ROBO CYLINDER

Controller

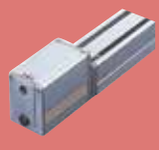
PMEC/AMEC
PSEP/ASEP/DSEP
MSEP
ERC3
ERC2
PCON-CA/CFA
PCON
ACON
PCON/ACON-ABU
SCON-CA
MSCON
PSEL
ASEL
SSEL
XSEL
PS-24


PMEC/AMEC


PSEP/ASEP/DSEP


MSEP


ERC3


ERC2


PCON-CA


ACON


PCON-ABU
ACON-ABU


SCON-CA


MSCON


PSEL


ASEL


SSEL


XSEL


PS241/PS242

PMEC	3 Position Controller for RCP3/RCP2	PMEC-C	537
AMEC	3 Position Controller for RCA2/RCA/RCL	AMEC-C	
PSEP	3 Position Controller for RCP3/RCP2	PSEP-C / CW	
ASEP	3 Position Controller for RCA2/RCA/RCL	ASEP-C / CW	547
DSEP	3 Position Controller for RCD	DSEP-C / CW	
MSEP	Position Controller for RCP4/RCP3/RCP2/RCA2/ RCA/RCL, 8-axis type	MSEP-C	563
ERC3	ERC3 Controller	ERC3	577
ERC2	ERC2 Controller	ERC2	597
PCON-CA/CFA	Position Controller for RCP4 (with high output driver) /RCP3/RCP2	PCON-CA / CFA	607
PCON	Position Controller for RCP3/RCP2	PCON-CY / PL / PO / SE	623
ACON	Position Controller for RCA2/RCA/RCL	ACON-C / CG / CY / PL / PO / SE	631
PCON-ABU ACON-ABU	Simple Absolute Unit for PCON/ACON Controller	PCON / ACON-ABU	641
SCON-CA	Position Controller for RCS3/RCS2	SCON-CA	643
MSCON	Position Controller for RCS3/RCS2, 6-axis type	MSCON-C	655
PSEL	Program Controller for RCP3/RCP2	PSEL-CS	665
ASEL	Program Controller for RCA2/RCA/RCL	ASEL-CS	675
SSEL	Program Controller for RCS3/RCS2	SSEL-CS	685
XSEL	Multi-axis Program Controller for RCS3/RCS2	X-SEL-J / K / P / Q / R / S	695
PS-24	24-VDC Power Supply for ROBO Cylinder	PS-241 / 242	717

Controller

Controller/Actuator Correspondence Table

Classification			Positioner Type								
Controller model			PMEC-C	AMEC-C	PSEP-C /W	ASEP-C /W	DSEP-C /W	MSEP-C	PCON-CA	PCON-CFA	PCON-CY/ PL/PO/SE
Appearance											
Input voltage			AC100V AC200V	AC100V	DC24V						
Number of controllable axes			1 axis only					1 to 8 axes	1 axis only		
Motor type (*1)			20P, 20SP, 28P, 28SP, 35P, 42P, 56P	2, 5, 5S, 10, 20, 20S, 30	20P, 20SP, 28P, 28SP, 35P, 42P, 56P	2, 5, 5S, 10, 20, 20S, 30	2.5	20P, 20SP, 28P, 28SP, 35P, 42P, 56P		60P, 86P	20P, 20SP, 28P, 28SP, 35P, 42P, 56P
Supported actuators	Slider type	RCP4						●	●		
		RCP2/RCP3	●		●			●	●		●
		RCP2-HS8□								●	
		RCA/RCA2		●		●		●			
		RCA2-SA2A□		●		●		●			
		RCS2/RCS3									
	Rod type	RCP4						●	●		
		RCP3	●		●			●	●		●
		RCP4-RA8□/RA10□								●	
		RCP2	●		●			●	●		●
		RCA/RCA2		●		●		●			
		RCA2-RA2A□		●		●		●			
		RCS2									
		RCS2-□□5N									
		RCS2-RA13R									
		RCS2-RA13R with Load cell									
		RCD					●				
	Table type	RCP3	●		●			●	●		●
		RCA/RCA2		●		●		●			
		RCA2-□□3NA/□□4NA		●		●		●			
		RCS2									
		RCS2-□□□5N									
	Gripper type	RCP2	●		●			●	●		●
		RCS2									
	Rotary type	RCP2	● (*3)		● (*3)			●	●		●
		RCS2									
	Linear Servo type	RCL		●		●		●			
	Cleanroom type	RCP4CR						●	●		
		RCP2CR	●		●			●	●		●
		RCP2CR-HS8□								●	
		RCACR		●		●		●			
		RCS2CR/RCS3CR									
	Dustproof/ splash-proof type	RCP4W							●		
		RCP2W	●		●			●	●		●
		RCAW		●		●		●			
		RCS2W									
Position detection method			Incremental		Incremental Simple Absolute		Incremental	Incremental Simple Absolute		Incremental	Incremental (Simple absolute unit can be connected)
Supported absolute batteries			—		SEP-ABUM SEP-ABUM-W		—	MSEP-ABB	AB-7 SEP-ABU SEP-ABUS	—	PCON-ABU
Number of programs Number of program steps Number of multi-tasking programs			No program is required.								
Number of positions			Max. 3 points					Max. 3 points	Max. 512 points		
Data input tool	Teaching pendant		SEP-PT/CON-PTA-C/ CON-PDA-C/CON-PGAS-C-S					CON-PTA-C CON-PDA-C CON-PGA-C-S	CON-PTA-C CON-T/TGS CON-PDA-C CON-PGAS-C-S		CON-PTA-C CON-T/TGS CON-PDA-C CON-PGA-C-S
	PC software		MEC PC software (Free)		RCM-101-MW RCM-101-USB						
Standard I/Os (PIOs)			4 input points/4 output points					4 input points 4 output points	16 input points 16 output points		Varies depending on the controller type
Expansion I/Os (PIOs)			(Not expandable)								
Supported field networks	DeviceNet		—	—	—	—	—	●	●	●	—
	CC-Link		—	—	—	—	—	●	●	●	—
	PROFIBUS-DP		—	—	—	—	—	●	●	●	—
	MECHATROLINK-I/II		—	—	—	—	—	—	●	●	—
	CompoNet		—	—	—	—	—	●	●	●	—
	Ethernet		—	—	—	—	—	—	—	—	—
	EtherNet/IP		—	—	—	—	—	●	●	●	—
	EtherCAT		—	—	—	—	—	(*5)	●	●	—
Regenerative resistor unit			—	—	—	—	—	—	—	—	—

(*1) The "Motor type" field indicates the motor size for a pulse motor (□P) and motor wattage for a servo motor.
(*2) RCS2-RA7/SRA7/□□5N actuators cannot be connected to XSEL-P/Q controllers of 5/6-axis type, XSEL-R/S controllers or MSCON controllers.

	Positioner Type			Program Type								
	ACON-C/ CG/CY/PL/ PO/SE	SCON-CA	MSCON-C	PSEL-CS	ASEL-CS	SSEL-CS	XSEL J type	XSEL K type	XSEL P type	XSEL Q type	XSEL R type	XSEL S type
												
	DC24V	AC100V AC200V		DC24V		AC100V AC200V	Single-phase AC100V Single-phase AC200V		Single-phase AC200V 3-phase AC200V		3-phase AC200V	
	1 axis only		1 to 6 axes	1 and 2 axes			1 and 2 axes	3 and 4 axes	1 to 4 axes	1 to 6 axes		1 to 8 axes
	2, 5, 5S, 10, 20, 20S, 30	12, 20, 30, 60, 100, 150, 200, 300, 400, 600, 750	12, 20, 30, 60, 100, 150, 200	20P, 20SP, 28P, 28SP, 35P, 42P, 56P	2, 5, 5S, 10, 20, 20S, 30	12, 20, 30, 60, 100, 150, 200, 300 400, 600, 750	20, 30, 60, 100, 150, 200, 300, 400, 600, 750		12, 20, 30, 60, 100, 150, 200, 300, 400, 600, 750			
				●								
	●				●							
		●	●			●	●	●	●	●	●	●
				●								
	●				●							
		●	● (*2)				●	●	● (*2)	● (*2)	● (*2)	● (*2)
		●				●			● (*2)	● (*2)		
		●				●			●	●	●	●
		●										
				●								
	●				●							
	●				●							
		●	●			●	●	●	●	●	●	●
		●				●			● (*2)	● (*2)		
				●								
		●	●			●	● (*4)	● (*4)	●	●	●	●
				●								
		●	●			●	●	●	●	●	●	●
	●				●							
				●								
	●				●							
		●	●			●	●	●	●	●	●	●
				●								
	●				●							
		●	●			●	●	●	●	●	●	●
	Incremental (Simple absolute unit can be connected)	Incremental Absolute		Incremental Simple absolute	Incremental Absolute		Incremental Absolute					
	ACON-ABU	AB-5		PCON-ABU	AB-5		IA-XAB-BT		AB-5			
	No program is required.			64		128	64		128		128	
				2000		9999	6000		9999		9999	
				8			16		16		16	
	Max. 512 points		Max. 256 points	1,500 points		20,000 points	3,000 points		20,000 points		16,000 to 53,332 points	
	CON-PTA-C CON-T/TGS CON-PDA-C CON-PGAS-C-S		CON-PTA-C CON-PDA-C CON-PGAS-C-S	SEL-T-JS/SEL-TD-JS			IA-T-X(XD)		IA-T-X/XD SEL-T/TD	SEL-TD	SEL-T/TD	SEL-TD
	RCM-101-MW RCM-101-USB			IA-101-X-MW-JS IA-101-X-USBS			IA-101-X-MW IA-101-X-USBMW		IA-101-X-MW IA-101-X-USBMW	IA-101-XA-MW	IA-101-X-MW IA-101-X-USBMW	IA-101-XA-MW
	Varies depending on the controller type	16 input points 16 output points	Exclusive network type	24 input points/8 output points			32 input points/ 16 output points		32 input points/16 output points, 16 input points/32 output points or 48 input points/48 output points (selectable)			
	(Not expandable)						Not expandable	Total 48 input/ output points 1 unit expandable	Total 96 input/output points x 3 units expandable (when multi-point I/O board is used)		Total 96 input/output points x 4 units expandable (when multi-point I/O board is used)	
	●	●	●	●	●	●	●		●	●	●	●
	●	●	●	●	●	●	●		●	●	●	●
	●	●	●	●	●	●	●		●	●	●	●
	●	●	—	—	—	—	—		—	—	—	—
	●	●	●	—	—	—	—		—	—	—	—
	—	—	—	—	—	—	●		●	●	—	—
	●	●	●	—	—	—	—		—	●	●	●
	●	●	(*5)	—	—	—	—		—	—	●	●
	—	REU-2/RESUD-2	REU/RESUD-2	—	—	REU-2/RESUD-2	REU-1/RESUD-1					

(*3) PMEC/PSEP controllers do not support infinite rotational movement of rotary actuators.
(*4) RCS2-RTC8L/RTC8HL/RTC10L/RTC12L actuators are not supported.
(*5) To be released soon.

Controller Overview

The ROBO Cylinder model can be selected from an ultra-simple type, which is operable with the same controls as a solenoid valve, to a high functionality type compatible with networks;
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.

ROBO Cylinder Controllers

Positioner Type

- Operable simply with an ON/OFF signal; easy-to-operate type.
- Operable with the same signal as a solenoid valve.
- Pulse train input type is available as well which is operable freely based on the customer's control.

Program Type

- Standalone operation available without master devices such as a PLC.
- Interpolated motion for 2-6 axes is possible; available for application and transferring movements.

Network Type

- Connection to a main field network such as DeviceNet, CC-link, or EtherNet/IP is available; applicable for large scale equipment.
- Position can be specified directly using a numeric value; there will be no limit of positioning points.
- Only one dedicated cable is needed; The number of operational steps will be significantly reduced.

3-Position Controller
AC100V/AC200V Type
PMEC/AMEC

3-Position Controller
DC24V Type
PSEP/ASEP/DSEP

Position Controller
DC24V/AC100V/AC200V Type
PCON/ACON/SCON

See page **529**.

Program Controller
DC24V Type
PSEL/ASEL

Program Controller
AC100V/AC200V Type
SSEL/XSEL

See page **531**.

Network
Controller
DC24V Type
MSEP

Network
Dedicated
Controller
DC24V Type
MSCON

Network Compatible Controller
DC24V/AC100V/AC200V Type
PCON/ACON/SCON/PSEL/ASEL/SSEL/XSEL

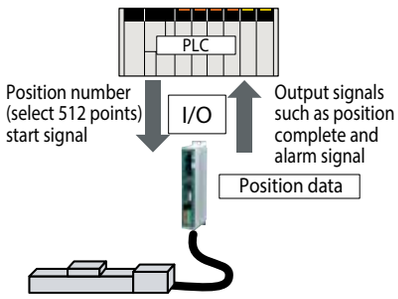
See page **533**.

Positioner Type

The positioner type controller stores positions to which the actuator is moved by specifying a target position number.
If you are considering motorizing your air-cylinder system, the positioner type is an ideal choice because this controller can directly use the signals you have been using to operate your air cylinder. This means that you can motorize your system with minimum changes to significantly improve the productivity of your system.

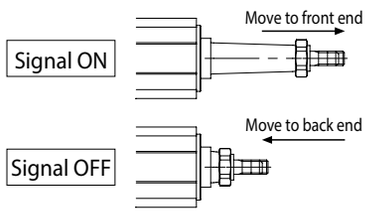
1 No programming needed

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 to the equipment.



2 Operation using the same signal as solenoid valve possible (PMEC/AMEC, PSEP/ASEP/DSEP controllers)

Same as single solenoid-type valve, traveling between front/back ends is possible only by the single ON/OFF.
Furthermore, if the double solenoid-type valve signal (two signals) are used, positioning at 3 points including an intermediate position is possible.



3 Reasonable price

A reasonable price range is offered for the pulse motor type controllers which maintain the effective functionality of a servo motor.
The PMEC controller, including the power supply, PC software and communication cable, is sold as a set at a reasonable price.

4 Wide Variations and Functions

Positioner controllers are available in many different types, from the 3-point positioning type that accepts the same operation signals used for air cylinders, to the enhanced positioning type accommodating up to 512 points and the space-saving type that can connect up to 8 axes per controller. Choose the type that best meets your specific application.
Each controller also comes with various functions including smart tuning and maintenance, all designed to fully demonstrate the performance of your actuator.

PMEC/AMEC Controller

- Every element needed for operation such as the controller, power supply, PC software and communication cable, etc. are supplied in the set so that direct operation right after the purchase is possible.
- Intuitive operation is possible without the need for instruction. Acceleration/deceleration and speed can be programmed from the front panel of the controller.
- Operable with the same signals as a solenoid valve.
- Power supply of the controller is single-phase AC100V/AC200V (Only AC100V for AMEC)

PMEC

AMEC

See page **537**.

PSEP/ASEP Controller

- Operable with the same signals as a solenoid valve.
- Splash-proof type having good resistance to water splashes.
- Simple absolute type setting which eliminates the need for home return upon power-on.
- Controller power supply: DC24V

PSEP

ASEP

DSEP

See page **547**.

PCON/ACON/SCON/MSEP Controller

- Positioning is possible for up to 512 points.
- Compatible for pulse train input control. (MSEP is excluded)
- When combined with the RCP4, the PCON-CA achieves significantly higher performance of up to 1.5 times the maximum speed and twice the payload of an existing model of comparable size.
- With the offboard tuning function you can increase the maximum acceleration/deceleration of the SCON-CA to 2G.
- Despite its compact body, the MSEP is able to connect and operate up to 8 actuator axes.
- You can choose the absolute specification(*) that makes home return no longer necessary, for all controllers in the PCON, ACON, SCON and MSEP series.

(*) PCON, ACON and MSEP series are simple absolute specifications.

PCON

See page **607**.

ACON

See page **631**.

MSEP

See page **563**.

SCON

See page **643**.

Program Type

**The program type controller executes programs that are input to it.
Programs input to the controller are used to perform various tasks such as operating the actuator and communicating with external equipment. Ideal for small systems where a PLC is not required which leads to cost savings.**

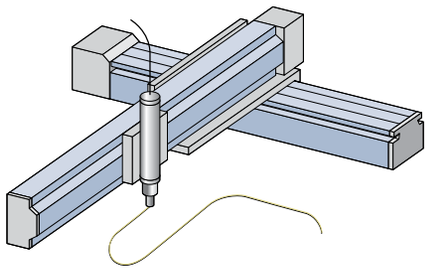
1 High-level control available using simple language.

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	

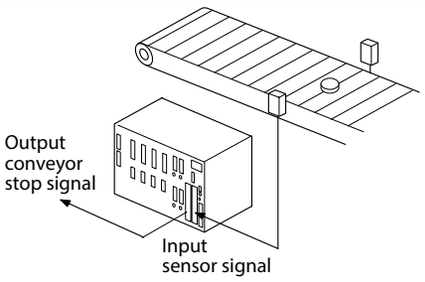
2 Interpolation possible up to 2/8 axes

Simultaneous movement of the actuators is possible up to 2 axes for PSEL/ASEL/SSEL controllers and 8 axes for the XSEL controller.
Depending on the program, interpolation is available to easily perform arc or path movements needed for dispensing jobs.



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 home return needed for absolute type and simple absolute type

A direct operation without home return is possible upon power-on if an absolute type actuator and controller are applied for ASEL/SSEL/XSEL Controllers.
The PSEL controller is also operable without home return just like an absolute type actuator by installing the simple absolute unit between the actuator and the controller.

PSEL/ASEL/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, 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.
- Can store up to 1500 points for PSEL/ASEL and 20,000 points for SSEL.
- Absolute type available for ASEL/SSEL controllers. PSEL controller is available for the same operation if a simple absolute unit is connected.
- Controller power supply is DC24V for PSEL/ASEL and single-phase AC100V/200V for SSEL.

PSEL

See page **665**.

ASEL

See page **675**.

SSEL

See page **685**.

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.
- A maximum of 53,332 points can be stored for positioning.
- Expansion I/O is available up to a maximum of 576 points.
- Up to 16 PCON/ACON/SCON/MSEP controller axes can be connected via serial communication or field network to operate ROBO Cylinders using programs stored in the XSEL controller.

XSEL

See page **695**.

Network Type

**The network type controller is available for field networks or serial communication.
Compatible with the majority of main field networks widely used over the world.
There is a large variety available for use with various kinds of FA equipment such as a PLC or touch panel, etc.**

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
CC-Link
EtherNet/IP
EtherCAT
MECHATROLINK

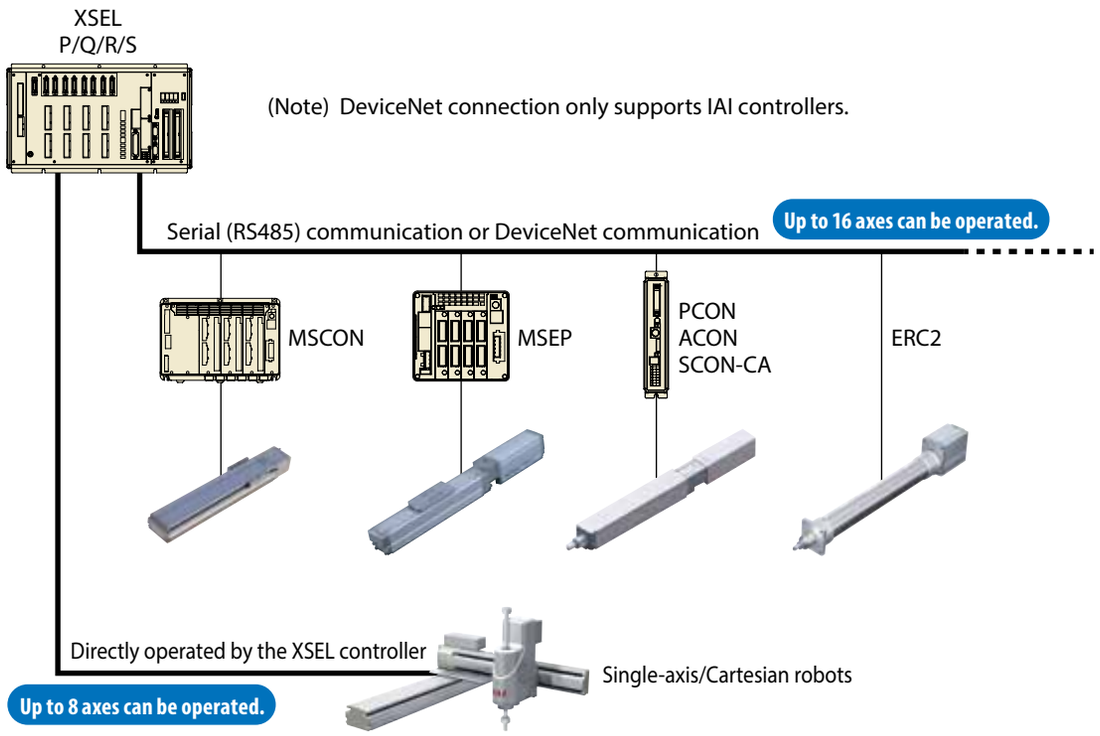
Compatible Networks and Functions

Controller series		Positioner Type					Program Type			
		PCON-CA	ACON	SCON-CA	MSEP	MSCON	PSEL	ASEL	SSEL	XSEL
Appearance										
Field network types	DeviceNet	●	●	●	●	●	●	●	●	●
	CC-Link	●	●	●	●	●	●	●	●	●
	PROFIBUS-DP	●	●	●	●	●	●	●	●	●
	MECHATROLINK -I/II	●	●	●	—	—	—	—	—	—
	CompoNet	●	●	●	●	●	—	—	—	—
	Ethernet	—	—	—	—	—	—	—	—	●
	EtherNet/IP	●	●	●	●	●	—	—	—	●
	EtherCAT	●	●	●	(*2)	(*2)	—	—	—	●
Applicable ROBO Cylinder		RCP4 RCP3 RCP2	RCA2 RCA RCL	RCS3 RCS2	RCP4 RCP3 RCP2 RCA2 RCA RCL	RCS3 RCS2	RCP3 RCP2	RCA2 RCA RCL	RCS3 RCS2	RCS3 RCS2
Maximum number of positioning points (*1)		768 points			256 points		1,500 points		20,000 points	53,332 points
Operating method	Movement by specifying positions	○	○	○	○	○	○	○	○	○
	Movement by specifying direct values	○	○	○	○	○	X	X	X	X

(*1) When it is operated by movement by specifying direct values, the number of positioning points is unlimited. (*2) To be released soon.

2 Operating Up to 16 ROBO Cylinder Axes from One XSEL Controller

The RC gateway function of the XSEL controller lets you connect multiple ROBO Cylinder controllers via serial communication or DeviceNet communication to operate up to 16 axes using programs stored in the XSEL controller. Combined with up to 8 axes that can be operated directly by the XSEL controller, you can effortlessly operate a maximum of 24 axes from one controller.
Another advantage is that wiring is much easier compared to when ROBO Cylinder controllers are PIO-controlled.



Specification

	Serial Communication Type	DeviceNet Communication Type
Supported controllers	XSEL-P/Q/R/S type	XSEL-P/Q/R/S type (*1)
Connectable controllers	ERC2-SE PCON-SE/ACON-SE SCON-CA ROBONET	PCON-DV/ACON-DV SCON-DV/MSEP-DV MSCON-DV * All controllers must be of the DeviceNet specification.
Maximum number of connectable ROBO Cylinder axes	16	16
Baud rate	230.4kbps	500kbps
Communication cable length	Total cable length of no more than 100m	Total cable length of no more than 100m
Required connection equipment	RCB-CV-GW CB-RCB-SIO050 CB-RCB-CTL002	DeviceNet gateway master board (*2)

(*1) XSEL-P/Q controllers of DeviceNet communication type must be custom-ordered. (XSEL-R/S controllers of this type are available as standard models.)
(*2) Your XSEL controller will come with this board if an applicable code is specified in the model name of the controller.

Network Type

3 Vision System

With the XSEL controller, you can directly connect a vision system of any leading brand to take advantage of the convenience of vision system functions, such as reading coordinate values into the controller and using these coordinates to move actuators.

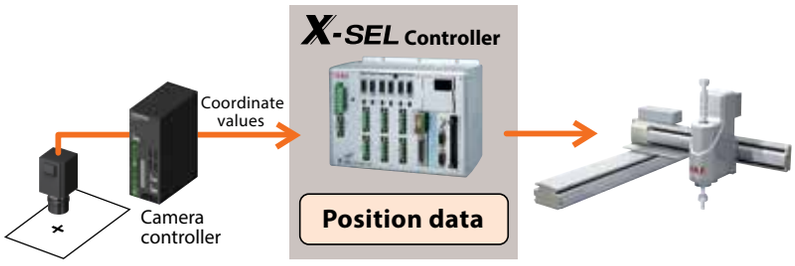
(1) Any leading vision system can be connected directly

High-functional vision systems from leading brands, such as Omron, Keyence and Cognex, can be used with ease.

Examples of vision system models					
Brand	Model				Interface
Cognex	In-Sight 5000 series				Ethernet
Omron	F210-C10	FZ3	—		RS232C
Keyence	CV2000	CV3000	CV5000	XG-7000	Ethernet RS232C

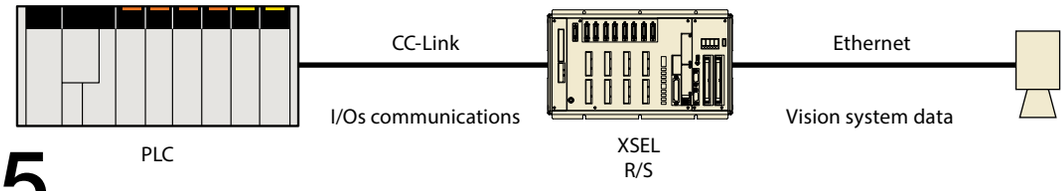
(2) No need for complex communication programs

Coordinates read by the camera are sent to the robot controller via a dedicated command and stored as part of position data in the controller. There is no need for complex communication programs, etc.



(3) Able to communicate with other networks while communicating with the vision system via Ethernet

XSEL-R/S controllers can communicate with DeviceNet, CC-Link or PROFIBUS-DP while communicating with the vision system via EtherNet/IP or EtherCAT.
This means that, for example, you can use Ethernet for communication between the XSEL controller and vision system, while allowing the XSEL controller to send and receive I/Os to/from peripherals via a CC-Link network.
* XSEL-P/Q controllers can be set up to support one network selected from the types mentioned above.



MSEP Controller

- Up to 8 axes of pulse/servo motor actuators can be connected to this compact controller of just 123mm (W) x 115mm (H) in size. The compact body, which is 60% slimmer than a comparable model, saves space in the control panel.
- You can specify the target position numerically.
- Significantly shorter communication time within the controller. (Supported actuators) RCP4/RCP3/RCP2/RCA2/RCA/RCL series

MSEP

See page 563.

MSCON Controller

- Dedicated low-cost network controller of space-saving design that connects up to 6 axes.
- You can specify the target position numerically.
- Significantly shorter communication time within the controller. (Supported actuators) RCS3/RCS2 series.

MSCON

See page 655.

Controller compatible with field network *Network type set for each controller

PCON

See page 607.

ACON

See page 631.

SCON

See page 643.

PSEL

See page 665.

ASEL

See page 675.

SSEL

See page 658.

- Able to connect to major networks directly.
- The position controllers let you operate your actuator by directly sending the values of target position, speed, acceleration, etc., via network.

XSEL

See page 695.

PMEC 3-position, AC100/200V controller for RCP2/RCP3 Series

AMEC 3-position, AC100V controller for RCA/RCA2/RCL Series

ROBO Cylinder 3-position controller MEC (Mechanical Engineer Control)

Feature

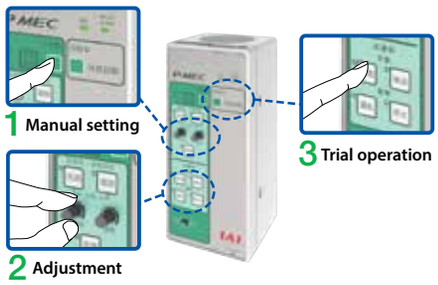
1 Low Cost

The MEC package, which combines a controller, power supply, acceleration/speed change function and PC connection cable, among others, is at an affordable price. The MEC PC software can be downloaded free of charge from IAI's website.

2 Easy Operation

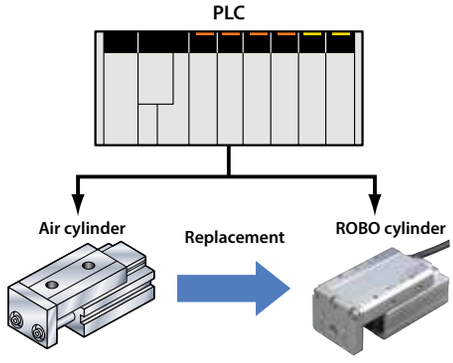
Even a beginner can set up the controller without reading the operation manual.
The acceleration and speed can be adjusted using the knobs on the controller.

* The setting range for acceleration/speed varies depending on the actuator. Please refer to the instruction manual for further detail.



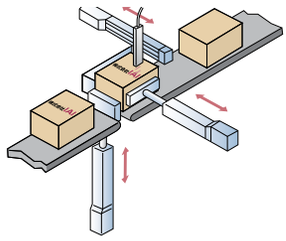
3 Easy Replacement from your Air-cylinder System

Operation signals are exactly the same as those used to operate air cylinders. This means that you can use the program of your current PLC directly.



4 Push-motion Operation/Intermediate Stopping

Push-motion operation can be performed in the same manner as you would with any air-cylinder system.
Also, you can cause the actuator to stop at any desired intermediate point between the home position and stroke end by changing the setting of the intermediate point using the MEC PC software.



Model List

Series	PMEC		AMEC
External View			
Applicable actuators	RCP2 / RCP3		RCA / RCA2 / RCL
Power supply voltage	100V	100V-240V	100V
Accessories	AC power supply cable (2m) USB cable (3m) I/O cable (2m) I/O connector EMG connector Standard mounting bracket		

Model

PMEC — C — ☐ I — ☐ — 2 — ☐ — ENG

Series: PMEC

Type: C Standard

Motor type: 20P For 20☐ pulse motor; 20SP For 20☐ pulse motor (dedicated for RCP3-RA2); 28P For 28☐ pulse motor; 28SP For 28☐ pulse motor (dedicated for RA3C); 35P For 35☐ pulse motor; 42P For 42☐ pulse motor; 56P For 56☐ pulse motor

Encoder type: I Incremental

I/O type: NP NPN type; PN PNP type

I/O cable length: 2 2m

Power supply voltage: 1 Single phase AC100V; 2 Single phase AC100~240V

Display panel: ENG

AMEC — C — ☐ I — ☐ — 2 — 1 — ENG

Series: AMEC

Type: C Standard

Motor type: 2 For 2W motor; 5 For 5W motor; 5S For 5W motor (dedicated for RCA2-SA2A☐); 10 For 10W motor; 20 For 20W motor; 20S For 20W motor (dedicated for RCA2-SA4☐/TA5☐/RCA-RA3☐); 30 For 30W motor

Encoder type: I Incremental

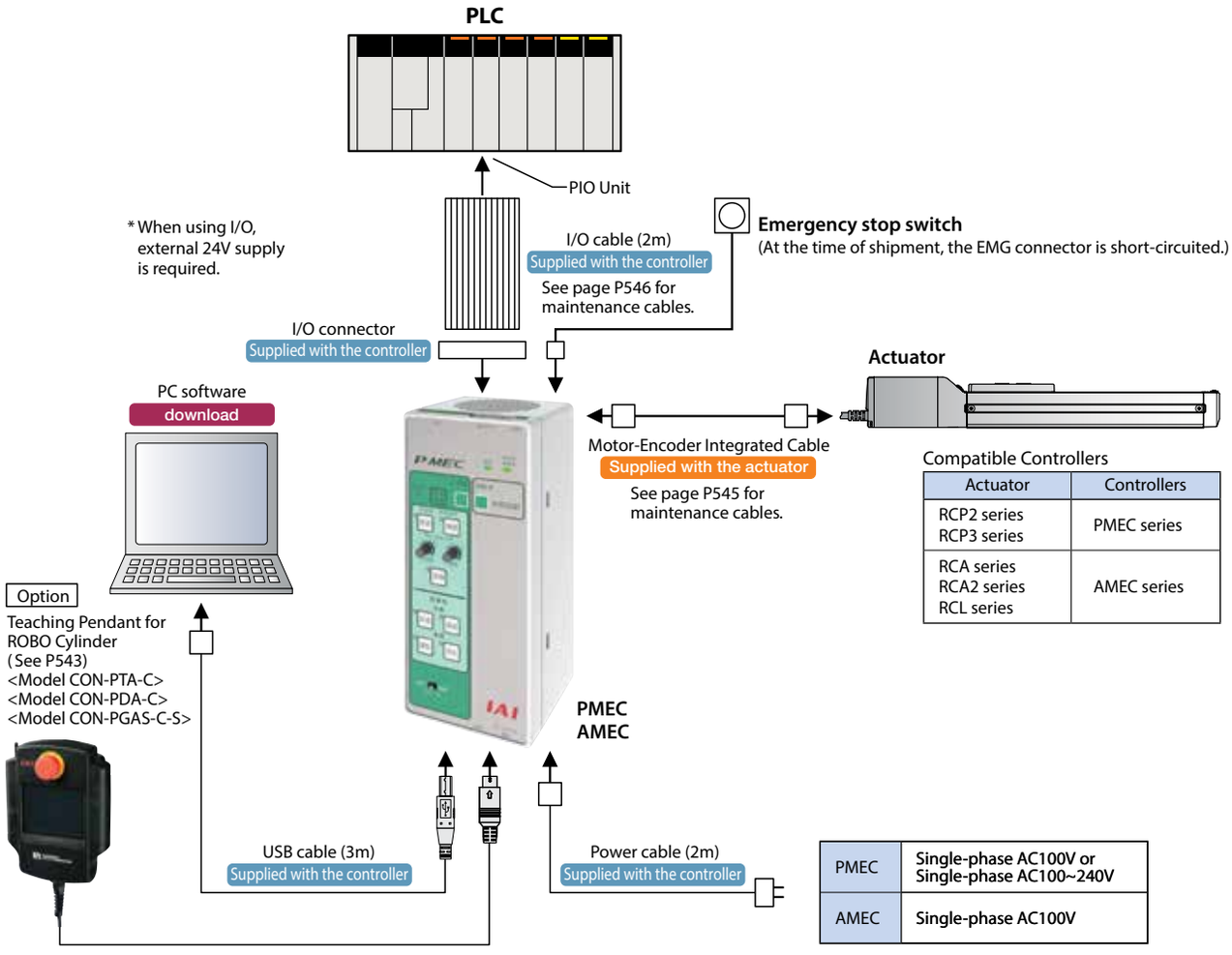
I/O type: NP NPN type; PN PNP type

I/O cable length: 2 2m

Power supply voltage: 1 Single phase AC100V

Display panel: ENG

System Configuration



I/O Signal Table

(Note) External power supply is needed.

Motion Pattern			2-Position Travel	3-Position Travel
Pin No.	Wire Color	Signal Type	Signal Name	Signal Name
1	Brown	PIO power	24V (Note)	24V (Note)
2	Red		0V (Note)	0V (Note)
3	Orange	Input	ST0 (Solenoid A: ON moves to end position, OFF moves to home position)	ST0 (Solenoid A: Move signal 1)
4	Yellow		—	ST1 (Solenoid B: Move signal 2)
5	Green		RES (Alarm reset)	RES (Alarm reset)
6	Blue		—	—
7	Purple	Output	LS0 (home position detection)/PE0 (home positioning complete)*1	LS0 (home position detection)/PE0 (home positioning complete)*1
8	Gray		LS1 (end position detection)/PE1 (end positioning complete)*1	LS1 (end position detection)/PE1 (end positioning complete)*1
9	White		HEND (Homing complete)	LS2 (intermediate point detection)/PE2 (intermediate positioning complete)*1
10	Black		*ALM (alarm)*2	*ALM (alarm)*2

*1: Signals PE0 through PE2 will be output if the pushing motion was enabled in the initial setting. Otherwise, LS0 through LS2 will be output.
*2: * ALM is ON when normal, and OFF when it is activated.

MEC PC software

By using the MEC PC software you can change the stop position data or run a test operation.
In addition, you can change the setting on the intermediate stop function, pushing function or change the coordinates.

The MEC PC software can be downloaded from the IAI website.

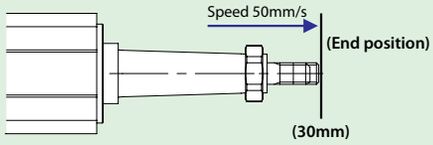
IAI Website: www.intelligentactuator.com

Explanation of PIO Patterns

PIO Pattern (2-position travel)

This motion pattern is between two positions, the home position and the end position. The home and end positions can be configured numerically (using the MEC PC software or the optional touch panel teaching pendant).
Two motions are possible: A positioning motion moves the rod or the slider to the specified position, and a pushing motion presses the rod against a workpiece.

Positioning



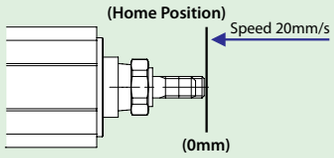
Input Signal

ST0	Solenoid A	ON

When ST0 is turned ON, the slider/rod moves at 50mm/s to the end position (30mm position).

End Position Data

Position	30mm
Speed	50mm/s
Pushing Force	—
Width	—



Input Signal

ST0	Solenoid A	OFF

When ST0 is turned OFF, the slider/rod returns to the home position (0mm position) at 20mm/s.

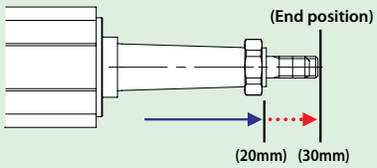
Home Position Data

Position	0mm
Speed	20mm/s
Pushing Force	—
Width	—

PIO Pattern (2-position travel)

This motion pattern is between two positions, the home position and the end position, which enables a pushing motion of the rod against a workpiece.

Push



Input Signal

ST0	Solenoid A	ON

When ST0 is turned ON, the actuator moves the rod to the 20mm position at 80mm/s, and from there, pushes it at slower speed to the 30mm position.

End Position Data

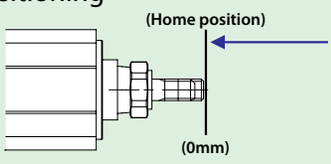
Position	30mm
Speed	80mm/s
Pushing Force	50%
Width	10mm

* The pushing motion is performed when there is a numerical value in the controller's push force data. (If there is no numerical value, a positioning motion is performed instead.)

PIO Pattern (3-position travel)

This motion pattern enables moves between three positions: the end position and the home position, as well as an intermediate position.
The positions are switched by combining two signals, ST0 and ST1.

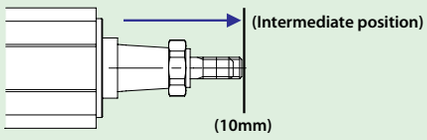
Positioning



Input Signal

ST0	Solenoid A	ON
ST1	Solenoid B	OFF

When only ST0 is turned ON, the actuator moves to the starting position at a set acceleration and speed.

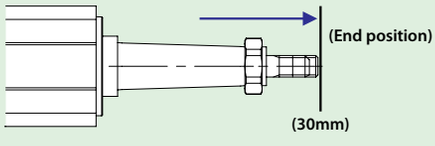


Input Signal

ST0	Solenoid A	ON*
ST1	Solenoid B	ON*

When both ST0 and ST1 are turned ON, it will move to the intermediate position at the set acceleration and speed.
When both are turned OFF, it stops at the current position.

* You can also configure the initial settings so that the rod will move to the intermediate position with both signals turned OFF, and stop at the current position with both signals turned ON.



Input Signal

ST0	Solenoid A	OFF
ST1	Solenoid B	ON

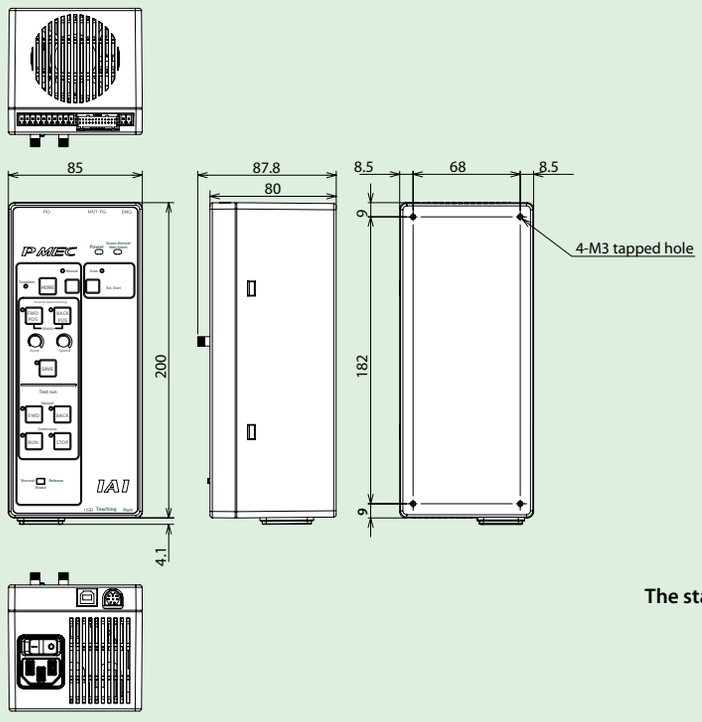
When only ST1 is turned ON, the actuator moves to the end position at a set acceleration and speed.

Specifications Table

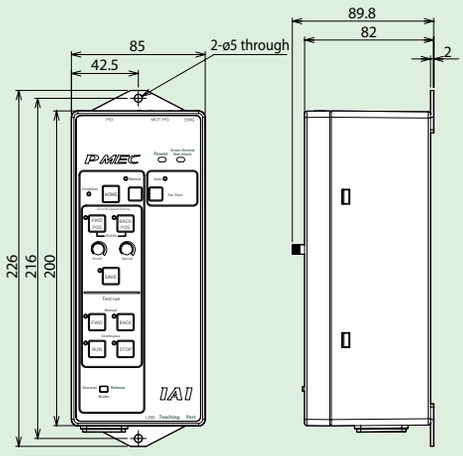
Item	Type		
Controller Type	PMEC		AMEC
Connectible Actuators	RCP2/RCP3 Series Actuators		RCA/RCA2/RCL Series Actuators
Number of Controllable Axes	Single axis		
Operation Method	Positioner Type		
Number of Positions	2 positions / 3 positions		
Backup Memory	EEPROM		
I/O Connector	10-pin terminal block		
I/O Points	4 input points / 4 output points		
Power for I/O	Externally supplied DC24V±10%		
Serial Communication	RS485: 1ch/USB: 1ch		
Position Detection Method	Incremental encoder		
Power Supply Voltage	AC100~115V±10%	AC100V-240V±10%	AC100V~115V±10%
Rated Current	1.3A	0.67A (AC100V)/0.36A (AC200V)	2.4A
Rush Current	30A	15A (AC100V)/30A (AC200V)	15A
Leak Current	0.50mA max	0.40mA max (AC100V) 0.75mA max (AC200V)	0.50mA max
Dielectric Strength Voltage	DC500V 1MΩ		
Vibration Resistance	XYZ directions 10~57Hz One-side amplitude 0.035mm (continuous), 0.075mm (intermittent) 57~150Hz 4.9m/s² (continuous), 9.8m/s² (intermittent)		
Ambient Operating Temperature	0~40°C		
Ambient Operating Humidity	10~85% RH (non-condensing)		
Ambient Operating Atmosphere	Free from corrosive gases		
Protection Class	IP20		
Weight	500g	508g	614g

Note: The minimum/maximum speeds vary depending on the actuator model.
For more information, see the instruction manual, or contact IAI.

Outer Dimensions

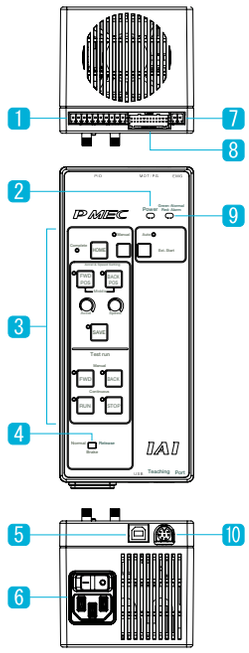


[With standard mounting bracket]



The standard mounting bracket is supplied with the controller.

Names of Parts and Functions



1 **PIO connector**..... Connects with a PLC or other external controllers to communicate inputs and outputs (I/O).

2 **Power LED** ..... When the power is ON, it illuminates in green.

3 **Control panel** ..... See below

4 **Brake switch**

Release	Used to release the brake of the actuator
Normal	The controller automatically controls the brake of the actuator

5 **USB connector**..... When using MEC PC software, connect to the computer via USB.

6 **AC inlet** ..... Insert the power supply cable.

7 **EMG connector**..... Connect the emergency stop button. Short-circuit it if you will not be using an emergency stop button.

8 **M/PG connector**..... Insert the motor/encoder cable that connects with the actuator.

9 **Status LED**

RUN (Green)	Indicates the servo status. On = Servo ON, Off=Servo OFF (Energy-saving) status Flashing (1Hz)=Auto servo OFF
ALM (Red) EMG (Red)	The LED illuminates if an alarm is turned ON or if the controller has come to an emergency stop.

10 **SIO Connector**..... Connects with the teaching pendant (CON-PTA, SEP-PT).

Explanation of the Control Panel

HOME button

When starting, homing is performed first to confirm the 0mm coordinate.

Manual button

Press this button to set the acceleration and/or speed, or to run a test operation. (Press for at least 1 second)

AUTO button

Press this button when operating from the MEC PC software or the PLC commands. (Press for at least 1 second)

Acceleration/Speed Settings

Configure the actuator's motion.

FWD POS / **BACK POS** buttons

Switch the motion you want to configure (see types below).

FWD POS: Motion toward the end position
BACK POS: Motion toward the home position
Middle: Motion toward the middle position
(Enabled from the MEC PC software and switched on by simultaneously pressing "FWD POS" and "BACK POS" buttons to switch. During a 2-position stop, simultaneous pressing is disabled.)

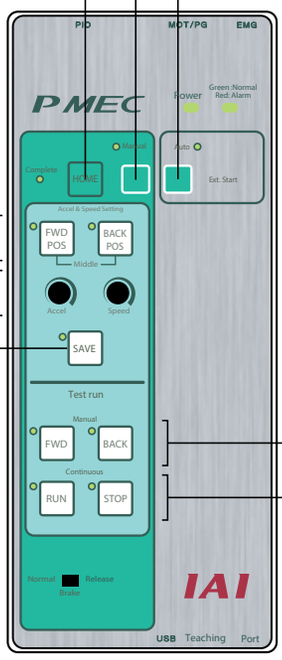
Acceleration / **Speed** knobs

By turning the knob, you can change the speed between 1%~100% of the actuator's maximum speed or rated acceleration / deceleration.

* The minimum speed may be less than 1% in some cases.

SAVE button

Saves the speed and acceleration adjusted above.



Test Operation

Confirm the saved motion by physically running the actuator.

FWD button

In a 2-position travel, the actuator moves from the BACK position to the FWD position. In a 3-position travel, the actuator moves from the BACK position to the middle position, then to the FWD position.

BACK button

The actuator returns to the home position.

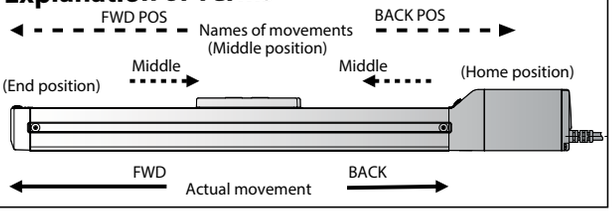
RUN button

In a 2-position travel, the actuator moves back and forth between the FWD and BACK positions. In a 3-position travel, the actuator repeats its movement from the BACK position, middle position, FWD position, then BACK position.

STOP button

Stops the above operation.

Explanation of Terms

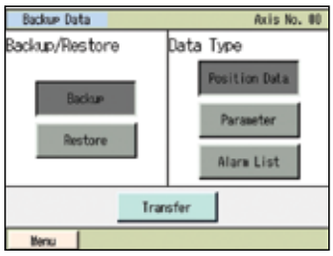


Options

Touch-panel Teaching Pendant for Position Controller CON-PTA/PDA/PGAS

Adopting an easy-to-use interactive touch-panel menu screen, these simple data devices can be operated without consulting to the manuals.

1. Color screen for greater ease of view
2. Supporting the takt time minimization function and maintenance information checking/input functions.
3. Position, parameters and other data can be saved in a SD card
4. Built-in clock function records the date & time of each event; data can then be saved in a SD card.



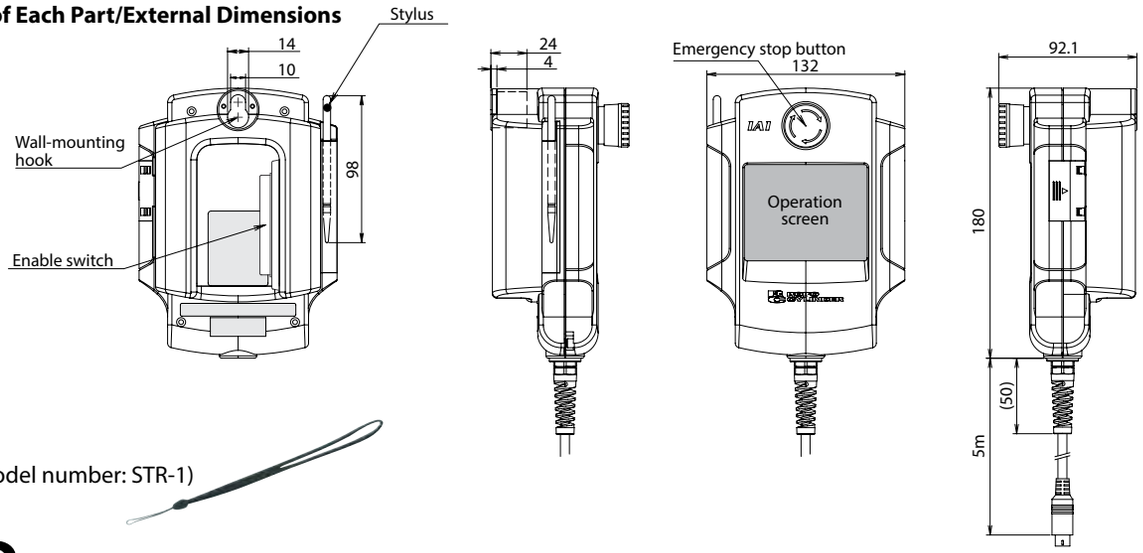
Model Numbers/Specifications

Item	Description		
Model number	**CON-PTA-C-ENG**	**CON-PDA-C-ENG**	**CON-PGAS-C-S-ENG (set)**
Type	Standard type	Enable switch type	Safety-category compliant type
Connectable controllers	ACON/PCON/SCON/RACON/RPCON/MSCON/ASEP/PSEP/MSEP/DSEP/AMEC/PMEC /ERC2 (*1) /ERC3		
3-position enable switch	×	○	○
Functions	• Position data input/editing • Moving function (moving to set positions, jogging/inching) • Parameter editing • Monitoring (current position, current speed, I/O signals, alarm code, alarm generation time) • Saving/reading data to/from external SD cards (position data parameters, alarm list) • Takt time minimization function • Maintenance information (total number of movements, total distance travelled, etc.)		
Display	65,536 colors (16-bit colors), white LED backlight		
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)		
Environmental resistance	IP40 or equivalent		
Mass	Approx. 570g	Approx. 600g	
Cable length	5m		
Accessories	Stylus	Stylus	Stylus, TP adapter (Model number: RCB-LB-TGS) Dummy plug (Model number: DP-4S) Controller cable (Model number: CB-CON-LB005)
Standard price	—	—	—

*1 Among the ERC2 series, only the actuators bearing 4904 or greater number stamped on the serial number label can be connected.

Name of Each Part

■ Name of Each Part/External Dimensions

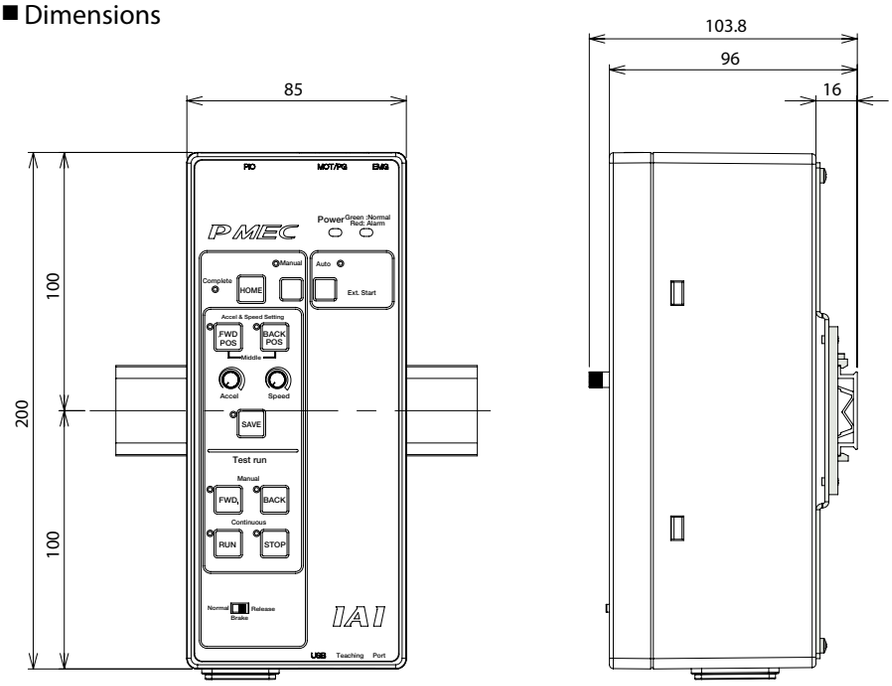


■ Option

• Strap (Model number: STR-1)

● DIN Rail Mounting Bracket MEC-AT-D

■ Dimensions



● Maintenance cable

■ List of maintenance cable models

Type	Cable length	Cable length	Model	Standard price
Integrated motor-encoder cable	PMEC ←→ RCP3 RCP2-GRSS/GRLS/ GRST/ SRA4R/SRGS4R/ SRGD4R AMEC ←→ RCA2/RCL	1m	**CB-APSEP-MPA010**	—
		3m	**CB-APSEP-MPA030**	—
		5m	**CB-APSEP-MPA050**	—
	PMEC ←→ RCP2	1m	**CB-PSEP-MPA010**	—
		3m	**CB-PSEP-MPA030**	—
		5m	**CB-PSEP-MPA050**	—
	PMEC ←→ RCP2-RTBS/RTBSL -RTCS/RTCSL	1m	**CB-RPSEP-MPA010**	—
		3m	**CB-RPSEP-MPA030**	—
		5m	**CB-RPSEP-MPA050**	—
	AMEC ←→ RCA	1m	**CB-ASEP-MPA010**	—
		3m	**CB-ASEP-MPA030**	—
		5m	**CB-ASEP-MPA050**	—
I/O cable		2m	**CB-APMEC-PIO020-NC**	—
		3m	**CB-APMEC-PIO030-NC**	—
		5m	**CB-APMEC-PIO050-NC**	—
USB cable		3m	**CB-SEL-USB030**	—

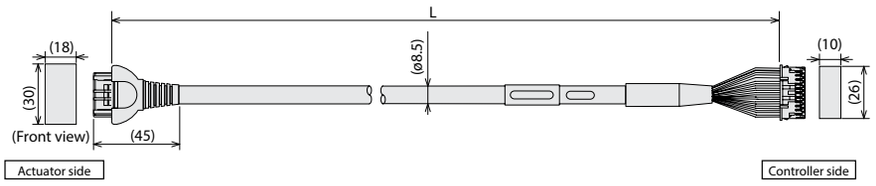
Components for maintenance

Please refer to the models listed below when arrangements such as cable replacement are needed after purchasing the product.

[RCP3/RCA2/RCL]-[PMEC/AMEC] Integrated motor-encoder robot cable for indirect connection/ Integrated motor-encoder cable

Model **CB-APSEP-MPA □□□/CB-APSEP-MPA □□□-LC** * □□□ indicated the cable length (L) Lengths up to 20m can be specified Example) 080=8m

*Refer to page A-59 for connectable actuators.



Minimum bend radius r = 68mm or larger (when movable unit is used)

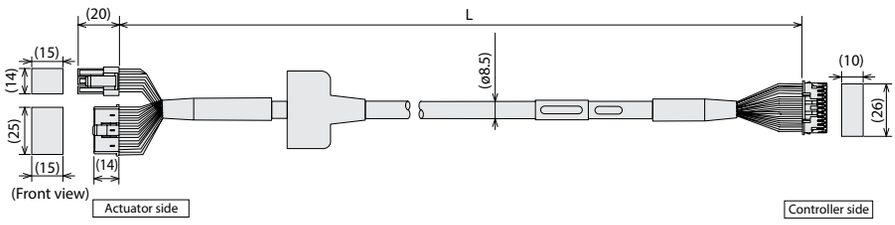
Actuator side Pin number		Controller side Pin number
A1	Black [øA](U)	1
B1	White [VMM](V)	2
A2	Brown [ø/A](W)	5
B2	Green [øB](-)	3
A3	Yellow [VMM](-)	4
B3	Red [ø/B](-)	6
A4	Orange [LS+](BK+)	7
B4	Gray [LS-](BK-)	8
A6	White [-](A+)	11
B6	Yellow [-](A-)	12
A7	Red [A+](B+)	13
B7	Green [A-](B-)	14
A8	Black [B+](Z+)	15
B8	Brown [B-](Z-)	16
A5	Black (label)[BK+](LS+)	9
B5	Brown (label)[BK-](LS-)	10
A9	Green (label)[GNDLS](GNDLS)	20
B9	Red (label)[VPS](VPS)	18
A10	White (label)[VCC](VCC)	17
B10	Yellow (label)[GND](GND)	19
A11	NC	21
B11	Shield [FG](FG)	24
	NC	22
	NC	23

[RCP2/RCP2CR/RCP2W]-[PMEC] Integrated motor-encoder robot cable for indirect connection

Model **CB-PSEP-MPA □□□** * Robot cable is the standard specification.

* □□□ indicated the cable length (L) Lengths up to 20m can be specified Example) 080=8m

*Refer to page A-59 for connectable actuators.



Minimum bend radius r = 68mm or larger (when movable unit is used)

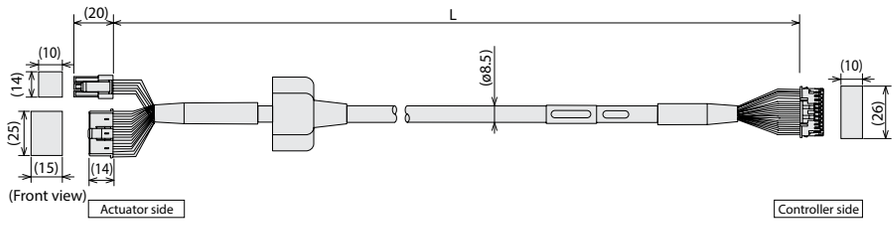
	Actuator side Pin number		Controller side Pin number
1st Connector	1	Black [ØA]	1
	2	White [VMM]	2
	4	Red [ØB]	3
	5	Green [VMM]	4
	3	Brown [Ø/A]	5
	6	Yellow [Ø/B]	6
	16	Orange [BK+]	9
	17	Gray [BK-]	10
	5	NC	11
	6	NC	12
2nd Connector	13	Black [LS+]	7
	14	Brown [LS-]	8
	1	White [A+]	13
	2	Yellow [A-]	14
	3	Red [B+]	15
	4	Green [B-]	16
	10	White (label)[VCC]	17
	11	Yellow (label)[VPS]	18
	9	Red (label)[GND]	19
	12	Green (label)[(Spare)]	20
	15	NC	21
	7	NC	22
	8	NC	23
	18	Shield [FG]	24

[RCA/RCACR/RCAW]-[AMEC] Integrated motor-encoder robot cable for indirect connection

Model **CB-ASEP-MPA □□□** * Robot cable is the standard specification.

* □□□ indicated the cable length (L) Lengths up to 20m can be specified Example) 080=8m

*Refer to page A-59 for connectable actuators.



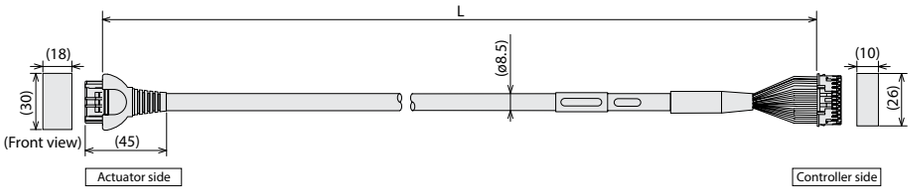
Minimum bend radius r = 68mm or larger (when movable unit is used)

	Actuator side Pin number		Controller side Pin number
1st Connector	1	Red [U]	1
	2	Yellow [V]	2
	—	NC	3
	—	NC	4
	3	Black [W]	5
	—	NC	6
	18	Orange [BK+]	7
	17	Gray [BK-]	8
2nd Connector	7	Black [LS+]	9
	16	Brown [LS-]	10
	1	White [A+]	11
	2	Yellow [A-]	12
	3	Red [B+]	13
	4	Green [B-]	14
	10	Black (label)[Z+]	15
	11	Brown (label)[Z-]	16
	14	White (label)[VCC]	17
	13	Yellow (label)[VPS]	18
	15	Red (label)[GND]	19
	6	Green (label)[(Spare)]	20
	5	NC	21
	8	NC	22
	12	NC	23
	9	Shield [FG]	24

[RCP2-RTBS/RTBSL/RTCS/RTCSL]-[PMEC] Integrated motor-encoder robot cable for indirect connection

Model **CB-RPSEP-MPA □□□** * Robot cable is the standard specification.

*□□□ indicated the cable length (L)
Lengths up to 20m can be specified Example) 080=8m



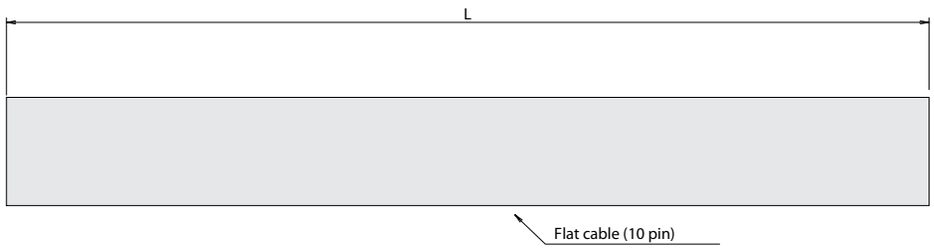
Minimum bend radius r = 68mm or larger (when movable unit is used)

Actuator side Pin number		Controller side Pin number
A1	Black [øA]	1
B1	White [VMM]	2
A2	Brown [ø/A]	5
B2	Green [øB]	3
A3	Yellow [VMM]	4
B3	Red [ø/B]	6
A6	Orange [LS+]	7
B6	Gray [LS-]	8
A7	Red [A+]	13
B7	Green [A-]	14
A8	Black [B+]	15
B8	Brown [B-]	16
A4	NC	7
B4	NC	8
A5	Black (label)[BK+]	9
B5	Brown (label)[BK-]	10
A9	Green (label)[GNDLS]	20
B9	Red (label)[VPS]	18
A10	White (label)[VCC]	17
B10	Yellow (label)[GND]	19
A11	NC	21
B11	Shield [FG](FG)	24
	NC	22
	NC	23

I/O cable for PMEC-C/AMEC-C

Model **CB-APMEC-PIO □□□-NC**

* The 3 types differ in cable length: 020=2m, 030=3m, 050=5m



Pin NO.	Electric wire color	Signal
1	Brown	PIO Power supply
2	Red	
3	Orange	Input
4	Yellow	
5	Green	
6	Blue	
7	Purple	Output
8	Gray	
9	White	
10	Black	

PSEP/ASEP/DSEP Controller

PSEP Model C/CW 3-position controller for RCP3/RCP2

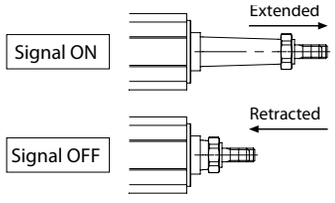
ASEP Model C/CW 3-position controller for RCA2/RCA/RCL

DSEP Model C/CW 3-position controller for RCD

Feature

1 Can operate with the same signal as a solenoid valve.

The signal that operates the actuator is the same as the signal that operates the air cylinder. Therefore, the PLC program currently in use can be used without modification even if the air cylinder is replaced by an electric-powered cylinder.
Either a single solenoid or a double solenoid may be used.



2 Establishes a dustproof type that supports IP53.

We provide dustproof type controllers with an IP53 equivalent (*1) protection structure, so that the controller can be mounted outside the control panel.
(*1) The bottom surface is excluded.

3 Provides the simple absolute type that can be operated immediately upon power-ON without homing.

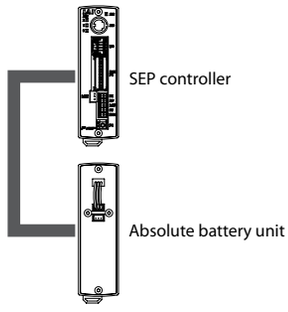
Since the simple absolute type can store the current position with the assistance of the absolute battery unit during power-up or after the emergency stop is deactivated; it can start the next operation at that position.

(Note 1) When the actuator is connected to the simple absolute type controller, the model is considered an incremental model.

(Note 2) It can not be used for the linear servo type.

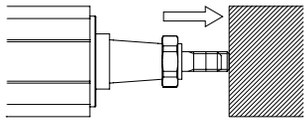
(Note 3) Not applicable for the DSEP.

When mounting the absolute battery unit, mount it below the SEP controller to prevent heat damage.



4 Pushing and intermediate stop operation is available.

Like air cylinders, the pushing operation is available. In this operation, you can stop with the rod being pushed to a workpiece.
Since the force for the push operation is adjustable within a range between 20 to 70 % of the maximum pushing force and a signal is generated when it reaches the specified pushing force, it can be used to perform such tasks as clamping the workpiece or determine its size.



Push force can be adjusted from 20 to 70% of the maximum push force.

5 Easy data entry with the dedicated touch panel teaching unit.

Data, such as setting target positions or pushing force, are easily entered with the optional touch panel teaching unit model: CON-PTA-C-ENG.
Since the touch panel teaching unit provides an interactive menu and can be controlled directly on the screen, you can operate intuitively with no assistance from operation manuals.

Model List

Series	PSEP				ASEP				DSEP	
Type	C		CW		C		CW		C	CW
Name	Standard type		Dustproof type		Standard type		Dustproof type		Standard type	Dustproof type
Positioning method	Incremental encoder	Simple absolute type	Incremental encoder	Simple absolute type	Incremental encoder	Simple absolute type	Incremental encoder	Simple absolute type	Incremental encoder	Incremental encoder
External View										
Description	Position controller, for pulse motors, specialized to 2 positions / 3 positions positioning and easier control		PSEP-C dustproof type with an IP53 equivalent protection structure		Position controller, for servo motors, specialized to 2 positions / 3 positions positioning and easier control		ASEP-C dustproof type with an IP53 equivalent protection structure		Position controller, for the RCD actuator, specialized to 2 positions / 3 positions positioning and easier control	DSEP-C dustproof type with an IP53 equivalent protection structure
Number of positions	2 positions / 3 positions									
Standard price	—	—	—	—	—	—	—	—–	—	—

Model

PSEP — □ — □ **I** — □ — □ — **0** — □ — □

Series | Type | Motor type | Encoder type | I/O type | I/O cable length | Power supply voltage | Simple absolute compatible | High acceleration compatible model

Type
- C: Standard
- CW: Dustproof Type

Motor type
- 20P: 20□ pulse motor compatible
- 20SP: 20□ pulse motor compatible RCP3-RA2 high-thrust type only)
- 28P: 28□ pulse motor compatible
- 28SP: 28□ pulse motor compatible (RA3C only)
- 35P: 35□ pulse motor compatible
- 42P: 42□ pulse motor compatible
- 56P: 56□ pulse motor compatible

Encoder type
- I: Incremental

I/O type
- NP: NPN type
- PN: PNP type

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

Power supply voltage
- 0: DC24V

Simple absolute compatible
- ABUM: Simple absolute type (with absolute battery unit)
- ABUMN: Simple absolute type (without absolute battery unit)
- (Blank): Incremental type

High acceleration compatible model
- Blank: Standard
- H: High acceleration compatible model

* Enter "H" when connecting with the RCP3-SA4C/SA5C/SA6C or RCP2 (RCP2CR)-SA5C/SA6C that are high acceleration compatible models.

ASEP — □ — □ **I** — □ — □ — □ — **0** — □

Series | Type | Motor type | Encoder type | Option | I/O type | I/O cable length | Power supply voltage | Simple absolute compatible

Type
- C: Standard
- CW: Dustproof Type

Motor type
- 2: 2W motor compatible
- 5: 5W motor compatible
- 5S: 5W motor compatible (SA2A□,RA2A□ only)
- 10: 10W motor compatible
- 20: 20W motor compatible
- 20S: 20W motor compatible (RCA2-SA4□/TA5□, RCA-RA3□ only)
- 30: 30W motor compatible

Encoder type
- I: Incremental

Option
- HA: High-acceleration specification
- LA: Power-saving specification

I/O type
- NP: NPN type
- PN: PNP type

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

Power supply voltage
- 0: DC24V

Simple absolute compatible
- ABUM: Simple absolute type (with absolute battery unit)
- ABUMN: Simple absolute type (without absolute battery unit)
- (Blank): Incremental type

DSEP — □ — **3** **I** — □ — □ — **0**

Series | Type | Motor type | Encoder type | I/O type | I/O cable length | Power supply voltage

Type
- C: Standard type
- CW: Dustproof type

Motor type
- 3: DC brushless 2.5W Motors

Encoder type
- I: Incremental Type

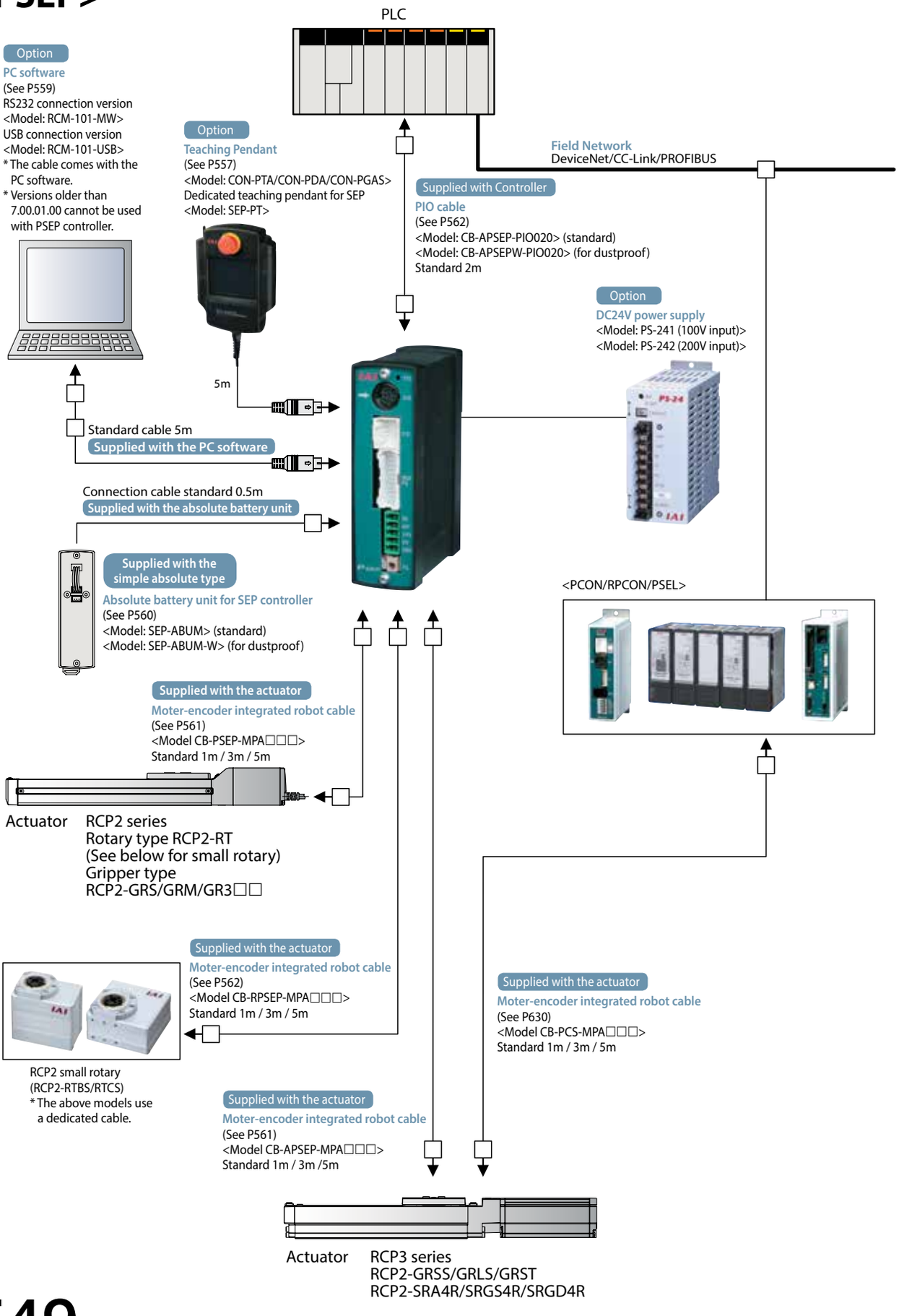
I/O type
- NP: NPN type
- PN: PNP type

I/O cable length
- 0: Without cable
- 2: 2m
- 3: 3m
- 5: 5m

Power supply voltage
- 0: DC24V

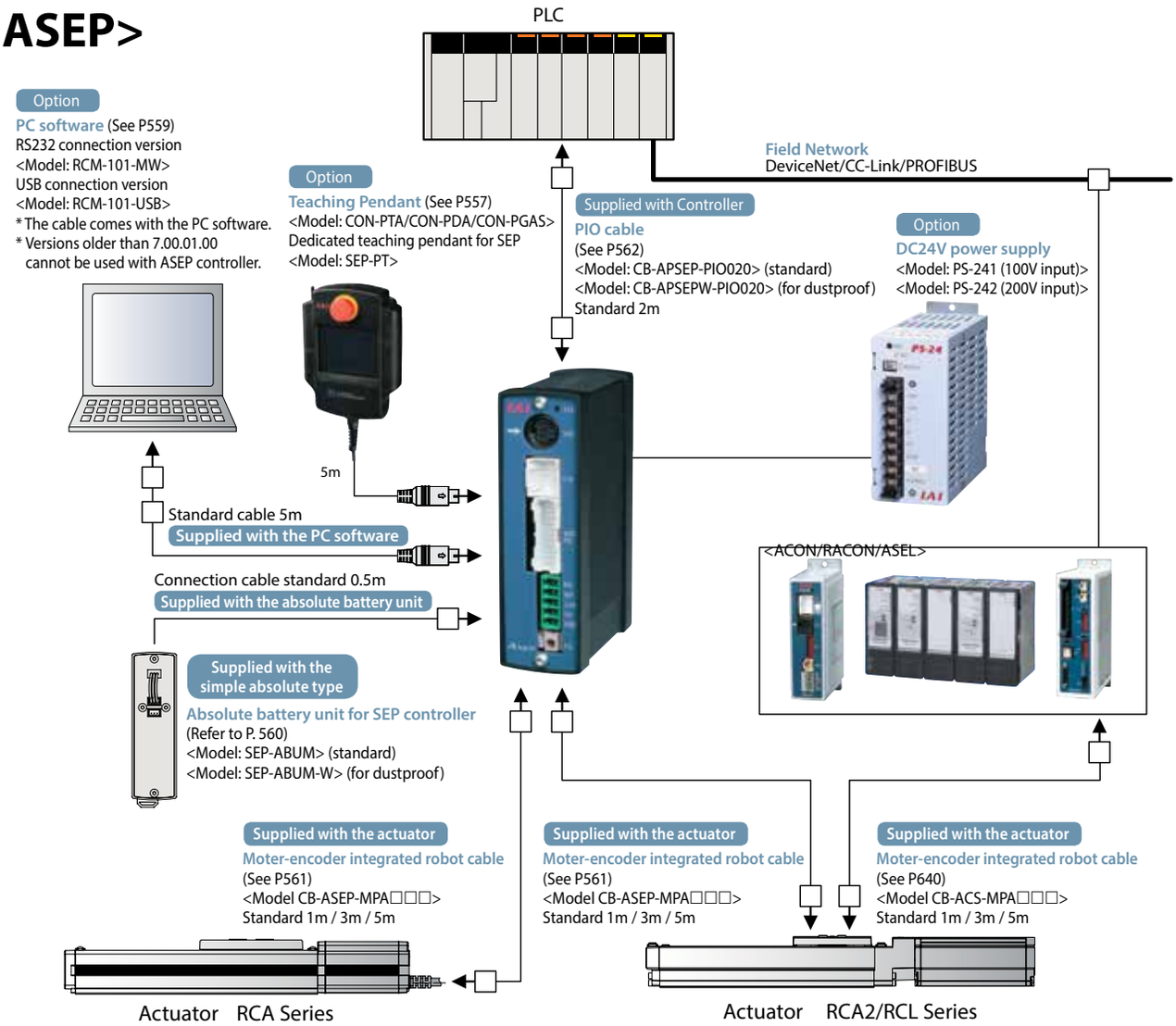
System Configuration

<PSEP>

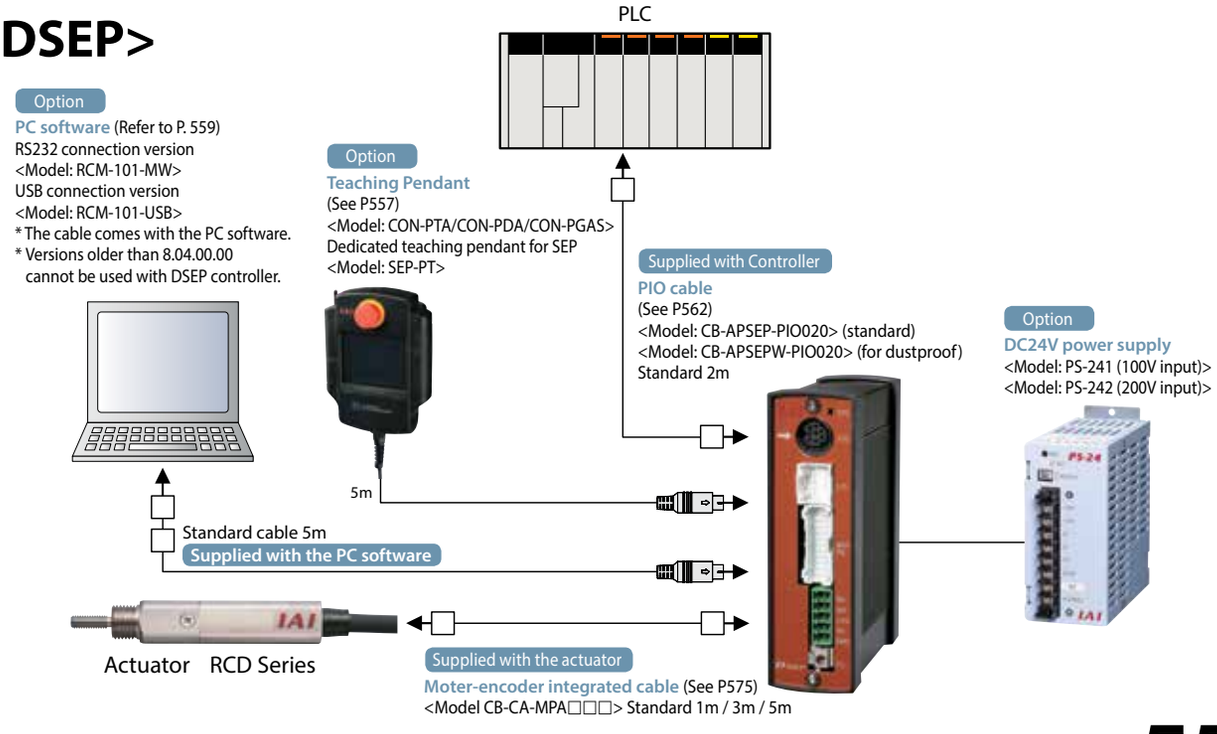


System configuration

<ASEP>



<DSEP>



PIO Pattern Description

The SEP controller provides the following six PIO patterns from which you can choose for operation.
Also, PIO patterns 0 to 2 support both the single solenoid and double solenoid signal configurations.

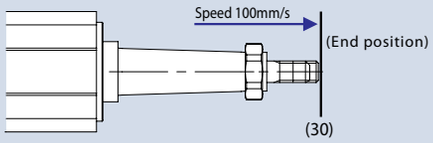
PIO pattern number		0		1		2		3	4	5
PIO pattern name		Standard 2-position movement		Moving speed change		Position data change		2-input 3-position travel	3-input 3-position travel	Continuous cycle operation
Feature		2-position motion		2-position motion		2-position motion		3-position motion	3-position motion	Continuous motion between 2 positions
		Push		Push		Push		Push	Push	Push
		—		Changing speed during motion		Motion position data change		—	—	—
Supported solenoid configurations		Single	Double	Single	Double	Single	Double	—	—	—
Input	0	Motion signal	Motion signal 1	Motion signal	Motion signal 1	Motion signal	Motion signal 1	Motion signal 1	Retract motion signall	Continuous operation signal
	1	Pause signal	Motion signal 2	Pause signal	Motion signal 2	Pause signal	Motion signal 2	Motion signal 2	Extend motion signal	Pause signal
	2	— (Reset signal)		Moving speed change signal (Reset signal)		Target position change signal (Reset signal)		— (Reset signal)	Intermediate motion signal (Reset signal)	— (Reset signal)
	3	— /Servo-ON signal		— /Servo-ON signal		— /Servo-ON signal		— /Servo-ON signal	— /Servo-ON signal	— /Servo-ON signal
Output	0	Retract motion output signal		Retract motion output signal		Retract motion output signal		Retract motion output signal	Retract motion output signal	Retract motion output signal
	1	Extend motion output signal		Extend motion output signal		Extend motion output signal		Extend motion output signal	Extend motion output signal	Extend motion output signal
	2	Homing completion signal /Servo-ON output signal		Homing completion signal /Servo-ON output signal		Homing completion signal /Servo-ON output signal		Intermediate position output signal	Intermediate position output signal	Homing completion signal /Servo-ON output signal
	3	Alarm output signal /Servo-ON output signal		Alarm output signal /Servo-ON output signal		Alarm output signal /Servo-ON output signal		Alarm output signal /Servo-ON output signal	Alarm output signal /Servo-ON output signal	Alarm output signal /Servo-ON output signal

*For details of the signals listed above, see the Controller User's Manual. (Can be downloaded from our corporate website.)

PIO pattern 0 (Standard 2-position travel)

This PIO pattern involves movements between two positions—the end position and the home position.
The positions can be set numerically to any position (by inputting to the controller using the PC software or the optional touch panel teaching pendant). Two motions are possible: A "positioning motion" moves the rod or the slider to the specified position, and a "pushing motion" pushes the rod against a workpiece.

Positioning motion (single solenoid)

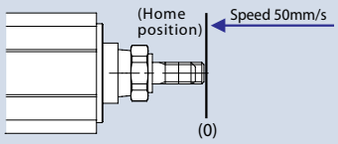


End position data	
Position	30
Speed	100
Push force	—
Width	—

Input signal

Input 0	ON
Input 1	—
Input 2	—
Input 3	—

When Input 0 is turned ON, the slider/rod moves to the end position (30mm coordinate) at a speed of 100mm/s.



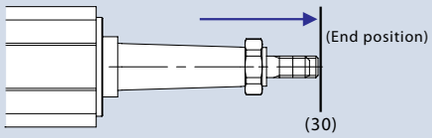
Home position data	
Position	0
Speed	50
Push force	—
Width	—

Input signal

Input 0	OFF
Input 1	—
Input 2	—
Input 3	—

When input 0 is turned OFF, the slider/rod returns to the home position (0mm coordinate) at a speed of 50mm/s.

Positioning motion (double solenoid)

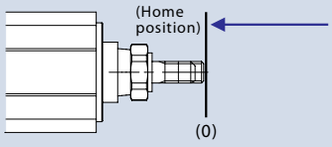


End position data	
Position	30
Speed	100
Push force	—
Width	—

Input signal

Input 0	OFF
Input 1	ON
Input 2	—
Input 3	—

When Input 1 is turned ON and Input 0 is turned OFF, the slider/rod moves to the end position (30mm coordinate) at a speed of 100mm/s.



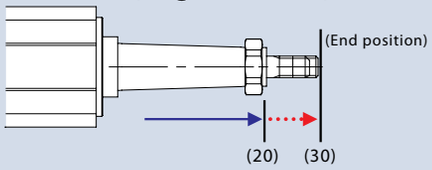
Home position data	
Position	0
Speed	50
Push force	—
Width	—

Input signal

Input 0	ON
Input 1	OFF
Input 2	—
Input 3	—

When Input 0 is turned ON and Input 1 is turned OFF, the slider/rod returns to the home position (0mm coordinate) at a speed of 50mm/s.

Push motion (single solenoid)



End position data	
Position	30
Speed	100
Push force	50
Width	10

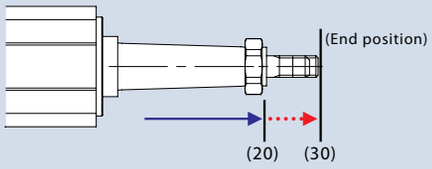
Input signal

Input 0	ON
Input 1	—
Input 2	—
Input 3	—

When Input 0 is turned ON, the rod moves to the 20mm position at 100mm/s, and then starts pushing from the 20mm position to the 30mm position at slow speed.

* The pushing motion is performed only if there is a numerical value for the pushing force in the controller's position data. (If there is no numerical value for the pushing force, a positioning motion will be performed instead.)

Push motion (double solenoid)



End position data	
Position	30
Speed	100
Push force	50
Width	10

Input signal

Input 0	OFF
Input 1	ON
Input 2	—
Input 3	—

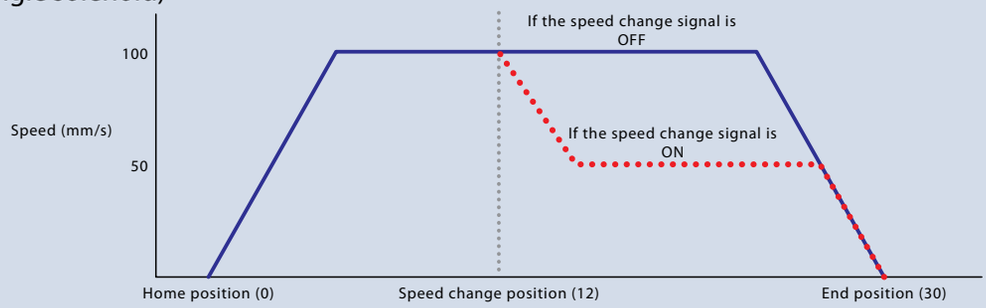
When Input 1 is turned ON and Input 0 is turned OFF, the rod moves to the 20mm position at 100mm/s, and then starts pushing from the 20mm position to the 30mm position at slow speed.

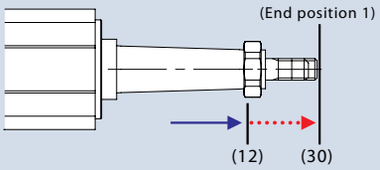
* The pushing motion is performed only if there is a numerical value for the pushing force in the controller's position data. (If there is no numerical value for the pushing force, a positioning motion will be performed instead.)

PIO pattern 1 (Speed Change during movement)

This PIO pattern involves movements between two positions—the end position and the home position.
The speed can be changed in 2 stages. (The speed can be either increased or decreased.)
The speed change occurs when the rod/slider passes the speed change position, specified in the position values.

(Single solenoid)





Input signal

Input 0	ON
Input 1	—
Input 2	ON
Input 3	—

When Input 0 is turned ON while Input 2 is turned ON, the rod moves at the initial speed up to the speed change position. After it passes the speed change position, the speed changes. If Input 2 is not turned ON, the speed will not change.

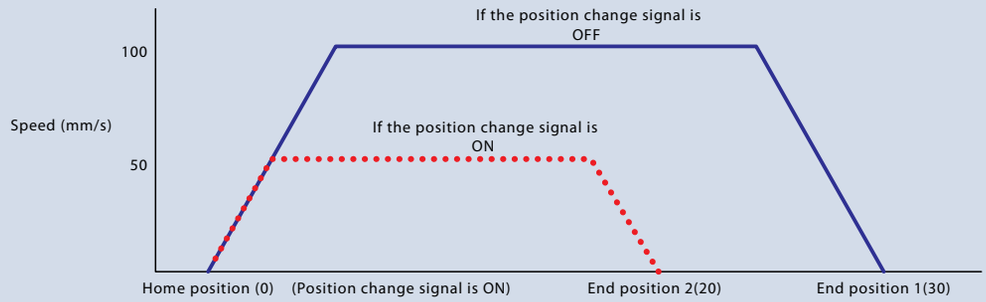
Home position data	
Position	0
Speed	50
Speed change position	12
Changed speed	100
Push force	—
Width	—

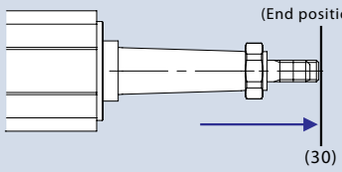
End position data	
Position	30
Speed	100
Speed change position	12
Changed speed	50
Push force	—
Width	—

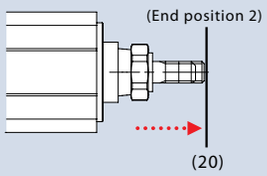
PIO pattern 2 (position change)

This PIO pattern involves movements between two positions—the end position and the home position.
You can set 2 sets of data for the end / home positions, speed, pushing force, and pushing width.
Switching between the 2 sets of data can be done by turning ON/OFF Input 2, which is the signal for switching the target position.

(Single solenoid)







Input signal

Input 0	ON
Input 1	—
Input 2	ON
Input 3	—

If Input 2 (position change signal) is OFF when Input 0 is turned ON, the rod moves according to the position and speed set in "End Position Data 1" (position: 30 / speed: 100). If Input 2 is ON when Input 0 is turned ON, the rod's movement changes to the position and speed set in "End Position Data 2" (position: 20 / speed: 50). If Input 2 is OFF when the movement starts, but is turned ON in transit, the target position and speed is changed from that position.

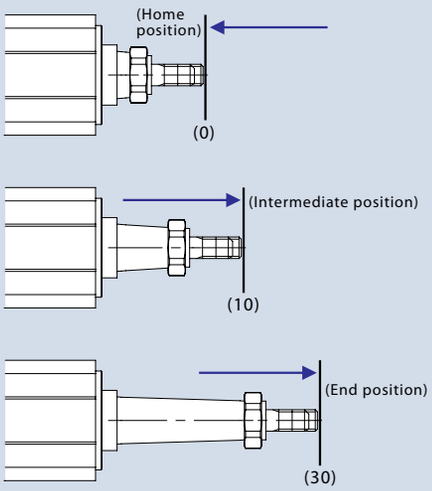
End position data 1	
Position	30
Speed	100
Push force	—
Width	—

End position data 2	
Position	20
Speed	50
Push force	—
Width	—

PIO pattern 3 (2-input 3-position travel)

This PIO pattern involves movements between 3 positions—the end position, the home position, and an intermediate position.
Changing between the positions is done by a combination of 2 signals, Input 0 and Input 1.

