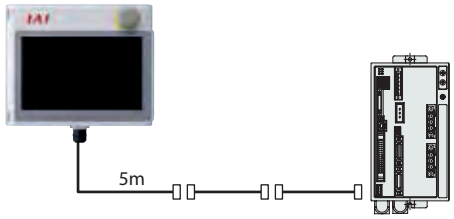
Options

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)

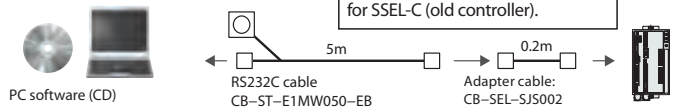
PC dedicated teaching software (Windows only)

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.

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

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

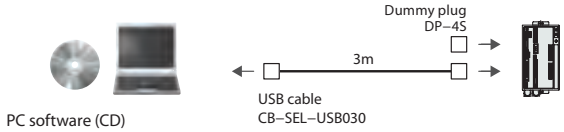
Configuration



Note
The CB-SEL-SJS002 cannot be used for SSEL-C (old controller).

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

CAD drawings can be downloaded from our website. www.iai-automation.com 2D CAD 3D CAD

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)

Specifications

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	

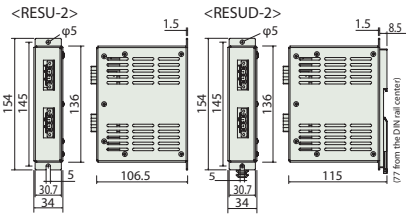
Required number of units

	Horizontal	Vertical
0	~200W	~200W
1	~800W	~600W
2		~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)

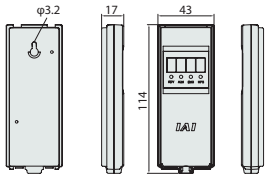
External dimensions



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.

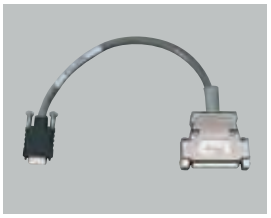
Model **CB–SEL–USB030** (cable length: 3m)

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

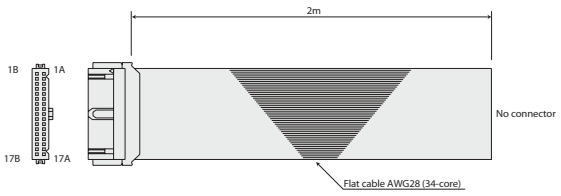
	Product model		Motor cable	(EU) Motor robot cable	Encoder cable	(EU) Encoder robot cable
①	RCS2(CR/W) RCS3(CR)	Models other than ② - ④ .	CB-RCC-MA□□□	CB-RCC-MA□□□-RB CB-XEU-MA□□□ (EU version)	CB-RCS2-PA□□□	CB-X(EU)3-PA□□□
②	RCS2	RT			CB-RCS2-PLA□□□	CB-X(EU)2-PLA□□□
③		RA13R (without load cell/ without brake) *2			CB-RCS2-PLA□□□	CB-X(EU)2-PLA□□□
④		RA13R (without load cell/ with brake) *2			CB-RCS2-PLA□□□ * Between controller and brake is CB-RCS2-PLA□□□	CB-X(EU)2-PLA□□□ * Between controller and brake is CB-X(EU)2-PLA□□□
⑤	RCS4(CR)				–	CB-X(EU)1-PA□□□
⑥	NS	without LS	–	CB-X-MA□□□ CB-XEU-MA□□□ (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□□□ CB-XEU-MA□□□ (EU version)	–	CB-X(EU)1-PA□□□ (in case of 20m or shorter) *1 CB-X(EU)1-PA□□□-AWG24 (in case of 21m or longer)
⑬	Models other than ① - ⑪ with LS specification		–		–	CB-X(EU)1-PLA□□□ (in case of 20m or shorter) *1 CB-X(EU)1-PLA□□□-AWG24 (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

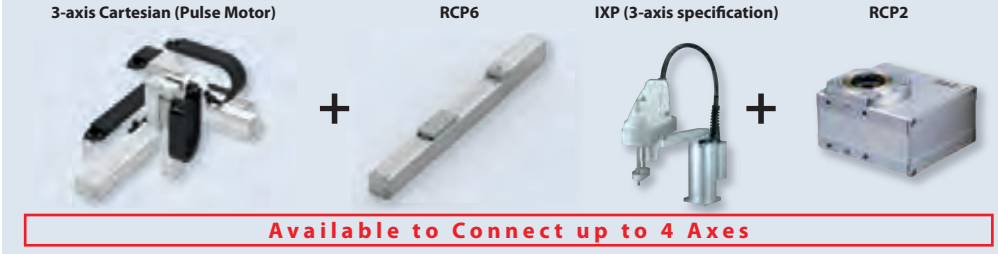
CE RoHS

Features

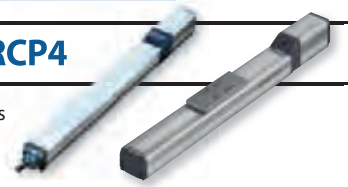
1 Control Maximum of 4 Axes Available with Pulse Motor Mounted RoboCylinder

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



2 Available to Connect RoboCylinders RCP6, RCP5 and RCP4



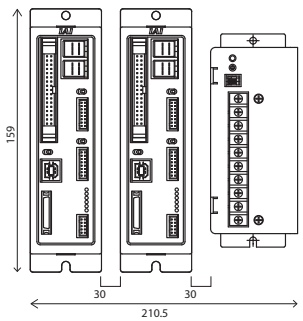
By applying to PowerCon, it is now possible to perform interpolation operations with RoboCylinders RCP6, RCP5 and RCP4, which are applicable for high-output driver, but were not feasible with the program controller PSEL in the past.

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

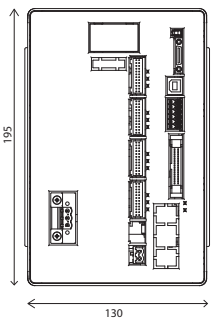
Conventional product **2 PSEL units + 24V power supply**



Cable Reduction
Applicable for AC100 to 230V built-in power source.

Cost Reduction
Approx. 36% reduced

New **1 MSEL unit**



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 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 – [Series] – [Type] – [Number of axes] – [(Specs for 1st axis): Motor / Encoder / Option] – [(Specs for axis 2 to 4): Motor / Encoder / Option] – [Standard I/O] – [Expansion I/O] – [I/O cable length] – 4 – [Simple absolute unit] – [Mounting specification]

Series

PC	Standard type
PG	Safety category compliant type

Type

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

Number of axes

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

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

(Specs for 1st axis) Motor

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

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

(Specs for 1st axis) Encoder

WAI	Battery-less absolute Incremental
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.

(Specs for 1st axis) Option

B	Brake

(Specs for axis 2 to 4) Motor

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

(Specs for axis 2 to 4) Encoder

WAI	Battery-less absolute Incremental
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.

(Specs for axis 2 to 4) Option

B	Brake

Standard I/O

NP	NPN
PN	PNP

Expansion I/O

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.

I/O cable length

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

Power voltage

4	AC100~230

Simple absolute unit

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.

Mounting specification

Blank	Screw fixation
DN	DIN rail mount

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 (Specs for 1st axis) | Option | Motor (Specs for axis 2s) | Encoder | Option | Motor (Specs for axis 3 and 4) | Encoder | Option | Standard I/O | Expansion I/O | I/O cable length | Power voltage | Simple absolute unit | Mounting specification

Type

PCF	56SP/60P/86P motor type
PGF	Safety category compliant 56SP/60P/86P motor type

Number of axes

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

Motor (Specs for 1st axis)

56SP	56□
60P	60□
86P	86□

(Ex) 20P: 20□ pulse motor compatible

NOTE
One WU can be connected to one MSEL.

Option

B	Brake

Motor (Specs for axis 2s)

20P	20□
20SP	20□
28P	28□
28SP	28□
35P	35□
42P	42□
42SP	42□
56P	56□
56SP	56□
60P	60□
86P	86□
WUS	For WU-S
WUM	For WU-M

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

Encoder

WAI	Battery-less absolute Incremental
SA	Simple absolute specification

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

Option

B	Brake

Motor (Specs for axis 3 and 4)

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

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

Encoder

WAI	Battery-less absolute Incremental
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.

Option

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 communication
PRT	PROFINET IO
SE1	RS232C
SE2	RS485

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

Standard I/O

NP	NPN
PN	PNP

Expansion I/O

B	Brake

I/O cable length

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

Power voltage

4	AC100~230

Simple absolute unit

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.

Mounting specification

Blank	Screw fixation
DN	DIN rail mount

System Configuration

Optional

Touch panel teaching pendant
(See P7-266)
<Model: TB-02-□>
*Compatible versions
PC/PG: ver. 1.00 or later
PCF/PGF: ver. 1.60 or later

Optional

PC dedicated teaching software
(See P7-266)
<Model: IA-101-X-MW-JS>
(with RS232C cable + adapter cable)
<Model: IA-101-X-USBS>
(with USB cable + dummy plug)
* Compatible versions
PC/PG: ver. 12.00.01.00 or later
PCF/PGF: ver. 13.02.00.00 or later

Supplied with controller

Dummy Plug
(See P7-266)
<Model: DP-4S>
(supplied with MSEL-PG/PGF and IA-101-X-USBS)

Supplied with controller

Adapter Cable
(See P7-266)
<Model: CB-SEL-SJS002>
(supplied with TB-01-SJ/IA-101-X-W-JS)

Emergency stop switch

Enable switch

Supplied with controller

PIO Flat Cable
(See P7-267)
<Model: CB-PAC-PIO020>
Standard 2m

AC100~230V

PLC

Protective grounding

Electromagnetic contactor

Supplied with controller

Connecting Cable
<Model: CB-MSEL-AB005>
(supplied with MSEL-ABB)

Optional

Absolute Battery Box
(See P7-266)
<Model: MSEL-ABB>

Replacement Battery
(See P7-266)
<Model: AB-7>

* When a simple absolute type is selected at the controller model, an absolute battery box is supplied.

Expansion PIO/field networks

Supplied with expansion PIO

PIO Flat Cable
(See P7-267)
<Model: CB-PAC-PIO020>
Standard: 2m

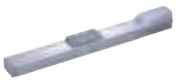
PROFIBUS DeviceNet PROFINET
CC-Link EtherNet/IP EtherCAT

* Wire the emergency stop switch, enable switch, electromagnetic contactor, etc., as necessary.
The same applies to the factory settings (shorting).

<Connectable Actuators>

Motor-Encoder Integrated Cable
(See RCP6 cat. V3 P.269)
<Model: CB-PSEP-MPA□□□>
Standard: 1m/3m/5m
Supplied with actuator

Actuator RCP2 Series

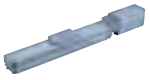


Motor-Encoder Integrated Cable
(See RCP6 cat. V3 P.268/269)
For PC/PG <Model: CB-RPSEP-MPA□□□>
For PCF/PGF <Model: CB-CFA-MPA□□□>/
<Model: CB-CFA-MPA□□□-RB>
Standard: 1m/3m/5m
Supplied with actuator

Actuator RCP2 Small Rotary

Motor-Encoder Integrated Cable
(See RCP6 cat. V3 P.268)
<Model: CB-APSEP-MPA□□□>
Standard: 1m/3m/5m
Supplied with actuator

Actuator RCP3 Series



Motor-Encoder Integrated Cable
(See RCP6 cat. V3 P.268)
For PC/PG <Model: CB-CA-MPA□□□>/<Model: CB-CA-MPA□□□-RB>
For PCF/PGF <Model: CB-CFA2-MPA□□□>/<Model: CB-CFA2-MPA□□□-RB
Standard: 1m/3m/5m
Supplied with actuator

Actuator RCP4 Series

Motor-Encoder Integrated Cable
(See RCP6 cat. V3 P.267)
For PC/PG <Model: CB-CAN-MPA□□□>/<Model: CB-CAN-MPA□□□-RB>
For PCF/PGF <Model: CB-CFA3-MPA□□□>/<Model: CB-CFA3-MPA□□□-RB>
Standard: 1m/3m/5m
Supplied with actuator

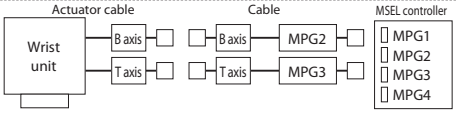
Actuator RCP5 Series

Motor-Encoder Integrated Cable
(See RCP6 cat. V3 P.267)
For PC/PG<Model: CB-CAN-MPA□□□>/
<Model: CB-CAN-MPA□□□-RB>
For PCF/PGF<Model: CB-CFA3-MPA□□□>/
<Model: CB-CFA3-MPA□□□-RB>
Standard: 1m/3m/5m
Supplied with actuator

Actuator RCP6 Series/ WU Series

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) IXP 4-axis specification	
Standard I/O	NPN, PNP (16IN/16OUT)			
Number of positions	30000			
Power voltage	Single-phase AC100 to 230V			

Model

Specs of SCARA / Specs of additional axes

* 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).

MSEL – [Controller type] – [SCARA type] – WAI [Encoder] [Option] – [Motor] WAI [Encoder] [Option] – [Standard I/O] – [Expansion I/O] – [PIO Cable] – 4 [Power voltage] – [Mounting specification]

Controller type

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

SCARA type

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

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

Encoder

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.

Motor

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

Option

Blank	No option
B	Brake

Standard I/O

NP	NPN
PN	PNP

Expansion I/O

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.

PIO Cable

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

Power voltage

4	AC100~230V

Mounting specification

Blank	Screw fixation
DN	DIN rail mount

System Configuration

Supplied with the SCARA robot

Motor-Encoder Integrated Cable
(See P7-267)
<Model: CB-CAN-MPA□□□>
Standard: 1m/3m/5m
*The SCARA robot can be connected to PCX/PGX only.

Supplied with the controller/Option

Dummy Plug
(See P7-266)
<Model: DP-4S>
(Supplied with MSEL-PGX and IA-101-X-USBS)

Optional

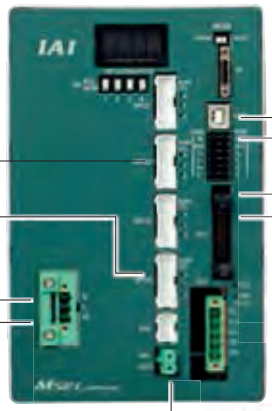
Touch panel teaching pendant
(See P7-266)
<Model: TB-02-□>
* Compatible versions
PC/PG: ver. 1.00 or later
PCX/PGX: ver. 1.02 or later

Supplied with the controller/Option

Adapter Cable
(See P7-266)
<Model: CB-SEL-SJS002>
(supplied with TB-01-SJ/IA-101-X-W-JS)

Optional

PC dedicated teaching software
(See P7-266)
<Model: IA-101-X-MW-JS>
(with RS232C cable + adapter cable)
<Model: IA-101-X-USBS>
(with USB cable + dummy plug)
* Compatible versions
PCX/PGX: ver. 11.00.00.00 or later



Emergency stop switch

Enable switch

Supplied with controller

PIO Flat Cable
(See P7-267)
<Model: CB-PAC-PIO020>
Standard: 2m

AC100~230V

Protective grounding

Electromagnetic contactor

Expansion PIO/field networks

Supplied with expansion PIO specification

PIO Flat Cable
(See P7-267)
<Model: CB-PAC-PIO020>
Standard: 2m

PROFIBUS DeviceNet PROFINET
CC-Link EtherNet/IP EtherCAT

* Wire the emergency stop switch, enable switch, electromagnetic contactor, etc., as necessary.
The same applies to the factory settings (shorting).

<Compatible Actuators>

* MSEL-PCX/PGX can be connected to IXP with 3-axis specification.

Motor-Encoder Integrated Cable
(See RCP6 cat. V3 P.269)
<Model: CB-PSEP-MPA□□□>
Standard: 1m/3m/5m
Supplied with actuator

Actuator RCP2 Series

Motor-Encoder Integrated Cable
(See RCP6 cat. V3 P.268)
<Model: CB-RPSEP-MPA□□□>
Standard: 1m/3m/5m
Supplied with actuator

Actuator RCP2 Small Rotary

Motor-Encoder Integrated Cable
(See RCP6 cat. V3 P.268)
<Model: CB-APSEP-MPA□□□>
Standard: 1m/3m/5m
Supplied with actuator

Actuator RCP3 Series

Motor-Encoder Integrated Cable
(See RCP6 cat. V3 P.268)
<Model: CB-CA-MPA□□□>
<Model: CB-CA-MPA□□□-RB>
Standard: 1m/3m/5m
Supplied with actuator

Actuator RCP4 Series

Motor-Encoder Integrated Cable
(See RCP6 cat. V3 P.267)
<Model: CB-CAN-MPA□□□>
<Model: CB-CAN-MPA□□□-RB>
Standard: 1m/3m/5m
Supplied with actuator

Actuator RCP5 Series

Motor-Encoder Integrated Cable
(See RCP6 cat. V3 P.267)
<Model: CB-CAN-MPA□□□>
<Model: CB-CAN-MPA□□□-RB>
Standard: 1m/3m/5m
Supplied with actuator

Actuator RCP6 Series

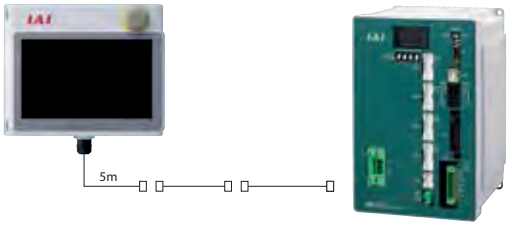
Options

Touch Panel Teaching Pendant

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

Model number **TB-02-□**

Configuration



Specifications

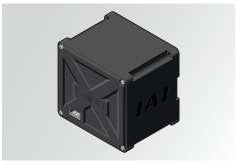
Rated voltage	24V DC
Power consumption	3.6W or smaller (150mA or smaller)
Ambient operating temperature	0~40°C
Ambient operating humidity	20~85%RH (No-condensing)
Protective structure	IP20
Weight	470g (TB-02 unit only)

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**

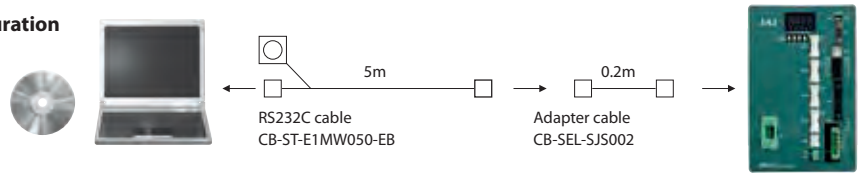
* Same quantity of absolute battery units is required as the number of axes.