Positioning motion



Input signal

Input 0	ON
Input 1	OFF
Input 2	—
Input 3	—

When only Input 0 is turned ON, the rod moves to the home position at the specified speed.

Input signal

Input 0	ON
Input 1	ON
Input 2	—
Input 3	—

When Input 0 and Input 1 are both turned ON, the rod moves to the intermediate position at the specified speed.

Input signal

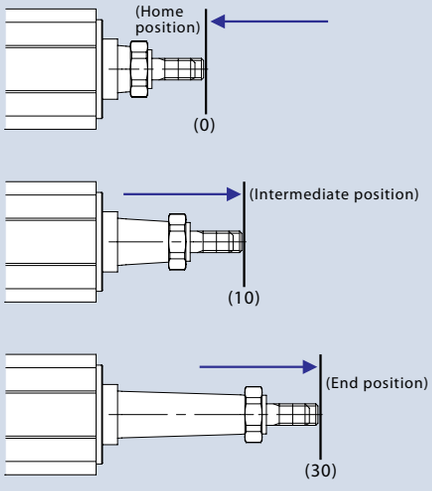
Input 0	OFF
Input 1	ON
Input 2	—
Input 3	—

When only Input 1 is turned ON, the rod moves to the end position at the specified speed.

PIO pattern 4 (3-input 3-position travel)

This PIO pattern involves movements between 3 positions—the end position, the home position, and an intermediate position.
Changing between positions is done by three signals—Input 0, Input 1 and Input 2, which are commanded to move to the home, end and intermediate positions, respectively.

Positioning motion



Input signal

Input 0	ON
Input 1	OFF
Input 2	OFF
Input 3	—

When Input 0 is turned ON, the rod moves to the home position at the specified speed.

Input signal

Input 0	OFF
Input 1	OFF
Input 2	ON
Input 3	—

When Input 2 is turned ON, the rod moves to the intermediate position at the specified speed.

Input signal

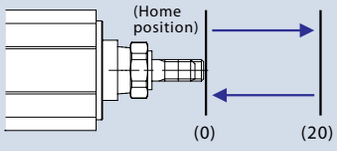
Input 0	OFF
Input 1	ON
Input 2	OFF
Input 3	—

When Input 1 is turned ON, the rod moves to the end position at the specified speed.

PIO pattern 5 (continuous cycle operation)

This PIO pattern involves continuous cycling between 2 positions—the end and home positions.
When Input 0 (continuous operation signal) is turned ON, the rod continuously moves between the specified 2 positions.
If Input 0 is turned OFF while in motion, it stops after reaching the current destination.

Positioning motion



Input signal

Input 0	ON
Input 1	—
Input 2	—
Input 3	—

When Input 0 is turned ON,the rod moves continuously between the end and home positions at the specified speed.

I/O signal table

Pin No.	Cable color	PIO pattern number		0		1		2		3	4	5
		PIO pattern name		Standard 2-position travel		Speed change		Position change		2-input 3-position travel	3-input 3-position travel	Continuous cycle operation
		Solenoid type		Single	Double	Single	Double	Single	Double	—	—	—
1	Brown	COM		24V		24V		24V		24V	24V	24V
2	Red	COM		0V		0V		0V		0V	0V	0V
3	Orange	Input	0	ST0	ST0	ST0	ST0	ST0	ST0	ST0	ST0	ASTR
4	Yellow		1	*STP	ST1(—)	*STP	ST1(—)	*STP	ST1(—)	ST1	ST1(—)	—/*STP
5	Green		2	— (RES)		SPDC (RES)		CN1 (RES)		— (RES)	ST2 (RES)	— (RES)
6	Blue		3	—/SON		—/SON		—/SON		—/SON	—/SON	—/SON
7	Purple	Output	0	LS0/PE0		LS0/PE0		LS0/PE0		LS0/PE0	LS0/PE0	LS0/PE0
8	Gray		1	LS1/PE1		LS1/PE1		LS1/PE1		LS1/PE1	LS1/PE1	LS1/PE1
9	White		2	HEND/SV		HEND/SV		HEND/SV		LS2/PE2	LS2/PE2	HEND/SV
10	Black		3	*ALM/SV		*ALM/SV		*ALM/SV		*ALM/SV	*ALM/SV	*ALM/SV

Note: The above signals marked with * are normally ON and turn OFF when active.

Specification table

Item		Specifications					
Controller type		PSEP		ASEP		DSEP	
		C	CW	C	CW	C	CW
Connectable actuators		CP2/RCP3 series actuators		RCA/RCA2/RCL series actuators		RCD series actuators	
Number of control axes		1 Axis					
Operating method		Positioner type					
Number of positions		2-positions/ 3-positions (4-positions *2)					
Backup memory		EEPROM					
I/O connector		10-pin connector					
Number of I/O points		4 input points/4 output points					
II/O power supply		External supply DC24V±10%					
Dedicated type for serial communication		RS485 1ch					
Peripheral device communication cable		CB-APSEP-PIO□□□	CB-APSEPW-PIO□□□	CB-APSEP-PIO□□□	CB-APSEPW-PIO□□□	CB-APSEP-PIO□□□	CB-APSEPW-PIO□□□
Position detection method		Incremental encoder (Attaching an absolute battery unit makes the simple absolute specification possible. *3)				Incremental encoder	
Motor-encoder cable	RCP2 connection-use	CB-PSEP-MPA□□□		(Connection not possible)		(Connection not possible)	
	RCA connection-use	(Connection not possible)		CB–ASEP–MPA□□□		(Connection not possible)	
	RCP3/RCA2 connection-use	CB-APSEP-MPA□□□				(Connection not possible)	
	RCP2 small rotary connection-use	CB–RPSEP–MPA□□□		(Connection not possible)		(Connection not possible)	
	RCD connection	(Connection not possible)				CB-CA-MPA□□□	
Input voltage		DC24V±10%					
Control power supply capacity		0.5A (0.8A for the simple absolute specification)					

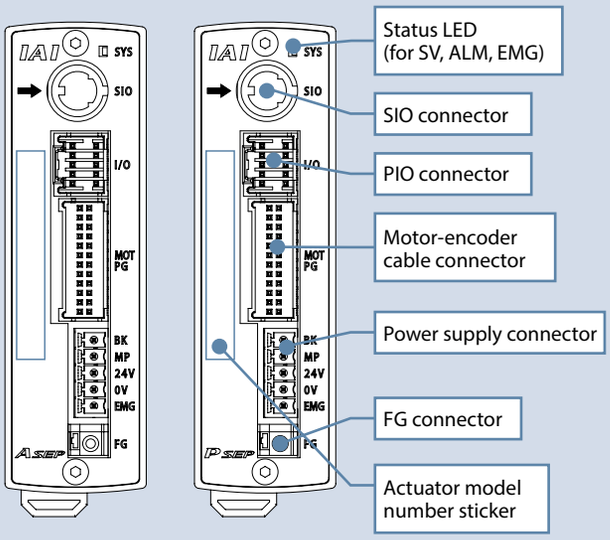
Motor power supply capacity									
Motor size	Rated	Max. (*4)	Motor power output	Rated	Max (Power-saving (*5))	Max (Standard (*6), high acceleration/deceleration)	Motor power output	Rated	Max.
20P	0.17A	2.0A	2W	0.8A	Not specified	4.6A	3W	0.7A	1.5A
28P	0.17A	2.0A	5W	1.0A	Not specified	6.4A			
			5W□RCA2-SA2□□	1.0A	Not specified	2.0A			
35P	0.9A	2.0A	10W□RCL□□	1.3A	Not specified	6.4A			
42P	0.9A	2.0A	10W□RCA□RCA2□□	1.3A	2.5A	4.4A			
56P	0.9A	2.0A	20W	1.3A	2.5A	4.4A			
—	—	—	20W□20S□□□□□	1.7A	3.4A	5.1A			
—	—	—	30W	1.3A	2.2A	4.4A			

Inrush current (*1)	Max.10A					
Amount of heat generated	8.4W		9.6W		4W	
Dielectric strength voltage	DC500V 1MΩ					
Vibration resistance	XYZ direction 10~57Hz One-side width 0.035mm (continuous), 0.075mm (intermittent) 58~150Hz 4.9m/s² (continuous), 9.8m/s² (intermittent)					
Ambient operating temperature	0 to 40°C					
Ambient operating humidity	10~85% RH (non-condensing)					
Ambient operating atmosphere	Free from corrosive gases					
Protection Class	IP20	IP53 (*7)	IP20	IP53 (*7)	IP20	IP53 (*7)
Weight	Approx. 130g	Approx. 160g	Approx. 130g	Approx. 160g	Approx. 130g	Approx. 160g

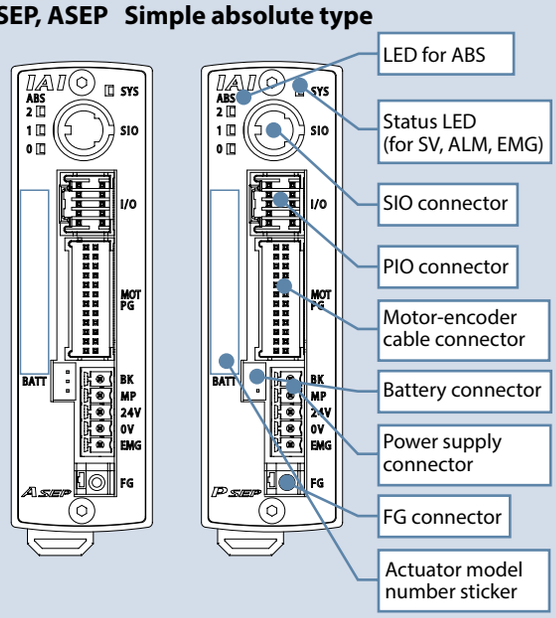
(*1) Upon power-ON, an electrical current of 5 to 12 times as much as the rated current, called "in rush current" flows for 1 to 2 ms. Note that the amount of inrush current varies based on the impedance of power source lines.
(*2) This applies to the case where two position data points are set at each of the end and home positions during a "position change" motion pattern process.
(*3) The simple absolute type controllers cannot be used for the linear servo type.
(*4) After the motor power has been turned on, the motor is excited and it performs a phase detection operation. During this time, the current will maximized. (Generally for about 100ms) However, if after the motor power is off, it is turned on again, approximately 6.0A current will flow. (For approximately 1~2 ms)
(*5) The current will be maximized when the motor is excited and it performs a phase detection operation or during a collision or a motion constraint. The phase detection operation can take up to 10 seconds during which it is necessary to require the listed current.
(*6) The current will be maximized during acceleration, deceleration, a collision, or a motion constraint. The longest time will be during a collision or a motion constraint. The listed current is required until an overload is detected.
(*7) The bottom surface is excluded.

Names

PSEP, ASEP, DSEP Incremental type

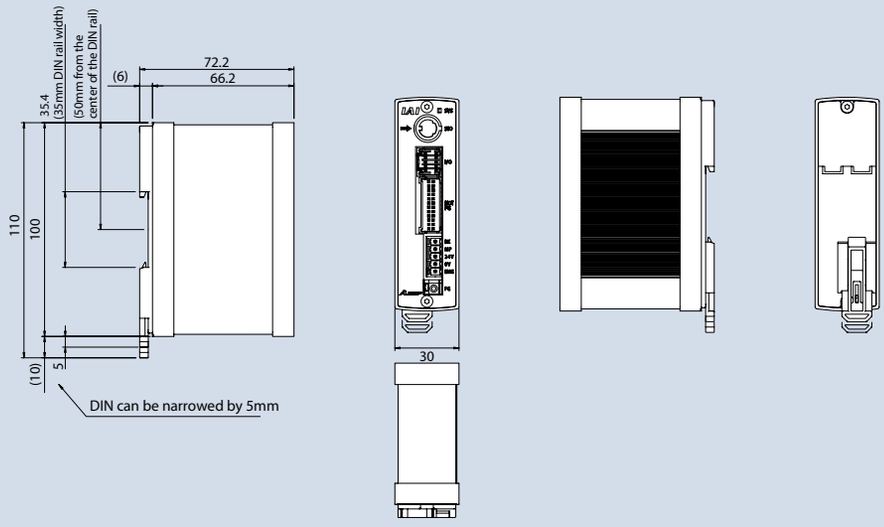


PSEP, ASEP Simple absolute type

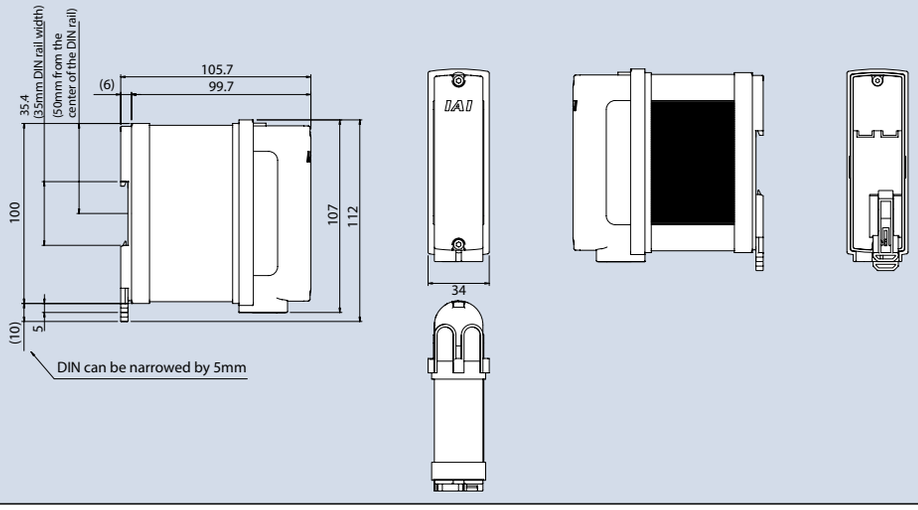


External dimensions

Standard type



Dustproof type

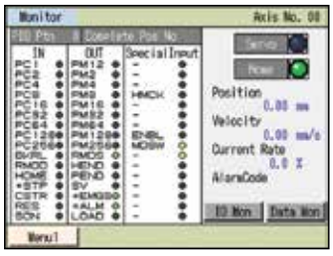


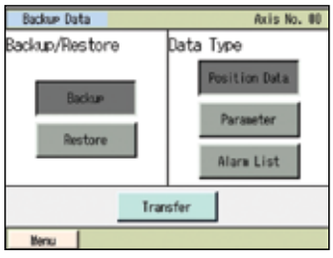
Options

Touch-panel Teaching Pendant for Position Controller CON-PTA/PDA/PGAS

Adopting an easy-to-use interactive touch-panel menu screen, these simple data devices can be operated without consulting to the manuals.

1. Color screen for greater ease of view
2. Supporting the takt time minimization function and maintenance information checking/input functions.
3. Position, parameters and other data can be saved in a SD card
4. Built-in clock function records the date & time of each event; data can then be saved in a SD card.



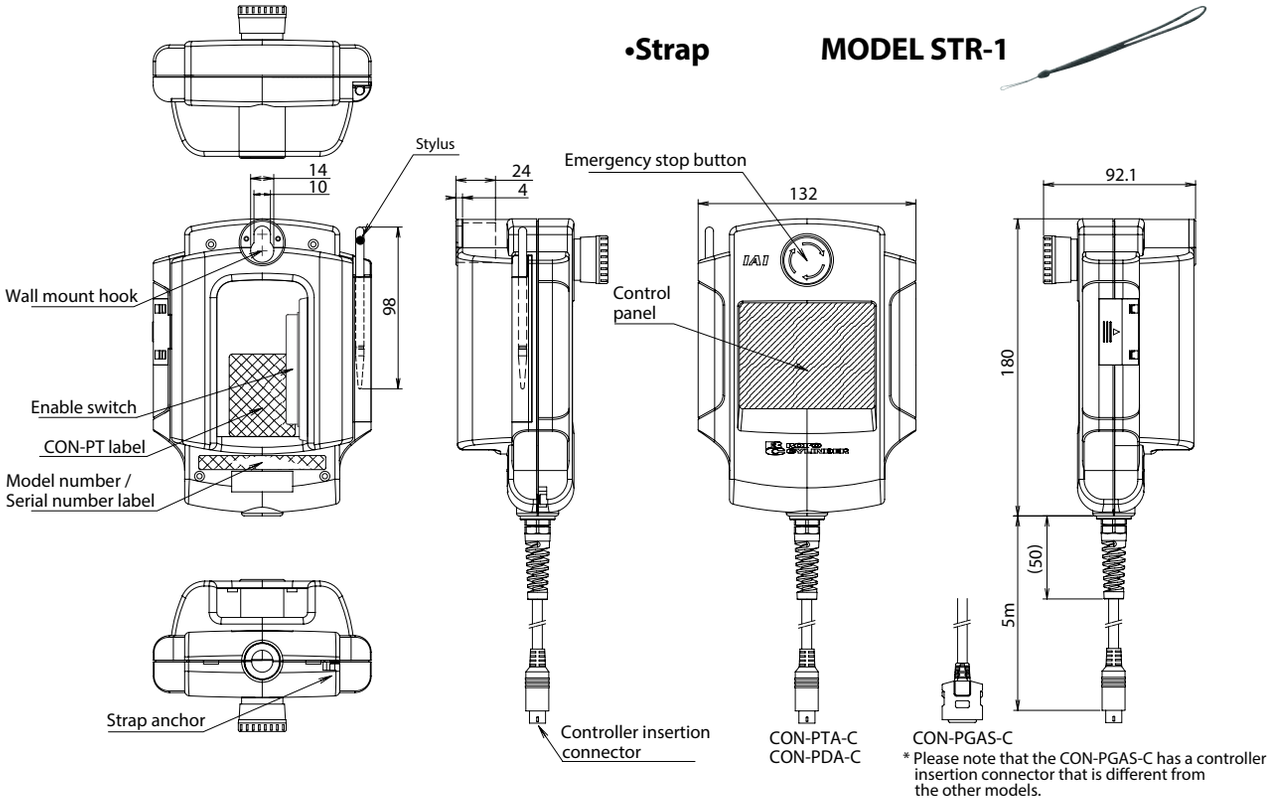


Model Numbers/Specifications

Item	Description		
Model number	**CON-PTA-C-ENG**	**CON-PDA-C-ENG**	**CON-PGAS-C-S-ENG (set)**
Type	Standard type	Enable switch type	Safety-category compliant type
Connectable controllers	ACON/PCON/SCON/RACON/RPCON/MSCON/ASEP/PSEP/MSEP/DSEP/AMEC/PMEC /ERC2 (*1) /ERC3		
3-position enable switch	×	○	○
Functions	• Position data input/editing • Moving function (moving to set positions, jogging/inching) • Parameter editing • Monitoring (current position, current speed, I/O signals, alarm code, alarm generation time) • Saving/reading data to/from external SD cards (position data parameters, alarm list) • Takt time minimization function • Maintenance information (total number of movements, total distance travelled, etc.)		
Display	65,536 colors (16-bit colors), white LED backlight		
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)		
Environmental resistance	IP40 or equivalent		
Mass	Approx. 570g	Approx. 600g	
Cable length	5m		
Accessories	Stylus	Stylus	Stylus, TP adapter (Model number: RCB-LB-TGS) Dummy plug (Model number: DP-4S) Controller cable (Model number: CB-CON-LB005)
Standard price	—	—	—

*1 Among the ERC2 series, only the actuators bearing 4904 or greater number stamped on the serial number label can be connected.

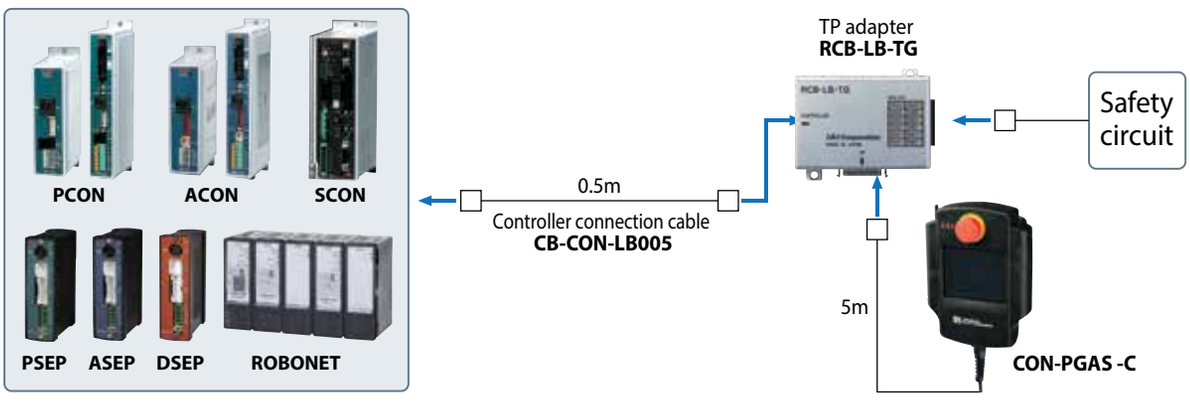
Name of each part/Outer dimensions



Option

•Strap **MODEL STR-1**

Wiring Diagram of CON-PGAS-C-S

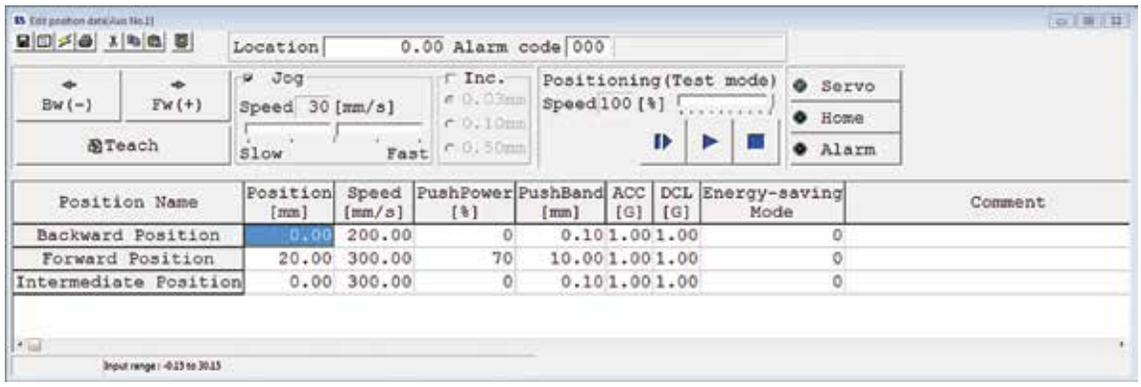


Option

PC software (Windows only)

Features

This startup support software provides functions to input positions, perform test operations and monitor data, among others. Incorporating all functions needed to make adjustments, this software helps shorten the initial startup time.

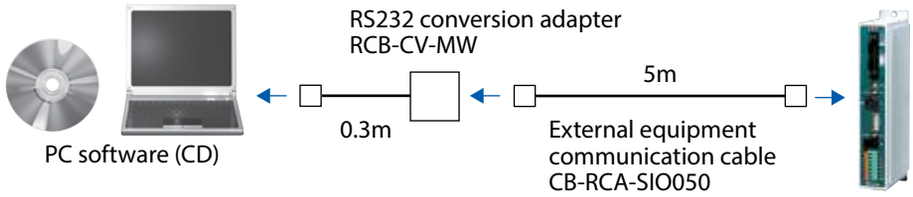


Supported Windows OS: 2000 SP4 or later / XP SP2 or later / Vista / 7

Model

RCM-101-MW
(With external equipment communicatio
+ RS232 conversion unit)

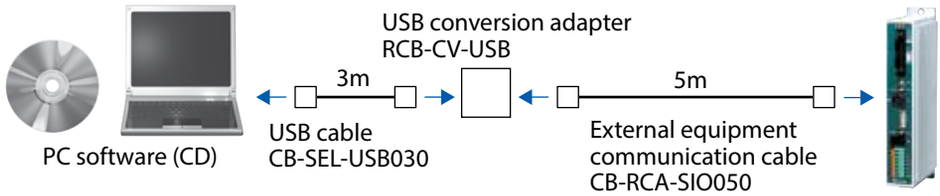
Configuration



Model

RCM-101-USB
(With external equipment communicatio
+ USB conversion adapter + USB cable)

Configuration



Absolute battery unit for SEP controllers

Description Supplied with the PSEP and ASEP simple absolute controllers.
This is a battery unit used for backing up the current position data.

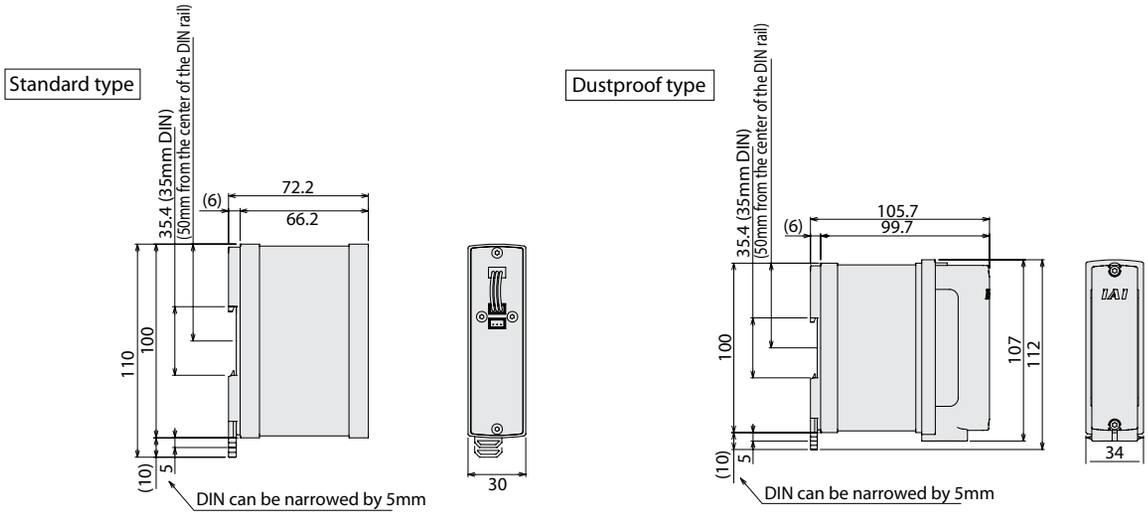
Note:
There is no simple absolute type DSEP.

Model **SEP-ABUM** (standard type)
SEP-ABUM-W (dustproof type)

Specifications

Item	Specifications			
Ambient operating temperature and humidity	0 to 40°C (about 20°C preferred), 95% RH or below (non-condensing)			
Ambient operating environment	Free from corrosive gases			
Absolute battery (*1)	Model: AB-7(Ni-MH battery/approx. 3-year life)			
Controller-absolute battery unit cable (*1)	Model: CB-APSEP-ABM005 (length 0.5m)			
Weight	Standard type: approx. 230g / Dustproof type: approx. 260g			
Allowable encoder RPM during data retention (*2)	800rpm	400rpm	200rpm	100rpm
Position data retention time (*2)	120h	240h	360h	480h

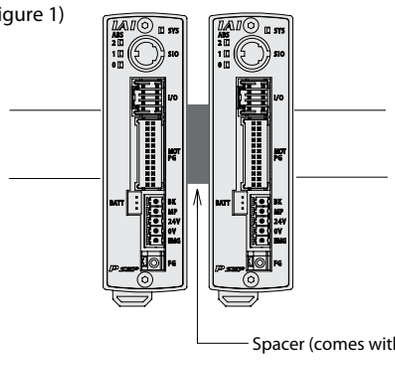
(*1) The absolute battery unit comes with a cable to connect the controller and the absolute battery unit.
(*2) Position data retention time changes with the allowable encoder RPMs during data retention.
(800rpm→120h, 400rpm→240h, 200rpm→360h,100rpm→480h)



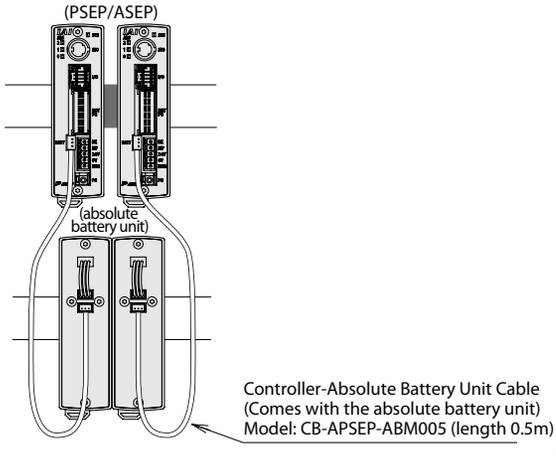
Precautions related to controllers and options:

- When mounting the controller to a DIN rail, use the supplied spacer between the controllers to prevent them from contacting each other, to deal with heat dissipation. (See Fig. 1)
- When mounting the absolute battery units and controllers, place the absolute battery units below the controllers. (See Fig. 2) If there is not enough space below the controllers, mount the absolute battery units in such a way that the temperature around the controllers stays at 40°C or below.

(Figure 1)



(Figure 2)



Components for Maintenance

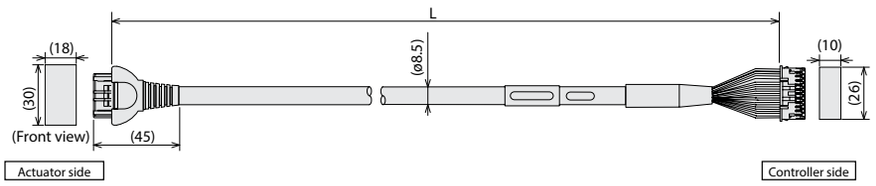
Please refer to the models listed below when arrangements such as cable replacement are needed after purchasing the product.

[RCP3/RCA2/RCL]-[PSEP/ASEP] / Integrated motor-encoder robot cable for indirect connection /Integrated motor-encoder robot cable

Model **CB-APSEP-MPA □□□/CB-APSEP-MPA □□□-LC**

* □□□ indicated the cable length (L)
Lengths up to 20m can be specified Example) 080=8m

***Refer to page A-59 for connectable actuators.**



Minimum bend radius r = 68mm or larger (when movable unit is used)

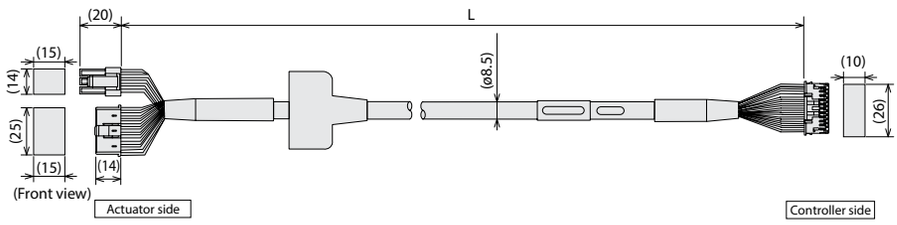
Actuator side Pin number		Controller side Pin number
A1	[PCON](ACON) Black [øA](U)	1
B1	White [VMM](V)	2
A2	Brown [ø/A](W)	5
B2	Green [øB](-)	3
A3	Yellow [VMM](-)	4
B3	Red [ø/B](-)	6
A4	Orange [LS+](BK+)	7
B4	Gray [LS-](BK-)	8
A6	White [-](A+)	11
B6	Yellow [-](A-)	12
A7	Red [A+](B+)	13
B7	Green [A-](B-)	14
A8	Black [B+](Z+)	15
B8	Brown [B-](Z-)	16
A5	Black (label)[BK+](LS+)	9
B5	Brown (label)[BK-](LS-)	10
A9	Green (label)[GNDLS](GNDLS)	20
B9	Red (label)[VPS](VPS)	18
A10	White (label)[VCC](VCC)	17
B10	Yellow (label)[GND](GND)	19
A11	NC	21
B11	Shield [FG](FG)	24
	NC	22
	NC	23

[RCP2]-[PSEP] Integrated motor-encoder robot cable for indirect connection

Model **CB-PSEP-MPA □□□** * Robot cable is the standard specification.

* □□□ indicated the cable length (L)
Lengths up to 20m can be specified Example) 080=8m

***Refer to page A-59 for connectable actuators.**



Minimum bend radius r = 68mm or larger (when movable unit is used)

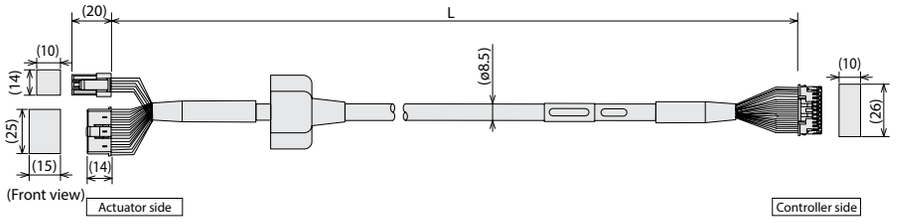
	Actuator side Pin number		Controller side Pin number
1st Connector	1	Black [ØA]	1
	2	White [VMM]	2
	4	Red [ØB]	3
	5	Green [VMM]	4
	3	Brown [Ø/A]	5
	6	Yellow [Ø/B]	6
	16	Orange [BK+]	9
	17	Gray [BK-]	10
	5	NC	11
	6	NC	12
2nd Connector	13	Black [LS+]	7
	14	Brown [LS-]	8
	1	White [A+]	13
	2	Yellow [A-]	14
	3	Red [B+]	15
	4	Green [B-]	16
	10	White (label)[VCC]	17
	11	Yellow (label)[VPS]	18
	9	Red (label)[GND]	19
	12	Green (label)[(Spare)]	20
	15	NC	21
	7	NC	22
	8	NC	23
	18	Shield [FG]	24

[RCA]-[ASEP] Integrated motor-encoder robot cable for indirect connection

Model **CB-ASEP-MPA □□□** * Robot cable is the standard specification.

* □□□ indicated the cable length (L)
Lengths up to 20m can be specified Example) 080=8m

***Refer to page A-59 for connectable actuators.**



Minimum bend radius r = 68mm or larger (when movable unit is used)

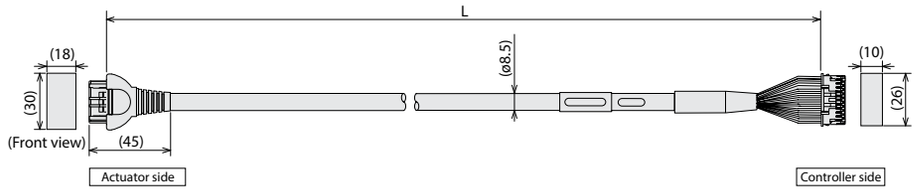
	Actuator side Pin number		Controller side Pin number
1st Connector	1	Red [U]	1
	2	Yellow [V]	2
	—	NC	3
	—	NC	4
	3	Black [W]	5
	—	NC	6
	18	Orange [BK+]	7
	17	Gray [BK-]	8
2nd Connector	7	Black [LS+]	9
	16	Brown [LS-]	10
	1	White [A+]	11
	2	Yellow [A-]	12
	3	Red [B+]	13
	4	Green [B-]	14
	10	Black (label)[Z+]	15
	11	Brown (label)[Z-]	16
	14	White (label)[VCC]	17
	13	Yellow (label)[VPS]	18
	15	Red (label)[GND]	19
	6	Green (label)[(Spare)]	20
	5	NC	21
	8	NC	22
	12	NC	23
	9	Shield [FG]	24

[RCP2 small rotary]-[PSEP] Integrated motor-encoder robot cable for indirect connection

Model **CB-RPSEP-MPA □□□** * Robot cable is the standard specification.

*□□□ indicated the cable length (L)
Lengths up to 20m can be specified Example) 080=8m

*Refer to page A-59 for connectable actuators.



Minimum bend radius r = 68mm or larger (when movable unit is used)

Actuator side Pin number		Controller side Pin number
A1	Black [øA]	1
B1	White [VMM]	2
A2	Brown [ø/A]	5
B2	Green [øB]	3
A3	Yellow [VMM]	4
B3	Red [ø/B]	6
A6	Orange [LS+]	7
B6	Gray [LS-]	8
A7	Red [A+]	13
B7	Green [A-]	14
A8	Black [B+]	15
B8	Brown [B-]	16
A4	NC	7
B4	NC	8
A5	Black (label)[BK+]	9
B5	Brown (label)[BK-]	10
A9	Green (label)[GNDLS]	20
B9	Red (label)[VPS]	18
A10	White (label)[VCC]	17
B10	Yellow (label)[GND]	19
A11	NC	21
B11	Shield [FG](FG)	24
	NC	22
	NC	23

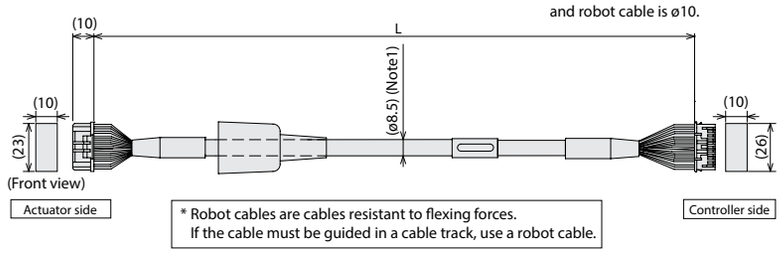
[RCD]-[DSEP] Integrated motor-encoder cable for indirect connection/ Integrated motor-encoder robot cable

Model **CB-CA-MPA □□□/CB-CA-MPA□□□-RB**

*□□□ indicated the cable length (L)
Lengths up to 20m can be specified Example) 080=8m

*Refer to page A-59 for connectable actuators.

(Note 1) If cable length is 5m or more,non-robotic cable is ø9.1 and robot cable is ø10.



* Robot cables are cables resistant to flexing forces.
If the cable must be guided in a cable track, use a robot cable.

Minimum bend radius r = 68mm or larger (when movable unit is used)

Actuator end
1-1827863-1 (AMP)

Controller end
PADP-24V-1-S (JST)

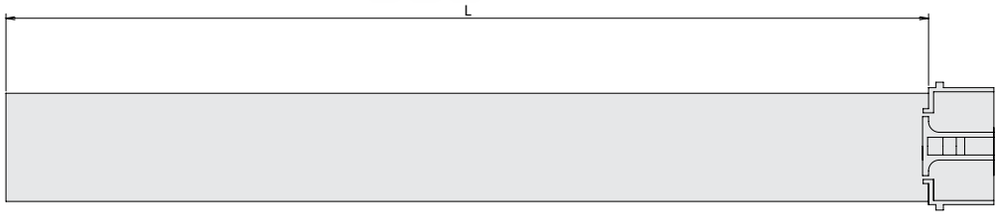
Pin No.	Signal name	Color	Pin No.	Signal name	Color
A1	ØA/U	Blue(Black)	1	ØA/U	Blue (Black)
B1	VMM/V	Orange (White)	2	VMM/V	Orange (White)
A2	Ø_A/W	Green (Brown)	5	Ø_A/W	Green (Brown)
B2	ØB/-	Brown (Green)	3	ØB/-	Brown (Green)
A3	VMM/-	Gray (Yellow)	4	VMM/-	Gray (Yellow)
B3	Ø_B/-	Red (Red)	6	Ø_B/-	Red (Red)
A4	LS+/BK+	Black (Orange)	7	LS+/BK+	Black (Orange)
B4	LS-/BK-	Yellow (Gray)	8	LS-/BK-	Yellow (Gray)
A6	-/A+	Blue (White)	11	-/A+	Blue (White)
B6	-/A-	Orange (Yellow)	12	-/A-	Orange (Yellow)
A7	A+/B+	Green (Red)	13	A+/B+	Green (Red)
B7	A-/B-	Brown (Green)	14	A-/B-	Brown (Green)
A8	B+/Z+	Gray (Black)	15	B+/Z+	Gray (Black)
B8	B-/Z-	Red (Brown)	16	B-/Z-	Red (Brown)
A5	BK+/LS+	Blue (Black)	9	BK+/LS+	Blue (Black)
B5	BK-/LS-	Orange (Brown)	10	BK-/LS-	Orange (Brown)
A9	LS_GND	Green (Green)	20	LS_GND	Green (Green)
B9	VPS	Brown (Red)	18	VPS	Brown (Red)
A10	VCC	Gray (White)	17	VCC	Gray (White)
B10	GND	Red (Yellow)	19	GND	Red (Yellow)
A11	—	—	21	—	—
B11	FG	Black (—)	22	—	—
			23	—	—
			24	FG	Black (—)

* Colors of robot cables are shown in ( ).

I/O cable for PSEP-C/ASEP-C/DSEP-C

Model **CB-APSEP-PIO □□□**

*□□□ indicated the cable length (L)
Lengths up to 10m can be specified Example) 080=8m



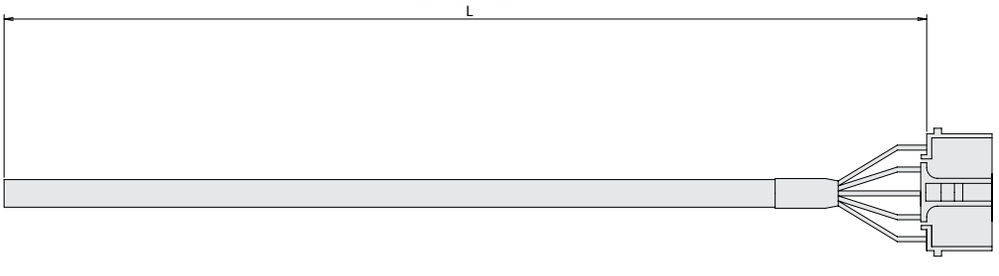
51353-1000(MOLEX)

No.	Signal	Color	Wiring
1	24V	Brown	Flat Cable (crimped)
2	0V	Red	
3	IN0	Orange	
4	IN1	Yellow	
5	IN2	Green	
6	IN3	Blue	
7	OUT0	Purple	
8	OUT1	Gray	
9	OUT2	White	
10	OUT3	Black	

I/O cable for PSEP-CW/ASEP-CW /DSEP-CW

Model **CB-APSEPW-PIO □□□**

*□□□ indicated the cable length (L)
Lengths up to 10m can be specified Example) 080=8m



51353-1000(MOLEX)

No.	Signal	Color	Wiring
1	24V	Brown	Cable (crimped)
2	0V	Brown-White	
3	IN0	Red	
4	IN1	Red-White	
5	IN2	Yellow	
6	IN3	Yellow-White	
7	OUT0	Green	
8	OUT1	Green-White	
9	OUT2	Black	
10	OUT3	Black-White	

Pulse Motor
Servo Motor (24V)
Servo Motor (200V)
Linear Servo Motor

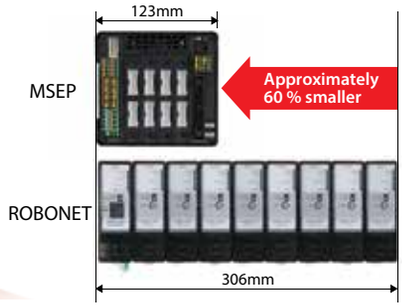
MSEP

Position controller
SEP series 8-axis type

Features

1 Compact Design

A successfully designed 8-axis compact controller with a 123 mm width x 115 mm height unit. A 60% reduction in width from the predecessor controller which contributes to space savings within the controller cabinet.



2 Supports major field networks

Allows direct connection with the major field networks including DeviceNet, CC-Link, PROFIBUS-DP, CompoNet, EtherCAT, and EtherNet/IP.

Network Specification Features

- 256 positioning points per each axis
- Allows designation of position and speed navigation numerically.
- Ability to verify current position in real-time.
- Significant communication time reduction within the controller (Approximately by 1/10 compared to the predecessor model).

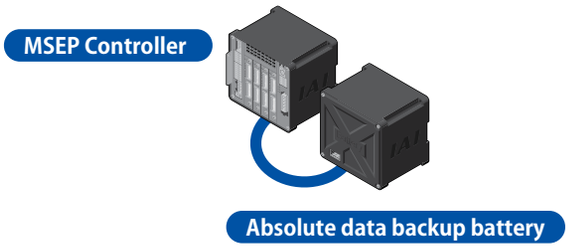
DeviceNet™
PROFIBUS®
CompoNet™
CC-Link
EtherNet/IP™
EtherCAT®
Coming soon

3 Supports major field networks

A single MSEP controller can operate both the pulse motor and the servo motor type actuators, reducing set-up efforts significantly such as wiring even when different types of actuators have to be used at the same time.

4 Simple absolute option

An absolute position encoder is available, which saves the position data by battery, providing prompt operation without returning to the home position after power off. Even in an emergency shut-off or momentary power-loss, it allows continuous operation from its last position.



Model List

Type	C							
I/O category	NP	PN	DV	CC	PR	CN	EC	EP
Item name	PIO specification (NPN type)	PIO specification (PNP type)	DeviceNet Specification	CC-Link Specification	PROFIBUS-DP Specification	CompoNet Specification	EtherCAT Specification	EtherNet/IP Specification
Exterior view	 * The picture shown is of the PIO specification. Depending on the I/O category, the PIO connector and field network joint connector changes.							
Item description	Operates via digital signals from the PLC		Operates with any of the above field network connections. A choice of method either a serial communication with PIO specification control, or transmitting traveling position, velocity and acceleration by data is available.					
No. of positions	3 positions per axis		256 positions per axis (There is no limit if operated directly by transferring data)					
Standard price	—							

Model

* Representation of the 2nd to the 8th axis is depending on the total number of axes applied. (i.e. after the 2nd axis)

(Description of the 1st axis) — (Description of the 2nd to 8th axis)

MSEP — C — [Total number of axes] — [Motor type] — I — [Encoder type] — [Option] — ([Motor type] — I — [Encoder type] — [Option]) — [I/O type] — [Type of I/O cable] — 0 — [Power-supply voltage] — [Absolute position encoder option]

Series: MSEP
Type: C

Total number of axes

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

Motor type

20P	20-frame pulse motor type	2	2 W servo motor type
20SP	20-frame pulse motor type (RA2AC, RA2BC)	5	5 W servo motor type
28P	28-frame pulse motor type	5S	5 W servo motor type (SA2A □, RA2A □ exclusive)
28SP	28-frame pulse motor type (RA3C exclusive)	10	10 W servo motor type
		20	20 W servo motor type
35P	35-frame pulse motor type	20S	20 W servo motor type (RCS2-SA4 □ /TA5□, RCA-RA3 □ exclusive)
42P	42-frame pulse motor type		
56P	56-frame pulse motor type		
P	Unused pulse motor axis (*)	30	30 W servo motor type
N	Code for no connected axis (*)	A	Unused servo motor axis (*)

(*) Please refer to the instruction for completing selected model description on the following page.

Encoder type

I	Incremental specification

Option

HA	High acceleration/ deceleration capability
LA	Power-saving

* The above options are only available with the actuator.

I/O type

NP	PIO specification (NPN type)
PN	PIO specification (PNP type)
DV	DeviceNet connection specification
CC	CC-Link connection specification
PR	PROFIBUS-DP connection specification
CN	CompoNet connection specification
ML	MECHATROLINK connection specification
EC	EtherCAT connection specification
EP	EtherNet/IP connection specification

Note) EC specifications will be available soon.

Type of I/O cable

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

Power-supply voltage

0	DC24V

Absolute position encoder option

ABB	Absolute position encoder type (with absolute data backup battery)
ABBN	Absolute position encoder type (without absolute data backup battery)
(Blank)	Incremental Type

Guide for the description of the selected configuration

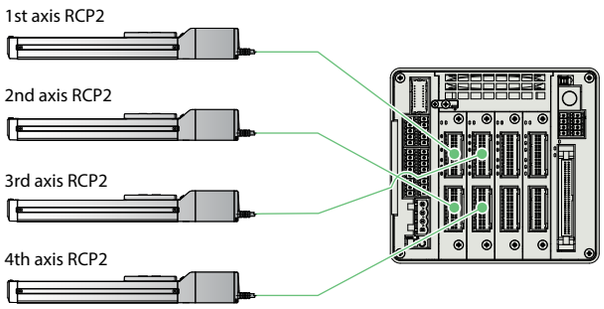
The description of the MSEP controller configuration varies depending on the type of actuator connected to the controller, and the total number of axes installed. Please see the following conditions to configure a desired controller.

Connect the SAME TYPE of actuators (either pulse motor type or servo motor type)

Please indicate the motor type code of the actuator starting from the 1st axis respectively.

e.g.) MSEP — C — 4 — 42PI — 56PI — 42PI — 56PI — NP — 2 — 0

Total number of axes: 4
1st axis: Pulse motor
2nd axis: Pulse motor
3rd axis: Pulse motor
4th axis: Pulse motor



If the total number of axes is an odd count, please indicate an [N] following the last axis description (as shown after the 3rd axis below for example).

e.g.) MSEP — C — 3 — 42PI — 56PI — 42PI — N — NP — 2 — 0

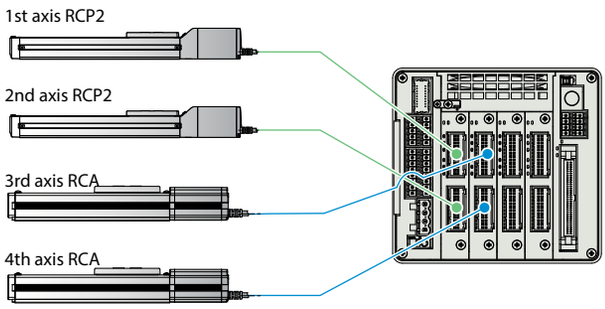
Total number of axes: 3
1st axis: Pulse motor
2nd axis: Pulse motor
3rd axis: No connected axis

Connect a MIXTURE OF TYPES of actuators (both pulse motor type and servo motor type)

Each board is designed to connect to a pair of axes, and two different types of motors cannot be connected to the same board. Please indicate the same types of motors for each pair of axes.

e.g.) MSEP — C — 4 — 42PI — 56PI — 20I — 20I — NP — 2 — 0

Total number of axes: 4
1st axis: Pulse motor
2nd axis: Pulse motor
3rd axis: Servo motor
4th axis: Servo motor



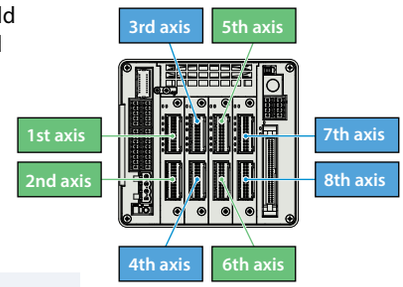
If either motor type is an odd count, please indicate an [N] following the last axis description per the corresponding board.

e.g.) MSEP — C — 3 — 42PI — N — 20SI — 30I — NP — 2 — 0

Total number of axes: 3
1st axis: Pulse motor
2nd axis: Servo motor
3rd axis: Servo motor
No connected axis

<If you choose to operate the controller with fewer axes connections now but may add more in the future>

- If there's a possibility to increase connections, for example, to 6 or 8 axes in the future but would like to start with only 4 axes to operate the controller now, it is possible to keep the base board installed as is and leave room for the potential axes by indicating an [UNUSED AXIS].
- When configuring unused axis/axes for the pulse motor, please indicate a [P] in the box for the motor type.
- When configuring unused axis/axes for the servo motor, please indicate an [A] in the box for the motor type.
- When configuring unused axis/axes, please include number of unused axis/axes in the total number of axes.



e.g.) MSEP — C — 8 — 42PI — 56PI — 20I — 10I — PI — PI — AI — AI — NP — 2 — 0

Total number of axes: 8
1st axis: Pulse motor
2nd axis: Pulse motor
3rd axis: Servo motor
4th axis: Servo motor
5th axis: Unused axis (Pulse motor)
6th axis: Unused axis (Pulse motor)
7th axis: Unused axis (Servo motor)
8th axis: Unused axis (Servo motor)

Actuator combination patterns for the MSEP

There are 40 combination patterns of the pulse motor type or the servo motor type actuator that can be connected to the MSEP controller as shown in the table below.

(all * are an incremental specification)
(The boxes in the configuration lines are to indicate the type of motor code number)

<Connectable actuators>

Pulse
Pulse motor type actuator
- **RCP4 series (*)**
- **RCP3 series**
- **RCP2 series**

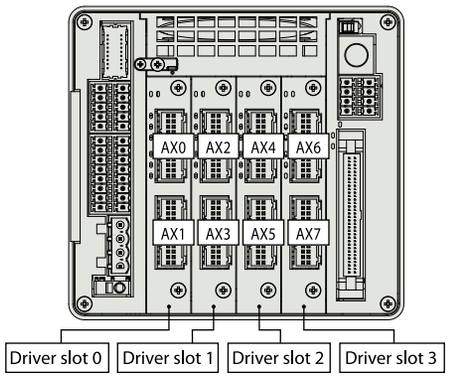
Servo
Servo motor type actuator
- **RCA2 series (*)**
- **RCA series**
- **RCL series**

(*) High-output motion is not available

1-axis to 5-axis specification

	Total number of axes	Driver slot 0 AX0	Driver slot 0 AX1	Driver slot 1 AX2	Driver slot 1 AX3	Driver slot 2 AX4	Driver slot 2 AX5	Driver slot 3 AX6	Driver slot 3 AX7	Configuration	Pattern No	Unit price Incremental specification PIO specification
1-axis specification		Pulse	N							MSEP-C-1-☐PI-N-(*)	1	—
		Servo	N							MSEP-C-1-☐I-N-(*)	2	—
2-axis specification		Pulse	Pulse							MSEP-C-2-☐PI-☐PI-(*)	3	—
		Pulse	N	Servo	N					MSEP-C-2-☐PI-N-☐I-N-(*)	4	—
		Servo	Servo							MSEP-C-2-☐I-☐I-(*)	5	—
3-axis specification		Pulse	Pulse	Pulse	N					MSEP-C-3-☐PI-☐PI-☐PI-N-(*)	6	—
		Pulse	Pulse	Servo	N					MSEP-C-3-☐PI-☐PI-☐I-N-(*)	7	—
		Pulse	N	Servo	Servo					MSEP-C-3-☐PI-N-☐I-☐I-(*)	8	—
		Servo	Servo	Servo	N					MSEP-C-3-☐I-☐I-☐I-N-(*)	9	—
4-axis specification		Pulse	Pulse	Pulse	Pulse					MSEP-C-4-☐PI-☐ PI-☐PI-☐PI-(*)	10	—
		Pulse	Pulse	Pulse	N	Servo	N			MSEP-C-4-☐PI-☐PI-☐PI-N-☐I-N-(*)	11	—
		Pulse	Pulse	Servo	Servo					MSEP-C-4-☐PI-☐PI-☐I-☐I-(*)	12	—
		Pulse	N	Servo	Servo	Servo	N			MSEP-C-4-☐PI-N-☐I-☐I-☐I-N-(*)	13	—
		Servo	Servo	Servo	Servo					MSEP-C-4-☐I-☐I-☐I-☐I-(*)	14	—
5-axis specification		Pulse	Pulse	Pulse	Pulse	Pulse	N			MSEP-C-5-☐PI-☐PI-☐PI-☐PI-☐PI-N-(*)	15	—
		Pulse	Pulse	Pulse	Pulse	Servo	N			MSEP-C-5-☐PI-☐PI-☐PI-☐PI-☐I-N-(*)	16	—
		Pulse	Pulse	Pulse	N	Servo	Servo			MSEP-C-5-☐PI-☐PI-☐PI-N-☐I-☐I-(*)	17	—
		Pulse	Pulse	Servo	Servo	Servo	N			MSEP-C-5-☐PI-☐PI-☐I-☐I-☐I-N-(*)	18	—
		Pulse	N	Servo	Servo	Servo	Servo			MSEP-C-5-☐PI-N-☐I-☐I-☐I-☐I-(*)	19	—
		Servo	Servo	Servo	Servo	Servo	N			MSEP-C-5-☐I-☐I-☐I-☐I-☐I-N-(*)	20	—

<Actuator connector and driver slot description>



6-axis to 8-axis specification

	Total number of axes	Driver slot 0		Driver slot 1		Driver slot 2		Driver slot 3		Configuration	Pattern No	Unit price Incremental specification PIO specification
		AX0	AX1	AX2	AX3	AX4	AX5	AX6	AX7			
6-axis specification		Pulse	Pulse	Pulse	Pulse	Pulse	Pulse			MSEP-C-6-□PI-□PI-□PI-□PI-□PI-□PI-(*)	21	—
		Pulse	Pulse	Pulse	Pulse	Pulse	N	Servo	N	MSEP-C-6-□PI-□PI-□PI-□PI-□PI-N-□I-N-(*)	22	—
		Pulse	Pulse	Pulse	Pulse	Servo	Servo			MSEP-C-6-□PI-□PI-□PI-□PI-□I-□I-(*)	23	—
		Pulse	Pulse	Pulse	N	Servo	Servo	Servo	N	MSEP-C-6-□PI-□PI-□PI-N-□I-□I-□I-N-(*)	24	—
		Pulse	Pulse	Servo	Servo	Servo	Servo			MSEP-C-6-□PI-□PI-□I-□I-□I-□I-(*)	25	—
		Pulse	N	Servo	Servo	Servo	Servo	Servo	N	MSEP-C-6-□PI-N-□I-□I-□I-□I-□I-N-(*)	26	—
		Servo	Servo	Servo	Servo	Servo	Servo			MSEP-C-6-□I-□I-□I-□I-□I-□I-(*)	27	—
7-axis specification		Pulse	Pulse	Pulse	Pulse	Pulse	Pulse	Pulse	N	MSEP-C-7-□PI-□PI-□PI-□PI-□PI-□PI-□PI-N-(*)	28	—
		Pulse	Pulse	Pulse	Pulse	Pulse	Pulse	Servo	N	MSEP-C-7-□PI-□PI-□PI-□PI-□PI-□PI-□I-N-(*)	29	—
		Pulse	Pulse	Pulse	Pulse	Pulse	N	Servo	Servo	MSEP-C-7-□PI-□PI-□PI-□PI-□PI-N-□I-□I-(*)	30	—
		Pulse	Pulse	Pulse	Pulse	Servo	Servo	Servo	N	MSEP-C-7-□PI-□PI-□PI-□PI-□I-□I-□I-N-(*)	31	—
		Pulse	Pulse	Pulse	N	Servo	Servo	Servo	Servo	MSEP-C-7-□PI-□PI-□PI-N-□I-□I-□I-□I-(*)	32	—
		Pulse	Pulse	Servo	Servo	Servo	Servo	Servo	N	MSEP-C-7-□PI-□PI-□I-□I-□I-□I-□I-N-(*)	33	—
		Pulse	N	Servo	Servo	Servo	Servo	Servo	Servo	MSEP-C-7-□PI-N-□I-□I-□I-□I-□I-□I-(*)	34	—
		Servo	Servo	Servo	Servo	Servo	Servo	Servo	N	MSEP-C-7-□I-□I-□I-□I-□I-□I-□I-N-(*)	35	—
8-axis specification		Pulse	Pulse	Pulse	Pulse	Pulse	Pulse	Pulse	Pulse	MSEP-C-8-□PI-□PI-□PI-□PI-□PI-□PI-□PI-□PI-(*)	36	—
		Pulse	Pulse	Pulse	Pulse	Pulse	Pulse	Servo	Servo	MSEP-C-8-□PI-□PI-□PI-□PI-□PI-□PI-□I-□I-(*)	37	—
		Pulse	Pulse	Pulse	Pulse	Servo	Servo	Servo	Servo	MSEP-C-8-□PI-□PI-□PI-□PI-□I-□I-□I-□I-(*)	38	—
		Pulse	Pulse	Servo	Servo	Servo	Servo	Servo	Servo	MSEP-C-8-□PI-□PI-□I-□I-□I-□I-□I-□I-(*)	39	—
		Servo	Servo	Servo	Servo	Servo	Servo	Servo	Servo	MSEP-C-8-□I-□I-□I-□I-□I-□I-□I-□I-(*)	40	—

(*) include codes for (I/O type)-(I/O cable length)-(Power supply)-(Absolute position encoder option)

Standard price chart

The standard price of the MSEP controller can be calculated by adding the 2 I/O type price, plus additional prices for the 3 absolute position encoder specification, and the 4 absolute data backup battery (Absolute-battery) option to the basic unit prices as listed in 1 below.

1 Basic unit price (Incremental specification + PIO specification)
+
2 Additional price by I/O type
+
3 Additional price for the absolute position encoder specification
+
4 Additional battery price for the absolute position encoder specification

The prices of combination patterns from page 566-567 (all incremental axes).

For field network specification, please add the price.

For the absolute position encoder specification, please add the price for the total number of axes in the controller.

Please add the battery price for the absolute position encoder specification. If the battery is not necessary such as it is an extra module to the controller, (if configuration code ABBN for absolute position encoder specification is selected), please omit the price for 4 .

1		+	2	+	3	+	4	=	
Pattern No	Unit price (Incremental specification/ PIO specification)		Additional I/O type price		Additional absolute position encoder specification price		Additional battery price for the absolute position encoder specification		Standard price
1	—		DeviceNet specification — CC-Link specification — PROFIBUS-DP — CompoNet specification — MECHATROLINK specification — EtherCAT specification — EtherNet/IP specification —		1st axis — 2nd axis — 3rd axis — 4th axis — 5th axis — 6th axis — 7th axis — 8th axis —		1st axis — 2nd axis — 3rd axis — 4th axis — 5th axis — 6th axis — 7th axis — 8th axis —		Specification specific standard price
2	—								
3	—								
4	—								
5	—								
6	—								
7	—								
8	—								
9	—								
10	—								
11	—								
12	—								
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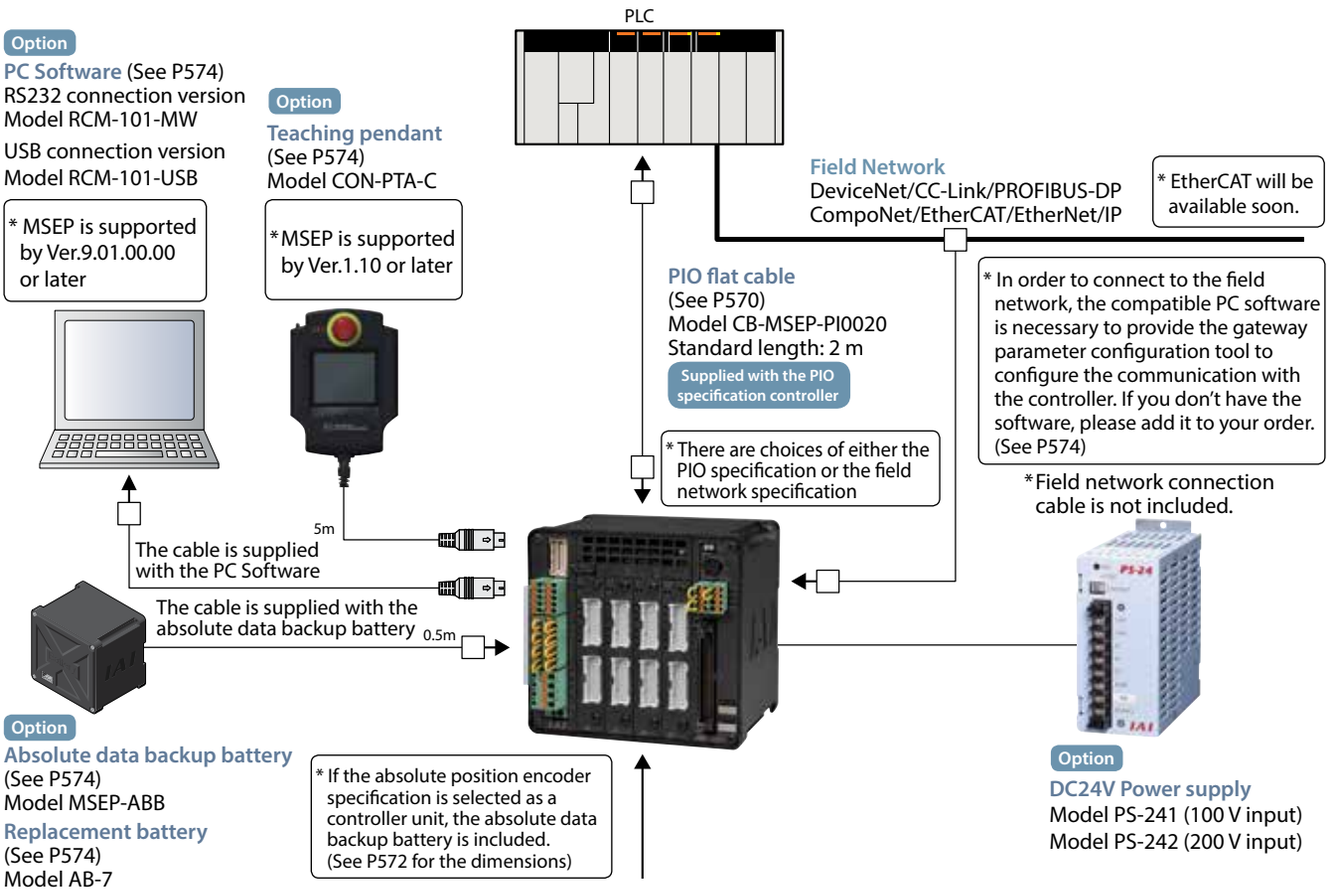
39	—								
40	—								

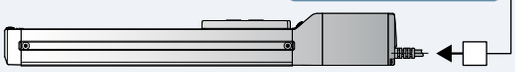
System configuration



<Connectable actuators>

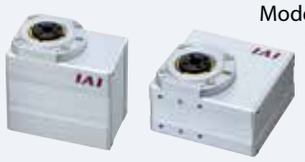
Actuators in green are according to the pulse motor specification
Actuators in blue are according to the servo motor specification

Motor-encoder integrated cable
(See P575)
Model CB-PSEP-MPA □□□
Standard 1m / 3m / 5m
Supplied with the actuator



Actuator RCP2 series
Excluding RCP2-RTBS/ RTCS

Motor-encoder integrated cable
(See P576)
Model CB-RPSEP-MPA □□□
Standard 1m / 3m / 5m
Supplied with the actuator



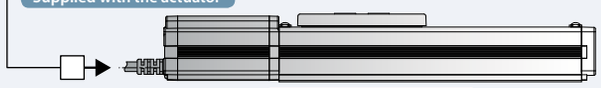
Actuator RCP2 compact rotary
(RCP2-RTBS/ RTCS)

* The rotary cannot operate with the 360-degree specifications (RCP2-RT□ SL/RT□ L/RT□ BL)

Actuator RCP4 series

* When operating the RCP4, the actuator specification differs from those when operating with the PCON-CA. Please ask for details.

Motor-encoder integrated cable
(See P575)
Model CB-ASEP-MPA □□□
Standard 1m / 3m / 5m
Supplied with the actuator



Actuator RCA series

Motor-encoder integrated cable
(See P575)
Model CB-APSEP-MPA □□□
Standard 1m / 3m / 5m
Supplied with the actuator

Actuator RCP3 series
RCP2-GRSS/GRLS/GRST
RCP2-SRA4R/SRGS4R/SRGD4R
RCA2 series
RCL series (Note 1)

(Note 1) RCL series are not compatible with the absolute position encoder specification.

Motor-encoder integrated cable
(See P575)
Model CB-CA -MPA □□□

Motor-encoder integrated ROBOT cable
(See P575) Model CB-CA -MPA □□□-RB
Standard 1m / 3m / 5m
Supplied with the actuator

* The Motor/Encoder cable type varies depending on the actuator type. When ordering a replacement cable, please see page A-59.

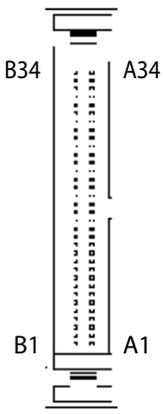
PIO Controlled Motion Mode

The MSEP controller with the PIO control specification offers the following six-motion modes. In addition, Mode No. 0 through 2 support both the single and double solenoid valves for signal configuration.

Motion Mode No.		0		1		2		3	4	5
Motion Mode Type		Standard 2-position motion		Speed change during movement		Position data change		2-input/ 3-position motion	3-input/ 3-position motion	Continuous cycle operation
Feature		2-position motion		2-position motion		2-position motion		3-position motion	3-position motion	2-position continuous motion
		Push		Push		Push		Push	Push	Push
		—		Speed change during movement		Travel position data change		—	—	—
Solenoid configurations		Single	Double	Single	Double	Single	Double	—	—	—
Input	0	Motion signal	Motion signal 1	Motion signal	Motion signal 1	Motion signal	Motion signal 1	Motion signal 1	Retract motion signal	Continuous motion signal
	1	Pause signal	Motion signal 2	Pause signal	Motion signal 2	Pause signal	Motion signal 2	Motion signal 2	Extend motion signal	Pause signal
	2	Reset signal		Speed change signal (Reset signal)		Target position change signal (Reset signal)		Reset signal	Intermediate point motion command signal (Reset signal)	Reset signal
	3	— /Servo-ON signal		— /Servo-ON signal		— /Servo-ON signal		— /Servo-ON signal	— /Servo-ON signal	— /Servo-ON signal
Output	0	Retract motion output signal		Retract motion output signal		Retract motion output signal		Retract motion output signal	Retract motion output signal	Retract motion output signal
	1	Extend motion output signal		Extend motion output signal		Extend motion output signal		Extend motion output signal	Extend motion output signal	Extend motion output signal
	2	Homing complete signal/ Servo-ON output signal		Homing complete signal/ Servo-ON output signal		Homing complete signal/ Servo-ON output signal		Intermediate point position output signal	Intermediate point position output signal	Homing complete signal/ Servo-ON output signal
	3	Alarm output signal/ Servo-ON output signal		Alarm output signal/ Servo-ON output signal		Alarm output signal/ Servo-ON output signal		Alarm output signal/ Servo-ON output signal	Alarm output signal/ Servo-ON output signal	Alarm output signal/ Servo-ON output signal

* Please refer to the controller operation instruction for the above signal information. (Download is available from our website)

PIO Plug Chart



Connector name: HIF6-68PA-1.27DS(Hirose Electric)

Pin No.	Category	Signal ID	Pin No.	Category	Signal ID
A1	24V	For I/O	A18	Output (Axis No. 0)	OUT0
A2	Input (Axis No. 0)	IN0	A19		OUT1
A3		IN1	A20		OUT2
A4		IN2	A21		OUT3
A5	Input (Axis No. 1)	IN3	A22	Output (Axis No. 1)	OUT4
A6		IN4	A23		OUT5
A7		IN5	A24		OUT6
A8		IN6	A25		OUT7
A9	Input (Axis No. 2)	IN7	A26	Output (Axis No. 2)	OUT8
A10		IN8	A27		OUT9
A11		IN9	A28		OUT10
A12		IN10	A29		OUT11
A13	Input (Axis No. 3)	IN11	A30	Output (Axis No. 3)	OUT12
A14		IN12	A31		OUT13
A15		IN13	A32		OUT14
A16		IN14	A33		OUT15
A17		IN15	A34	0V	For I/O

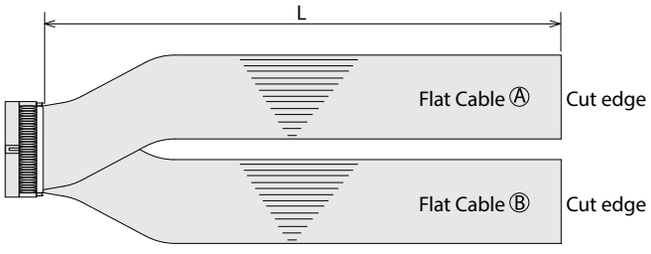
Connector name: HIF6-68PA-1.27DS(Hirose Electric)

Pin No.	Category	Signal ID	Pin No.	Category	Signal ID
B1	24V	For I/O	B18	Output (Axis No. 4)	OUT16
B2	Input (Axis No. 4)	IN16	B19		OUT17
B3		IN17	B20		OUT18
B4		IN18	B21		OUT19
B5	Input (Axis No. 5)	IN19	B22	Output (Axis No. 5)	OUT20
B6		IN20	B23		OUT21
B7		IN21	B24		OUT22
B8		IN22	B25		OUT23
B9	Input (Axis No. 6)	IN23	B26	Output (Axis No. 6)	OUT24
B10		IN24	B27		OUT25
B11		IN25	B28		OUT26
B12		IN26	B29		OUT27
B13	Input (Axis No. 7)	IN27	B30	Output (Axis No. 7)	OUT28
B14		IN28	B31		OUT29
B15		IN29	B32		OUT30
B16		IN30	B33		OUT31
B17		IN31	B34	0V	For I/O

PIO Flat Cable

Mode **CB-MSEP-PIO □□□**

* Please indicate cable length (L) in □□□, maximum 10m. e.g.) 020=2m



Connector: HIF6-068D-1.27R

Connection Chart

Pin No.	Signal name
A1	For I/O +24V
A2	IN0
A3	IN1
A4	IN2
A5	IN3
A6	IN4
A7	IN5
A8	IN6
A9	IN7
A10	IN8
A11	IN9
A12	IN10
A13	IN11
A14	IN12
A15	IN13
A16	IN14
A17	IN15
A18	OUT0
A19	OUT1
A20	OUT2
A21	OUT3
A22	OUT4
A23	OUT5
A24	OUT6
A25	OUT7
A26	OUT8
A27	OUT9
A28	OUT10
A29	OUT11
A30	OUT12
A31	OUT13
A32	OUT14
A33	OUT15
A34	GND for I/O

Flat cable Ⓐ

Connector: HIF6-068D-1.27R

Pin No.	Signal name
B1	For I/O +24V
B2	IN16
B3	IN17
B4	IN18
B5	IN19
B6	IN20
B7	IN21
B8	IN22
B9	IN23
B10	IN24
B11	IN25
B12	IN26
B13	IN27
B14	IN28
B15	IN29
B16	IN30
B17	IN31
B18	OUT16
B19	OUT17
B20	OUT18
B21	OUT19
B22	OUT20
B23	OUT21
B24	OUT22
B25	OUT23
B26	OUT24
B27	OUT25
B28	OUT26
B29	OUT27
B30	OUT28
B31	OUT29
B32	OUT30
B33	OUT31
B34	GND for I/O

Flat cable Ⓑ

PIO Input/Output Interface

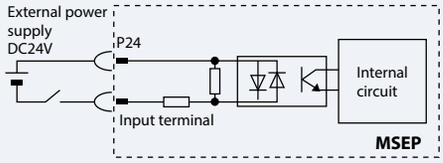
Input External Input Specification

Item	Specification
Input voltage	DC24V ±10%
Input current	5mA, 1 circuit
ON/OFF voltage	ON voltage MIN.DC18V OFF voltage MAX.DC6V

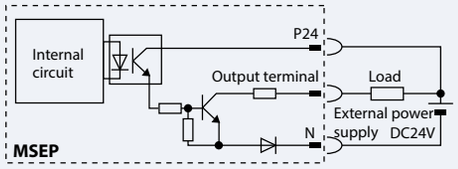
Output External Output Specification

Item	Specification
Load voltage	DC24V ±10%
Maximum load current	50mA, 1 circuit
Leakage current	MAX 2mA/one point

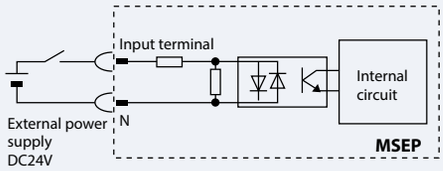
NPN specification



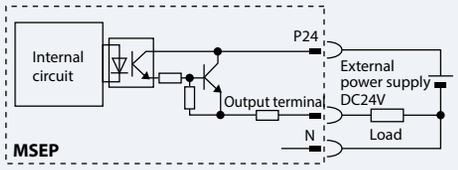
NPN specification



PNP specification



PNP specification



Field Network Control Motion Mode

There are five motion modes to choose from in the field network control mode with the MSEP controller as follows.

Motion pattern (*1)	Description	Outline
Positioner 1/ Simple numerical mode	Positioner 1 mode is programmable up to 256 positions of data to designate the stop position. The simple numerical control allows designating the target position numerically. They both have the capability of monitoring the current position.	PLC: Target position, Target position number, Control signal / Current position, End position number, Status signal — Communication via field network — Actuator
Direct numerical control mode	This mode allows designating the target position, velocity, acceleration, and current parameters for pushing. Also, it is capable of monitoring the current position, real-time velocity, and the electric current command value.	PLC: Target position, Positioning width, Velocity, Acceleration, Pushing percentage, Control signal / Current position, Current value (Designated value), Current velocity (Designated value), Alarm code, Status signal — Communication via field network — Actuator
Positioner 2 mode	Positioner 2 mode is programmable up to 256 positions of data to designate stop positions, and this mode does not allow monitoring of the current position. This mode has less in/out data transfer volume than the positioner 1 mode.	PLC: Target position number, Control signal / End position number, Status signal — Communication via field network — Actuator
Positioner 3 mode	Positioner 3 mode is programmable up to 256 positions of data to designate stop positions, and this mode does not allow monitoring of the current position. This mode has less in/out data transfer volume from the positioner 2 mode, and operates under minimum number of signals.	PLC: Target position number, Control signal / End position number, Status signal — Communication via field network — Actuator
SEP I/O	This mode allows the same functions with the field network as the PIO controlled motion mode 0 to 5 as described in the previous page.	Please refer to the PIO controlled motion mode.

(*1) Only the positioner 3 mode and the SEP I/O mode are available with CompoNet.

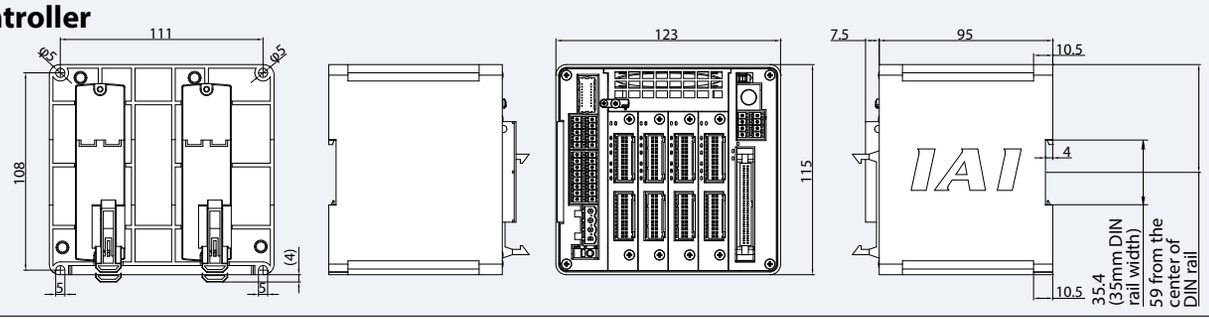
Table of General Specification

Specification item		Description						
Number of axes in the controller		8 axes MAX						
Controller/ Motor input power		DC24V ±10%						
Brake power supply		0.15A x Number of axis						
Controller power supply		0.8A						
Controller inrush current		5A MAX, under 30ms						
Motor consumption current		Servo motor type	Rated ampere	Maximum: Energy saver	Maximum: Standard/ Hi-accel./decel.	Pulse motor type	Rated ampere	Maximum
		2W	0.8A		4.6A	20P	1.0A	2.0A
		5W	1.0A		6.4A	28P	2.0A	2.0A
		5W (RCA2-SA2)	1.0A		2.0A			
		10W(RCL)	1.3A		6.4A	35P	2.0A	2.0A
		10W(RCA/RCA2)		2.5A	4.4A			
		20W	1.3A	2.5A	4.4A	42P	2.0A	2.0A
		20W(20S type)	1.7A	3.4A	5.1A			
		30W	1.3A	2.2A	4.4A	56P	2.0A	2.0A
Motor inrush current		Slot numbers x 10A MAX, under 5ms						
Motor-encoder cable length		Maximum length 20m (note) for absolute position						
Serial communication (SIO port: dedicated teaching)		RS485 1ch (Modbus protocol compatible) Velocity 9.6~230.4kbps						
External interface	PIO specification	PIO specification : DC24 V dedicated signal in/output; Maximum input of 4 points/axis; Maximum output of 4 points/axis; Maximum cable length 10m						
	Field network specification	DeviceNet, CC-Link, PROFIBUS-DP, CompoNet, EtherCAT, EtherNet/IP(*)						
Data configuration and input method		PC software application, touch panel teaching pendant, gateway parameter configuration tool						
Data retention memory		Restore the position data and parameter in non-volatile memory (no limited input)						
Positioning points		PIO specification: 2 or 3 points Field network specification: 256 points (no limited input for the simple numerical control and the direct numerical control) (Note) The number of designated positions vary depending on the parameter configuration with motion mode selection.						
LED display (On the front panel)		LED for driver status, 8 LEDs (for each driver board) Status LED, 4 LEDs (PIO specification), 7 LEDs (Fieldbus specification)						
Electromagnetic brake force release		Enable to force-release by transmitting a deactivation signal to each axis (DC24 V input).						
Surge protection		Overcurrent protection (An interception semiconductor circuit is furnished on each slot)						
Electric shock protection		Class I basic insulation						
Insulation resistance		DC500V 10MΩ						
Weight		620g, 690g with the absolute position encoder specification plus 1950 g absolute data backup battery (8-axis specification)						
Cooling method		Forced- air cooling						
Required ambient temperature/ humidity for operation		0~40°C, under 85% RH (non-condensing)						
Vibration resistance		Frequency 10~57Hz/Amplitude 0.075mm Frequency 57~150Hz/Acceleration 9.8m/s^2 Each XYZ direction, sweep time 10 minutes, sweep count 10 times						
Shock resistance		150mm/s^2, 11 ms half sine wave pulse, each XYZ direction 3 times						
International Protection code		IP20						

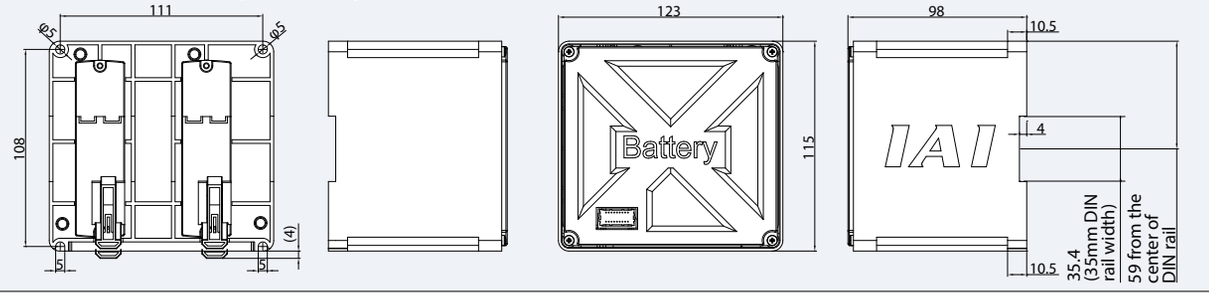
(*) EtherCAT will be available soon.

Exterior Dimensions

Controller

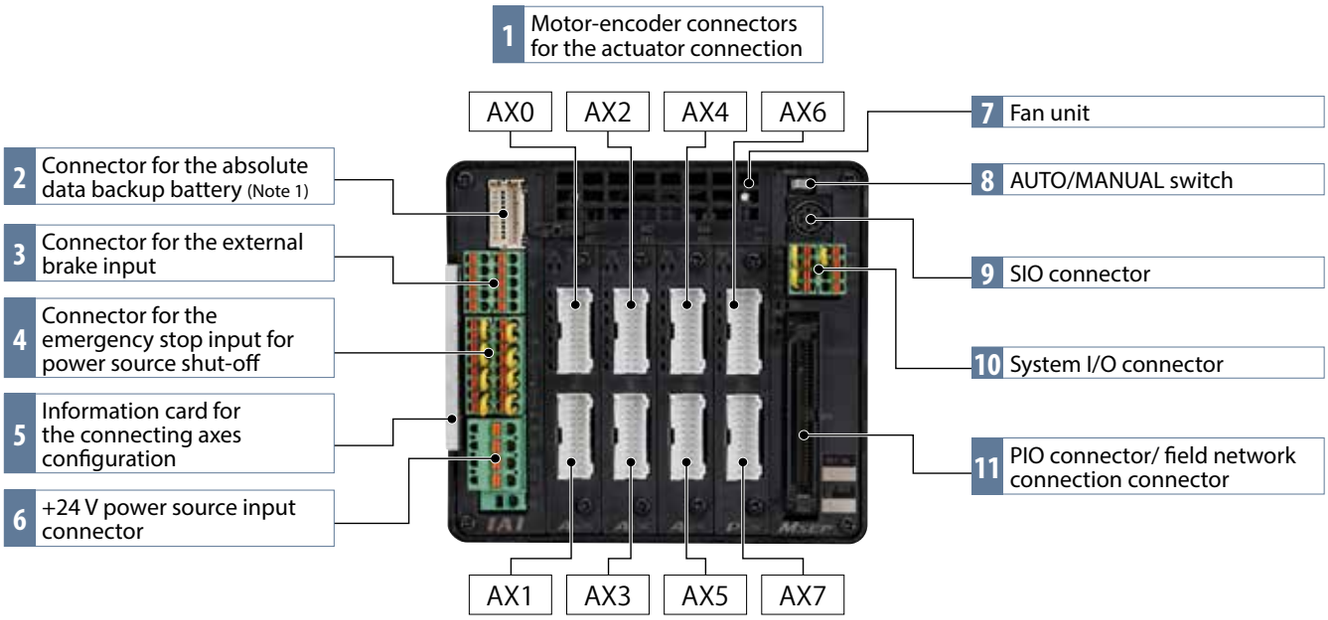


Absolute data backup battery box



MSEP Controller

Names of the MSEP Controller components



Note) All the connectors are represented as AX0 through AX7. Please be aware that the motor-encoder cable for the first axis is to be connected to AX0 and the second axis to AX1 respectively.

Descriptions of the components

1 Motor-encoder connectors for the actuator connection
Connect motor-encoder cable to the actuator.

2 Connector for the absolute data backup battery (Note 1) Connector is not used for the incremental specification.
Connect the absolute data backup battery if the controller has the absolute position encoder specification.

3 Connector for the external brake input
The connector to input a signal to release the brake for the actuator externally.

4 Connector for the emergency stop input for power source shut-off
The emergency stop input connector to connect in/output terminal of the external relay of the motor drive shut –off and each driver slot (*1).

5 Information card for configuration of the connecting axes
The information card contains information regarding the configuration of the controller axes which is removable to examine the contents.

6 +24 V power source input connector
The main power source connector for the controller: Motor drive source shut-down is possible while restoring the power source for the controller unit in case of an emergency shut-down; This is because the terminals for the power source of the motor and the controller are separate.

7 Fan unit
Easily replaceable fan unit. (Replacement fan unit: Model MSEP-FU).

8 AUTO/MANUAL switch
To switch automatic operation to/from manual operation.

9 SIO connector
To connect teaching box and the connecting cable for PC software.

10 System I/O connector
The connector for remote AUTO/MANU switch input and emergency stop input for the entire controller with functions including an external regeneration-resistance expansion terminal.

11 PIO connector/ field network connection connector
The PIO specification — connects to a 68-pin ribbon I/O cable.
The field network specification — connects to a field network type specified on the MSEP controller.

(*1) The shut-off feature is available on a single slot basis which is for two axes per slot. Please note that a single axis basis cannot be accommodated.

Options

Teaching pendant

Summary Teaching device for positioning input, test operation, and monitoring.

Model **CON-PTA-C** (Touch panel teaching pendant)

Setting

Specification

Item	CON-PTA-C-ENG
Data input	○
Actuator motion	○
Operating ambient temperature/humidity	Temperature 0 to 40°C, humidity 85%RH or less
Operating environment	Free from corrosive gas and especially, considerably dusty condition
Protection degree	IP40
Weight	Approximately 570g
Cable length	5m
Display	65,536 color White LED back light
Standard price	—

PC software (Windows only)

* For the field network specification, the PC software is required.

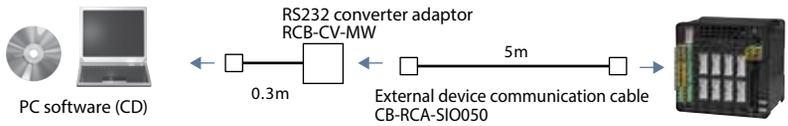
Supported Windows OS: 2000 SP4 or later / XP SP2 or later / Vista / 7

Summary A startup support software for inputting positions, performing test runs, and monitoring. With enhancements for adjustment functions, the startup time is shortened.

Model **RCM-101-MW** (External device communication cable + RS232 conversion unit)

MSEP is supported by Ver.9.01.00.00 or later

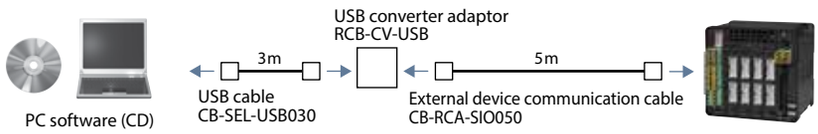
Setting



Model **RCM-101-USB** (External device communication cable + USB converter adaptor + USB cable)

MSEP is supported by Ver.9.01.00.00 or later

Setting



External regeneration resistor

Summary The regeneration resistor converts regenerated current dissipated during deceleration of the motor load into heat. The MSEP controller has an internal regeneration resistor for ordinary operations, however, depending on the operational condition, please install an external regeneration resistor if the internal regeneration resistor capacity is insufficient.
Note: When 3 or more servo actuators with the HA option are used then a regeneration resistor is recommended to convert the excess motor current into heat.

Model **RER-1**

Exterior dimensions

Square shape helix resistor:BGR10THA12RJ(KOA)

Driver board

Summary A supplement or modification to the driver board is feasible with the MSEP controller. When the actuator that control motions needs to be modified, just replacing the driver board would serve the purpose without changing the entire controller. (The parameters need to be adjusted when changing the driver board)

Model

Type			Model	Standard price
For the pulse motor	Incremental	1-axis	MSEP-PD1-I	—
		2-axis	MSEP-PD2-I	—
	Absolute position encoder	1-axis	MSEP-PD1-A	—
		2-axis	MSEP-PD2-A	—
For the servo motor	Incremental	1-axis	MSEP-AD1-I	—
		2-axis	MSEP-AD2-I	—
	Absolute position encoder	1-axis	MSEP-AD1-A	—
		2-axis	MSEP-AD2-A	—

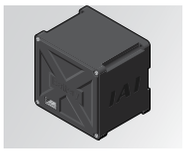
Box for the absolute data backup battery

Summary If the absolute position encoder specification is selected with code ABB, the absolute data backup battery box is included with the controller. However, if the battery box is ordered as a separate unit, it does not include the battery but just the box itself. If the battery is needed, please purchase it separately. (Model: AB-7).

Model **MSEP-ABB** (Battery not included)

Exterior dimensions **See P. 572**

* A cable (Model CB-MSEP-AB005) that connects the absolute data backup battery box to the MSEP is included with the box.



Replacement battery

Summary The replacement battery for the absolute data backup battery box.

Model **AB-7**

Replacement fan unit

Model **MSEP-FU**

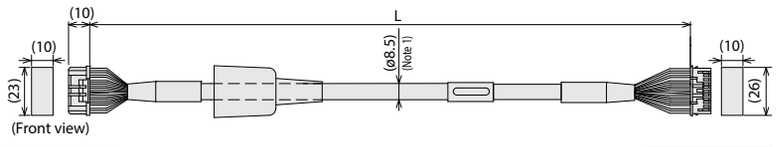
Service Parts

Integrated Motor-Encoder Cable/ Motor-Encoder Robot Cable for RCP4

Model **CB-CA-MPA□□□/CB-CA-MPA□□□-RB**

*Enter the cable length (L) into □□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m

*Refer to page A-59 for connectable actuators.