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.

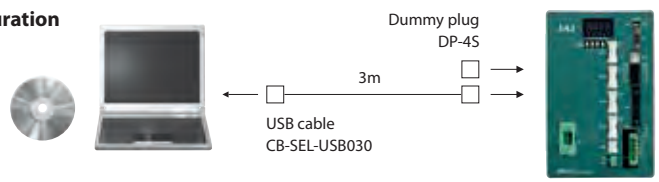
Model number **IA-101-X-MW-JS** (with RS232C cable + Connector adapter cable)

Configuration



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

Configuration



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

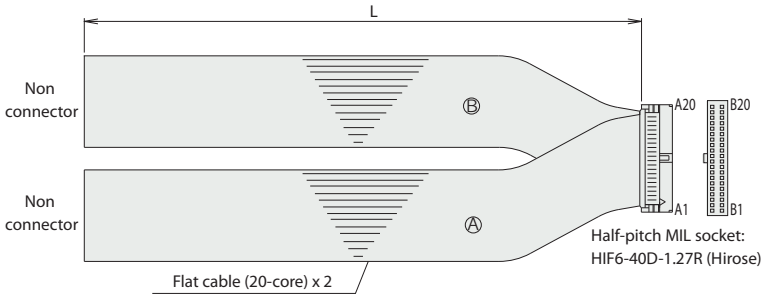
When you need spare parts after purchasing the product, such as when replacing a cable, refer to the list of models below.

■ Table of Applicable Cables

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

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
A1	24V	Brown-1	Flat cable (A) (Crimped) AWG28
A2	24V	Red-1	
A3	—	Orange-1	
A4		Yellow-1	
A5	IN0	Green-1	
A6	IN1	Blue-1	
A7	IN2	Purple-1	
A8	IN3	Gray-1	
A9	IN4	White-1	
A10	IN5	Black-1	
A11	IN6	Brown-2	
A12	IN7	Red-2	
A13	IN8	Orange-2	
A14	IN9	Yellow-2	
A15	IN10	Green-2	
A16	IN11	Blue-2	
A17	IN12	Purple-2	
A18	IN13	Gray-2	
A19	IN14	White-2	
A20	IN15	Black-2	

No.	Signal	Cable color	Wiring
B1	OUT0	Brown-3	Flat cable (B) (Crimped) AWG28
B2	OUT1	Red-3	
B3	OUT2	Orange-3	
B4	OUT3	Yellow-3	
B5	OUT4	Green-3	
B6	OUT5	Blue-3	
B7	OUT6	Purple-3	
B8	OUT7	Gray-3	
B9	OUT8	White-3	
B10	OUT9	Black-3	
B11	OUT10	Brown-4	
B12	OUT11	Red-4	
B13	OUT12	Orange-4	
B14	OUT13	Yellow-4	
B15	OUT14	Green-4	
B16	OUT15	Blue-4	
B17	—	Purple-4	
B18		Gray-4	
B19	0V	White-4	
B20	0V	Black-4	

X-SEL

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

CE RoHS (*)

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

List of models

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

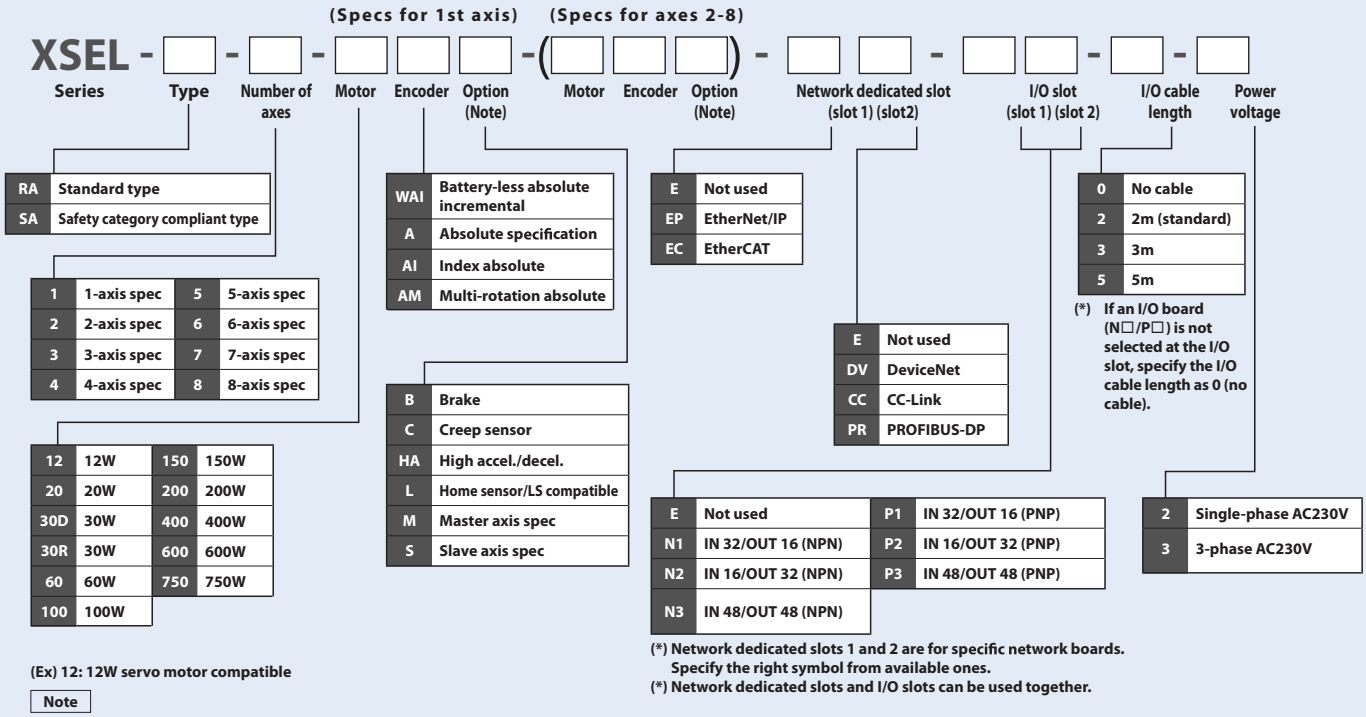
Type		RA	SA	P	Q
External view					
Description		Standard specification	Safety category compliant	Standard specification	Safety category compliant
Maximum number of control axes		8 axes		6 axes	
Number of positions		Maximum 55000 positions (It varies depending on the number of axes.)		20000 positions	
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% 3-hpase AC200V/230V ±10%		Single-phase AC200V/230V ±10% 3-hpase 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. (Only for the IAI controllers that are compatible with MECHATROLINK III)		Up to 16 axes can be controlled. (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)



(Ex) 12: 12W servo motor compatible

(*) 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

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**

* Note: When selecting a single-axis or Carrtesian 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)**
- **NS-SXM□/SZM□ (Incremental)**
- **Servo press**
- **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) Motor / Encoder / (Note) Option / (Specs for axis 2-6) Motor / Encoder / (Note) Option / Network dedicated slot / (Slot 1) Standard I/O / (Slot 2) (Slot 3) (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

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

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

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

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

* 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).

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

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

* 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.

* 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".

S S S
(Slot 2) (Slot 3) (Slot 4)
Expansion I/O

2	Single-phase AC230V
3	3-phase AC230V

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

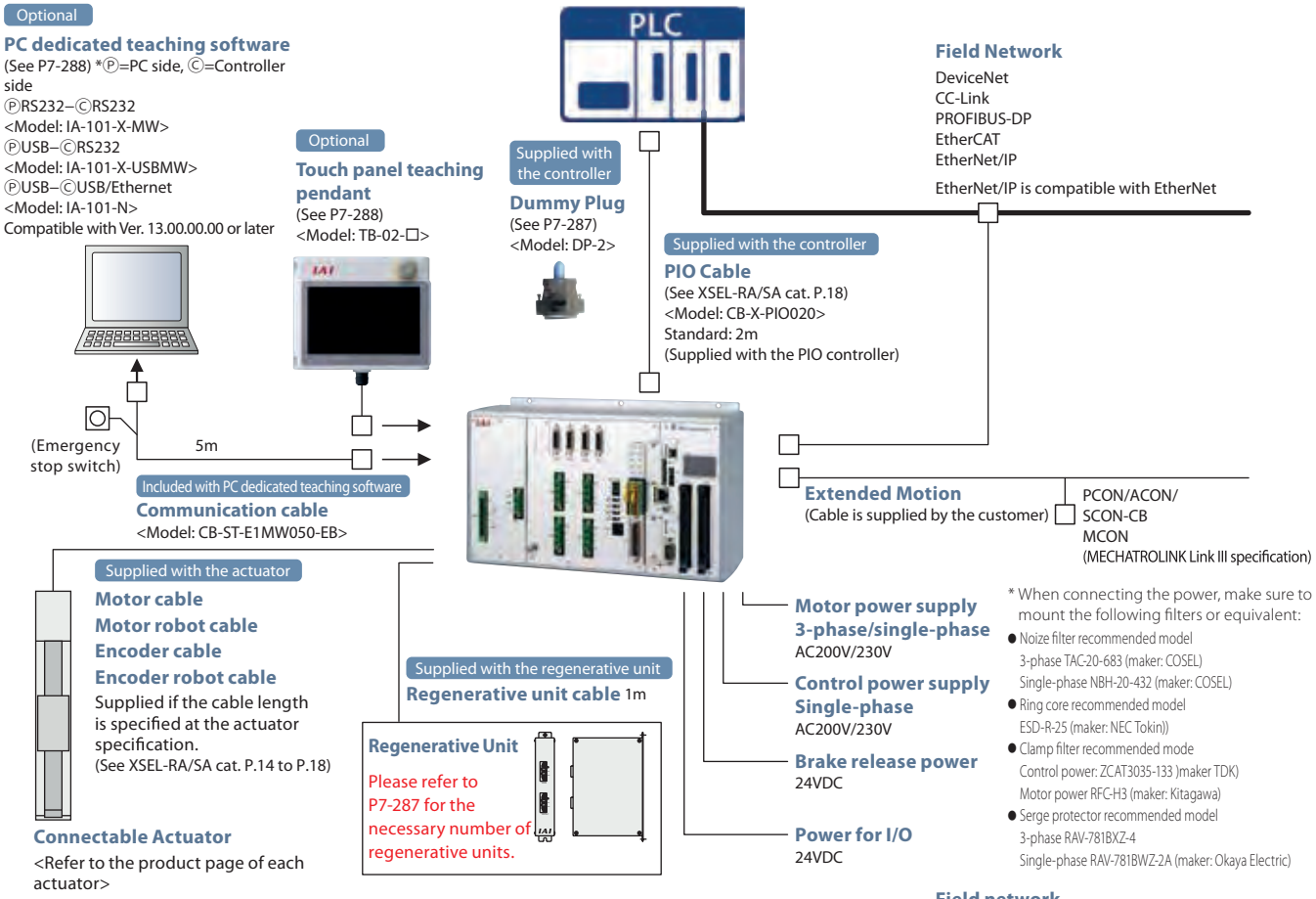
NOTE

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

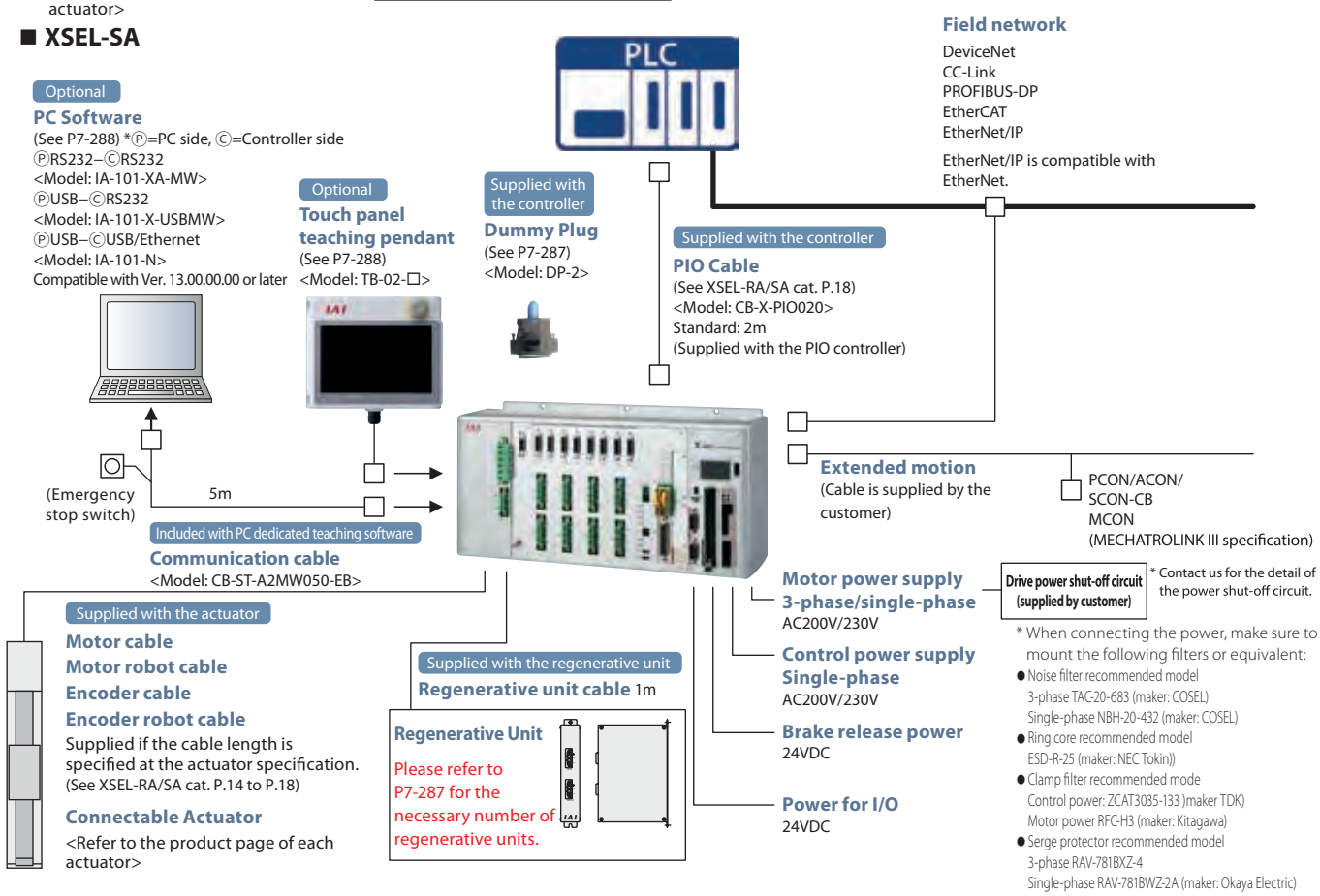
- **RCS2-SRA7/SRGS7/SRGD7**
- **RCS2-□□5N (Incremental)**
- **NS-SXM□ /SZM□ (Incremental)**
- **Servo press**

System Configuration

■ XSEL-RA



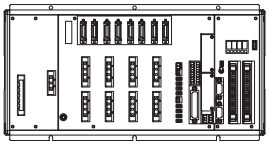
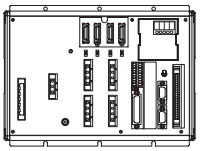
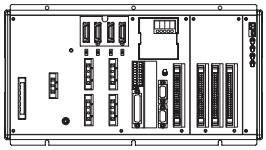
■ XSEL-SA