Actuator side — Minimum bend radius R: r = 68mm or larger (for movable use) — Controller side

* The robot cable is designed for flex-resistance:
Please use the robot cable if the cable has to be installed through the cable track.

(Note 1) If cable length is 5m or more, non-robotic cable is ø9.1 and robot cable is ø10.

Actuator side 1-1827863-1 (AMP)			Controller side PADP-24V-1-S (JST)		
Pin No.	Signal name	Color	Pin No.	Signal name	Color
A1	ØA/U	Blue(Black)	1	ØA/U	Blue (Black)
B1	VMM/V	Orange (White)	2	VMM/V	Orange (White)
A2	Ø_A/W	Green (Brown)	5	Ø_A/W	Green (Brown)
B2	ØB/-	Brown (Green)	3	ØB/-	Brown (Green)
A3	VMM/-	Gray (Yellow)	4	VMM/-	Gray (Yellow)
B3	Ø_B/-	Red (Red)	6	Ø_B/-	Red (Red)
A4	LS+/BK+	Black (Orange)	7	LS+/BK+	Black (Orange)
B4	LS-/BK-	Yellow (Gray)	8	LS-/BK-	Yellow (Gray)
A6	-/A+	Blue (White)	11	-/A+	Blue (White)
B6	-/A-	Orange (Yellow)	12	-/A-	Orange (Yellow)
A7	A+/B+	Green (Red)	13	A+/B+	Green (Red)
B7	A-/B-	Brown (Green)	14	A-/B-	Brown (Green)
A8	B+/Z+	Gray (Black)	15	B+/Z+	Gray (Black)
B8	B-/Z-	Red (Brown)	16	B-/Z-	Red (Brown)
A5	BK+/LS+	Blue (Black)	9	BK+/LS+	Blue (Black)
B5	BK-/LS-	Orange (Brown)	10	BK-/LS-	Orange (Brown)
A9	LS_GND	Green (Green)	20	LS_GND	Green (Green)
B9	VPS	Brown (Red)	18	VPS	Brown (Red)
A10	VCC	Gray (White)	17	VCC	Gray (White)
B10	GND	Red (Yellow)	19	GND	Red (Yellow)
A11	—	—	21	—	—
B11	FG	Black (—)	22	—	—
			23	—	—
			24	FG	Black (—)

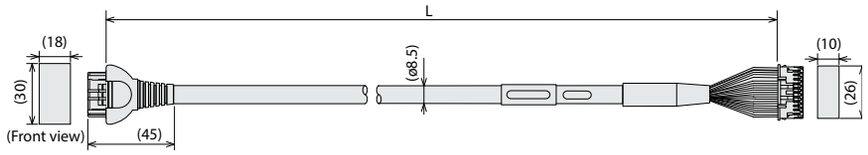
* Color in ( ) indicates color of robot cable

Integrated Motor-Encoder Robot Cable/ Motor-Encoder Cable for RCP3/RCA2 and others

Model **CB-APSEP-MPA□□□/CB-APSEP-MPA□□□-LC**

*Enter the cable length (L) into □□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m

*Refer to page A-59 for connectable actuators.



Actuator side — Minimum bend radius R: r = 68mm or larger (for movable use) — Controller side

Actuator side Pin number		Controller side Pin number
A1	[PCON](ACON) Black [ØA](U)	1
B1	White [VMM](V)	2
A2	Brown [Ø/A](W)	5
B2	Green [ØB](-)	3
A3	Yellow [VMM](-)	4
B3	Red [Ø/B](-)	6
A4	Orange [LS+](BK+)	7
B4	Gray [LS-](BK-)	8
A6	White [-](A+)	11
B6	Yellow [-](A-)	12
A7	Red [A+](B+)	13
B7	Green [A-](B-)	14
A8	Black [B+](Z+)	15
B8	Brown [B-](Z-)	16
A5	Black (label)[BK+](LS+)	9
B5	Brown (label)[BK-](LS-)	10
A9	Green (label)[GNDLS](GNDLS)	20
B9	Red (label)[VPS](VPS)	18
A10	White (label)[VCC](VCC)	17
B10	Yellow (label)[GND](GND)	19
A11	NC	21
B11	Shield [FG](FG)	24
	NC	22
	NC	23

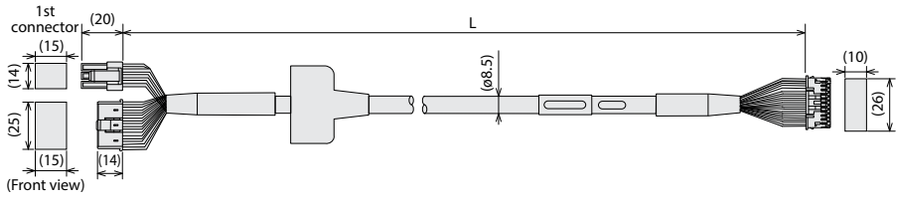
Integrated Motor-Encoder Robot Cable for RCP2

Model **CB-PSEP-MPA□□□**

* Robot cable is the standard specification.

*Enter the cable length (L) into □□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m

*Refer to page A-59 for connectable actuators.



Actuator side — Minimum bend radius R: r = 68mm or larger (for movable use) — Controller side

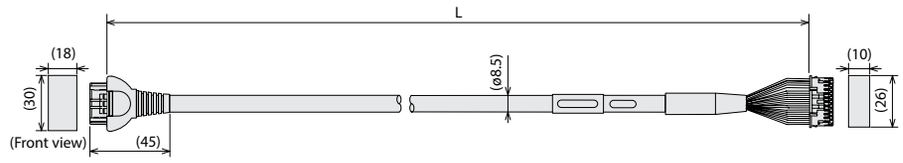
	Actuator side Pin number		Controller side Pin number
1st Connector	1	Black [ØA]	1
	2	White [VMM]	2
	4	Red [ØB]	3
	5	Green [VMM]	4
	3	Brown [Ø/A]	5
	6	Yellow [Ø/B]	6
	16	Orange [BK+]	9
	17	Gray [BK-]	10
	5	NC	11
	6	NC	12
2nd Connector	13	Black [LS+]	7
	14	Brown [LS-]	8
	1	White [A+]	13
	2	Yellow [A-]	14
	3	Red [B+]	15
	4	Green [B-]	16
	10	White (label)[VCC]	17
	11	Yellow (label)[VPS]	18
	9	Red (label)[GND]	19
	12	Green (label)[Spare]	20
	15	NC	21
	7	NC	22
	8	NC	23
	18	Shield [FG]	24

Integrated Motor-Encoder Robot Cable for RCP2-RTBS/RTBSL/RTCS/RTCSL

Model **CB-RPSEP-MPA** □□□ * Robot cable is the standard specification.

*Enter the cable length (L) into □□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m

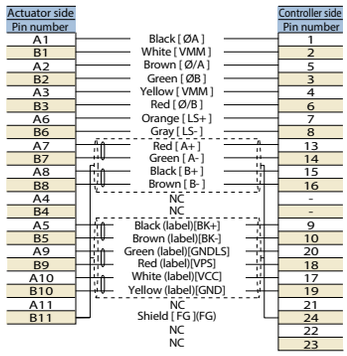
*Refer to page A-59 for connectable actuators.



Actuator side

Minimum bend radius R: r = 68 mm or larger (for movable use)

Controller side

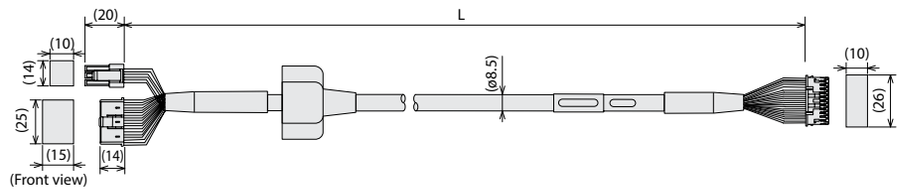


Integrated Motor-Encoder Robot Cable for RCA

Model **CB-ASEP-MPA** □□□ * Robot cable is the standard specification.

*Enter the cable length (L) into □□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m

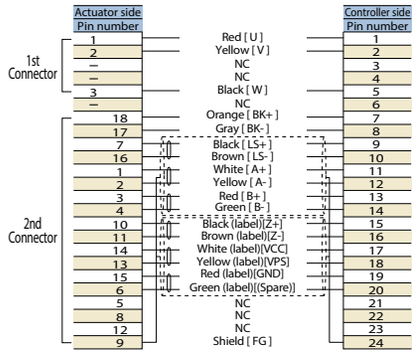
*Refer to page A-59 for connectable actuators.



Actuator side

Minimum bend radius R: r = 68 mm or larger (for movable use)

Controller side



ERC3 controller specification

■Model number NP/PN/SE/PLN/PLP

Controller part of actuator with built-in controller

List of Models

Controller type	CON type					MEC type		
Operation mode	Positioner mode			Pulse-train control mode		Positioner mode		
I/O type	PIO		SIO	NPN	PNP	PIO		SIO
	NPN	PNP				NPN	PNP	
Type (I/O type)	NP	PN	SE	PLN	PLP	NP	PN	SE
Position points	16 points		512 points (When the PIO converter or gateway unit is used)	—	—	3 points		2 points/ 3 points
Description	Basic type	Basic type	The PIO converter or gateway unit can be used. (Note)	When pulse trains are used	When pulse trains are used	3-point movement	3-point movement	The Quick Teach and PIO converter or gateway unit can be used. (Note)
External view								
Standard price	—							

(Note) The PIO converter and gateway unit cannot be used at the same time.

Model number

⑦ & ⑨ refers to the I/O type and controller type shown in the above table.

① Series
- ERC3 Standard type
- ERC3CR Cleanroom type
- ERC3D Simple, dustproof type

② Type
- SA5C Actuator width 50mm
- SA7C Actuator width 74mm
- RA4C Actuator width 45mm
- RA6C Actuator width 64mm

③ Encoder type
- I Incremental type

④ Motor type
- 42P Pulse motor 42□size
- 56P Pulse motor 56□size

⑤ Lead
- 20 for SA5C/RA4C 20mm
- 12 for SA5C/RA4C 12mm
- 6 for SA5C/RA4C 6mm
- 3 for SA5C/RA4C 3mm
- 24 for SA7C/RA6C 24mm
- 16 for SA7C/RA6C 8mm
- 8 for SA7C/RA6C 8mm
- 4 for SA7C/RA6C 4mm

⑥ Stroke
- Slider type: 50 50mm; 〜 〜; 800 800mm
- Rod type: 50 50mm; 〜 〜; 300 300mm

(Can be set in 50mm increments)

⑦ I/OType
- NP PIO (NPN) type
- PN PIO (PNP) type
- SE SIO type
- PLN Pulse-train (NPN) type
- PLP Pulse-train (PNP) type

⑧ Cable length
- N None
- P 1m
- S 3m
- M 5m
- X□□ Custom length

* The standard cable is a robot cable.

⑨ Controller type
- CN CON type
- MC MEC type

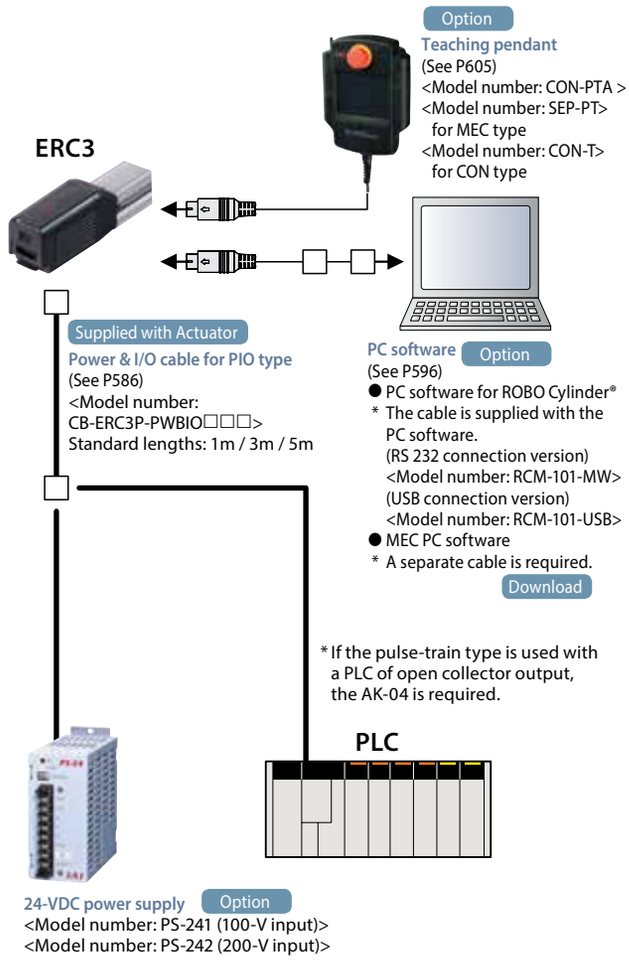
* If the I/O type is PLN or PLP, "CN" is selected automatically.

⑩ Option
- B Brake
- NM Non-motor end specification
- ABU Simple absolute specification
- FL Flange
- FT Foot bracket
- VR Vacuum joint on opposite side

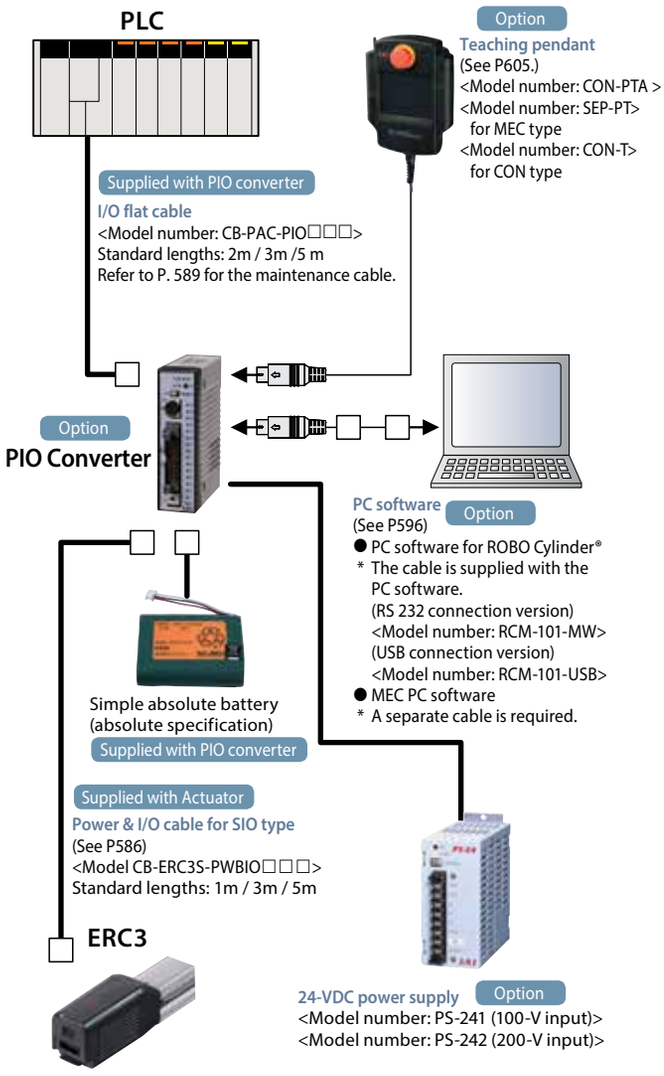
* The simple absolute specification can be selected only when the I/O type is "SIO communication."
* The flange and foot bracket option can be selected only for rod types.

System Configuration

■PIO Type/Pulse-train type

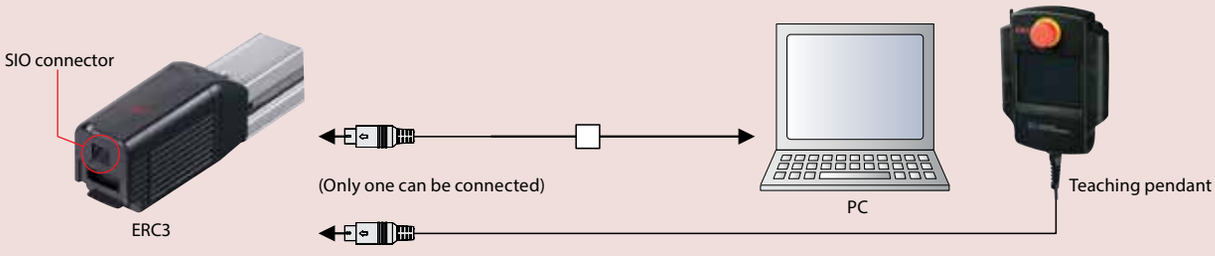


■SIO Type



PC Wiring Diagram

The SIO connector is used to connect a teaching tool.



List of Base Controller Specifications

Item		Description
Power supply voltage		24 VDC±10%
Load current (including current consumed for control)		High-output setting enabled: 3.5 A rated/4.2 A max. High-output setting disabled: 2.2A
Heat output		High-output setting enabled: 8 W High-output setting disabled: 5W
Rush current (Note 1)		8.3A
Momentary power failure resistance		MAX. 500µs
Motor control method		Field-weakening vector control
Supported encoder		Incremental encoder of 800 pulses/rev in resolution
Actuator cable length		10 m max.
Serial communication interface (SIO port)		RS485: 1 channel (conforming to Modbus protocol RTU/ASCII) / Speed: 9.6 to 230.4 kbps Actuators can be controlled via serial communication in a mode other than pulse-train
External interface PIO specification		Dedicated 24-VDC signal input/output (NPN or PNP selected)—Up to 6 input points, up to 4 output points Cable length: 10m max.
Data setting/input method		PC software, touch-panel teaching pendant, quick teach
Data retention memory		Position data and parameters are saved in the non-volatile memory (There is no limit to the number of times the memory can be written.)
Operation mode		Positioner mode/Pulse-train control mode
Number of positions in positioner mode		Standard 8 points, maximum 16 points Note) Positioning points vary depending on the selected PIO pattern.
Pulse-train interface	Input pulse	Differential method (line driver method): 200 kpps max. / Cable length: 10m max.
		Open collector method: Not supported * If the host is of open collector output type, use the optional AK-04 (sold separately) to convert open collector pulses to differential pulses.
	Command pulse magnification (electronic gear ratio: A/B)	1/50 < A/B < 50/1 Setting range of A and B (set by parameters): 1 to 4096
	Feedback pulse output	None
LED indicators (installed on the motor unit)		Servo ON (green), servo OFF (unlit), emergency stop (red), alarm (red), resetting (orange)
Isolation resistance		500 VDC, 10 MΩ or more
Electric shock protection mechanism		Class I basic isolation
Cooling method		Natural air cooling
Environment	Ambient operating temperature	0 to 40°C
	Ambient operating humidity	85%RH or less (non-condensing)
	Ambient storage temperature	-20 to 70°C (excluding batteries)
	Operating altitude	Altitude 1000m or less
	Protection degree	IP20
	Cooling method	Natural air cooling
	Vibration resistance	(Test conditions) Number of vibrations: 10 to 57 Hz/Amplitude: 0.075 mm Number of vibrations: 57 to 150 Hz/Acceleration: 9.8 m/s^2 Sweep time in X/Y/Z directions: 10 minutes/Number of sweeps: 10 times
	Impact	(Test conditions) 150mm/sec^2, 11mm/sec, sinusoidal half pulse, 3 times each in X, Y and Z directions

Note 1 Rush current will flow for approx. 5msec after the power is turned on (at 40°C).
Take note that the value of rush current varies depending on the impedance of the power line.

Emergency Stop Circuit

The ERC3 series has no built-in emergency stop circuit, so the customer must provide an emergency stop circuit. Refer to the operation manual for details on the emergency stop circuit.

■Positioner mode

I/O specification (PIO type)

■Input Part

Item	Specification
Input points	6 points
Input voltage	24 VDC ±10%
Input current	5mA/1 circuit
Leak current	1mA/point max.

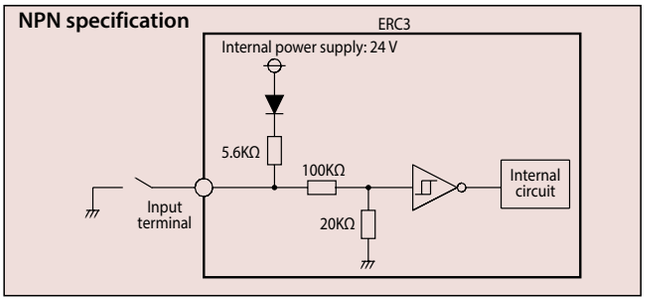
* The input circuit is not isolated from signals input from external equipment.

■Output Part

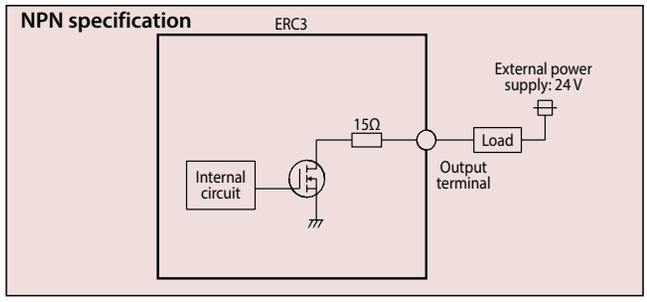
Item	Specification
Output points	4 points
Load voltage	24 VDC ±10%
Maximum load current	5mA/1 circuit
Residual voltage	2 V or less

* The output circuit is not isolated from signals output to external equipment.

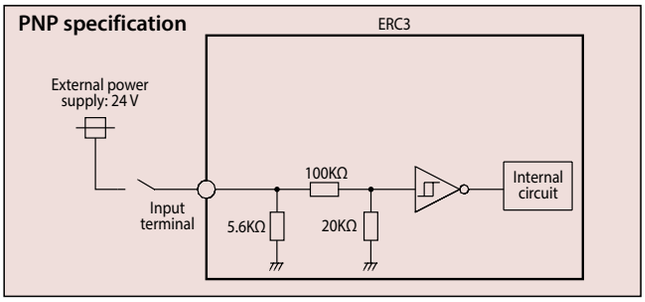
NPN specification



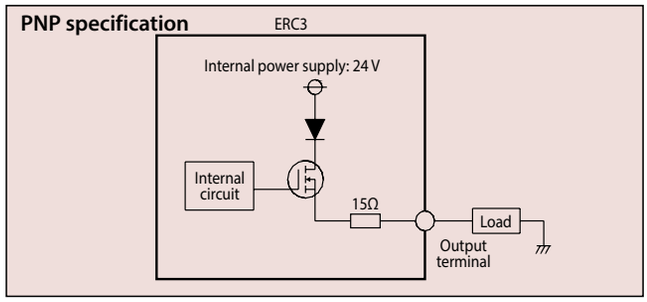
NPN specification



PNP specification



PNP specification



I/O Signal Table (PIO Type) [ERC3 and PLC Connected Directly]

Pin number	Category	Controller type	CN (CON type)			MC (MEC type)	
		PIO function	Parameter No. 25 (PIO pattern) selection			Selected on teaching pendant or in PC software	
			0	1	2		
			8-point type	Solenoid type	16-point type	Standard/Movement between 2 points (single solenoid)	2 inputs/Movement among 3 points
	Input	Number of positioning points	8 points	3 points	16 points	2 points	3 points
		Home return signal	○	×	×	×	×
		Jog signal	×	×	×	×	×
		Teaching signal (writing of current position)	×	×	×	×	×
		Brake release	×	×	×	×	×
	Output	Moving signal	×	×	×	×	×
		Zone signal	○	×	○	×	×
		Position zone signal	×	×	○	×	×
A1	Frame ground	FG					
B1	+24V for control power supply	CP					
A2	–	—					
B2	0 V for control power supply	GND					
A3	External brake release input	BK					
B3	+24V for motor power supply	MP					
A4	Emergency stop input	EMG					
B4	0 V for motor power supply	GND					
A5	–	—					
B5	–	—					
A6	–	—					
B6	–	—					
A7	–	—					
B7	–	—					
A8	–	—					
B8	–	—					
A9	Input	IN0	PC1	ST0	PC1	ST0	ST0
B9		IN1	PC2	ST1	PC2	—	ST1
A10		IN2	PC4	ST2	PC4	RES	RES
B10		IN3	HOME	—	PC8	—	—
A11		IN4	CSTR	RES	CSTR	—	—
B11		IN5	*STP	*STP	*STP	—	—
A12	Output	OUT0	PEND	PE0	PEND	LS0/PE0	LS0/PE0
B12		OUT1	HEND	PE1	HEND	LS1/PE1	LS1/PE1
A13		OUT2	ZONE1	PE2	PZONE/ZONE1	HEND	LS2/PE2
B13		OUT3	*ALM	*ALM	*ALM	*ALM	*ALM

(Note) Signals marked with an asterisk (*) (ALM/STP) are negative logic signals so they are nomally on.

I/O Signal Table (SIO Type) [ERC3 and PLC Connected via PIO Converter]

Pin number		Category	Controller type	CN (CON type)						MC (MEC type)	
			PIO function	Parameter No. 25 (PIO pattern) selection						Selected on teaching pendant or in PC software	
				0	1	2	3	4	5		
				Positioning mode	Teaching mode	256-point mode	512-point mode	Solenoid valve mode 1	Solenoid valve mode 2	Standard/Movement between 2 points (single solenoid)	2 inputs/Movement among 3 points
		Input	Number of positioning points	64 points	64 points	256 points	512 points	7 points	3 points	2 points	3 points
			Home return signal	○	○	○	○	○	×	×	×
			Jog signal	×	○	×	×	×	×	×	×
			Teaching signal (writing of current position)	×	○	×	×	×	×	×	×
			Brake release	○	×	○	○	○	○	×	×
		Output	Moving signal	○	○	×	×	×	×	×	×
			Zone signal	○	×	×	×	○	○	×	×
			Position zone signal	○	○	○	×	○	○	×	×
PIO converter	1A	—		—							
	2A	—		—							
	3A	—		—							
	4A	—		—							
	5A	Input	IN0	PC1	PC1	PC1	PC1	ST0	ST0	ST0	ST0
	6A		IN1	PC2	PC2	PC2	PC2	ST1	ST1(JOG+)	—	ST1
	7A		IN2	PC4	PC4	PC4	PC4	ST2	ST2 *1	RES	RES
	8A		IN3	PC8	PC8	PC8	PC8	ST3	—	—	—
	9A		IN4	PC16	PC16	PC16	PC16	ST4	—	—	—
	10A		IN5	PC32	PC32	PC32	PC32	ST5	—	—	—
	11A		IN6	—	MODE	PC64	PC64	ST6	—	—	—
	12A		IN7	—	JISL	PC128	P128	—	—	—	—
	13A		IN8	—	JOG+	—	PC256	—	—	—	—
	14A		IN9	BKRL	JOG-	BKRL	BKRL	BKRL	BKRL	—	—
	15A		IN10	—	—	—	—	—	—	—	—
	16A		IN11	HOME	HOME	HOME	HOME	HOME	—	—	—
	17A		IN12	*STP	*STP	*STP	*STP	*STP	—	—	—
	18A		IN13	CSTR	CSTR/PWRT	CSTR	CSTR	—	—	—	—
	19A		IN14	RES	RES	RES	RES	RES	RES	—	—
	20A		IN15	SON	SON	SON	SON	SON	SON	—	—
	1B	Output	OUT0	PM1(ALM1)	PM1(ALM1)	PM1(ALM1)	PM1(ALM1)	PE0	LSO	LS0/PE0	LS0/PE0
	2B		OUT1	PM2(ALM2)	PM2(ALM2)	PM2(ALM2)	PM2(ALM2)	PE1	LS1(TRQS)	LS1/PE1	LS1/PE1
	3B		OUT2	PM4(ALM4)	PM4(ALM4)	PM4(ALM4)	PM4(ALM4)	PE2	LS2 *1	HEND	LS2/PE2
	4B		OUT3	PM8(ALM8)	PM8(ALM8)	PM8(ALM8)	PM8(ALM8)	PE3	—	*ALM	*ALM
	5B		OUT4	PM16	PM16	PM16	PM16	PE4	—	—	—
	6B		OUT5	PM32	PM32	PM32	PM32	PE5	—	—	—
	7B		OUT6	MOVE	MOVE	PM64	PM64	PE6	—	—	—
	8B		OUT7	ZONE1	MODES	PM128	PM128	ZONE1	ZONE1	—	—
	9B		OUT8	PZONE/ZONE2	PZONE/ZONE1	PZONE/ZONE1	PM256	PZONE/ZONE2	PZONE/ZONE2	—	—
	10B		OUT9	—	—	—	—	—	—	—	—
	11B		OUT10	HEND	HEND	HEND	HEND	HEND	HEND	—	—
	12B		OUT11	PEND	PEND/WEND	PEND	PEND	PEND	—	—	—
	13B		OUT12	SV	SV	SV	SV	SV	SV	—	—
	14B		OUT13	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	—	—
	15B		OUT14	*ALM	*LM	*ALM	*ALM	*ALM	*ALM	—	—
	16B		OUT15	LOAD/TRQS *ALML	* ALML	LOAD/TRQS *ALML	LOAD/TRQS *ALML	LOAD/TRQS *ALML	*ALML	—	—
	17B	—		—							
	18B	—		—							
	19B	—		—							
	20B	—		—							

(Note) In the table above, codes in ( ) indicate functions effective before the home return. * indicates a negative logic signal.
PM1 to PM8 serve as alarm binary code output signals when an alarm occurs.
*1 These signals are invalid before the home return.

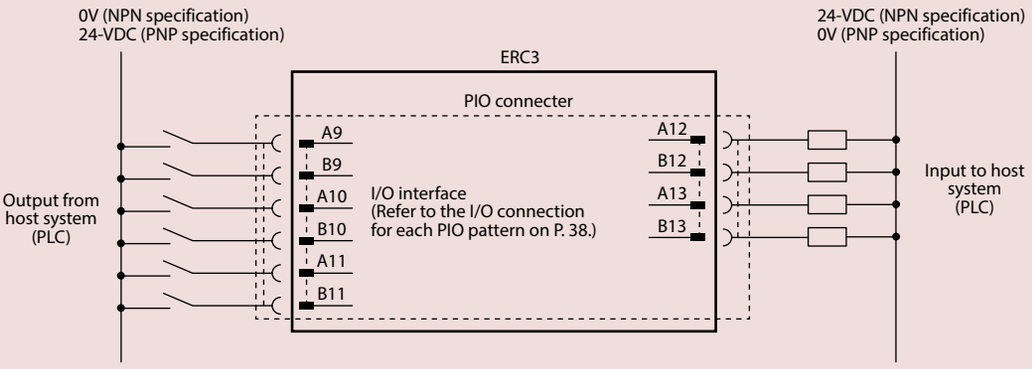
Explanation of Signal Names

Category	Signal name	Signal abbreviation	Function overview
Input	PTP strobe (start signal)	CSTR	The actuator starts moving to the position set by the command position number.
	Command position number	PC1~PC256	This signal is used to input the position number of the position to move the actuator to (binary input).
	Forced brake release	BKRL	The brake is forcibly released.
	Pause	*STP	When this signal turns OFF while the actuator is moving, the actuator will decelerate to a stop. The remaining travel is put on hold while the actuator is stopped and will resume when the signal turns ON.
	Reset	RES	Present alarms are reset when this signal turns ON. By turning ON this signal while the actuator is paused (*STP signal is OFF), the remaining travel can be cancelled.
	Servo ON	SON	The servo is ON while this signal is ON, and OFF while the signal is OFF.
	Home return	HOME	Home return operation is performed when this signal is turned ON.
	Teaching mode	MODE	The actuator switches to the teaching mode when this signal turns ON. The mode will not change unless the CSTR, JOG+ and JOG- signals are all OFF and the actuator is not operating.
	Jog/inching switching	JISL	The actuator can be jogged with a JOG+ or JOG- command while this signal is OFF. The actuator operates by inching with a JOG+ or JOG- command while this signal is ON.
	Jog	JOG + JOG –	When the JISL signal is OFF, the actuator jogs in the positive direction upon detection of the ON edge of the JOG+ signal, or in the negative direction upon detection of the ON edge of the JOG- signal. The actuator decelerates to a stop if the OFF edge is detected while jogging in each direction. The actuator operates by inching when the JISL signal is ON.
	Current position write	PWRT	When a position number is specified and this signal is turned ON for 20 ms or more in the teaching mode, the current position is written to the specified position number.
	Start signal	ST0~ST6	In the solenoid mode, the actuator moves to the specified position when this signal turns ON.
Output	Positioning complete	PEND/INP	This signal turns ON when the actuator reaches the positioning band after moving. The PEND signal does not turn OFF even when the actuator moves beyond the positioning band, but the INP signal turns OFF. A parameter is used to switch between PEND and INP.
	Completed position number	PM1~PM256	The position number of the position reached upon completion of positioning is output (by a binary signal).
	Home return complete	HEND	This signal turns ON upon completion of home return. It will remain ON until the home position is lost.
	Zone signal 1	ZONE1	This signal turns ON when the current position of the actuator falls within the parameter-set range.
	Zone signal 2	ZONE2	
	Position zone	PZONE	This signal turns ON when the current position of the actuator enters the range set in the position data table while moving to a position. This signal can be used with ZONE1, but the PZONE signal is effective only when moving to a set position.
	Alarm	*ALM	This signal remains ON while the controller is normal, and turns OFF when an alarm occurs.
	Moving	MOVE	This signal is ON while the actuator is moving (also during home return and push-motion operation).
	Servo ON	SV	This signal is ON when the servo is ON.
	Emergency stop output	*EMGS	This signal is ON when the controller is not in the emergency stop mode, and turns OFF when an emergency stop is actuated.
	Teaching mode output	MODES	This signal turns ON when the actuator enters the teaching mode due to an input of the MODE signal. It turns OFF when the actuator returns to the normal mode.
	Write complete	WEND	This signal is OFF immediately after switching to the teaching mode, and turns ON the moment the writing per the PWRT signal is completed. This signal also turns OFF when the PWRT signal turns OFF.
	Current position number	PE0~PE6	This signal turns ON when the actuator completes moving to the target position in the solenoid mode.
	Limit switch output	LS0~LS2	This signal turns ON when the current position of the actuator enters the positioning band (±) around the target position. If the home return has been completed, this signal is output even before a move command is issued or the servo is OFF.
	Load output judgment status	LOAD	This signal turns ON when the in-certification-range command torque exceeds the threshold.
	Torque level status signal	TRQS	This signal turns ON when the motor current reaches the threshold.
	Minor failure alarm	*ALML	This signal is output when a message-level alarm generates.

(Note) In the table above, * indicates a negative logic signal.

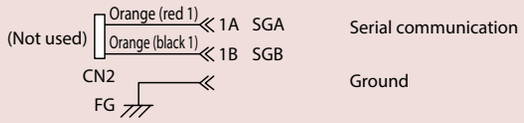
I/O Wiring Diagram

PIO 8-point Type (ERC3 and PLC Connected Directly)



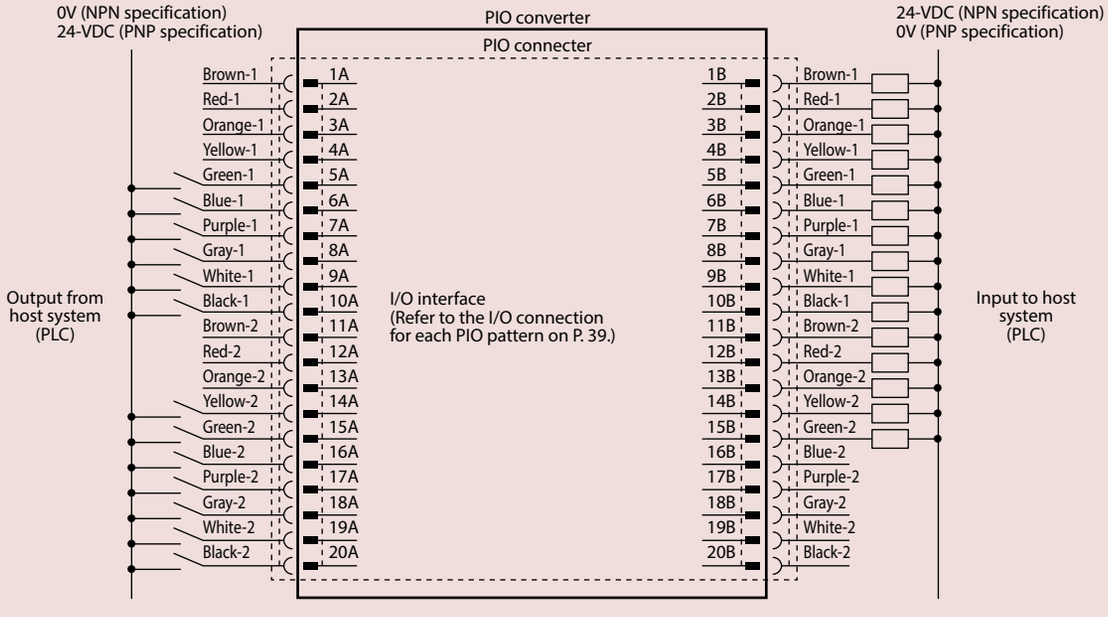
*The wire colors change as follows if a robot cable is used.

Line color	Pin number
Gray (red 1)	2A
Gray (black 1)	2B
Gray (red 2)	7A
Gray (black 2)	7B



(Note) To forcibly release the brake, provide a switch between BKR and 0V and turn it ON.

PIO Positioning Mode (Standard Type) (ERC3 and PLC Connected via PIO Converter)



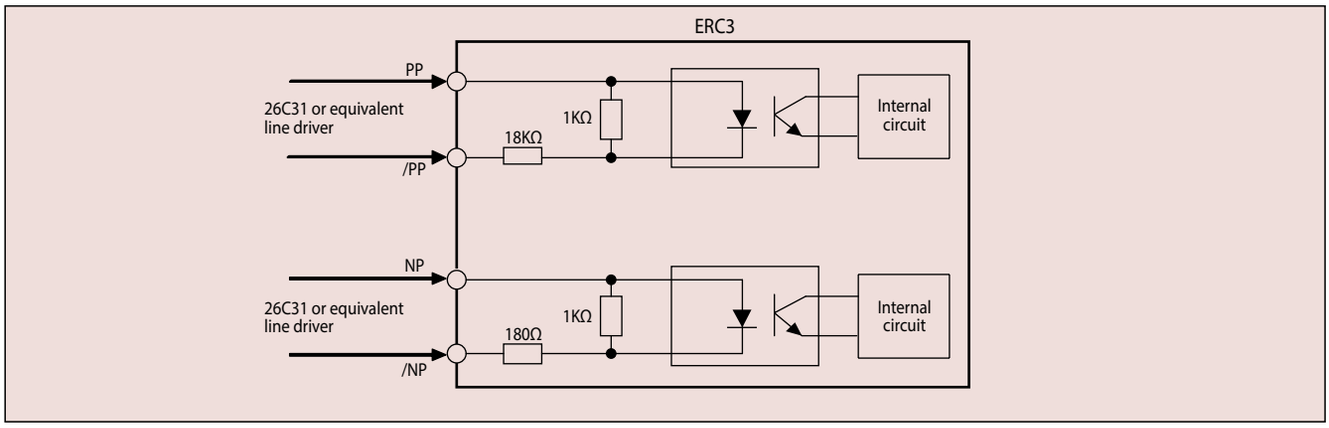
■Pulse-train control mode

I/O specification (Pulse-train type)

■ Input Part

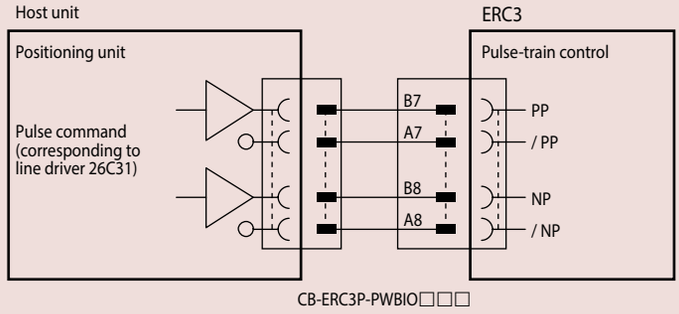
Code	Remarks
Differential input voltage range	26C31 or equivalent
Maximum cable length	Differential line driver method: 10m max. Open collector method (AK-04 used): 2m max.
Maximum number of input pulses	Differential line driver method: 200 kpps max. Open collector method (AK-04 used): 60kpps max.

* If the user-side I/O is of open collector type, use the AK-04.

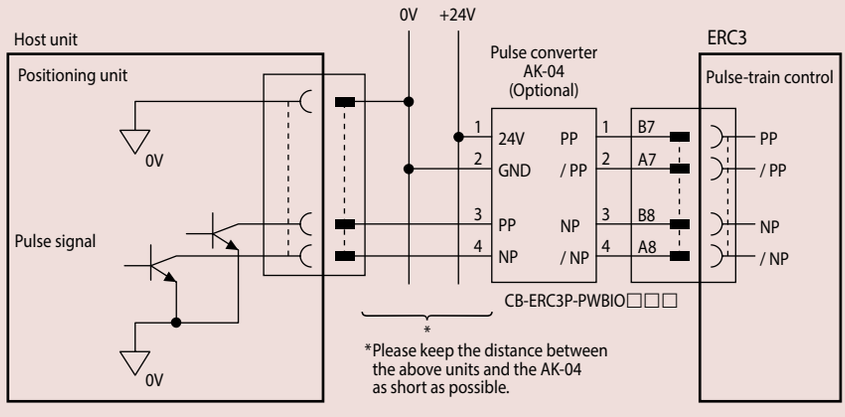


Pulse-train Control Circuit

●Host Unit = Differential Type



●Host Unit = Open Collector Type



* The AK-04 (optional) is needed to input pulses.
* Use the same power supply for open collector input/output to/from the host and for the AK-04.

I/O Signals for the Pulse-train Control Mode

The table below lists the signal assignments for the flat cable for the pulse-train control mode. Connect an external device (such as PLC) according to this table.

[1] Positioning Operation - PIO Pattern: 0

Pin number	Category	I/O number	Signal abbreviation	Signal name	Description of function
A1	Frame ground		FG	—	Frame ground.
B1	+24 V for control power supply		CP	—	+24 V of the control power supply is input.
A2				—	
B2	0 V for control power supply		GND	—	0 V of the control power supply.
A3	External brake release input		BK	—	This signal is used to release the brake externally. The brake is released when +24 V is input.
B3	+24 V for motor power supply		MP	—	+24 V of the motor power supply is input.
A4	Emergency stop input		EMG	—	Input signal for emergency stop.
B4	0 V for motor power supply		GND	—	+24 V of the motor power supply is input.
A5					
B5					
A6					
B6					
A7			/PP	Command pulse	
B7			PP	Command pulse	
A8			/NP	Command pulse	
B8			NP	Command pulse	
A9	Input	IN0	SON	Servo ON	The servo is ON while this signal is ON, and OFF while the signal is OFF.
B9		IN1	TL	Torque limit selection	When this signal is turned ON, the motor torque is limited to the value set by a parameter.
A10		IN2	HOME	Home return	Home return operation is performed when this signal is turned ON.
B10		IN3	RES	Reset	Present alarms are reset when this signal is turned ON.
A11		IN4	—		
B11		IN5	—		
A12	Output	OUT0	SV	Servo ON status	This signal turns ON when the servo is ON.
B12		OUT1	INP	Positioning complete	This signal turns ON when the amount of remaining travel pulses in the deviation counter falls within the positioning band.
A13		OUT2	HEND	Home return complete	This signal turns ON upon completion of home return.
B13		OUT3	*ALM	Controller alarm status	This signal turns ON when the controller is normal, and turns OFF when an alarm generates.

* indicates a negative logic signal. Negative logic signals are normally ON while the power is supplied, and turn OFF when the signal is output.

[2] Push-motion Operation - PIO Pattern: 1

Pin number	Category	I/O number	Signal abbreviation	Signal name	Description of function
A1	Frame ground		FG	—	Frame ground.
B1	+24 V for control power supply		CP	—	+24 V of the control power supply is input.
A2				—	
B2	0 V for control power supply		GND	—	0 V of the control power supply.
A3	External brake release input		BK	—	This signal is used to release the brake externally. The brake is released when +24 V is input.
B3	+24 V for motor power supply		MP	—	+24 V of the motor power supply is input.
A4	Emergency stop input		EMG	—	Input signal for emergency stop.
B4	0 V for motor power supply		GND	—	+24 V of the motor power supply is input.
A5					
B5					
A6					
B6					
A7			/PP	Command pulse	
B7			PP	Command pulse	
A8			/NP	Command pulse	
B8			NP	Command pulse	
A9	Input	IN0	SON	Servo ON	The servo is ON while this signal is ON, and OFF while the signal is OFF.
B9		IN1	TL	Torque limit selection	When this signal is turned ON, the motor torque is limited to the value set by a parameter.
A10		IN2	HOME	Home return	Home return operation is performed when this signal is turned ON.
B10		IN3	RES	Reset	This signal serves as a reset signal when the torque is not limited (torque TL signal is OFF). When this signal turns ON, present alarms are reset.
			DCLR	Deviation counter clear	This signal serves as a deviation counter signal when the torque is limited (torque TL signal is ON). This signal clears the deviation counter.
A11		IN4	—		
B11		IN5	—		
A12	Output	OUT0	SV	Servo ON status	This signal turns ON when the servo is ON.
B12		OUT1	INP	Positioning complete	This signal serves as a positioning complete signal when the torque is not limited (torque TL signal is OFF). It turns ON when the remaining travel pulses in the deviation counter are within the range of positioning band.
			TLR	Torque limited	This signal serves as a torque limited signal when the torque is limited (torque TL signal is ON). If the torque is limited, this signal turns ON when the torque limit is reached.
A13		OUT2	HEND	Home return complete	This signal turns ON upon completion of home return.
B13		OUT3	*ALM	Controller alarm status	This signal turns ON when the controller is normal, and turns OFF when an alarm generates.

*indicates a negative logic signal. Negative logic signals are normally ON while the power is supplied, and turn OFF when the signal is output.

Cable/Maintenance Parts

Power & I/O Cable for PIO Type

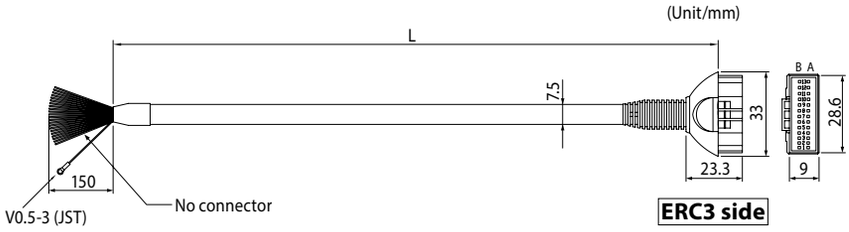
Model number **CB-ERC3P-PWBIO□□□**

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

* The standard cable is a robot cable.

Wiring	Color	Signal	No.
AWG22	Ground	FG	1

No.	Signal	Color	Wiring
A1	FG	Ground	AWG22
A2	—	—	—
A3	BK	Red 1	AWG28
A4	EMG	Orange 1	
A5	—	—	—
A6	—	—	—
A7	—	Blue	AWG28
A8	—	Gray	
A9	IN0	Brown2	
A10	IN2	Orange2	
A11	IN4	Green2	
A12	OUT0	Purple2	
A13	OUT2	White2	
B1	CP	Brown	AWG22
B2	CP_GND	Red	
B3	MP	Orange	AWG19
B4	MP_GND	Yellow	
B5	—	Green	AWG28
B6	—	Brown1	
B7	—	Purple	
B8	—	White	
B9	IN1	Red2	
B10	IN3	Yellow2	
B11	IN5	Blue2	
B12	OUT1	Gray2	
B13	OUT3	Black	



Minimum bending R: r = 45mm or more (when movable type is used)

Power & I/O Cable for SIO Type

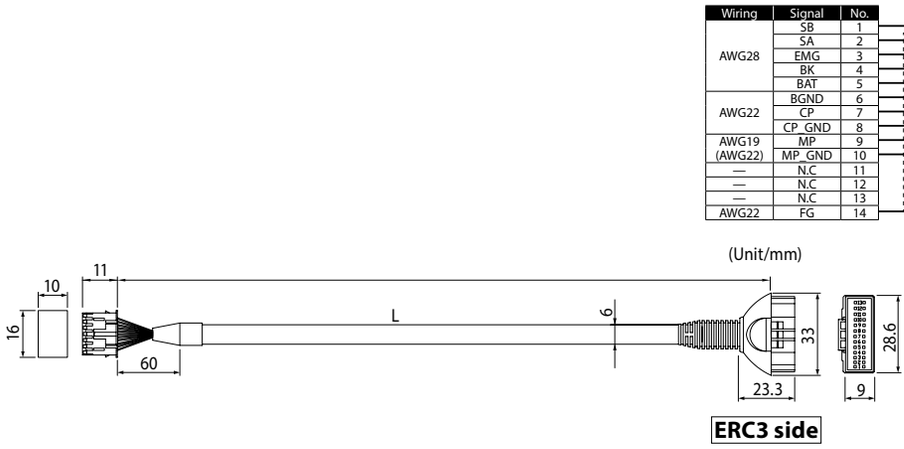
Model number **CB-ERC3S-PWBIO□□□**

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

* The standard cable is a robot cable.

Wiring	Signal	No.
AWG28	SB	1
	SA	2
	EMG	3
	BK	4
	BAT	5
AWG22	BGND	6
	CP	7
	CP_GND	8
AWG19 (AWG22)	MP	9
	MP_GND	10
—	N.C	11
—	N.C	12
—	N.C	13
AWG22	FG	14

No.	Signal	Wiring
A1	FG	AWG22
A2	–	–
A3	BK	AWG28
A4	EMG	
A5	BGND	AWG22
A6	BAT	AWG28
B1	CP	AWG22
B2	CP_GND	
B3	MP	AWG19
B4	MP_GND	
B5	SA	AWG28
B6	SB	
A7	N.C	—
B7	N.C	—
A8	N.C	—
B8	N.C	—
A9	N.C	—
B9	N.C	—
A10	N.C	—
B10	N.C	—
A11	N.C	—
B11	N.C	—
A12	N.C	—
B12	N.C	—
A13	N.C	—
B13	N.C	—



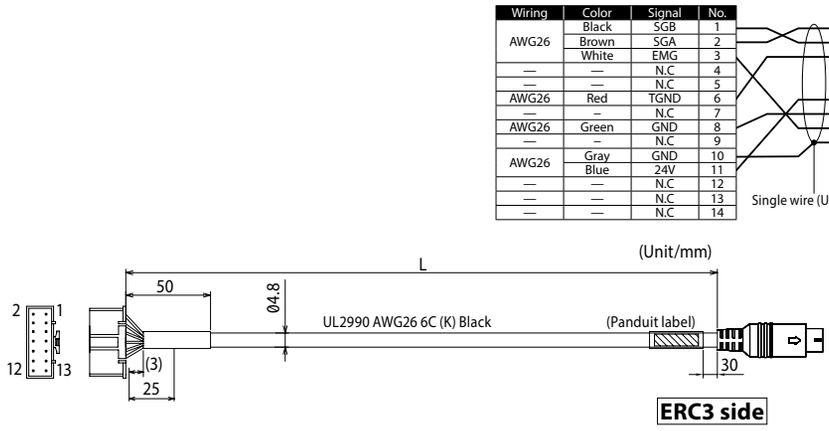
Minimum bending R: r = 36 mm or more (when movable type is used)

SIO Communication Cable (for Quick Teach)

Model number **CB-PST-SIO050**

Wiring	Color	Signal	No.
AWG26	Black	SGB	1
	Brown	SGA	2
	White	EMG	3
—	—	N.C	4
—	—	N.C	5
AWG26	Red	TGND	6
—	–	N.C	7
AWG26	Green	GND	8
—	–	N.C	9
AWG26	Gray	GND	10
	Blue	24V	11
—	—	N.C	12
—	—	N.C	13
—	—	N.C	14

No.	Signal	Color	Wiring
1	SGA	Brown	AWG26
2	SGB	Black	
3	5V	Red	
4	N.C	—	
5	N.C	—	
6	24V	Yellow	AWG26
7	GND	Green	
8	EMGB	White	
GND		Shield	—



Options

PIO Converter <RCB-CV>

RoHS

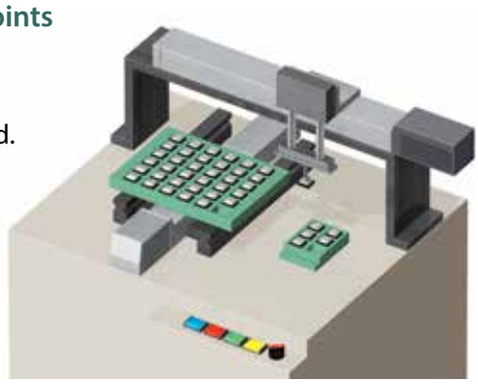
Realizing controller functions of the next higher class with the ERC3 series

When connected to the PIO converter, the ERC3 series can demonstrate functions equivalent to the RCP4 controller "PCON-CA." Use the PIO converter if you want to configure a high-function system using the ERC3 series, use the absolute function or monitor the status of the actuator.

Features

Increased maximum number of positioning points

While the maximum number of positioning points supported by the ERC3 series' built-in controller is 16, it increases to 512 when the PIO converter is connected. Connecting the PIO converter also increases the numbers of I/O signals, allowing for complex controls and connection with peripheral equipment.



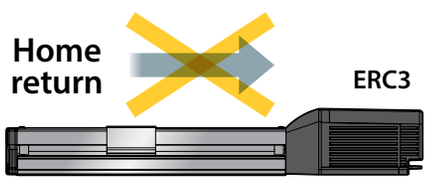
Supporting the simple absolute mode

The standard encoder of the ERC3 series is of incremental type. Once the power is turned off, therefore, the actuator's current position is lost and home return operation will be required next time the actuator is started. When the PIO converter is connected, the ERC3 lets you select the simple absolute mode. Home return operation is not required while the encoder is in the simple absolute mode, because the current position is retained.

* To use the simple absolute function, the PIO converter must be of the simple absolute type (equipped with the simple absolute battery) and the actuator must also be of the simple absolute specification.
* Among the diffrent I/O types, only the serial communication type supports the simple absolute function.

In the simple absolute mode…

Home return operation is no longer required

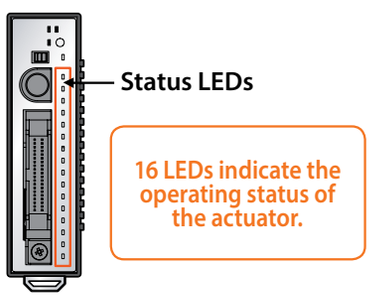


The actuator can be operated immediately after reconnecting the power.

Status LEDs indicating the operating status of the actuator

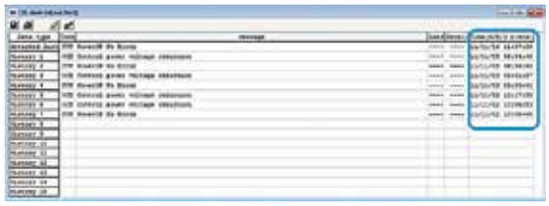
The PIO converter lets you check the following status using the status LEDs provided on the front panel (optional).

- Command current ratio level
- Alarm code
- PIO input terminal status
- PIO output terminal status



Calendar function for checking when errors occurred

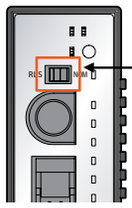
The PIO converter has a calendar function that lets you check the details of past alarms, such as when each alarm occurred, by connecting the teaching pendant and PC software to the PIO converter. This function is useful when analyzing alarms.



Brake release switch for at-will release of the brake

If your ERC3 actuator comes with a brake, the brake can be turned on/off freely using the brake release switch on the front panel of the PIO converter. To release the brake, turn the switch to the "RLS" position.

* If the actuator is used vertically, hold the actuator in place before releasing the brake.



Brake release switch
Release the brake: RLS
Normal: NOM

Model Configuration

RCB Series — Type — I/O type — I/O cable length — Simple absolute function supported

Type	
CV	Built-in power cutoff relay type (standard)
CVG	External power cutoff relay type

I/O type	
NP	NPN specification (without monitoring LEDs)
PN	PNP specification (without monitoring LEDs)
NPM	NPN specification (with monitoring LEDs)
PNM	PNP specification (with monitoring LEDs)

* Select "NPM/PNM" if you want to use the functions of monitoring LEDs on the front panel.

I/O cable length	
0	No cable
2	With 2m cable
3	With 3m cable
5	With 5m cable

Simple absolute function supported	
(No entry)	Simple absolute function not supported (for incremental specification only)
AB	Simple absolute function supported (with simple absolute battery)
ABUN	Simple absolute function supported (without simple absolute battery

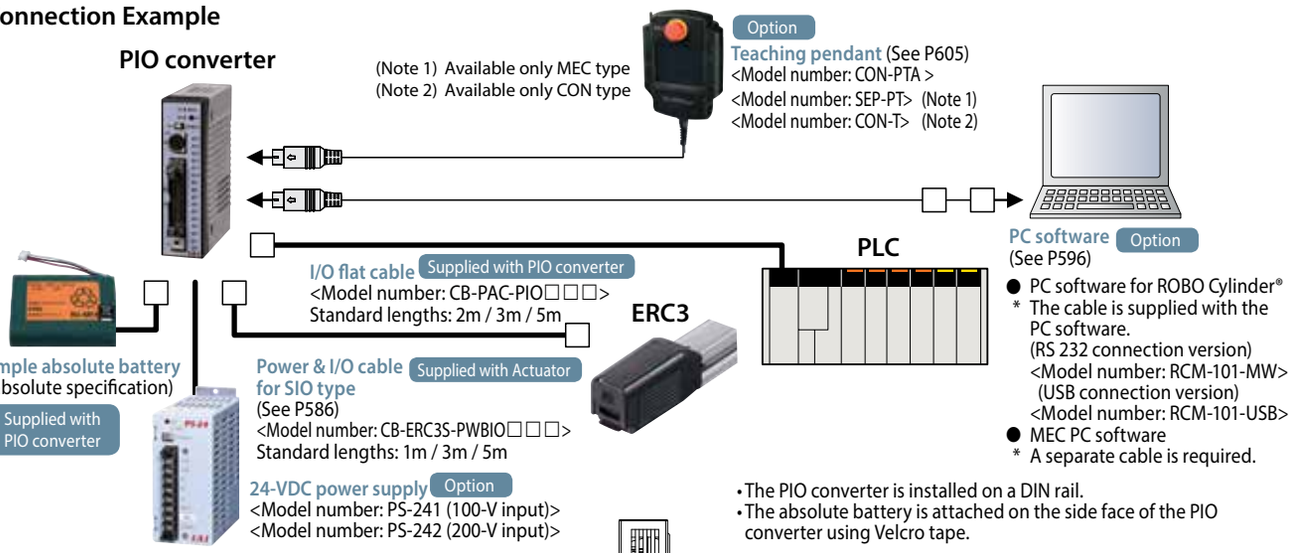
Base Specifications

Item		Description
Number of connected axes		ERC3 1 axis
Power supply voltage		24VDC±10%
Control power capacity		0.8A max.
Heat output		1.3W
Momentary power failure resistance		500μs max.
Serial communication interface (SIO port)		RS485: 1 channel (conforming to Modbus protocol RTU/ASCII) / Speed: 9.6 to 230.4 kbps Actuators can be controlled via serial communication.
External interface		Dedicated 24-VDC signal input/output (NPN or PNP selected)—Up to 16 input points, up to 16 output points / Cable length: 10 m max.
Data setting/input method		PC software, touch-panel teaching pendant
Operation Mode		Positioner mode
Number of positions in positioner mode		Standard 64 points, maximum 512 points Note) Positioning points vary depending on the selected PIO pattern.
LED display (installed on the front panel)		Status indicator LED - Steady green light: Servo ON / Blinking green light: Auto servo OFF / Steady red light: Alarm present Absolute battery status indicator LED - Green: Fully charged / Orange: Charging / Red: Not connected Absolute reset status LED - Green: Absolute reset complete / Red: Absolute reset not yet complete LED0 to LED15 (optional): 4 different statuses can be indicated by changing the switch setting. Command current ratio, alarm code, PIO input status, PIO output status
Electromagnetic brake forced release switch (installed on the front panel)		Switched between NOM (standard) and BK RLS (forced releases)
Isolation resistance		500VDC, 10MΩ or more
Electric shock protection mechanism		Class I basic isolation
Cooling method		Natural air cooling
Environment	Ambient operating temperature	0 to 40°
	Ambient operating humidity	85%RH or less (non-condensing)
	Ambient storage temperature	–20 to 70° (excluding batteries)
	Operating altitude	Altitude 1000m or less
	Protection degree	IP20
	Vibration resistance	Number of vibrations: 10 to 57 Hz / Amplitude: 0.075 mm Number of vibrations: 57 to 150 Hz / Acceleration: 9.8 m/s² Sweep time in X/Y/Z directions: 10 minutes / Number of sweeps: 10 times
	Weight	103g or less, or 287g (including 190g for the battery) or less for the simple absolute specification
	External Dimensions	25W×90H×98D
Consumable parts		RTC backup capacitor: Approx. 5 years* Drive-source cutoff relay: Approx. 100,000 actuations Absolute battery: Approx. 3 years

*When the power is supplied 12 hours a day at an ambient temperature of 40°C and the actuator is stopped (power turned off) 12 hours a day in an ambient temperature of 20°C.

ERC3 Controller

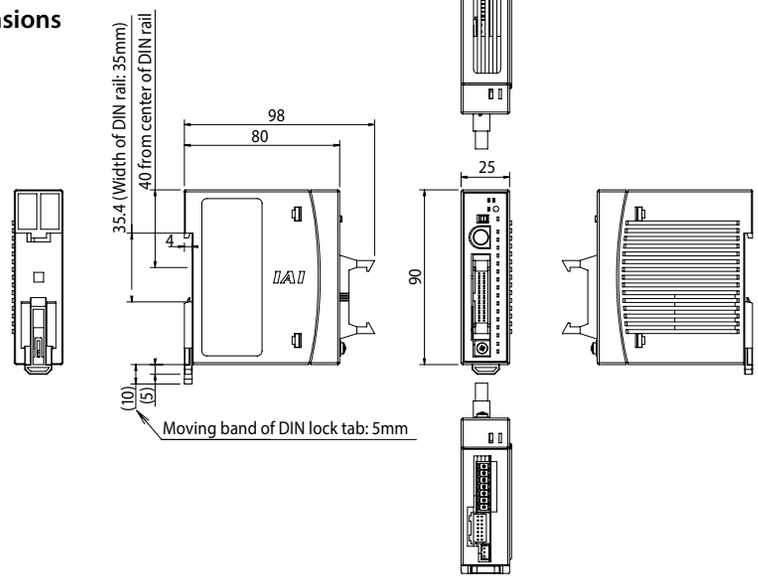
Connection Example



- PC software for ROBO Cylinder®
  * The cable is supplied with the PC software.
  (RS 232 connection version)
  <Model number: RCM-101-MW>
  (USB connection version)
  <Model number: RCM-101-USB>
- MEC PC software
  * A separate cable is required.

- The PIO converter is installed on a DIN rail.
- The absolute battery is attached on the side face of the PIO converter using Velcro tape.

External Dimensions



Standard Prices

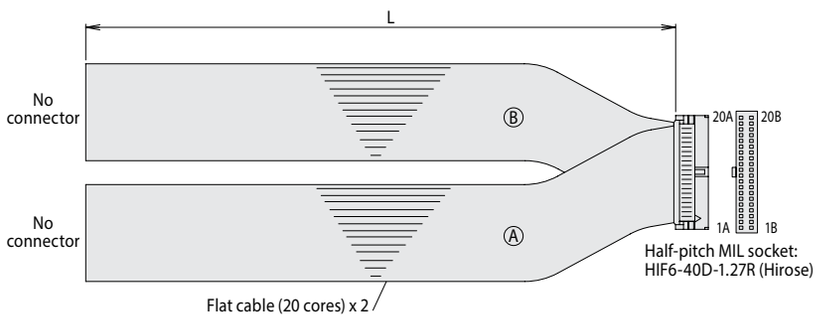
*① in the model numbers below represents the number indicating I/O cable length.

Power cut-off relay	Monitoring LEDs	Positoning method	Model Numbers	Standard Prices
Built-in type	N/A	Incremental specification	RCB-CV-(NP/PN)-①	—
		Simple absolute specification (with battery)	RCB-CV-(NP/PN)-①-AB	—
		Simple absolute specification (without battery)	RCB-CV-(NP/PN)-①-ABUN	—
	Available	Incremental specification	RCB-CV-(NPM/PNM)-①	—
		Simple absolute specification (with battery)	RCB-CV-(NPM/PNM)-①-AB	—
		Simple absolute specification (without battery)	RCB-CV-(NPM/PNM)-①-ABUN	—
External type	N/A	Incremental specification	RCB-CVG-(NP/PN)-①	—
		Simple absolute specification (with battery)	RCB-CVG-(NP/PN)-①-AB	—
		Simple absolute specification (without battery)	RCB-CVG-(NP/PN)-①-ABUN	—
	Available	Incremental specification	RCB-CVG-(NPM/PNM)-①	—
		Simple absolute specification (with battery)	RCB-CVG-(NPM/PNM)-①-AB	—
		Simple absolute specification (without battery)	RCB-CVG-(NPM/PNM)-①-ABUN	—

I/O Flat Cable

Model number **CB-PAC-PIO□□□**

*□□□indicates the cable length (L). A desired length can be specified up to 10m. Example: 080=8m



HIF6-40D-1.27R

No.	Signal name	Cable color	Wiring
1A	-	Brown - 1	Flat cable Ⓐ (crimped)
2A	-	Red - 1	
3A	-	Orange - 1	
4A	-	Yellow - 1	
5A	IN0	Green - 1	
6A	IN1	Blue - 1	
7A	IN2	Purple - 1	
8A	IN3	Gray - 1	
9A	IN4	White - 1	
10A	IN5	Black - 1	
11A	IN6	Brown - 2	
12A	IN7	Red - 2	
13A	IN8	Orange - 2	
14A	IN9	Yellow - 2	
15A	IN10	Green - 2	
16A	IN11	Blue - 2	
17A	IN12	Purple - 2	
18A	IN13	Gray - 2	
19A	IN14	White - 2	
20A	IN15	Black - 2	

No.	Signal name	Cable color	Wiring
1B	OUT0	Brown - 3	Flat cable Ⓑ (crimped) AWG 28
2B	OUT1	Red - 3	
3B	OUT2	Orange - 3	
4B	OUT3	Yellow - 3	
5B	OUT4	Green - 3	
6B	OUT5	Blue - 3	
7B	OUT6	Purple - 3	
8B	OUT7	Gray - 3	
9B	OUT8	White - 3	
10B	OUT9	Black - 3	
11B	OUT10	Brown - 4	
12B	OUT11	Red - 4	
13B	OUT12	Orange - 4	
14B	OUT13	Yellow - 4	
15B	OUT14	Green - 4	
16B	OUT15	Blue - 4	
17B	—	Purple - 4	
18B	—	Gray - 4	
19B	—	White - 4	
20B	—	Black - 4	

Options

Gateway Unit <RCM-EGW>

RoHS

The ERC3 gateway unit lets you connect up to four ERC3 actuators to implement the gateway function.
The gateway unit connects to a PLC or other host control system via a field network. It supports seven network protocols (CC-Link, DeviceNet, PROFIBUS-DP, MECHATROLINK-II, CompoNet, EtherCAT, EtherNet/IP).

Features

- Use the position adjustment switches on the front panel to jog the actuator
- The brake release switch for each axis is provided on the front panel

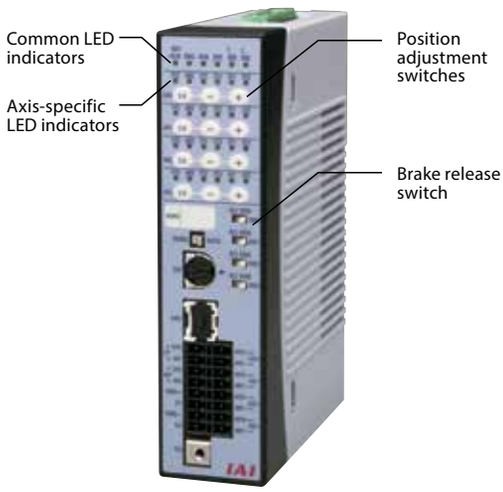
Model Configuration

RCM — □ — □

RCM: Series
□: Controller type
□: I/O signal pattern

EGW	Built-in power cutoff relay type
EGWG	External power cutoff relay type

CC	CC-Link
DV	DeviceNet
PR	ProfiBus
ML	MECHATROLINK-II (To be released soon)
CN	CompoNet
EC	EtherCAT (To be released soon)
EP	EtherNet/IP



Base Specifications

Item		Description
Number of controlled axes		Up to 4 axes
Control/motor power-supply voltage		24 VDC ±10%
Control power capacity		1 A max.
Load current (per axis)	High-output setting enabled	3.5 A rated/4.2 A max.
	High-output setting disabled	1.2 A rated/2.2 A max.
Brake release power capacity (per axis)		0.15 A max.
Rush current (Note)		60 A max.
Cable length between actuator and gateway unit		10 m max. (A dedicated cable is used)
Number of positioning points		Up to 512 points (Unlimited in the simple direct mode or direct numerical specification mode) (Note) The number of positioning points varies depending on the operation pattern selected by the parameter.
Electromagnetic brake forced release		The electromagnetic brake for each axis can be released using the applicable brake forced release switch provided on the front panel.
Environment	Ambient operating temperature	0~40°
	Ambient operating humidity	85% RH max. (Non-condensing)
	Protection class	IP20

Note) Approx. 50 µs of rush current flows after the power is turned on.

Operation Mode

Operation pattern	Description
Positioner 1/simple direct mode (*)	In the positioner 1 mode, position data of up to 512 points can be registered to stop the actuator at any of the registered positions. The current position can also be monitored. In the simple direct mode, the target position can be specified directly by entering a value. The current position can also be monitored.
Direct numerical specification mode (*)	The target position, speed, acceleration/deceleration and push-current limiting value can be each specified by entering a value. In addition to the current position, the current speed and command current value can also be monitored.
Positioner 2 mode (*)	In this mode, the actuator is operated using the position data of up to 512 points set in the position table. The current position cannot be monitored. The functions available in this mode are the same as those provided in the positioner 1 mode, except that less amount of data can be sent/received.
Positioner 3 mode (*)	In this mode, the actuator is operated using the position data of up to 256 points set in the position table. The current position cannot be monitored. The amount of data sent/received in this mode is further less than that in the positioner 2 mode, and the actuator is controlled using the minimum signals required for positioning.
Remote I/O	The same six functions (Note 1) available with the PIO specification (CON type) can be controlled. The same two functions (Note 2) available with the PIO specification (MEC type) can be controlled.

Note 1) Switched using the ERC3's PIO pattern parameter.
Note 2) Switched using the ERC3's operation pattern parameter.
(*) For the CON type only. (Cannot work with the MEC type.)

Control Signals in the Remote I/O Mode

The table below lists the ERC3 functions that can be controlled in each type.

CON Type Specifications

O: Supported X: Not supported

ROBO Cylinder function	Operation pattern (PIO pattern)					
	0	1	2	3	4	5
	Positioning mode	Teaching mode	256-point mode	512-point mode	Solenoid valve mode 1	Solenoid valve mode 2
Home return operation	○	○	○	○	○	× (Note 1)
Positioning operation	○	○	○	○	○	○
Speed & acceleration/deceleration setting	○	○	○	○	○	○
Pitch feed (inching)	○	○	○	○	○	○
Push-motion operation	○	○	○	○	○	×
Speed change while moving	○	○	○	○	○	○
Operation at different acceleration/speed	○	○	○	○	○	○
Pause	○	○	○	○	○	○ (Note 2)
Zone signal output	○	○	○	×	○	○
PIO pattern selection	○	○	○	○	○	○

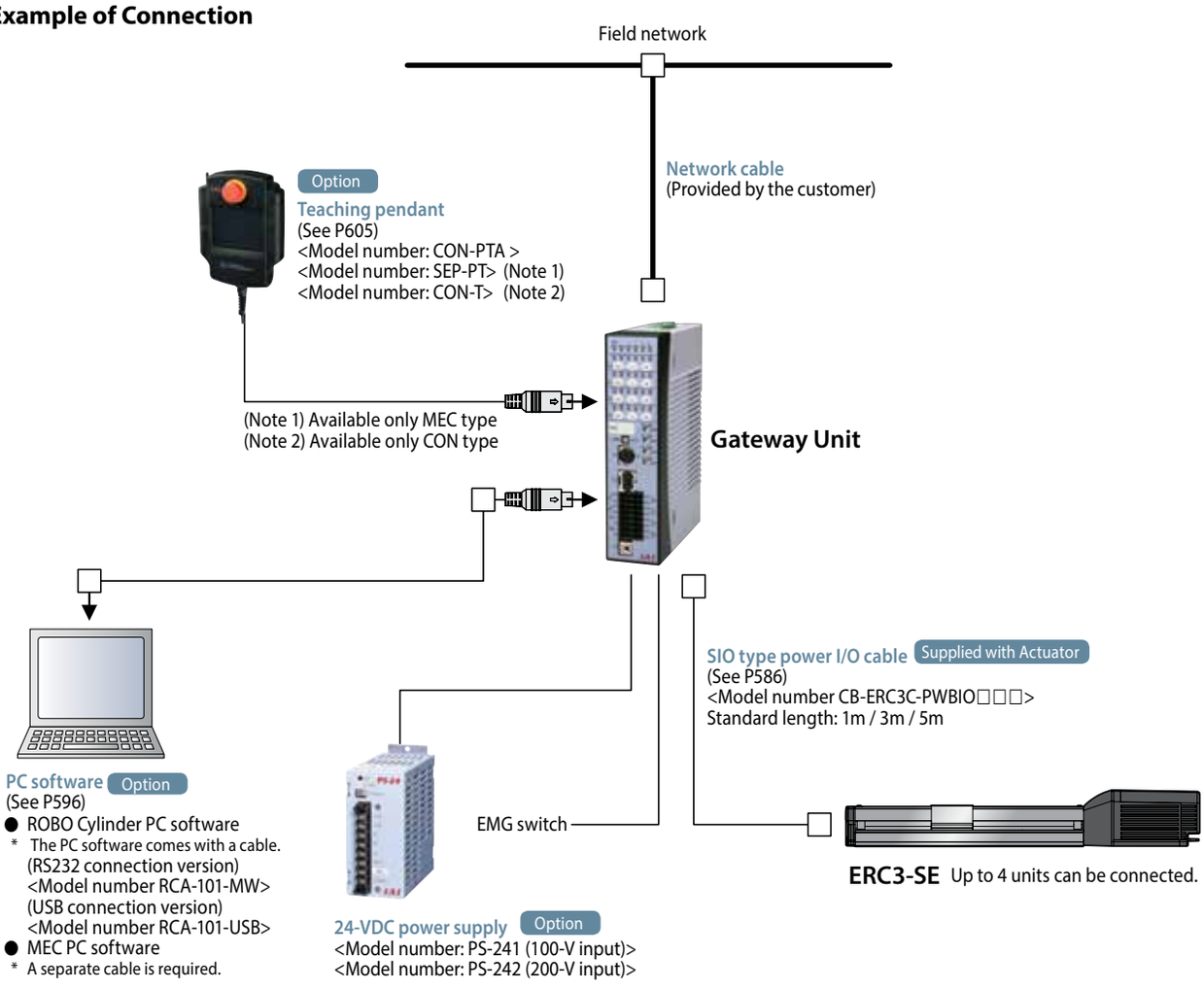
Note 1) Home return is performed with the first move command.
Note 2) Supported if ERC3 Parameter No. 27, "Move command type" is set to "0."

MEC Type Specifications

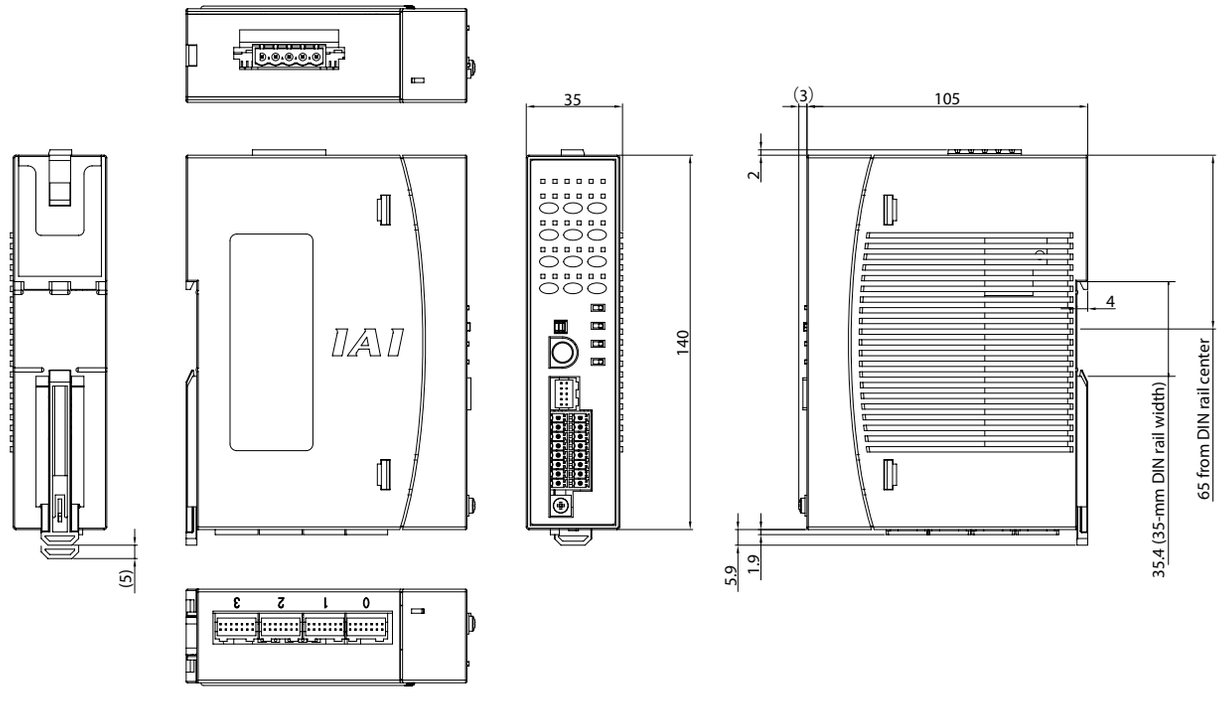
ROBO Cylinder function	Operation pattern	
	1-input, 2-point move	2-input, 3-point move
Home return operation	× (Note 1)	× (Note 1)
Positioning operation	○	○
Speed & acceleration/deceleration setting	○	○
Pitch feed (inching)	×	×
Push-motion operation	○	○
Speed change while moving	×	×
Operation at different acceleration/speed	○	○
Pause	×	○
Zone signal output	×	×

Note 1) Home return is performed with the first move command.

Example of Connection



External Dimensions



Notes on Selecting the Teaching Pendant and PC Software

With the ERC3 series, usable teaching pendant and PC software vary depending on the controller type (CON type/MEC type). Refer to P.5 for controller types.

Teaching pendant

Controller type	CON-PTA	RCM-PST	SEP-PT
CON type	○	△	—
MEC type	○	○	○

PC software

Controller type	RCM-101-MW	RCM-101-USB	MEC PC software
CON type	○	○	—
MEC type	—	—	○

○: All functions are supported / △: Limited functions are supported (home return, servo ON/OFF, JOG+, JOG-, stop (press and hold to reset alarms))

Options

Quick Teach <RCM-PST>

RoHS

A teaching pendant equipped with intuitive operation buttons and acceleration/speed knobs that can be used easily even by mechanical engineers and those who never operated a robot before.

Features

- User-friendly panel sheet switches and knobs let you complete the settings in no time.
- The small pendant can be held in a hand.
- Separate power-supply unit

Model configuration

RCM — [ ] — [ ] — [ ]

Series | Unit name | Input power supply | Panel language

Unit name	
PST	Product unit
PS	Power-supply unit

Input power supply	
0	24 VDC (24-V power-supply specification, without power-supply unit)
1	Single-phase 100 to 115 VAC (100-V power-supply specification)
2	Single-phase 100 to 230 VAC (200-V power-supply specification)

Panel language	
(No entry)	Japanese version
ENG	English version

Base Specifications

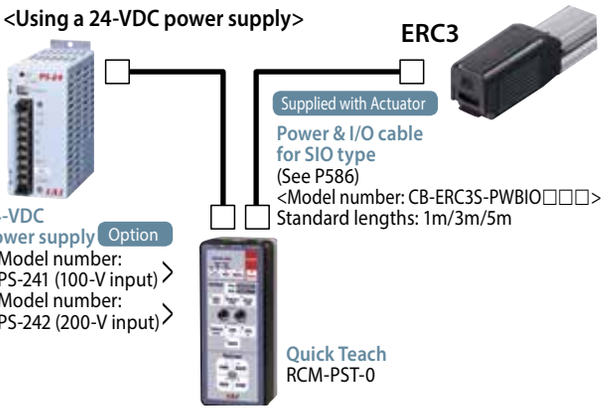
Item		Description		
Product name		24-VDC specification	100-VDC specification	200-VDC specification
Product model		RCM-PST-0	RCM-PST-1	RCM-PST-2
Product configuration	Teaching pendant	RCM-PST-0		
	Power-supply unit	— (Teaching pendant only)	RCM-PS-1	RCM-PS-2
Power supply voltage		24 VDC±10% (DC 21.6V to DC 26.4V)	Single-phase 100 to 115 VAC±10% (AC 90V to AC 126.5V)	Single-phase 100 to 230 VAC±10% (AC 90V to AC253 V)
Load capacity (motor power capacity) of connected ERC3 (Note 1)	ERC3	Rated		Rated
	42P	1.2A		2.2A
	56P	1.2A		2.2A
Number of controlled axes		1 axis		
Environment conditions		Operating temperature range: 0 to 40°C Operating humidity range: 85% RH or less (non-condensing) Storage temperature range: -20°C to 70°C		
Protection degree		IP20		
Power-supply frequency		50Hz/60Hz		
Pollution degree		Pollution degree 2		
Leak current		—	0.5mA max	0.75mA max
Cooling method		Natural air cooling		
Cable length		Actuator cable: 10m or less AC cable: 2m SIO communication cable (optional): 5m		
Product size		65 (W) x 157 (H) x 21.6 (D)	65 (W) x 157 (H) x 64.4 (D)	
Weight *Excluding connection cables		120g	540g	535g
Standard price		—	—	—

Note 1) If an ERC3 actuator whose high-output setting is enabled is used to perform test run using the Quick Teach connected to the above power-supply unit, the ERC3 may not operate as specified. (Position data can be edited without problems.)
If test run is performed with the actuator's high-output setting enabled, connect a 24-VDC power supply to the Quick Teach. In this case, disconnect the power-supply unit.

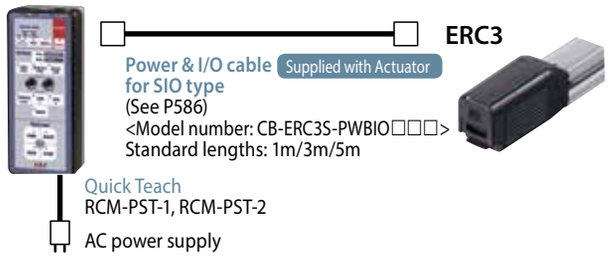
Connection Example

■ Supplying power from the Quick Teach to the ERC3

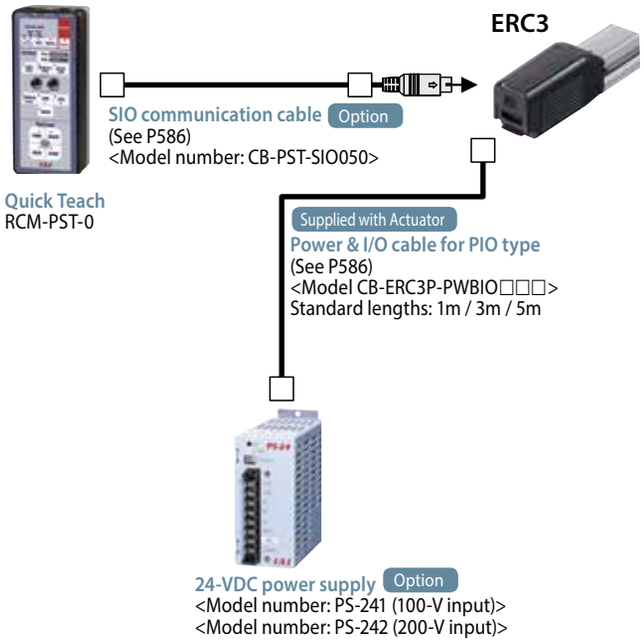
<Using a 24-VDC power supply>



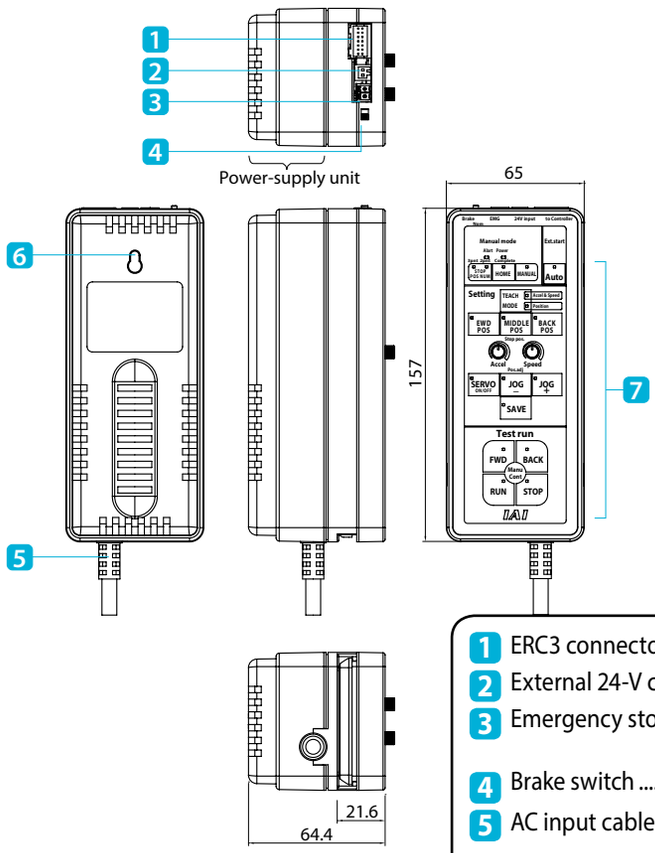
<Using a 100/200-VAC power supply>



■ Connecting the Quick Teach to the ERC3 supplied with power

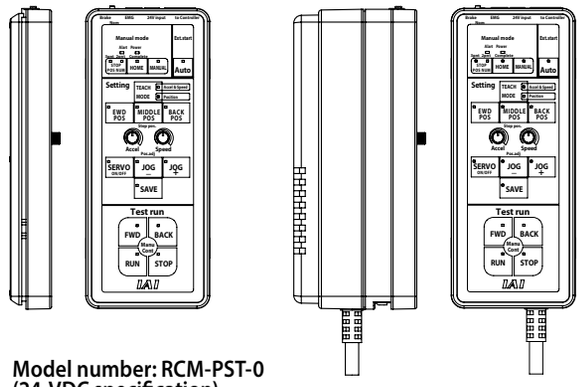


Name and Function of Each Part/External Dimensions



Shown above are the external dimensions of the Quick Teach with power-supply unit (model number: RCM-PST-1/2).
The 24-V power-supply specification (model number: RCM-PST-0) has no power-supply unit.

<Quick Teach and Model Numbers>



Model number: RCM-PST-0
(24-VDC specification)

Model number: RCM-PST-1
RCM-PST-2
(Power-supply unit specifications)

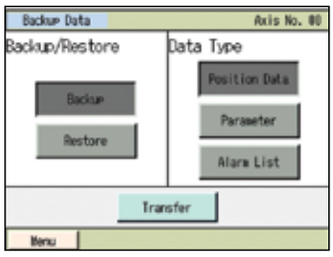
1	ERC3 connector	For cable connection with the ERC3.
2	External 24-V connector	24 VDC±10%. * Supplied with a plug connector.
3	Emergency stop connector	Connect an emergency stop switch. * Supplied with a plug connector.
4	Brake switch	Forced release switch for an actuator with brake.
5	AC input cable	Single-phase 100 or 230-V input. * Varies depending on the product.
6	Wall-mounting hook	The hook can be secured with M3 or equivalent screws or bolts (screw head size: ø6 or less).
7	Operation switches	Panel sheet switches

Options

Touch-panel Teaching Pendant for Position Controller CON-PTA/PDA/PGAS

Adopting an easy-to-use interactive touch-panel menu screen, these simple data devices can be operated without consulting to the manuals.

1. Color screen for greater ease of view
2. Supporting the takt time minimization function and maintenance information checking/input functions.
3. Position, parameters and other data can be saved in a SD card
4. Built-in clock function records the date & time of each event; data can then be saved in a SD card.



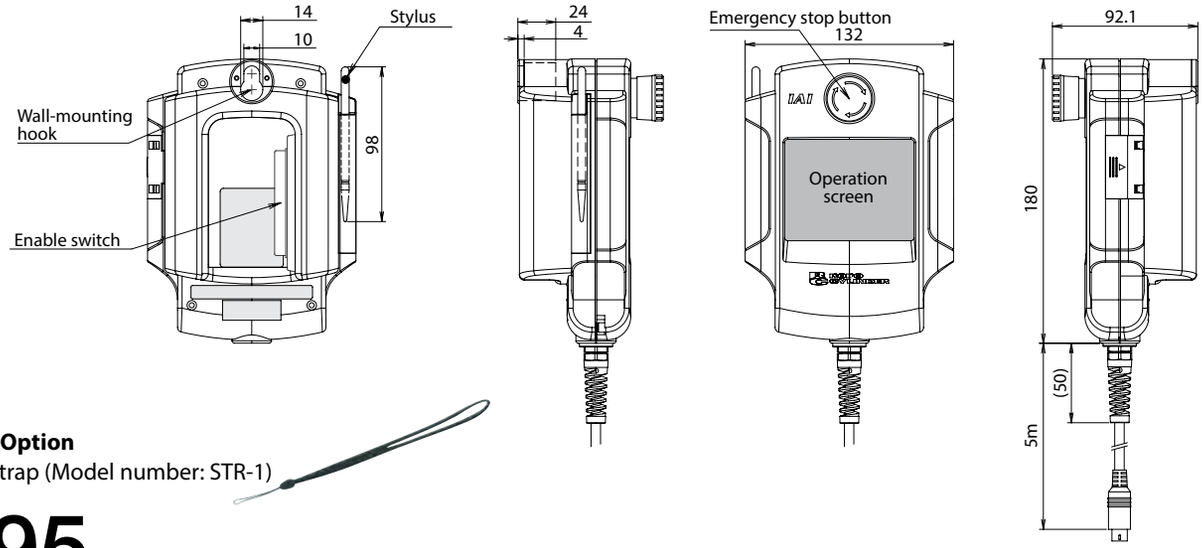
Model Numbers/Specifications

Item	Description		
Model number	**CON-PTA-C-ENG**	**CON-PDA-C-ENG**	**CON-PGAS-C-S-ENG (set)**
Type	Standard type	Enable switch type	Safety-category compliant type
Connectable controllers	ACON/PCON/SCON/RACON/RPCON/MSCON/ASEP/PSEP/MSEP/DSEP/AMEC/PMEC /ERC2 (*1) /ERC3		
3-position enable switch	×	○	○
Functions	• Position data input/editing • Moving function (moving to set positions, jogging/inching) • Parameter editing • Monitoring (current position, current speed, I/O signals, alarm code, alarm generation time) • Saving/reading data to/from external SD cards (position data parameters, alarm list) • Takt time minimization function • Maintenance information (total number of movements, total distance travelled, etc.)		
Display	65,536 colors (16-bit colors), white LED backlight		
Ambient operating temperature/humidity	0 to 40°C, 85% RH or less (Non-condensing)		
Environmental resistance	IP40 or equivalent		
Mass	Approx. 570g	Approx. 600g	
Cable length	5m		
Accessories	Stylus	Stylus	Stylus, TP adapter (Model number: RCB-LB-TGS) Dummy plug (Model number: DP-4S) Controller cable (Model number: CB-CON-LB005)
Standard price	—	—	—

*1 Among the ERC2 series, only the actuators bearing 4904 or greater number stamped on the serial number label can be connected.

Name of Each Part

■ Name of Each Part/External Dimensions



■ Option

• Strap (Model number: STR-1)

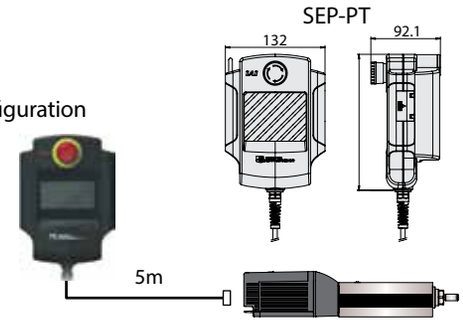
Options

Touch-panel Teaching Pendant for Position Controller SEP-PT

SEP-PT version 3.00 or later is supported.

Features Teaching device offering position input, test run, monitoring and other functions.
* This teaching pendant can be used when the ERC3's controller type is set to "MEC type."

Configuration



Specifications

Item	SEP-PT
Data input	○
Actuator operation	○
Ambient operating temperature/humidity	Temperature 0 to 40°C, humidity 85%RH or less
Operating ambience	Free from corrosive gases or significant powder dust.
Protection degree	IP40
Mass	Approx. 550g
Cable length	5m
Display	3-color LED touch panel with backlight
Standard price	—

PC software version 8.03.00.00 or later is supported.

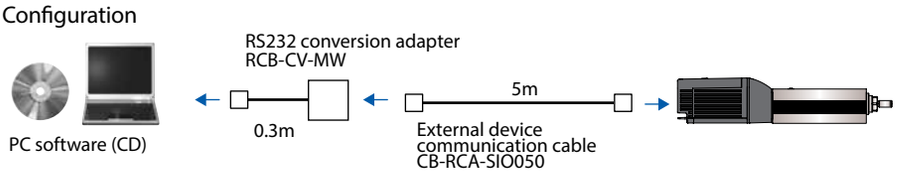
PC Software (Windows Only)

Features This startup support software provides functions to input positions, perform test runs and monitor data, among others.
Incorporating all functions needed to make adjustments, this software helps shorten the initial startup time.
* This software can be used when the ERC3's controller type is set to "CON type."

Supported Windows OS:
2000 SP4 or later / XP SP2 or later / Vista / 7

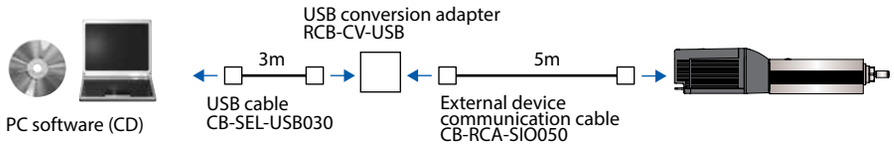
Model number **RCM-101-MW**
(With external device communication cable + RS232 conversion unit)

Configuration



Model number **RCM-101-USB**
(With external equipment communication cable + USB conversion adapter + USB cable)

Configuration



MEC PC Software

You can change the stop position data, perform test run and do many other things on a PC using the MEC PC software. This software also lets you use the middle stop function, perform push-motion operation, change the coordinates, etc., with ease.
The MEC PC software can be downloaded on the IAI's website.

The MEC PC software can be used with the version 2.00.00.00 or later.

IAI's website: www.intelligentactuator.com

* This software can be used when the ERC3's controller type is set to "MEC type."

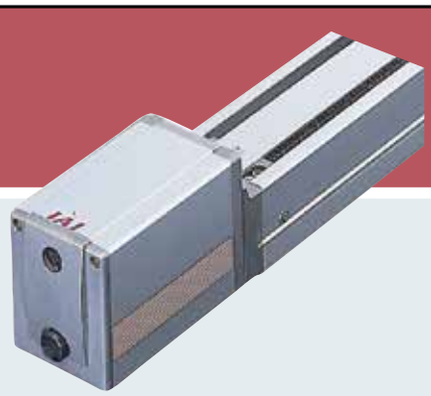
The cable supplied with the above "PC software (RCM-101-MW/RCM-101-USB)" can be used to connect the PC and ERC3 series.
To purchase a cable separately, select an appropriate cable/adapter by referring to the table below.

PC connection method	Model	Name	Price
RS232	CB-RCA-SIO050	External device communication cable	—
	RCB-CV-MW	RS232 conversion adapter	—
USB	CB-RCA-SIO050	External device communication cable	—
	RCB-CV-USB	USB conversion adapter	—
	CB-SEL-USB030	USB cable	—

ERC2

■ Model: NP / PN / SE

Controller module of controller-integrated actuator



List of Models

I/O type		NP	PN	SE
Name		PIO type (NPN Specification)	PIO type (PNP Specification)	Serial Communication Type
External View				
Description		Controller that moves by designating position numbers with NPN PIO via PLC.	Controller that moves by designating position numbers with PNP PIO via PLC.	Controller that is used by connecting to the field network via the gateway unit.
Position points		16 points	16 points	64 points
Standard Price	SA6C	—		
	SA7C	—		
	RA6C	—		
	RA7C	—		
	RGS6C	—		
	RGS7C	—		
	RGD6C	—		
	RGD7C	—		

Model

ERC2 – □ – I – PM – □ – □ – □ – □ – □

Series – Type – Encoder – Motor – Lead – Stroke – I/O Type – Cable length – Option

Type	
SA6C	Slider type (52mm width)
SA7C	Slider type (58mm width)
RA6C	Rod type (52mm width)
RA7C	Rod type (58mm width)
RGS6C	Rod type with single guide (52mm width)
RGS7C	Rod type with single guide (58mm width)
RGD6C	Rod type with double guide (52mm width)
RGD7C	Rod type with double guide (58mm width)

Encoder	
I	Incremental type

Motor	
PM	Pulse Motor

Lead	
16	16mm
12	12mm
8	8mm
6	6mm
4	4mm
3	3mm

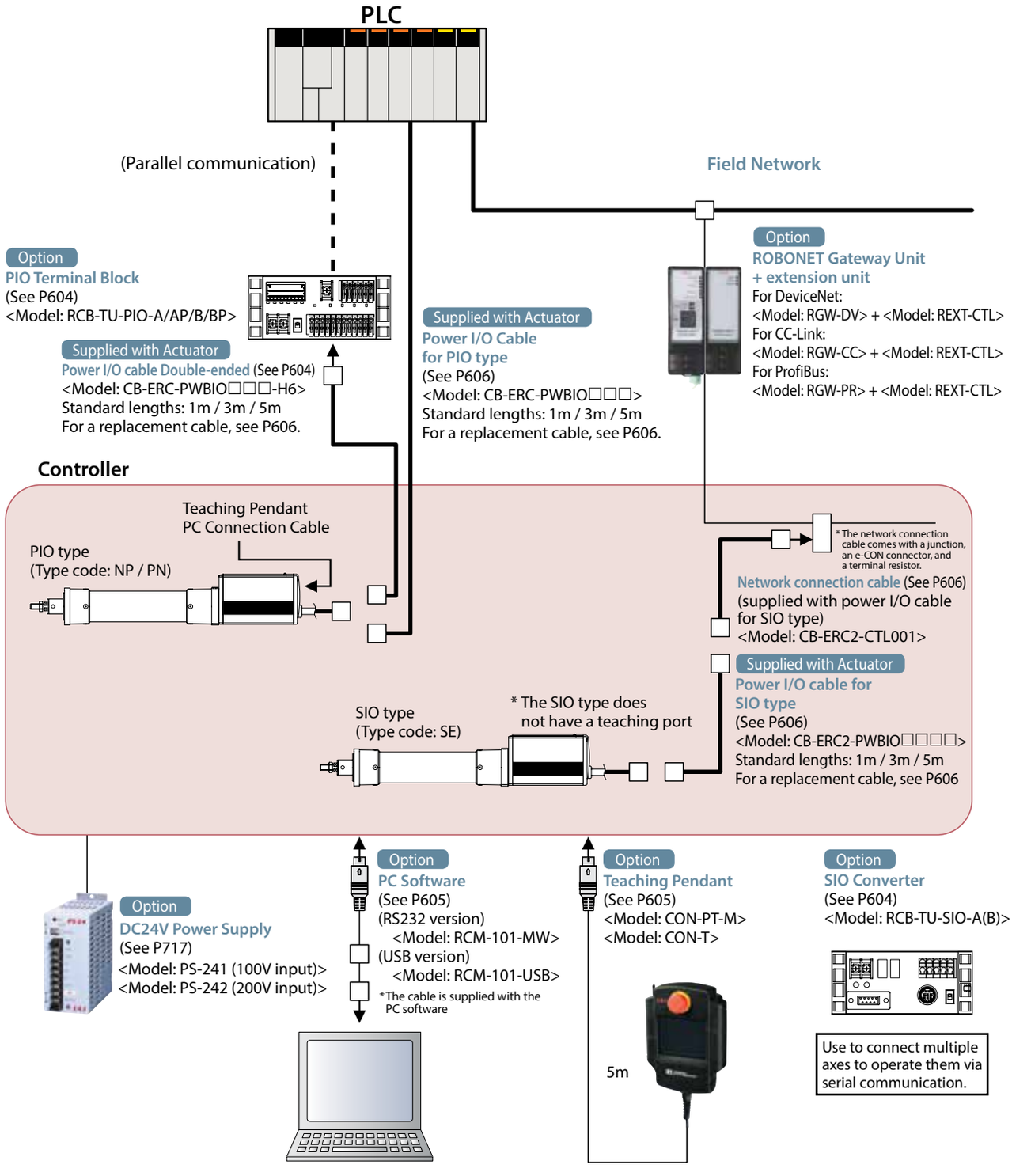
Stroke	
50 ~ 600	50mm ~ 600mm (50mm increments)

I/O Type	
NP	PIO Type (NPN)
PN	PIO Type (PNP)
SE	SIO type

Cable length	
N	No cable
P	1m
S	3m
M	5m
X□□	Custom length
R□□	Robot Cable
W□□	Cable with connectors at both ends
RW□□	Robot cable with cnnectors at both ends

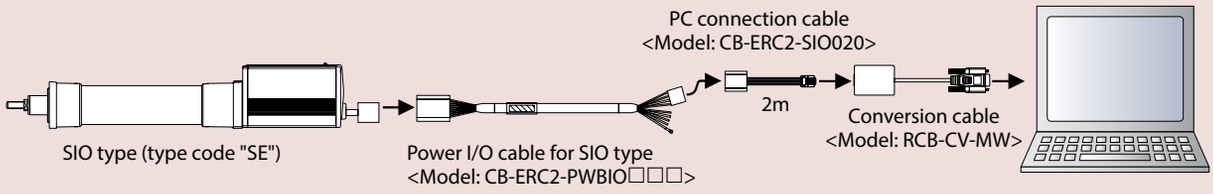
Option	
B	Brake
NM	Non-motor end
FT	Foot bracket

System configuration



Wiring Diagram to Connect to a PC

When connecting the SIO type to the PC directly, use the following cable. (See P606)



I/O Specification (PIO type)

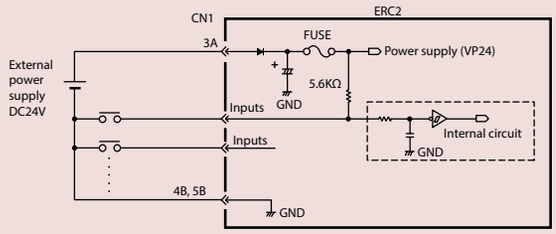
Input section External input specifications

Item	Specifications
Input points	6 points
Input voltage	DC24V +/-10%
Input current	4mA/circuit
Leak current	Max. 1mA/point
Operating voltage	ON voltage: Min. 18V (3.5mA) OFF voltage: Max. 6V (1mA)

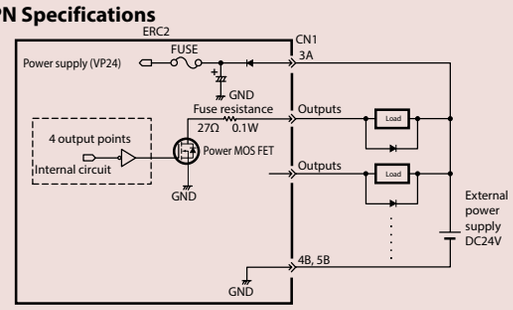
Output section External input specifications

Item	Specifications
Input points	4 points
Nominal load voltage	DC24V
Max. current	60mA/point
Remaining voltage	2V or less
Short-circuit, reverse voltage, protection	Fuse resistance (27Ω0.1W)

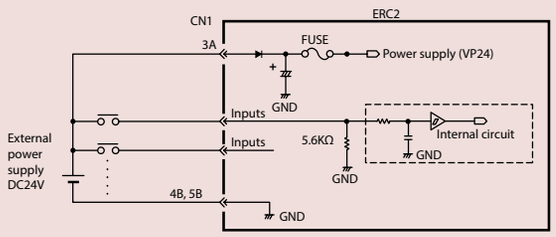
NPN Specifications



NPN Specifications



PNP Specifications



PNP Specifications

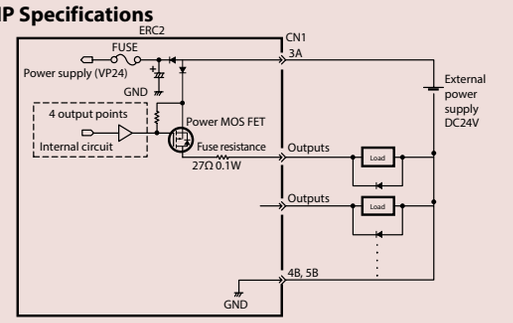


Table of I/O Signals (PIO type)

Parameter (PIO pattern select)	PIO pattern	Pin No.
0	8-point type	A standard specification providing eight positioning points, plus a home return signal, zone signal,etc. (The parameter has been set to this pattern prior to the shipment.)
1	3-point type (Solenoid valve type)	Simply turn ON three signals of ST0 to ST2 to move the actuator to the corresponding positions (0 to 2), just like you do with solenoid valves (This allows for easy conversion from air cylinders).
2	16-point type (Zone signal type)	Can be positioned for up to 16 points. (Same as the 8-point type, except that this pattern provides no home return signal.)
3	16-point type (Position zone signal type)	A 16-point pattern with a position zone signal instead of a zone signal.

Pin No.	Classification	Wire color	Parameters (select PIO pattern)			
			0	1	2	3
			Conventional type	3-point type (Solenoid valve type)	16-point type (Zone signal type)	16-point type (Position zone signal type)
1A	PIO	Orange (Red 1)	SGA			
1B		Orange (Black 1)	SGB			
2A	Signal	Light Blue (Red 1)	EMS1			
2B	Signal	Light Blue (Black 1)	EMS2			
3A	24V	White (Red 1)	24V			
3B	0V	White (Black 1)	BLK			
4A	24V	Yellow (Red 1)	MPI			
4B	0V	Yellow (Black 1)	GND			
5A	24V	Pink (Red 1)	MPI			
5B	0V	Pink (Black 1)	GND			
6A	Input	Orange (Red 2)	PC1	ST0	PC1	PC1
6B		Orange (Black 2)	PC2	ST1	PC2	PC2
7A		Light Blue (Red 2)	PC4	ST2	PC4	PC4
7B		Light Blue (Black 2)	HOME	—	PC8	PC8
8A		White (Red 2)	CSTR	RES	CSTR	CSTR
8B		White (Black 2)	* STP	* STP	* STP	* STP
9A	Output	Yellow (Red 2)	PEND	PE0	PEND	PEND
9B		Yellow (Black 2)	HEND	PE1	HEND	HEND
10A		Pink (Red 2)	ZONE	PE2	ZONE	ZONE
10B		Pink (Black 2)	*ALM			

Signals marked with an asterisk (*) (ALM/STP) are negative logic signals so they are normally on.

Signal Names

Classification	Signal Name	Signal Abbreviation	Function Overview
SIO	Serial communication	SGA SGB	Used for serial communication.
24V 0V	Emergency stop	EMS1 EMS2	These signals are wired to enable the emergency stop switch on the teaching pendant (see P521).
Input	Brake release	BKR	By connecting to 0V (150mA needed) the brake is forcibly released.
	Command position No.	PC1 PC2 PC4 PC8	Designates the position number using 4-bit binary signals (or 3-bit binary signals if the 8-point PIO pattern is selected). (Example) Position 3 → Input PC1 and PC2 Position 7 → Input PC1 and PC2 and PC4
	Position movement	ST0 ST1 ST2	Turn the ST0 signal on to move the actuator to position 0. Same for ST1 and ST2 (Operation can be started with these signals alone. No need to input a start signal).
	Home return	HOME	Home-return operation starts at the leading edge of this signal.
	Start	CSTR	Input a command position number signal and turn this signal ON, and the actuator will start moving to the specified position
	Reset	RES	Turning this signal ON resets the alarms that are present. When it is paused (*STP is off), it is possible to cancel the residual movement.
	Pause	* STP	Normal operation is allowed while this signal is ON (negative logic) The actuator starts to decelerate to a stop at the ON → OFF leading edge of this signal.
Output	Positioning complete	PEND	This signal turns ON once the actuator has moved to the target position and completed the positioning by entering the specified positioning band. Used to determine if positioning has completed.
	Complete position No.	PE0 PE1 PE2	PE0 is output upon completion of movement to position 0. Same for PE1 and PE2. (These signals are valid only when the 3-point PIO pattern is selected.)
	Home return complete	HEND	This signal turns ON upon completion of home return.
	Zone	ZONE	This signal turns ON upon entry into the zone signal range set by parameters.
	Position zone	PZONE	This signal turns ON upon entry into the zone signal range set in the position table.
	Alarm	* ALM	The signal remains ON in normal conditions and turns OFF upon generation of the alarm (negative logic). Synchronized with the LED at the top of the motor cover (green: normal state, red: alarm on).

Signals marked with an asterisk (*) (ALM/STP) are negative logic signals so they are normally on.

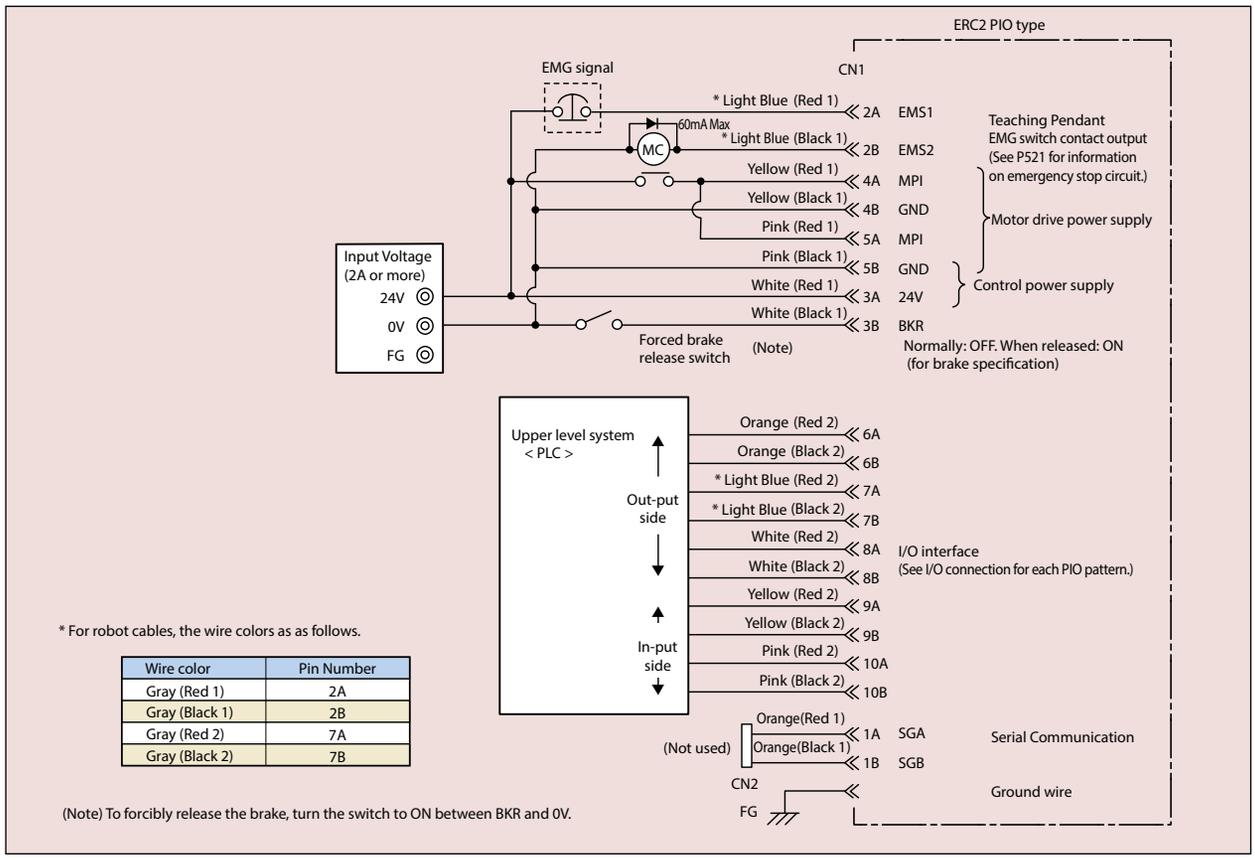
Specification Table

Specification		Details	
Type		PIO specification (NP / PN)	SIO specification (SE)
Control method		Low field vector control (patent pending)	
Positioning command		Position No. designation	Position No. designation / Direct value designation
Position No.		Max. 16 points	Max. 64 points
Backup memory		Position number data and parameters are stored in nonvolatile memory. Serial EEPROM with a rewrite life of 100,000 times	
PIO		6 dedicated input points/4 dedicated output points	None
Electromagnetic brake		Built-in circuit DC24V±10 0.15A max.	
2-color LED display		Servo ON (green), Alarm/motor drive power supply shut-down (red)	
I/O power (Note 1)		common to control power (non-isolated)	
Serial Communication		RS485 1ch (External termination)	
Absolute function		None	
Forced release of electromagnetic brake		Forced release when connected to 0V (NP), or 24V (PN)	Forced release when connected to 24V
Cable Length		I/O cable: 10m max.	
		SIO connector communication cable: 5m or shorter	
Dielectric strength voltage		DC500V 10MΩ	
EMC		EN55011 Class A Group1 (3m)	
Power supply voltage		DC24V ± 10%	
Power supply current		2A max.	
Environment	Ambient operating temperature	0~40°C	
	Ambient operating humidity	85% RH or lower (non-condensing)	
	Ambient operating atmosphere	Free from corrosive gases	
Protection class		IP20	

(Note 1) Use the isolated PIO terminal block (option P604) to isolate the I/O power supply.

I/O Wiring Drawing

PIO Type NP (NPN Specification)

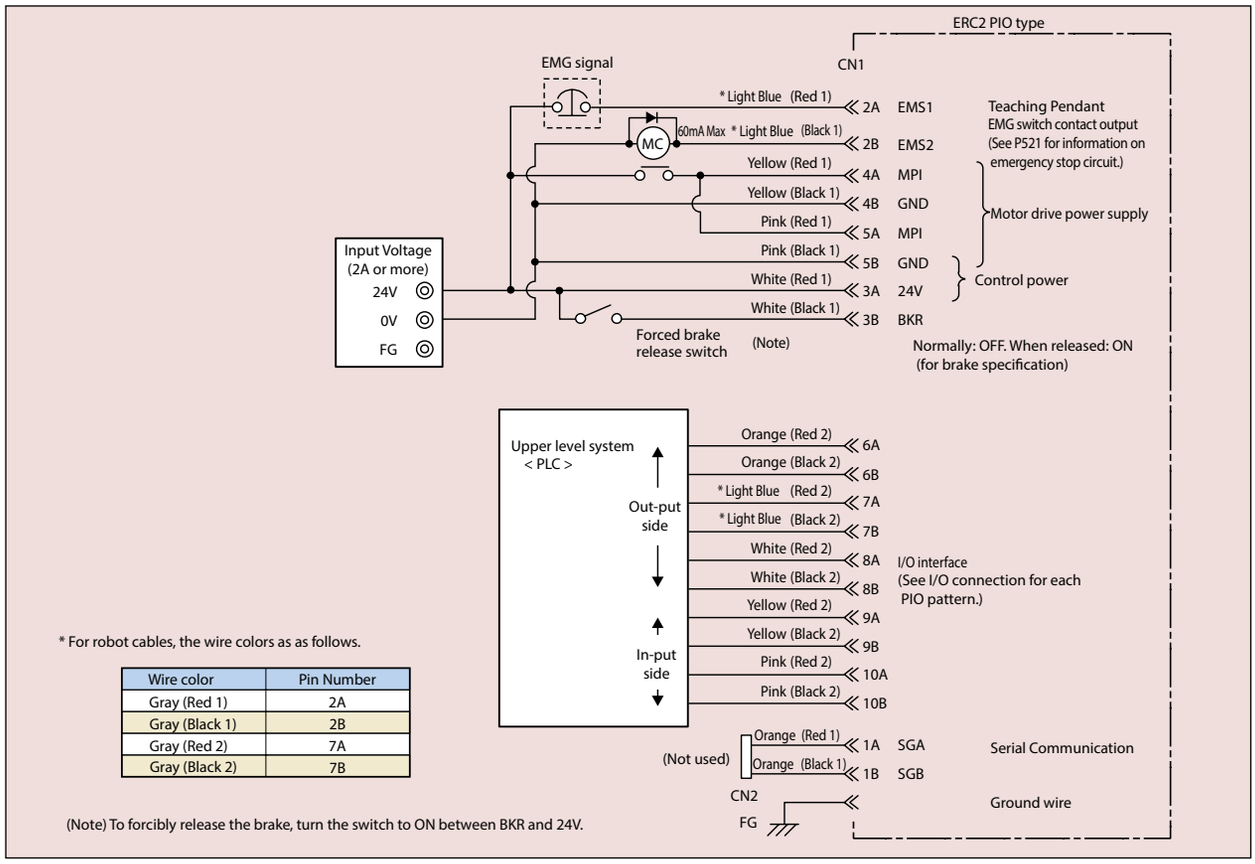


* For robot cables, the wire colors as as follows.

Wire color	Pin Number
Gray (Red 1)	2A
Gray (Black 1)	2B
Gray (Red 2)	7A
Gray (Black 2)	7B

(Note) To forcibly release the brake, turn the switch to ON between BKR and 0V.

PIO Type PN (PNP Specification)

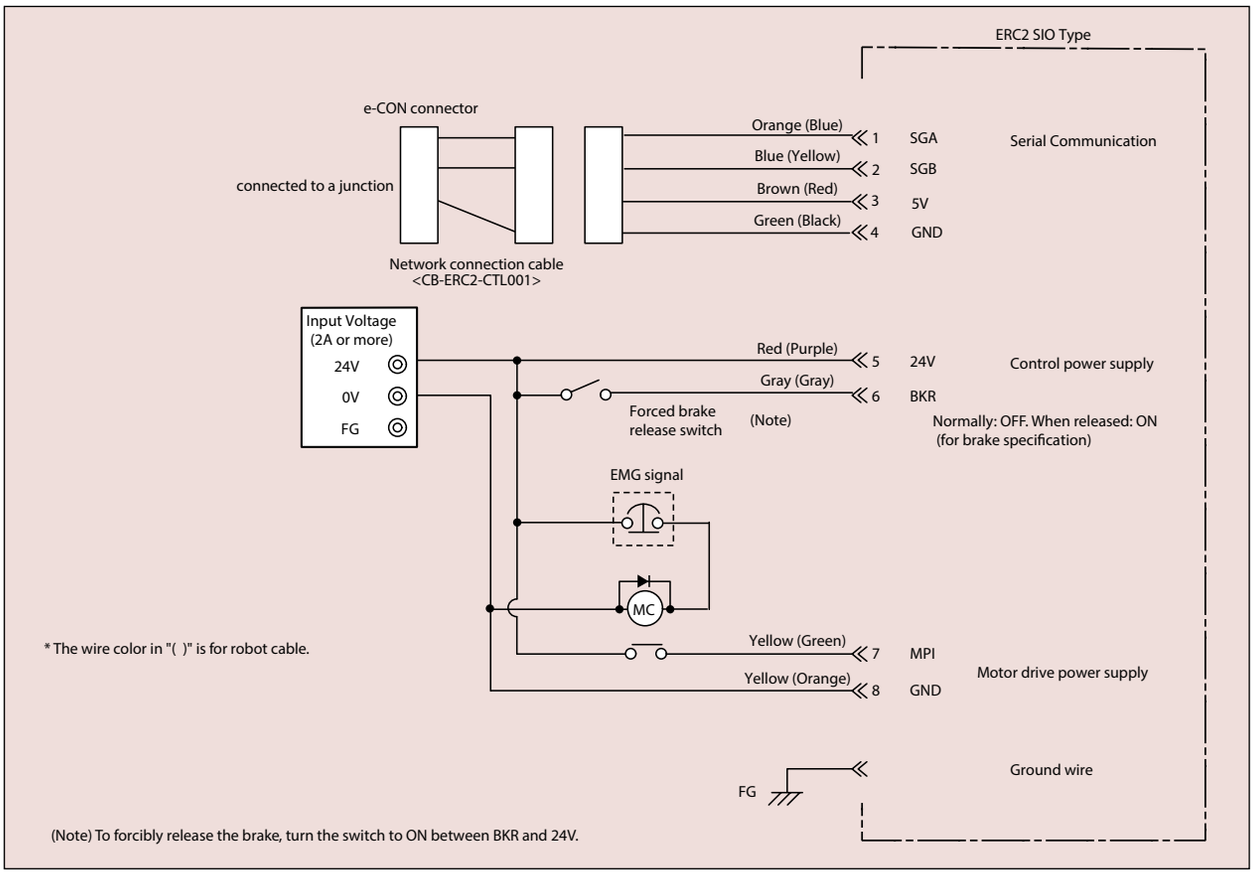


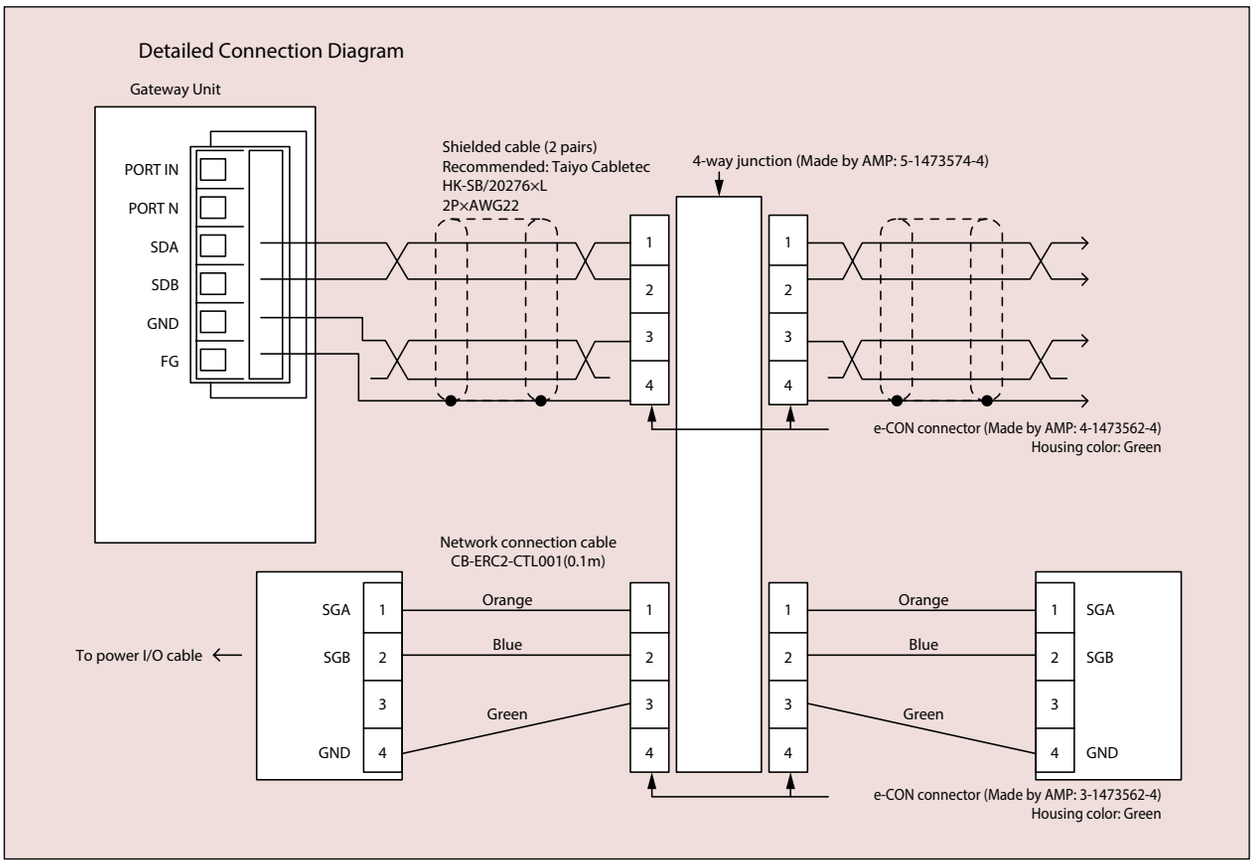
* For robot cables, the wire colors as as follows.

Wire color	Pin Number
Gray (Red 1)	2A
Gray (Black 1)	2B
Gray (Red 2)	7A
Gray (Black 2)	7B

(Note) To forcibly release the brake, turn the switch to ON between BKR and 24V.

SIO Type SE



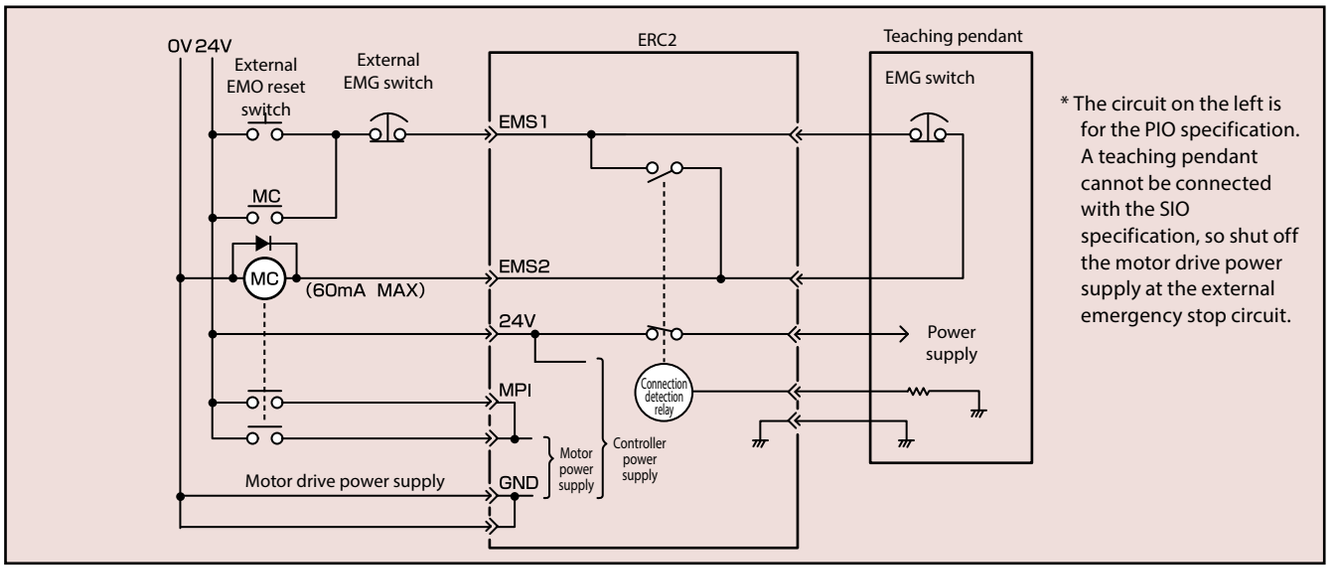


Emergency Stop Circuit

The ERC2 series has no built-in emergency stop circuit, so the customer must provide an emergency stop circuit based on the logic explained below. (The circuit below is simplified for explanation purposes. Provide a ready circuit, etc., according to your specification.)

Single Axis:

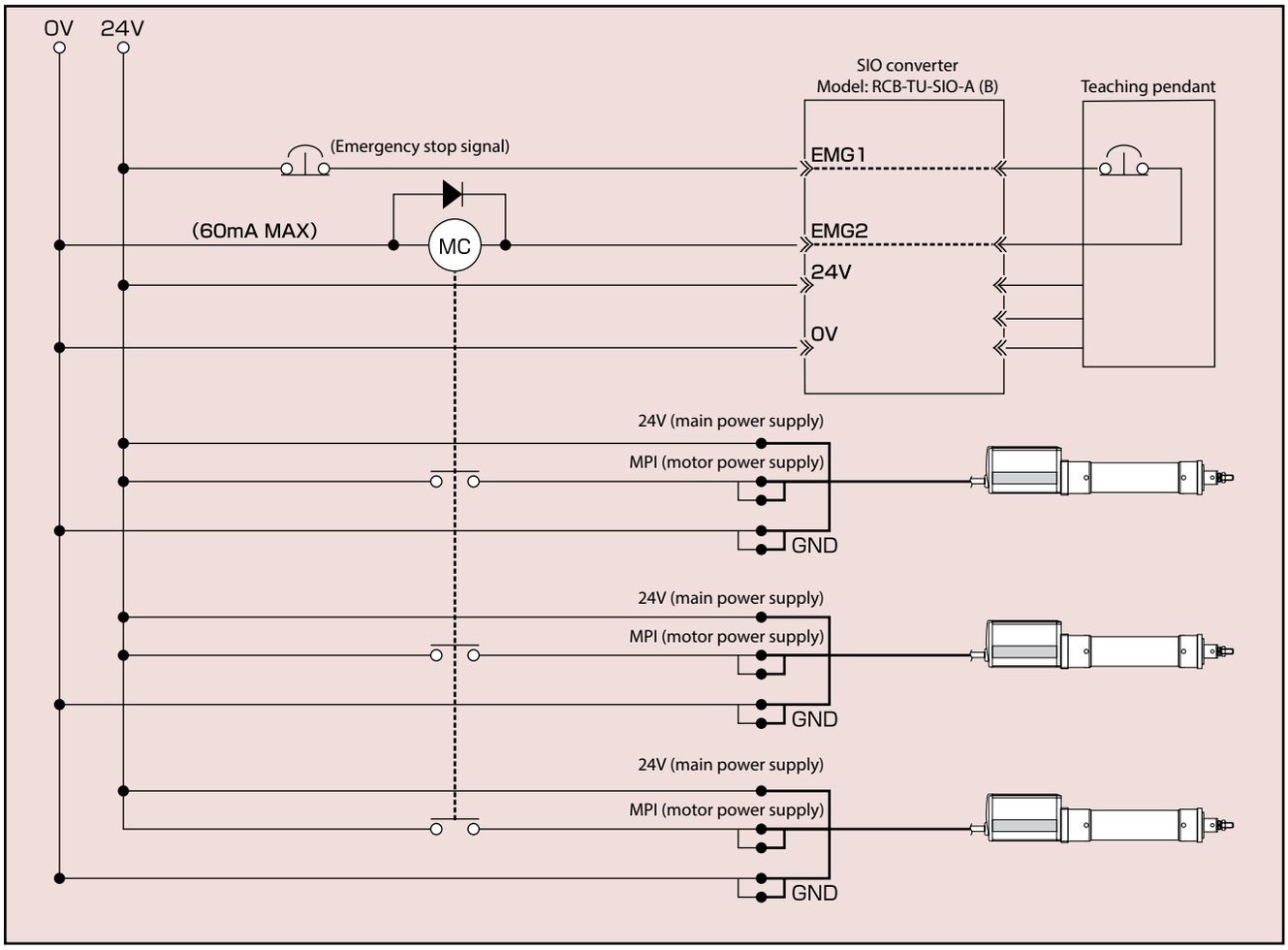
To provide an emergency stop circuit for a single-axis configuration, operate a relay using the EMS1 and EMS2 contacts of the power & I/O cable to cut off MPI (motor power).



* The circuit on the left is for the PIO specification. A teaching pendant cannot be connected with the SIO specification, so shut off the motor drive power supply at the external emergency stop circuit.

Multiple Axis:

To provide an emergency stop circuit for a multiple-axes configuration, operate a relay using the EMG1 and EMG2 contacts of the SIO converter to cut off MPI (motor power) for each axis.



Options

Isolated PIO Terminal Block

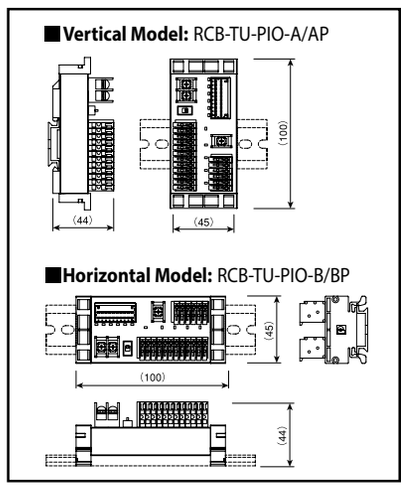
This terminal block is used to isolate the I/O power or simplify the wiring with a PLC.
*When a terminal block is used, the optional power & I/O cable with connectors on both ends must be used.

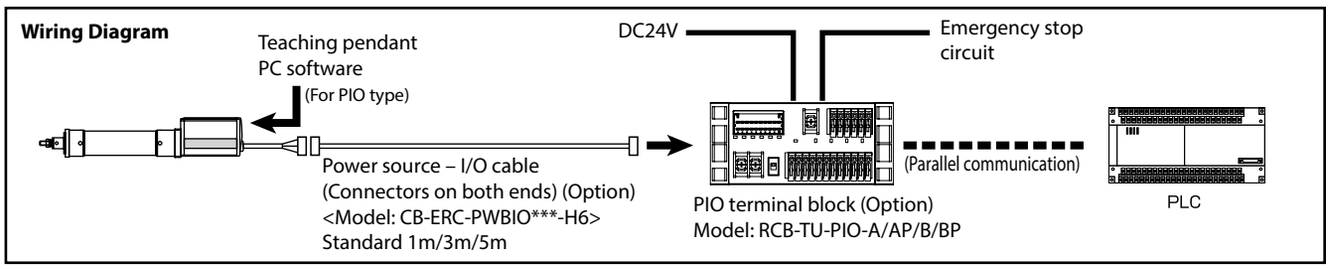
Features • The input and output ports are non-polar, so both NPN and PNP are compatible with the I/O specifications on the PLC side.
• An input/output-signal monitor LED is equipped to check the ON/OFF status of signals.

Specifications

Item		Specifications
Power supply voltage		DC24V±10%
Ambient Operating Temp./Humidity		0 to 55°C, 85%RH or below (non-condensing)
Input area	Input points	6 points
	Input voltage	DC24V±10%
	Input current	7mA/circuit (bipolar)
	Allowable leaked current	1mA/point (at room temperature, about 2mA)
	Operating voltage (with respect to ground)	Input ON: Min. 16V (4.5mA) OFF : Max. 5V (1.3 mA)
Output area	Output points	4 points
	Rated load voltage	DC24V
	Max. current	60mA/point
	Residual voltage	2V or less/60mA
	Short circuit Overcurrent protection	Fuse resistance (27Ω0.1W)

Note:
If you are using the ERC2-PN (PNP specification), use RCB-TU-PIO-AP/BP (compatible with PNP specification).





SIO Converter

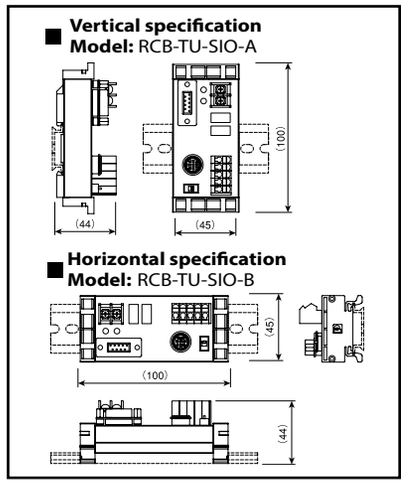
This converter can be used for RS232 communication by connecting a serial communication wire (SGA, SGB) for the power-I/O cable, and using a D-sub 9-pin cross cable to connect a computer.

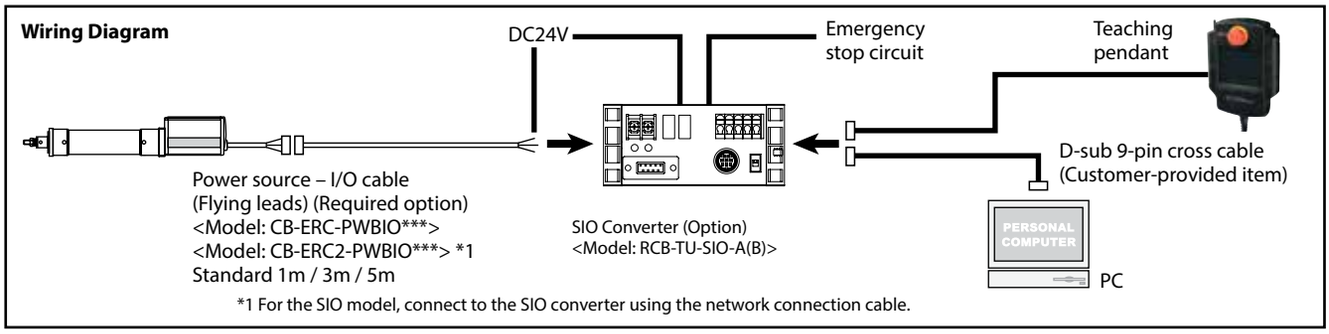
Features • The connection port for teaching-pendant or a PC cable can be installed at any position away from the actuator.

• Multiple axes can be connected and operated from a PC via serial communication.

Specifications

Item	Specifications
Power supply voltage	DC24V ±10%
Ambient Operating Temp./Humidity	0 to 55°C, 85%RH or below (non-condensing)
Terminal resistor	120Ω (built-in)





*1 For the SIO model, connect to the SIO converter using the network connection cable.

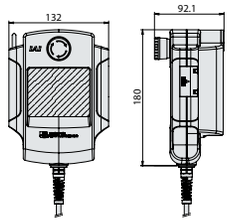
Options

Teaching Pendant

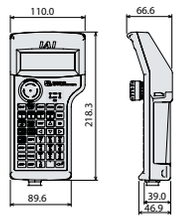
Features This is a teaching device that provides information on functions such as position input, test runs, and monitoring.

Model **CON-PTA-C-ENG** (Touch panel teaching pendant)
CON-T-ENG (Standard type)

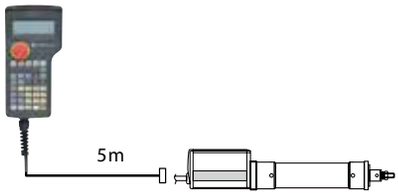
CON-PTA-C-ENG



CON-T-ENG

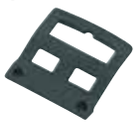


Configuration



CON-T-ENG Options

• Wall-mounting hook
Model **HK-1**



• Strap
Model **STR-1**

Specification

Item	Content	
Model number	CON-PTA-C-ENG	CON-T-ENG
Data Input	○	○
Actuator Motion	○	○
Ambient Operating Temp./Humidity	Temp 0~40°C; 85% RH or below	
Ambient Operating Atmosphere	No corrosive gases. Especially no dust.	
Protective class	IP40	IP54
Weight	Approx. 570g	Approx. 400g
Cable Length	5m	
Display	65,536 color (16 bit color) White LED back light	20 char. x 4 lines LCD display
Standard Price	—	—

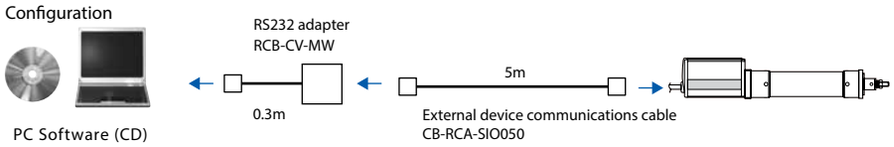
PC Software (Windows Only)

Features A startup support software for teaching positions, performing test runs, and monitoring.
With enhancements for adjustment functions, the startup time is shortened.

Supported Windows OS:
2000 SP4 or later / XP SP2 or later / Vista / 7

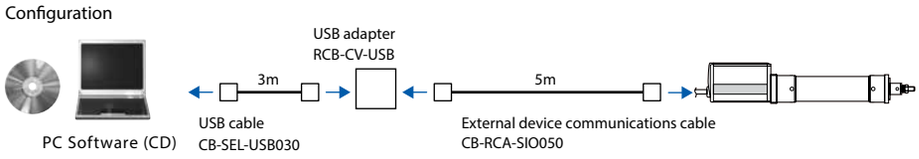
Model **RCM-101-MW** (External device communications cable + RS232 conversion unit)

Configuration



Model **RCM-101-USB** (External device communications cable + USB adapter + USB cable)

Configuration

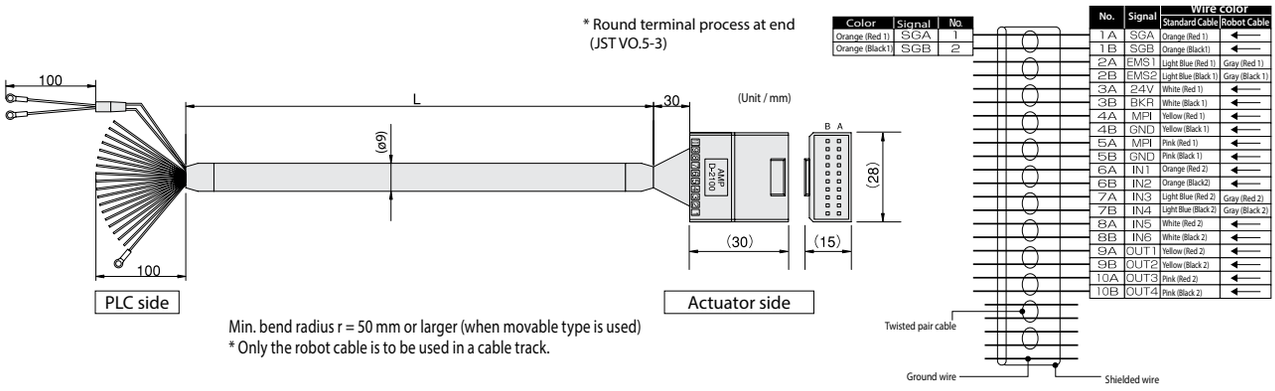


Cables & Spare Parts

Power & I/O Cable, Power & I/O Robot Cable For PIO

Model **CB-ERC-PWBIO□□□/CB-ERC-PWBIO□□□-RB**

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



Color	Signal	No.
Orange (Red 1)	SGA	1
Orange (Black1)	SGB	2

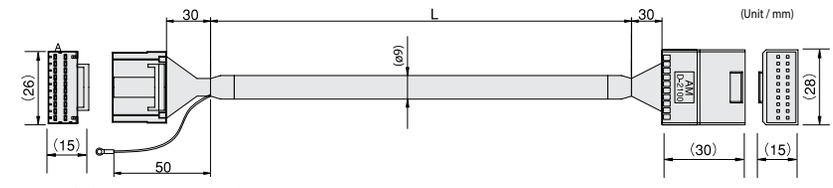
No.	Signal	Wire Color: Standard Cable	Wire Color: Robot Cable
1A	SGA	Orange (Red 1)	←
1B	SGB	Orange (Black1)	←
2A	EMS1	Light Blue (Red 1)	Gray (Red 1)
2B	EMS2	Light Blue (Black 1)	Gray (Black 1)
3A	24V	White (Red 1)	←
3B	BKR	White (Black 1)	←
4A	MPI	Yellow (Red 1)	←
4B	GND	Yellow (Black 1)	←
5A	MPI	Pink (Red 1)	←
5B	GND	Pink (Black 1)	←
6A	IN1	Orange (Red 2)	←
6B	IN2	Orange (Black2)	←
7A	IN3	Light Blue (Red 2)	Gray (Red 2)
7B	IN4	Light Blue (Black 2)	Gray (Black 2)
8A	IN5	White (Red 2)	←
8B	IN6	White (Black 2)	←
9A	OUT1	Yellow (Red 2)	←
9B	OUT2	Yellow (Black 2)	←
10A	OUT3	Pink (Red 2)	←
10B	OUT4	Pink (Black 2)	←

Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track.

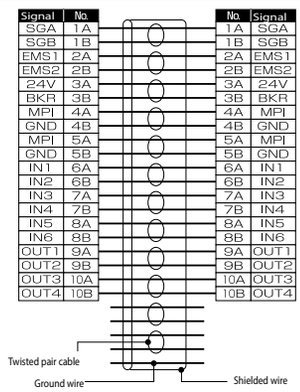
Power & I/O Cable, Power-I/O Robot Cable (Connectors on Both Ends)

Model **CB-ERC-PWBIO□□□-H6/CB-ERC-PWBIO□□□-RB-H6**

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



Signal	No.	No.	Signal
SGA	1A	1A	SGA
SGB	1B	1B	SGB
EMS1	2A	2A	EMS1
EMS2	2B	2B	EMS2
24V	3A	3A	24V
BKR	3B	3B	BKR
MPI	4A	4A	MPI
GND	4B	4B	GND
MPI	5A	5A	MPI
GND	5B	5B	GND
IN1	6A	6A	IN1
IN2	6B	6B	IN2
IN3	7A	7A	IN3
IN4	7B	7B	IN4
IN5	8A	8A	IN5
IN6	8B	8B	IN6
OUT1	9A	9A	OUT1
OUT2	9B	9B	OUT2
OUT3	10A	10A	OUT3
OUT4	10B	10B	OUT4

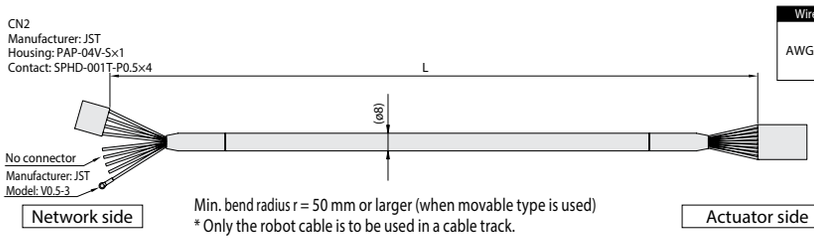


Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track.

Power & I/O Cable, Power & I/O Robot Cable For SIO Type

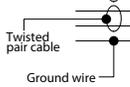
Model **CB-ERC2-PWBIO□□□/CB-ERC2-PWBIO□□□-RB**

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



Wire	Color	Signal	No.
AWG26	Orange	SGA	1
	Blue	SGB	2
	Brown	5V	3
	Green	GND	4

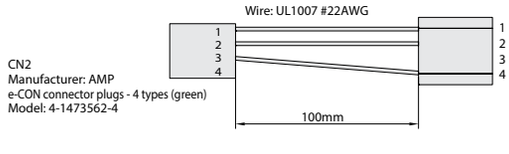
No.	Signal Name	Wire color: Standard Cable	Wire color: Robot Cable
1	SGA	Orange	Blue
2	SGB	Blue	Yellow
3	5V	Brown	Red
4	GND	Green	Black
5	Control power	Red	Purple
6	Brake	Gray	Gray
7	MPI	Yellow	Green
8	GND	Black	Orange
9	Shield	Shield	Shield



Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track.

Network Connection Cable

Model **CB-ERC2-CTL001**



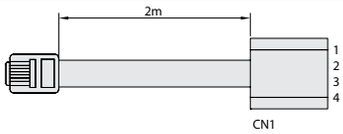
Wire	Color	Signal	No.
CN2 AWG22	Orange	SGA	1
	Blue	SGB	2
	Green	GND	3
		NC	4

No.	Signal	Color	Wire
1	SGA	Orange	CN1 AWG22
2	SGB	Blue	
3	5V	—	
4	GND	Green	

CN1
JST
Housing: PALR-04VF×1
Contact: SPAL-001T-P0.5×4

Communication Cable to Connect to PC

Model **CB-ERC2-SIO020**



Wire	Signal	No.
AWG26	5V	1
	SGA	2
	GND	3
	SGB	4
	GND	5
	5V	6

No.	Signal	Wire
1	SGA	AWG26
2	SGB	
3	5V	
4	GND	

PCON-CA/CFA

For RCP4 <Power CON 150>
For RCP3/RCP2
Position Controllers

Features

1 Built-in high-output driver designed exclusively for RCP4 generates greater torque at high speed

The newly developed high-output driver (patent pending) achieves significantly improved specifications compared to conventional models (RCP2 series), with the acceleration/deceleration higher by 1.4 times, maximum speed by 1.5 times, and payload twice as large.

(*) The rates of improvement vary depending on the type.
(*) RCP3/RCP2 also can be operated.

2 DeviceNet, CC-Link, PROFIBUS-DP, CompoNet, MECHATROLINK (I, II), EtherCAT, EtherNet/IP are supported

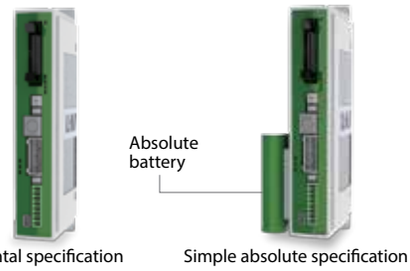
Features include wire-saving design, as well as the abilities to support direct numerical specification, position number specification, current position read, etc.

DeviceNet
PROFIBUS
CompoNet
CC-Link
EtherNet/IP
EtherCAT
MECHATROLINK

3 Incremental specification and simple absolute specification to choose from

You can choose one of the two types: the incremental specification and the simple absolute specification. The simple absolute specification is available in three types, including the specification having only the absolute battery attached on the side face of the actuator, specification equipped with the absolute battery unit where screw stopper/DIN rail mounting is possible, and controller-only specification without absolute battery.

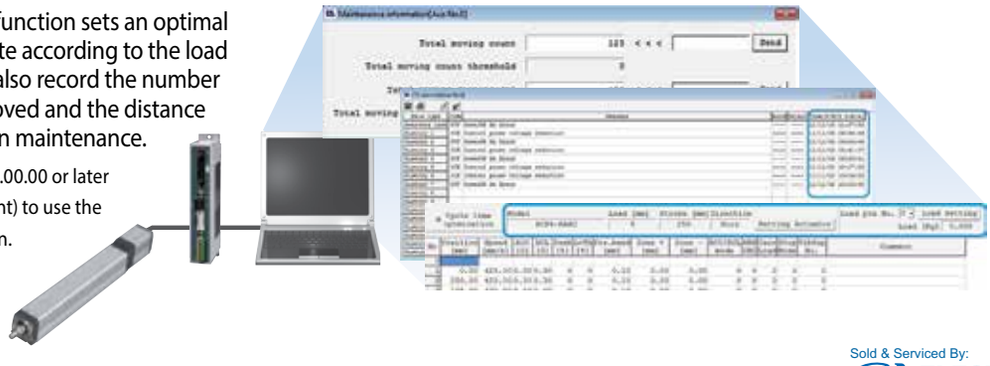
(Note) All pulse-train Power CON controllers are of the incremental specification.



4 Smart tuning function, maintenance information, calendar function

The takt time minimization function sets an optimal acceleration/deceleration rate according to the load that is available (*). You can also record the number of times the actuator has moved and the distance that it has travelled, for use in maintenance.

(*) You need PC software Ver. 8.03.00.00 or later or a CON-PTA (teaching pendant) to use the takt time minimization function.



List of Models

ROBO Cylinder Position Controller PowerCON 150 <PCON-CA>

External view										
I/O type			Positioner type	Pulse-train type	Field network type					
					DeviceNet	CC-Link	PROFIBUS	CompoNet	MECHATROLINK	EtherCAT / EtherNet/IP
					DeviceNet connection specification	CC-Link connection specification	PROFIBUS-DP connection specification	CompoNet connection specification	MECHATROLINK connection specification	EtherCAT connection specification / EtherNet/IP connection specification
I/O type model code			NP/PN	PLN/PLP	DV	CC	PR	CN	ML	EC / EP
Standard price	Incremental specification		—	—	—	—	—	—	—	— / —
	Simple absolute specification	With absolute battery	—	—	—	—	—	—	—	— / —
		With absolute battery unit	—	—	—	—	—	—	—	— / —
		No absolute battery	—	—	—	—	—	—	—	— / —

ROBO Cylinder Position Controller High-thrust Motor Type <PCON-CFA>

External view										
I/O type			Positioner type	Pulse-train type	Field network type					
					DeviceNet	CC-Link	PROFIBUS	CompoNet	MECHATROLINK	EtherCAT / EtherNet/IP
					DeviceNet connection specification	CC-Link connection specification	PROFIBUS-DP connection specification	CompoNet connection specification	MECHATROLINK connection specification	EtherCAT connection specification / EtherNet/IP connection specification
I/O type model code			NP/PN	PLN/PLP	DV	CC	PR	CN	ML	EC / EP
Standard price	Incremental specification		—	—	—	—	—	—	—	— / —

PCON-CA/CFA Controller

Model Number

<Controller>

PCON — CA — [ ] — I — [ ] — [ ] — 0 — [ ] — [ ]

Series: PCON
Type: CA
Motor type
Encode type: I
I/O type
I/O cable length
Power supply voltage: 0
Simple absolute specification
Actuator mounting specification

CA	Standard type

20P	20 frame pulse motor
20SP	20 frame pulse motor (RCP3-RA2 high-thrust type dedicated)
28P	28 frame pulse motor
28SP	28 frame pulse motor (RCP2-RA3C dedicated)
35P	35 frame pulse motor
42P	42 frame pulse motor
56P	56 frame pulse motor

I	Incremental

0	DC24V

NP	PIO (NPN) specification
PLN	Pulse-train (NPN) specification
PN	PIO (PNP) specification
PLP	Pulse-train (PNP) specification
DV	DeviceNet connection specification
CC	CC-Link connection specification
PR	PROFIBUS-DP connection specification
CN	CompoNet connection specification
ML	MECHATROLINK connection specification
EC	EtherCAT connection specification
EP	EtherNet/IP connection specification

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

* If a network connection specification (I/O type = DV, CC, PR, CN, ML, EC or EP) is selected, the I/O cable length becomes "0" (no cable).

(Blank)	Incremental specification
AB	Simple absolute specification (With absolute battery)
ABU	Simple absolute specification (With absolute battery unit)
ABUN	Simple absolute specification (No absolute battery)

(Blank)	Screw fastening specification
DN	DIN rail mounting specification

* The mounting specification for the absolute battery unit (screws mounting or DIN rail mounting) conforms to the mounting specification for the controller.

<Controller>

* The PCON-CFA does not support the simple absolute specification.

PCON — CFA — [ ] — I — [ ] — [ ] — 0 — [ ]

Series: PCON
Type: CFA
Motor type
Encode type: I
I/O type
I/O cable length
Power supply voltage: 0
Actuator mounting specification

CFA	High-thrust motor type

I	Incremental

0	DC24V

60P	60 frame pulse motor
86P	86 frame pulse motor

NP	PIO (NPN) specification
PLN	Pulse-train (NPN) specification
PN	PIO (PNP) specification
PLP	Pulse-train (PNP) specification
DV	DeviceNet connection specification
CC	CC-Link connection specification
PR	PROFIBUS-DP connection specification
CN	CompoNet connection specification
ML	MECHATROLINK connection specification
EC	EtherCAT connection specification
EP	EtherNet/IP connection specification

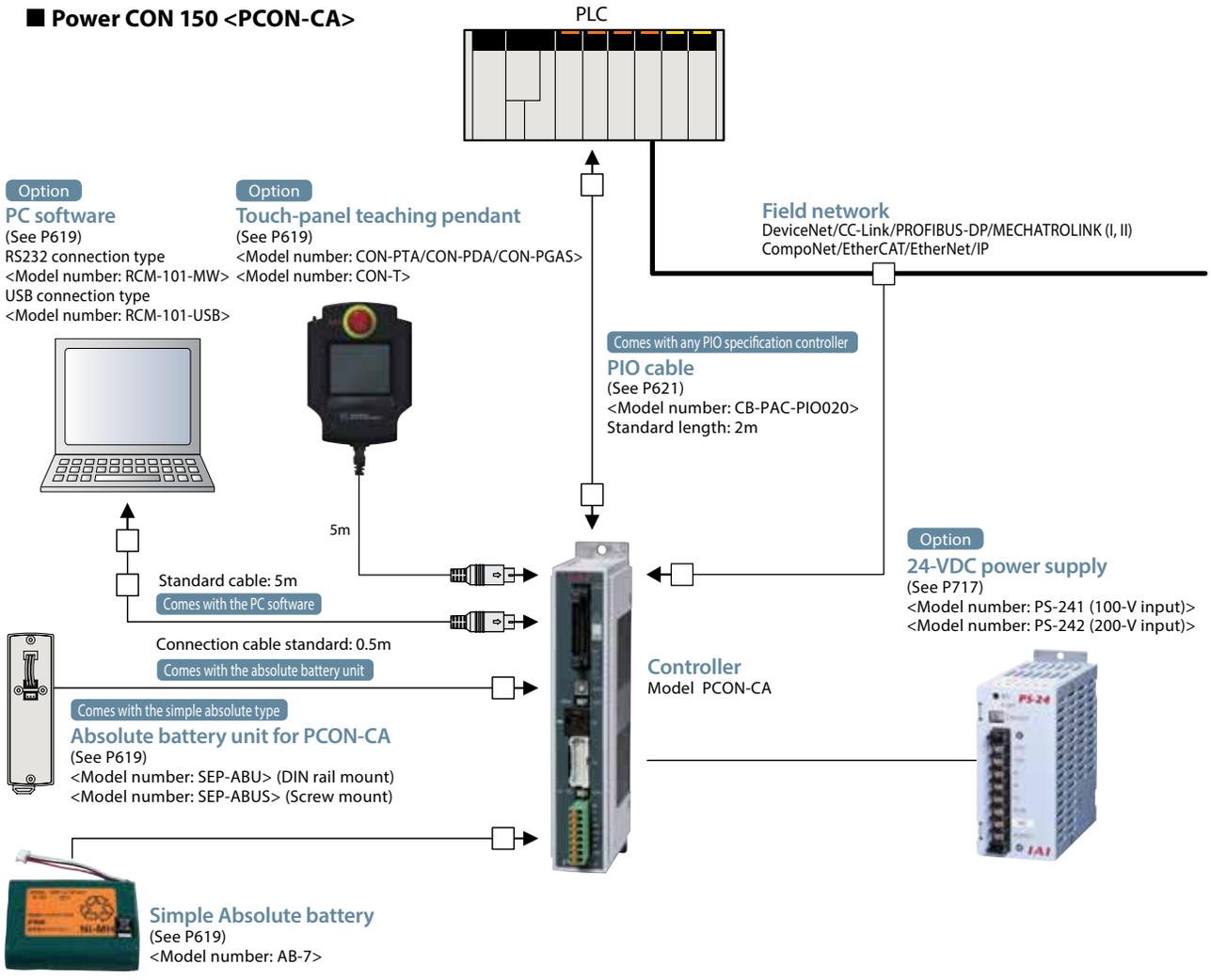
0	No cable
2	2 m
3	3 m
5	5 m

* If a network connection specification (I/O type = DV, CC, PR, CN, ML, EC or EP) is selected, the I/O cable length becomes "0" (no cable).

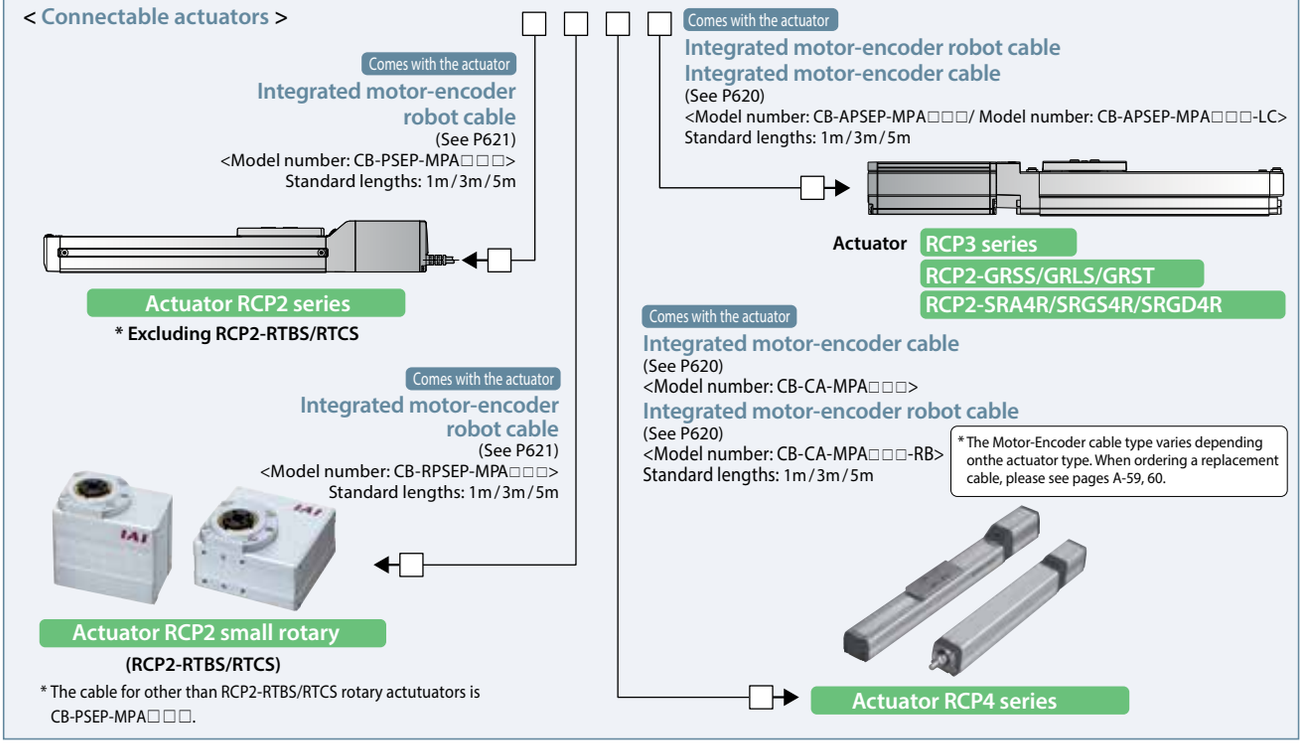
(Blank)	Screw fastening specification
DN	DIN rail mounting specification

System Configuration

■ Power CON 150 <PCON-CA>



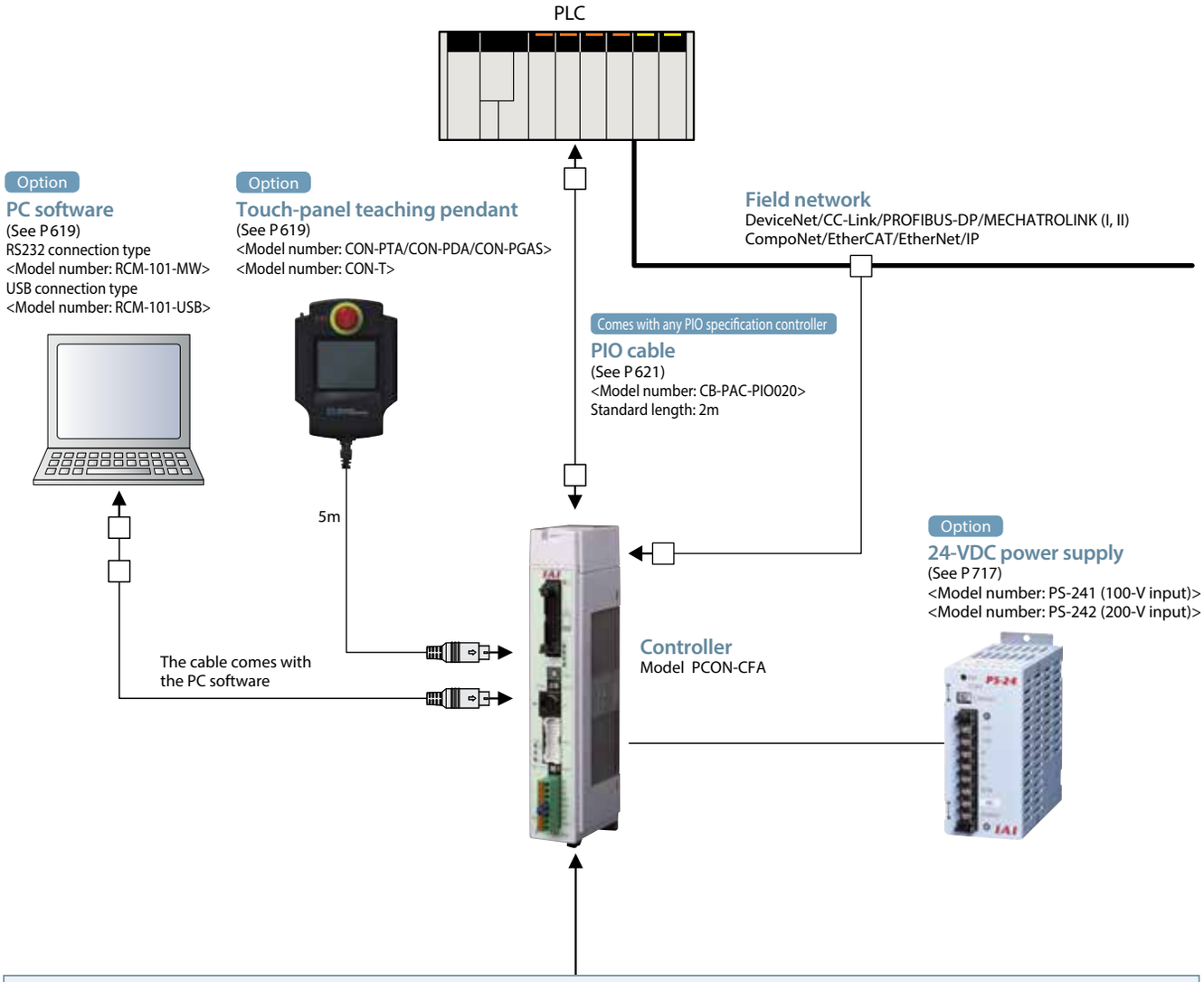
< Connectable actuators >



PCON-CA/CFA Controller

System Configuration

■ High-thrust Motor Type <PCON-CFA>



< Connectable actuators >

Comes with the actuator

Integrated motor-encoder cable
(See P 620)
<Model number: CB-CFA-MPA□□□>

Integrated motor-encoder robot cable
(See P 620)
<Model number: CB-CFA-MPA□□□-RB>
Standard lengths: 1m / 3m / 5m

ROBO Cylinder
High-thrust type
RCP2-RA8C/RA8R

ROBO Cylinder
High-thrust type
RCP2-RA10C

ROBO Cylinder
High-speed type
RCP2-HS8C / HS8R

ROBO Cylinder
Water-proof
RCP2W-SA16C

PIO I/O Interface

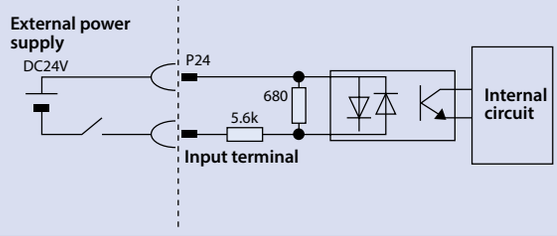
■ Input Part External Input Specifications

Item	Specification
Input voltage	24 VDC ± 10%
Input current	5mA, 1 circuit
ON/OFF voltage	ON voltage: 18 VDC min. OFF voltage: 6 VDC max.

■ Output Part External Output Specifications

Item	Specification
Load voltage	24 VDC
Maximum load current	50mA, 1 circuit
Leak current	2mA max. per point

NPN specification



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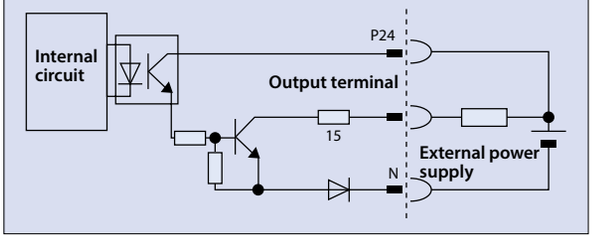

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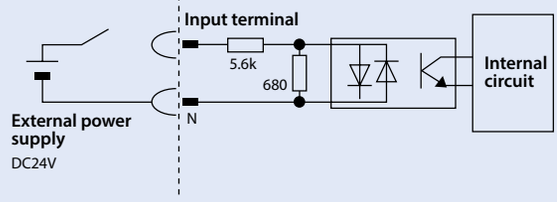

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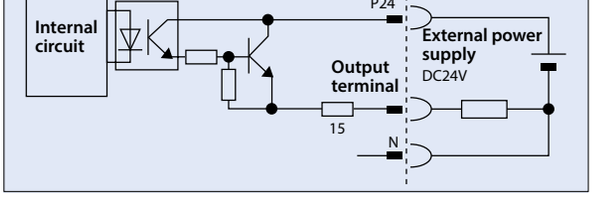


Types of PIO Patterns (Control Patterns)

This controller supports seven types of control methods. Select in Parameter No. 25, "PIO pattern selection" the PIO pattern that best suits your purpose of use.

Type	Set value of Parameter No. 25	Mode	Overview
PIO pattern 0	0 (factory setting)	Positioning mode (standard type)	• Number of positioning points: 64 points • Position number command: Binary Coded Decimal (BCD) • Zone signal output*1: 1 point • Position zone signal output*2: 1 point
PIO pattern 1	1	Teaching mode (teaching type)	• Number of positioning points: 64 points • Position number command: Binary Coded Decimal (BCD) • Position zone signal output*2: 1 point • Jog (inching) operation using PIO signals is supported. • Current position data can be written to the position table using PIO signals.
PIO pattern 2	2	256-point mode (256 positioning points)	• Number of positioning points: 256 points • Position number command: Binary Coded Decimal (BCD) • Position zone signal output*2: 1 point
PIO pattern 3	3	512-point mode (512 positioning points)	• Number of positioning points: 512 points • Position number command: Binary Coded Decimal (BCD) • No zone signal output
PIO pattern 4	4	Solenoid valve mode 1 (7-point type)	• Number of positioning points: 7 points • Position number command: Individual number signal ON • Zone signal output*1: 1 point • Position zone signal output*2: 1 point
PIO pattern 5	5	Solenoid valve mode 2 (3-point type)	• Number of positioning points: 3 points • Position number command: Individual number signal ON • Completion signal: A signal equivalent to a LS (limit switch) signal can be output. • Zone signal output*1: 1 point • Position zone signal output*2: 1 point
PIO pattern 6 (Note)	6	Pulse-train control mode	• Differential pulse input (200 kpps max.) • Home return function • Zone signal output*1: 2 points • No feedback pulse output

*1 Zone signal output: A desired zone is set by Parameter Nos. 1 and 2 or 23 and 24, and the set zone always remains effective once home return has completed.
*2 Position zone signal output: This function is available as part of a position number. A desired zone is set in the position table and becomes effective only when the corresponding position is specified, but not with commands specifying other positions.
(Note) Pulse Train Control Model is available only if the pulse train control type is indicated (PCON-CA-PLN or PLP) at the time of purchase.

PIO Patterns and Signal Assignments

The table below lists the signal assignments for the I/O flat cable under different PIO patterns. Connect an external device (such as a PLC) according to this table.

Pin number	Category	PIO function	Parameter No. 25, "PIO pattern selection"					
			0	1	2	3	4	5
			Positioning mode	Teaching mode	256-point mode	512-point mode	Solenoid valve mode 1	Solenoid valve mode 2
	Input	Number of positioning points	64 points	64 points	256 points	512 points	7 points	3 points
		Home return signal	○	○	○	○	○	×
		Jog signal	×	○	×	×	×	×
		Teaching signal (writing of current position)	×	○	×	×	×	×
		Brake release	○	×	○	○	○	○
	Output	Moving signal	○	○ (Note 1)	× (Note 1)	×	×	×
		Zone signal	○	△	△	×	○	○
		Position zone signal	○	○	○	×	○	○
1A	24V	P24						
2A	24V	P24						
3A	Pulse input	—						
4A		—						
5A	Input	IN0	PC1	PC1	PC1	PC1	ST0	ST0
6A		IN1	PC2	PC2	PC2	PC2	ST1	ST1(JOG+)
7A		IN2	PC4	PC4	PC4	PC4	ST2	ST2(-)
8A		IN3	PC8	PC8	PC8	PC8	ST3	—
9A		IN4	PC16	PC16	PC16	PC16	ST4	—
10A		IN5	PC32	PC32	PC32	PC32	ST5	—
11A		IN6	—	MODE	PC64	PC64	ST6	—
12A		IN7	—	JISL	PC128	PC128	—	—
13A		IN8	—	JOG+	—	PC256	—	—
14A		IN9	BKRL	JOG-	BKRL	BKRL	BKRL	BKRL
15A		IN10	RMOD	RMOD	RMOD	RMOD	RMOD	RMOD
16A		IN11	HOME	HOME	HOME	HOME	HOME	—
17A		IN12	*STP	*STP	*STP	*STP	*STP	—
18A		IN13	CSTR	CSTR/PWRT	CSTR	CSTR	—	—
19A		IN14	RES	RES	RES	RES	RES	RES
20A		IN15	SON	SON	SON	SON	SON	SON
1B	Output	OUT0	PM1(ALM1)	PM1(ALM1)	PM1(ALM1)	PM1(ALM1)	PE0	LSO
2B		OUT1	PM2(ALM2)	PM2(ALM2)	PM2(ALM2)	PM2(ALM2)	PE1	LS1(TRQS)
3B		OUT2	PM4(ALM4)	PM4(ALM4)	PM4(ALM4)	PM4(ALM4)	PE2	LS2
4B		OUT3	PM8(ALM8)	PM8(ALM8)	PM8(ALM8)	PM8(ALM8)	PE3	—
5B		OUT4	PM16	PM16	PM16	PM16	PE4	—
6B		OUT5	PM32	PM32	PM32	PM32	PE5	—
7B		OUT6	MOVE	MOVE	PM64	PM64	PE6	—
8B		OUT7	ZONE1	MODES	PM128	PM128	ZONE1	ZONE1
9B		OUT8	PZONE/ZONE2	PZONE/ZONE1	PZONE/ZONE1	PM256	PZONE/ZONE2	PZONE/ZONE2
10B		OUT9	RMDS	RMDS	RMDS	RMDS	RMDS	RMDS
11B		OUT10	HEND	HEND	HEND	HEND	HEND	HEND
12B		OUT11	PEND	PEND/WEND	PEND	PEND	PEND	—
13B		OUT12	SV	SV	SV	SV	SV	SV
14B		OUT13	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS
15B		OUT14	*ALM	*ALM	*ALM	*ALM	*ALM	*ALM
16B		OUT15	LOAD/TRQS *ALML	*ALML	LOAD/TRQS *ALML	LOAD/TRQS *ALML	LOAD/TRQS *ALML	*ALML
17B	Pulse input	—						
18B		—						
19B	0V	N						
20B	0V	N						

(Note) In the table above, asterisk * symbol accompanying each code indicates a negative logic signal. PM1 to PM8 are alarm binary code output signals that are used when an alarm generates.
(Note 1) In all PIO patterns other than 3, this signal can be switched with PZONE by setting Parameter No. 149 accordingly.
(Note 2) The setting will not become effective until the origin return is completed.

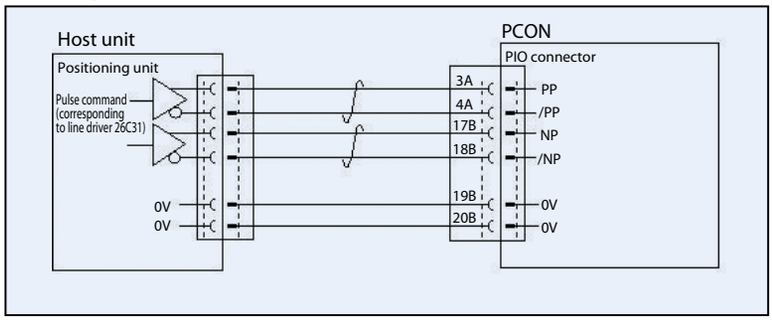
Reference) Negative logic signal

Signals denoted by * are negative logic signals. Negative logic input signals are processed when turned OFF. Negative logic output signals normally remain ON while the power is supplied, and turn OFF when the signal is output.

Note: The names of the signals above inside () are functions before the unit returns home.

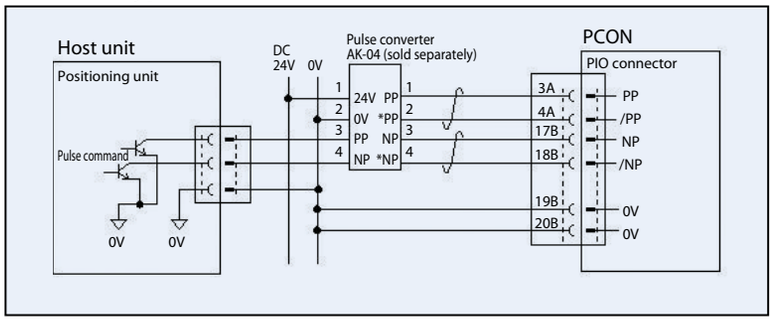
Pulse-train Control Circuit

■Host Unit = Differential Type



■Host Unit = Open Collector Type

The AK-04 (optional) is needed to input pulses.



⚠ Caution: Use the same power supply for open collector input/output to/from the host and for the AK-04.

Command Pulse Input Patterns

	Command pulse-train pattern	Input terminal	Forward	Reverse
Negative logic	Forward pulse-train	PP·/PP		
	Reverse pulse-train	NP·/NP		
	A forward pulse-train indicates the amount of motor rotation in the forward direction, while a reverse pulse-train indicates the amount of motor rotation in the reverse direction.			
	Pulse-train	PP·/PP		
	Sign	NP·/NP	Low	High
	The command pulses indicate the amount of motor rotation, while the sign indicates the rotating direction.			
	Phase A/B pulse-train	PP·/PP		
		NP·/NP		
	Command phases A and B having a 90° phase difference (multiplier is 4) indicate the amount of rotation and the rotating direction.			
Positive logic	Forward pulse train	PP·/PP		
	Reverse pulse-train	NP·/NP		
	Pulse-train	PP·/PP		
	Sign	NP·/NP	High	Low
	Phase A/B pulse-train	PP·/PP		
		NP·/NP		

I/O Signals in Pulse-train Control Mode

The table below lists the signal assignments for the flat cable in the pulse-train control mode. Connect an external device (such as PLC) according to this table.

Pin number	Category	I/O number	Signal abbreviation	Signal name	Parameter No. 25, "PIO pattern 6"
1A	24V		P24	Power supply	I/O power supply +24 V
2A	24V		P24	Power supply	I/O power supply +24 V
3A	Pulse input		PP	Differential pulse-train input (+)	Differential pulses are input from the host. Up to 200 kpps can be input.
4A			/PP	Differential pulse-train input (-)	
5A	Input	IN0	SON	Servo ON	The servo is ON while this signal is ON, and OFF while the signal is OFF.
6A		IN1	RES	Reset	Present alarms are reset when this signal is turned ON.
7A		IN2	HOME	Home return	Home return operation is performed when this signal is turned ON.
8A		IN3	TL	Torque limit selection	When this signal is turned ON, the motor torque is limited to the value set by the parameter.
9A		IN4	CSTP	Forced stop	The actuator is forcibly stopped when this signal has remained ON for 16 ms or more. The actuator decelerates to a stop at the torque set in the controller and the servo turns OFF.
10A		IN5	DCLR	Deviation counter clear	This signal clears the deviation counter.
11A		IN6	BKRL	Forced brake release	The brake is forcibly released.
12A		IN7	RMOD	Operation mode switching	The operation mode can be switched when the MODE switch on the controller is set to AUTO. (AUTO when this signal is OFF, and to MANU when the signal is ON.)
13A		IN8	NC	—	Not used
14A		IN9	NC	—	Not used
15A		IN10	NC	—	Not used
16A		IN11	NC	—	Not used
17A		IN12	NC	—	Not used
18A		IN13	NC	—	Not used
19A		IN14	NC	—	Not used
20A		IN15	NC	—	Not used
1B	Output	OUT0	PWR	System ready	This signal turns ON when the controller becomes ready after the main power has been turned on.
2B		OUT1	SV	Servo ON status	This signal turns ON when the servo is ON.
3B		OUT2	INP	Positioning complete	This signal turns ON when the amount of remaining travel pulses in the deviation counter falls within the in-position band.
4B		OUT3	HEND	Home return complete	This signal turns ON upon completion of home return.
5B		OUT4	TLR	Torque limited	This signal turns ON upon reaching the torque limit while the torque is limited.
6B		OUT5	*ALM	Controller alarm status	This signal turns ON when the controller is normal, and turns OFF when an alarm generates.
7B		OUT6	*EMGS	Emergency stop status	This signal turns ON when the emergency stop of the controller is cancelled, and turns OFF when an emergency stop is actuated.
8B		OUT7	RMDS	Operation mode status	The operation mode status is output. This signal turns ON when the controller is in the manual mode.
9B		OUT8	ALM1	Alarm code output signal	An alarm code is output when an alarm generates. For details, refer to the operation manual.
10B		OUT9	ALM2		
11B		OUT10	ALM4		
12B		OUT11	ALM8		
13B		OUT12	*ALML	Minor failure alarm	This signal is output when a message-level alarm generates.
14B		OUT13	NC	—	Not used
15B		OUT14	ZONE1	Zone signal 1	This signal turns ON when the current position of the actuator falls within the parameter-set range.
16B		OUT15	ZONE2	Zone signal 2	
17B	Pulse input		NP	Differential pulse-train input (+)	Differential pulses are input from the host. Up to 200 kpps can be input.
18B			/NP	Differential pulse-train input (-)	
19B	0V		N	Power supply	I/O power supply 0 V
20B	0V		N	Power supply	I/O power supply 0 V

Note) * indicates a negative logic signal. Negative logic signals are normally ON while the power is supplied, and turn OFF when the signal is output.

(Note) The number of encoder pulses is 800 with all RCP4, RCP3, RCP2 series models. For details, refer to the operation manual.