Connectable I/O Models by Controller Type

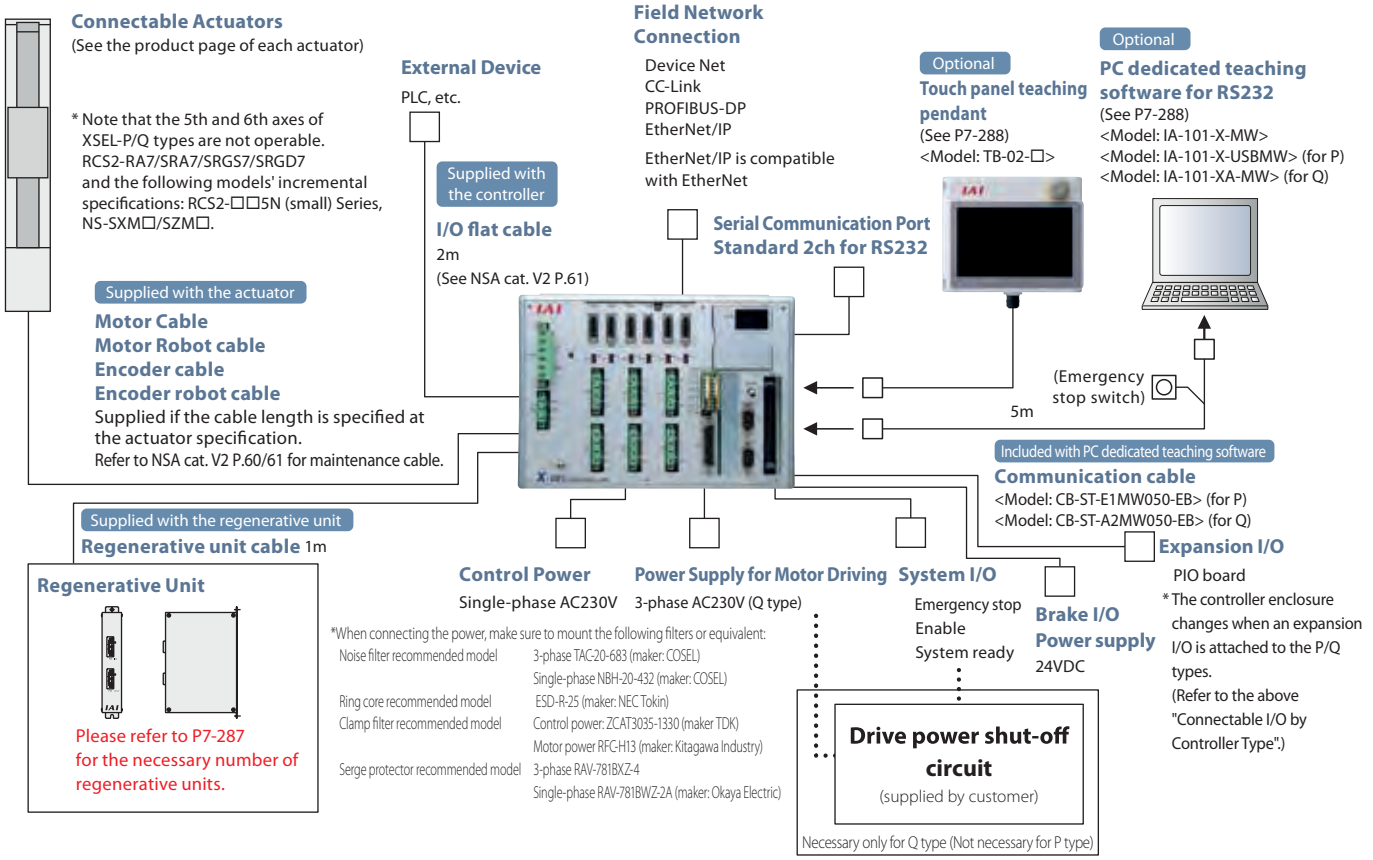
Specifications of the connectable I/O (input/output) vary according to the XSEL controller type.

* 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 SA type			E EP EC	E DV CC PR	E N1 N2 N3 P1 P2 P3	E N1 N2 N3 P1 P2 P3	(not applicable)	(not applicable)
P type Q type	Standard specification		(not applicable) DV CC PR EP ET	(not applicable)	E N1 N2 N3 P1 P2 P3	(not applicable)	(not applicable)	(not applicable)
	With expansion slot specification			(not applicable)		E N1 N2 N3 P1 P2 P3 S	E N1 N2 N3 P1 P2 P3 S	E N1 N2 N3 P1 P2 P3 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.

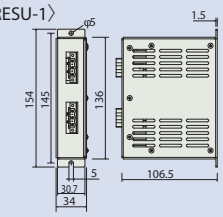
Horizontal use

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

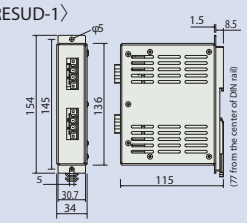
Vertical use

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

〈RESU-1〉



〈RESUD-1〉



■ 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.

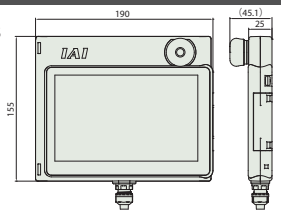
Options

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℃
Operating ambient humidity	20 to 85%RH (non-condensing)
Protective class	IP20
Weight	470g (TB-02 single unit only)

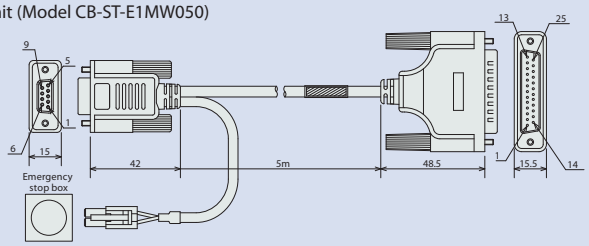
PC dedicated teaching software (Windows only)

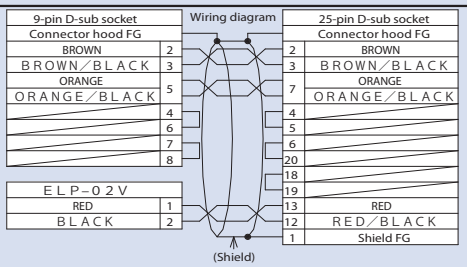
Model IA-101-X-MW

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.





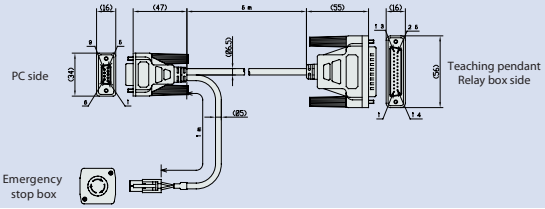
Safety category 4 compliant PC dedicated software (for XSEL-Q/QX/SA/SAX)

Model IA-101-XA-MW
* Exclusive use for XSEL-Q/QX/SA/SAX. Cannot be used for other controllers.

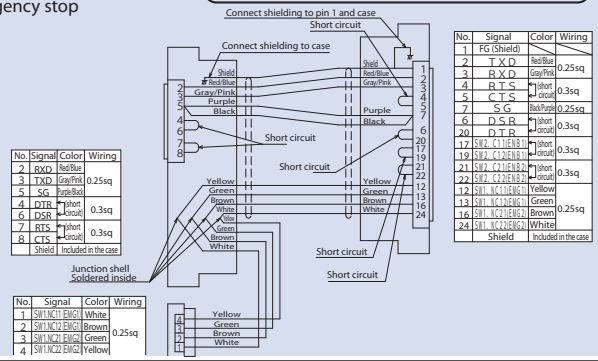
Features A startup support software program offering program/position input function, test operation function, monitoring function, and more.
The functions needed for debugging have been enhanced to help reduce the startup time.
PC connecting cable is compatible to safety category 4 by duplicating the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

Details (Accessories) Software (CD-ROM)
Compatible Windows: 7/8/8.1/10
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.

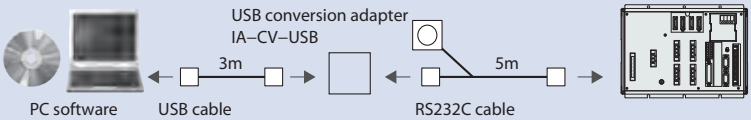


USB-compatible PC software

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

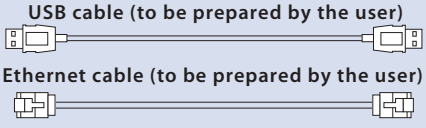
Features Contains only the PC dedicated teaching software (CD-ROM).
Order only the software when connecting both the controller and PC sides by USB cable or Ethernet cable. The cable that meets the following specifications is supplied by the customer.

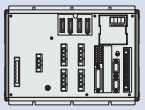
Details Sofware (CD-ROM), compatible Windows: XP SP2 or later/Vista 7/8/10

	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.

PC software (CD)





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 (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 (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

(*) Selectable boards are fixed for the network dedicated slot.

(*) The network dedicated slot and I/O slot can be used together.