Field Network Specification: Explanation of Operation Modes

If the PCON-CA is controlled via a field network, you can select one of the following five modes to operate the actuator. Take note that the required data areas on the PLC side vary depending on the mode.

■ Explanation of Modes

	Mode	Description
0	Remote I/O mode	In this mode, the actuator is operated by controlling the ON/OFF of bits via the network, just like with the PIO specification. The number of positioning points and functions vary with each of the operation patterns (PIO patterns) that can be set by the controller's parameter.
1	Position/simple direct numerical mode	The target position is specified by directly entering a value, while other operating conditions (speed, acceleration, etc.) are set by specifying the desired position number corresponding to the desired operating conditions already input to the position data table.
2	Half direct numerical mode	The actuator is operated by specifying the speed, acceleration/deceleration and push current, in addition to the target position, by directly entering values.
3	Full direct numerical mode	The actuator is operated by specifying the target position, speed, acceleration/deceleration, push current control value, etc., by directly entering values. The current position, current speed, command current, etc., can also be read.
4	Remote I/O mode 2	Same as the above remote I/O mode, plus the current position read function and command current read function.

■ Required Data Size for Each Network

		DiviceNet	CC-Link	PROFIBUS-DP	CompoNet	MECHATROLINK I, II	EtherCAT	EtherNet/IP
0	Remote I/O mode	1CH	1 station	2 bytes	2 bytes	*	2 bytes	2 bytes
1	Position/simple direct numerical mode	4CH	1 station	8 bytes	8 bytes	*	8 bytes	8 bytes
2	Half direct numerical mode	8CH	2 stations	16 bytes	16 bytes	*	16 bytes	16 bytes
3	Full direct numerical mode	16CH	4 stations	32 bytes	32 bytes	*	32 bytes	32 bytes
4	Remote I/O mode 2	6CH	1 station	12 bytes	12 bytes	*	12 bytes	12 bytes

* No required data size is set for MECHATROLINK I and II.

■ List of Functions by Operation Mode

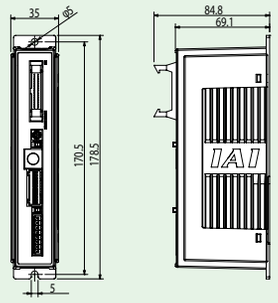
	Remote I/O mode	Position/simple direct numerical mode	Half direct numerical mode	Full direct numerical mode (Note 1)	Remote I/O mode 2
Number of positioning points	512 points	768 points	Unlimited	Unlimited	512 points
Operation by direct position data specification	X	○	○	○	X
Direct speed/acceleration specification	X	X	○	○	X
Push-motion operation	○	○	○	○	○
Current position read	X	○	○	○	○
Current speed read	X	X	○	○	X
Operation by position number specification	○	○	X	X	○
Completed position number read	○	○	X	X	○

* ○ indicates that the operation is supported, and X indicates that it is not supported.
(Note 1) Take note that the MECHATROLINK specification does not support the full direct numerical mode.

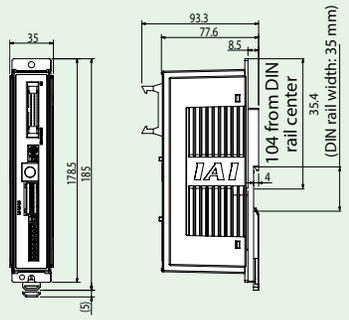
External Dimensions

<PCON-CA>

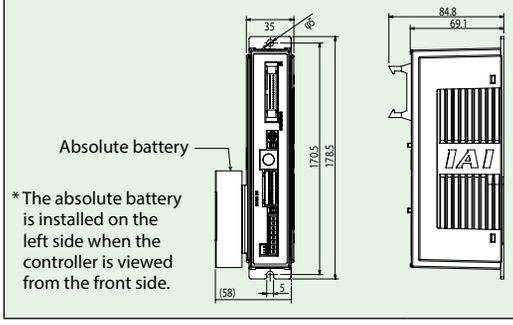
Incremental specification / Screw fastening specification



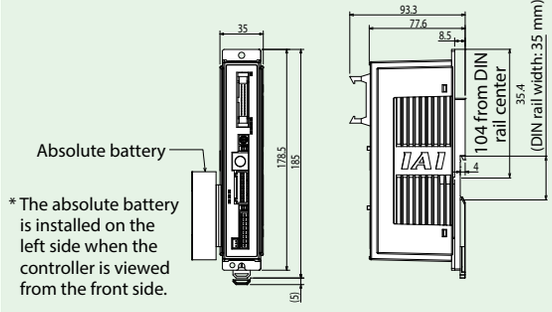
Incremental specification / DIN rail mounting specification



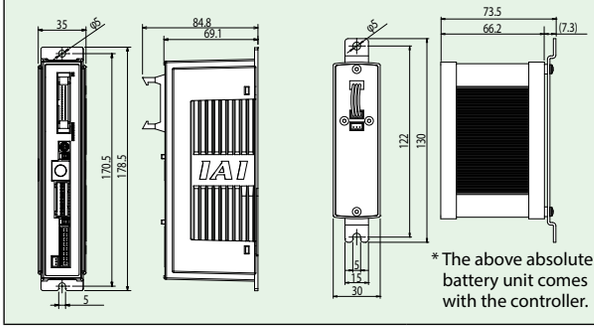
Simple absolute specification With absolute battery / Screw fastening specification



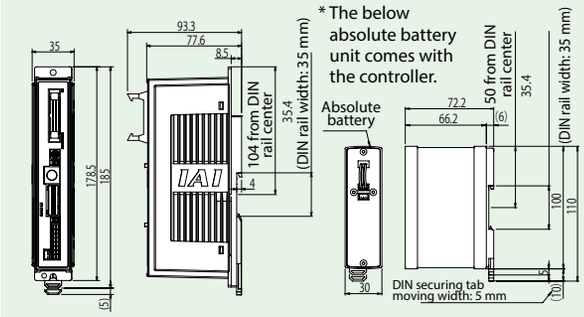
Simple absolute specification With absolute battery / DIN rail mounting specification



Simple absolute specification With absolute battery unit / Screw fastening specification

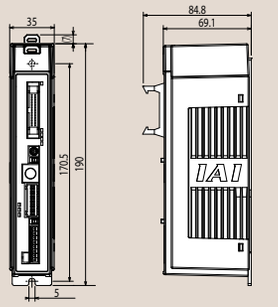


Simple absolute specification With absolute battery unit / DIN rail mounting specification

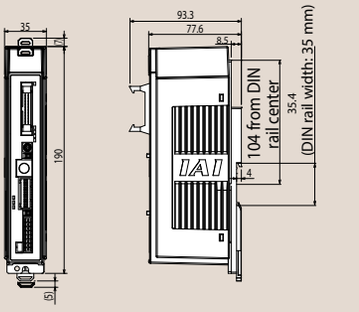


<PCON-CFA>

Incremental specification / Screw fastening specification



Incremental specification / DIN rail mounting specification



Specification table

Item				Description	
				PCON-CA	PCON-CFA
Number of controlled axes				1 axis	
Power supply voltage				24 VDC ± 10%	
Load capacity (Current consumption of controlled axes included) (Note 1)	RCP2 RCP3	Motor type	20P, 28P, 28SP	1A max.	
			42P, 56P	2.2A max.	
			60P, 86P		6A max.
	RCP4	Motor type	28P, 35P 42P, 56P	High-output setting disabled: 2.2 A max.	
				High-output setting enabled: 3.5 A rated / 4.2 A max.	
			60P, 86P		6A max.
Power supply for electromagnetic brake (for actuators with brake)				DC24 VDC ± 10%, 0.15 A (max.)	DC24 VDC ± 10%, 0.5 A (max.)
Rush current (Note 2)				8.3 A	10 A
Momentary power failure resistance				500 µs max.	
Applicable encoder				Incremental encoder of 800 pulses/rev in resolution	
Actuator cable length				20 m max.	
External interface	PIO specification			Dedicated 24-VDC signal input/output (NPN or PNP selected) --- Up to 16 input points, up to 16 output points / Cable length: 10m max.	
	Field network specification			DeviceNet, CC-Link, PROFIBUS, CompoNET, MECHATROLINK, EtherCAT, EtherNet/IP	
Data setting/input method				PC software, touch-panel teaching pendant	
Data retention memory				Position data and parameters are saved in the non-volatile memory (The memory can be written any number of times.)	
Operation modes				Positioner mode / Pulse-train control mode (Selectable by parameter setting)	
Number of positions in positioner mode				Up to 512 points for the positioner type, up to 768 points for the network type (Note) The number of positioning points varies depending on the PIO pattern selected.	
Pulse-train interface	Input pulse			Differential method (line driver method): 200 kpps max. / Cable length: 10 m max.	
				Open collector method: Not supported * If the host uses open-collector output, convert the open-collector pulses to differential pulses using the AK-04 (available as an option).	
	Command pulse magnification (electronic gear ratio: A/B)			1/50 < A/B < 50/1 Setting range of A and B (set by parameters): 1 to 4096	
	Feedback pulse output			None	
Isolation resistance				500-VDC 100 MΩ or more	
Electric shock protection mechanism				Class I basic isolation	
Mass (Note 3)	Incremental specification			Screw fastening type: 250 g or less DIN rail securing type: 285 g or less	Screw fastening type: 270g or less DIN rail securing type: 305g or less
	Simple absolute specification (190 g of battery weight included)			Screw fastening type: 450 g or less DIN rail securing type: 485 g or less	
Cooling method				Natural air cooling	Forced air cooling
Environment	Ambient operating temperature			0 to 40°C	
	Ambient operating humidity			85%RH or less (non-condensing)	
	Operating ambience			Not exposed to corrosive gases	
	Protection degree			IP20	

Note 1) The value increases by 0.3 A for the field network specification.
Note 2) After the power is turned on, rush current will flow for approx. 5 msec (at 40°C). Take note that the rush current varies depending on the impedance of the power-supply line.
Note 3) The value increases by 30 g for the field network specification.

PCON-CA/CFA Controller

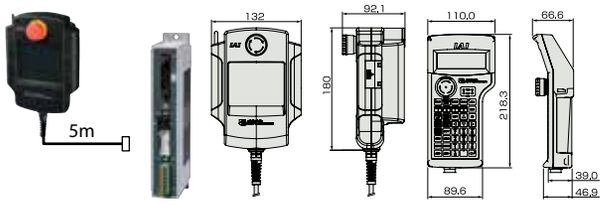
Options

Teaching pendant

Summary Teaching device for positioning input, test operation, and monitoring.

Model **CON-PTA-C** (Touch panel teaching pendant)
CON-T (Standard type)

Setting



Specification

Item		Content	
Model	English Version	CON-PTA-C-ENG	CON-T-ENG
Data Input		○	○
Actuator Motion		○	○
Ambient Operating Temp./Humidity		Temp 0~40°C; 85% RH or below	
Ambient Operating Atmosphere		No corrosive gases. Especially no dust.	
Protective class		IP40	IP54
Weight		Approx. 570g	Approx. 400g
Cable Length		5m	
Display		65,536 color (16 bit color) White LED back light	20 char. x 4 lines LCD display
Standard Price		—	—

PC software (Windows only)

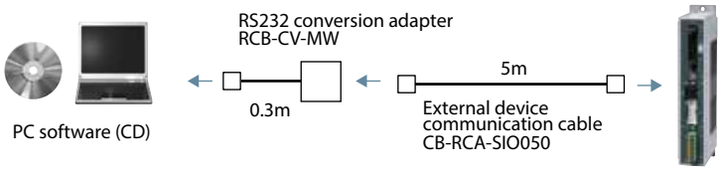
Summary A startup support software for inputting positions, performing test runs, and monitoring. With enhancements for adjustment functions, the startup time is shortened.

Supported Windows OS:
2000 SP4 or later / XP SP2 or later / Vista / 7

Model **RCM-101-MW** (External device communication cable + RS232 conversion unit)

Setting

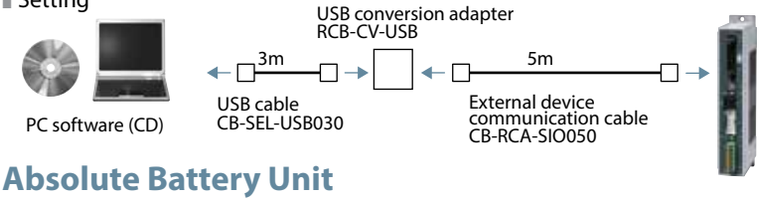
PCON-CA/CFA are supported by Ver.8.03.00.00 or later



Model **RCM-101-USB** (External device communication cable + USB converter adaptor + USB cable)

Setting

PCON-CA/CFA are supported by Ver.8.03.00.00 or later



Absolute Battery Unit

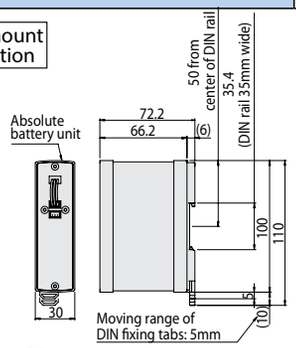
Summary Battery unit that comes with a simple absolute controller, used to back up the current controller position.

Model **SEP-ABU** (DIN rail mount specification)
SEP-ABUS (screw fixing specification)

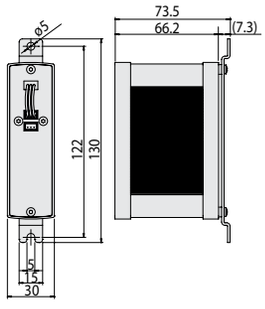
Specifications

Item	Specification
Ambient operating temperature, humidity	0 to 40°C (desirably around 20°C), 95% RH or below (non-condensing)
Operating ambience	Free from corrosive gases
Absolute battery	Model number: AB-7 (Ni-MH battery / Life: Approx. 3 years)
Controller/absolute battery unit link cable	Model number: CB-APSEP-AB005 (Length: 0.5m)
Mass	Standard type: Approx. 230g / Dust-proof type: Approx. 260g

DIN rail mount specification



Screw fixing specification



Replacement battery

Summary The replacement battery for the absolute data backup battery box.

Model **AB-7**

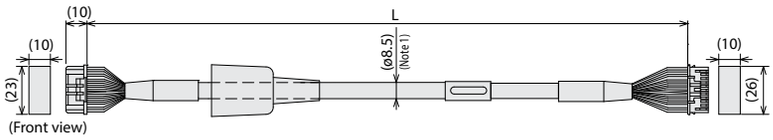
Service parts

Integrated Motor-Encoder Cable/ Motor-Encoder Robot Cable for RCP4

Model **CB-CA-MPA□□□/CB-CA-MPA□□□-RB**

*Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m

*Refer to page A-59 for connectable actuators.



Actuator side — Minimum bend radius R: r = 80mm or larger (for movable use) — Controller side

* The robot cable is designed for flex-resistance:
Please use the robot cable if the cable has to be installed through the cable track.

(Note 1) If cable length is 5m or more, non-robotic cable is ø9.1 and robot cable is ø10.

Actuator side 1-1827863-1 (AMP) — Controller side PADP-24V-1-S (JST)

Pin No.	Signal name	Color	Pin No.	Signal name	Color
A1	ØA/U	Blue(Black)	1	ØA/U	Blue (Black)
B1	VMM/V	Orange (White)	2	VMM/V	Orange (White)
A2	Ø_A/W	Green (Brown)	5	Ø_A/W	Green (Brown)
B2	ØB/-	Brown (Green)	3	ØB/-	Brown (Green)
A3	VMM/-	Gray (Yellow)	4	VMM/-	Gray (Yellow)
B3	Ø_B/-	Red (Red)	6	Ø_B/-	Red (Red)
A4	LS+/BK+	Black (Orange)	7	LS+/BK+	Black (Orange)
B4	LS-/BK-	Yellow (Gray)	8	LS-/BK-	Yellow (Gray)
A6	-/A+	Blue (White)	11	-/A+	Blue (White)
B6	-/A-	Orange (Yellow)	12	-/A-	Orange (Yellow)
A7	A+/B+	Green (Red)	13	A+/B+	Green (Red)
B7	A-/B-	Brown (Green)	14	A-/B-	Brown (Green)
A8	B+/Z+	Gray (Black)	15	B+/Z+	Gray (Black)
B8	B-/Z-	Red (Brown)	16	B-/Z-	Red (Brown)
A5	BK+/LS+	Blue (Black)	9	BK+/LS+	Blue (Black)
B5	BK-/LS-	Orange (Brown)	10	BK-/LS-	Orange (Brown)
A9	LS_GND	Green (Green)	20	LS_GND	Green (Green)
B9	VPS	Brown (Red)	18	VPS	Brown (Red)
A10	VCC	Gray (White)	17	VCC	Gray (White)
B10	GND	Red (Yellow)	19	GND	Red (Yellow)
A11	—	—	21	—	—
B11	FG	Black (—)	22	—	—
			23	—	—
			24	FG	Black (—)

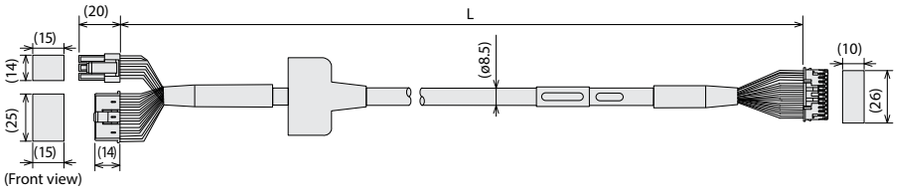
* Color in ( ) indicates color of robot cable

Integrated Motor-Encoder Robot Cable/ Motor-Encoder Cable for RCP2-RA10C/HS8□/SA16C

Model **CB-CFA-MPA□□□/CB-CFA-MPA□□□-RB**

*Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m

*Refer to page A-59 for connectable actuators.



Actuator side — Minimum bend radius R: r = 68mm or larger (for movable use) — Controller side

Actuator side SLP -06V (JST) — Controller side PADP-24V-1-S (JST)

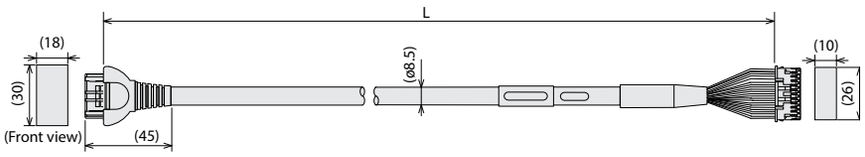
Pin No.	Signal name	Pin No.	Signal name
1	øA	1	øA
2	VMM	2	VMM
4	øB	3	øB
5	VMM	4	VMM
3	ø/A	5	ø/A
6	ø/B	6	ø/B
5	NC	11	NC
6	NC	12	NC
13	LS+	7	LS+
14	LS-	8	LS-
1	A+	13	A+
2	A-	14	A-
3	B+	15	B+
4	B-	16	B-
16	BK+	9	BK+
17	BK-	10	BK-
12	VCC	21	VCC
9	GND	19	GND
11	VPS	18	VPS
10	NC	20	NC
18	FG	24	FG
15	NC	17	NC
7	NC	22	NC
8	NC	23	NC

Integrated Motor-Encoder Robot Cable/ Motor-Encoder Cable for RCP3/RCA2 and others

Model **CB-APSEP-MPA□□□/CB-APSEP-MPA□□□-LC**

*Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m

*Refer to page A-59 for connectable actuators.



Actuator side — Minimum bend radius R: r = 68mm or larger (for movable use) — Controller side

Actuator side Pin number	[PCON](ACON)	Controller side Pin number
A1	Black [ØA](U)	1
B1	White [VMM](V)	2
A2	Brown [Ø/A](W)	5
B2	Green [ØB](-)	3
A3	Yellow [VMM](-)	4
B3	Red [Ø/B](-)	6
A4	Orange [LS+](BK+)	7
B4	Gray [LS-](BK-)	8
A6	White [-](A+)	11
B6	Yellow [-](A-)	12
A7	Red [A+](B+)	13
B7	Green [A-](B-)	14
A8	Black [B+](Z+)	15
B8	Brown [B-](Z-)	16
A5	Black (label)[BK+](LS+)	9
B5	Brown (label)[BK-](LS-)	10
A9	Green (label)[GND.LS](GND.LS)	20
B9	Red (label)[VPS](VPS)	18
A10	White (label)[VCC](VCC)	17
B10	Yellow (label)[GND](GND)	19
A11	NC	21
B11	Shield [FG](FG)	24
	NC	22
	NC	23

Service parts

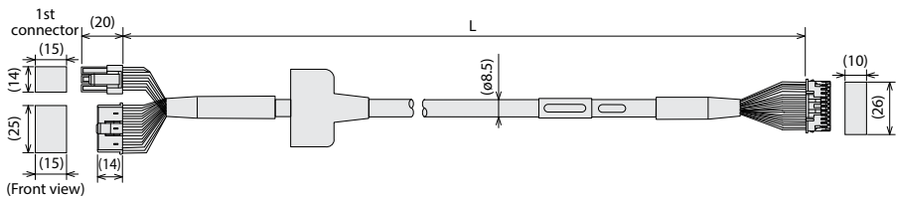
Integrated Motor-Encoder Robot Cable for RCP2

Model **CB-PSEP-MPA□□□**

* Robot cable is the standard specification.

*Enter the cable length (L) into □□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m

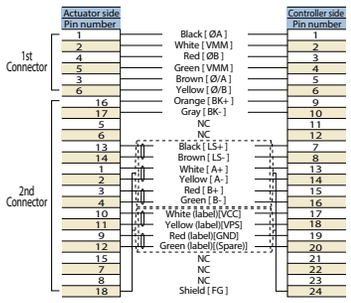
*Refer to page A-59 for connectable actuators.



Actuator side

Minimum bend radius R: r = 68mm or larger (for movable use)

Controller side



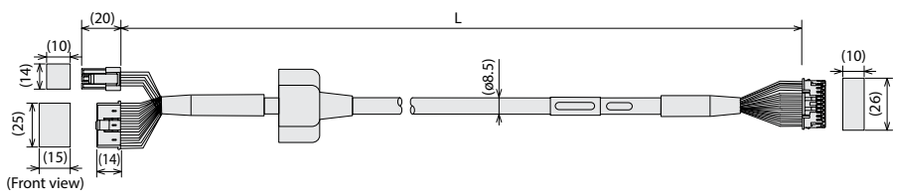
Integrated Motor-Encoder Robot Cable for RCA

Model **CB-ASEP-MPA□□□**

* Robot cable is the standard specification.

*Enter the cable length (L) into □□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m

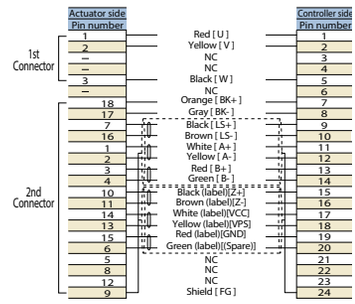
*Refer to page A-59 for connectable actuators.



Actuator side

Minimum bend radius R: r = 68 mm or larger (for movable use)

Controller side



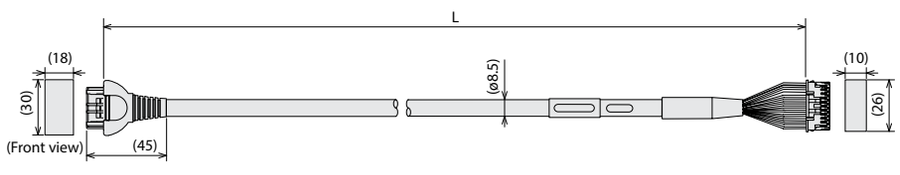
Integrated Motor-Encoder Robot Cable for RCP2 small rotary

Model **CB-RPSEP-MPA□□□**

* Robot cable is the standard specification.

*Enter the cable length (L) into □□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m

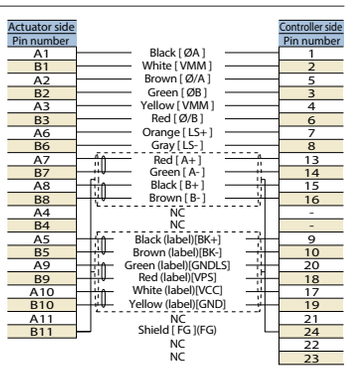
*Refer to page A-59 for connectable actuators.



Actuator side

Minimum bend radius R: r = 68 mm or larger (for movable use)

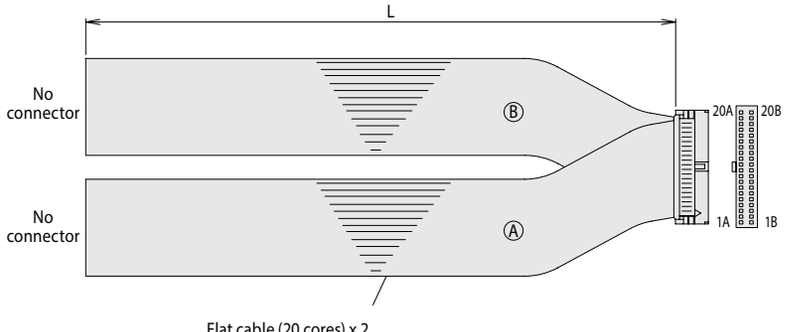
Controller side



I/O Flat Cable

Model **CB-PAC-PIO□□□**

*□□□indicates the cable length (L). A desired length can be specified up to 10m. Example: 080=8m



Flat cable (20 cores) x 2

HIF6-40D-1.27R

No.	Signal name	Cable color	Wiring
1A	24V	Brown - 1	Flat cable Ⓐ (crimped)
2A	24V	Red - 1	
3A	Pulse	Orange - 1	
4A	Input	Yellow - 1	
5A	IN0	Green - 1	
6A	IN1	Blue - 1	
7A	IN2	Purple - 1	
8A	IN3	Gray - 1	
9A	IN4	White - 1	
10A	IN5	Black - 1	
11A	IN6	Brown - 2	
12A	IN7	Red - 2	
13A	IN8	Orange - 2	
14A	IN9	Yellow - 2	
15A	IN10	Green - 2	
16A	IN11	Blue - 2	
17A	IN12	Purple - 2	
18A	IN13	Gray - 2	
19A	IN14	White - 2	
20A	IN15	Black - 2	

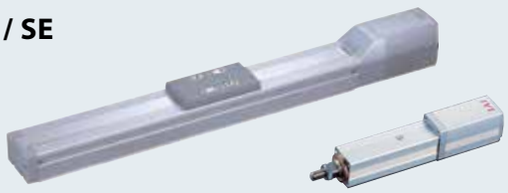
No.	Signal name	Cable color	Wiring
1B	OUT0	Brown - 3	Flat cable Ⓑ (crimped) AWG 28
2B	OUT1	Red - 3	
3B	OUT2	Orange - 3	
4B	OUT3	Yellow - 3	
5B	OUT4	Green - 3	
6B	OUT5	Blue - 3	
7B	OUT6	Purple - 3	
8B	OUT7	Gray - 3	
9B	OUT8	White - 3	
10B	OUT9	Black - 3	
11B	OUT10	Brown - 4	
12B	OUT11	Red - 4	
13B	OUT12	Orange - 4	
14B	OUT13	Yellow - 4	
15B	OUT14	Green - 4	
16B	OUT15	Blue - 4	
17B	Pulse	Purple - 4	
18B	Input	Gray - 4	
19B	0V	White - 4	
20B	0V	Black - 4	

MEMO

PCON

■Models CY / PL / PO / SE

Position Controllers
For RCP3/RCP2 Series



List of models

These are the position controllers that can be used with the RCP3/RCP2 Series actuators. Our line-up has 3 types, which are compatible with various control systems.

Type	CY	PL/PO	SE
Name	Solenoid type	Pulse train control type	Serial communication type
External view			
Description	Can be operated using the same control as the air cylinder type	For pulse train control	For serial communication
Position Points	3 points	—	64 points
Standard Price	—	—	—

Model

PCON – [Series] – [Type] – [Motor] – **I** – [Encoder] – [I/O Type] – [I/O cable length] – **0** – [Power/Voltage] – [Simple absolute unit] – [High acceleration type model]

Type

CY	Solenoid Valve Type
SE	Serial Communication Type
PL	Pulse Train Control Type (differential line driver model)
PO	Pulse Train Control Type (open collector model)

Motor

20P	20 frame pulse motor
20SP	20 frame pulse motor support (RCP3-RA2 high thrust type only)
28P	28 frame pulse motor-compatible
28SP	28 frame pulse motor (RCP2-RA3C only)
35P	35 frame pulse motor-compatible
42P	42 frame pulse motor-compatible
56P	56 frame pulse motor-compatible

* If connecting to RCP2-RA3C/ RGD3C, the motor type is 28SP.

Encoder

I	Incremental

I/O Type

NP	NPN (standard)
PN	PNP
N	No I/O (SE type only)

* When selecting type SE (serial communication), the standard I/O is "N" (no I/O).

I/O cable length

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

* If SE (serial communication type) is selected, specify "0" (no cable) for the I/O cable.

Power/Voltage

0	DC24V

Simple absolute unit

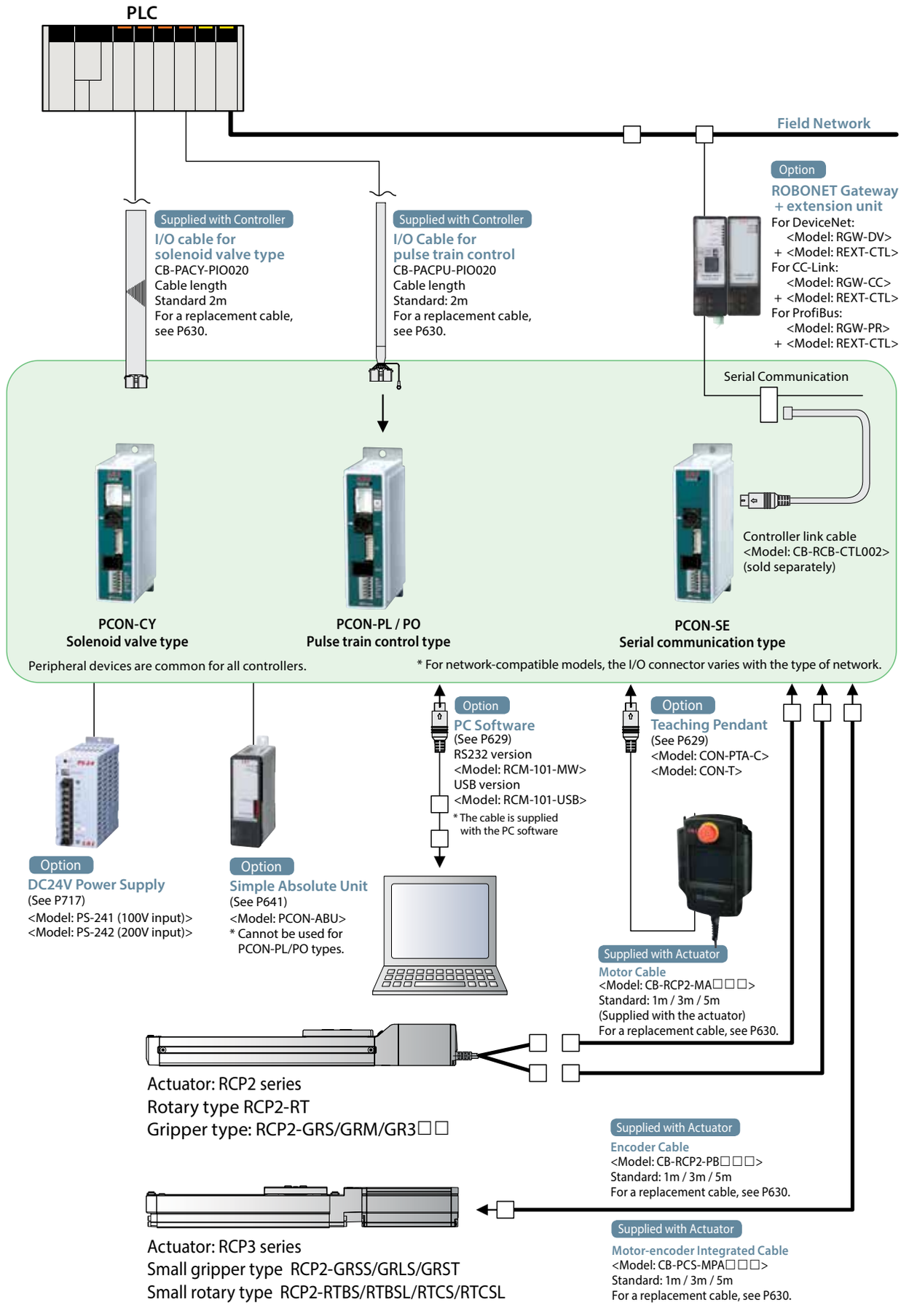
Blank	Not used
ABU	Used

High acceleration type model

Blank	Standard
H	High Acceleration Type Model

* If connecting to an RCP3-SA4C/SA5C/SA6C, or an RCP2(RCP2CR)-SA5C/SA6C, specify an "H", for the high-acceleration type model. (The side-mounted motor type is exempted.) An "H" is not required with the high-lead (lead 20).

System Configuration



I/O Specification

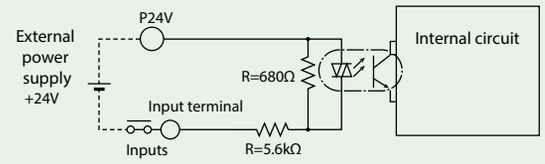
■ Input section External input specifications

Item	Specifications
Input voltage	DC24V ±10%
Input current	4mA/circuit
Leak current	1mA max./point
Isolation method	Photocoupler

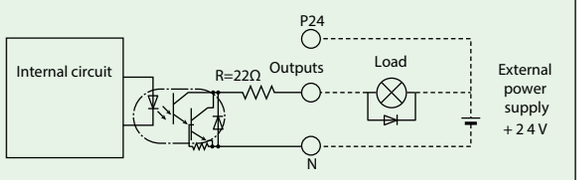
■ Output section External output specifications

Item	Specifications
Load Voltage	DC24V
Max. load current	50mA/point
Remaining voltage	2V or less
Isolation method	Photocoupler

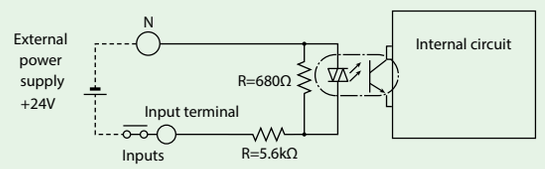
NPN Specifications



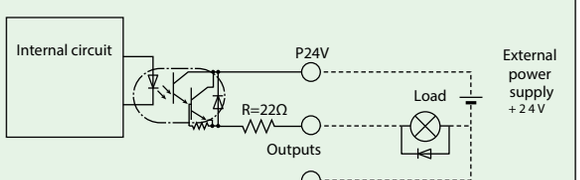
NPN Specifications



PNP Specifications



PNP Specifications



I/O Specification

The 3 types of controllers (CY, PL/PO, and SE) are classified by their respective I/O specifications. In addition, with the positioner type and solenoid valve type, the I/O signal details can be changed via the controller settings. As a result, a number of functions can be used.

■Control Function by Type

Type	CY	PL/PO	SE	Features
Name	Solenoid valve type	Pulse in-line control type	Serial communication type	
Positioner mode	×	×	○ (*1)	This is the basic operating mode, in which the user designates position numbers and inputs start signals.
Teaching mode	×	×	○ (*1)	In this mode, the slider (rod) moves based on an external signal, and the stopped positions can be registered as position data.
Solenoid valve mode	○	×	○ (*1)	The actuator can be moved simply by ON/OFF of position signals. This mode supports the same control signals you are already familiar with on solenoid valves of air cylinders.
Pulse train mode	×	○	×	In this mode, you can operate the actuator freely using pulse trains without inputting position data.
Network compatible	×	×	○ (*2)	The controller can be connected to a DeviceNet or CC-Link network.

*1 Operates using network communications or serial communications.
*2 Can make a direct connection to a field network with the network specifications.

Explanation of I/O Signal Functions

The table below explains the functions allocated to the controller's I/O signal.
Since the signals that can be used vary depending on the controller type and settings, check the signal table for each controller to confirm the available functions.

■ Signal Function Description

Classification	Signal abbreviations	Signal	Function description
Input	CSTR	PTP strobe signal (start signal)	Input this signal to cause the actuator to start moving to the position set by the command position number signal.
	PC1 to PC256	Command position number signal	This signal is used to input a target position number (binary input).
	BKRL	Brake forced release signal	This signal forcibly releases the brake.
	RMOD	Running mode switching signal	This signal can switch the running mode when the MODE switch on the controller is set to AUTO. (AUTO when this signal is OFF, or MANU when the signal is ON)
	*STP	Pause signal	Turning this signal OFF causes the moving actuator to decelerate to a stop. The actuator will resume the remaining movement if the signal is turned ON during the pause.
	RES	Reset signal	Turning this signal ON resets the alarms that are present. If this signal is turned ON while the actuator is paused (*STP is OFF), the remaining movement can be cancelled.
	SON	Servo ON signal	The servo remains on while this signal is ON, or off while the signal is OFF.
	HOME	Home return signal	Turning this signal ON performs home-return operation.
	MODE	Teaching mode signal	Turning this signal ON switches the controller to the teaching mode. (provided that CSTR, JOG+ and JOG- are all OFF and the actuator is not moving).
	JISL	JOG/INCHING switching signal	When the main signal is off, the JOG operation will be conducted for JOG+ and JOG-. When the signal is on, the unit will do the inching operation for JOG+ and JOG-.
	JOG+, JOG–	JOG signal	When the JISL signal is off and the JOG +/- signal turns on, the unit will jog in the + (positive) direction when the JOG + turns on and the - (negative) direction when the JOG - turns on. During the JOG operation, the unit slows to a stop when the JOG +/- signal turns off.
	PWRT	Teaching signal	In the teaching mode, specify a desired position number and then turn this signal ON for at least 20ms to write the current position to the specified position number.
	ST0 to ST6	Start position command	Turning this signal ON in the solenoid valve mode causes the actuator to move to the specified position. (Start signal is not required)
	TL	Torque limit selection signal	While this signal is ON, torque is limited by the value set by a parameter. The TLR signal turns on if torque has reached the specified value.
	DCLR	Deviation counter clear signal	The position deviation counter is continuously cleared while this signal is ON.
Output	PEND/INP	In position signal	This signal turns ON when the actuator has entered the positioning band after movement. If the actuator has exceeded the positioning band, PEND does not turn OFF, but INP does. PEND and INP can be swapped within parameters.
	PM1 to PM256	Positioning complete signal	This signal is used to output the position number achieved at the completion of positioning (binary output)
	HEND	Home return completion signal	This signal turns ON upon completion of home return.
	ZONE1	Zone signal	This signal turns ON when the current actuator position has entered the range specified by the parameters.
	PZONE	Position zone signal	Turns ON when the actuator moves into a position within the range of the target position data that was set. PZONE can be used together with ZONE1, but PZONE is valid only during movement to a specified position.
	RMDS	Running mode status signal	This outputs the operation mode status.
	*ALM	Controller alarm status signal	This signal remains ON while the controller is not in the alarm condition, and turns OFF when an alarm has occurred.
	MOVE	Moving signal	Turns ON while the actuator is moving (home return), including when there is push force.
	SV	Servo ON status signal	This signal turns ON when servo is ON.
	*EMGS	Emergency stop status signal	This signal remains ON while the controller is not in the emergency stop mode, and turns OFF once an emergency stop has been actuated.
	MODES	Mode status signal	The mode signal input turns it ON when it goes into teaching mode. It turns OFF when it goes into normal mode.
	WEND	Writing complete signal	This signal remains OFF after the controller has switched to the teaching mode. It turns ON upon completion of data write using the PWRT signal. If the PWRT signal is turned Off, this signal also turns OFF.
	PE0 to PE6	Current position number signal	This signal turns ON after the controller has completed moving to the target position in the solenoid valve mode.
	TLR	Torque limiting signal	This signal turns ON once the motor torque has reached the specified value in a condition where torque is being limited by the TL signal.
	LSO to LS2	Limit switch output signal	Each signal turns ON when the current actuator position has entered the positioning band before or after the target position. If the actuator has already completed home return, these signals are output even before a movement command is issued or while the servo is OFF.
	LOAD	Load output determination status signal	This signal turns ON once the motor torque has reached the specified value. (*PCON-CF dedicated signal)
	TRQS	Torque level status signal	Turns ON when the motor current reaches the threshold. (*PCON-CF dedicated signal)

I/O Signal Table

■ Solenoid valve type (PCON-CY)

Pin No.	Classification		Parameters (select PIO pattern) 0	1
			Solenoid valve mode 0	Solenoid valve mode 1
		Positioning Points	3 points	3 points
		Zone signal	×	×
		P-zone signal	×	O
1	24V			
2	0V			
3	Input	IN0	ST0	ST0
4		IN1	ST1 (JOG+)	ST1 (JOG+)
5		IN2	ST2 (RES)	ST2 (RES)
6		IN3	SON	SON
7	Output	OUT0	LS0	PE0
8		OUT1	LS1 (TRQS)	PE1 (TRQS)
9		OUT2	LS2 (–)	PE2 (–)
10		OUT3	SV	PZONE
11		OUT4	HEND	HEND
12		OUT5	* ALM	* ALM

(Note) The names of signals above inside ( ) are functions before the unit returns home.
(Note) Signals with asterisks (*) are normally ON, and OFF during operation.

■ Pulse Train Type (PCON-PL/PO)

Pin No.	Classification		Parameters (select PIO pattern) 0	1
			Standard mode	Push mode
		Positioning Points	—	—
		Zone signal	×	×
		P-zone signal	×	×
1	24V			
2	0V			
3	Input	IN0	SON	ON
4		IN1	TL	TL
5		IN2	HOME	HOME
6		IN3	RES	RES / DCLR
7	Output	OUT0	SV	SV
8		OUT1	INP	INP / TLR
9		OUT2	HEND	HEND
10		OUT3	* ALM	* ALM
11	Input		* PP	* PP
12			PP	PP
13			* NP	* NP
14			NP	NP

(Note) Signals with asterisks (*) are normally ON, and OFF during operation.

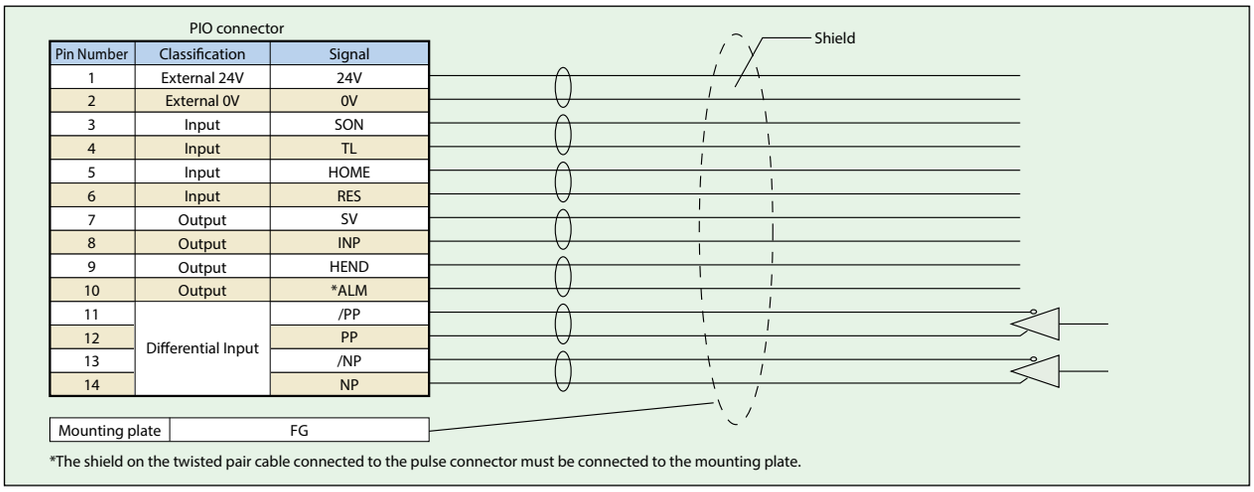
Pulse Train Input Wiring Diagram

■ Differential Receiver Method (PCON-PL)

Max. input pulse frequency	: Max. 200 kpps
Cable Length	: Max. 10m

PIO connector

Pin Number	Classification	Signal
1	External 24V	24V
2	External 0V	0V
3	Input	SON
4	Input	TL
5	Input	HOME
6	Input	RES
7	Output	SV
8	Output	INP
9	Output	HEND
10	Output	*ALM
11	Differential Input	/PP
12		PP
13		/NP
14		NP



Mounting plate	FG

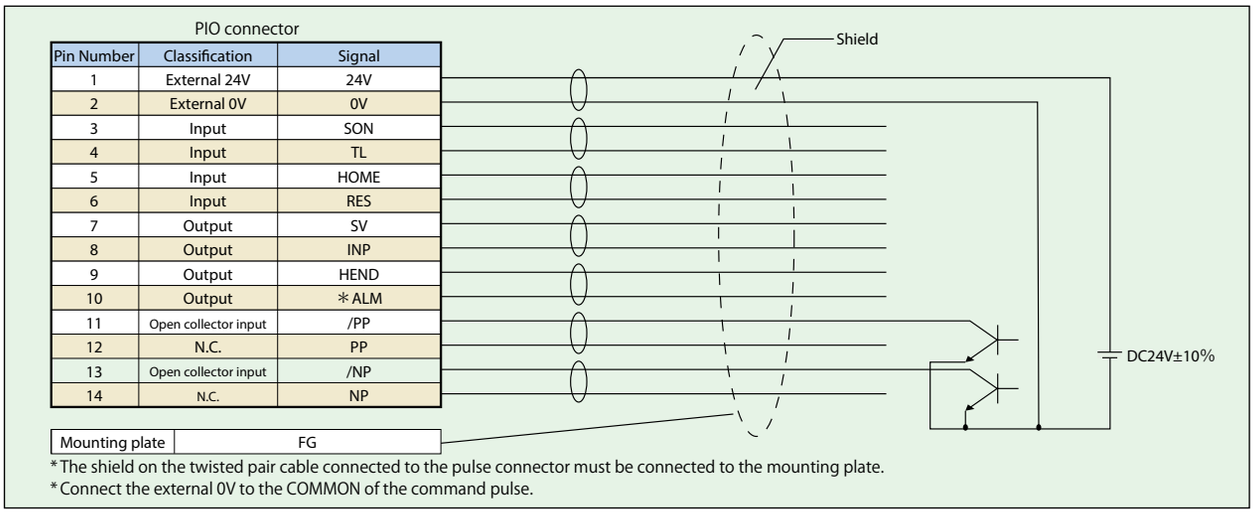
*The shield on the twisted pair cable connected to the pulse connector must be connected to the mounting plate.

■ Open Collector Method (PCON-PO)

Max. input pulse frequency	: Max. 60 kpps
Cable Length	: Max. 2m

PIO connector

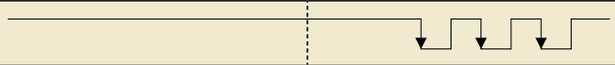
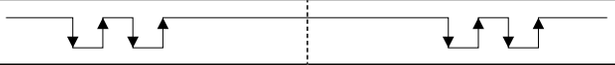
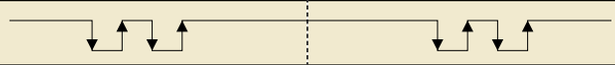
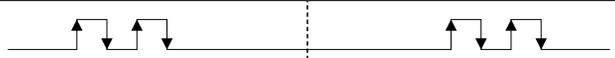
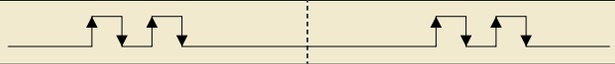
Pin Number	Classification	Signal
1	External 24V	24V
2	External 0V	0V
3	Input	SON
4	Input	TL
5	Input	HOME
6	Input	RES
7	Output	SV
8	Output	INP
9	Output	HEND
10	Output	＊ALM
11	Open collector input	/PP
12	N.C.	PP
13	Open collector input	/NP
14	N.C.	NP



Mounting plate	FG

*The shield on the twisted pair cable connected to the pulse connector must be connected to the mounting plate.
*Connect the external 0V to the COMMON of the command pulse.

Command Pulse Input State

	Command pulse train state	Input terminal	During forward operation	During reversed operation
Negative logic	Forward pulse train	PP•/PP		
	Reversed pulse train	NP•/NP		
	The forward pulse train causes the motor to rotate forward, and the reverse pulse train causes the motor to rotate in reverse.			
	Pulse train	PP•/PP		
	Symbols	NP•/NP	Low	High
	The command pulse is used for the amount of motor rotation, and the command symbol is used for rotational direction.			
	A/B phase pulse train	PP•/PP		
		NP•/NP		
	An A/B phase pulse with a 90° phase difference (multiplier is 4) is used to generate commands for the amount of rotation and rotational direction.			
Positive logic	Forward pulse train	PP•/PP		
	Reversed pulse train	NP•/NP		
	Pulse train	PP•/PP		
	Symbols	NP•/NP	High	Low
	A/B phase pulse train	PP•/PP		
		NP•/NP		

* The number of encoder pulse for the RCP3, RCP2 series operable with PCON is 800 in all models.

Table Of Specifications

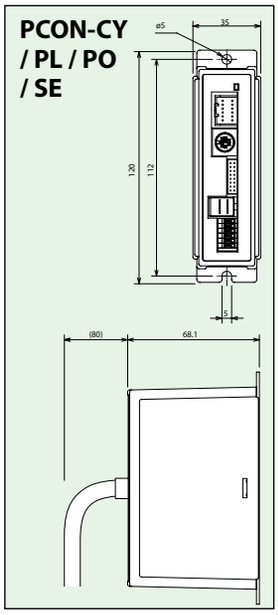
Item	Specifications			
Controller type	CY	PL	PO	SE
Connected actuator (*1)	RCP3/RCP2 series actuator (Note 1)			
Number of control axes	1-axis			
Operating method	Solenoid valve type	Pulse train input type		Serial communication type
Positioning Points	3 points	—		64 points
Backup memory	EEPROM			
I/O connector	12-pin connector	14-pin connector		None
Number of I/O	4 input points/6 output points	4 input points/4 output points		None
I/O power	External supply DC24V±10%			—
Serial Communication	RS485 1ch			
Peripheral device communication cable	CB-PACY-PIO□□□	CB-PACPU-PIO□□□		CB-RCB-CTL002
Command pulse train input method	—	Differential line driver	Open collector	—
Max. input pulse frequency (Note 2)	—	Max. 200 kpps	Max. 60 kpps	—
Position detection method	Incremental encoder			
Drive-source cutoff relay at emergency stop	External			
Forced release of electromagnetic brake	ON/OFF terminal signal inside the power terminal for brake release			
Input Supply Voltage	DC 24 V ± 10%			
Power Supply Capacity	2A max.			
Dielectric strength voltage	DC500V 1MΩ			
Vibration resistance	XYZ directions	10 to 57Hz, One side amplitude: 0.035mm (continuous), 0.075mm (intermittent) 58 to 150Hz, 4.9m/s² (continuous), 9.8m/s² (intermittent)		
Ambient operating temperature	0~40°C			
Ambient operating humidity	10 - 95% (non-condensing)			
Ambient operating atmosphere	Without corrosion gases			
Protection class	IP20			
Weight	Approx. 130g			

(Note 1) The high-thrust type (RA10C), high-speed type (HS8C/HS8R) and waterproof type (RCP2W-SA16) cannot be operated.
(Note 2) With the open collector specification, keep the maximum input frequency to 60 kpps or below to prevent malfunction. For applications exceeding 60kpps, use the differential line driver.

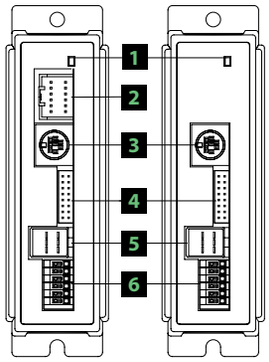
PCON Controller

Dimensions

PCON-CY / PL / PO / SE



Name of each part



CY / PL / PO Type

SE Type

* PIO connectors are:
CY: 12 pin
PL/PO: 14 pin

1 LED display

These LED colors indicate the condition of the controller.
Lit (green) Servo ON Lit (red) Alarm activated Unlit Servo OFF Blinking (green) Automatic servo-OFF
Emergency stop

2 PIO connector

Connects a cable for communicating with a PLC or other external equipment.

3 SIO connector

Connects a teaching pendant, PC cable, controller, or gateway unit to a controller.

Operation details

Pin No.	Signal	Name	Note
1	SGA	Positive side, RS485 differential signal	
2	SGB	Negative side, RS485 differential signal	
3	5V	+5V output	For RS232/485 conversion
4	ENBL	Enable signal	
5	EMGA	EMG line connection to external equipment	
6	24V	24-V power for T/P	For T/P
7	0V	GND	
8	EMGB	EMG line connection to external equipment	
9	0V	EMG line connection to external equipment ground	

4 Encoder brake connector

Connects the encoder/brake cable for the actuator.

5 Motor connector

Connects the motor cable for the actuator.

6 Power terminal block

Main power for controller(s), emergency stop.

CY / PL / PO / SE type

Terminal number	Signal	Name
6	BK	BK release
5	MPI	Motor drive-source cutoff terminal
4	MPO	Motor drive-source cutoff terminal
3	24V	Positive side of the 24-V power supply
2	0V	Negative side of the 24-V power supply
1	EMG	EMG signal (application of 24 V)

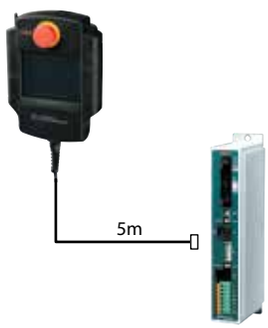
Options

Teaching pendant

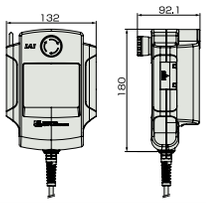
Summary Teaching device for positioning input, test operation, and monitoring.

Model **CON-PTA-C** (Touch panel teaching pendant)
CON-T (Standard type)

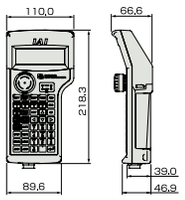
Setting



CON-PTA-C



CON-T



Specification

Item		Content	
Model	English Version	CON-PTA-C-ENG	CON-T-ENG
Data Input		○	○
Actuator Motion		○	○
Ambient Operating Temp./Humidity		Temp 0~40°C; 85% RH or below	
Ambient Operating Atmosphere		No corrosive gases. Especially no dust.	
Protective class		IP40	IP54
Weight		Approx. 570g	Approx. 400g
Cable Length		5m	
Display		65,536 color (16 bit color) White LED back light	20 char. x 4 lines LCD display
Standard Price		—	—

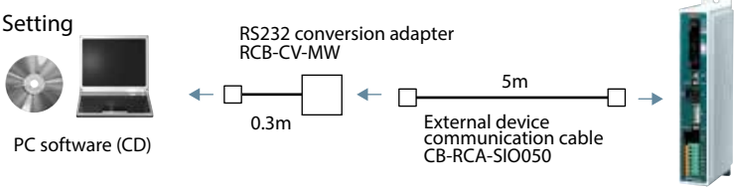
PC software (Windows only)

Summary A startup support software for inputting positions, performing test runs, and monitoring. With enhancements for adjustment functions, the startup time is shortened.

Supported Windows OS:
2000 SP4 or later / XP SP2 or later / Vista / 7

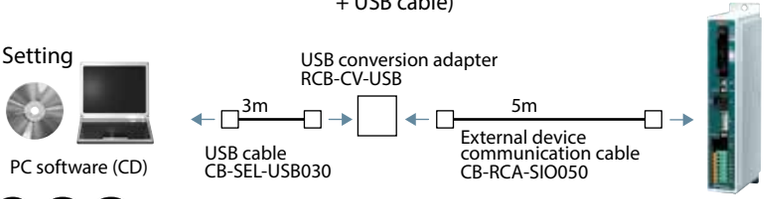
Model **RCM-101-MW** (External device communication cable + RS232 conversion unit)

Setting



Model **RCM-101-USB** (External device communication cable + USB converter adaptor + USB cable)

Setting



Spare Parts

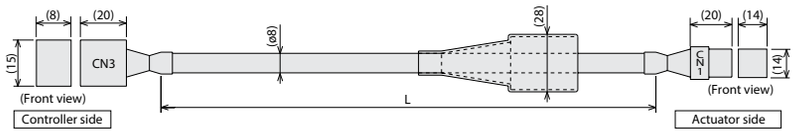
When you need spare parts after purchasing the product, such as when replacing a cable, refer to the list of models below.
(* See page A-59 for connectable actuators.)

Motor Robot Cable for RCP2

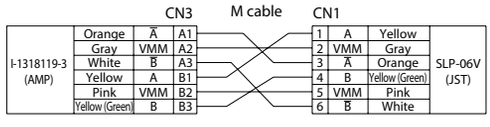
Model **CB-RCP2-MA □□□**

* The standard cable for the motor cable is the robot cable.

* Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m



Min. bend radius r = 50mm or larger (when movable type is used)



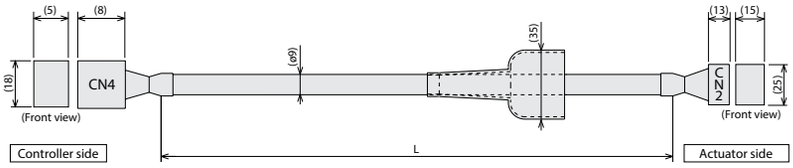
Encoder Cable/Encoder Robot Cable for RCP2

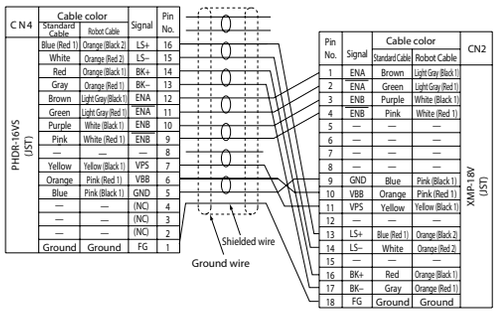
Model **CB-RCP2-PB □□□/CB-RCP2-PB □□□-RB**

* The standard cable for the encoder cable is the normal cable. A robot cable can be specified as an option.

* Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m

Min. bend radius r = 54mm or larger (when movable type is used)
* Only robot cable is to be used in a cable track.



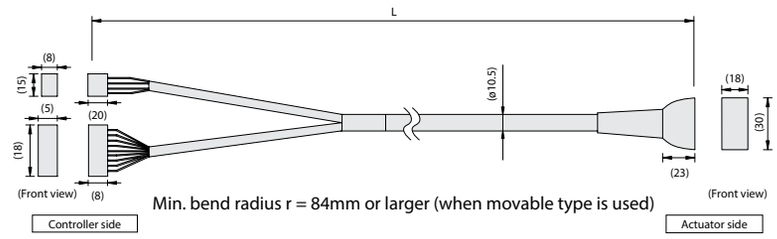


Motor-Encoder Integrated Type Cable for RCP3/RCP2 (Limited to RCP2-GRSS/GRLS/GRST/SRA4R/SRGS4R/SRGD4R)

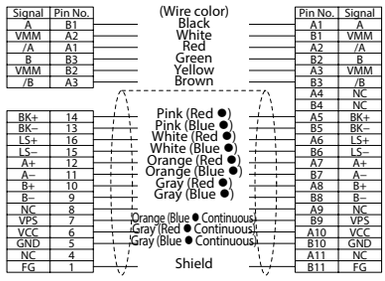
Model **CB-PCS-MPA □□□**

* The standard cable is robot cable.

* Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m



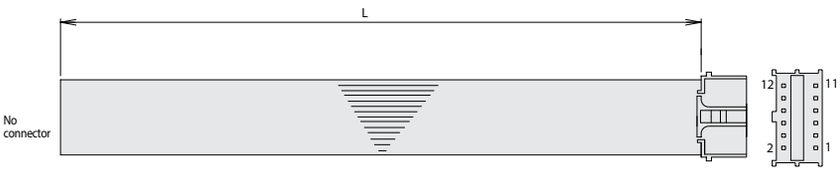
Min. bend radius r = 84mm or larger (when movable type is used)



Solenoid Valve Type I/O Cable (for PCON-CY)

Model **CB-PACY-PIO □□□**

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



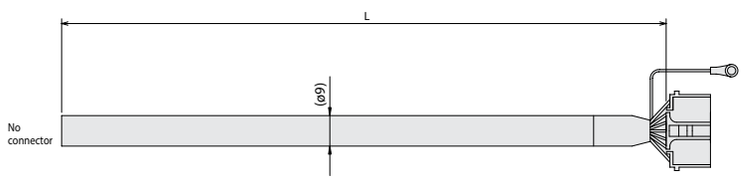
51353-1200 (MOLEX)

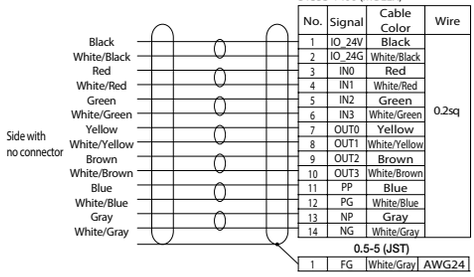
No.	Signal	Cable Color	Wire
1	24V	Brown-1	Flat cable (crimped) AWG28
2	0V	Red-1	
3	IN0	Orange-1	
4	IN1	Yellow-1	
5	IN2	Green-1	
6	IN3	Blue-1	
7	OUT0	Purple-1	
8	OUT1	Gray-1	
9	OUT2	White-1	
10	OUT3	Black-1	
11	OUT4	Brown-2	
12	OUT5	Red-2	

Pulse Train Control I/O Cable (for PCON-PL/PO)

Model **CB-PACPU-PIO □□□**

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





51353-1400 (MOLEX)

No.	Signal	Cable Color	Wire
1	IO_24V	Black	0.2sq
2	IO_24G	White/Black	
3	IN0	Red	
4	IN1	White/Red	
5	IN2	Green	
6	IN3	White/Green	
7	OUT0	Yellow	
8	OUT1	White/Yellow	
9	OUT2	Brown	
10	OUT3	White/Brown	
11	PP	Blue	
12	PG	White/Blue	
13	NP	Gray	
14	NG	White/Gray	

1	FG	White/Gray	AWG24

ACON

■ Models C / CG / CY / PL / PO / SE

Position Controllers
For RCA2/RCA

C/CG CY PL/PO SE

List of models

This position controller enables movement of the RCA2/RCA series actuators. A line-up of 5 types to support various controlling methods.

Type	C	CG	CY	PL/PO	SE
Name	Positioner type	Safety category compatible type	Solenoid valve type	Pulse train control type	Serial Communication Type
External view					
Description	Positioner capable of a maximum of 512 points of positioning	Conforming to type C safety category specifications	Can be operated using the same control as the air cylinder type	For pulse train control	For serial communication
Position points	512 points	512 points	3 points	(—)	64 points
Standard price	—	—	—	—	—

Model

ACON – [Series] – [Type] – [Motor] **I** [Encoder] – [Option] – [I/O Type] – [I/O Cable Length] – **0** – [Power Voltage] – [Simple absolute unit]

Type	
C	Positioner Type
CG	Safety-compliant type
CY	Solenoid Valve Type
SE	Serial Communication Type
PL	Pulse Train Control Type (differential line driver model)
PO	Pulse Train Control Type (open collector model)

Motor	
2	2W motor-compatible
5	5W motor-compatible
10	10W motor-compatible
20S	20W motor-compatible (*)
20	20W motor-compatible
30	30W motor-compatible

* When connecting an RCA-RA3□/RGS3□/RGD3□ and RCA2-SA4□/TA5□, the motor type is 20S.

Encoder	
I	Incremental

* The absolute-type RCA actuators cannot be operated with the ACON controller To operate an absolute-type actuator, use the ASEL controller. However, you can operate a simple absolute-type actuator, in which a simple absolute unit is attached to an incremental actuator.

Option	
HA	High Accel./Decel.
LA	Power-saving

I/O Type	
NP	NPN (standard)
PN	PNP
DV	DeviceNet
CN	CompoNet connection model
CC	CC-Link
ML	MECHATROLINK connection model
PR	ProfiBus
EC	EtherCAT
EP	EtherNet/IP
N	No I/O (SE type only)

* The network models (DV/CC/PR/ML/CN/EC/EP) support C/CG types only.
* When selecting type SE (serial communication), the standard I/O is "N" (no I/O).

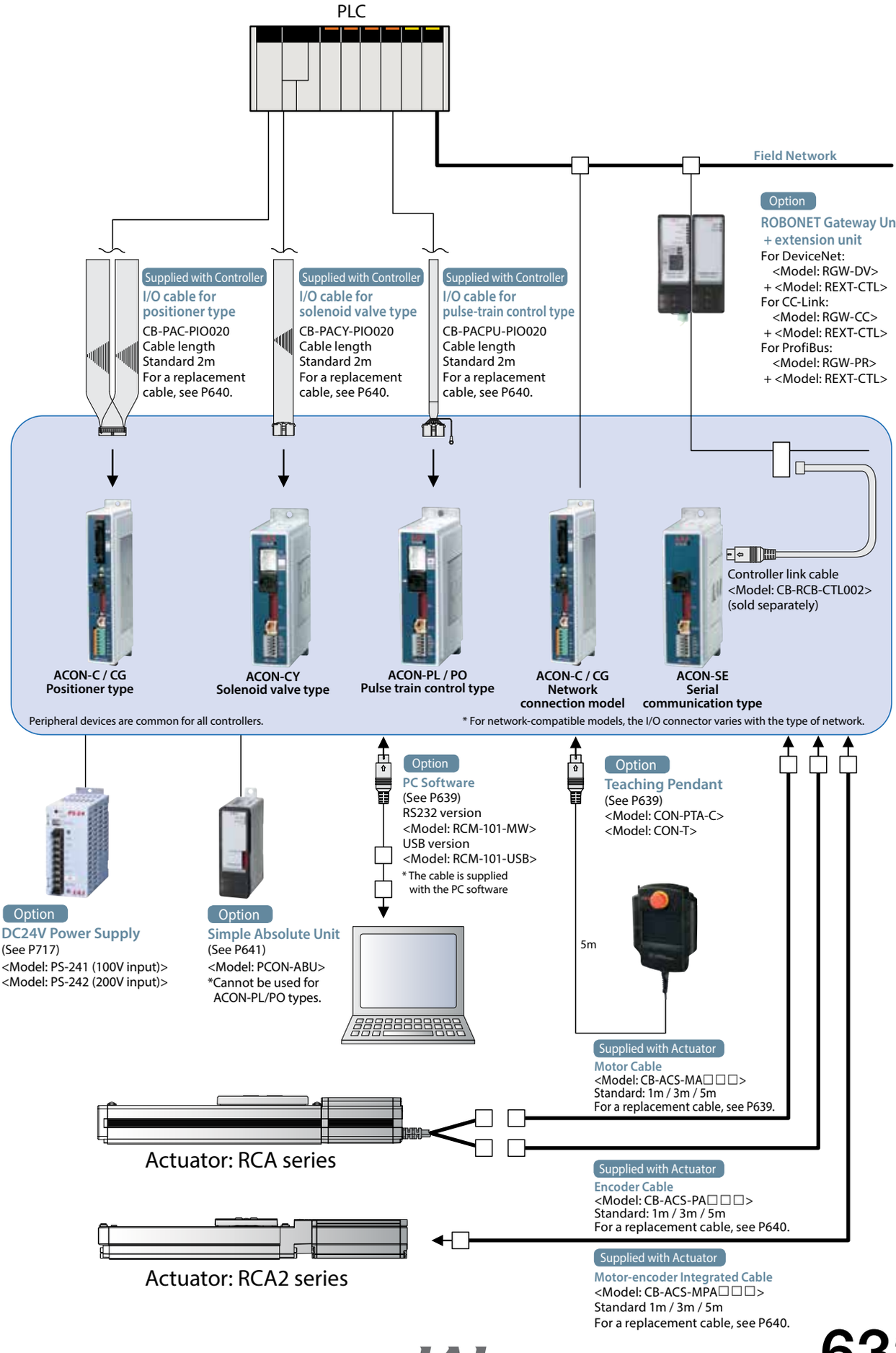
I/O Cable Length	
0	No cable
2	2m (standard)
3	3m
5	5m

* If SE (serial communication type), and the network model (I/O type DV, CN, CC, ML, PR, EC, or EP) is selected, specify "0" (no cable) for the I/O cable.

Power Voltage	
0	DC24V

Simple absolute unit	
Blank	Not used
ABU	Used

System Configuration



I/O Specification

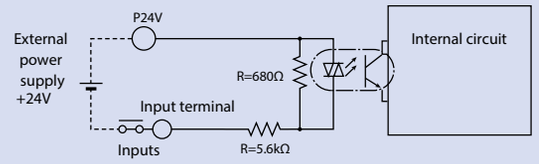
■Input section External input specifications

Item	Specifications
Input voltage	DC24V +/-10%
Input current	4mA/circuit
Leak current	1mA max./point
Isolation method	Photocoupler

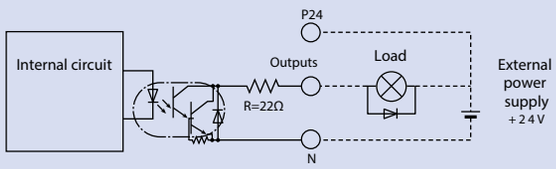
■Output section External output specifications

Item	Specifications
Load Voltage	DC24V
Max. load current	50mA/point
Remaining voltage	2V or less
Isolation method	Photocoupler

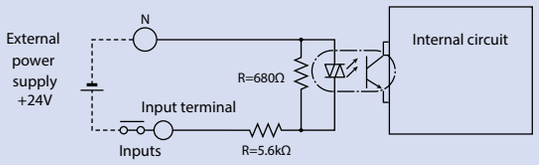
NPN Specifications



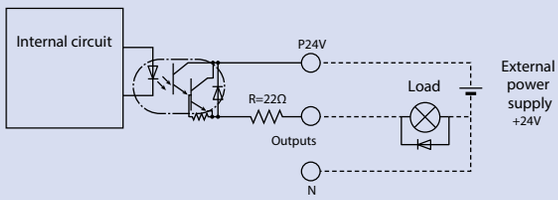
NPN Specifications



PNP Specifications



PNP Specifications



I/O Specification

The 4 types of controllers (C/CG, CY, PL/PO, and SE) are classified by their respective I/O specifications. Also, for the positioner type and solenoid valve type, the I/O signal information can be changed in the controller settings, so multiple functions can be effectively used.

■Control Function by Type

Type	CY	PL/PO	SE	Features
Name	Solenoid valve type	Pulse in-line control type	Serial communication type	
Positioner mode	×	×	○ (*1)	This is the basic operating mode, in which the user designates position numbers and inputs start signals.
Teaching mode	×	×	○ (*1)	In this mode, the slider (rod) moves based on an external signal, and the stopped positions can be registered as position data.
Solenoid valve mode	○	×	○ (*1)	The actuator can be moved simply by ON/OFF of position signals. This mode supports the same control signals you are already familiar with on solenoid valves of air cylinders.
Pulse train mode	×	○	×	In this mode, you can operate the actuator freely using pulse trains without inputting position data.
Network compatible	×	×	○ (*3)	The controller can be connected to a DeviceNet or CC-Link network.

*1 Operates using network communications or serial communications.
*2 Can make a direct connection to a field network with the network specifications.
*3 Can be connected to a field network using a gateway unit.

Explanation of I/O Signal Functions

The table below explains the functions allocated to the controller's I/O signal.
Since the signals that can be used vary depending on the controller type and settings, check the signal table for each controller to confirm the available functions.

■Signal Function Description

Classification	Signal abbreviations	Signal	Function description
Input	CSTR	Start signal	Input this signal to cause the actuator to start moving to the position set by the command position number signal.
	PC1 to PC256	Command position number signal	This signal is used to input a target position number (binary input).
	BKRL	Brake forced release signal	This signal forcibly releases the brake.
	RMOD	Running mode switching signal	This signal can switch the running mode when the MODE switch on the controller is set to AUTO. (AUTO when this signal is OFF, or MANU when the signal is ON).
	* STP	Pause signal (Note 1)	Turning this signal OFF causes the moving actuator to decelerate to a stop. The actuator will resume the remaining movement if the signal is turned ON during the pause.
	RES	Reset signal	Turning this signal ON resets the alarms that are present. If this signal is turned ON while the actuator is paused (*STP is OFF), the remaining movement can be cancelled.
	SON	Servo ON signal	The servo remains on while this signal is ON, or off while the signal is OFF.
	HOME	Home return signal	Turning this signal ON performs home-return operation.
	MODE	Teaching mode signal	Turning this signal ON switches the controller to teaching mode (provided that CSTR, JOG+ and JOG- are all OFF and the actuator is not moving).
	JISL	JOG/INJOG switching signal	When the main signal is off, the JOG operation will be conducted for JOG+ and JOG-. When the signal is on, the unit will do the inching operation for JOG+ and JOG-.
	JOG+, JOG–	JOG signal	When the JISL signal is off and the JOG +/- signal turns on, the unit will jog in the + (positive) direction when the JOG + turns on and the - (negative) direction when the JOG - turns on. During the JOG operation, the unit slows to a stop when the JOG +/- signal turns off.
	PWRT	Teaching signal	In the teaching mode, specify a desired position number and then turn this signal ON for at least 20ms to write the current position to the specified position number.
	ST0 to ST6	Start position command	Turning this signal ON in the solenoid valve mode causes the actuator to move to the specified position. (Start signal is not required)
	TL	Torque limit selection signal	While this signal is ON, torque is limited by the value set by a parameter. The TLR signal turns on if torque has reached the specified value. (Dedicated pulse train type)
	DCLR	Deviation counter clear signal	The position deviation counter is continuously cleared while this signal is ON. (Dedicated pulse train type)
Output	PEND/INP	In position signal	This signal turns ON when the actuator has entered the positioning band after movement. If the actuator has exceeded the positioning band, PEND does not turn OFF, but INP does. PEND and INP can be swapped within parameters.
	PM1 to PM256	Position complete signal	This signal is used to output the position number achieved at the completion of positioning (binary output)
	HEND	Home return completion signal	This signal turns ON upon completion of home return.
	ZONE1	Zone signal	This signal turns ON when the current actuator position has entered the range specified by the parameters.
	PZONE	Positioning zone signal	Turns ON when actuator moves into a position within the range of the target position data that was set. PZONE can be used together with ZONE1, but PZONE is valid only during movement to a specified position.
	RMDS	Running mode status signal	This outputs the operation mode status.
	* ALM	Controller alarm status signal	This signal remains ON while the controller is not in the alarm condition, and turns OFF when an alarm has occurred.
	MOVE	Moving signal	Turns ON while the actuator is moving (home return), including when there is push force.
	SV	Servo ON status signal	This signal turns ON when servo is ON.
	* EMGS	Emergency stop status signal	This signal remains ON while the controller is not in the emergency stop mode, and turns OFF once an emergency stop has been actuated.
	MODES	Mode status signal	The mode signal input turns it ON when it goes into teaching mode. It turns OFF when it goes into normal mode.
	WEND	Writing complete signal	This signal remains OFF after the controller has switched to the teaching mode. It turns ON upon completion of data write using the PWRT signal. If the PWRT signal is turned Off, this signal also turns OFF.
	PE0 to PE6	Current position number signal	This signal turns ON after the controller has completed moving to the target position in the solenoid valve mode.
	TLR	Torque limiting signal	This signal turns ON once the motor torque has reached the specified value in a condition where torque is being limited by the TL signal. (Dedicated pulse train type)
	LSO to LS2	Limit switch output signal	Each signal turns ON when the current actuator position has entered the positioning band before or after the target position. If the actuator has already completed home return, these signals are output even before a movement command is issued or while the servo is OFF. (Dedicated Solenoid Valve Mode)

(Note) Signals with asterisks (*) are normally ON and OFF during operation.
(Note 1) Please note that no pause can be made during an S-shaped acceleration/deceleration operation.

I/O Signal Table

■Positioner type (ACON-C / CG)

Pin No.	Classification		Parameters (select PIO pattern)					
			0	1	2	3	4	5
			Positioning mode	Teaching mode	256-point mode	512-point mode	Solenoid Valve Mode 1	Solenoid Valve Mode 2
		Positioning Points	64 points	64 points	256 points	512 points	7 points	3 points
		Zone signal	○	×	×	×	○	○
		P-zone signal	○	○	○	×	○	○
1A	24V		P24					
2A	24V		P24					
3A	—		NC					
4A	—		NC					
5A	Input	IN0	PC1	PC1	PC1	PC1	ST0	ST0
6A		IN1	PC2	PC2	PC2	PC2	ST1	ST1 (JOG+)
7A		IN2	PC4	PC4	PC4	PC4	ST2	ST2 (-)
8A		IN3	PC8	PC8	PC8	PC8	ST3	—
9A		IN4	PC16	PC16	PC16	PC16	ST4	—
10A		IN5	PC32	PC32	PC32	PC32	ST5	—
11A		IN6	—	MODE	PC64	PC64	ST6	—
12A		IN7	—	JISL	PC128	PC128	—	—
13A		IN8	—	JOG+	—	PC256	—	—
14A		IN9	BKRL	JOG-	BKRL	BKRL	BKRL	BKRL
15A		IN10	RMOD	RMOD	RMOD	RMOD	RMOD	RMOD
16A		IN11	HOME	HOME	HOME	HOME	HOME	—
17A		IN12	* STP	* STP	* STP	* STP	* STP	—
18A		IN13	CSTR	CSTR/PWRT	CSTR	CSTR	—	—
19A		IN14	RES	RES	RES	RES	RES	RES
20A		IN15	SON	SON	SON	SON	SON	SON
1B	Output	OUT0	PM1	PM1	PM1	PM1	PE0	LS0
2B		OUT1	PM2	PM2	PM2	PM2	PE1	LS1
3B		OUT2	PM4	PM4	PM4	PM4	PE2	LS2 (–)
4B		OUT3	PM8	PM8	PM8	PM8	PE3	—
5B		OUT4	PM16	PM16	PM16	PM16	PE4	—
6B		OUT5	PM32	PM32	PM32	PM32	PE5	—
7B		OUT6	MOVE	MOVE	PM64	PM64	PE6	—
8B		OUT7	ZONE1	MODES	PM128	PM128	ZONE1	ZONE1
9B		OUT8	PZONE	PZONE	PZONE	PM256	PZONE	PZONE
10B		OUT9	RMDS	RMDS	RMDS	RMDS	RMDS	RMDS
11B		OUT10	HEND	HEND	HEND	HEND	HEND	HEND
12B		OUT11	PEND	PEND/WEND	PEND	PEND	PEND	—
13B		OUT12	SV	SV	SV	SV	SV	SV
14B		OUT13	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS
15B		OUT14	*ALM	*ALM	*ALM	*ALM	*ALM	*ALM
16B		OUT15	—	—	—	—	—	—
17B	—		NC					
18B	—		NC					
19B	0V		N					
20B	0V		N					

(Note) The names of signals above inside ( ) are functions before the unit returns home.
(Note) Signals with asterisks (*) are normally ON, and OFF during operation.

■Solenoid valve type (ACON-CY)

Pin No.	Classification		Parameters (select PIO pattern)	
			0	1
			Solenoid valve mode 0	Solenoid valve mode 1
		Positioning Points	3 points	3 points
		Zone signal	×	×
		P-zone signal	×	○
1	24V			
2	0V			
3	Input	IN0	ST0	ST0
4		IN1	ST1 (JOG+)	ST1 (JOG+)
5		IN2	ST2 (RES)	ST2 (RES)
6		IN3	SON	SON
7	Output	OUT0	LS0	PE0
8		OUT1	LS1	PE1
9		OUT2	LS2 (–)	PE2 (–)
10		OUT3	SV	PZONE
11		OUT4	HEND	HEND
12		OUT5	* ALM	* ALM

(Note) The names of signals above inside ( ) are functions before the unit returns home.
(Note) Signals with asterisks (*) are normally ON, and OFF during operation.

■Pulse Train Type (ACON-PL/PO)

Pin No.	Classification		Parameters (select PIO pattern)	
			0	1
			Standard mode	Push mode
		Positioning Points	—	—
		Zone signal	×	×
		P-zone signal	×	×
	24V			
2	0V			
	Input	IN0	SON	ON
4		IN1	TL	TL
		IN2	HOME	HOME
6		IN3	RES	RES / DCLR
	Output	OUT0	SV	SV
8		OUT1	INP	INP / TLR
		OUT2	HEND	HEND
10		OUT3	* ALM	* ALM
	Input		* PP	* PP
12			PP	PP
			* NP	* NP
14			NP	NP

(Note) Signals with asterisks (*) are normally ON, and OFF during operation.

Wiring Diagram for the Pulse-Train Type

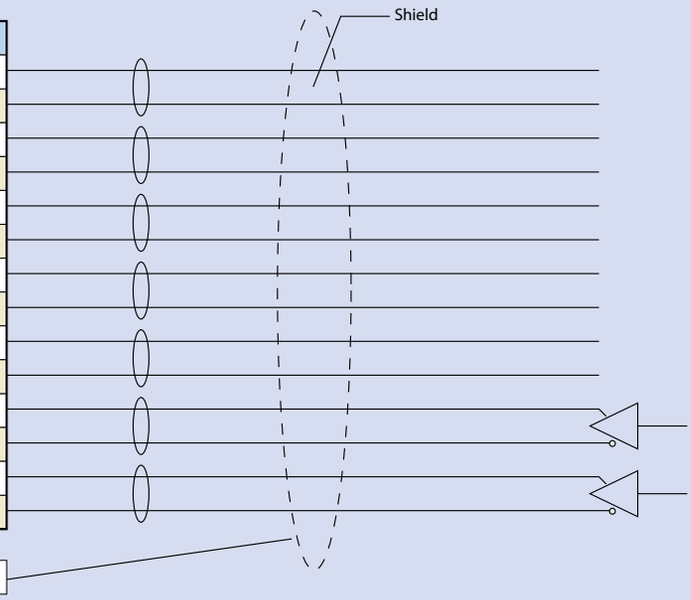
■Differential Line Driver Method (ACON-PL)

Max. input pulse frequency	: Max. 200 kpps
Cable Length	: Max. 10m

PIO connector

Pin Number	Classification	Signal
1	External 24V	24V
2	External 0V	0V
3	Input	SON
4	Input	TL
5	Input	HOME
6	Input	RES
7	Output	SV
8	Output	INP
9	Output	HEND
10	Output	* ALM
11	Differential input	/PP
12		PP
13		/NP
14		NP

Mounting plate	FG



* The shield on the twisted pair cable connected to the pulse connector must be connected to the mounting plate.

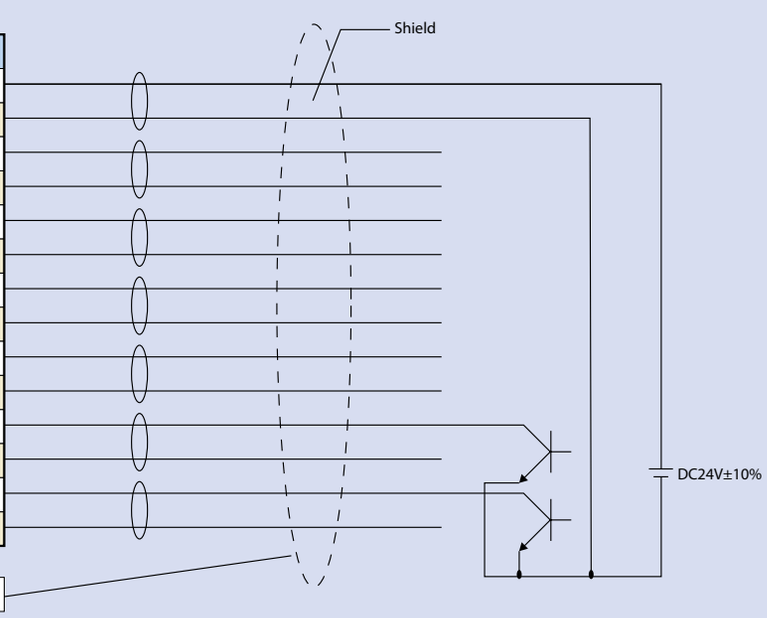
■Open Collector Method (ACON-PO)

Max. input pulse frequency	: Max. 60 kpps
Cable Length	: Max. 2m

PIO connector

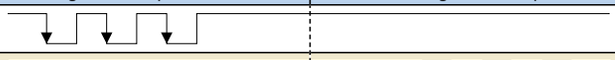
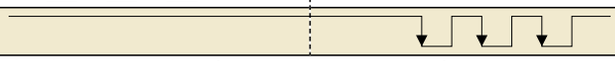
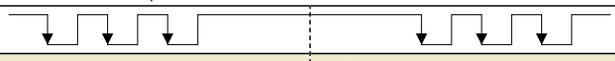
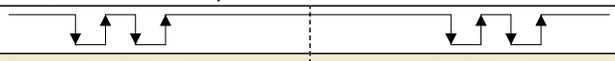
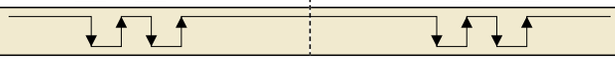
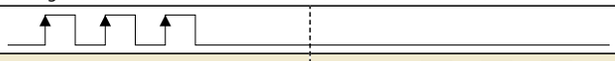
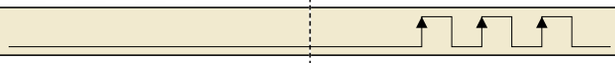
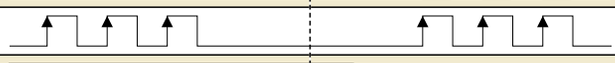
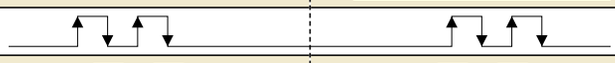
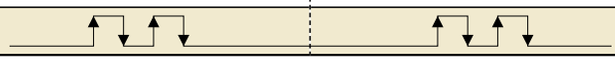
Pin Number	Classification	Signal
1	External 24V	24V
2	External 0V	0V
3	Input	SON
4	Input	TL
5	Input	HOME
6	Input	RES
7	Output	SV
8	Output	INP
9	Output	HEND
10	Output	* ALM
11	Open collector input	/PP
12	N.C	PP
13	Open collector input	/NP
14	N.C	NP

Mounting plate	FG



* The shield on the twisted pair cable connected to the pulse connector must be connected to the mounting plate.
* Connect the external 0V to the COMMON of the command pulse.

Command Pulse Input State

	Command pulse train state	Input terminal	During forward operation	During reversed operation
Negative logic	Forward pulse train	PP•/PP		
	Reversed pulse train	NP•/NP		
	The forward pulse train causes the motor to rotate forward, and the reverse pulse train causes the motor to rotate in reverse.			
	Pulse train	PP•/PP		
	Symbols	NP•/NP	Low	High
	The command pulse is used for the amount of motor rotation, and the command symbol is used for rotational direction.			
	A/B phase pulse train	PP•/PP		
		NP•/NP		
	An A/B phase pulse with a 90° phase difference (multiplier is 4) is used to generate commands for the amount of rotation and rotational direction.			
Positive logic	Forward pulse train	PP•/PP		
	Reversed pulse train	NP•/NP		
	Pulse train	PP•/PP		
	Symbols	NP•/NP	High	Low
	A/B phase pulse train	PP•/PP		
		NP•/NP		

* For the number of encoder pulse for the actuators operable with ACON, please refer to page Pre-41.

Table Of Specifications

Item	Specifications					
Controller type	C	CG	CY	PL	PO	SE
Connected actuator	RCA Series Actuator					
Number of control axes	1-axis					
Operating method	Positioner type		Solenoid valve type	Pulse train input type		Serial communication type
Positioning Points	512 points		3 points	—		64 points
Backup memory	EEPROM					
I/O connector	40-pin connector		12-pin connector	14-pin connector		None
Number of I/O	16 input points/16 output points		4 input points / 6 output points	4 input points/4 output points		None
I/O power	External supply DC24V±10%					—
Serial Communication	RS485 1ch					
Peripheral device communication cable	CB-PAC-PIO□□□		CB-PACY-PIO□□□	CB-PACPU-PIO□□□		CB-RCB-CTL002
Command pulse train input method	—			Differential line driver	Open collector	—
Max. input pulse frequency (Note 1)	—			Max. 200 kpps	Max. 60 kpps	—
Position detection method	Incremental encoder					
Drive-source cutoff relay at emergency stop	Integrated	External				
Forced release of electromagnetic brake	Brake release switch ON/OFF		ON/OFF terminal signal inside the power terminal for brake release			
Input Voltage	DC24V ± 10%					
Dielectric strength voltage	DC500V 1MΩ					
Vibration resistance	XYZ directions	10 to 57Hz, One side amplitude: 0.035mm (continuous), 0.075mm (intermittent) 58 to 150 Hz 4.9 m/s² (continuous), 9.8 m/s² (intermittent)				
Ambient operating temperature	0~40°C					
Ambient operating humidity	10 - 95% (non-condensing)					
Ambient operating atmosphere	Without corrosive gases					
Protection class	IP20					
Weight	Approx. 300g		Approx. 130g			

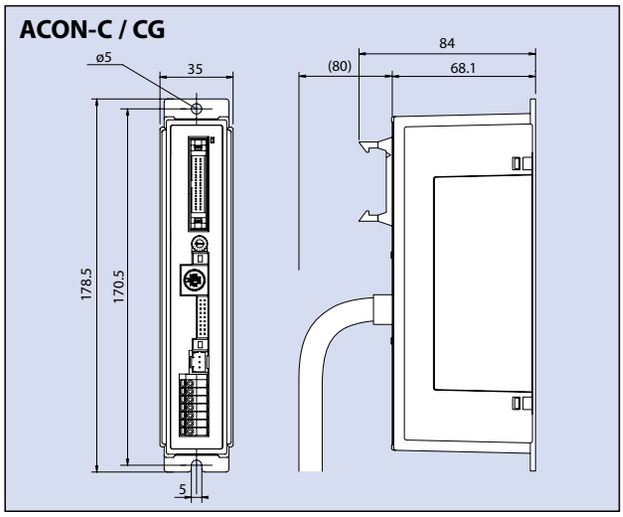
(Note 1) With the open collector specification, keep the maximum input frequency to 60 kpps or below to prevent malfunction. For applications exceeding 60kpps, use the differential line driver.

	Actuator	Motor	Standard specifications/high acceleration and deceleration model		Power-saving model	
			Rated [A]	Max. [A]	Rated [A]	Max. [A]
Motor Power Supply Capacity (Note 2)	RCA	10W	1.3	4.4	1.3	2.5
		20W [Model symbol: 20]	1.3	4.4	1.3	2.5
		30W	1.3	4.4	1.3	2.2
	RCA2	20W [Model symbol: 20S] SA4, RA3, TA5 Type dedicated	1.7	5.1	1.7	3.4
	RCL	2W	0.8	4.6		
		5W	1.0	6.4		
		10W	1.3	6.4		

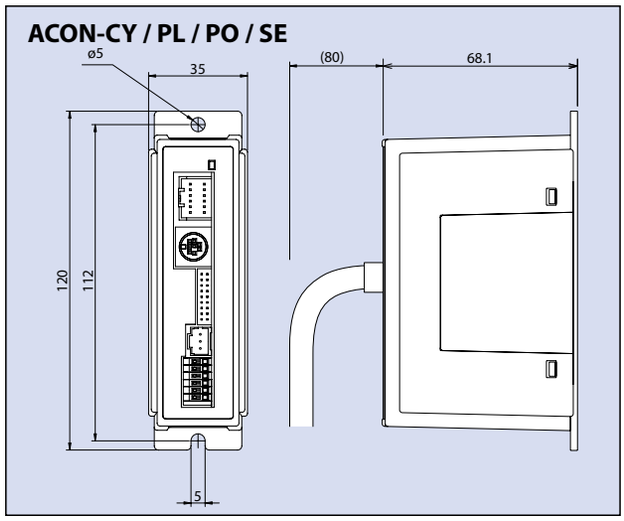
(Note 2) Other than motor power supply capacity, increase 0.5A as control power supply. Inrush current of approx. 5 to 12 times the rated current occurs within 1 to 2 msec from turning the power on. The inrush current changes depending on the power supply line impedance.

External Dimensions

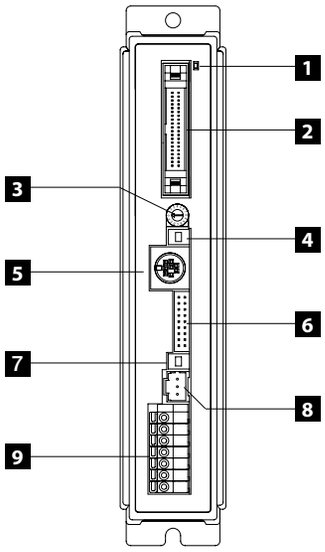
ACON-C / CG



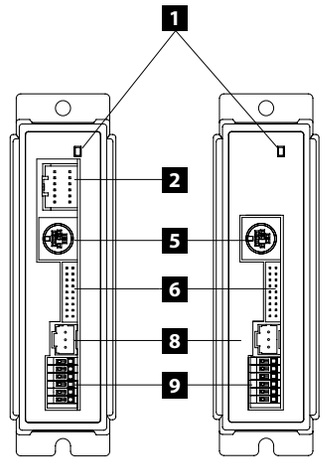
ACON-CY / PL / PO / SE



Name of each Part



C / CG type



CY/PL/PO Type

SE Type

* PIO connectors are:
CY: 12 pin
PL/PO: 14 pin

1 LED display

These LED colors indicate the condition of the controller.

Lit (green) Servo ON Lit (red) Alarm activated Emergency stop Unlit Servo OFF Blinking (green) Automatic servo-OFF

2 PIO connector

Connects a cable for communicating with a PLC or other external equipment.

3 Address-setting rotary switch

This switch sets the addresses for controllers used when the unit is linked with controllers.

4 Mode switch

Switches between manual teaching pendant operations (MANU) and automatic operations (AUTO).

Operation details

MANUAL	I/O commands are not accepted. Data can be written from a teaching pendant or PC.
AUTO	I/O commands are valid, while operations from a teaching pendant or PC are not accepted. However, monitoring is possible.

5 SIO connector

Connects a teaching pendant, PC cable, controller, or gateway unit to a controller.

Operation details

Pin No.	Signal	Name	Remarks
1	SGA	Positive side, RS485 differential signal	
2	SGB	Negative side, RS485 differential signal	
3	5V	+5V output	For RS232/485 conversion
4	ENBL	Enable signal	
5	EMGA	EMG line connection to external equipment	
6	24V	24-V power for T/P	For T/P
7	0V	GND	
8	EMGB	EMG line connection to external equipment	
9	0V	EMG line connection to external equipment ground	

6 Encoder brake connector

Connects the encoder/brake cable for the actuator.

7 Brake release switch

This switch forces the brake to release.

8 Motor connector

Connects the motor cable for the actuator.

9 Power terminal block

Main power for controller(s), emergency stop

C / CG type

Terminal number	Signal	Name
7	S1	External drive-source cutoff for TP_EMG terminal
6	S2	
5	MPI	Motor drive-source cutoff terminal
4	MPO	Motor drive-source cutoff terminal
3	24V	Positive side of the 24-V power supply
2	0V	Negative side of the 24-V power supply
1	EMG	EMG signal (application of 24 V)

CY / PL / PO / SE type

Terminal number	Signal	Name
6	BK	BK release
5	MPI	Motor drive-source cutoff terminal
4	MPO	Motor drive-source cutoff terminal
3	24V	Positive side of the 24-V power supply
2	0V	Negative side of the 24-V power supply
1	EMG	EMG signal (application of 24 V)

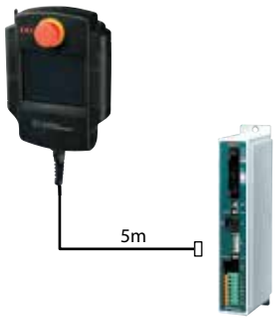
Options

Teaching pendant

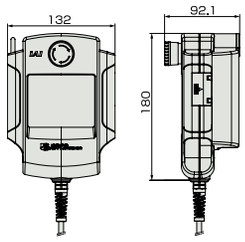
Summary Teaching device for positioning input, test operation, and monitoring.

Model **CON-PTA-C** (Touch panel teaching pendant)
CON-T (Standard type)

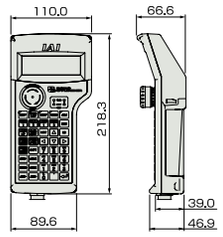
Setting



CON-PTA-C



CON-T



Specification

Item		Content	
Model	English Version	CON-PTA-C-ENG	CON-T-ENG
Data Input		○	○
Actuator Motion		○	○
Ambient Operating Temp./Humidity		Temp 0~40°C; 85% RH or below	
Ambient Operating Atmosphere		No corrosive gases. Especially no dust.	
Protective class		IP40	IP54
Weight		Approx. 570g	Approx. 400g
Cable Length		5m	
Display		65,536 color (16 bit color) White LED back light	20 char. x 4 lines LCD display
Standard Price		—	—

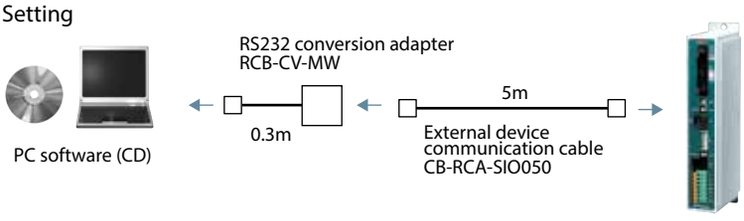
PC software (Windows only)

Summary A startup support software for inputting positions, performing test runs, and monitoring. With enhancements for adjustment functions, the startup time is shortened.

Supported Windows OS:
2000 SP4 or later / XP SP2 or later / Vista / 7

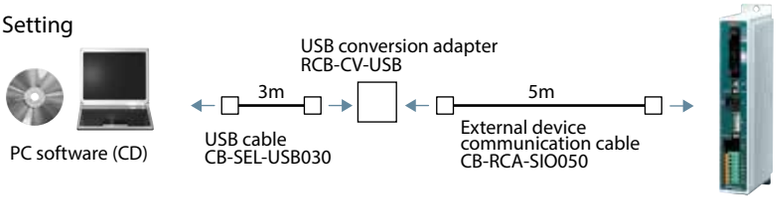
Model **RCM-101-MW** (External device communication cable + RS232 conversion unit)

Setting



Model **RCM-101-USB** (External device communication cable + USB converter adaptor + USB cable)

Setting



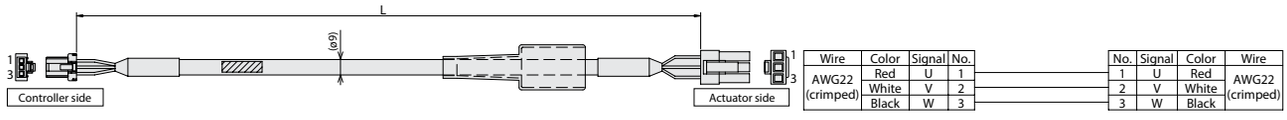
Spare Parts

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

Motor Cable for RCA

Model **CB-ACS-MA □□□**

* Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m



Wire	Color	Signal	No.		No.	Signal	Color	Wire
AWG22 (crimped)	Red	U	1		1	U	Red	AWG22 (crimped)
	White	V	2		2	V	White	
	Black	W	3		3	W	Black	

Min. bend radius r = 50mm or larger (when movable type is used)

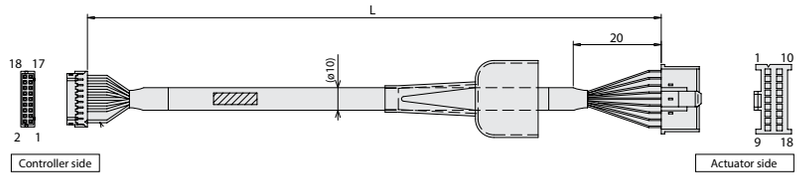
Encoder Cable / Encoder Robot Cable for RCA

Model **CB-ACS-PA □□□/CB-ACS-PA □□□-RB**

* The standard cable for the encoder cable is the normal cable. A robot cable can be specified as an option.

* Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters. Ex.: 080 = 8m

Min. bend radius r = 50 mm or larger (when movable type is used)
* Only robot cable is to be used in a cable track.



CN2

Cable color		Signal	Pin No.
Robot Cable	Standard Cable		
White/Purple	Blue	LS+	18
White/Gray	Orange	LS–	17
Yellow	Green	BK+	16
Blue	Brown	BK–	15
White/Blue	Gray	ENA	14
White/Yellow	Red	ENA	13
White/Red	Black	ENB	12
White/Black	Yellow	ENB	11
Orange	Pink	ENZ	10
Green	Purple	ENZ	9
Purple	White	–	8
Gray	Blue/red	VPS	7
Red	Orange/White	5V	6
Black	Green/White	GND	5
–	–	–	4
–	–	–	3
–	–	–	2
Ground	Ground	FG	1

Housing : PHDR-18VR (JST)
Contact : SPHD-001T-P0.5 (JST)

CN1

Pin No.	Signal	Cable color	
		Standard Cable	Robot Cable
1	ENA	Gray	White/Blue
2	ENA	Red	White/Yellow
3	ENB	Black	White/Red
4	ENB	Yellow	White/Black
5	–	–	–
6	–	–	–
7	LS+	Blue	White/Purple
8	–	–	–
9	FG	Ground	Ground
10	ENZ	Pink	Orange
11	ENZ	Purple	Green
12	–	White	Purple
13	VPS	Blue/red	Gray
14	5V	Orange/White	Red
15	GND	Green/White	Black
16	LS–	Orange	White/Gray
17	BK–	Brown	Blue
18	BK+	Green	Yellow

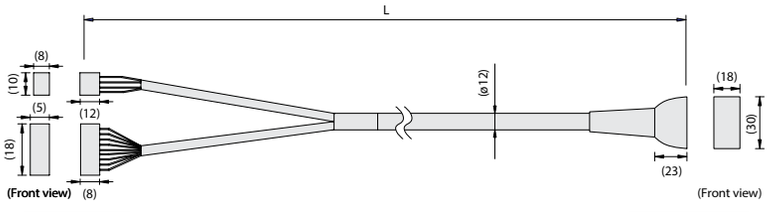
Plug housing : XMP-18V (JST)
Socket contact : BXA-001T-P0.6 (JST)
Retainer : XMS-09V (JST)

Motor-Encoder Integrated Robot Cable for RCA2

* The standard cable is a robot cable.

Model **CB-ACS-MPA □□□**

* Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters. Ex.: 080 = 8m



Min. bend radius r = 84 mm or larger (when movable type is used)

Signal	Pin No.
U	1
V	2
W	3
BK+	16
BK–	15
LS+	18
LS–	17
A+	14
A–	13
B+	12
B–	11
Z+	10
Z–	9
–	8
/PS	7
VCC	6
GND	5
NC	4
FG	1

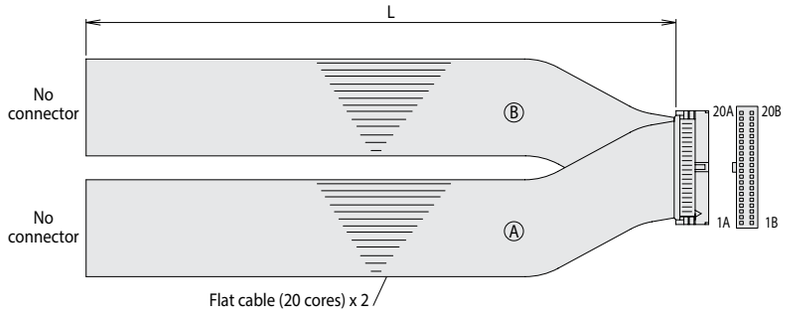
(Wire color)
Red
Yellow
Black
Yellow (Red ●)
Yellow (Blue ●)
Pink (Red ●)
Pink (Blue ●)
White (Red ●)
White (Blue ●)
Orange (Red ●)
Orange (Blue ●)
Gray (Red ●)
Gray (Blue ●)
Orange (Red ● Consecutive)
Orange (Blue ● Consecutive)
Gray (Red ● Consecutive)
Gray (Blue ● Consecutive)
Shield

Pin No.	Signal
A1	U
B1	V
A2	W
B2	NC
A3	NC
B3	NC
A4	BK+
B4	BK–
A5	LS+
B5	LS–
A6	A+
B6	A–
A7	B+
B7	B–
A8	Z+
B8	Z–
A9	–
B9	/PS
A10	VCC
B10	GND
A11	NC
B11	FG

I/O Flat Cable (for ACON-C / CG)

Model **CB-PAC-PIO □□□**

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



HIF6-40D-1.27R

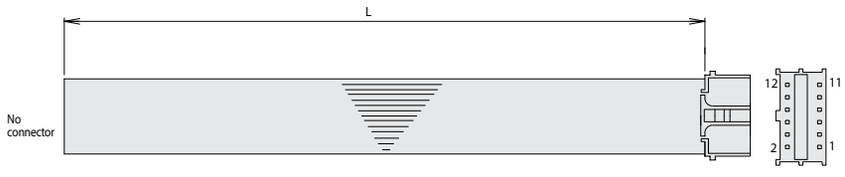
No.	Signal name	Cable color	Wiring
1A	24V	Brown - 1	Flat cable Ⓐ (crimped)
2A	24V	Red - 1	
3A	—	Orange - 1	
4A	—	Yellow - 1	
5A	IN0	Green - 1	
6A	IN1	Blue - 1	
7A	IN2	Purple - 1	
8A	IN3	Gray - 1	
9A	IN4	White - 1	
10A	IN5	Black - 1	
11A	IN6	Brown - 2	
12A	IN7	Red - 2	
13A	IN8	Orange - 2	
14A	IN9	Yellow - 2	
15A	IN10	Green - 2	
16A	IN11	Blue - 2	
17A	IN12	Purple - 2	
18A	IN13	Gray - 2	
19A	IN14	White - 2	
20A	IN15	Black - 2	

No.	Signal name	Cable color	Wiring
1B	OUT0	Brown - 3	Flat cable Ⓑ (crimped) AWG 28
2B	OUT1	Red - 3	
3B	OUT2	Orange - 3	
4B	OUT3	Yellow - 3	
5B	OUT4	Green - 3	
6B	OUT5	Blue - 3	
7B	OUT6	Purple - 3	
8B	OUT7	Gray - 3	
9B	OUT8	White - 3	
10B	OUT9	Black - 3	
11B	OUT10	Brown - 4	
12B	OUT11	Red - 4	
13B	OUT12	Orange - 4	
14B	OUT13	Yellow - 4	
15B	OUT14	Green - 4	
16B	OUT15	Blue - 4	
17B	—	Purple - 4	
18B	—	Gray - 4	
19B	0V	White - 4	
20B	0V	Black - 4	

Solenoid Valve Type I/O Cable (for ACON-CY)

Model **CB-PACY-PIO □□□**

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



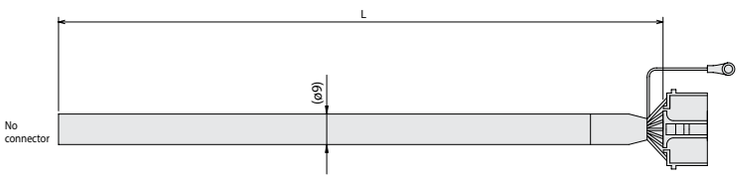
51353-1200 (MOLEX)

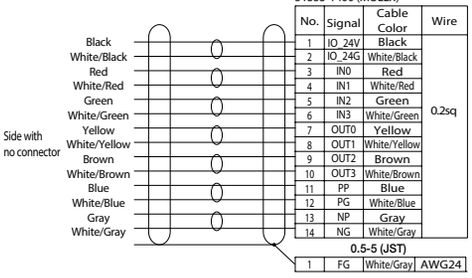
No.	Signal	Cable Color	Wire
1	24V	Brown-1	Flat cable (crimped) AWG28
2	0V	Red-1	
3	IN0	Orange-1	
4	IN1	Yellow-1	
5	IN2	Green-1	
6	IN3	Blue-1	
7	OUT0	Purple-1	
8	OUT1	Gray-1	
9	OUT2	White-1	
10	OUT3	Black-1	
11	OUT4	Brown-2	
12	OUT5	Red-2	

Pulse Train Control I/O Cable (for ACON-PL/PO)

Model **CB-PACPU-PIO □□□**

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





51353-1400 (MOLEX)

No.	Signal	Cable Color	Wire
1	IO_24V	Black	0.2sq
2	IO_24G	White/Black	
3	IN0	Red	
4	IN1	White/Red	
5	IN2	Green	
6	IN3	White/Green	
7	OUT0	Yellow	
8	OUT1	White/Yellow	
9	OUT2	Brown	
10	OUT3	White/Brown	
11	PP	Blue	
12	PG	White/Blue	
13	NP	Gray	
14	NG	White/Gray	

0.5-5 (JST)

1	FG	White/Gray	AWG24

PCON-ABU ACON-ABU

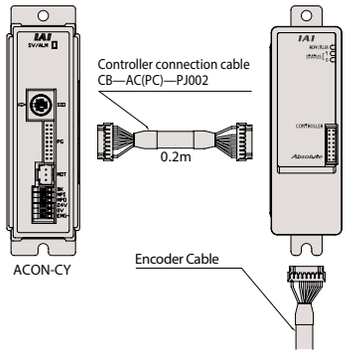
Simple absolute unit
For PCON / ACON controller

Features

1 When attached to a ACON/PCON-C, -CG, -CY, or -SE (incremental) controller, the data from the encoder is retained even after the controller's main power has been turned OFF, allowing you to use it as an absolute model, which does not require homing at power-up.

* Cannot be used for ACON/PCON-PL or PO types, PCON-CA/CFA types.

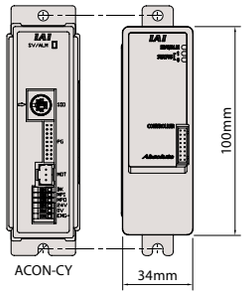
Caution The encoder type for the actuators and controllers with a simple absolute unit is "I" (incremental) and not "A" (absolute).



2 Having the same size as the CY and SE compact controllers 34mm (W) × 100mm (H) × 75.3mm (D), it can be installed in a small space.

3 Encoder data can be retained up to 20 days.

Caution An error will occur if the actuator's slider or rod is moved faster than the fixed speed, while the encoder data is retained. Check the specifications table on page 642 for the allowable speed (rotations).



Models

	PCON controller	ACON controller
Model	PCON-ABU	ACON-ABU
Standard Price	—	—

Connectable Actuators

The simple absolute unit is available for the following actuators. (Models other than following models are not available.)

Corresponding series	Reference
RCP3 series	Corresponding to all models
RCP2 series	Corresponding to all models other than HS8C/HS8R/RA10C.
RCP2CR series	Corresponding to all models other than HS8C.
RCP2W series	Corresponding to all models other than SA16C/RA10C.
RCA2 series	Corresponding to all models
RCA series	Corresponding to all models
RCACR series	Corresponding to all models
RCAW series	Corresponding to all models

Specifications

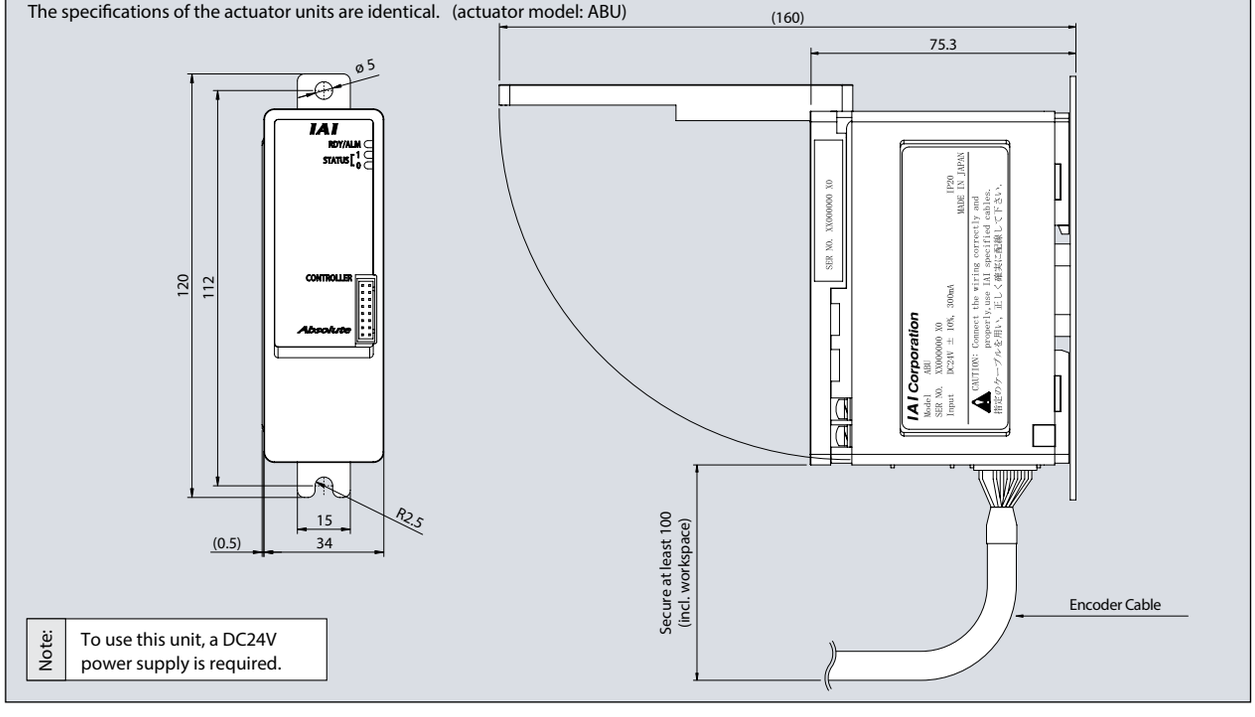
Item	Details	
Model	ACON-ABU	PCON-ABU
Connecting controller	ACON-C / CG / CY / SE	PCON-C / CG / CY / SE
	Caution: When choosing a controller to connect with the simple absolute unit, add "-ABU" to the end of the controller model designation. Ex. ACON-C-20I-NP-2-0-ABU	
Connecting actuator	RCA2 / RCA series	RCP3/RCP2 series (* 1)
Controller connection cable (included accessory)	Model CB-AC-PJ002 (0.2m)	Model CB-PC-PJ002 (0.2m)
Simple absolute unit	Model ABU	
Backup battery (included accessory)	Model AB-7 (Ni-MH battery / Life: approx. 3 years)	
Power supply voltage	DC24V±10%	
Power supply current	Max. 300mA	
Ambient operating temperature	0 to 40°C (approx. 20°C is preferred)	
Ambient operating humidity	95% RH or lower (non-condensing)	
Ambient operating atmosphere	Without corrosive gases, without dust	
Weight	330g	

Allowable encoder RPM during data retention (*2)	800rpm	400rpm	200rpm	100rpm
Position data retaining time (*2)	120h	240h	360h	480h

(*1) Cannot be used with RCP2-RA10C/HS8C/HS8R/RCP2W-SA16C.
(*2) Position data retention time changes with the allowable encoder RPMs during data retention.
(800rpm→120h / 400rpm→240h / 200rpm→360h / 100rpm→480h)

External Dimension

* The only difference between ACON-ABU and PCON-ABU is the controller cable;
The specifications of the actuator units are identical. (actuator model: ABU)



Note: To use this unit, a DC24V power supply is required.

SCON-CA

RCS2/RCS3/Cartesian Robot/
Linear Servo Actuator Position Controller

Feature

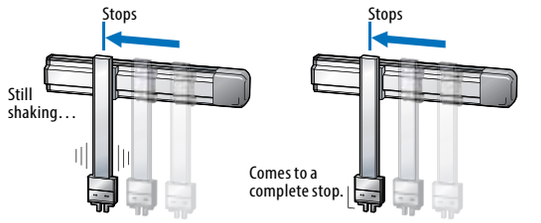
1 Supporting major field networks <Optional function>

Direct connection is now possible not only to DeviceNet, CC-Link (*1) and PROFIBUS-DP, but also to MECHATROLINK, CompoNet, EtherCAT and EtherNet/IP. The actuator can also be operated by specifying coordinate values directly via a field network.
(*1) CC-Link was changed from remote I/O to remote device.

DeviceNet
PROFIBUS
CompoNet
CC-Link
EtherNet/IP
EtherCAT
MECHATROLINK

2 Vibration control function <Standard function>

A vibration control function has been added 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.

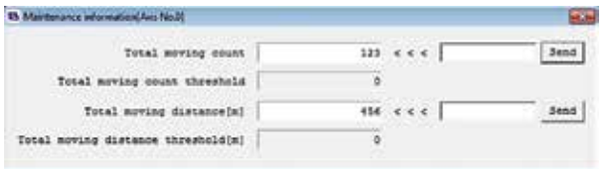
With vibration control
The work part generates virtually no vibration after stopping.

3 Increasing the actuator's load capacity with offboard tuning

Offboard tuning is a function to increase the acceleration/deceleration when the load mass is small, or decrease the acceleration/deceleration when the load mass is large, so that the actuator is set to operate optimally for the given load mass. Also, servo tuning would be done at the same time. (See page A-98 for the details.)

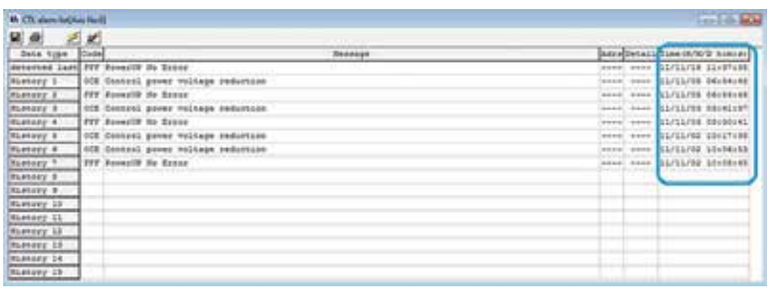
4 Checking when to maintain based on the total number of movements and total distance travelled <Standard function>

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.



5 Keeping the alarm generation times with the calendar function <Standard function>

The clock function has been added 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.
(The time and date data is retained for 10 days.)



List of Models

Model		SCON-CA							
External view									
I/O type		Standard specification	Network connection specification (optional) (*2)						
I/O type specification		PIO connection specification (*1)	DeviceNet	CC-Link	PROFIBUS-DP	CompoNet	MECHATROLINK	EtherCAT	EtherNet/IP
I/O type code		NP/PN	DV	CC	PR	CN	ML	EC	EP
Applicable encoder type		Incremental	Absolute	Incremental/Absolute					
Standard price	20~150W	—	—	—	—	—	—	—	—
	200W	—	—						
	300~400W	—	—						
	600W	—	—						
	750W	—	—						
	750W (for force control)	—	—						

(*1) If the controller is operated in the pulse-train mode, only an incremental encoder can be used.
(*2)The network connection specification type will not be able to operate with the PIO or Pulse train mode.

Model

SCON – CA – [Motor type] [Encoder type] [Option] – [I/O type] – [I/O cable length] – [Power supply voltage]

Series: SCON
Type: CA

CA	High-function type

Motor type

12	12W motor	200	200W motor
20	20W motor	200S	For LSA-S10H/N15 LSAS-N15
30D	30W motor (for RCS2)	300S	For LSA-N19
30R	30W motor (for RS)	400	400W motor
60	60W motor	600	600W motor
100	100W motor	750	750W motor
100S	For LSA-N10 LSAS-N10	750S	For 750W actuator with load cell
150	150W motor		

Encoder type

I	Incremental
A	Absolute
G	Quasi-absolute

* The quasi-absolute is for the LSAS series.

Option

HA	High-acceleration/ deceleration specification

* The high acceleration/deceleration specification can only be selected when the actuator is the high acceleration/deceleration type.
<Actuators for high acceleration/deceleration>
RCS2-SA4C/SA5C/SA6C/SA7C/RA4C/RA5C/
RGS4C/RGS5C/RGD4C/RGD5C

I/O type

NP	PIO NPN specification (standard)
PN	PIO PNP specification
DV	DeviceNet connection specification
CC	CC-Link connection specification
PR	PROFIBUS-DP connection specification
CN	CompoNet connection specification
ML	MECHATROLINK connection specification
EC	EtherCAT connection specification
EP	EtherNet/IP connection specification

I/O cable length

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

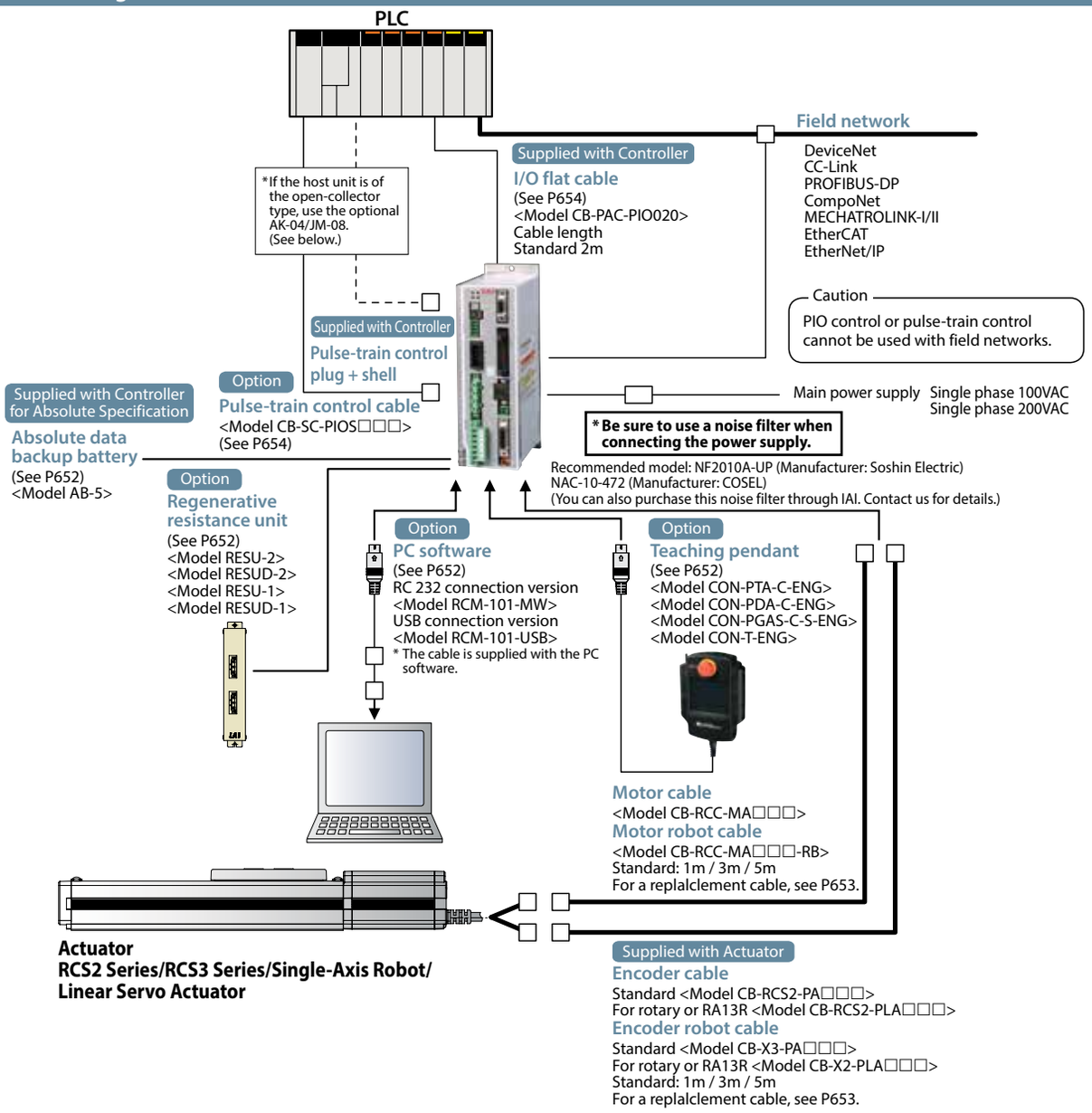
* If "DV," "CC," "PR," "CN," "ML," "EC" or "EP" is selected for the I/O type, select "0" for the I/O cable length.

Power supply voltage

1	Single phase 100VAC
2	Single phase 200VAC

SCON-CA Controller

System Configuration

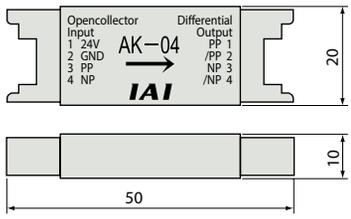


Pulse Converter: AK-04

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	24 VDC±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	37104-3122-000L (e-CON connector) x 2 Applicable wire: AWG Nos. 24 to 26

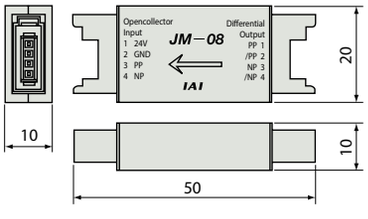


Pulse Converter: JM-08

Difference feedback pulses are converted to open-collector feedback pulses. Use this converter if the host controller inputs open-collector pulses.

Specification

Item	Specification
Input power	24 VDC±10% (Max. 50mA)
Input pulse	Differential input (10 mA 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) x 2 Applicable wire: AWG Nos. 24 to 26



Operation Modes

With this controller, you can select a desired control method from the two modes of positioner mode and pulse-train control mode.
In the positioner mode, you can enter position data (target position, speed, acceleration, etc.) in the controller under the desired numbers and then specify each number externally via an I/O (input/output signal) to operate the actuator.
Also, in the positioner mode, you can select the desired operation mode from the eight modes using the parameter.
In the pulse-train control mode, you can control the travel, speed, acceleration, etc., by sending pulses from an external pulse generator.

Mode		Number of positioning points	Features
Positioner mode	Positioning mode	64 points	Standard factory-set mode. Specify externally a number corresponding to the position you want to move to, to operate the actuator.
	Teaching mode	64 points	In this mode, you can move the slider (rod) via an external signal and register the stopped position in the position data table.
	256-point mode	256 points	In this mode, the number of positioning points available in the positioning mode has been increased to 256 points.
	512-point mode	512 points	In this mode, the number of positioning points available in the positioning mode has been increased to 512 points.
	Solenoid value mode 1	7 points	In this mode, the actuator can be moved only by turning signals ON/OFF, just like you do with an air cylinder of solenoid valve type.
	Solenoid value mode 2	3 points	In this mode, the output signal is set to the same as the air cylinder auto switch in the solenoid valve mode.
	Force mode 1	32 points	In this mode, you can move to positions under force control in the positioning mode. (Up to 32 positioning points are available.)
	Force mode 2	5 points	In this mode, you can move to positions under force control in the solenoid valve mode. (Up to five positioning points are available.)
Pulse-train control mode		—	There is no need to enter position data in the controller, and the customer can operate the actuator freely based on custom control.

I/O Signal Table * You can select one of nine types of I/O signal assignments.

Pin No.	Category		Parameter (PIO pattern) selection								Pulse-train mode
			0	1	2	3	4	5	6	7	0
			Positioning mode	Teaching mode	256-point mode	512-point mode	Solenoid valve mode 1	Solenoid valve mode 2	Force mode 1	Force mode 2	Standard mode
		Positioning point	64 points	64 points	256 points	512 points	7 points	3 points	32 points	5 points	—
1A	24V		P24								P24
2A	24V		P24								P24
3A	—		NC								NC
4A	—		NC								NC
5A	Input	IN0	PC1	PC1	PC1	PC1	ST0	ST0	PC1	ST0	SON
6A		IN1	PC2	PC2	PC2	PC2	ST1	ST1(JOG+)	PC2	ST1	RES
7A		IN2	PC4	PC4	PC4	PC4	ST2	ST2(–)	PC4	ST2	HOME
8A		IN3	PC8	PC8	PC8	PC8	ST3	—	PC8	ST3	TL
9A		IN4	PC16	PC16	PC16	PC16	ST4	—	PC16	ST4	CSTP
10A		IN5	PC32	PC32	PC32	PC32	ST5	—	—	—	DCLR
11A		IN6	—	MODE	PC64	PC64	ST6	—	—	—	BKRL
12A		IN7	—	JISL	PC128	PC128	—	—	—	—	RMOD
13A		IN8	—	JOG+	—	PC256	—	—	CLBR	CLBR	—
14A		IN9	BKRL	JOG–	BKRL	BKRL	BKRL	BKRL	BKRL	BKRL	—
15A		IN10	RMOD	RMOD	RMOD	RMOD	RMOD	RMOD	RMOD	RMOD	—
16A		IN11	HOME	HOME	HOME	HOME	HOME	—	HOME	HOME	—
17A		IN12	*STP	*STP	*STP	*STP	*STP	—	*STP	*STP	—
18A		IN13	CSTR	CSTR/PWRT	CSTR	CSTR	—	—	CSTR	—	—
19A		IN14	RES	RES	RES	RES	RES	RES	RES	RES	—
20A		IN15	SON	SON	SON	SON	SON	SON	SON	SON	—
1B	Output	OUT0	PM1	PM1	PM1	PM1	PE0	LS0	PM1	PE0	PWR
2B		OUT1	PM2	PM2	PM2	PM2	PE1	LS1(TRQS)	PM2	PE1	SV
3B		OUT2	PM4	PM4	PM4	PM4	PE2	LS2(–)	PM4	PE2	INP
4B		OUT3	PM8	PM8	PM8	PM8	PE3	—	PM8	PE3	HEND
5B		OUT4	PM16	PM16	PM16	PM16	PE4	—	PM16	PE4	TLR
6B		OUT5	PM32	PM32	PM32	PM32	PE5	—	TRQS	TRQS	*ALM
7B		OUT6	MOVE	MOVE	PM64	PM64	PE6	—	LOAD	LOAD	*EMGS
8B		OUT7	ZONE1	MODES	PM128	PM128	ZONE1	ZONE1	CEND	CEND	RMDS
9B		OUT8	PZONE/ZONE2	PZONE/ZONE1	PZONE/ZONE1	PM256	PZONE/ZONE2	PZONE/ZONE2	PZONE/ZONE1	PZONE/ZONE1	ALM1
10B		OUT9	RMDS	RMDS	RMDS	RMDS	RMDS	RMDS	RMDS	RMDS	ALM2
11B		OUT10	HEND	HEND	HEND	HEND	HEND	HEND	HEND	HEND	ALM4
12B		OUT11	PEND	PEND/WEND	PEND	PEND	PEND	—	PEND	PEND	ALM8
13B		OUT12	SV	SV	SV	SV	SV	SV	SV	SV	*OVLW/*ALML
14B		OUT13	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	—
15B		OUT14	*ALM	*ALM	*ALM	*ALM	*ALM	*ALM	*ALM	*ALM	ZONE1
16B		OUT15	*BALM	*BALM	*BALM	*BALM	*BALM	*BALM	*BALM	*BALM	ZONE2
17B	—		—								—
18B	—		—								—
19B	0V		N								N
20B	0V		N								N

* In the above table, signals in ( ) represent functions available before the home return.
* In the above table, signals preceded by * are turned OFF while the actuator is operating.

Explanation of the I/O Signal Functions

The table below explains the functions assigned to the controller's I/O signals.
The available signals vary depending on the controller type and settings, so use the signal table of each controller to check the functions available with that controller.

Category	Signal abbreviation	Signal name	Description of function
Input	CSTR	PTP strobe (start signal)	The actuator starts moving to the position set by the command position.
	PC1~PC256	Command position number	The position number of the target position is input (binary input).
	BKRL	Forced brake release	The brake is forcibly released.
	RMOD	Operation mode switching	The operation mode can be switched when the MODE switch on the controller is in the AUTO position. (The switch position is AUTO when this signal is OFF, or MANU when the signal is ON.)
	*STP	Pause	The actuator will decelerate to a stop when this signal turns OFF while the actuator is moving. The remaining movement will be suspended while the actuator is stopped and the movement will resume once the signal turns ON.
	RES	Reset	The alarm will be reset when the signal turns ON. The remaining travel can be cancelled by turning this signal ON while the actuator is paused (*STP is OFF).
	SON	Servo ON	The servo is ON while this signal is ON, and remains OFF while this signal is OFF.
	HOME	Home return	When this signal turns ON, the actuator performs home return operation.
	MODE	Teaching mode	When this signal turns ON, the actuator switches to the teaching mode. (Switching will not occur if CSTR, JOG+ and JOG- are all OFF and the actuator is still moving.)
	JISL	Jog/inch switching	When this signal turns OFF, the actuator can be jogged with JOG+ and JOG-. When the signal is ON, the actuator can be inched with JOG+ and JOG-.
	JOG+, JOG-	Jog	When the JISL signal is OFF, the actuator starts jogging in + or – direction upon detection of the ON edge of this signal. If the OFF edge of this signal is detected during jogging, the actuator decelerates to a stop.
	PWRT	Current position write	In the teaching mode, specify a position and then turn this signal ON for at least 20ms, and the current position will be written to the specified position.
	ST0~ST6	Start signal	In the solenoid valve mode, the actuator moves to the specified position when this signal turns ON. (The start signal is not required.)
	CLBR	Load cell calibration command	Load cell calibration starts when this signal has remained ON for at least 20ms.
	TL	Torque limit selection signal	While this signal is ON, torque is limited by the value set by a parameter. The TLR signal turns on if torque has reached the specified value.
	CSTP	Compulsory stop	Turning it ON continuously for more than 10ms compulsorily stops the actuator. The actuator decelerates then stops with the torque set in the controller and then turns the servo OFF.
	DCLR	Deviation counter clear signal	The position deviation counter is continuously cleared while this signal is ON.
Output	PEND/INP	Positioning complete	This signal turns ON when the actuator enters the in-position band after movement. If the actuator exceeds the in-position band, the PEND signal does not turn OFF, but the INP signal turns OFF. PEND and INP can be switched using a parameter.
	PM1~PM256	Complete position number	The position number of the position reached at the end of positioning is output (binary output).
	HEND	Home return completion	This signal turns ON upon completion of home return.
	ZONE1/ZONE2	Zone	This signal turns ON if the current actuator position is within the range set by the parameter.
	PZONE	Position zone	This signal turns ON when the current actuator position enters the range set in the position data table after position movement. This signal can be used with ZONE1, but PZONE becomes effective only when moving to a specified position.
	RMDS	Operation mode status output	The operation mode status is output. This signal turns ON when the controller is in the manual mode.
	*OVLW	Overload warning	This signal is ON in a normal condition, and turns OFF when the overload warning level is exceeded. (Operation will continue.)
	*ALML	Minor failure alarm	This signal is ON in a normal condition, and turns OFF when a message-level alarm occurs. (Operation will continue.)
	*ALM	Alarm	This signal is ON when the controller is in a normal condition, and turns OFF when an alarm occurs.
	MOVE	Moving	This signal is ON while the actuator is moving (also during home return and push-motion operation).
	SV	Servo ON	This signal is ON while the servo is ON.
	*EMGS	Emergency stop output	This signal is ON when no emergency stop is actuated on the controller, and turns OFF when an emergency stop is actuated.
	*BALM	Absolute battery voltage low warning	If the controller is of the absolute specification, this signal turns OFF when the voltage of the absolute battery drops. (Operation will continue.)
	MODES	Teaching mode output	This signal turns ON when the actuator enters the teaching mode via MODE signal input. It turns OFF once the actuator returns to the normal mode.
	WEND	Write complete	This signal is OFF immediately after switching to the teaching mode, and turns ON once writing is completed according to the PWRT signal. When the PWRT signal turns OFF, this signal also turns OFF.
	PE0~PE6	Current position number	This signal turns ON when the actuator has completed moving to the target position in the solenoid valve mode.
	CEND	Load cell calibration complete	This signal turns ON upon completion of load cell calibration. When the CLBR signal turns OFF, this signal also turns OFF.
	LOAD	Load output judgment signal	During push-motion operation, this signal is output when the current value set for the "threshold" is exceeded within the range of "Zone+" and "Zone-" set in the position data table. The signal is used to determine if press-fitting action has been performed correctly.
	TRQS	Torque level output	This signal is output when the motor current reaches the current value set for the "threshold" in the position data table after the slider (rod) has collided with an obstacle, etc., during movement in push-motion operation.
	LS0~LS2	Limit switch output	This signal turns ON when the current actuator position enters the in-position band set before and after the target position. If the home return has already completed, this signal is output even before a movement command is issued or while the servo is OFF.
	ALM1~ALM8	Alarm code output signal	The alarm code is output together with the alarm sign output. Refer to Alarm List for details. (Dedicated pulse-train type)
	PWR	System ready	This signal turns ON if SCON is controllable after main power ON. (Dedicated pulse-train type)
	TLR	Torque limiting signal	This signal turns ON once the motor torque has reached the specified value in a condition where torque is being limited by the TL signal. (Dedicated pulse-train type)

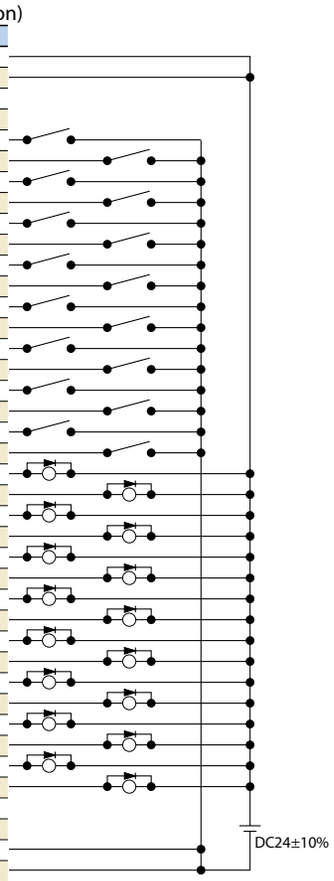
* In the above table, signals preceded by * are normally ON and turn OFF while the actuator is operating.

I/O Wiring Diagram

Positioning mode/Teaching mode/Solenoid valve mode

PIO connector (NPN specification)

Pin No.		Category
1A	Power supply	24V
2A		24V
3A	—	Not used
4A	—	Not used
5A	Input	IN0
6A		IN1
7A		IN2
8A		IN3
9A		IN4
10A		IN5
11A		IN6
12A		IN7
13A		IN8
14A		IN9
15A		IN10
16A		IN11
17A		IN12
18A		IN13
19A		IN14
20A		IN15
1B	Output	OUT0
2B		OUT1
3B		OUT2
4B		OUT3
5B		OUT4
6B		OUT5
7B		OUT6
8B		OUT7
9B		OUT8
10B		OUT9
11B		OUT10
12B		OUT11
13B		OUT12
14B		OUT13
15B		OUT14
16B		OUT15
17B	—	Not used
18B	—	Not used
19B	Power supply	0V
20B		0V

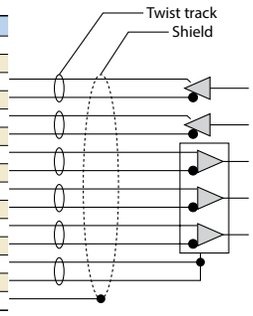


*Connect Pins 1A and 2A to 24 V, and Pins 19B and 20B to 0 V.

Pulse Train Mode (Differential Output)

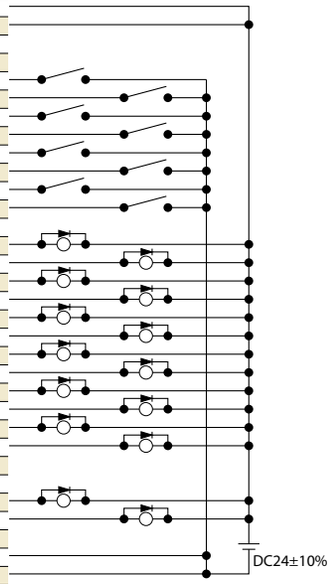
Pulse connector

Pin No.		Category
1		Not used
2		Not used
3	Input	PP
4		/PP
5		NP
6		/NP
7	Output	AFB
8		/AFB
9		BFB
10		/BFB
11		ZFB
12		/ZFB
13	Ground	GND
14		GND
Shell	Shield	Shield



PIO connector (NPN specification)

Pin No.		Category
1A	Power supply	24V
2A		24V
3A		Not used
4A		Not used
5A	Input	SON
6A		RES
7A		HOME
8A		TL
9A		CSTR
10A		DCLR
11A		BKRL
12A		RMOD
13A-20A	—	Not used
1B	Output	PWR
2B		SV
3B		INP
4B		HEND
5B		TLR
6B		*ALM
7B		*EMGS
8B		RMDS
9B		ALM1
10B		ALM2
11B		ALM4
12B		ALM8
13B		(*1)
14B		—
15B		ZONE1
16B		ZONE2
17B~18B		Not used
19B	Power supply	0V
20B		0V



* Be sure to connect to the shell the shield of the twist track cable connected to the PULSE connector. Also **keep the cable length to 10m or less**.
* Connect Pins 1A and 2A to 24 V, and Pins 19B and 20B to 0 V
(*1)-/*ALML/*OVLW/*BALM (switchable with parameters)

I/O Specification

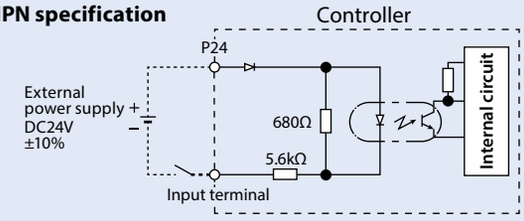
Input Part External Input Specification

Item	Specification
Input voltage	24VDC±10%
Input current	4mA/1 circuit
ON/OFF voltage	ON voltage: 18VDC min. OFF voltage: 6VDC max.
Isolation method	Photocoupler

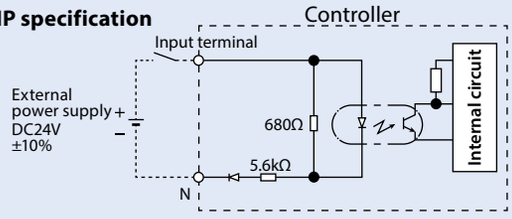
Output Part External Output Specifications

Item	Specification
Load voltage	24VDC
Maximum load current	100mA/1 point, 400mA/8 points
Leak current	0.1mA max./1 point
Isolation method	Photocoupler

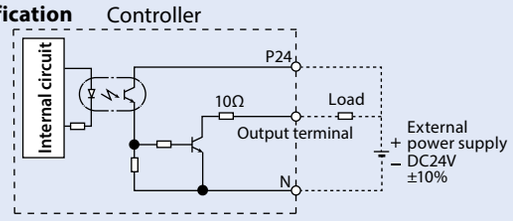
NPN specification



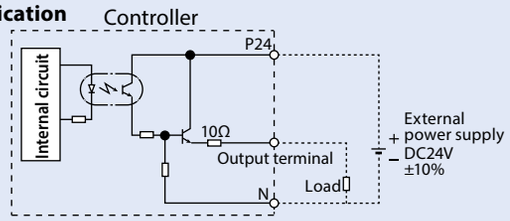
PNP specification



NPN specification



PNP specification

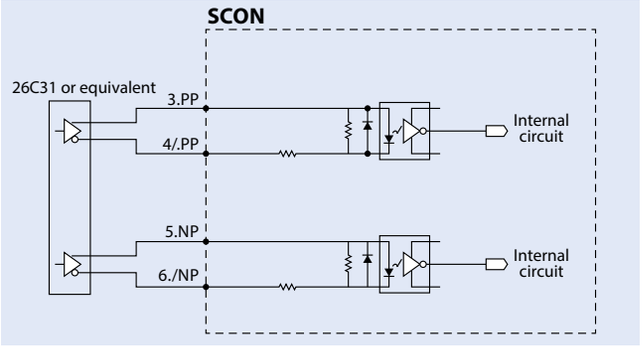


SCON-CA Controller

Pulse-Train Type I/O Specification (Differential Line Driver Specification)

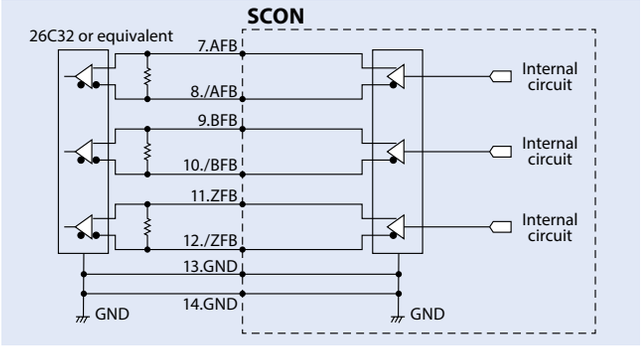
■ Input Part

Maximum number of input pulses: Line driver interface 2.5Mpps
Isolation method : Photocoupler isolation



■ Output Part

Maximum number of output pulses: Line driver interface 2.5Mpps
Isolation/non-isolation : Non-isolation

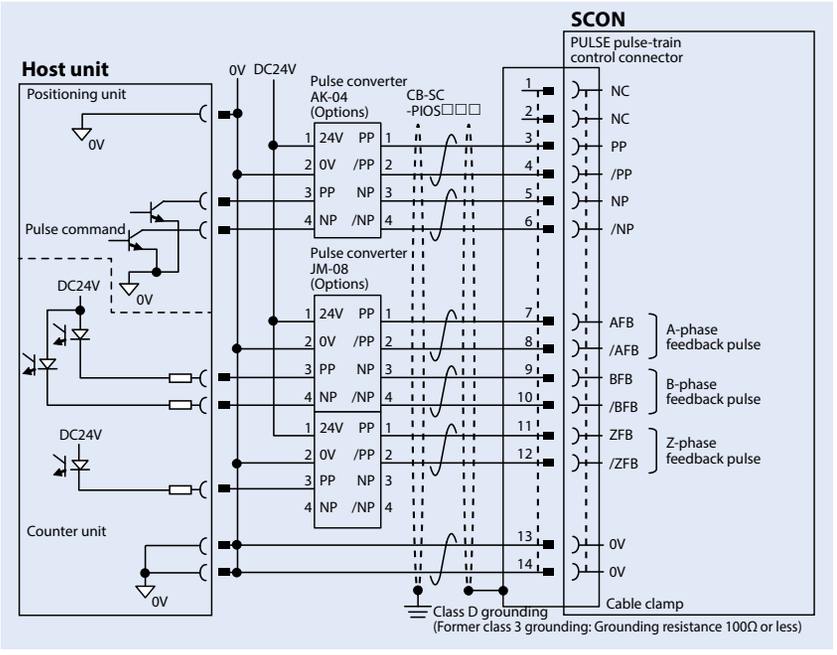


Pulse-Train Type I/O Specification (Open-collector Specification)

The AK-04 (Option) is needed to input pulses. The JM-08 (Option) is needed to output pulses.

Maximum number of input pulses:
200kpps (The AK-04 is needed.)
Maximum number of output pulses:
200kpps (The JM-08 is needed.)

* The 24-VDC power supply connected to the AK-4 must be shared with the PIO interface.
* Keep the length of the cable connecting the pulse output unit (PLC) and AK-04/JM-08 as short as possible.
Also keep the cable between the AK-04/JM-08 and **PULSE connector to 2m or less**.



Note

Use the same power supply for open collector input/output to/from the host and for the AK-04, JM-08.

Command Pulse Input Patterns

Command pulse train pattern		Input terminal	Forward	Reverse
Negative logic	Forward pulse-train	PP·/PP		
	Reverse pulse-train	NP·/NP		
	A forward pulse-train indicates the amount of motor rotation in the forward direction, while a reverse pulse-train indicates the amount of motor rotation in the reverse direction.			
	Pulse-train	PP·/PP		
	Sign	NP·/NP	Low	High
	The command pulse is used for the amount of motor rotation, while the sign indicates the rotating direction.			
	Phase A/B pulse-train	PP·/PP		
		NP·/NP		
	Command phases A and B having a 90° phase difference (multiplier is 4) indicate the amount of rotation and the rotating direction.			
Positive logic	Forward pulse train	PP·/PP		
	Reverse pulse-train	NP·/NP		
	Pulse-train	PP·/PP		
	Sign	NP·/NP	High	Low
	Phase A/B pulse-train	PP·/PP		
		NP·/NP		

Specification Table

Item	Specification	
Applicable motor capacity	Less than 400W	400W or more
Connected actuator	RCS2/RCS3 series actuator/single-axis robot/linear servo actuator	
Number of controlled axes	1 axis	
Operation method	Positioner type/pulse-train type	
Number of positioning points	512 points (PIO specification), 768 points (fieldbus specification)	
Backup memory	Nonvolatile memory (FRAM)	
I/O connector	40-pin connector	
Number of I/O points	16 input points/16 output points	
I/O power supply	Externally supplied 24VDC±10%	
Serial communication	RS485 1ch	
Peripherals communication cable	CB-PAC-PIO□□□	
Command pulse-train input method (Note 1)	Differential line driver output supported	
Maximum input pulse frequency	Differential line driver method: 2.5Mpps max./Open-collector method (pulse converter used): 200kpps max.	
Position detection method	Incremental encoder/absolute encoder	
Emergency stop function	Available (built-in relay)	
Forced electromagnetic brake release	Brake release switch ON/OFF	
Input power supply	Single-phase AC90V to AC126.5V Single-phase AC180V to AC253V	Single-phase AC180V to AC253V
Power-supply capacity (Note 2)	20W/74VA 30W (other than RS)/94VA 30W (RS)/186VA 60W/186VA 100W/282VA 150W/376VA 200W/469VA	100W (LSA-N10)(*)/331VA 200W (LSA-S10H, N15S)(*)/534VA 200W (LSA-N15H)(*)/821VA 300W (LSA-N19)(*)/710VA 400W/968VA 600W/1212VA 750W/1569VA
Vibration resistance	XYZ directions – 10 to 57Hz: Single amplitude 0.035mm (continuous), 0.075mm (intermittent) 58 to 150Hz: 4.9 m/s² (continuous), 9.8 m/s² (intermittent)	
Ambient operating temperature	0 ~ 40°C	
Ambient operating humidity	85%RH or less (non-condensing)	
Operating ambience	Not exposed to corrosive gases	
Protection degree	IP20	
Mass	Approx. 900g (+ 25g for the absolute specification)	Approx. 1.2kg (+ 25g for the absolute specification)
External dimensions	58mm (W) x 194mm (H) x 121mm (D)	72mm (W) x 194mm (H) x 121mm (D)

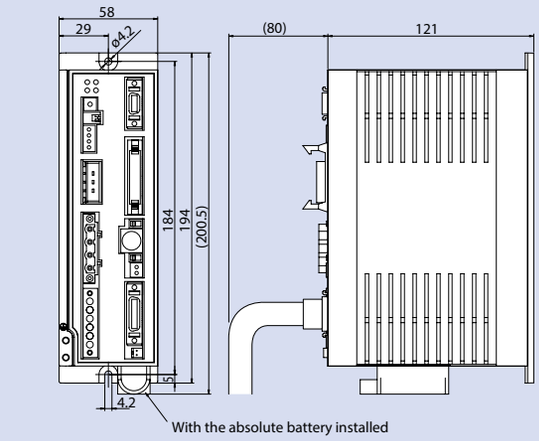
(Note 1) For the command pulse input method, use the differential line driver method resistant to noise. If the open-collector method must be used, use the optional pulse converter (AK-04/JM-08) to convert open-collector pulses to differential pulses.
(Note 2) Controllers operating any of the actuator models denoted by (*) shall conform to the external dimensions of controllers for 400 W or more, even when the output is less than 400W.

* The number of encoder pulses for the ROBO Cylinders operable with SCON-CA are:
RCS2-SRA7BD/SRGS7BD/SRGD7BD — 3072 pulses
RCS2-□□5N — 1600 pulses
other models —16384 pulses.

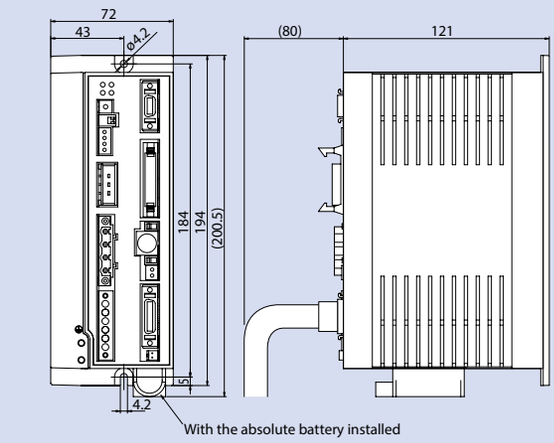
SCON-CA Controller

External dimensions

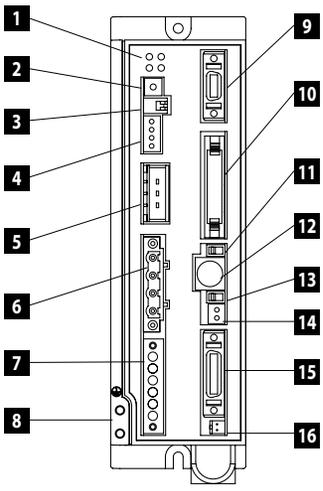
Less than 400W

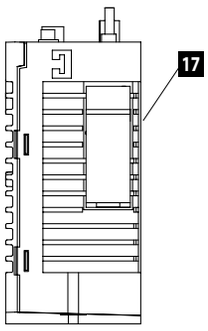


400W or more



Name of Each Part





1 LED display

These LED colors indicate the condition of the controller.

Name	Color	Explanation
PWR	Green	Lit when the system is ready (after power is ON CPU normal functions)
SV	Green	Lit when servo is ON
ALM	Orange	Lit during an alarm
EMG	Red	Lit during an emergency stop

2 Rotary switch

This is the address setting switch for identifying each controller when they are linked.

3 Piano switch

Controller system switch.

Name	Explanation
1	Operating mode switch OFF: positioner mode ON: pulse train control mode *Enabled at power ON.
2	Remote update switch (normally set to OFF) OFF: normal operating mode ON: update mode *Enabled when power is ON or during soft reset.

4 System I/O connector

Connector for the emergency stop switch etc.

5 Regeneration unit connector

Connector for resistance unit that absorbs regeneration current produced when the actuator decelerates to a stop.

6 Motor connector (X-SEL, ECON, RCS compatible)

Actuator motor cable connector.

7 Power supply connector

AC power connector. Divided into the control power input and motor power input.

8 Grounding screw

Protective grounding screw. Always ground this screw.

9 Pulse train control connector

This connector is used during pulse train control mode operations. It is disconnected during operations in positioner mode.

10 PIO connector

Connector for the cable for parallel communications with the PLC and other peripheral devices.

11 Operating mode switch

Name	Explanation
MANU	Do not receive PIO commands
AUTO	Accept PIO commands

*The emergency stop switch on the teaching pendant becomes effective when the line is connected, regardless of whether this switch is set to AUTO or MANU. Take note that an emergency stop will be actuated momentarily when the teaching-pendant or SIO communication cable is disconnected. This is a normal phenomenon and does not indicate an error.

12 SIO connector

Connector for the teaching pendant or PC communications cable.

13 Brake release switch

This is the electromagnetic brake forced release switch, integrated with the actuator.

*It is necessary to connect the DC 24V power for the brake drive.

14 Brake power connector

Brake power DC 24V supply connector (only required when the brake equipped actuator is connected)

15 Encoder sensor connector (X-SEL-P/Q compatible)

Encoder sensor cable connector

16 Absolute battery connector

Connector for the absolute data backup battery. (Required only for absolute encoder specifications)

17 Absolute battery holder

Battery holder for installing the absolute data backup battery

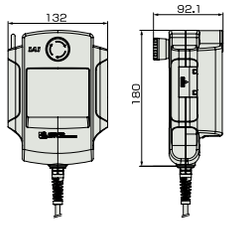
Options

Teaching Pendant

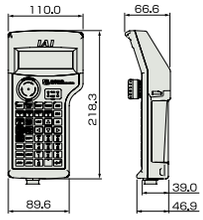
Features This teaching device offers position input, test operation, monitoring and other functions.

Model
CON-PTA-C (Standard type)
CON-PDA-C (Deadman switch type)
CON-PGAS-C-S (Safety-category compliant type)
CON-T (Standard type)
CON-TGS (Safety-category compliant type)

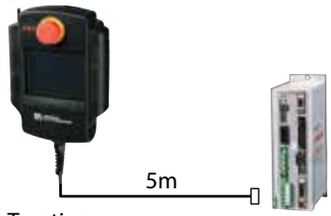
CON-PTA-C-ENG



CON-T-ENG



Configuration



CON-T options

- Wall-mounting hook
  Model: **HK-1**

- Strap
  Model: **STR-1**

Specification

Item	Touch panel teaching			Teaching pendant
Model	CON-PTA-C-ENG	CON-PDA-C-ENG	CON-PGAS-C-S-ENG	CON-T-ENG
Type	Standard	Deadman switch	Safety-category compliant	Standard
Display	65,536 colors (16 bit color) White LED backlight			20 characters x 4 lines LCD display
Ambient operating temperature/humidity	Temperature 0 to 40°C, humidity 85%RH or less (Non-condensing)			
Protection degree	IP40			IP54
Mass	Approx. 570g	Approx. 600g		Approx. 400g
Cable length	5m			
Accessories	Touch pen	Touch pen	Touch pen TP adapter (model: RCB-LB-TG) dummy plug (model: DP-4) controller connector cable (model: CB-CON-LB005)	—

PC Software (Windows Only)

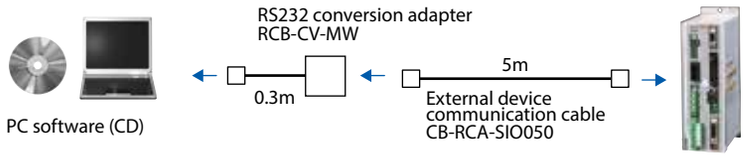
Features This startup support software provides functions to input positions, perform test operations and monitor data, among others.
Incorporating all functions needed to make adjustments, this software helps shorten the initial startup time.

Supported Windows OS:
2000 SP4 or later / XP SP2 or later / Vista / 7

Model number **RCM-101-MW** (With external device communication cable + RS232 conversion unit)

Configuration

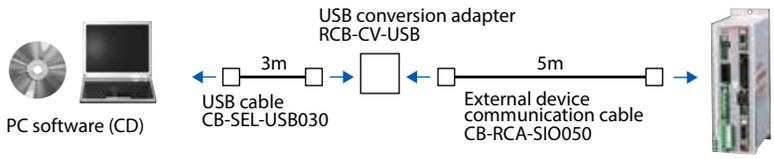
Offboard tuning is supported only in Ver. 8.05.00.00 or later.



Model number **RCM-101-USB** (With external device communication cable + USB adapter + USB cable)

Configuration

Offboard tuning is supported only in Ver. 8.05.00.00 or later.



Regenerative Resistor Unit

Features This unit converts regenerative current that generates when the motor decelerates, to heat. Check the total wattage of the actuators to be operated and provide a regenerative resistance unit or units if required.

Model
RESU-2 (Standard specification)
RESUD-2 (DIN rail mount specification)
RESU-1 (Standard specification, second or subsequent unit)
RESUD-1 (DIN rail mount specification, second or subsequent unit)

* If two regenerative units are required, arrange one RESU-2/ RESUD-2 (1st) and one RESU-1/ RESUD-1 (2nd or after).

Guide for Required Quantity

	Horizontal	Vertical
0 unit	~ 100W	~ 100W
1 unit	~ 400W	~ 400W
2 units	~ 750W	~ 750W

* The required regenerative resistance may be more than as specified above depending on the operating conditions.

Guide for Required Quantity (RCS2-RA13R only)

	Lead 2.5	Lead 1.25
Horizontal	1 unit	0 unit
Vertical	1 unit	1 unit

* The required regenerative resistance may be more than as specified above depending on the operating conditions.

To operate the linear servo actuator LSA/LSAS-N10S☐ with SCON controller, one regenerative resistance is required.

Absolute Data Backup Battery

Features Absolute data backup battery used when an actuator of absolute specification is operated.

Model number **AB-5**

* Please see MSCON section page 662 for specification information and drawings.

Spare Parts

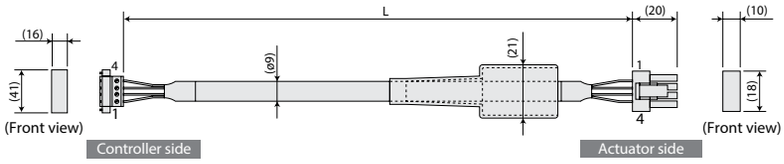
When you need spare parts after purchasing the product, such as when replacing a cable, refer to the list of models below.

Motor Cable/Motor Robot Cable

Model **CB-RCC-MA □□□/CB-RCC-MA □□□-RB**

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m

Min. bend radius r = 50 mm or larger
(when movable type is used)
* Only the robot cable is to be used in a cable track.



Wire	Color	Signal	Pin No.
0.75sq	Green	PE	1
	Red	U	2
	White	V	3
	Black	W	4

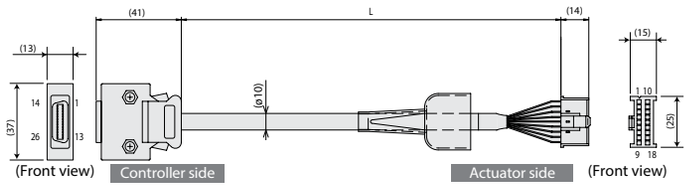
Pin No.	Signal	Color	Wire
1	U	Red	0.75sq (crimped)
2	V	White	
3	W	Black	
4	PE	Green	

Encoder Cable/Encoder Robot Cable

Model **CB-RCS2-PA □□□/CB-X3-PA □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m

Min. bend radius r = 50 mm or larger
(when movable type is used)
* Only robot cable is to be used in a cable track.



Wire	Color	Signal	Pin No.
AWG26 (soldered)	–	–	10
	–	–	11
	–	E24V	12
	Gray/White	0V	13
	Brown/White	LS	26
	–	CREEP	25
	–	OT	24
	–	RSV	23
	–	–	9
	–	–	18
	–	–	19
	Pink	A+	1
	Purple	A–	2
	White	B+	3
	Blue/red	B–	4
	Orange/White	Z+	5
	Green/White	Z–	6
	Blue	SRD+	7
	Orange	SRD-	8
	Black	BAT+	14
	Yellow	BAT–	15
	Green	VCC	16
	Brown	GND	17
	Gray	BKR-	20
	Red	BKR+	21
	–	–	22

Note 4 · Note 1

Pin No.	Signal	Color	Wire
1	A	Pink	AWG26 (crimped)
2	A	Purple	
3	B	White	
4	B	Blue/red	
5	Z	Orange/White	
6	Z	Green/White	
7	LS+	Brown/White	
8	–	–	
9	FG	Ground	
10	SD	Blue	
11	SD	Orange	
12	BAT+	Black	
13	BAT–	Yellow	
14	VCC	Green	
15	GND	Brown	
16	LS-	Gray/White	
17	BK–	Gray	
18	BK+	Red	

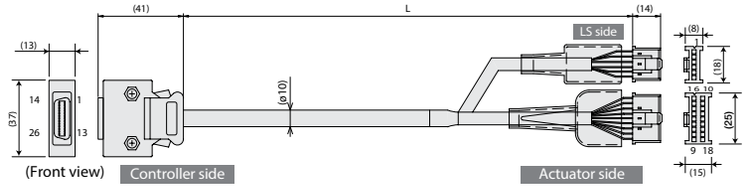
The shield is connected to the hood by a clamp. Note 3
Ground wire and braided shield Note 2

Encoder Cable/Encoder Robot Cable for RCS2-RT6/RT6R/RT7/RA13R

Model **CB-RCS2-PLA□□□ / CB-X2-PLA□□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m

Min. bend radius r = 50 mm or larger
(when movable type is used)
*Only the robot cable is to be used in a cable track.



Wire	Color	Signal	Pin No.
AWG26 (soldered)	–	–	10
	–	–	11
	White/Orange	E24V	12
	White/Green	0V	13
	Brown/Blue	LS	26
	Brown/Yellow	CREEP	25
	Brown/Red	OT	24
	Brown/Black	RSV	23
	–	–	9
	–	–	18
	–	–	19
	White/Blue	A+	1
	White/Yellow	A–	2
	White/Red	B+	3
	White/Black	B–	4
	White/Purple	Z+	5
	White/Gray	Z–	6
	Orange	SRD+	7
	Green	SRD–	8
	Purple	BAT+	14
	Gray	BAT–	15
	Red	VCC	16
	Black	GND	17
	Blue	BKR–	20
	Yellow	BKR+	21
	–	–	22

Pin No.	Signal	Color	Wire
1	E24V	White/Orange	AWG26 (crimped)
2	0V	White/Green	
3	LS	Brown/Blue	
4	CREEP	Brown/Yellow	
5	OT	Brown/Red	
6	RSV	Brown/Black	

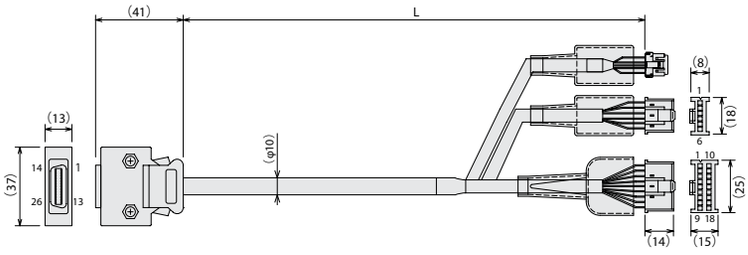
Pin No.	Signal	Color	Wire
1	A	White/Blue	AWG26 (crimped)
2	A	White/Yellow	
3	B	White/Red	
4	B	White/Black	
5	Z	White/Purple	
6	Z	White/Gray	
7	–	–	
8	–	–	
9	FG	Ground	
10	SD	Orange	
11	SD	Green	
12	BAT+	Purple	
13	BAT–	Gray	
14	VCC	Red	
15	GND	Black	
16	–	–	
17	BK–	Blue	
18	BK+	Yellow	

The shield is connected to the hood by a clamp.
Ground wire and braided shield
(The wire color "White/Blue" indicates the colors of the band and insulation.)

Encoder cable/ Encoder Robot Cable for RCS2-RA13R Load Cell Specification

Model **CB-RCS2-PLLA □□□ / CB-RCS2-PLLA □□□-RB**

* Enter the cable length (L) into □□□. Compatible to a maximum of 30meters. Ex.: 080 = 8m



Wiring	Signal	No.
	—	
	E24V	12
	0V	13
	LS	26
	CREEP	25
	OT	24
	RSV	23
	LC SRD+	9
	LC SRD–	10
	LC VCC	18
	LC GND	19
AWG26 (soldered)	A+	1
	A–	2
	B+	3
	B–	4
	Z+	5
	Z–	6
	SRD+	7
	SRD–	8
	BAT+	14
	BAT–	15
	VCC	16
	GND	17
	BKR–	20
	BKR+	21
	—	22

The shield is connected to the hood by a clamp.

No.	Signal	Wiring
1	SGA	AWG26 (crimped)
2	SGB	
3	VIN	
4	GND	
5	FG	

No.	Signal	Wiring
1	E24V	AWG26 (crimped)
2	0V	
3	LS	
4	CREEP	
5	OT	
6	RSV	

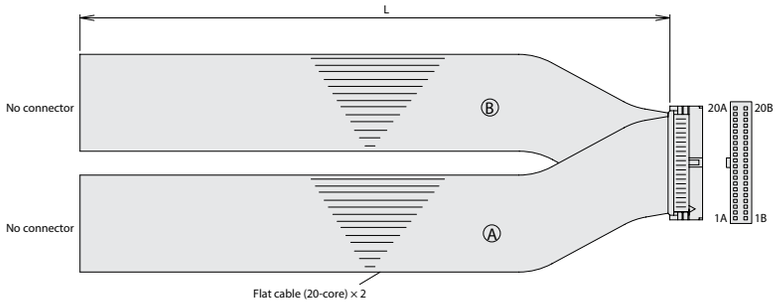
No.	Signal	Wiring
1	A	AWG26 (crimped)
2	A	
3	B	
4	B	
5	Z	
6	Z	
7	—	
8	—	
9	FG	
10	SD	
11	SD	
12	BAT+	
13	BAT–	
14	VCC	
15	GND	
16	—	
17	BK–	
18	BK+	

Ground wire and braided shield

I/O Flat Cable

Model **CB-PAC-PIO □□□**

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



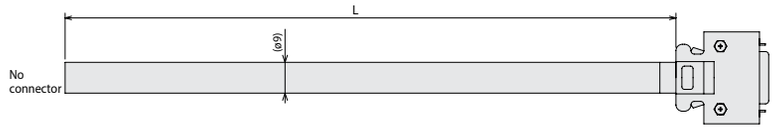
HIF6-40D-1. 27R

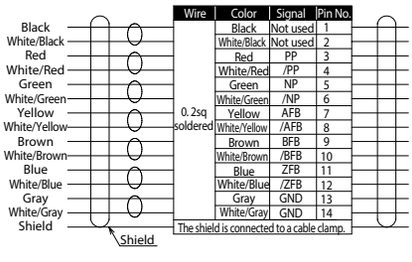
Pin No.	Signal	Color	Wire	Pin No.	Signal	Color	Wire
1A	24V	Brown-1	Flat cable Ⓐ (crimped)	1B	OUT0	Brown-3	Flat cable Ⓑ (crimped) AWG28
2A	24V	Red-1		2B	OUT1	Red-3	
3A	–	Orange-1		3B	OUT2	Orange-3	
4A	–	Yellow-1		4B	OUT3	Yellow-3	
5A	IN0	Green-1		5B	OUT4	Green-3	
6A	IN1	Blue-1		6B	OUT5	Blue-3	
7A	IN2	Purple-1		7B	OUT6	Purple-3	
8A	IN3	Gray-1		8B	OUT7	Gray-3	
9A	IN4	White-1		9B	OUT8	White-3	
10A	IN5	Black-1		10B	OUT9	Black-3	
11A	IN6	Brown-2		11B	OUT10	Brown-4	
12A	IN7	Red-2		12B	OUT11	Red-4	
13A	IN8	Orange-2		13B	OUT12	Orange-4	
14A	IN9	Yellow-2		14B	OUT13	Yellow-4	
15A	IN10	Green-2		15B	OUT14	Green-4	
16A	IN11	Blue-2		16B	OUT15	Blue-4	
17A	IN12	Purple-2		17B	–	Purple-4	
18A	IN13	Gray-2		18B	–	Gray-4	
19A	IN14	White-2		19B	0V	White-4	
20A	IN15	Black-2		20B	0V	Black-4	

SCON Pulse-Train Control Cable

Model **CB-SC-PIOS □□□**

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





Wire	Color	Signal	Pin No.
0.2sq soldered	Black	Not used	1
	White/Black	Not used	2
	Red	PP	3
	White/Red	/PP	4
	Green	NP	5
	White/Green	/NP	6
	Yellow	AFB	7
	White/Yellow	/AFB	8
	Brown	BFB	9
	White/Brown	/BFB	10
	Blue	ZFB	11
	White/Blue	/ZFB	12
	Gray	GND	13
	White/Gray	GND	14

MSCON

ROBO Cylinder Position Controller
SCON Series, 6-axis Type

Features

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

Six RCS2/RCS3 (SCON-CA) controllers 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, CompoNet, EtherCAT(*) and EtherNet/IP.

Features of Network Specification

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

DeviceNet™
PROFIBUS®
CompoNet™
CC-Link
EtherNet/IP™
EtherCAT®
(Available soon)

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. Also, servo tuning would be done at the same time. (See page A-98 for the details.)

4 Vibration control function for shorter cycle time

The vibration control function has been added to prevent the work part 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.

Pulse Motor
Servo Motor (24V)
Servo Motor (200V)
Linear Servo Motor

Model List/Standard Price

Model			MSCON-C					
External view								
I/O type			DeviceNet connection specification	CC-Link connection specification	PROFIBUS-DP connection specification	CompoNet connection specification	EtherCAT connection specification (Note)	EtherNet/IP connection specification
I/O type model code			DV	CC	PR	CN	EC	EP
	Number of axes	Encoder	Standard price					
Standard price	1 axis	Incremental	—	—	—	—	—	—
		Absolute	—	—	—	—	—	—
	2 axes	Incremental	—	—	—	—	—	—
		Absolute	—	—	—	—	—	—
	3 axes	Incremental	—	—	—	—	—	—
		Absolute	—	—	—	—	—	—
	4 axes	Incremental	—	—	—	—	—	—
		Absolute	—	—	—	—	—	—
	5 axes	Incremental	—	—	—	—	—	—
		Absolute	—	—	—	—	—	—
	6 axes	Incremental	—	—	—	—	—	—
		Absolute	—	—	—	—	—	—

Available soon (Note)

Model Description

MSCON series – C – Type – [ ] Number of axes – [ ] Motor – [ ] Encoder (Specs for 1st axis) – [ ] Option – ([ ] Motor – [ ] Encoder – [ ] Option (Specs for axis 2 - 6)) – [ ] I/O type – 0 I/O cable length – [ ] Power/voltage

Number of axes	
1	Single-axis model
2	2-axis model
3	3-axis model
4	4-axis model
5	5-axis model
6	6-axis model

Motor	
12	12W servo motor
20	20W servo motor
30D	30W servo motor
30R	30W servo motor (RS series)
60	60W servo motor
100	100W servo motor
150	150W servo motor
200	200W servo motor

Encoder	
I	Incremental
A	Absolute

* Encoder types may be specified as either absolute or incremental on each axis.

Option	
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
EC	EtherCAT connection specification
EP	EtherNet/IP connection specification

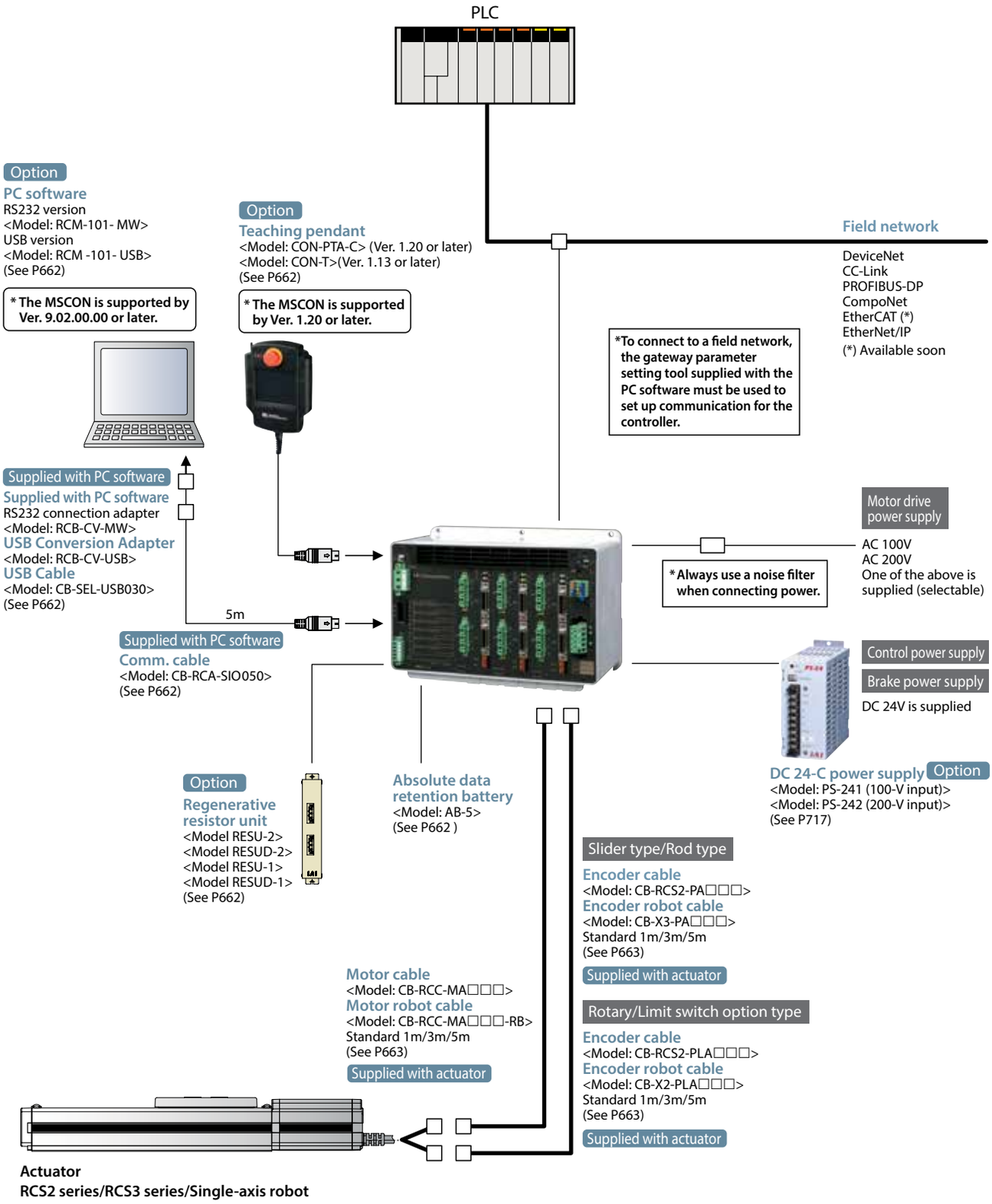
(Note) EC specifications will be available soon.

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	AC100V
2	AC200V

System Configuration



Actuator
RCS2 series/RCS3 series/Single-axis robot

Note	Take note that the following models are not supported by the MSCON: All linear servo actuator models, RCS2-RN5N/RP5N/GS5N/GD5N/SD5N/TCA5N/TWA5N/TFA5N/SRA7BD/SRGS7BD/SRGD7BD, NS-SXM□/SZM□ (both incremental specifications only)

Operation Mode

When the MSCON is controlled via a field network, one of the following seven operation modes can be used. The necessary data areas on the PLC side vary depending on the mode, so please consult the MSCON controller manual or contact IAI before use.

Mode	Description
Simple direct input mode	The target position is specified by directly entering a value, while other operating conditions (speed, acceleration, etc.) are set by specifying the desired position number corresponding to the desired operating conditions already input to the position data table.
Positioner 1 mode	The target position, speed, acceleration/deceleration, etc., are input to the position data table of the controller and input position numbers are specified to operate the actuator (maximum 256 points). The current position can be read, as well.
Direct input mode	The actuator is operated by specifying the target position, speed, acceleration/deceleration, push current control value, etc., by directly entering values. The current position, current speed, command current, etc., can also be read.
Direct input mode 2	Same as the direct input mode, except that the jog operation is not supported and vibration control is added.
Positioner 2 mode	Same as the positioner 1 mode, except that the target position is not specified and reading of current position not supported, in order to reduce the amount of data to be transmitted/received.
Positioner 3 mode	Same as the positioner 2 mode, with the amount of data to be transmitted/received reduced further to allow for actuator operation with minimum input/output signals.
Remote I/O mode (*)	In this mode, the actuator is operated by controlling the ON/OFF of bits via the network, just like with the PIO specification. The number of positioning points and functions vary with each of the operation patterns (PIO patterns) that can be set by the controller's parameter.

(*) Take note that if the remote I/O mode is selected, all axes will operate in the remote I/O mode.
(*) With CompoNet, either positoner 3 mode or remote I/O mode can be selected.

List of Functions for Operation Mode

	Simple direct input mode	Positioner 1 mode	Direct input mode	Direct input mode 2	Positioner 2 mode	Positioner 3 mode
Number of positions	Unlimited	256 points	Unlimited	Unlimited	256 points	256 points
Home return operation	○	○	○	○	○	○
Positioning operation	○	△	○	○	△	△
Speed & acceleration/ deceleration setting	△	△	○	○	△	△
Pitch feed (inching)	△	△	○	○	△	△
Push-motion operation	△	△	○	○	△	△
Speed change during movement	△	△	○	○	△	△
Pause	○	○	○	○	○	○
Zone signal output	△	△	△	△	△	△
Vibration control	△	△	×	○	△	△
Reading of current value	○	○	○	○	×	×
Selection of PIO pattern	×	×	×	×	×	×

*○indicates that direct setting is possible; △ indicates that position data or parameter must be input; and X indicates that the function is not supported.
(Note 1) PIO pattern is fixed to "8".

	Remote I/O mode				
	Positioning mode	Teaching mode	256-point mode	Solenoid valve mode 1	Solenoid valve mode 2
Number of positions	64 points	64 points	256 points	7 points	3 points
Home return operation	○	○	○	○	×
Positioning operation	△	△	△	△	△
Speed & acceleration/ deceleration setting	△	△	△	△	△
Pitch feed (inching)	△	△	△	△	×
Push-motion operation	△	△	△	△	×
Speed change during movement	△	△	△	△	×
Pause	○	○	○	○	×
Zone signal output	△	△	△	△	△
Vibration control	△	△	△	△	△
Reading of current value	×	×	×	×	×
Selection of PIO pattern	○	○	○	○	○

* ○ indicates that direct setting is possible; △ indicates that position data or parameter must be input; and X indicates that the function is not supported.

Explanation of I/O Signal Functions

The table below explains the functions assigned to the controller's I/O signals.
The controller can be operated by setting the remote I/O mode, selecting one of modes 0 to 5, and then turning each port number ON/OFF via the network.