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)

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

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		4NSW6033	IXA-4NSW6033

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

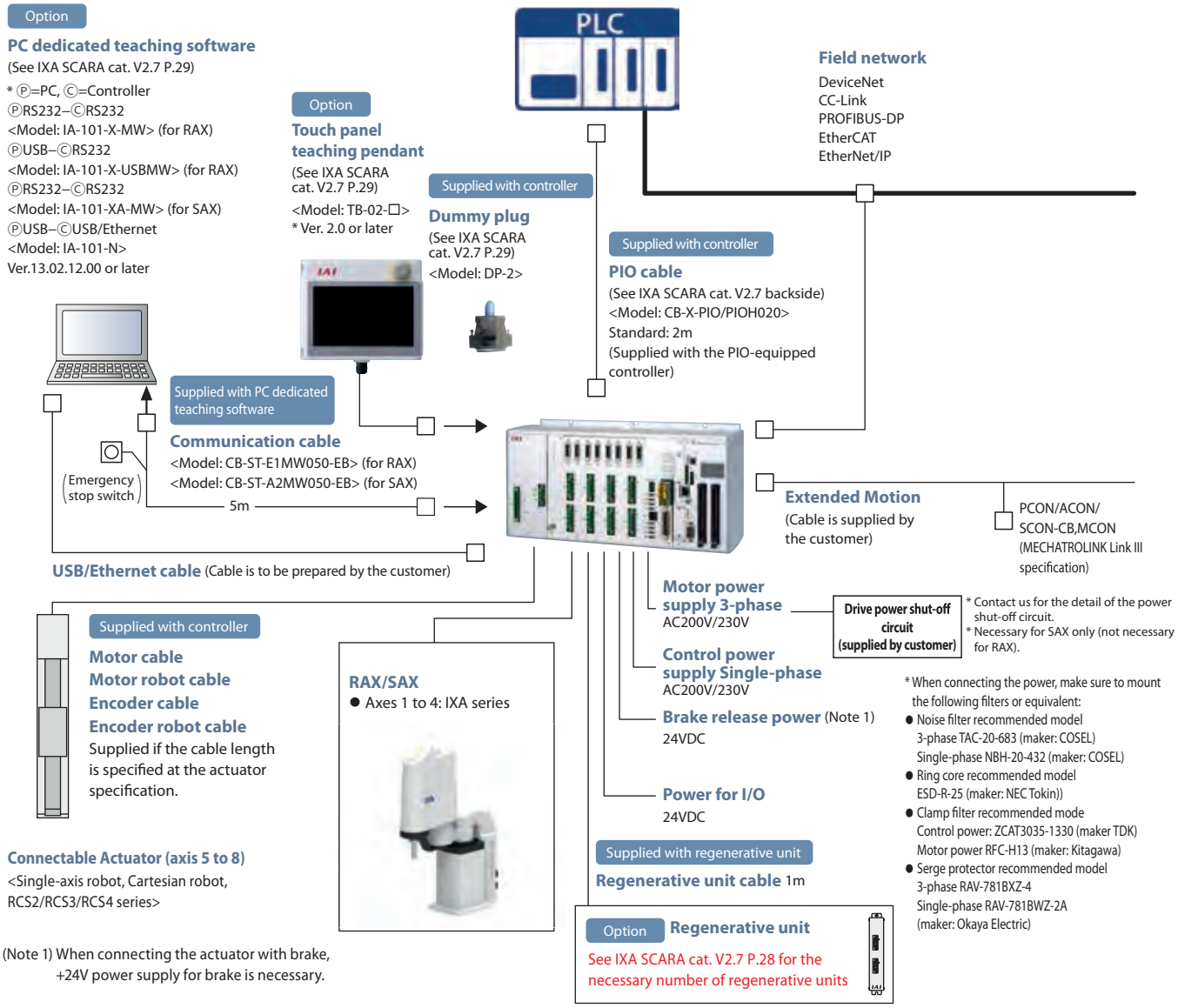
SCARA robot model		Total wattage that can be connected to XSEL-RAX/SAX and the number of connectable axes .	
		Total wattage	Number of connectable axes
Standard type	IXA-3NNN1805	Total 1500W or smaller (Max. 750W per axis)	Maximum 4 axes (from 5th to 8th axes)
	IXA-4NNN1805		
	IXA-3NNN3015	Total 700W or smaller (Max. 700W per axis)	
	IXA-3NNN45□□		
	IXA-3NNN60□□		
	IXA-4NNN3015	Total 600W or smaller (Max. 600W per axis)	
	IXA-4NNN45□□		
	IXA-4NNN60□□		Maximum 3 axes (from 6th to 8th axes)
High-speed type	IXA-3NSN3015	Not connectable	
	IXA-3NSN45□□		
	IXA-3NSN60□□		
	IXA-4NSN3015		
	IXA-4NSN45□□		
	IXA-4NSN60□□		
Dust- and splash-proof specification	IXA-4NSW3015		
	IXA-4NSW45□□		
	IXA-4NSN60□□		

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]

XSEL - [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]

(Additional axis content 5th~8th axes)

Type	
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.

SCARA Robot Main Body Type			
NNN1205~8040H	Standard type	TNN3015H~3515H	Wall-mounting type
		UNN3015H~3515H	Wall-mounting inverse type
NNN1205B~1805B	Standard ultra-compact type with brake	HNN5020H~8040H	Ceiling-mounting type
NSN5016H~6016H	High-speed type	INN5020H~8040H	Inverse type
NNC1205~8040H	Clean room 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).

Motor Type			
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

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

Options	
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

Network Dedicated Slot(s) (Slot 1)	
E	Not used
DV	DeviceNet
CC	CC-Link
PR	PROFIBUS-DP

Network Dedicated Slot(s) (Slot 2)	
E	Not used
EP	EtherNet/IP
EC	EtherCAT

I/O Slot(s) (Slot 1) (Slot 2)	
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.

I/O Cable Length	
0	No cable
2	2m (Standard)
3	3m
5	5m

Power Supply Voltage	
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 - [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]

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

SCARA Robot Main Body Type 1 / Type 2	
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

Network Dedicated Slot(s) (Slot 1)	
E	Not used
DV	DeviceNet
CC	CC-Link
PR	PROFIBUS-DP

Network Dedicated Slot(s) (Slot 2)	
E	Not used
EP	EtherNet/IP
EC	EtherCAT

I/O Slot(s) (Slot 1) (Slot 2)	
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.

I/O Cable Length	
0	No cable
2	2m (Standard)
3	3m
5	5m

Power Supply Voltage	
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) Motor Type	Encoder Type	Options	(Additional axis content 6th axes) Motor Type	Encoder Type	Options	Network Dedicated Slots	(Slot 1) Standard I/O	(Slot 2) (Slot 3) Expansion I/O	(Slot 4)	I/O cable length	Power Supply Voltage

Type

PX4	4-axis type
PX5	5-axis type
PX6	6-axis type
QX4	4-axis global specification type
QX5	5-axis global specification type
QX6	6-axis global specification type

IX Main Body 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).

(Additional axis content 5th axes) Motor Type / (Additional axis content 6th axes) 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 type

(Example) 12:12W Servo motor compliant

Encoder Type

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

Options

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

Network Dedicated Slots

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

* Ethernet/IP spcification can support Ethernet.

(Slot 1) Standard I/O / (Slot 2) (Slot 3) Expansion I/O

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

(Slot 4) I/O cable length

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

Power Supply Voltage

3	Three phase AC230V

* 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 S for slots 2 to 4.

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

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 NN*3515H / TNN3515H / UNN3515H	1500W 4 axes (max. 750W/axis)
Medium high-power type	NN*50☐☐H / HNN5020H / INN5020H NN*60☐☐H / HNN6020H / INN6020H	600W 4 axes (max. 600W/axis)
Large high-power type	NN*70☐☐H / HNN70☐☐H / INN70☐☐H 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

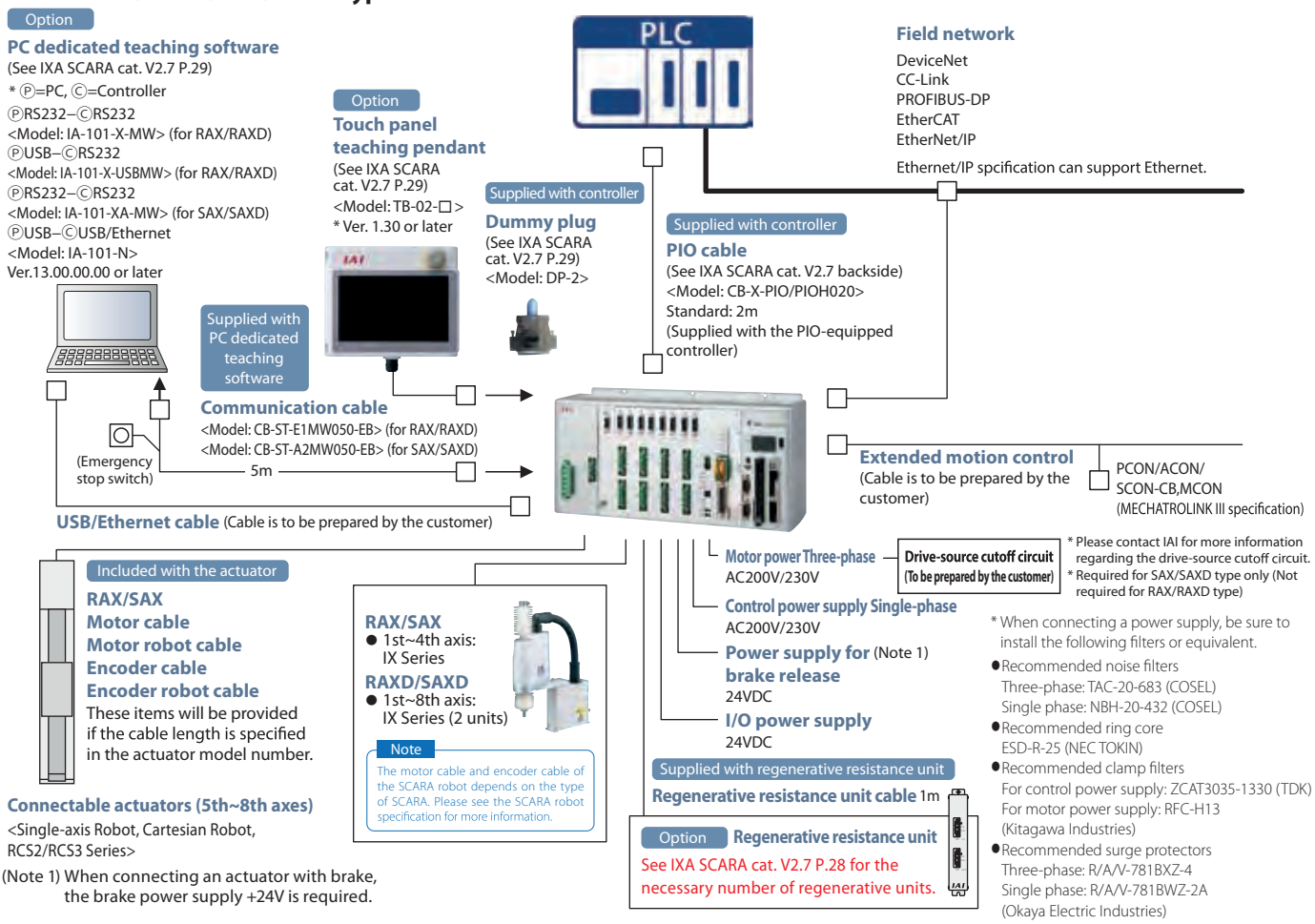
Controllers for SCARA can connect max. two SCARA robots, but there is a limitation for the combination. Please select a connectable combination.