		Setting of MSCON Parameter No. 25									
		Positioning mode		Teaching mode		256-point mode		Solenoid valve mode 1		Solenoid valve mode 2	
		0		1		2		4		5	
Classification	Port No.	Code	Signal name	Code	Signal name	Code	Signal name	Code	Signal name	Code	Signal name
PLC output ↓ MSCON input	0	PC1	Command position number	PC1	Command position number	PC1	Command position number	ST0	Start position 0	ST0	Start position 0
	1	PC2		PC2		PC2		ST1	Start position 1	ST1	Start position 1
	2	PC4		PC4		PC4		ST2	Start position 2	ST2	Start position 2
	3	PC8		PC8		PC8		ST3	Start position 3	—	Cannot be used
	4	PC16		PC16		PC16		ST4	Start position 4	—	
	5	PC32		PC32		PC32		ST5	Start position 5	—	
	6	—	Cannot be used	MODE	Teaching mode command	PC64		ST6	Start position 6	—	
	7	—		JISL	Jog/inch switching	PC128		—	Cannot be used	—	
	8	—		JOG+	Jogging in + direction	—	Cannot be used	—		—	
	9	BKRL	Forced brake release	JOG–	Jogging in - direction	BKRL	Forced brake release	BKRL	Forced brake release	BKRL	Forced brake release
	10	—	Cannot be used	—	Cannot be used	—	Cannot be used	—	Cannot be used	—	Cannot be used
	11	HOME	Home return	HOME	Home return	HOME	Home return	HOME	Home return	—	
	12	*STP	Pause	*STP	Pause	*STP	Pause	*STP	Pause	—	
	13	CSTR	Positioning start	CSTR/ PWRT	Positioning start/ position data load command	CSTR	Positioning start	—	Cannot be used	—	
	14	RES	Reset	RES	Reset	RES	Reset	RES	Reset	RES	Reset
	15	SON	Servo ON command	SON	Servo ON command	SON	Servo ON command	SON	Servo ON command	SON	Servo ON command
MSCON output ↓ PLC input	0	PM1	Complete position number	PM1	Complete position number	PM1	Complete position number	PE0	Position complete 0	LS0	Rear end movement command 0
	1	PM2		PM2		PM2		PE1	Position complete 1	LS1	Rear end movement command 1
	2	PM4		PM4		PM4		PE2	Position complete 2	LS2	Rear end movement command 2
	3	PM8		PM8		PM8		PE3	Position complete 3	—	Cannot be used
	4	PM16		PM16		PM16		PE4	Position complete 4	—	
	5	PM32		PM32		PM32		PE5	Position complete 5	—	
	6	MOVE	Moving signal	MOVE	Moving signal	PM64		PE6	Position complete 6	—	
	7	ZONE1	Zone 1	MODES	Teaching mode signal	PM128		ZONE1	ZONE1	ZONE1	ZONE1
	8	PZONE/ ZONE2	Position zone/ Zone 2	PZONE/ ZONE1	Position zone/ Zone 1	PZONE/ ZONE1	Position zone	PZONE/ ZONE2	Position zone/ Zone 2	PZONE/ ZONE2	Position zone/ Zone 2
	9	—	Cannot be used	—	Cannot be used	—	Cannot be used	—	Cannot be used	—	Cannot be used
	10	HEND	Home return complete	HEND	Home return complete	HEND	Home return complete	HEND	Home return complete	HEND	Home return complete
	11	PEND	Positioning complete signal	PEND/ WEND	Positioning complete signal/position data load complete	PEND	Positioning complete signal	PEND	Positioning complete signal	—	Cannot be used
	12	SV	Ready	SV	Ready	SV	Ready	SV	Ready	SV	Ready
	13	*EMGS	Emergency stop	*EMGS	Emergency stop	*EMGS	Emergency stop	*EMGS	Emergency stop	*EMGS	Emergency stop
	14	*ALM	Alarm	*ALM	Alarm	*ALM	Alarm	*ALM	Alarm	*ALM	Alarm
	15	*BALM	Absolute battery voltage low warning	*BALM	Absolute battery voltage low warning	*BALM	Absolute battery voltage low warning	*BALM	Absolute battery voltage low warning	*BALM	Absolute battery voltage low warning

In the table above, * accompanying each code indicates a negative logic signal.

List of Base Controller Specifications

Item		Specification
Number of controlled axes		1 to 6 axes
Control power-supply voltage		DC 24V ± 10%
Control power-supply current consumption		2.4A max.
Control power-supply rush current (Note 1)		7A max., 5msec or less
Drive (motor) power-supply voltage	Drive power-supply voltage AC 100 V specification	AC100 to 115V ± 10%
	Drive power-supply voltage AC 200 V specification	AC200 to 230V ± 10%
Drive (motor) power-supply rush current (Note 1)	Drive power-supply voltage AC 100 V specification	20A, 10A max. within 80msec (Drive power-supply voltage 100V 25°C ambience) 45A, 10A max. within 80msec (Drive power-supply voltage 115V x 10%, 40°C ambience)
	Drive power-supply voltage AC 200 V specification	45A, 10A max. within 40msec (Drive power-supply voltage 200V 25°C ambience) 95A, 10A max. within 40msec (Drive power-supply voltage 230V x 10%, 40°C ambience)
Connectable actuator motor capacity	Drive power-supply voltage AC 100 V specification	200W max. per axis (Total of 6 axes limited to 450W)
	Drive power-supply voltage AC 200 V specification	200W max. per axis (Total of 6 axes limited to 900W)
Electromagnetic brake power-supply voltage (when actuator with brake is connected)		DC 24 V ± 10%
Brake power-supply current		1A max. per axis (0.5A per axis in steady state)
Brake power-supply rush current (Note 1)		10A max., 10msec or less
Leak current (Note 2)		3.5 mA (motor power supply) ◉ No leak current from the control power supply or brake power supply
Motor control method		Sinusoidal PWM vector current control
Applicable encoder		Incremental serial encoder Absolute serial encoder
Serial communication (SIO port: Teaching only)		RS485: 1 channel (conforming to Modbus protocol) / Speed: 9.6 to 230.4 kbps
External interface		DeviceNet, CC-Link, PROFIBUS-DP, CompoNet, MECHATROLINKII (*), EtherNet/IP, EtherCAT (*) Specifications supporting the interfaces denoted by (*) will be available soon.
Data setting/input method		PC software, touch panel teaching, gateway parameter setting tool
Data retention memory		Saving of position data and parameters to nonvolatile memory (Memory can be rewritten an unlimited number of times)
Number of positioning points		Max. 256 points (Not limited in the simple direct input mode or direct input mode) Note: The number of positioning points varies depending on the operation mode selected by the parameter.
LED display (installed on the front panel)		Driver status LED x 2 Fieldbus status LED x 2 Gateway status LED x 5 Power-supply status LED x 2
Electromagnetic brake forced release switch (installed on the front panel)		Switched between NOM (standard) and RLS (forced releases)
Protective function		Overload, overcurrent, overvoltage, etc.
Electric shock protection mechanism		Class I
Isolation resistance		DC 500V, 10 MΩ or more
Withstand voltage		AC 1500V for 1 minute
External dimensions		225W×154H×115D
Weight	Incremental specification (When drivers for 6 axes are installed)	Approx. 1,900g
	Absolute specification (When drivers for 6 axes are installed)	Approx. 2,000g
Cooling method		Forced air cooling
Environment	Ambient operating temperature	0 to 40°C
	Ambient operating humidity	85% RH or less (non-condensing)
	Operating ambience	[Refer to 1.7, "Installation and Storage Environment."]
	Protection degree	IP20

Note 1: Take note that the rush current value varies depending on the impedance of the power supply line.
Note 2: Leak current varies depending on the motor capacity to be connected, cable length, and ambient environment. To protect against leak current, measure leak current at locations where the earth leakage breaker is set.
An earth leakage breaker must be selected that serves the specific purpose required, such as fire protection and injury protection.
Use an earth leakage breaker of harmonic wave type (inverter type).

Power Supply Selection

With the MSCON controller, motor driver power (AC 100V/AC 200V) and control power (DC 24V) must be supplied separately. Check the necessary power-supply capacity according to the table below.

■Motor Drive Power-supply Capacity

RS: Rotational shaft

Actuator motor W number	Motor power supply capacity [VA]	Momentary maximum motor power-supply capacity [VA]	Heat output [W]
12	41	123	1.7
20	50	150	2.0
30D (other than RS)	47	141	2.0
30R (RS)	138	414	4.0
60	146	438	4.8
100	238	714	7.0
150	328	984	8.3
200	421	1263	9.2

■Selecting the Circuit Breaker

Select the circuit breaker as follows:

- Three times the rated current will flow through the controller during acceleration/deceleration. (Refer to "Momentary maximum motor power-supply capacity" above).
  Select a circuit breaker that will not trip when this current flows. If the selected circuit breaker trips under this current, select another breaker of the next higher rated current. (Confirm on the operation characteristic curve in the manufacturer's catalog to confirm that the circuit breaker will not trip.)
- Select a circuit breaker that will not trip due to rush current. (Confirm on the operation characteristic curve in the manufacturer's catalog to confirm that the circuit breaker will not trip.)
- Select a rated break current that will break the circuit even when a short-circuit current flows.
  Rated break current > Short-circuit current = Primary power-supply capacity of circuit breaker / Power-supply voltage

Consider allowance when selecting the rated current of circuit breaker.

<Rated current of circuit breaker>
Total sum of motor power-supply capacities of all actuators connected [VA] / AC input voltage x Safety factor (Rough guide: 1.2 to 1.3)

■ Control Power-supply (DC 24-V) Capacity

Calculate the DC 24-V power-supply capacity as follows:

(1) Current consumption of control power supply: Select the applicable control power-supply current shown in the table below --- ①

Number of controlled axes (Note 1)	1 axis	2 axes	3 axes	4 axes	5 axes	6 axes
Heat generation from control power supply [W]	25.5	31.5	38.2	44.2	50.9	56.9
Control power-supply current [A]	1.1	1.3	1.6	1.8	2.1	2.4

(Note 1): Check the maximum number of controlled axes that can be connected to the MSCON. This information is available on the manufacturer's nameplate. MSCON-C-*-…: * represents the maximum number of axes that can be connected.

(2) Current consumption of brake power supply: 1 A or 0.5 A (Note 2) x Number of actuators with brakes --- ②

(Note 2): When the brake is released, up to 1 A of current will flow per actuator for a period of approx. 100 ms. If this maximum current can be accommodated by the DC 24-V power supply used which is capable of handling momentary load fluctuation at the time of peak load, etc., calculate at 0.5 A/unit. If not, calculate at 1 A/unit.

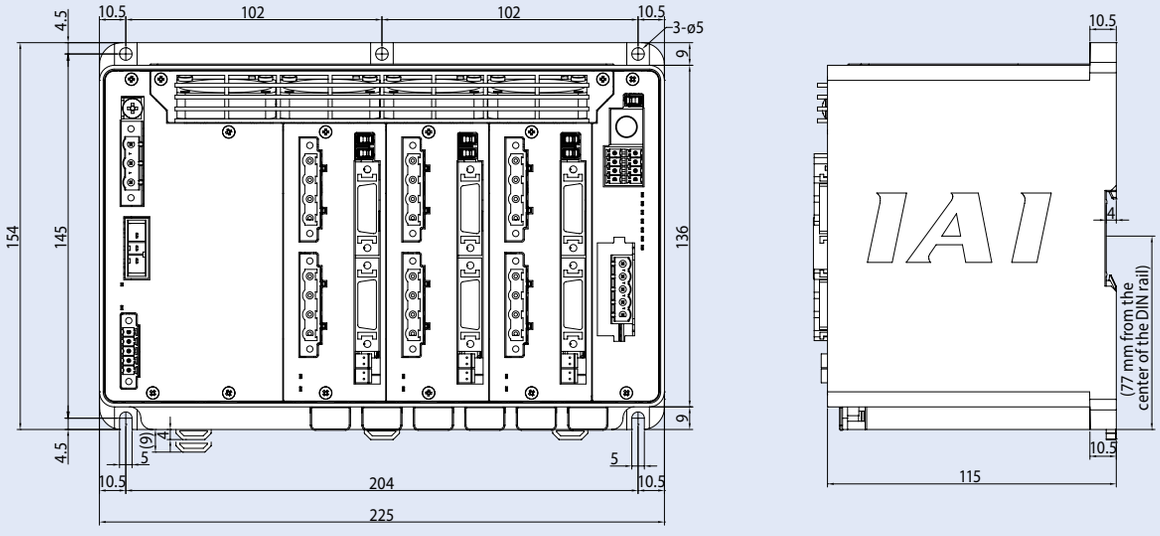
(3) Rush current of control power supply: 7 A/ --- ③

[Selection of power supply]

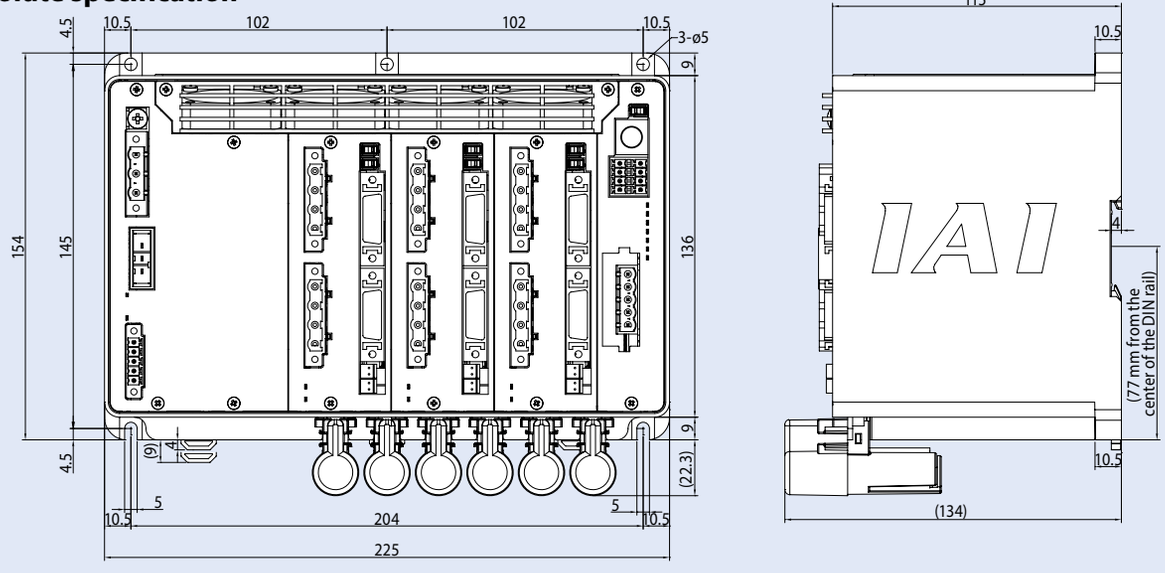
Normally a power supply whose rated current is approx. 1.3 times is selected by considering approx. 30% of allowance on top of the load current of ① + ② above. Since the current of ③ will flow for a short period, select a power supply of the "peak load accommodation" specification or having enough allowance. If the selected power supply has no allowance, voltage may drop momentarily. In particular, pay attention to the power supply with remote sensing function.

External Dimensions

Incremental specification



Absolute specification



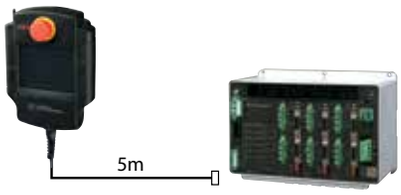
Options

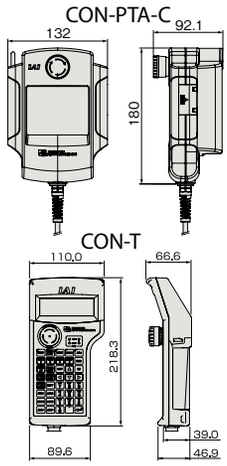
Teaching Pendant

Features: Teaching device offering position input, test operation, monitoring and other functions.

Model: **CON-PTA-C** (Touch panel teaching)
CON-T (Standard type)

Configuration





Specification

Item	Content	
Model	CON-PTA-C-ENG	CON-T-ENG
Data input	○	○
Actuator operation	○	○
Ambient operating temperature/humidity	Temperature 0 to 40°C, humidity 85%RH or less (Non-condensing	
Operating ambience	Free from corrosive gases or significant powder dust.	
Protection degree	IP40	IP54
Weight	Approx. 570g	Approx. 400g
Cable length	5m	
Display	65,536 colors White LED backlight	20 characters x 4 lines LCD display
Standard price	—	—

PC Software (Windows dedicated)

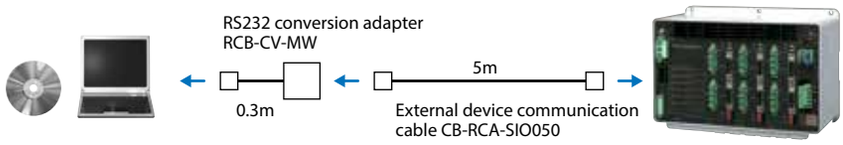
Supported Windows OS:
2000 SP4 or later / XP SP2 or later / Vista / 7

Features: This startup support software provides functions to input positions, perform test operations and monitor data, among others. Incorporating all functions needed to make adjustments, this software helps shorten the initial startup time.

Model: **RCM-101-MW** (With external device communication cable + RS232 conversion unit)

Configuration

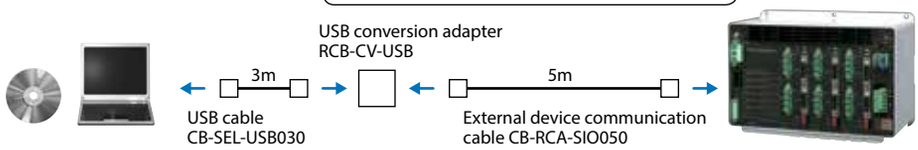
The MSCON is supported by Ver. 9.02.00.00 or later.



Model: **RCM-101-USB** (With external device communication cable + USB conversion adapter + USB cable)

Configuration

The MSCON is supported by Ver. 9.02.00.00 or later.



Regenerative Resistor Unit

Features: This unit converts regenerative current that generates when the motor decelerates, to heat. Check the total wattage of the actuators to be operated and provide a regenerative resistance unit or units if required.

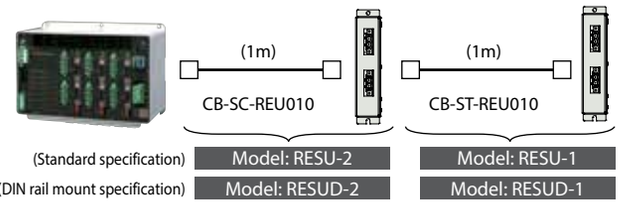
Model: **RESU-2** (Standard specification)
RESUD-2 (DIN rail mount specification)
RESU-1 (Standard specification, second or subsequent unit)
RESUD-1 (DIN rail mount specification, second or subsequent unit)

* If two regenerative units are required, arrange one RESU-2/ RESUD-2 (1st) and one RESU-1/ RESUD-1 (2nd or after).

Specification

Model	RESU-2	RESUD-2	RESU-1	RESUD-1
Connected to	MSCON controller		RESU-2/RESUD-2	
Supplied cable	CB-SC-REU010		CB-ST-REU010	
Unit installation method	Screw mount	DIN rail mount	Screw mount	DIN rail mount
Main unit weight	Approx. 0.4kg			
Built-in regenerative resistor	220 Ω, 80W			

* The first regenerative resistor unit connected to the MSCON should be the RESU-2/RESUD-2.
The regenerative resistor unit connected to this regenerative resistor unit should be the RESU-1/RESUD-1.



Reference Number of Units to Be Connected

Total wattage of 6 motor axes		Number of regenerative resistor units to be connected
Actuators installed horizontally	Actuators installed vertically	
~450	~200	0
~900	~600	1
—	~800	2
—	~900	3

Note:
The numbers of units to be connected are reference values based on the following operating conditions:
[Conditions] Operate the actuator to travel back and forth over 1,000mm at the maximum speed, acceleration/deceleration of 0.3G, rated load, and operation duty of 50%.
Depending on the operating conditions, an error may generate and regenerative resistance greater than the applicable value shown in the table above may be required. In this case, add a regenerative resistor unit or units. Note that only up to four regenerative resistor units can be connected. If five or more units are connected, a failure may occur.

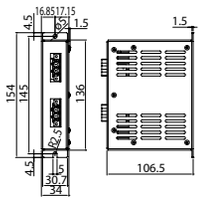
Absolute Data Backup Battery

Features: This is the battery to save the absolute data when the actuator with the absolute specification is operated.

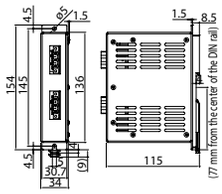
Model: **AB-5** (battery only) /
AB-5-CS (with case)

External dimensional drawing

<RESU-□>



<RESUD-□>



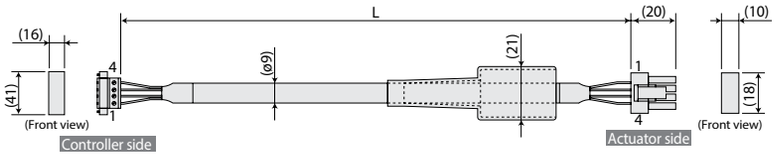
Maintenance Parts

Please refer to the models listed below if a cable needs to be exchanged, etc., after your purchase.

Motor cable/Motor robot cable

Model: **CB-RCC-MA □□□ / CB-RCC-MA □□□ -RB**

* Enter the cable length (L) into □□□. Compatible to a Maximum of 30 meters.
Ex.: 080 = 8m



Wire	Color	Signal	No.
0.75sq	Green	PE	1
	Red	U	2
	White	V	3
	Black	W	4

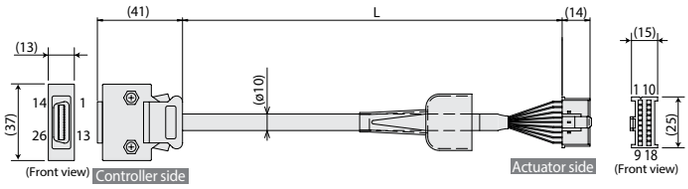
No.	Signal	Color	Wire
1	U	Red	0.75sq (crimped)
2	V	White	
3	W	Black	
4	PE	Green	

Minimum bending R: r = 50 mm or more (when a robot cable is used)
* If the cable must be guided in a cable track, use a robot cable.

Encoder cable / Encoder robot cable

Model: **CB-RCS2-PA □□□ / CB-X3-PA □□□**

* Enter the cable length (L) into □□□. Compatible to a Maximum of 30 meters.
Ex.: 080 = 8m



Wire	Color	Signal	No.
AWG26 (soldered)	–	–	10
	–	–	11
	–	E24V	12
	Gray/white	0V	13
	Brown/white	LS	26
	–	CREEP	25
	–	OT	24
	–	RSV	23
	–	–	9
	–	–	18
	–	–	19
	Pink	A+	1
	Purple	A-	2
	White	B+	3
	Blue/red	B-	4
	Orange/white	Z+	5
	Green/white	Z-	6
	Blue	SRD+	7
	Orange	SRD-	8
	Black	BAT+	14
	Yellow	BAT-	15
	Green	VCC	16
	Brown	GND	17
	Gray	BKR-	20
	Red	BKR+	21
	–	–	22

Note 4
Note 1
The shield is connected to the hood by a clamp.
Note 3
Note 2
Ground wire and braided shield

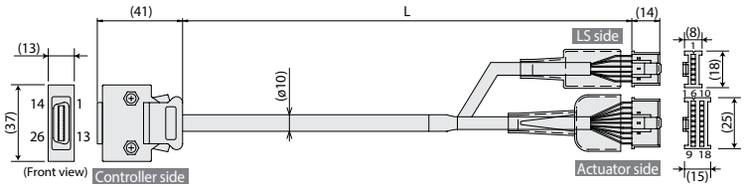
No.	Signal	Color	Wire
1	A	Pink	AWG26 (crimped)
2	A	Purple	
3	B	White	
4	B	Blue/red	
5	Z	Orange/white	
6	Z	Green/white	
7	LS+	Brown/white	
8	–	–	
9	FG	Ground	
10	SD	Blue	
11	SD	Orange	
12	BAT+	Black	
13	BAT-	Yellow	
14	VCC	Green	
15	GND	Brown	
16	LS-	Gray/white	
17	BK-	Gray	
18	BK+	Red	

Minimum bending R: r = 50 mm or more (when a robot cable is used)
* If the cable must be guided in a cable track, use a robot cable.

Encoder cable / Encoder robot cable for RCS2-RT6/RT6R/RT7

Model: **CB-RCS2-PLA □□□ / CB-X2-PLA □□□**

* Enter the cable length (L) into □□□. Compatible to a Maximum of 30 meters.
Ex.: 080 = 8m



Wire	Color	Signal	No.
AWG26 (soldered)	–	–	10
	–	–	11
	White/orange	E24V	12
	White/green	0V	13
	Brown/blue	LS	26
	Brown/yellow	CREEP	25
	Brown/red	OT	24
	Brown/black	RSV	23
	–	–	9
	–	–	18
	–	–	19
	White/blue	A+	1
	White/yellow	A–	2
	White/red	B+	3
	White/black	B–	4
	White/purple	Z+	5
	White/gray	Z–	6
	Orange	SRD+	7
	Green	SRD–	8
	Purple	BAT+	14
	Gray	BAT–	15
	Red	VCC	16
	Black	GND	17
	Blue	BKR–	20
	Yellow	BKR+	21
	–	–	22

The shield is connected to the hood by a clamp.
Ground wire and braided shield

No.	Signal	Color	Wire
1	E24V	White/orange	AWG26 (crimped)
2	0V	White/green	
3	LS	Brown/blue	
4	CREEP	Brown/yellow	
5	OT	Brown/red	
6	RSV	Brown/black	

No.	Signal	Color	Wire
1	A	White/blue	AWG26 (crimped)
2	A	White/yellow	
3	B	White/red	
4	B	White/black	
5	Z	White/purple	
6	Z	White/gray	
7	–	–	
8	–	–	
9	FG	Ground	
10	SD	Orange	
11	SD	Green	
12	BAT+	Purple	
13	BAT–	Gray	
14	VCC	Red	
15	GND	Black	
16	–	–	
17	BK–	Blue	
18	BK+	Yellow	

(The wire color "White/Blue" indicates the colors of the band and insulation.)

Minimum bending R: r = 50 mm or more (when a robot cable is used)
* If the cable must be guided in a cable track, use a robot cable.

MEMO

PSEL

Program controller
For RCP3/RCP2 Series

List of models

Program controller for operating RCP3/RCP2 Series actuators. Various control functions are combined into a single unit.

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 1,500 positioning points are supported. Push-motion operation and teaching operation are also possible.
Position Points		1,500 points	
Standard Price	1 axis	—	
	2 axes	—	

Model

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

PSEL – CS – ☐ – ☐ I ☐ – ☐ I ☐ – ☐ – ☐ – 0 – ☐ – ☐

Series / Type / Number of Axes / Motor / Encoder / Option (Specs for 1st axis) / Motor / Encoder / Option (Specs for 2nd axis) / I/O Type / I/O Cable Length / Power Voltage / Simple absolute unit / High acceleration type model

CS	Standard Type

1	Single-axis model
2	2-axis model

I	Incremental

B	Brake

20P	20☐ pulse motor-compatible
20SP	20☐ pulse motor (RCP3-RA2 high-thrust type only)
28P	28☐ pulse motor-compatible
28SP	28☐ pulse motor (RCP2-RA3C only)
35P	35☐ pulse motor-compatible
42P	42☐ pulse motor-compatible
56P	56☐ pulse motor-compatible

* If connecting to RCP2-RA3C/ RGD3C, the motor type is 28SP.

I	Incremental

B	Brake

20P	20☐ pulse motor-compatible
20SP	20☐ pulse motor (RCP3-RA2 high-thrust type only)
28P	28☐ pulse motor-compatible
28SP	28☐ pulse motor (RCP2-RA3C only)
35P	35☐ pulse motor-compatible
42P	42☐ pulse motor-compatible
56P	56☐ pulse motor-compatible

* If connecting to RCP2-RA3C/ RGD3C, the motor type is 28SP.

NP	PIO NPN (standard)
PN	PIO PNP
DV	DeviceNet
CC	CC-Link
PR	ProfiBus

0	DC24V

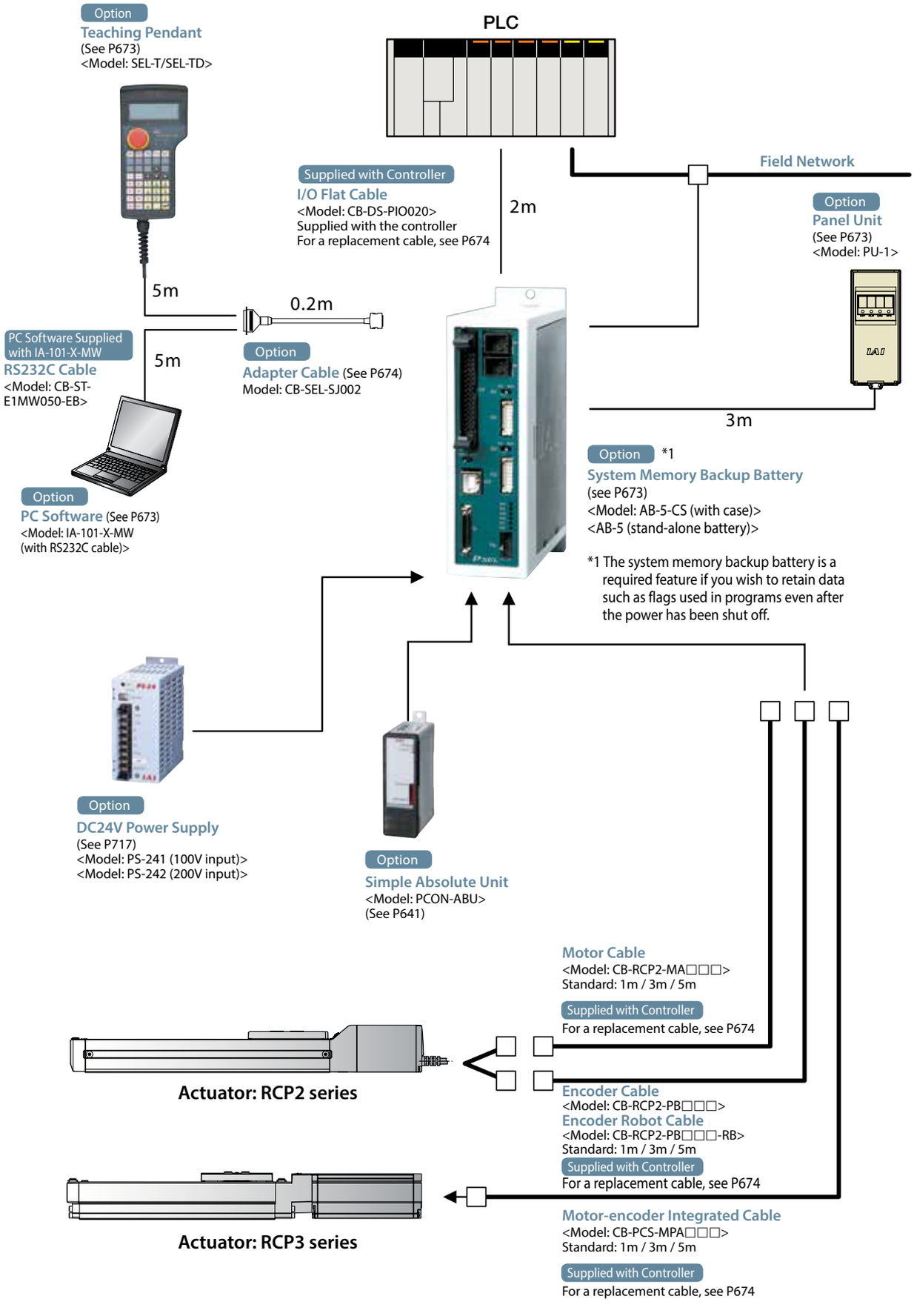
0	No cable
2	2m (standard)
3	3m
5	5m

Blank	Not used
ABU	Used

Blank	Standard
H	High acceleration type model

* If connecting to RCP3-SA4/ SA5/SA6 or RCP2-SA5/SA6, specify "H", for high-acceleration type model.

System Configuration



I/O Specification

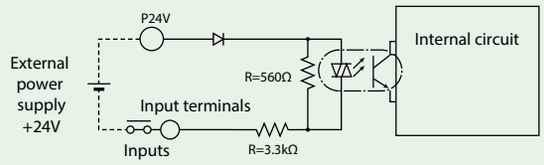
Input section External input specifications

Item	Specifications
Input voltage	DC24V ±10%
Input current	7mA/circuit
ON/OFF voltage	ON voltage (min.) NPN : DC16V / PNP : DC8V OFF voltage (max.) NPN : DC5V / PNP : DC19V
Isolation method	Photocoupler

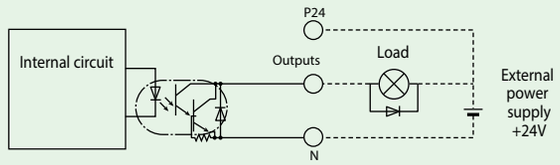
Output section External output specifications

Item	Specifications
Load Voltage	DC24V
Max. load current	100mA / 1 point 400mA / 8 points in total
Residual voltage (Max.)	Max 0.1mA / 1 point
Isolation method	Photocoupler

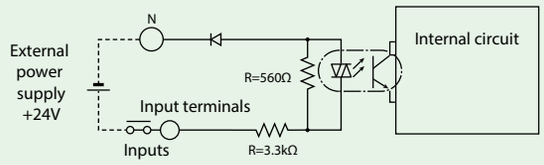
NPN Specifications



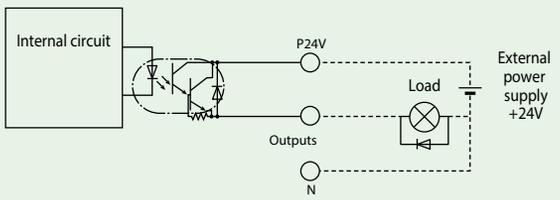
NPN Specifications



PNP Specifications



PNP Specifications



Explanation of I/O Signal Functions

Two modes can be selected for the SSEL controller: "Program Mode," in which the actuator is operated by entering a program, and "Positioner Mode," in which PLC signals are received and the actuator is moved to designated positions. The Positioner Mode has the five input patterns listed below to enable various applications.

Control Function by Type

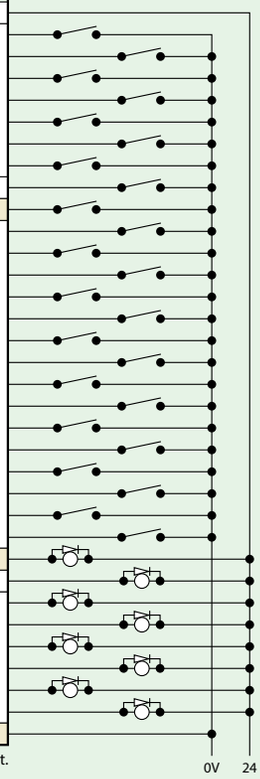
Operation mode		Features
Program mode		Various operations including linear/arc interpolation operation, path operation ideal for coating processes, etc., arch-motion operation and palletizing operation can be performed using the Super SEL language that lets you program complex control actions using simple commands.
Positioner mode	Standard mode	This is the basic mode from which operations can be conducted by designating position numbers and inputting the start signal. Push-motion operation and teaching operation are also possible.
	Product Change mode	Multiple work parts of the same shape with slightly different hole positions can be handled using movement commands to the same position numbers by simply changing the product type number.
	2-axis independent mode	With a 2-axis controller, each axis can be commanded and operated separately.
	Teaching mode	In this mode, the slider (rod) moves based on an external signal, when the actuator is stopped, the current location can be registered as position data.
	DS-S-C1 Compatible mode	If you were using a DS-S-C1 controller, you can replace it with a PSEL controller without having to change the host programs. *This mode does not ensure actuator compatibility.

Explanation of I/O Signal Functions

Program mode

Pin Number	Classification	Port No.	Program Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Select Program No. 1	Selects the program number to start. (Input as BCD values to ports 016 to 022)
2A		017	Select Program No. 2	
2B		018	Select Program No. 4	
3A		019	Select Program No. 8	
3B		020	Select Program No. 10	
4A		021	Select Program No. 20	
4B		022	Select Program No. 40	
5A		023	CPU reset	Resets the system to the same state as when the power is turned on.
5B		000	Start	Starts the program selected by ports 016 to 022.
6A		001	General-purpose input	Waits for external input via program instructions.
6B		002	General-purpose input	
7A		003	General-purpose input	
7B		004	General-purpose input	
8A		005	General-purpose input	
8B		006	General-purpose input	
9A		007	General-purpose input	
9B		008	General-purpose input	
10A		009	General-purpose input	
10B		010	General-purpose input	
11A		011	General-purpose input	
11B		012	General-purpose input	
12A		013	General-purpose input	
12B		014	General-purpose input	
13A		015	General-purpose input	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	General-purpose output	These outputs can be turned ON/OFF as desired via program instructions.
15A		303	General-purpose output	
15B		304	General-purpose output	
16A		305	General-purpose output	
16B		306	General-purpose output	
17A		307	General-purpose output	
17B	N		0V input	Connect 0V.

Wiring Diagram

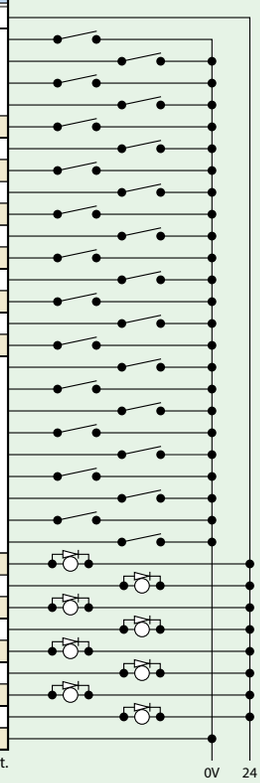


Note: This is for NPN. PNP will be different.

Positioner mode

Pin Number	Classification	Port No.	Positioner Standard Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position input 10	Specifies the position numbers to move to, using port number 007 to 019. The number can be specified either as BCD or binary.
2A		017	Position input 11	
2B		018	Position input 12	
3A		019	Position input 13	
3B		020	–	—
4A		021	–	—
4B		022	–	—
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start	Starts moving to selected position.
6A		001	Home return	Performs home return.
6B		002	Servo ON	Switches between Servo ON and OFF.
7A		003	Push	Performs a push motion.
7B		004	Pause	Pauses the motion when turned OFF, and resumes when turned ON.
8A		005	Cancel	Stops the motion when turned OFF. The remaining motion is canceled.
8B		006	Interpolation settings	When this signal is turned ON for a 2-axis model, the actuator moves by linear interpolation.
9A		007	Position input 1	Specifies the position numbers to move to, using ports 007 to 019. The number can be specified either as BCD or binary.
9B		008	Position input 2	
10A		009	Position input 3	
10B		010	Position input 4	
11A		011	Position input 5	
11B		012	Position input 6	
12A		013	Position input 7	
12B		014	Position input 8	
13A		015	Position input 9	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	Home return complete	Turns on when the home return operation is complete.
15B		304	Servo ON output	Turns on when servo is ON.
16A		305	Pushing complete	Turns on when a push motion is complete.
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	–	–
17B	N		0V input	Connect 0V.

Wiring Diagram



Note: This is for NPN. PNP will be different.

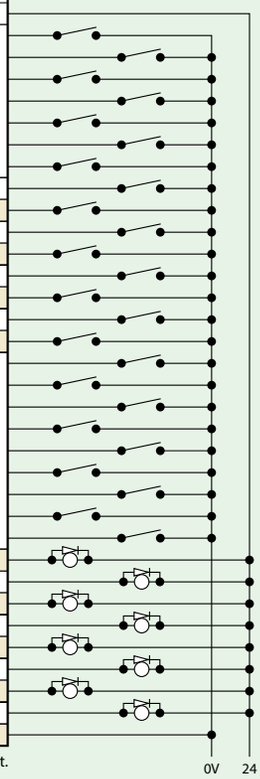
Explanation of I/O Signal Functions

Positioner, Product-Type Change Mode

Pin Number	Classification	Port No.	Positioner Product Type Change Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position/Product Type Input 10	Specifies the position numbers to move to, and the product type numbers, using ports 007 to 022. The position and product type numbers are assigned by parameter settings. The number can be specified either as BCD or binary.
2A		017	Position/Product Type Input 11	
2B		018	Position/Product Type Input 12	
3A		019	Position/Product Type Input 13	
3B		020	Position/Product Type Input 14	
4A		021	Position/Product Type Input 15	
4B		022	Position/Product Type Input 16	
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start	Starts moving to selected position.
6A		001	Home return	Performs home return.
6B		002	Servo ON	Switches between Servo ON and OFF.
7A		003	Push	Performs a push motion.
7B		004	Pause	Pauses the motion when turned OFF, and resumes when turned ON.
8A		005	Cancel	Stops the motion when turned OFF. The remaining motion is canceled.
8B		006	Interpolation settings	When this signal is turned ON for a 2-axis model, the actuator moves by linear interpolation.
9A		007	Position/Product Type Input 1	Specifies the position numbers to move to, and the product type numbers, using ports 007 to 022. The position and product type numbers are assigned by parameter settings. The number can be specified either as BCD or binary.
9B		008	Position/Product Type Input 2	
10A		009	Position/Product Type Input 3	
10B		010	Position/Product Type Input 4	
11A		011	Position/Product Type Input 5	
11B		012	Position/Product Type Input 6	
12A		013	Position/Product Type Input 7	
12B		014	Position/Product Type Input 8	
13A		015	Position/Product Type Input 9	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	Home return complete	Turns on when the home return operation is complete.
15B		304	Servo ON output	Turns on when servo is ON.
16A		305	Pushing complete	Turns on when a push motion is complete.
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	—	—
17B	N		0V input	Connect 0V.

Note: This is for NPN. PNP will be different.

Wiring Diagram

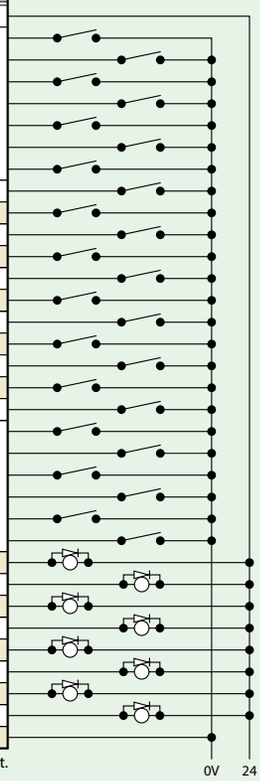


Positioner, 2-axis Independent Mode

Pin Number	Classification	Port No.	Positioner 2-axis Independent Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position input 7	Specifies the position numbers to move to, using ports 010 to 022. The position numbers on the 1st and 2nd axes are assigned by parameter settings. The number can be specified either as BCD or binary.
2A		017	Position input 8	
2B		018	Position input 9	
3A		019	Position input 10	
3B		020	Position input 11	
4A		021	Position input 12	
4B		022	Position input 13	
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start 1	Starts the movement to the selected position number on the 1st axis.
6A		001	Home return 1	Performs home return on the 1st axis.
6B		002	Servo ON 1	Switches between servo ON and OFF for the 1st axis.
7A		003	Pause 1	Pauses the motion on 1st axis when turned OFF, and resumes when turned ON.
7B		004	Cancel 1	Cancels the movement on the 1st axis.
8A		005	Start 2	Starts the movement to the selected position number on the 2nd axis.
8B		006	Home return 2	Performs home return on the 2nd axis.
9A		007	Servo ON 2	Switches between servo ON and OFF for the 2nd axis.
9B		008	Pause 2	Pauses the motion on 2nd axis when turned OFF, and resumes when turned ON.
10A		009	Cancel 2	Cancels the movement on the 2nd axis.
10B		010	Position input 1	Specifies the position numbers to move to, using ports 010 to 022. The position numbers on the 1st and 2nd axes are assigned by parameter settings. The number can be specified either as BCD or binary.
11A		011	Position input 2	
11B		012	Position input 3	
12A		013	Position input 4	
12B		014	Position input 5	
13A		015	Position input 6	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete 1	Turns on when the movement to the specified position on the 1st axis is complete.
15A		303	Home return complete 1	Turns on when home return on the 1st axis is complete.
15B		304	Servo ON output 1	Turns on when the 1st axis is in a servo ON state.
16A		305	Positioning complete 2	Turns on when the movement to the specified position on the 2nd axis is complete.
16B		306	Home return complete 2	Turns on when home return on the 2nd axis is complete.
17A		307	Servo ON output 2	Turns on when the 2nd axis is in a servo ON state.
17B	N		0V input	Connect 0V.

Note: This is for NPN. PNP will be different.

Wiring Diagram



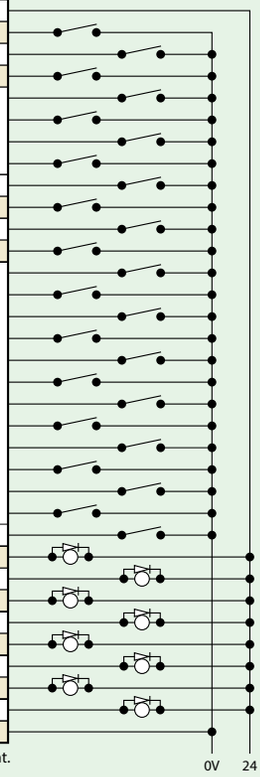
Explanation of I/O Signal Functions

Positioner, Teaching Mode

Pin Number	Classification	Port No.	Positioner Teaching Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	JOG– on 1st axis	While the signal is on, the 1st axis is moved in the - (negative) direction.
2A		017	JOG+ on 2nd axis	While the signal is on, the 2nd axis is moved in the + (positive) direction.
2B		018	JOG– on 2nd axis	While the signal is on, the 2nd axis is moved in the - (negative) direction.
3A		019	Specify inching (0.01mm)	Specifies how much to move during inching. (Total of the values specified for ports 019 to 022)
3B		020	Specify inching (0.1mm)	
4A		021	Specify inching (0.5mm)	
4B		022	Specify inching (1mm)	
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start	Starts moving to selected position.
6A		001	Servo ON	Switches between Servo ON and OFF.
6B		002	Pause	Pauses the motion when turned OFF, and resumes when turned ON.
7A		003	Position input 1	Ports 003 to 013 are used to specify the position number to move, and the position number for inputting the current position. - When the teaching mode setting on port 014 is in the ON state, the current value is written to the specified position number.
7B		004	Position input 2	
8A		005	Position input 3	
8B		006	Position input 4	
9A		007	Position input 5	
9B		008	Position input 6	
10A		009	Position input 7	
10B		010	Position input 8	
11A		011	Position input 9	
11B		012	Position input 10	
12A		013	Position input 11	
12B		014	Teaching mode setting	
13A		015	JOG+ on 1st axis	While the signal is on, the 1st axis is moved in the + (positive) direction.
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	Home return complete	Turns on when the home return operation is complete.
15B		304	Servo ON output	Turns on when servo is ON.
16A		305	—	—
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	—	—
17B	N		0V input	Connect 0V.

Note: This is for NPN. PNP will be different.

Wiring Diagram



Positioner, DS-S-C1 Compatible Mode

Pin Number	Classification	Port No.	Positioner DS-S-C1 Compatible Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position No. 1000	(Same as ports 004 through 015)
2A		017	—	—
2B		018	—	—
3A		019	—	—
3B		020	—	—
4A		021	—	—
4B		022	—	—
5A		023	CPU reset	Resets the system to the same state as when the power is turned on.
5B		000	Start	Starts moving to selected position.
6A		001	Hold (Pause)	Pauses the motion when turned ON, and resumes when turned OFF.
6B		002	Cancel	Stops the motion when turned ON. The remaining motion is canceled.
7A		003	Interpolation settings	When this signal is turned ON for a 2-axis model, the actuator moves by linear interpolation.
7B		004	Position No. 1	Ports 004 through 016 are used to specify the position number to move. The numbers are specified as BCD.
8A		005	Position No. 2	
8B		006	Position No. 4	
9A		007	Position No. 8	
9B		008	Position No. 10	
10A		009	Position No. 20	
10B		010	Position No. 40	
11A		011	Position No. 80	
11B		012	Position No. 100	
12A		013	Position No. 200	
12B		014	Position No. 400	
13A		015	Position No. 800	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact A)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	—	—
15B		304	—	—
16A		305	—	—
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	—	—
17B	N		0V input	Connect 0V.

Note: This is for NPN. PNP will be different.

Wiring Diagram

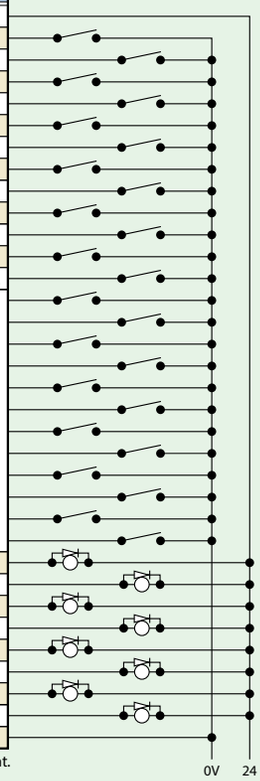


Table of Specifications

	Item	Specifications
Basic Specifications	Connected actuator	RCP2 series actuator (Note 1)
	Input voltage	DC24V ±10%
	Power Supply Capacity	Control power (Max. 1.2A) + Motor power (See the table below)
	Dielectric strength voltage	DC500V 10MΩ or higher
	Withstand voltage	AC500V 1 min.
	Rush current	Max. 30A
	Vibration resistance	XYZ directions 10 to 57Hz, One side amplitude: 0.035mm (continuous), 0.075mm (intermittent) 58 to 150 Hz 4.9 m/s² (continuous), 9.8 m/s² (intermittent)
Control specification	Maximum total output of connected axis	—
	Position detection method	Incremental encoder
	Speed setting	From 1mm/s. The maximum limit varies depending on the actuator.
	Acceleration setting	From 0.01G. The maximum limit varies depending on the actuator.
	Operating method	Program operation / Positioner operation (switchable)
Program	Programming language	Super SEL language
	Number of programs	64 programs
	Number of program steps	2,000 steps
	Number of multi-tasking programs	8 programs
	Positioning Points	1,500 points
	Data memory device	FLASHROM (A system-memory backup battery can be added as an option)
	Data input method	Teaching pendant or PC software
Communication	Number of I/O	24 input points / 8 output points (NPN or PNP selectable)
	I/O power	Externally supplied 24VDC ± 10%
	PIO cable	CB-DS-PIO□□□ (supplied with the controller)
	Serial communications function	RS232C (Half-pitch connector) / USB connector
	Field Network	DeviceNet, CC-Link, ProfiBus
	Motor Cable	CB-RCP2-MA□□□(Max. 20m)
	Encoder cable	CB-RCP2-PA□□□(Max. 20m)
General specifications	Protection function	Motor driver temperature check, Encoder open-circuit check Soft limit over, system error, battery error, etc.
	Ambient operating humidity and temperature	0 to 40°C 10 to 95% (non-condensing)
	Ambient atmosphere	Free from corrosive gases. In particular, there shall be no significant powder dust.
	Protection class	IP20
	Weight	Approx. 450g
	External dimension	43 mm (W) x 159 mm (H) x 110 mm (D)

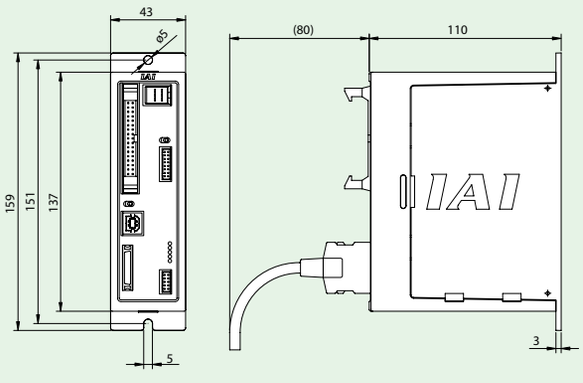
(Note 1) Cannot operate High-Thrust type (RA10C), High-Speed type (HS8C/HS8R), or Waterproof type (RCP2W-SA16).

		1-Axis specifications		2-Axis specifications	
Motorpower supply Capacity (Note2)	Motor type	Rated	Max.(Note 3)	Rated	Max.(Note 3)
	20P, 28P, 28SP motor	0.4A	2.0A	0.8A	4.0A
	35P, 42P, 56SP motor	1.2A		2.4A	

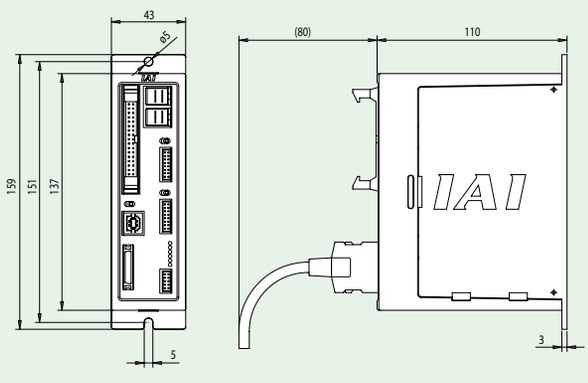
(Note 2) For both 1-axis and 2-axis specifications, approx. 30A inrush current flows for 5 ms when the control power supply is turned on.
(Note 3) After Servo ON, excitation detection is performed. In that case, the current is maximized. (Approx. 100 msec)
However, if motor drive power supply is turned on after a shut-down, approx. 6.0A and approx. 12.0A current flows to axis-1 and axis-2 respectively. (Approx. 1 to 2 msec)

Exterior Dimensions

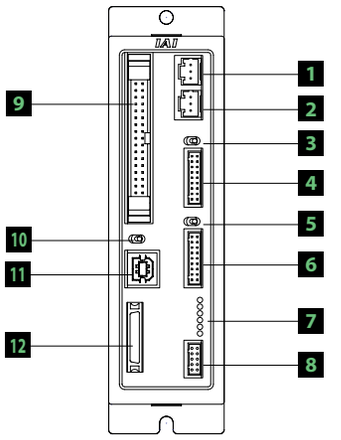
PSEL 1-axis controller

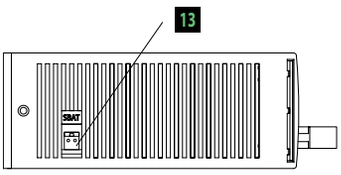


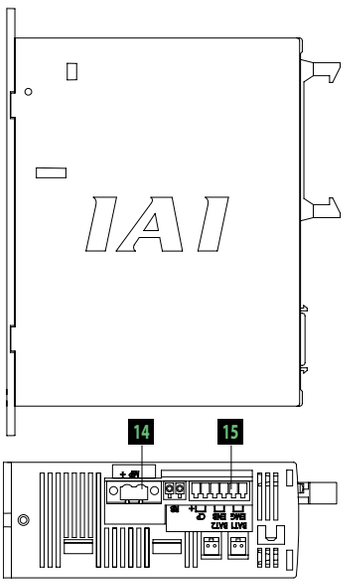
PSEL 2-axis controller



Name of Each Part







1 Motor connector for axis 1

Connects the motor cable of the axis 1 actuator.

2 Motor connector for axis 2

Connects the motor cable of the axis 2 actuator.

3 Brake switch for axis 1

This switch is used to release the axis brake. Setting it to the left position (RLS side) forcibly releases the brake, while setting it to the right position (NOM side) causes the controller to automatically control the brake.

4 Encoder connector for axis 1

Connect the encoder cable of the axis 1 actuator.

5 Brake switch for axis 2

This switch is used to release the axis brake. Setting it to the left position (RLS side) forcibly releases the brake, while setting it to the right position (NOM side) causes the controller to automatically control the brake.

6 Encoder connector for axis 2

Connect the encoder cable of the axis 2 actuator.

7 Status indicator LEDs

These LEDs are used to indicate the operating condition of the controller.

The LED status indicators are as follows:

PWR	:	Power is input to controller.
RDY	:	The controller is ready to perform program operation.
ALM	:	The controller is abnormal.
EMG	:	An emergency stop is actuated and the drive source is cut off.
SV1	:	The axis 1 actuator servo is on.
SV2	:	The axis 2 actuator servo is on.

8 Panel unit connector

A connector for the panel unit (optional) that displays the controller status and error codes.

9 I/O Connector

A connector for interface I/Os.

34-pin flat cable connector for DIO (24IN/8OUT) interface.

I/O power is also supplied to the controller via this connector (Pin No. 1 and No. 34).

10 Mode switch

This switch is used to specify the running mode of the controller. The left position indicates the MANU (manual operation) mode, while the right position indicates the AUTO (automatic operation) mode. Teaching can only be performed in manual operation, and automatic operation using external I/Os is not possible in the MANU mode.

11 USB connector

A connector for PC connection via USB. If the USB connector is connected, the TP connector is disabled and all communication inputs to the TP connector are cut off.

12 Teaching pendant connector

A half-pitch I/O 26-pin connector that connects a teaching pendant when the running mode is MANU. A special conversion cable is needed to connect a conventional D-sub, 25-pin connector.

13 System-memory backup battery connector

If you wish to retain the various data recorded in the SRAM of the controller even after the power is cut off, connect the necessary battery to this connector. This battery is installed externally to the unit. The controller does not come standard with the battery (Option).

14 Motor power input connector

This connector is used to input the motor power. It consists of a 2-pin, 2-piece connector by Phoenix Contact.

15 Control power/System input connector

This connector is used to connect the control power input, emergency stop switch, and enable switch. It consists of a Phoenix Contact 6-pin 2-piece connector.

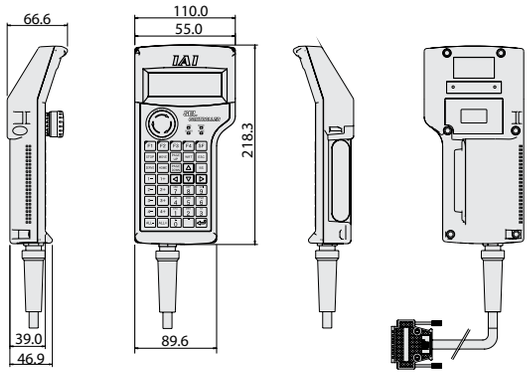
Options

Teaching Pendant

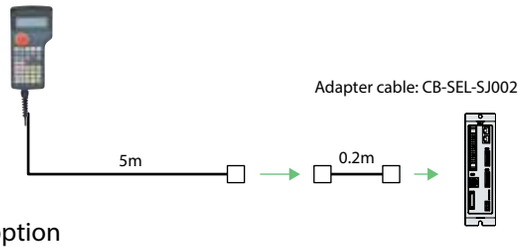
Features This is a teaching device that provides information on functions such as position input, test runs, and monitoring.

Model

Model	Description
SEL-T-JS	Standard type with adapter cable
SEL-TD-JS	Equipped with a deadman switch and adapter cable

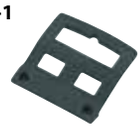


Configuration



SEL-T option

- Wall-mounting hook — Model **HK-1**



- Strap — Model **STR-1**

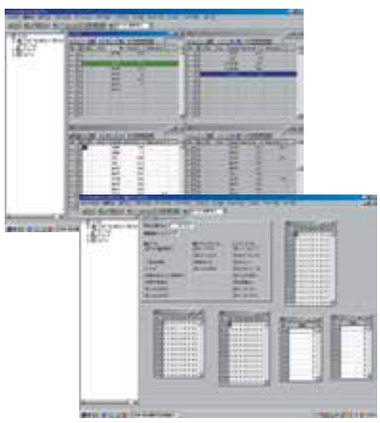
Specifications

Item	SEL-T-JS	SEL-TD-JS
3-position Enable Switch	No	Yes
ANSI/UL standards	Non-compliant	Compliant
CE mark	Compliant	
Display	20 char. × 4 lines	
Ambient Operating Temp./Humidity	0~40°C 10~90% RH (non-condensing)	
Protective structure	IP54	
Weight	Approx. 0.4kg (not incl. cable)	

PC Software (Windows Only)

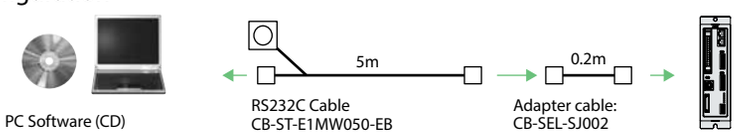
Features A startup support software for inputting programs/positions, performing test runs, and monitoring. More functions have been added for debugging, and improvements have been made to shorten the start-up time.

Supported Windows OS:
2000 SP4 or later / XP SP2 or later / Vista / 7



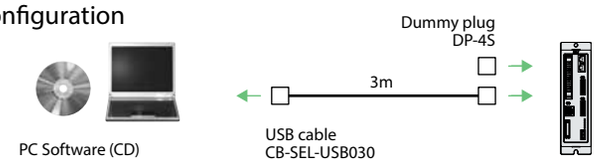
Model **IA-101-X-MW-JS** (with RS232C cable + adapter cable)

Configuration



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

Configuration



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

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)

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)

Dummy Plug

Features When connecting the PSEL controller to a computer with a USB cable, this plug is inserted in the teaching port to shut off the enable circuit. (Supplied with the PC software IA-101-X-USB)

Model **DP-4S**

Options

USB Cable

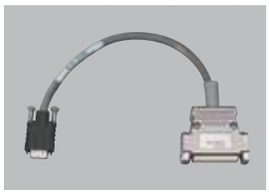
Features A cable for connecting the controller to the USB port to a computer. A controller with no USB port (e.g. XSEL) can be connected to the USB port of a computer by connecting an RS232C cable to the USB cable via a USB adapter. (See PC software IA-101-X-USBMW)

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

Adapter Cable

Features An adapter cable to connect the D-sub 25-pin connector from the teaching pendant or a PC to the teaching connector (half-pitch) of the PSEL controller.

Model **CB-SEL-SJ002** (Cable length: 0.2m)



Spare Parts

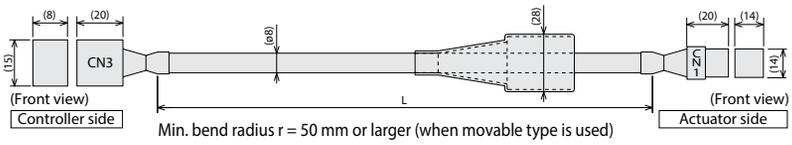
When you need spare parts after purchasing the product, such as when replacing a cable, refer to the list of models below.

Motor robot cable

Model **CB-RCP2-MA □□□**

** The standard cable for the motor cable is the robot cable.

* Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters. Ex.: 080 = 8m



Min. bend radius r = 50 mm or larger (when movable type is used)

CN3 M cable CN1

I-1318119-3 (AMP)				CN1			SLP-06V (JST)
Orange	Ā	A1		1	A	Yellow	
Gray	VMM	A2		2	VMM	Gray	
White	B̄	A3		3	Ā	Orange	
Yellow	A	B1		4	B	Orange (Black 1)	
Pink	VMM	B2		5	VMM	Pink	
Orange (Black 1)	B	B3		6	B̄	White	

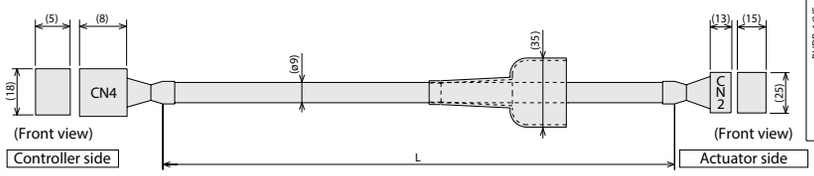
Encoder cable/Encoder robot cable

Model **CB-RCP2-PB□□□/CB-RCP2-PB□□□-RB**

* The standard cable for the encoder cable is a normal cable. A robot cable can be specified as an option.

* Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters. Ex.: 080 = 8m

Min. bend radius r = 50mm or larger (when movable type is used)
* Only robot cable is to be used in a cable track.



CN4	Cable color: Standard Cable	Cable color: Robot Cable	Signal	Pin No.
PHDR-16VS (JST)	Blue (Red 1)	Orange (Black 2)	LS +	16
	White	Orange (Red 2)	LS –	15
	Red	Orange (Black 1)	BK +	14
	Gray	Orange (Red 1)	BK –	13
	Brown	Light Gray (Black 1)	ENA	12
	Green	Light Gray (Red 1)	ENA	11
	Purple	White (Black 1)	ENB	10
	Pink	White (Red 1)	ENB	9
	—	—	—	8
	Yellow	Yellow (Black 1)	VPS	7
	Orange	Pink (Red 1)	VBB	6
	Blue	Pink (Black 1)	GND	5
	—	—	(N.C)	4
	—	—	(N.C)	3
	—	—	(N.C)	2
	Ground	Ground	F.G	1

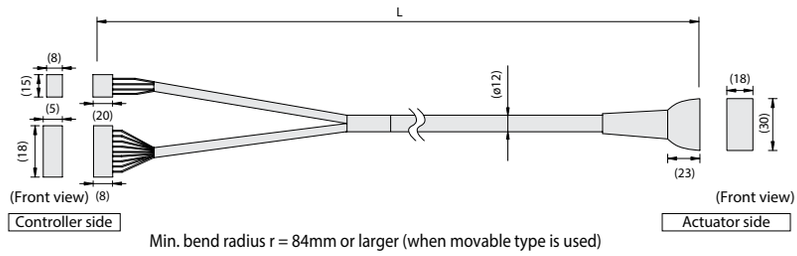
Shield wire
Ground wire

Pin No.	Signal	Cable color: Standard Cable	Cable color: Robot Cable	CN2
1	ENA	Brown	Light Gray (Black 1)	XMP-18V (JST)
2	ENA	Green	Light Gray (Red 1)	
3	ENB	Purple	White (Black 1	
4	ENB	Pink	White (Red 1)	
5	—	—	—	
6	—	—	—	
7	—	—	—	
8	—	—	—	
9	GND	Blue	Pink (Black 1)	
10	VBB	Orange	Pink (Red 1)	
11	VPS	Yellow	Yellow (Black 1)	
12	—	—	—	
13	LS +	Blue (Red 1)	Orange (Black 2)	
14	LS –	White	Orange (Red 2)	
15	—	—	—	
16	BK +	Red	Orange (Black 1)	
17	BK –	Gray	Orange (Red 1)	
18	F.G	Ground	Ground	

Motor-Encoder Integrated Cable for RCP3

Model **CB-PCS-MPA □□□**

* Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters. Ex.: 080 = 8m



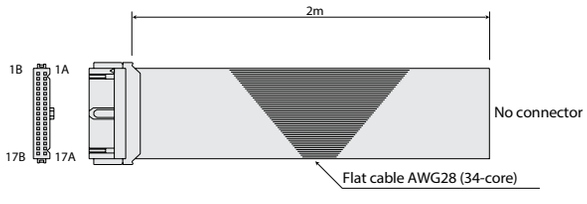
Min. bend radius r = 84mm or larger (when movable type is used)

Signal	Pin Number	(Wire color)	Pin Number	Signal
A	B1	Black	A1	A
VMM	A2	White	B1	VMM
/A	A1	Red	A2	/A
B	B3	Green	B2	B
VMM	B2	Yellow	A3	VMM
/B	A3	Brown	B3	/B
			A4	NC
			B4	NC
BK+	14	Pink (Red ●)	A5	BK+
BK–	13	Pink (Blue ●)	B5	BK–
LS+	16	White (Red ●)	A6	LS+
LS–	15	White (Blue ●)	B6	LS–
A+	12	Orange (Red ●)	A7	A+
A–	11	Orange (Blue ●)	B7	A–
B+	10	Gray (Red ●)	A8	B+
B–	9	Gray (Blue ●)	B8	B–
NC	8		A9	NC
VPS	7	Orange (Blue ● Contiguous)	B9	VPS
VCC	6	Gray (Red ● Contiguous)	A10	VCC
GND	5	Gray (Blue ● Contiguous)	B10	GND
NC	4		A11	NC
FG	1	Shield	B11	FG

I/O Flat Cable

Model **CB-DS-PIO □□**

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



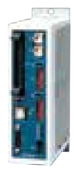
Pin No.	Color	Wire	Pin No.	Color	Wire
1A	Brown 1	Flat cable crimped	9B	Gray 2	Flat cable crimped
1B	Red 1		10A	White 2	
2A	Orange 1		10B	Black 2	
2B	Yellow 1		11A	Brown-3	
3A	Green 1		11B	Red 3	
3B	Blue1		12A	Orange 3	
4A	Purple 1		12B	Yellow 3	
4B	Gray 1		13A	Green 3	
5A	White 1		13B	Blue 3	
5B	Black 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	

ASEL

Program controller
For RCA2/RCA

List of models

Program controller for operating RCA2/RCA Series 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 1,500 positioning points are supported. Push-motion operation and teaching operation are also possible.
Position Points			1,500 points	
Standard Price	1 axis	Incremental	—	
		Absolute	—	
	2 axes	Incremental	—	
		Absolute	—	

Model

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

ASEL – CS – □ – □ □ □ – □ □ □ – □ – □ – 0

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

Type
- CS: Standard Type

Number of Axes
- 1: Single-axis model
- 2: 2-axis model

Motor (1st axis / 2nd axis)
- 2: 2W motor
- 5: 5W motor
- 10: 10W motor
- 20S: 20W motor (*)
- 20: 20W motor
- 30: 30W motor

* When connecting an RCA-RA3□/RGS3□/RGD3□ and RCA2-SA4□/TA5□, the motor type is 20S.

Encoder (1st axis / 2nd axis)
- I: Incremental
- A: Absolute

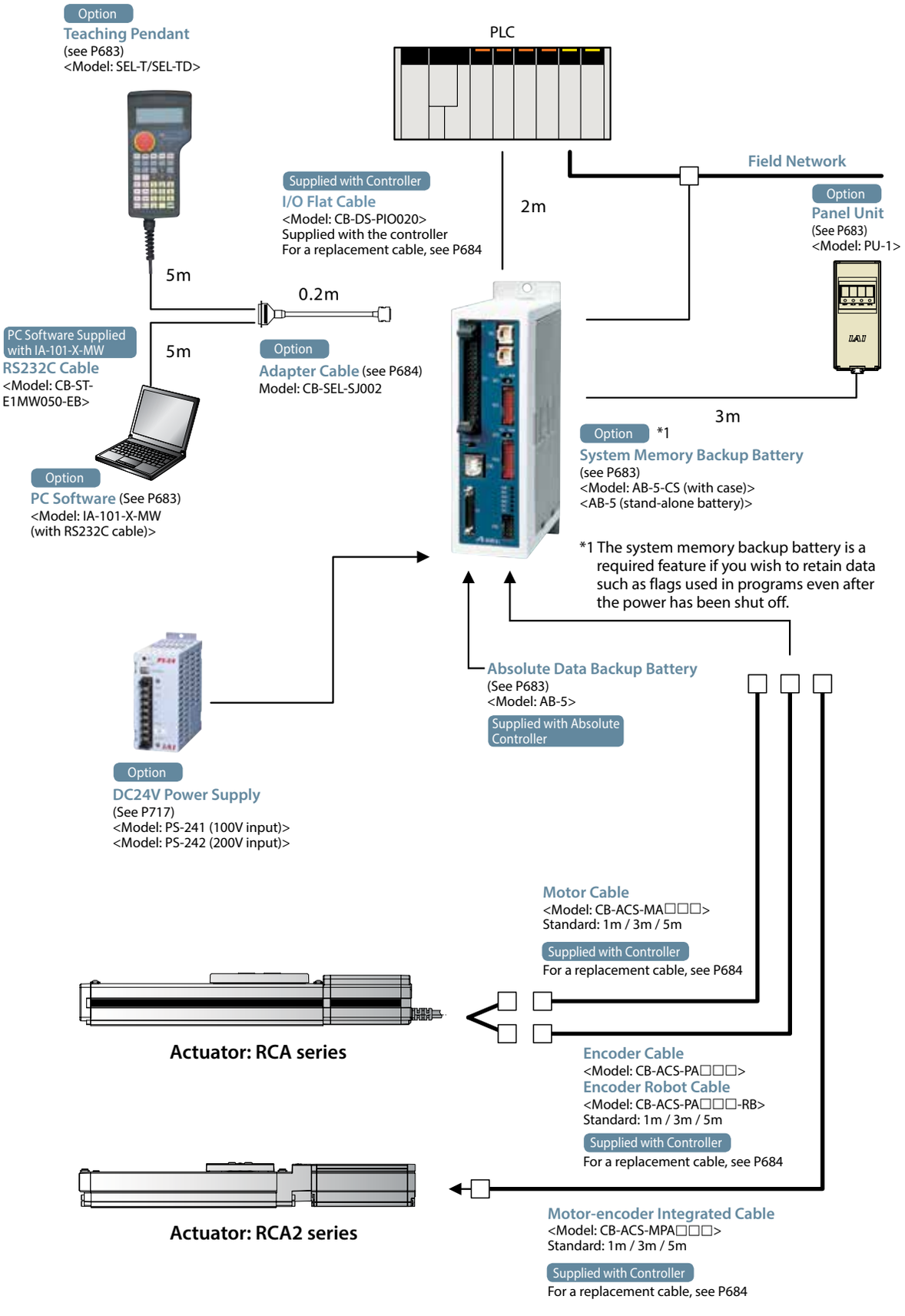
Option (1st axis / 2nd axis)
- B: Brake
- H: Home sensor compatible
- HA: High Accel./Decel.
- LA: Power-saving

I/O Type
- NP: PIO NPN (standard)
- PN: PIO PNP
- DV: DeviceNet
- CC: CC-Link
- PR: ProfiBus

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

Power/Voltage
- 0: DC24V

System Configuration



I/O Specification

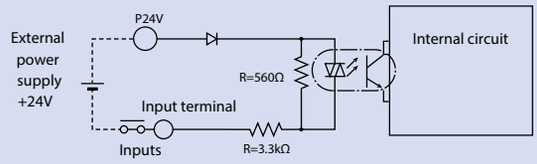
Input section External input specifications

Item	Specifications
Input voltage	DC24V ±10%
Input current	7mA/circuit
ON/OFF voltage	ON voltage (min.) NPN : DC16V / PNP : DC8V OFF voltage (max.) NPN : DC5V / PNP : DC19V
Isolation method	Photocoupler

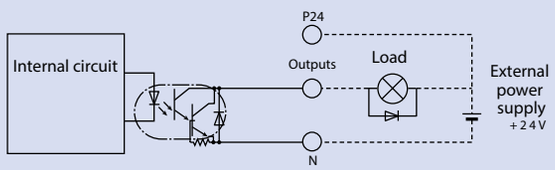
Output section External output specifications

Item	Specifications
Load Voltage	DC24V
Max. load current	100mA / 1 point 400mA / 8 points in total
Residual voltage (Max.)	Max 0.1mA / 1 point
Isolation method	Photocoupler

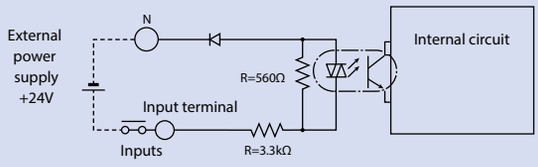
NPN Specifications



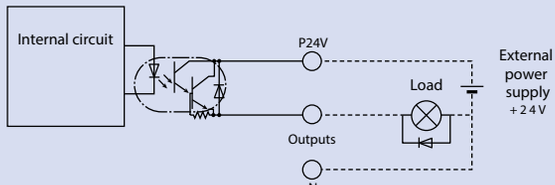
NPN Specifications



PNP Specifications



PNP Specifications



Explanation of I/O Signal Functions

Two modes can be selected for the ASEL controller: “Program Mode,” in which the actuator is operated by entering a program, and “Positioner Mode,” in which PLC signals are received and the actuator is moved to designated positions.
The Positioner Mode has the five input patterns listed below to enable various applications.

Control Function by Type

Operation mode		Features
Program mode		Various operations including linear/arc interpolation operation, path operation ideal for coating processes, etc., arch-motion operation and palletizing operation can be performed using the Super SEL language that lets you program complex control actions using simple commands.
Positioner mode	Standard mode	This is the basic mode from which operations can be conducted by designating position numbers and inputting the start signal. Push-motion operation and teaching operation are also possible.
	Product Change mode	Multiple work parts of the same shape with slightly different hole positions can be handled using movement commands to the same position numbers by simply changing the product type number.
	2-axis independent mode	With a 2-axis controller, each axis can be commanded and operated separately.
	Teaching mode	In this mode, the slider (rod) moves based on an external signal, when the actuator is stopped, the current location can be registered as position data.
	DS-S-C1 Compatible mode	If you were using a DS-S-C1 controller, you can replace it with a ASEL controller without having to change the host programs. *This mode does not ensure actuator compatibility.

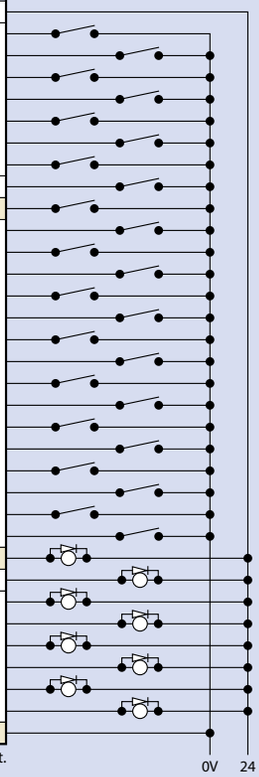
Explanation of I/O Signal Functions

Program mode

Pin Number	Category	Port No.	Program Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Select Program No. 1	Selects the program number to start. (Input as BCD values to ports 016 to 022)
2A		017	Select Program No. 2	
2B		018	Select Program No. 4	
3A		019	Select Program No. 8	
3B		020	Select Program No. 10	
4A		021	Select Program No. 20	
4B		022	Select Program No. 40	
5A		023	CPU reset	Resets the system to the same state as when the power is turned on.
5B		000	Start	Starts the program selected by ports 016 to 022.
6A		001	General-purpose input	Waits for external input via program instructions.
6B		002	General-purpose input	
7A		003	General-purpose input	
7B		004	General-purpose input	
8A		005	General-purpose input	
8B		006	General-purpose input	
9A		007	General-purpose input	
9B		008	General-purpose input	
10A		009	General-purpose input	
10B		010	General-purpose input	
11A		011	General-purpose input	
11B		012	General-purpose input	
12A		013	General-purpose input	
12B		014	General-purpose input	
13A		015	General-purpose input	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	General-purpose output	These outputs can be turned ON/OFF as desired via program instructions.
15A		303	General-purpose output	
15B		304	General-purpose output	
16A		305	General-purpose output	
16B		306	General-purpose output	
17A		307	General-purpose output	
17B	N		0V input	Connect 0V.

Note: This is for NPN. PNP will be different.

Wiring Diagram

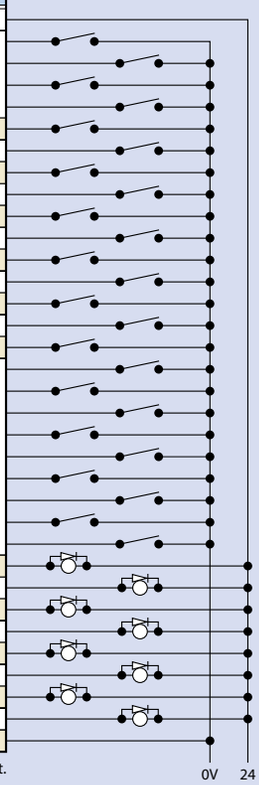


Positioner mode

Pin Number	Category	Port No.	Positioner Standard Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position input 10	Specifies the position numbers to move to, using port number 007 to 019 The number can be specified either as BCD or binary.
2A		017	Position input 11	
2B		018	Position input 12	
3A		019	Position input 13	
3B		020	–	–
4A		021	–	–
4B		022	–	–
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start	Starts moving to the selected position.
6A		001	Home Return	Performs Home Return.
6B		002	Servo ON	Switches between Servo ON and OFF.
7A		003	Push	Performs a push motion.
7B		004	Pause	Pauses the motion when turned OFF, and resumes motion when turned ON.
8A		005	Cancel	Stops the motion when turned OFF. The remaining motion is canceled.
8B		006	Interpolation settings	When this signal turned ON for a 2-axis model, the actuator moves by linear interpolation.
9A		007	Position input 1	Specifies the position numbers to move to, using ports 007 to 019. The number can be specified either as BCD or binary.
9B		008	Position input 2	
10A		009	Position input 3	
10B		010	Position input 4	
11A		011	Position input 5	
11B		012	Position input 6	
12A		013	Position input 7	
12B		014	Position input 8	
13A		015	Position input 9	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	Home Return complete	Turns on when the home return operation is complete.
15B		304	Servo ON output	Turns on when servo is ON.
16A		305	Pushing complete	Turns on when a push motion is complete.
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	Absolute encoder battery error	Turns on when the battery for the absolute encoder runs low (warning level).
17B	N		0V input	Connect 0V.

Note: This is for NPN. PNP will be different.

Wiring Diagram



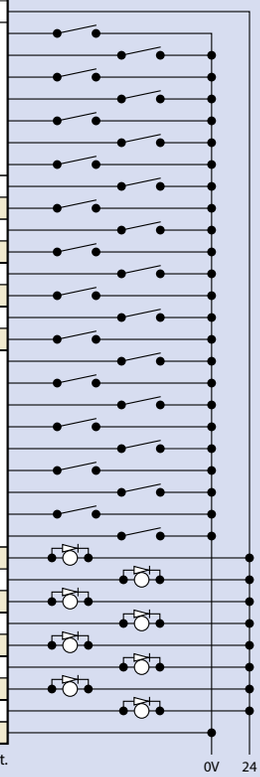
Explanation of I/O Signal Functions

Positioner, Product-Type Change Mode

Pin Number	Category	Port No.	Positioner Product Type Change Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position/Product Type Input 10	Specifies the position numbers to move to, and the product type numbers, using ports 007 to 022. The position and product type numbers are assigned by parameter settings. The number can be specified either as BCD or binary.
2A		017	Position/Product Type Input 11	
2B		018	Position/Product Type Input 12	
3A		019	Position/Product Type Input 13	
3B		020	Position/Product Type Input 14	
4A		021	Position/Product Type Input 15	
4B		022	Position/Product Type Input 16	
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start	Starts moving to the selected position.
6A		001	Home Return	Performs Home Return.
6B		002	Servo ON	Switches between Servo ON and OFF.
7A		003	Push	Performs a push motion.
7B		004	Pause	Pauses the motion when turned OFF, and resumes motion when turned ON.
8A		005	Cancel	Stops the motion when turned OFF. The remaining motion is canceled.
8B		006	Interpolation settings	When this signal is turned ON for a 2-axis model, the actuator moves by linear interpolation.
9A		007	Position/Product Type Input 1	Specifies the position numbers to move to, and the product type numbers, using ports 007 to 022. The position and product type numbers are assigned by parameter settings. The number can be specified either as BCD or binary.
9B		008	Position/Product Type Input 2	
10A		009	Position/Product Type Input 3	
10B		010	Position/Product Type Input 4	
11A		011	Position/Product Type Input 5	
11B		012	Position/Product Type Input 6	
12A		013	Position/Product Type Input 7	
12B		014	Position/Product Type Input 8	
13A		015	Position/Product Type Input 9	
13B	Output	300	Alarm	Turns off when an alarm occurs (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	Home Return complete	Turns on when the home return operation is complete.
15B		304	Servo ON output	Turns on when servo is ON.
16A		305	Pushing complete	Turns on when a push motion is complete.
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	Absolute encoder battery error	Turns on when the battery for the absolute encoder runs low (warning level).
17B	N		0V input	Connect 0V.

Note: This is for NPN. PNP will be different.

Wiring Diagram

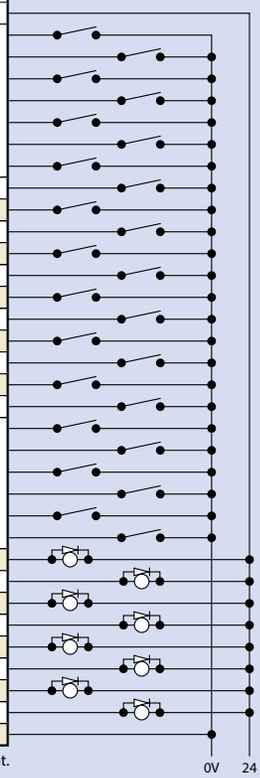


Positioner, 2-axis Independent Mode

Pin Number	Category	Port No.	Positioner 2-axis Independent Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position input 7	Specifies the position numbers to move to, using ports 010 to 022. The position numbers on the 1st and 2nd axes are assigned by parameter settings. The number can be specified either as BCD or binary.
2A		017	Position input 8	
2B		018	Position input 9	
3A		019	Position input 10	
3B		020	Position input 11	
4A		021	Position input 12	
4B		022	Position input 13	
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start 1	Starts movement to the selected position number on the 1st axis.
6A		001	Home Return 1	Performs home return on the 1st axis.
6B		002	Servo ON 1	Switches between servo ON and OFF for the 1st axis.
7A		003	Pause 1	Pauses the motion on 1st axis when turned OFF, and resumes motion when turned ON.
7B		004	Cancel 1	Cancels the movement on the 1st axis.
8A		005	Start 2	Starts the movement to the selected position number on the 2nd axis.
8B		006	Home Return 2	Performs home return on the 2nd axis.
9A		007	Servo ON 2	Switches between servo ON and OFF for the 2nd axis.
9B		008	Pause 2	Pauses the motion on 2nd axis when turned OFF, and resumes when turned ON.
10A		009	Cancel 2	Cancels the movement on the 2nd axis.
10B		010	Position input 1	Specifies the position numbers to move to, using ports 010 to 022. The position numbers on the 1st and 2nd axes are assigned by parameter settings. The number can be specified either as BCD or binary.
11A		011	Position input 2	
11B		012	Position input 3	
12A		013	Position input 4	
12B		014	Position input 5	
13A		015	Position input 6	
13B	Output	300	Alarm	Turns off when an alarm occurs (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete 1	Turns on when the movement to the specified position on the 1st axis is complete.
15A		303	Home Return complete 1	Turns on when home return on the 1st axis is complete.
15B		304	Servo ON output 1	Turns on when the 1st axis is in a servo ON state.
16A		305	Positioning complete 2	Turns on when the movement to the specified position on the 2nd axis is complete.
16B		306	Home Return complete 2	Turns on when home return on the 2nd axis is complete.
17A		307	Servo ON output 2	Turns on when the 2nd axis is in a servo ON state.
17B	N		0V input	Connect 0V.

Note: This is for NPN. PNP will be different.

Wiring Diagram



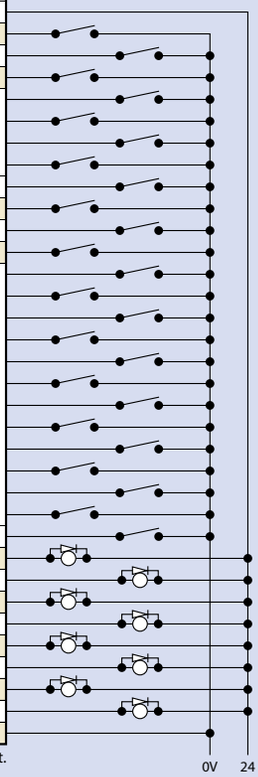
Explanation of I/O Signal Functions

Positioner, Teaching Mode

Pin Number	Category	Port No.	Positioner Teaching Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	JOG– on 1st axis	While the signal is on, the 1st axis is moved in the - (negative) direction.
2A		017	JOG+ on 2nd axis	While the signal is on, the 2nd axis is moved in the + (positive) direction.
2B		018	JOG– on 2nd axis	While the signal is on, the 2nd axis is moved in the - (negative) direction.
3A		019	Specify inching (0.01mm)	Specifies how much to move during inching. (Total of the values specified for ports 019 to 022)
3B		020	Specify inching (0.1mm)	
4A		021	Specify inching (0.5mm)	
4B		022	Specify inching (1mm)	
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start	Starts moving to selected position.
6A		001	Servo ON	Switches between Servo ON and OFF.
6B		002	Pause	Pauses the motion when turned OFF, and resumes motion when turned ON.
7A		003	Position input 1	Ports 003 to 013 are used to specify the position number to move, and the position number for inputting the current position. - When the teaching mode setting on port 014 is in the ON state, the current value is written to the specified position number.
7B		004	Position input 2	
8A		005	Position input 3	
8B		006	Position input 4	
9A		007	Position input 5	
9B		008	Position input 6	
10A		009	Position input 7	
10B		010	Position input 8	
11A		011	Position input 9	
11B		012	Position input 10	
12A		013	Position input 11	
12B		014	Teaching mode setting	
13A		015	JOG+ on 1st axis	While the signal is input, the 1st axis is moved in the + (positive) direction.
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	Home return complete	Turns on when the home return operation is complete.
15B		304	Servo ON output	Turns on when servo is ON.
16A		305	–	–
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	Absolute encoder battery error	Turns on when the battery for the absolute encoder runs low (warning level).
17B	N		0V input	Connect 0V.

Note: This is for NPN. PNP will be different.

Wiring Diagram

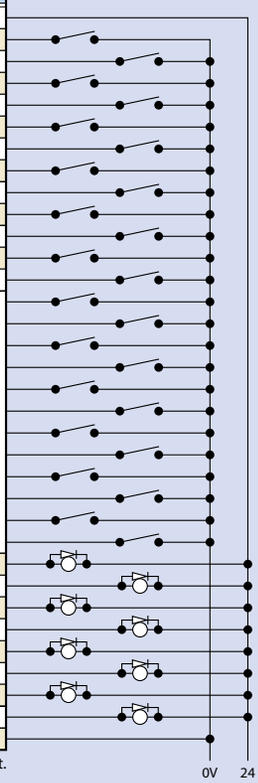


Positioner, DS-S-C1 Compatible Mode

Pin Number	Category	Port No.	Positioner DS-S-C1 Compatible Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position No. 1000	(Same as ports 004 through 015)
2A		017	–	–
2B		018	–	–
3A		019	–	–
3B		020	–	–
4A		021	–	–
4B		022	–	–
5A		023	CPU reset	Resets the system to the same state as when the power is turned on.
5B		000	Start	Starts moving to selected position.
6A		001	Hold (Pause)	Pauses the motion when turned ON, and resumes when turned OFF.
6B		002	Cancel	Stops the motion when turned ON. The remaining motion is canceled.
7A		003	Interpolation settings	When this signal is turned ON for a 2-axis model, the actuator moves by linear interpolation.
7B		004	Position No. 1	Ports 004 through 016 are used to specify the position number to move. The numbers are specified as BCD.
8A		005	Position No. 2	
8B		006	Position No. 4	
9A		007	Position No. 8	
9B		008	Position No. 10	
10A		009	Position No. 20	
10B		010	Position No. 40	
11A		011	Position No. 80	
11B		012	Position No. 100	
12A		013	Position No. 200	
12B		014	Position No. 400	
13A		015	Position No. 800	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact A)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	–	–
15B		304	–	–
16A		305	–	–
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	Absolute encoder battery error	Turns on when the battery for the absolute encoder runs low (warning level).
17B	N		0V input	Connect 0V.

Note: This is for NPN. PNP will be different.