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

● For SCARA robot IX

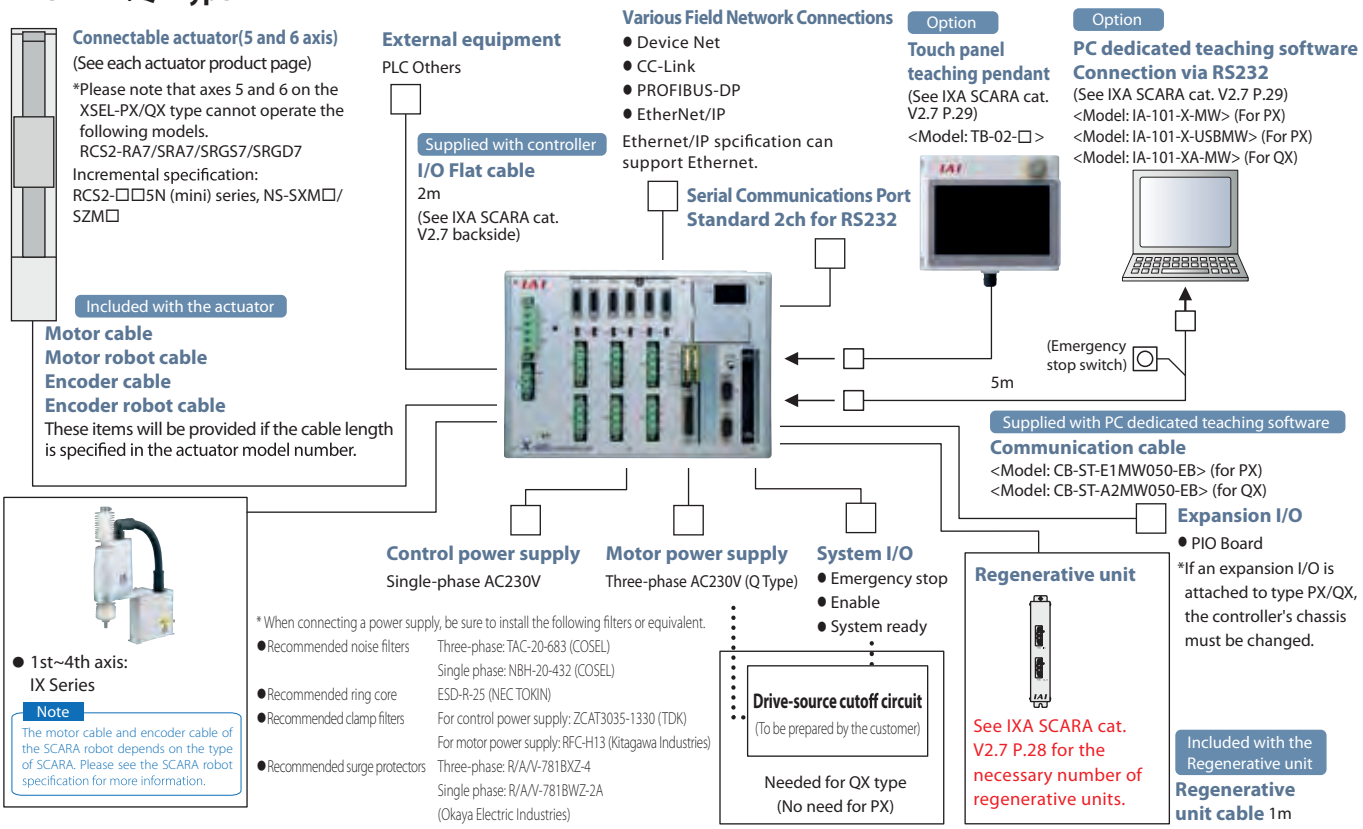
System Configuration

■ XSEL-RAX/RAXD/SAX/SAXD Type



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

■ 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 specication, 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.

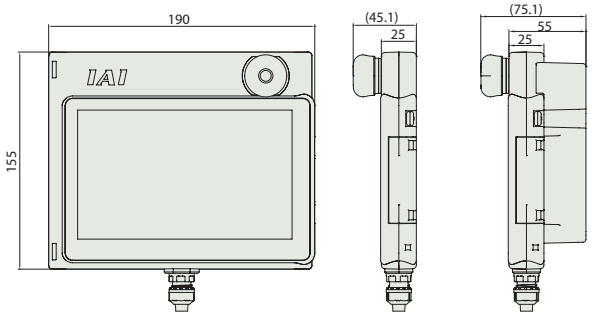
TB-02

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.iai-automation.com



Standard Specification

Deadman Switch Specification

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 + 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

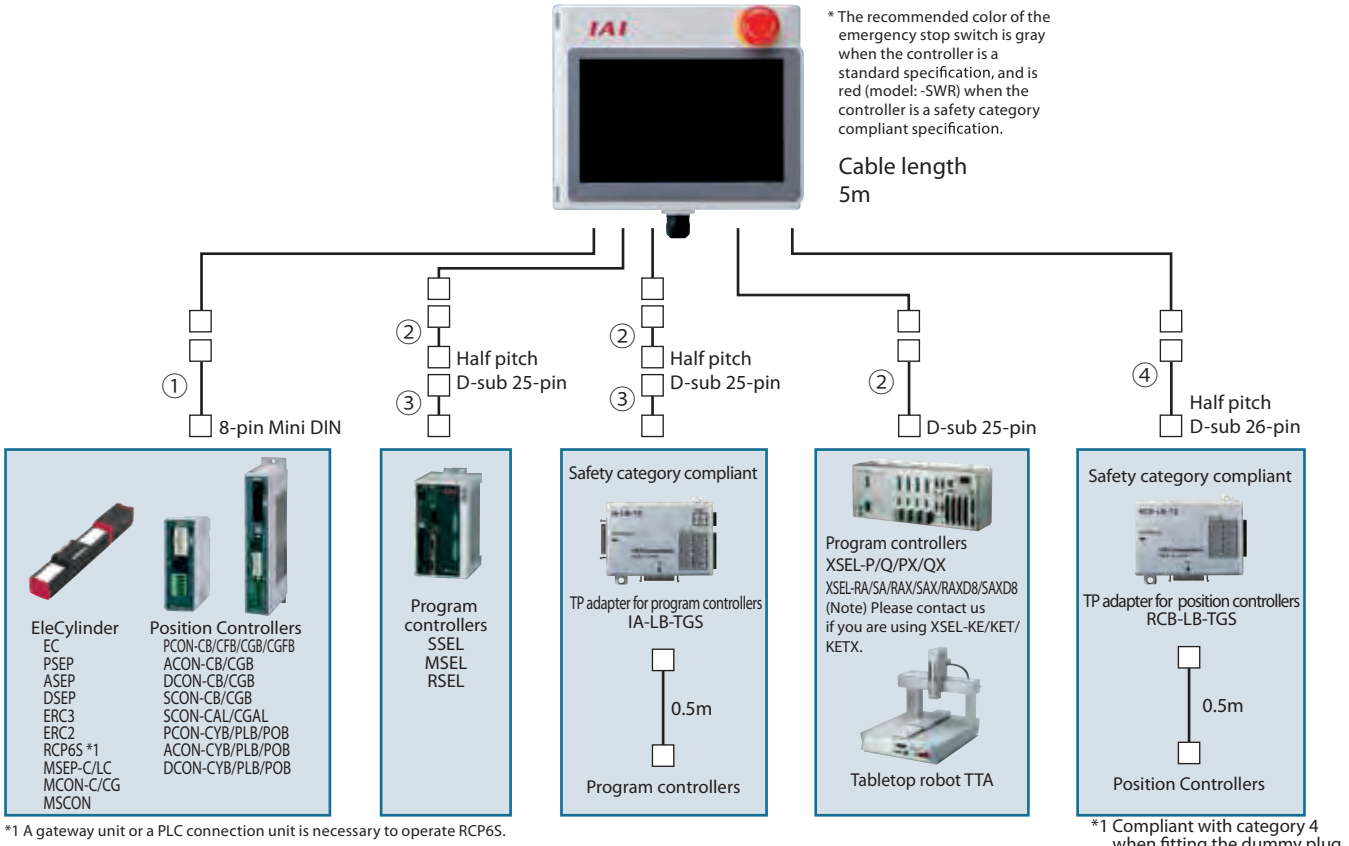
* Use with CB-TB1-X002 when connecting to ASEL, PSEL, SSEL, and MSEL.

●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.

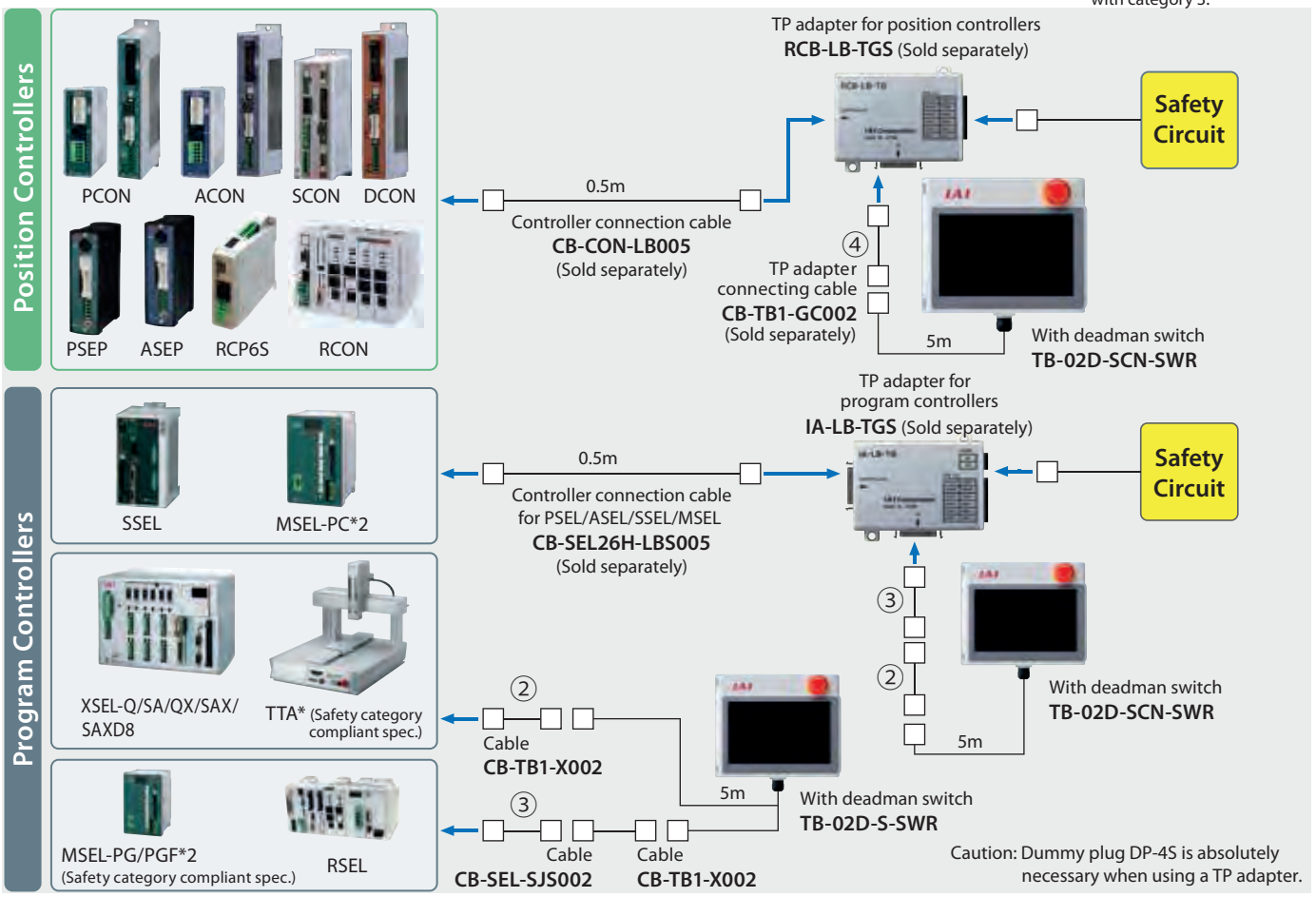
Applicable Controllers/Safety category compliant



*1 A gateway unit or a PLC connection unit is necessary to operate RCP6S.

*1 Compliant with category 4 when fitting the dummy plug.
*2 MSEL and TTA are compliant with category 3.

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



TB-03

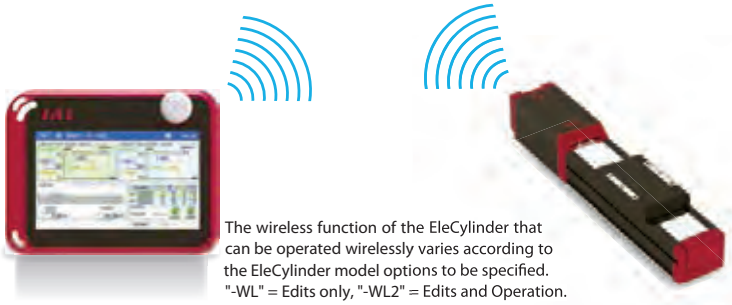
Universal for position controller / program controller
Touch panel teaching pendant TB-03

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.

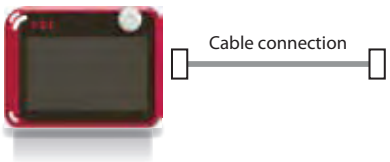
Status Monitor
Axis status check can be used for confirmation of maintenance timing.

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.



Controller

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/ position controller	For program controller
EleCylinder 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 Position Controller Program Controller	TB-03-SC	E	① CB-TB3-C050	② CB-TB3-S050 + ③ CB-SEL-SJS002 (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 Position Controller	① CB-TB3-C050
Program Controller	② CB-TB3-S050
	③ CB-SEL-SJS002 (conversion cable) *3

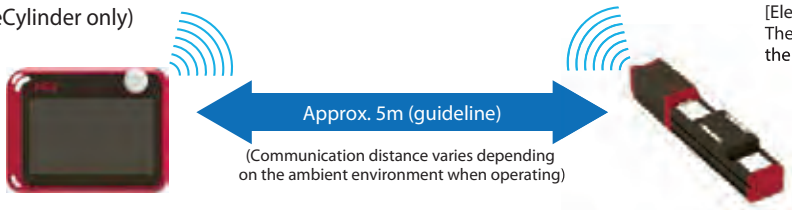
*3 Use with the ② cable when connecting to ASEL, PSEL, SSEL, or MSEL

● **AC adapter single product model number**

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

Connection

● Wireless connection (EleCylinder only)

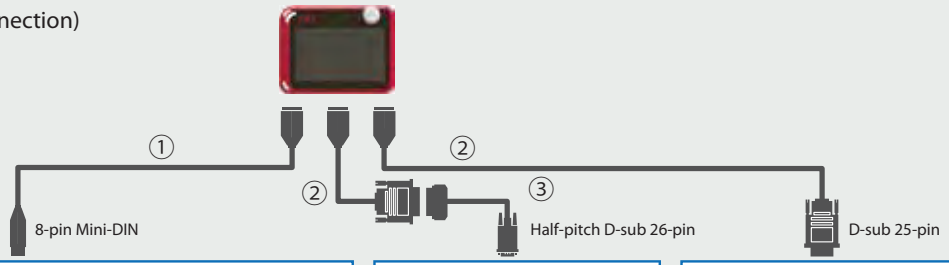


[EleCylinder model and wireless function]
The wireless function varies depending on the model option to be specified.

"-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)



[EleCylinder]
EC

[Position Controller]
PCON-CB/CFB/CGB/CGFB
ACON-CB/CGB
DCON-CB/CGB
SCON-CB/CGB
MCON-C/CG
RCP6S *1
PCON-CYB/PLB/POB
ACON-CYB/PLB/POB
DCON-CYB/PLB/POB
SCON-CAL/CGAL
MSCON
RCM-P6PC/P6AC/P6DC *1

[Program Controller]
MSEL-PC/PG/PCF/PGF/PCX/PGX
SSEL-CS
RSEL

[Program Controller]
XSEL-RA/SA/RAX/SAX/RAXD/SAXD
XSEL-P/Q/PX/QX
TTA

*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

ISO 9001
BUREAU VERITAS
Certification

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