Wiring Diagram



ASEL Controller

Table of Specifications

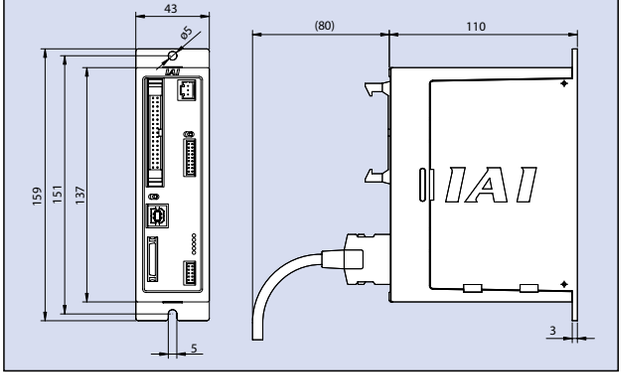
	Item	Specifications
Basic Specifications	Connected actuator	RCA/RCA2 Series Actuator
	Input Voltage	DC24V ±10%
	Power Supply Capacity	Control power supply (Max. 1.2A) + motor power supply (See the table below)
	Dielectric strength voltage	DC500V 10MΩ or higher
	Withstand voltage	AC500V 1 min.
	Rush current	Max. 30A
	Vibration resistance	XYZ directions 10 to 57Hz, One side amplitude: 0.035mm (continuous), 0.075mm (intermittent) 58 to 150 Hz 4.9 m/s² (continuous), 9.8 m/s²(intermittent)
Control specification	Number of control axes	1 axis / 2 axis
	Maximum total output of connected axis	60W (30W + 30W)
	Position detection method	Incremental encoder / Absolute encoder
	Speed setting	1mm/sec and up, the maximum depends on actuator specifications
	Acceleration setting	0.01G and up, the maximum depends on the actuator
	Operating method	Program operation / Positioner operation (switchable)
Program	Programming language	Super SEL language
	Number of programs	64 programs
	Number of program steps	2,000 steps
	Number of multi-tasking programs	8 points
	Positioning Points	1,500 points
	Data memory device	FLASHROM (A system-memory backup battery can be added as an option)
	Data input method	Teaching pendant or PC software
Communication	Number of I/O	24 input points / 8 output points (NPN or PNP selectable)
	I/O power	Externally supplied 24VDC ± 10%
	PIO cable	CB-DS-PIO□□□ (supplied with the controller)
	Serial communications function	RS232C (D-Sub Half-pitch connector) / USB connector
	Field Network	DeviceNet, CC-Link, ProfiBus
	Motor Cable	CB-ACS-MA□□□(Max. 20m)
	Encoder cable	CB-ACS-PA□□□(Max. 20m)
General specifications	Protection function	Motor overcurrent, Motor driver temperature check, Overload check, Encoder open-circuit check Soft limit over, system error, battery error, etc.
	Ambient operating humidity and temperature	0 to 40ºC 10 to 95% (non-condensing)
	Ambient atmosphere	Free from corrosive gases. In particular, there shall be no significant dust.
	Protection class	IP20
	Weight	Approx. 450g
	External dimensions	43 mm (W) x 159 mm (H) x 110 mm (D)

			1-Axis specification				2-Axis specification			
	Actuator type		Standard specifications/high acceleration and deceleration model		Power-saving		Standard specifications/high acceleration and deceleration model		Power-saving	
			Rated	Max. (Note2)	Rated	Max. (Note3)	Rated	Max. (Note2)	Rated	Max. (Note3)
Motor power supply capacity (Note1)	RCA RCA2	10W, 20W [Model symbol: 20]	1.3A	4.4A	1.3A	2.5A	2.6A	8.8A	2.6A	5.0A
		30W	1.3A	4.4A	1.3A	2.2A	2.6A	8.8A	2.6A	4.4A
		20W [Model symbol: 20S] SA4, RA3, TA5 type dedicated	1.7A	5.1A	1.7A	3.4A	3.4A	10.2A	3.4A	6.8A
	RCL	2W	0.8A	4.6A	—	—	1.6A	9.2A	—	—
		5W	1.0A	6.4A	—	—	2.0A	12.8A	—	—
		10W	1.3A	6.4A	—	—	2.6A	12.8A	—	—

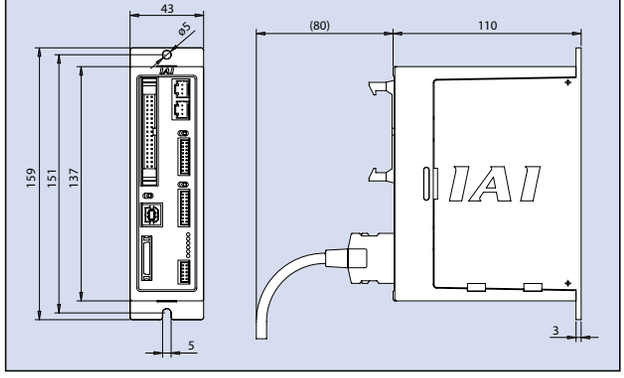
(Note 1) For both 1-axis and 2-axis specifications, approx. 30.0A inrush current flows for 5 ms when the control power supply is turned on.
(Note 2) Max. current at accelerating/decelerating
(Note 3) Current reaches the maximum when detecting the servo motor excitation phase at the first servo on after the power is on. (Normal: Approx. 1 to 2 sec., Max.: 10 sec)

External Dimensions

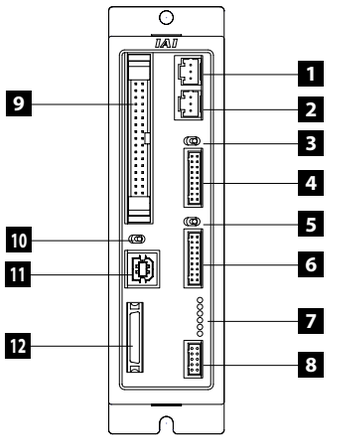
ASEL 1-axis controller

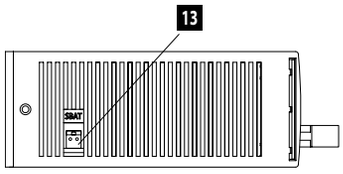


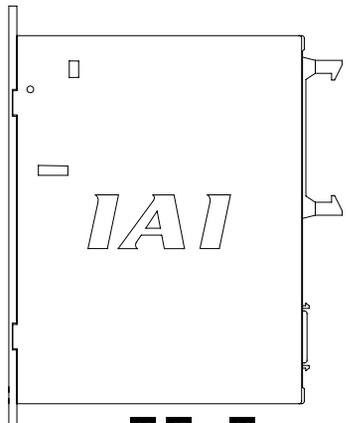
ASEL 2-axis controller

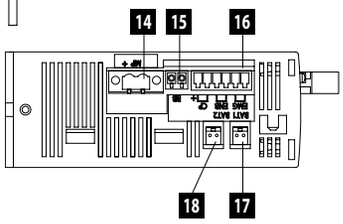


Name of Each Part









1 Motor connector for axis 1

Connect the motor cable of the axis 1 actuator.

2 Motor connector for axis 2

Connect the motor cable of the axis 2 actuator.

3 Brake switch for axis 1

This switch is used to release the axis brake. Setting it to the left position (RLS side) forcibly releases the brake, while setting it to the right position (NOM side) causes the controller to automatically control the brake.

4 Encoder connector for axis 1

Connect the encoder cable of the axis 1 actuator.

5 Brake switch for axis 2

This switch is used to release the axis brake.

Setting it to the left position (RLS side) forcibly releases the brake, while setting it to the right position (NOM side) causes the controller to automatically control the brake.

6 Encoder connector for axis 2

Connect the encoder cable of the axis 2 actuator.

7 Status indicator LEDs

These LEDs are used to indicate the operating condition of the controller.

The LED status indicators are as follows:

PWR : Power is input to controller.
RDY : The controller is ready to perform program operation.
ALM : The controller is abnormal.
EMG : An emergency stop is actuated and the drive source is cut off.
SV1 : The axis 1 actuator servo is on.
SV2 : The axis 2 actuator servo is on.

8 Panel unit connector

A connector for the panel unit (optional) that displays the controller status and error codes.

9 I/O Connector

A connector for interface I/Os.

34-pin flat cable connector for DIO (24IN/8OUT) interface.

I/O power is also supplied to the controller via this connector (Pin No. 1 and No. 34).

10 Mode switch

This switch is used to specify the running mode of the controller. The left position indicates the MANU (manual operation) mode, while the right position indicates the AUTO (automatic operation) mode. Teaching can only be performed in manual operation, and automatic operation using external I/Os is not possible in the MANU mode.

11 USB connector

A connector for PC connection via USB. If the USB connector is connected, the TP connector is disabled and all communication inputs to the TP connector are cut off.

12 Teaching pendant connector

A half-pitch I/O 26-pin connector that connects a teaching pendant when the running mode is MANU. A special conversion cable is needed to connect a conventional Dsub, 25-pin connector.

13 System-memory backup battery connector

If you wish to retain the various data recorded in the SRAM of the controller even after the power is cut off, connect the necessary battery to this connector. This battery is installed externally to the unit. The controller does not come standard with the battery (Option).

14 Motor power input connector

This connector is used to input the motor power. It consists of a 2-pin, 2-piece connector by Phoenix Contact.

15 External regenerative resistor connector

A connector for the regenerative resistor that must be connected when the built-in regenerative resistor alone does not offer sufficient capacity in high-acceleration/ high-load operation, etc.

Whether or not an external regenerative resistor is necessary depends on the conditions of your specific application such as the axis configuration.

16 Control power/System input connector

This connector is used to connect the control power input, emergency stop switch, and enable switch. It consists of a Phoenix Contact 6-pin 2-piece connector.

17 Absolute-data backup battery connector for axis 1

A connector for the battery that backs up absolute data when the actuator uses an absolute encoder. Secure installation of the battery is the customer's responsibility.

18 Absolute-data backup battery connector for axis 2

A connector for the battery that backs up absolute data when the actuator uses an absolute encoder. Secure installation of the battery is the customer's responsibility.

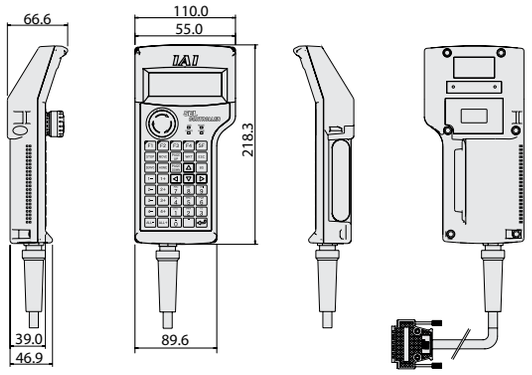
Options

Teaching Pendant

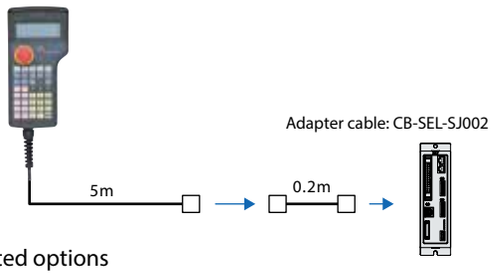
Features This is a teaching device that provides information on functions such as position input, test runs, and monitoring.

Model

Model	Description	Standard Price
SEL-T-JS	Standard type with adapter cable	—
SEL-TD-JS	Equipped with a deadman switch and adapter cable	—

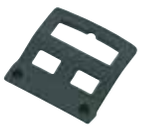


Configuration



SEL-T dedicated options

- Wall-mounting hook Model **HK-1**



- Strap Model **STR-1**

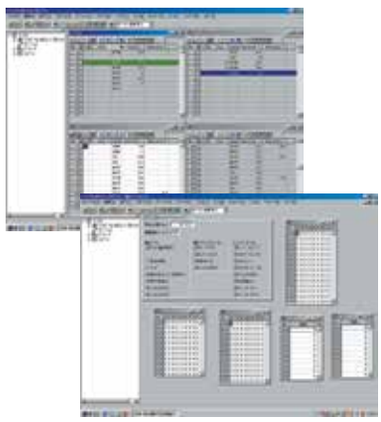
Specifications

Item	SEL-T-JS	SEL-TD-JS
3-position Enable Switch	No	Yes
ANSI/UL standards	Non-compliant	Compliant
CE mark	Compliant	
Display	20 char. × 4 lines	
Ambient OperatingTemp./Humidity	0~40°C 10~90% RH (non-condensing)	
Protective structure	IP54	
Weight	Approx. 0.4kg (not incl. cable)	

PC Software (Windows Only)

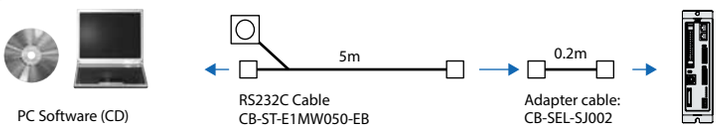
Features A startup support software for entering programs/positions, performing test runs, and monitoring. More functions have been added for debugging, and improvements have been made to shorten the start-up time.

Supported Windows OS:
2000 SP4 or later / XP SP2 or later / Vista / 7



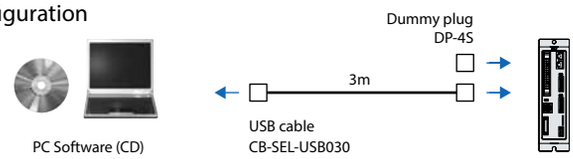
Model **IA-101-X-MW-JS** (with RS232C cable + adapter cable)

Configuration



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

Configuration

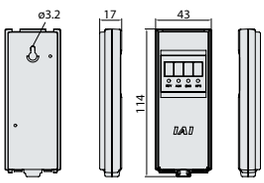


Note:
Only versions 7.0.0.0 and later can be used with the PSEL controller.

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 (Standalone battery)

Options

Dummy Plug

Features When connecting the ASEL controller to a computer with a USB cable, this plug is inserted in the teaching port to shut off the enable circuit.
(Supplied with the PC software IA-101-X-USB)

Model **DP-4S**

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)

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

Adapter Cable

Features An adapter cable to connect the D-sub 25-pin connector from the teaching pendant or a PC to the teaching connector (half-pitch) of the ASEL controller.

Model **CB-SEL-SJ002** (Cable length: 0.2m)

Spare Parts

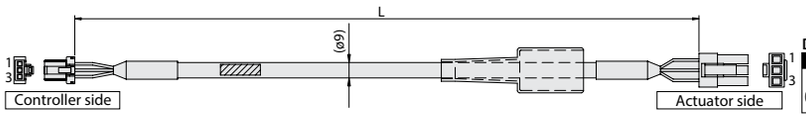
When you need spare parts after purchasing the product, such as when replacing a cable, refer to the list of models below.

Motor robot cable

Model **CB-ACS-MA □□□**

* The standard motor cable is a robot cable.

* Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m



Min. bend radius r = 50 mm or larger (when movable type is used)

DF1E-3S-2.5C

Wire	Color	Signal	Pin No.
AWG22 (crimped)	Red	U	1
	White	V	2
	Black	W	3

SLP-03V

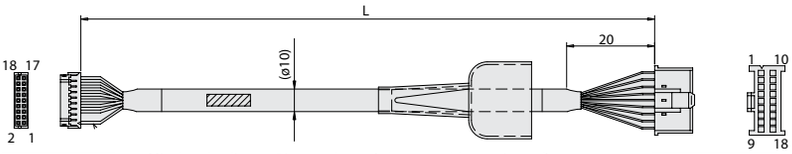
Pin No.	Signal	Color	Wire
1	U	Red	AWG22 (crimped)
2	V	White	
3	W	Black	

Encoder cable/Encoder robot cable

Model **CB-ACS-PA □□□ / CB-ACS-PA □□□-RB**

* The standard cable for the encoder cable is a normal cable. A robot cable can be specified as an option.

* Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m



Min. bend radius r = 50mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track.

CN2 Cable color: Robot Cable	Standard Cable	Signal	Pin No.
White/Purple	Blue	LS+	18
White/Gray	Orange	LS–	17
Yellow	Green	BK+	16
Blue	Brown	BK–	15
White/Blue	Gray	ENA	14
White/Yellow	Red	ENA	13
White/Red	Black	ENB	12
White/Black	Yellow	ENB	11
Orange	Pink	ENZ	10
Green	Purple	ENZ	9
Purple	White	–	8
Gray	Blue/red	VPS	7
Red	Orange/White	5V	6
Black	Green/White	GND	5
–	–	–	4
–	–	–	3
–	–	–	2
Ground	Ground	FG	1

Housing : PHDR-18VR (JST)
Contact : SPHD-001T-P0.5 (JST)

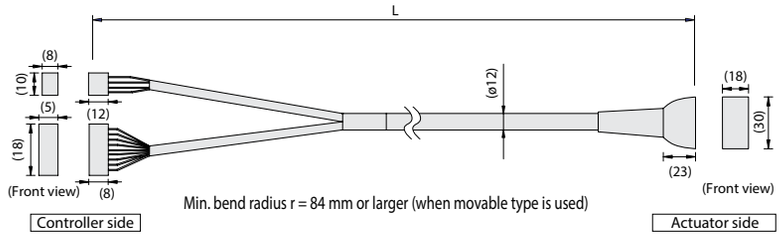
CN1 Pin No.	Signal	Cable color: Standard Cable	Robot Cable
1	ENA	Gray	White/Blue
2	ENA	Red	White/Yellow
3	ENB	Black	White/Red
4	ENB	Yellow	White/Black
5	–	–	–
6	–	–	–
7	LS+	Blue	White/Purple
8	–	–	–
9	FG	Ground	Ground
10	ENZ	Pink	Orange
11	ENZ	Purple	Green
12	–	White	Purple
13	VPS	Blue/red	Gray
14	5V	Orange/White	Red
15	GND	Green/White	Black
16	LS–	Orange	White/Gray
17	BK–	Brown	Blue
18	BK+	Green	Yellow

Plug housing : XMP-18V (JST)
Socket contact : BXA-001T-P0.6 (JST)
Retainer : XMS-09V (JST)

Motor-Encoder Integrated Cable for RCA2

Model **CB-ACS-MPA □□□**

* Enter the cable length (L) into□□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8m



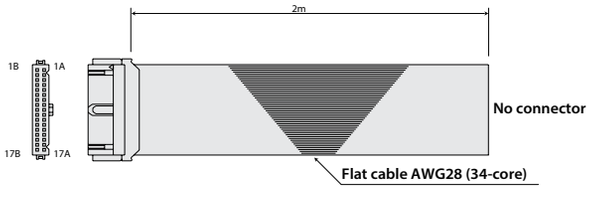
Min. bend radius r = 84 mm or larger (when movable type is used)

Signal	Pin No.	(Wire color)	Pin No.	Signal
U	1	Red	A1	U
V	2	Yellow	B1	V
W	3	Black	A2	W
			B2	NC
			A3	NC
			B3	NC
BK+	16	Yellow (Red ●)	A4	BK+
BK–	15	Yellow (Blue ●)	B4	BK–
LS+	18	Pink (Red ●)	A5	LS+
LS–	17	Pink (Blue ●)	B5	LS–
A+	14	White (Red ●)	A6	A+
A–	13	White (Blue ●)	B6	A–
B+	12	Orange (Red ●)	A7	B+
B–	11	Orange (Blue ●)	B7	B–
Z+	10	Gray (Red ●)	A8	Z+
Z–	9	Gray (Blue ●)	B8	Z–
–	8	Orange (Red ● Contiguous)	A9	–
/PS	7	Orange (Blue ● Contiguous)	B9	/PS
VCC	6	Gray (Red ● Contiguous)	A10	VCC
GND	5	Gray (Blue ● Contiguous)	B10	GND
NC			A11	NC
FG	1	Shield	B11	FG

I/O Flat Cable

Model **CB-DS-PIO □□□**

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



Pin No.	Color	Wire	Pin 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	Blue1		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	

SSEL

Program controller
For RCS2

List of models

Program controller for operating RCS2 Series 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 20,000 positioning points are supported. Push-motion operation and teaching operation are also possible.
Position points	20,000 points	

			20~150W	200W	300~400W	600W	750W
Standard Price	1 axis	Incremental	—	—	—	—	—
		Absolute	—	—	—	—	—
	2 axes	Incremental	—	—	—	—	—
		Absolute	—	—	—	—	—

Models

* 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

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

I	Incremental
A	Absolute

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

I	Incremental
A	Absolute

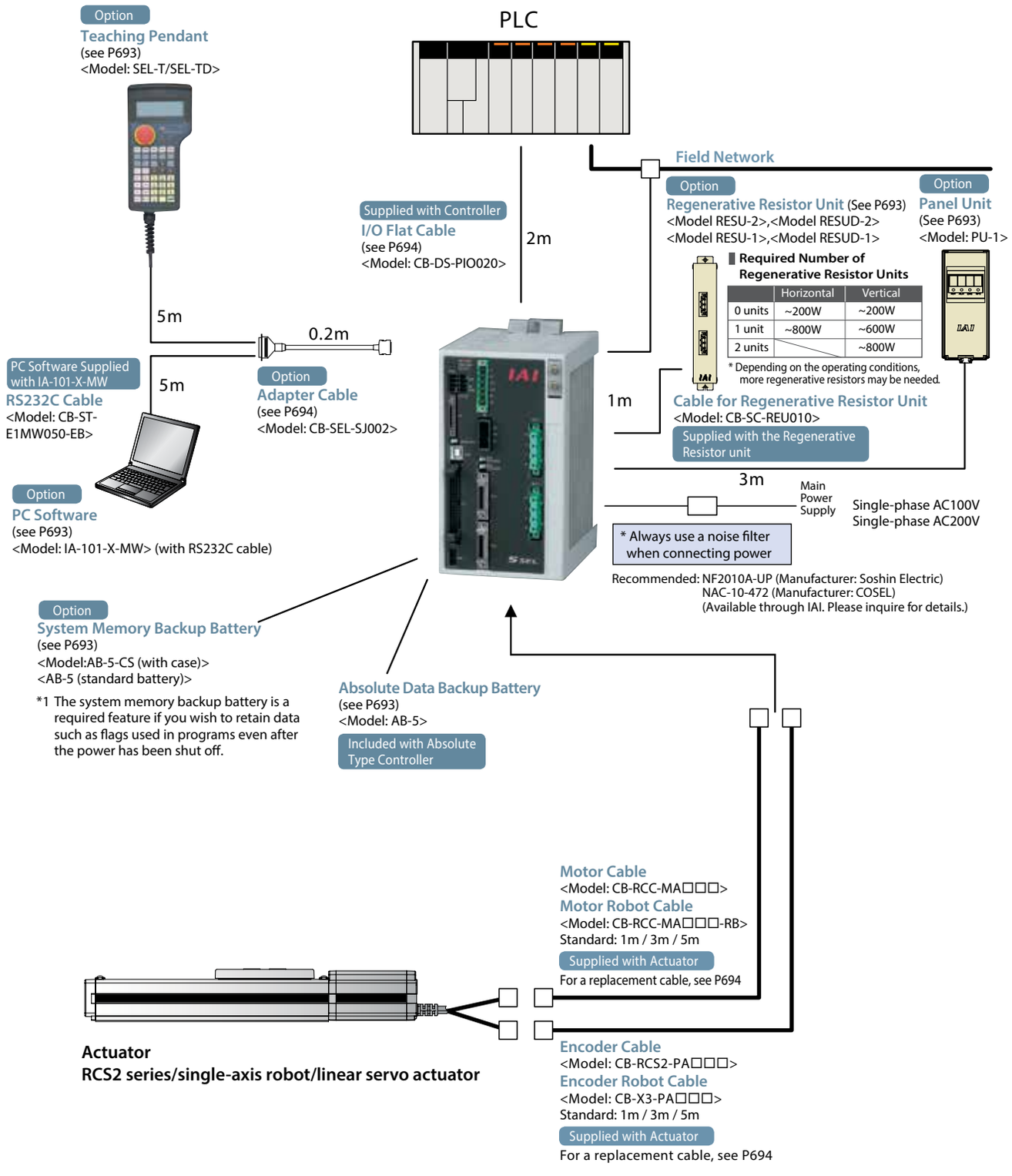
B	Brake
C	Creep sensor
HA	High Accel./Decel.
L	Home sensor/LS-compatible
S	Slave axis spec

NP	PIO NPN (standard)
PN	PIO PNP
DV	DeviceNet
CC	CC-Link
PR	ProfiBus

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

1	Single-phase AC100V
2	Single-phase AC200V

System Configuration



I/O Specification

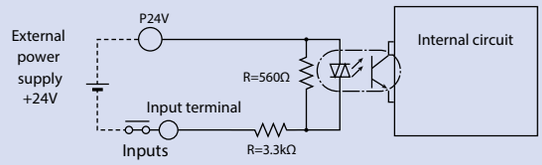
Input section External input specifications

Item	Specifications
Input voltage	DC24V ±10%
Input current	7mA/circuit
ON/OFF voltage	ON voltage (min.) NPN : DC16V / PNP : DC8V OFF voltage (max.) NPN : DC5V / PNP : DC19V
Isolation method	Photocoupler

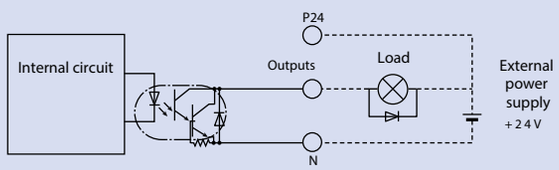
Output section External output specifications

Item	Specifications
Load Voltage	DC24V
Max. load current	100mA / 1 point 400mA / 8 points in total
Residual voltage (Max.)	Max 0.1mA / 1 point
Isolation method	Photocoupler

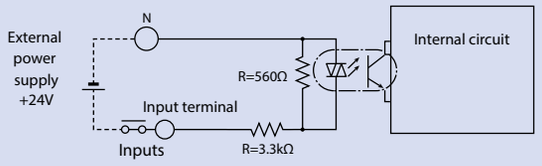
NPN Specifications



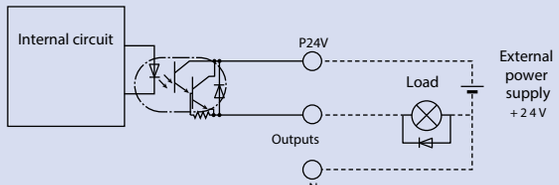
NPN Specifications



PNP Specifications



PNP Specifications



Explanation of I/O Signal Functions

Two modes can be selected for the ASEL controller: “Program Mode,” in which the actuator is operated by entering a program, and “Positioner Mode,” in which PLC signals are received and the actuator is moved to designated positions.
The Positioner Mode has the five input patterns listed below to enable various applications.

Control Function by Type

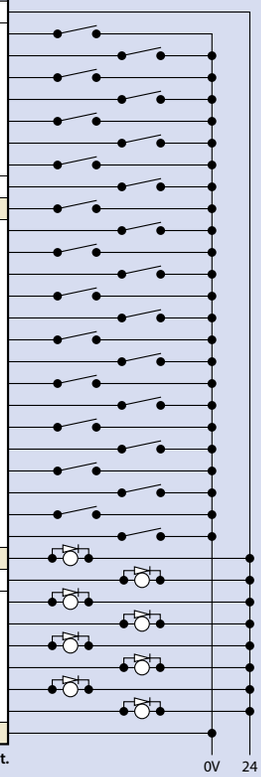
Operation mode		Features
Program mode		Various operations including linear/arc interpolation operation, path operation ideal for coating processes, etc., arch-motion operation and palletizing operation can be performed using the Super SEL language that lets you program complex control actions using simple commands.
Positioner mode	Standard mode	This is the basic mode from which operations can be conducted by designating position numbers and inputting the start signal. Push-motion operation and teaching operation are also possible.
	Product Change mode	Multiple work parts of the same shape with slightly different hole positions can be handled using movement commands to the same position numbers by simply changing the product type number.
	2-axis independent mode	With a 2-axis controller, each axis can be commanded and operated separately.
	Teaching mode	In this mode, the slider (rod) moves based on an external signal, when the actuator is stopped, the current location can be registered as position data.
	DS-S-C1 Compatible mode	If you were using a DS-S-C1 controller, you can replace it with a ASEL controller without having to change the host programs. *This mode does not ensure actuator compatibility.

Explanation of I/O Signal Functions

Program mode

Pin Number	Category	Port No.	Program Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Select Program No. 1	Selects the program number to start. (Input as BCD values to ports 016 to 022)
2A		017	Select Program No. 2	
2B		018	Select Program No. 4	
3A		019	Select Program No. 8	
3B		020	Select Program No. 10	
4A		021	Select Program No. 20	
4B		022	Select Program No. 40	
5A		023	CPU reset	Resets the system to the same state as when the power is turned on.
5B		000	Start	Starts the programs selected by ports 016 to 022.
6A		001	General-purpose input	Waits for external input via program instructions.
6B		002	General-purpose input	
7A		003	General-purpose input	
7B		004	General-purpose input	
8A		005	General-purpose input	
8B		006	General-purpose input	
9A		007	General-purpose input	
9B		008	General-purpose input	
10A		009	General-purpose input	
10B		010	General-purpose input	
11A		011	General-purpose input	
11B		012	General-purpose input	
12A		013	General-purpose input	
12B		014	General-purpose input	
13A		015	General-purpose input	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	General-purpose output	These outputs can be turned ON/OFF as desired via program instructions.
15A		303	General-purpose output	
15B		304	General-purpose output	
16A		305	General-purpose output	
16B		306	General-purpose output	
17A		307	General-purpose output	
17B	N		0V input	Connect 0V.

Wiring Diagram

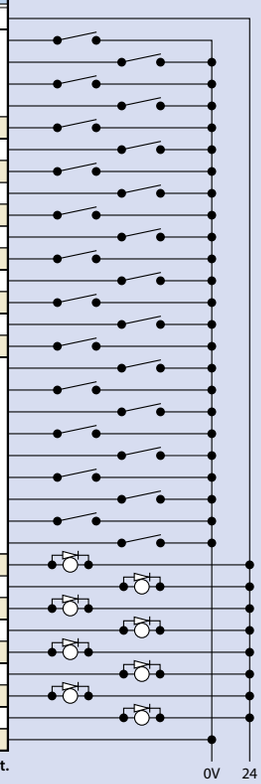


Note: This is for NPN. PNP will be different.

Positioner mode

Pin Number	Category	Port No.	Positioner Standard Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position input 10	Specifies the position numbers to move to, using port number 007 to 019 The number can be specified either as BCD or binary.
2A		017	Position input 11	
2B		018	Position input 12	
3A		019	Position input 13	
3B		020	Position input 14	—
4A		021	Position input 15	—
4B		022	Position input 16	—
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start	Starts moving to selected position.
6A		001	Home Return	Performs home return.
6B		002	Servo ON	Switches between Servo ON and OFF.
7A		003	Push	Performs a push motion.
7B		004	Pause	Pauses the motion when turned OFF, and resumes motion when turned ON.
8A		005	Cancel	Stops the motion when turned OFF. The remaining motion is canceled.
8B		006	Interpolation setting	When this signal is turned ON for a 2-axis model, the actuator moves by linear interpolation.
9A		007	Position input 1	Specifies the position numbers to move to, using ports 007 to 019. The number can be specified either as BCD or binary.
9B		008	Position input 2	
10A		009	Position input 3	
10B		010	Position input 4	
11A		011	Position input 5	
11B		012	Position input 6	
12A		013	Position input 7	
12B		014	Position input 8	
13A		015	Position input 9	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	Home Return complete	Turns on when the home return operation is complete.
15B		304	Servo ON output	Turns on when servo is ON.
16A		305	Pushing complete	Turns on when a push motion is complete.
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	Absolute encoder battery error	Turns on when the battery for the absolute encoder runs low (warning level).
17B	N		0V input	Connect 0V.

Wiring Diagram



Note: This is for NPN. PNP will be different.

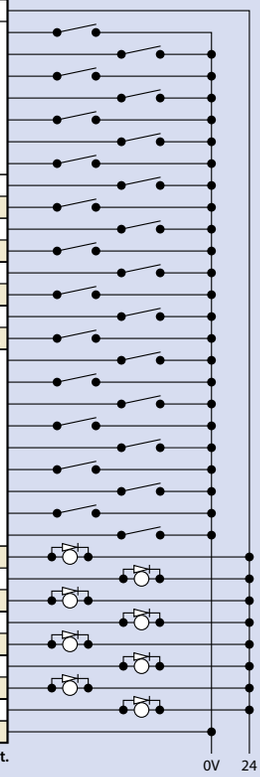
Explanation of I/O Signal Functions

Positioner, Product-Type Change Mode

Pin Number	Category	Port No.	Positioner Product Type Change Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position/Product Type Input 10	Specifies the position numbers to move to, and the product type numbers, using ports 007 to 022. The position and product type numbers are assigned by parameter settings. The number can be specified either as BCD or binary.
2A		017	Position/Product Type Input 11	
2B		018	Position/Product Type Input 12	
3A		019	Position/Product Type Input 13	
3B		020	Position/Product Type Input 14	
4A		021	Position/Product Type Input 15	
4B		022	Position/Product Type Input 16	
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start	Starts moving to selected position.
6A		001	Home Return	Performs home return.
6B		002	Servo ON	Switches between Servo ON and OFF.
7A		003	Push	Performs a push motion.
7B		004	Pause	Pauses the motion when turned OFF, and resumes motion when turned ON.
8A		005	Cancel	Stops the motion when turned OFF. The remaining motion is canceled.
8B		006	Interpolation setting	When this signal is turned ON for a 2-axis model, the actuator moves by linear interpolation.
9A		007	Position/Product Type Input 1	Specifies the position numbers to move to, and the product type numbers, using ports 007 to 022. The position and product type numbers are assigned by parameter settings. The number can be specified either as BCD or binary.
9B		008	Position/Product Type Input 2	
10A		009	Position/Product Type Input 3	
10B		010	Position/Product Type Input 4	
11A		011	Position/Product Type Input 5	
11B		012	Position/Product Type Input 6	
12A		013	Position/Product Type Input 7	
12B		014	Position/Product Type Input 8	
13A		015	Position/Product Type Input 9	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	Home Return complete	Turns on when the home return operation is complete.
15B		304	Servo ON output	Turns on when servo is ON.
16A		305	Pushing complete	Turns on when a push motion is complete.
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	Absolute encoder battery error	Turns on when the battery for the absolute encoder runs low (warning level).
17B	N		0V input	Connect 0V.

Note: This is for NPN. PNP will be different.

Wiring Diagram

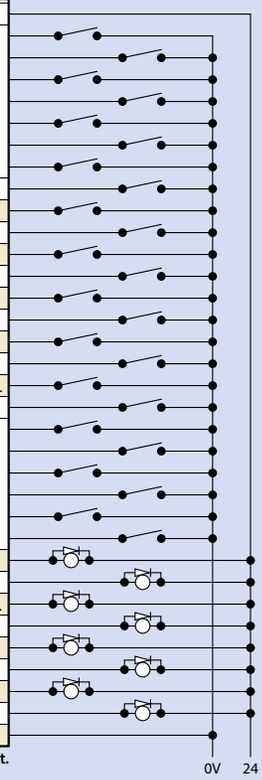


Positioner, 2-axis Independent Mode

Pin Number	Category	Port No.	Positioner Independent Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position input 7	Specifies the position numbers to move to, using ports 010 to 022. The position numbers on the 1st and 2nd axes are assigned by parameter settings. The number can be specified either as BCD or binary.
2A		017	Position input 8	
2B		018	Position input 9	
3A		019	Position input 10	
3B		020	Position input 11	
4A		021	Position input 12	
4B		022	Position input 13	
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start 1	Starts the movement to the selected position number on the 1st axis.
6A		001	Home Return 1	Performs Home Return on the 1st axis.
6B		002	Servo ON 1	Switches between servo ON and OFF for the 1st axis.
7A		003	Pause 1	Pauses the motion on 1st axis when turned OFF, and resumes when turned ON.
7B		004	Cancel 1	Cancels the movement on the 1st axis.
8A		005	Start 2	Starts the movement to the selected position number on the 2nd axis.
8B		006	Home Return 2	Performs Home Return on the 2nd axis.
9A		007	Servo ON 2	Switches between servo ON and OFF for the 2nd axis.
9B		008	Pause 2	Pauses the motion on 2nd axis when turned OFF, and resumes when turned ON.
10A		009	Cancel 2	Cancels the movement on the 2nd axis.
10B		010	Position input 1	Specifies the position numbers to move to, using ports 010 to 022. The position numbers on the 1st and 2nd axes are assigned by parameter settings. The number can be specified either as BCD or binary.
11A		011	Position input 2	
11B		012	Position input 3	
12A		013	Position input 4	
12B		014	Position input 5	
13A		015	Position input 6	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete 1	Turns on when the movement to the specified position on the 1st axis is complete.
15A		303	Home Return complete 1	Turns on when home return on the 1st axis is complete.
15B		304	Servo ON output 1	Turns on when the 1st axis is in a servo ON state.
16A		305	Positioning complete 2	Turns on when the movement to the specified position on the 2nd axis is complete.
16B		306	Home Return complete 2	Turns on when home return on the 2nd axis is complete.
17A		307	Servo ON output 2	Turns on when the 2nd axis is in a servo ON state.
17B	N		0V input	Connect 0V.

Note: This is for NPN. PNP will be different.

Wiring Diagram

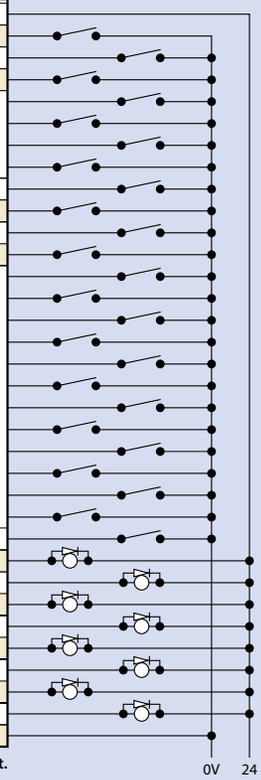


Explanation of I/O Signal Functions

Positioner, Teaching Mode

Pin Number	Category	Port No.	Positioner Teaching Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	JOG– on 1st axis	While the signal is input, the 1st axis is moved in the - (negative) direction.
2A		017	JOG+ on 2nd axis	While the signal is input, the 2nd axis is moved in the + (positive) direction.
2B		018	JOG– on 2nd axis	While the signal is input, the 2nd axis is moved in the - (negative) direction.
3A		019	Specify inching (0.01mm)	Specifies how much to move during inching. (Total of the values specified for ports 019 to 022)
3B		020	Specify inching (0.1mm)	
4A		021	Specify inching (0.5mm)	
4B		022	Specify inching (1mm)	
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start	Starts moving to selected position.
6A		001	Servo ON	Switches between Servo ON and OFF.
6B		002	Pause	Pauses the motion when turned OFF, and resumes motion when turned ON.
7A		003	Position input 1	Ports 003 to 013 are used to specify the position number to move, and the position number for inputting the current position. When the teaching mode setting on port 014 is in the ON state, the current value is written to the specified position number.
7B		004	Position input 2	
8A		005	Position input 3	
8B		006	Position input 4	
9A		007	Position input 5	
9B		008	Position input 6	
10A		009	Position input 7	
10B		010	Position input 8	
11A		011	Position input 9	
11B		012	Position input 10	
12A		013	Position input 11	
12B		014	Teaching mode setting	
13A		015	JOG+ on 1st axis	While the signal is input, the 1st axis is moved in the plus direction.
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	Home Return complete	Turns on when the home return operation is complete.
15B		304	Servo ON output	Turns on when servo is ON.
16A		305	—	—
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	Absolute encoder battery error	Turns on when the battery for the absolute encoder runs low (warning level).
17B	N		0V input	Connect 0V.

Wiring Diagram

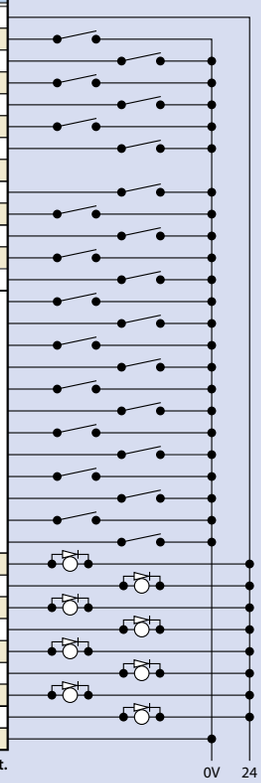


Note: This is for NPN. PNP will be different.

Positioner, DS-S-C1 Compatible Mode

Pin Number	Category	Port No.	Positioner DS-S-C1 Compatible Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position No. 1000	(Same as ports 004 through 015)
2A		017	Position No. 2000	—
2B		018	Position No. 4000	—
3A		019	Position No. 8000	—
3B		020	Position No. 10000	—
4A		021	Position No. 20000	—
4B		022	NC (*1)	—
5A		023	CPU reset	Resets the system to the same state as when the power is turned on.
5B		000	Start	Starts moving to selected position.
6A		001	Hold (Pause)	Pauses the motion when turned ON, and resumes motion when turned OFF.
6B		002	Cancel	Stops the motion when turned ON. The remaining motion is canceled.
7A		003	Interpolation setting	When this signal is turned ON for a 2-axis model, the actuator moves by linear interpolation.
7B		004	Position No. 1	Ports 004 through 016 are used to specify the position number to move. The numbers are specified as BCD.
8A		005	Position No. 2	
8B		006	Position No. 4	
9A		007	Position No. 8	
9B		008	Position No. 10	
10A		009	Position No. 20	
10B		010	Position No. 40	
11A		011	Position No. 80	
11B		012	Position No. 100	
12A		013	Position No. 200	
12B		014	Position No. 400	
13A		015	Position No. 800	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact A)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	—	—
15B		304	—	—
16A		305	—	—
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	Absolute encoder battery error	Turns on when the battery for the absolute encoder runs low (warning level).
17B	N		0V input	Connect 0V.

Wiring Diagram



(*1) The input needs to be set to OFF. Be sure to leave this disconnected.

Note: This is for NPN. PNP will be different.

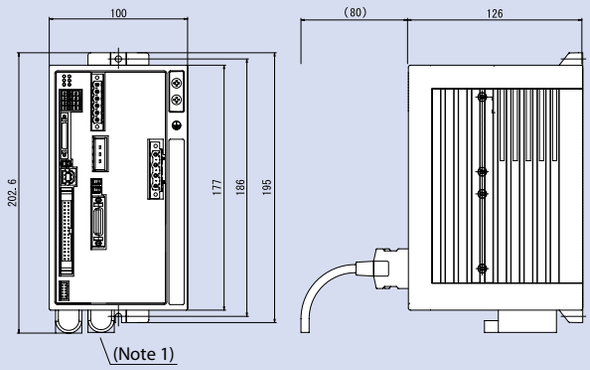
SSEL Controller

Table of Specifications

	Item	Specifications	
Basic Specifications	Connected actuator	RCS2 series actuator / single axis robot / linear servo actuator	
	Input Voltage	Single-phase AC90V to AC126.5V	Single-phase AC180V to AC253V
	Power Supply Capacity	Max. 1660VA (for 400W, 2-axis operation)	
	Dielectric strength voltage	DC500V 10MΩ or higher	
	Withstand voltage	AC500V 1 min.	
	Rush current	Control Power 15A / Motor Power 37.5A	Control Power 30A / Motor Power 75A
	Vibration resistance	XYZ directions 10 to 57Hz, One side amplitude: 0.035mm (continuous), 0.075mm (intermittent) 58 to 150 Hz 4.9 m/s^2 (continuous), 9.8 m/s^2 (intermittent)	
Control specification	Number of control axes	1 axis / 2 axes	
	Maximum total output of connected axis	400W	800W
	Position detection method	Incremental encoder / Absolute encoder	
	Speed setting	1mm/sec and up, the maximum depends on actuator specifications	
	Acceleration setting	0.01G and up, the maximum depends on the actuator	
	Operating method	Program operation / Positioner operation (switchable)	
Program	Programming language	Super SEL language	
	Number of programs	128 programs	
	Number of program steps	9,999 steps	
	Number of multi-tasking programs	8 programs	
	Positioning Points	20,000 points	
	Data memory device	FLASHROM (A system-memory backup battery can be added as an option)	
	Data input method	Teaching pendant or PC software	
Communication	Number of I/O	24 input points / 8 output points (NPN or PNP selectable)	
	I/O power	Externally supplied 24VDC ± 10%	
	PIO cable	CB-DS-PIO□□□ (supplied with the controller)	
	Serial communications function	RS232C (D-Sub Half-pitch connector) / USB connector	
	Field Network	DeviceNet, CC-Link, ProfiBus	
	Motor Cable	CB-ACS-MA□□□(Max. 20m)	
	Encoder cable	CB-RCP2-PA□□□(Max. 20m)	
General specifications	Protection function	Motor overcurrent, Motor driver temperature check, Overload check, Encoder open-circuit check Soft limit over, system error, battery error, etc.	
	Ambient operating humidity and temperature	0 to 40°C 10 to 95% (non-condensing)	
	Ambient atmosphere	Free from corrosive gases. In particular, there shall be no significant dust.	
	Protection class	IP20	
	Weight	1.4kg	
	External dimensions	100mm (W) x 202.6mm (H) x 126mm (D)	

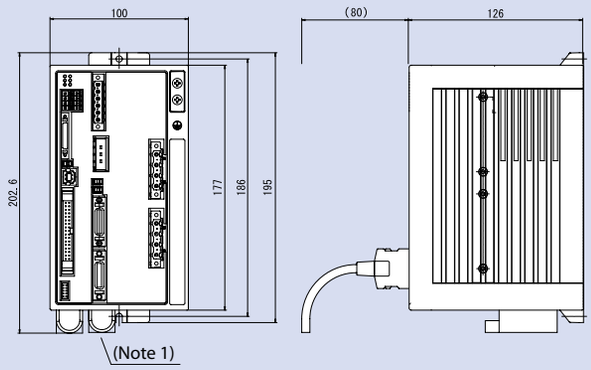
External Dimensions

SSEL 1-axis controller



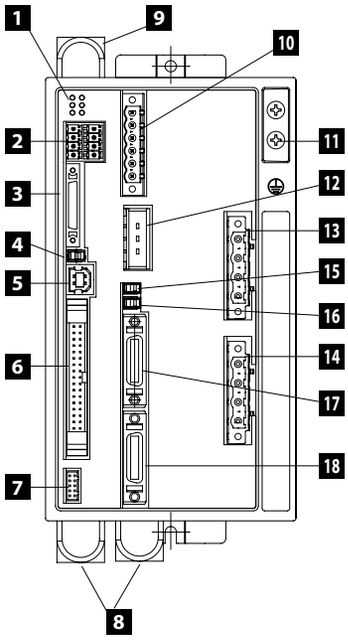
(Note 1) Absolute data back-up battery. Not installed with incremental specification.

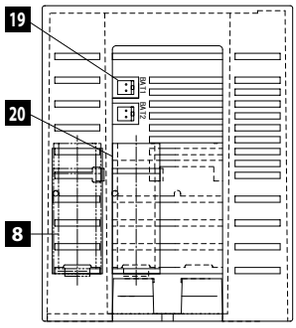
SSEL 2-axis controller

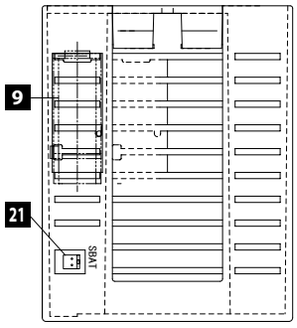


(Note 1) Absolute data back-up battery. Not installed with incremental specification.

Name of Each Part







1 Status indicator LEDs

These LEDs are used to indicate the operating condition of the controller.

The LED status indicators are as follows:

PWR : Power is input to controller.
RDY : The controller is ready to perform program operation.
ALM : The controller is abnormal.
EMG : An emergency stop is actuated and the drive source is cut off.
SV1 : The axis 1 actuator servo is on.
SV2 : The axis 2 actuator servo is on.

2 System I/O connector

Connector for emergency stop / enable input / brake power input, etc.

3 Teaching pendant connector

A half-pitch I/O 26-pin connector that connects a teaching pendant when the running mode is MANU. A special conversion cable is needed to connect a conventional Dsub, 25-pin connector.

4 Mode switch

This switch is used to specify the running mode of the controller. The left position indicates the MANU (manual operation) mode, while the right position indicates the AUTO (automatic operation) mode. Teaching can only be performed as manual operation, and automatic operation using external I/Os is not possible in the MANU mode.

5 USB connector

A connector for PC connection via USB. If the USB connector is connected, the TP connector is disabled and all communication inputs to the TP connector are cut off.

6 I/O Connector

A connector for interface I/Os.

34-pin flat cable connector for DIO (24IN/8OUT) interface.

I/O power is also supplied to the controller via this connector (Pin No. 1 and No. 34).

7 Panel unit connector

A connector for the panel unit (optional) that displays the controller status and error numbers.

8 Absolute data backup battery

When an absolute-type axis is operated, this battery retains position data even after the power is cut off.

9 System memory backup battery (Option)

This battery is needed if you wish to retain various data recorded in the SRAM of the controller even after the power is cut off. This battery is optional. Specify it if necessary.

10 Power supply connector

AC power connector. Divided into the control power input and motor power input.

11 Grounding screw

Protective grounding screw. Always ground this screw.

12 External regenerative resistor connector

A connector for the regenerative resistor that must be connected when the built-in regenerative resistor alone does not offer sufficient capacity in high-acceleration/ high-load operation, etc.

Whether or not an external regenerative resistor is necessary depends on the conditions of your specific application such as the axis configuration.

13 Motor connector for axis 1

Connects the motor cable of the axis 1 actuator.

14 Motor connector for axis 2

Connects the motor cable of the axis 2 actuator.

15 Brake switch for axis 1

This switch is used to release the axis brake. Setting it to the left position (RLS side) forcibly releases the brake, while setting it to the right position (NOM side) causes the controller to automatically control the brake.

16 Brake switch for axis 2

This switch is used to release the axis brake. Setting it to the left position (RLS side) forcibly releases the brake, while setting it to the right position (NOM side) causes the controller to automatically control the brake.

17 Encoder connector for axis 1

Connect the encoder cable of the axis 1 actuator.

18 Encoder connector for axis 2

Connect the encoder cable of the axis 2 actuator.

19 Absolute-data backup battery connector for axis 1

A connector for the battery that backs up absolute data for axis 1 when the actuator uses an absolute encoder.

20 Absolute-data backup battery connector for axis 2

A connector for the battery that backs up absolute data for axis 2 when the actuator uses an absolute encoder.

21 System-memory backup battery connector

A connector for the system-memory backup battery.

Options

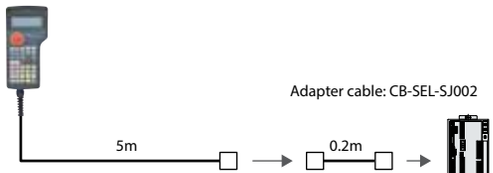
Teaching Pendant

Features A teaching device for entering programs and positions, test runs, and monitoring.

Model/Price

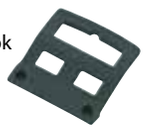
Model	Description
SEL-T-J	Standard type with adapter cable
SEL-TD-J	Deadman's switch type and adapter cable

Configuration

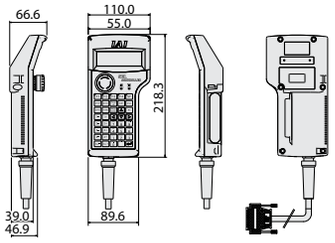


SEL-T options

- Wall-mounting hook Model **HK-1**



- Strap Model **STR-1**



Specifications

Item	SEL-T-J	SEL-TD-J
3-position Enable Switch	No	Yes
ANSI/UL standards	Non-compliant	Compliant
CE mark	Compliant	
Display	20 char. × 4 lines	
Ambient Operating Temp./Humidity	0~40ºC 10~90% RH (non-condensing)	
Protective structure	IP54	
Weight	Approx. 0.4kg (not incl. cable)	

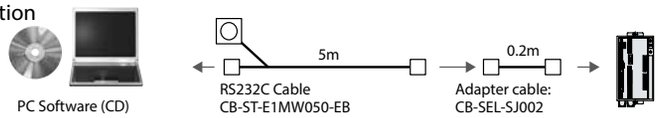
PC softare (Windows Only)

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

Supported Windows OS:
2000 SP4 or later / XP SP2 or later / Vista / 7

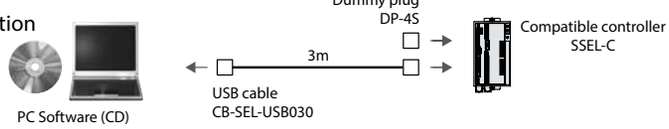
Model **IA-101-X-MW-JS** (with RS232C cable + adapter cable)
IA-101-X-MW (with RS232C cable)

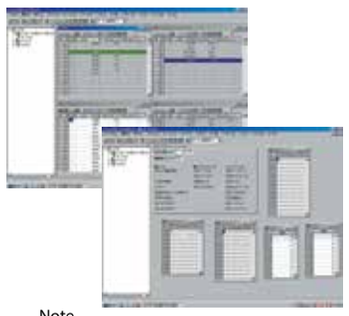
Configuration



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

Configuration





Note
Only versions 6.0.0.0 and later can be used with the SSEL controller.

Regenerative Resistor Unit

Features This unit converts regenerative current that generates when the motor decelerates, to heat. Check the total wattage of the actuators to be operated and provide a regenerative resistance unit or units if required.

Model
RESU-2 (Standard specification)
RESUD-2 (DIN rail mount specification)
RESU-1 (Standard specification, second or subsequent unit)
RESUD-1 (DIN rail mount specification, second or subsequent unit)

* If two regenerative units are required, arrange one RESU-2/ RESUD-2 (1st) and one RESU-1/ RESUD-1 (2nd or after).

Required Number of Units

Model	Horizontal	Vertical
0 units	~200W	~200W
1 unit	~800W	~600W
2 units		~800W

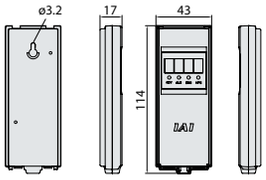
* Depending on the operating conditions, more regenerative resistors may be needed.

* Please see MSCON section page 662 for specification information and drawings.

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, for example, 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 (Standalone battery)

Options

Dummy Plug

Features When connecting the SSEL controller to a computer with a USB cable, this plug is inserted in the teaching port to shut off the enable circuit.
(Supplied with the PC software IA-101-X-USB)

Model **DP-4S**

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)

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

Adapter Cable

Features An adapter cable to connect the D-sub 25-pin connector from the teaching pendant or a PC to the teaching connector (half-pitch) of the SSEL controller.

Model **CB-SEL-SJ002** (Cable length: 0.2m)

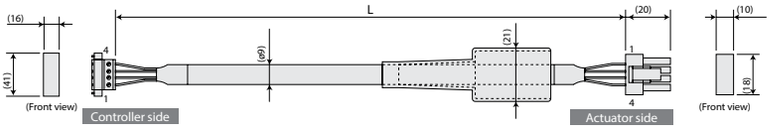
Spare parts

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

Motor cable/Motor robot cable

Model **CB-RCC-MA□□□/ CB-RCC-MA□□□-RB**

* Enter the cable length (L) into□□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8m



Wire	Color	Signal	
0.75sq	Green	PE	1
	Red	U	2
	White	V	3
	Black	W	4

	Signal	Color	Wire
1	U	Red	0.75sq (crimped)
2	V	White	
3	W	Black	
4	PE	Green	

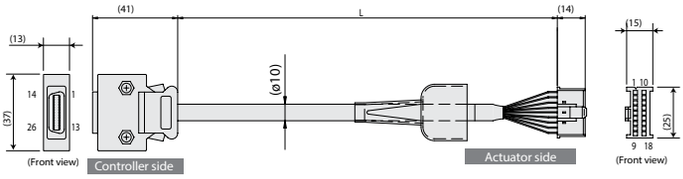
Min. bend radius r = 50mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track.

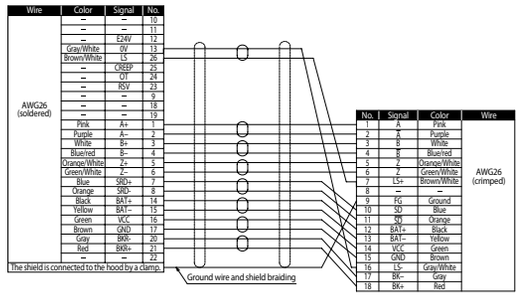
Encoder cable/Encoder robot cable

Model **CB-RCS2-PA□□□ / CB-X3-PA□□□**

* Enter the cable length (L) into□□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8m

Min. bend radius r = 50mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track.





Wire	Color	Signal	No.
AWG26 (soldered)	–	–	10
	–	–	11
	–	E24V	12
	Gray/White	0V	13
	Brown/White	LS	26
	–	CREEP	25
	–	OT	24
	–	RSV	23
	–	–	9
	–	–	18
	–	–	19
	Pink	A+	1
	Purple	A–	2
	White	B+	3
	Blue/red	B–	4
	Orange/White	Z+	5
	Green/White	Z–	6
	Blue	SRD+	7
	Orange	SRD–	8
	Black	BAT+	14
	Yellow	BAT–	15
	Green	VCC	16
	Brown	GND	17
	Gray	BKR–	20
	Red	BKR+	21
	–	–	22

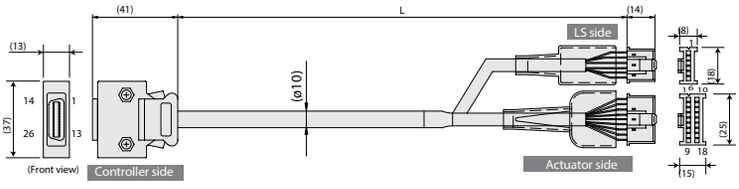
No.	Signal	Color	Wire
1	A	Pink	AWG26 (crimped)
2	A	Purple	
3	B	White	
4	B	Blue/red	
5	Z	Orange/White	
6	Z	Green/White	
7	LS+	Brown/White	
8	–	–	
9	FG	Ground	
10	SD	Blue	
11	SD	Orange	
12	BAT+	Black	
13	BAT–	Yellow	
14	VCC	Green	
15	GND	Brown	
16	LS–	Gray/White	
17	BK–	Gray	
18	BK+	Red	

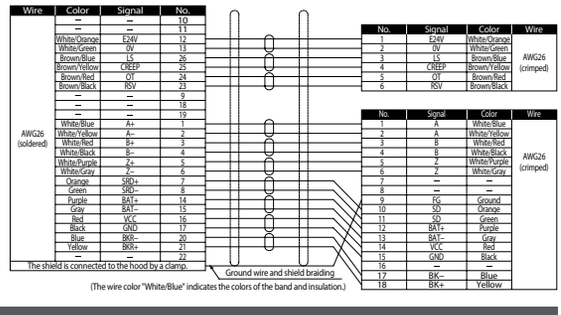
Encoder cable/Encoder robot cable for RCS2-RT6/RT6R/RT7R/RA13R

Model **CB-RCS2-PLA□□□ / CB-X2-PLA□□□**

* Enter the cable length (L) into□□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8m

Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track.





Wire	Color	Signal	No.
AWG26 (soldered)	–	–	10
	–	–	11
	White/Orange	E24V	12
	White/Green	0V	13
	Brown/Blue	LS	26
	Brown/Yellow	CREEP	25
	Brown/Red	OT	24
	Brown/Black	RSV	23
	–	–	9
	–	–	18
	–	–	19
	White/Blue	A+	1
	White/Yellow	A–	2
	White/Red	B+	3
	White/Black	B–	4
	White/Purple	Z+	5
	White/Gray	Z–	6
	Orange	SRD+	7
	Green	SRD–	8
	Purple	BAT+	14
	Gray	BAT–	15
	Red	VCC	16
	Black	GND	17
	Blue	BKR–	20
	Yellow	BKR+	21
	–	–	22

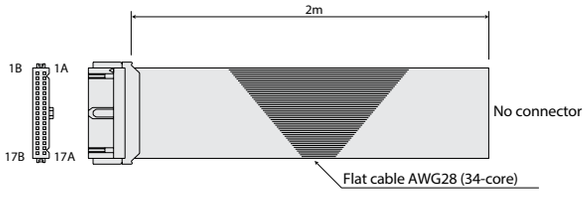
No.	Signal	Color	Wire
1	E24V	White/Orange	AWG26 (crimped)
2	0V	White/Green	
3	LS	Brown/Blue	
4	CREEP	Brown/Yellow	
5	OT	Brown/Red	
6	RSV	Brown/Black	

No.	Signal	Color	Wire
1	A	White/Blue	AWG26 (crimped)
2	A	White/Yellow	
3	B	White/Red	
4	B	White/Black	
5	Z	White/Purple	
6	Z	White/Gray	
7	–	–	
8	–	–	
9	FG	Ground	
10	SD	Orange	
11	SD	Green	
12	BAT+	Purple	
13	BAT–	Gray	
14	VCC	Red	
15	GND	Black	
16	–	–	
17	BK–	Blue	
18	BK+	Yellow	

I/O Flat Cable

Model **CB-DS-PIO□□□**

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



Pin No.	Color	Wire	Pin 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	Blue1		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	

X-SEL

Program controller
For RCS3 / RCS2 series

List of Models

Multi-axis program controller for operating RCS2 Series actuators. Up to 8 axes can be simultaneously controlled.

Type	J	K	P	Q	R	S
Name	Compact Type	General Purpose Type	Large-Capacity Type	Large-Capacity Type (Global specification)	High-function Type	High-function Type (Global specification)
External View						
Description	Compact, low-cost type ideal for operating low-output actuators	Standard type offering excellent expandability	Large-capacity type capable of controlling up to six axes or 2,400W	Large-capacity type conforming to safety category 4	Up to eight axes can be operated, high-function type comes with many options	High-function type confirmed to safety-category 4
Maximum number of control axes	4-axis		6-axis		8-axis	
Number of positions	3,000 positions		20,000 positions		Max. 53,332 pisitions (The number vaires according to the number of controlled axes.)	
Total Number of Connectable W	800W (*1)	1600W	2400W		2400W	
Power Supply	Single-phase AC100V/Single-phase AC200V		Single-phase AC200V/3-phase AC200V		Single-phase AC200V/3-phase AC200V	
Safety Category	B		B	Category 4 compatible	B	Category 4 compatible
Safety Rating	—		CE	CE	(*2)	(*2)
Standard Price	—					

(*1) The maximum output for 1 shaft during vertical operation is limited to 600W.
(*2) Preparing for CE compliance

Model

[XSEL-J/K type]

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

*Notation for 2 - 4 axes depends on the number of axes to be used.

XSEL - □ - □ - □ □ □ - (□ □ □) - □ - □ □ □ - □ - □

Series: J Small type; K General type; KE CE-compatible type; KT Safety-compliant type; KET CE, Safety-compliant type

Type: 1 Single-axis model; 2 2-axis model; 3 3-axis model; 4 4-axis model

Number of Axes

(Specs for 1st axis) Motor: 20 20W servo motor; 30D 30W servo motor for RCS2; 30R 30W servo motor for RS; 60 60W servo motor; 100 100W servo motor; 150 150W servo motor; 200 200W servo motor; 300 300W servo motor; 400 400W servo motor; 600 600W servo motor; 750 750W servo motor

(Specs for 1st axis) Encoder: I Incremental; A Absolute

(Specs for 1st axis) Option: B Brake; C Creep sensor; HA High Accel./Decel.; L Home sensor/ LS-compatible; M Master axis spec; S Slave axis spec

(Specs for axis 2 - 4) Motor: 20 20W servo motor; 30D 30W servo motor for RCS2; 30R 30W servo motor for RS; 60 60W servo motor; 100 100W servo motor; 150 150W servo motor; 200 200W servo motor; 300 300W servo motor; 400 400W servo motor; 600 600W servo motor; 750 750W servo motor

(Specs for axis 2 - 4) Encoder: I Incremental; A Absolute

(Specs for axis 2 - 4) Option (Note): B Brake; C Creep sensor; HA High Accel./Decel.; L Home sensor/ LS-compatible; M Master axis spec; S Slave axis spec

(Slot 1) Standard 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)

(Slot 2) (Slot 3) (Slot 4) Expansion I/O: E Not used; N1 Input 32/Output 16 (NPN); N3 Input 48/Output 48 (NPN); P1 Input 32/Output 16 (PNP); P3 Input 48/Output 48 (PNP); DV DeviceNet board; CC CC-Link board; PR ProfiBus board; ET Ethernet board; SA Expansion SIO type A; SB Expansion SIO type B; SC Expansion SIO type C

* E (Not used) is for expansion I/O only.

I/O Cable Length: 0 No cable; 2 2m (standard); 3 3m; 5 5m

* If you selected DV, CC, PR, or ET for standard and expansion I/O select 0 (no cable) for the I/O cable length.

Power/ Voltage: 1 Single-phase AC100V; 2 Single-phase AC200V

* For type J, 1-axis and 2-axis models cannot be expanded. On 3-axis and 4-axis models, only expansion slot 2 can be used.
* The expansion SIO board is only for type K. (Cannot be used for type J.)
* For N3/P3, standard I/O is dedicated to type J, expansion I/O is dedicated to type K.

[XSEL-P/Q type]

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

* Notation for 2 - 6 axes depends on the number of axes to be used.

XSEL - □ - □ - □ □ □ - (□ □ □) - □ - □ □ □ - □ - □

Series: P High-capacity type; Q Safety-compliant, high capacity type

Type

Number of Axes: 1 Single-axis model; 2 2-axis model; 3 3-axis model; 4 4-axis model; 5 5-axis model; 6 6-axis model

Motor: 12 12W servo motor; 20 20W servo motor; 30D 30W servo motor for RCS2; 30R 30W servo motor for RS; 60 60W servo motor; 100 100W servo motor; 100S For LSA-N10; 150 150W servo motor; 200 200W servo motor; 200S For LSA-S10/N15; 300 300W servo motor; 300S For LSA-N19; 400 400W servo motor; 600 600W servo motor; 750 750W servo motor; 1000 1000W servo motor (linear only)

(Specs for 1st axis) Encoder: I Incremental; A Absolute

(Specs for 1st axis) Option (Note): B Brake; C Creep sensor; HA High Accel./Decel.; L Home sensor/ LS-compatible; M Master axis spec; S Slave axis spec

(Specs for axis 2 - 6) Motor: 12 12W servo motor; 20 20W servo motor; 30D 30W servo motor for RCS2; 30R 30W servo motor for RS; 60 60W servo motor; 100 100W servo motor; 100S For LSA-N10; 150 150W servo motor; 200 200W servo motor; 200S For LSA-S10/N15; 300 300W servo motor; 300S For LSA-N19; 400 400W servo motor; 600 600W servo motor; 750 750W servo motor; 1000 1000W servo motor (linear only)

(Specs for axis 2 - 6) Encoder: I Incremental; A Absolute

(Specs for axis 2 - 6) Option (Note): B Brake; C Creep sensor; HA High Accel./Decel.; L Home sensor/ LS-compatible; M Master axis spec; S Slave axis spec

Dedicated network slot: Blank Not used; DV DeviceNet board; CC CC-Link board; PR ProfiBus board; EP Ethernet/IP board; ET Ethernet board

(Slot 1) Standard 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); MC Pulse input/ output board (*); S With expansion I/O base

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

(Slot 4)

* With the standard I/O and the expansion I/O, if you do not select the input/output board (N□ / P□), input "0" (no cable) as the I/O cable length symbol.

*Maximum of 2 MC cards can be used for the expansion I/O slots.

I/O Cable Length: 0 No cable; 2 2m (standard); 3 3m; 5 5m

* 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.
(See P705-706)
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.

Power/ Voltage: 2 Single-phase AC200V; 3 Three-phase AC200V; 2L Dedicated linear single-phase AC200V; 3L Dedicated linear 3-phase AC200V

* Enter 2L or 3L when operating a linear servo actuator. Otherwise, enter 2 or 3.

e.g. Expansion I/O on slot 2, remaining slots unused — XSEL-P-2-100A-100A-N1-N1EE-2-3
Expansion I/O base attached, but not the expansion I/O — XSEL-P-2-100A-100A-N1-SSS-2-3

Note:
For axis 5 and 6 of XSEL-P/Q type, the following actuators are unavailable:
LSA series, RCS2-RA7/SRA7/SRGS7/SRGD7 series, RCS2-□□5N (Mini ROBO) series, and NS-SXM□/SZM□ (incremental specification only for both).

XSEL Controller

Model

[XSEL-R/S type]

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

XSEL - □ - □ - □ □ □ - (□ □ □) - □ □ □ - □ □ - □ - □

	Specs for 1st axis			Specs for axis 2 – 8			Dedicated network slot			I/O slot		I/O cable length	Power/ voltage
	Type	Number of connected axes	Motor	Encoder	Option	Motor	Encoder	Option	(Slot 1)	(Slot 2)	(Slot 3)	(Slot 1)	(Slot 2)		

Type

R	Standard specification
S	Global specification

Number of connected axes

1	Single-axis model
2	2-axis model
3	3-axis model
4	4-axis model
5	5-axis model
6	6-axis model
7	7-axis model
8	8-axis model

Motor

12	12W	150	150W
20	20W	200	200W
30D	30W for DS	200S	200W for linear
30R	30W for RS	300	300W
60	60W	400	400W
100	100W	600	600W
100S	100 W for linear	750	750W

Encoder

I	Incremental
A	Absolute
G	Quasi-absolute

Option

B	Brake-equipped specification
C	Creep sensor specification
HA	High acceleration/ deceleration specification
L	Home sensor/LS-compatible
M	Master axis spec
S	Slave axis spec

Motor

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

Encoder

E	Not used
EP	EtherNet/IP
EC	EtherCAT

Option

E	Not used
IA	IA net-compatible

Dedicated network slot (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)
MC	Electronic cam Pulse I/O board
DG	DeviceNet Gateway master board

(*) Slots 1 to 3 are dedicated network slots where the selectable boards are fixed. Select one of the specified boards and enter the corresponding code.
(*) The above I/O boards can be installed in both I/O slots 1 and 2, but you can specify "DG" (DeviceNet Gateway board) only for slot 1.
(*) The dedicated network slots and I/O slots can be used at the same time.

I/O cable length

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

* With the I/O slots, if you do not select the input/output board (N□ / P□), input "0" (no cable) as the I/O cable length symbol.

Power/ voltage

2	Single-phase 200V
2L	Dedicated linear single-phase 200V
3	Three-phase 200V
3L	Dedicated linear 3-phase 200V

* Notes on selecting single-axis/Cartesian robots
The total wattage of single-axis/Cartesian robots connectable to the XSEL-R/S type is 2400 W in the case of the three-phase specification and 1600 W in the case of the single-phase specification.
The maximum wattage per axis is 750 W. Make sure the total wattage of each axis does not exceed the specified value.

**Note: For XSEL-R/S type, the following actuators are unavailable:
LSA series, RCS2-RA7/SRA7/SRGS7/SRGD7 series, RCS2-□□5N (Mini ROBO) series, and NS-SXM□/SZM□ (incremental specification only for both).**

Model Description Examples by Controller Types

Below shows model description examples for each controller type.
For more information about the I/O slots, please refer to the table "Possible I/O configuration by controller types" next page.

[XSEL-J/K type]

XSEL - J - 4 - 200A - 100A - 60A - 30A - N1 - N1EE - 2 - 1

Series	Type	Number of axes	Connected actuator motor wattage, Encoder type	Slot 1	Slot 2	I/O cable length	Power voltage
				I/O slot detail			

[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 type	Dedicated network slot 1	Slot 1	Slot 2/3/4	I/O cable length	Power voltage
				I/O slot detail				

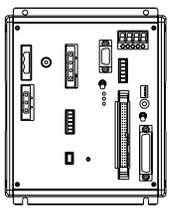
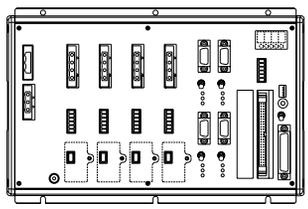
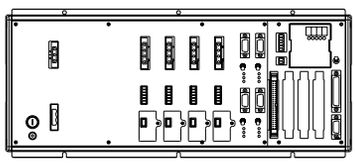
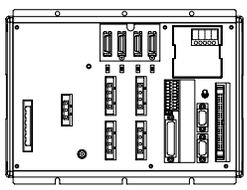
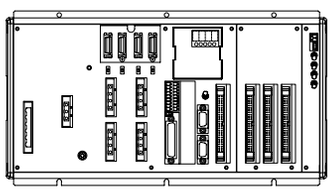
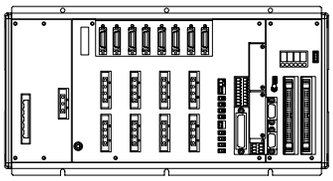
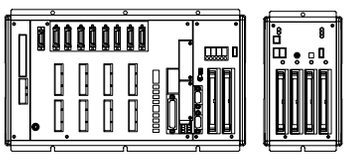
[XSEL-R/S type]

XSEL - R - 4 - 200A - 100A - 60A - 30A - EPDVE - N1E - 2 - 3

Series	Type	Number of axes	Connected actuator motor wattage, Encoder type	Dedicated network slot 1/2/3	Slot 1/2	I/O cable length	Power voltage
				I/O slot detail			

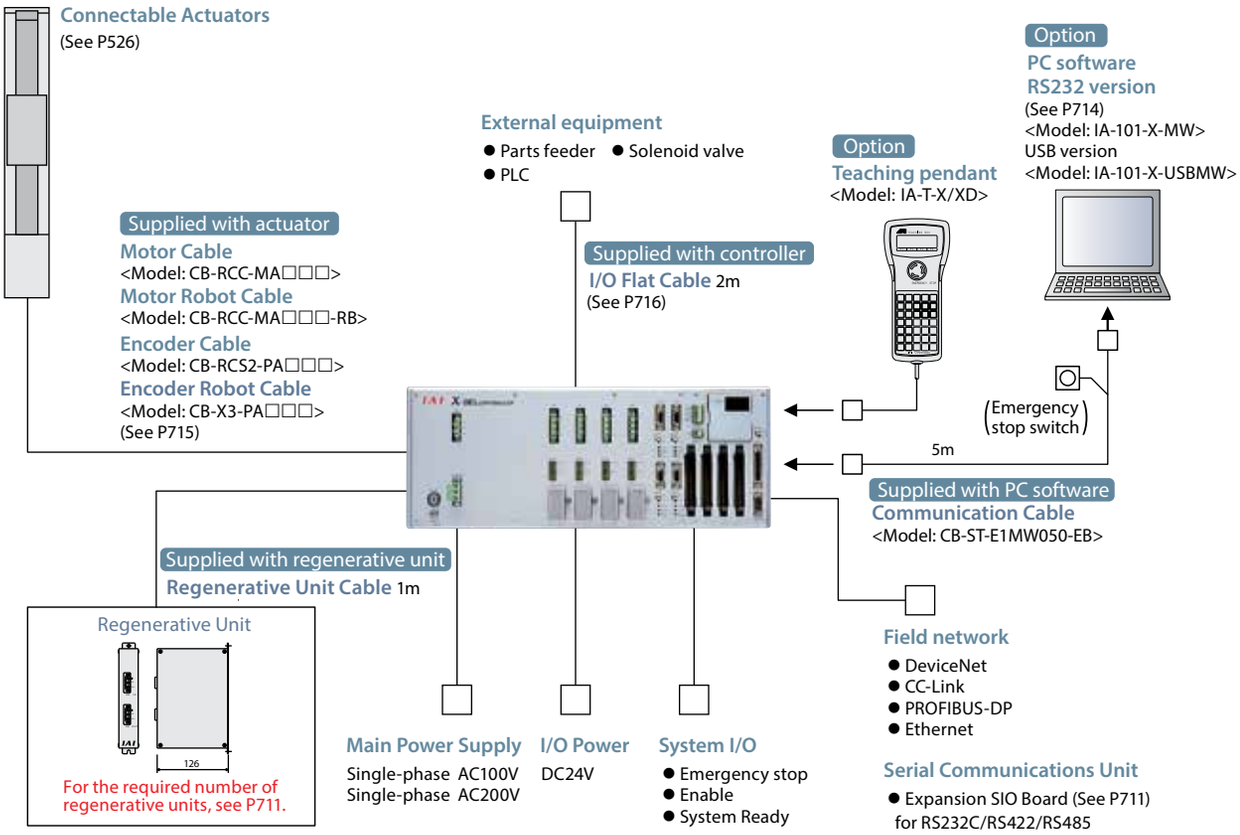
Possible I/O Configuration by Controller Types

Possible I/O (input and output) configuration varies depending on the XSEL controller type.
Please refer to the table below to find out possible I/O configuration for your desired controller type.
* For explanation of the symbols given to each slot in the table below, please refer to each controller model page, P696 and 697.

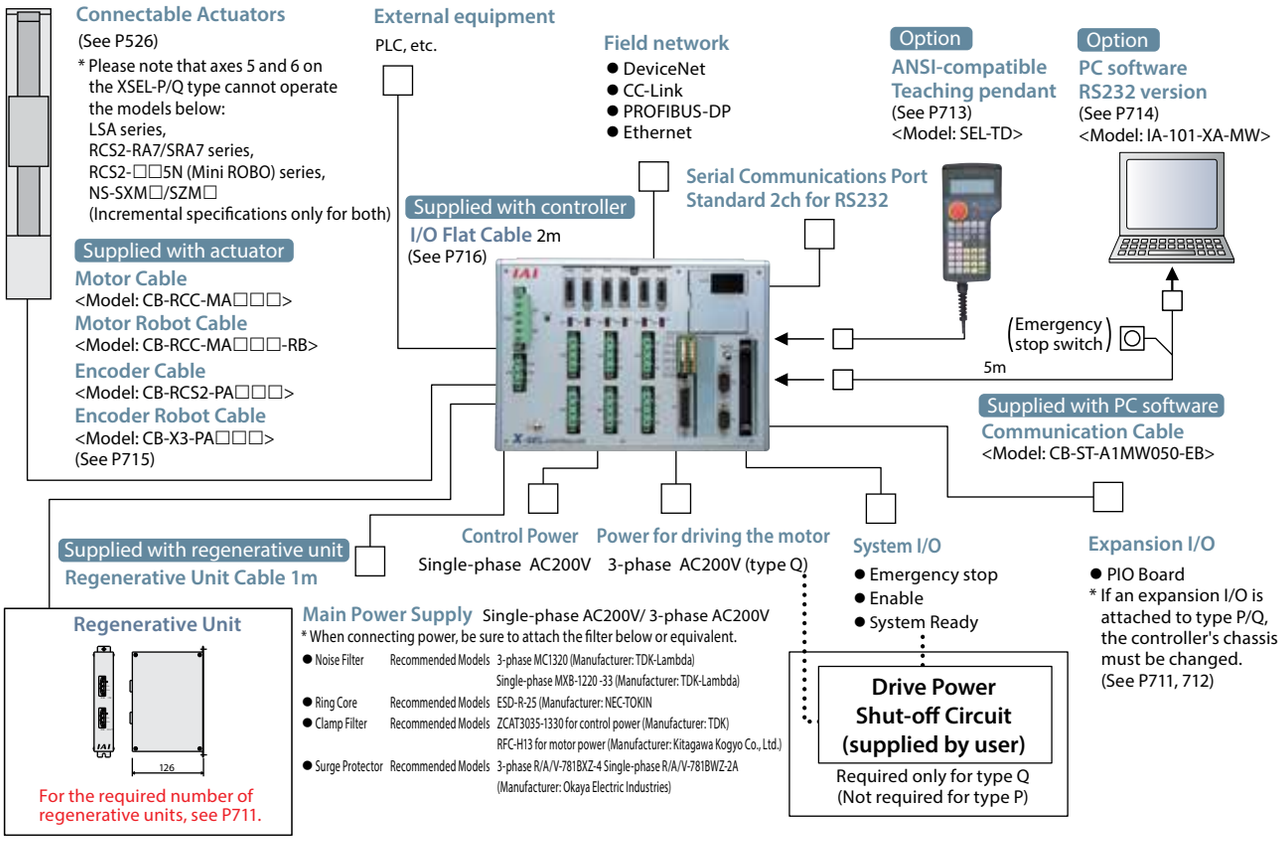
Controller type		External view	Possible I/O configuration by I/O slot							
			Dedicated network slot 1	Dedicated network slot 2	Dedicated network slot 3	Slot 1	Slot 2	Slot 3	Slot 4	Extension I/O unit
J type	1-axis/ 2-axis specification		(n/a)	(n/a)	(n/a)	N1 N3 P1 P3 DV CC PR ET	(n/a)	(n/a)	(n/a)	(n/a)
	3-axis/ 4-axis specification		(n/a)	(n/a)	(n/a)		E N1 N2 N3 P1 P2 P3 S☐	(n/a)	(n/a)	(n/a)
K type	Standard specification		(n/a)	(n/a)	(n/a)		E N1 N2 N3 P1 P2 P3 S☐	E N1 N2 N3 P1 P2 P3 S☐	E N1 N2 N3 P1 P2 P3 S☐	(n/a)
P type Q type	Standard specification		(n/a) DV CC PR EP ET	(n/a)	(n/a)	E N1 N2 N3 P1 P2 P3	(n/a)	(n/a)	(n/a)	(n/a)
	With extension slot specification			(n/a)	(n/a)		E N1 N2 N3 P1 P2 P3 S	E N1 N2 N3 P1 P2 P3 S	E N1 N2 N3 P1 P2 P3 S	(n/a)
R type S type	Standard specification		E EP EC	E DV CC PR	E IA	E N1 N2 N3 P1 P2 P3 MC DG	E N1 N2 N3 P1 P2 P3 MC	(n/a)	(n/a)	(n/a)
	With extension I/O unit							(n/a)	(n/a)	E N1 N2 N3 P1 P2 P3 / E N1 N2 N3 P1 P2 P3 / E N1 N2 N3 P1 P2 P3 / E N1 N2 N3 P1 P2 P3

System Configuration

■ XSEL-J (Compact) / K (General) / KE (CE type)

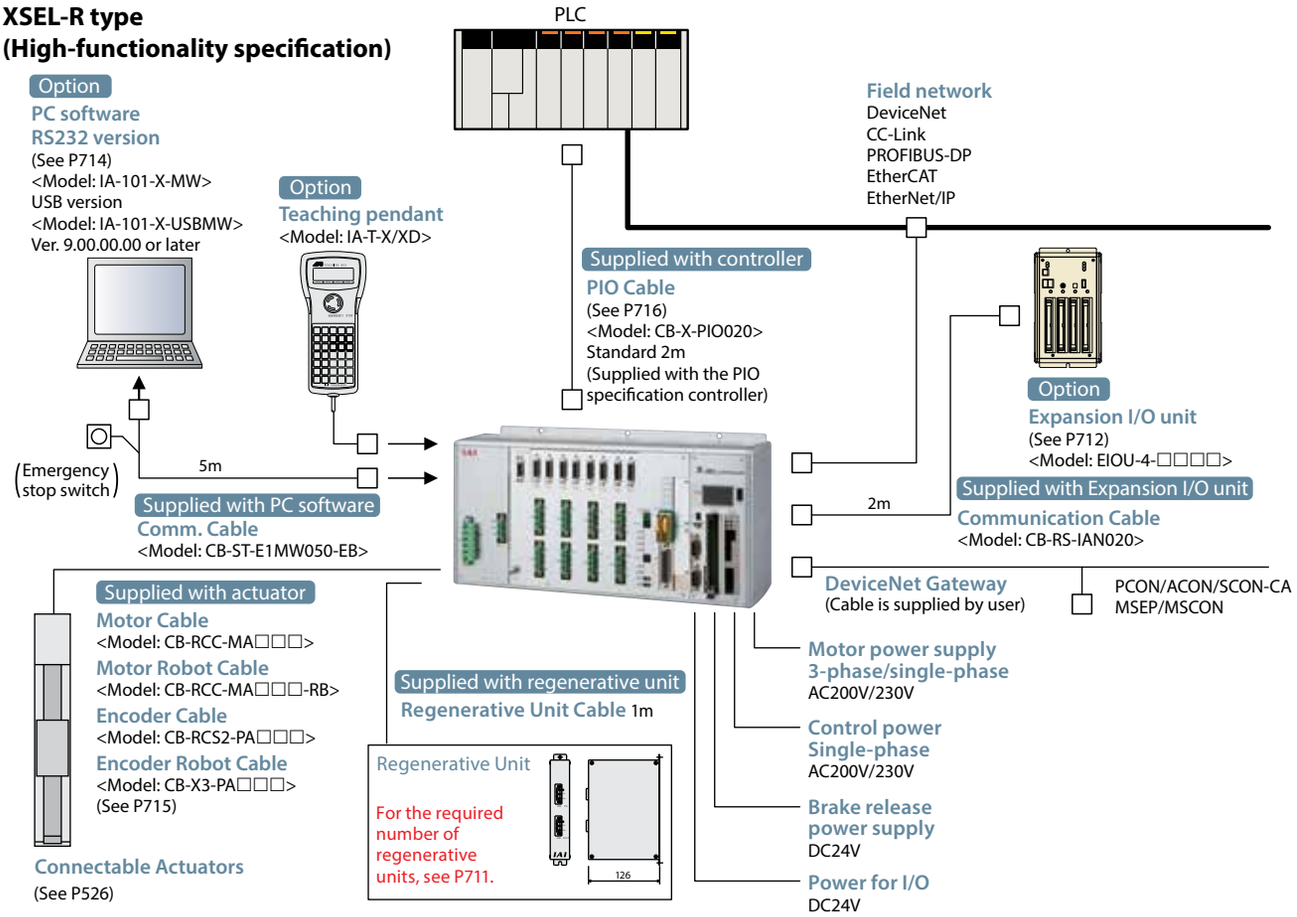


■ XSEL-P (Large-capacity type) / Q (Large-capacity global specification)

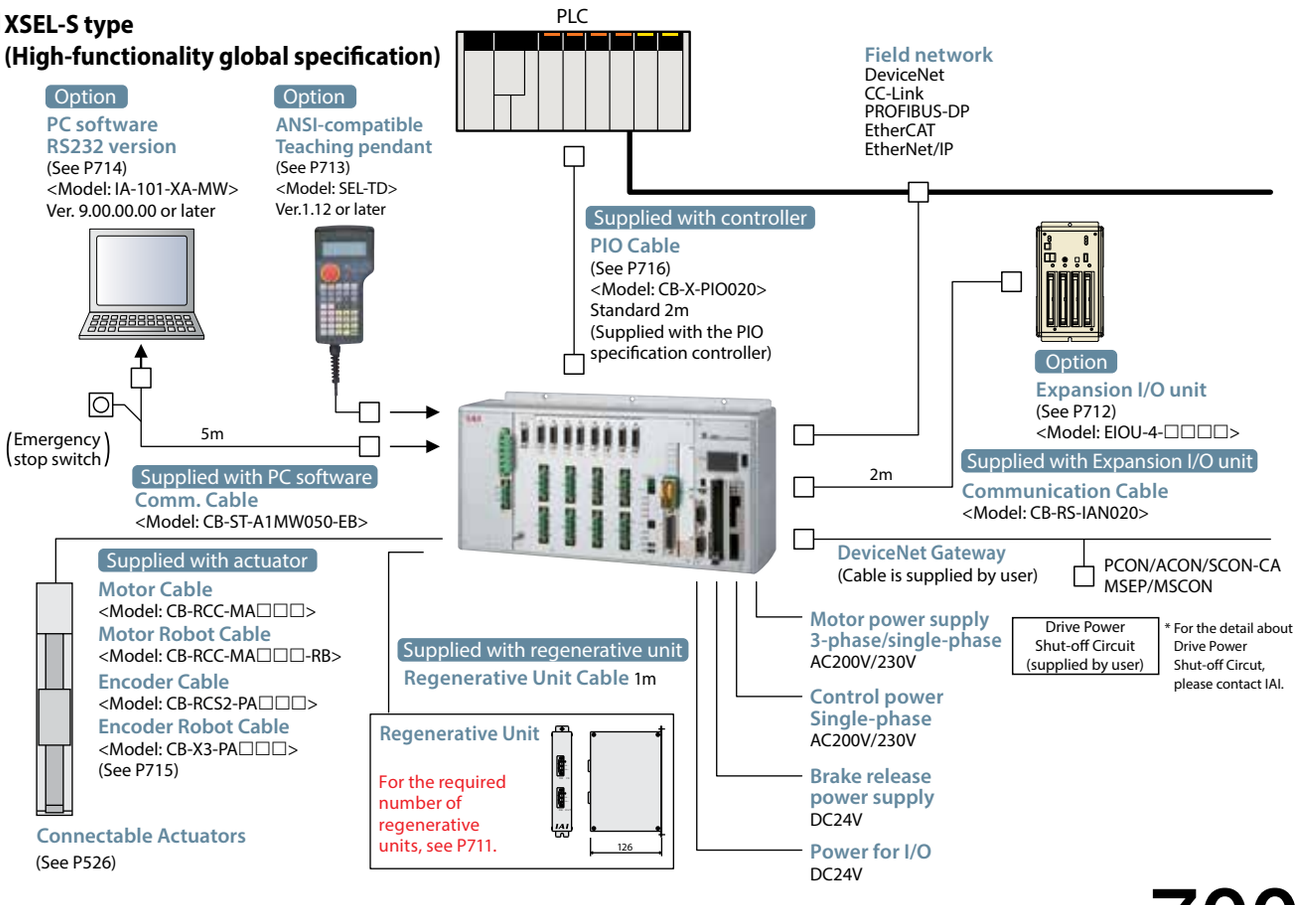


System Configuration

■ XSEL-R type (High-functionality specification)



■ XSEL-S type (High-functionality global specification)

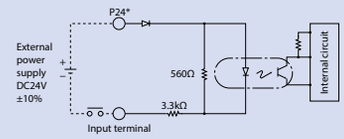


I/O wiring drawing

Input section External input specification (NPN specification)

Item	Specifications
Input voltage	DC24V ±10%
Input current	7mA / circuit
ON/OFF voltage	ON Voltage… Min DC16.0V / OFF Voltage… Max DC5.0V
Isolation method	Photocoupler
Externally Connected Equipment	① Non-Voltage Contact (Minimum load around DC5V, 1mA) ② Photoelectric Proximity Sensor (NPN Type) ③ PLC Transistor Output (Open Collector Type) ④ PLC Contact Output (Minimum Load approx. DC5V, 1mA)

[Input Circuit]

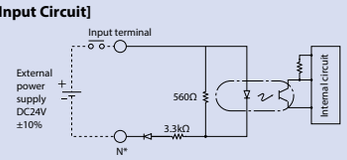


	K type	J/P/Q type
P24	IO24V Connector 24VIN	I/O Interface Pin No.1

Input section External input specification (PNP specification)

Item	Specifications
Input voltage	DC24V ±10%
Input current	7mA / circuit
ON/OFF voltage	ON Voltage… Min DC8V / OFF Voltage… Max DC19V
Isolation method	Photocoupler
Externally Connected Equipment	(1) Non-Voltage Contact (Minimum load around DC5V, 1mA) (2) Photoelectric Proximity Sensor (PNP Type) (3) PLC Transistor Output (Open Collector Type) (4) PLC Contact Output (Minimum Load approx. DC5V, 1mA)

[Input Circuit]

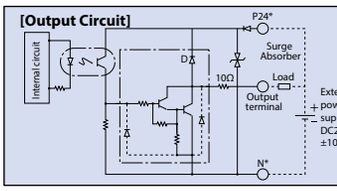


	K type	J/P/Q type
N	IO24V Connector 0V	I/O Interface Pin No.50

Output section External output specification (NPN specification)

Item	Specifications	
Load Voltage	DC24V	TD62084 (or equivalent)
Max. load current Leak current	100mA / point 400 mA Peak (Total Current)	
Isolation method	Max 0.1mA / point	
Externally Connected Equipment	Photocoupler	
	① Miniature Relay, ② PLC Input Unit	

[Output Circuit]



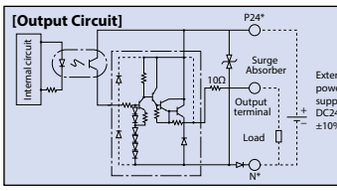
	K type	J/P/Q type
P24	IO24V Connector 24VIN	I/O Interface Pin No.1
N	IO24V Connector 0V	I/O Interface Pin No.50

Output section External input specification (PNP specification)

Item	Specifications	
Load Voltage	DC24V	TD62784 (or equivalent)
Max. load current	100mA /1 point 400mA / 8 ports (Note)	
Leak current	Max 0.1mA / point	
Isolation method	Photocoupler	
Externally Connected Equipment	(1) Miniature Relay, (2) PLC Input Unit	

(Note) 400mA is the maximum total load current for each set of the eight ports from output port No. 300. (The maximum total current output for output port No. 300+n to No. 300+n+7 must be 400mA, where n = 0 or a multiple of eight.)

[Output Circuit]



	K type	J/P/Q type
P24	IO24V Connector 24VIN	I/O Interface Pin No.1
N	IO24V Connector 0V	I/O Interface Pin No.50

I/O Signal table

Standard I/O Signal Table (when N1 or P1 is selected)

Pin No.	Classification	Port No.	Standard Settings
1		—	(J/P/Q type: 24V connection / K type: NC)
2		000	Program start
3		001	General Purpose Input
4		002	General Purpose Input
5		003	General Purpose Input
6		004	General Purpose Input
7		005	General Purpose Input
8		006	General Purpose Input
9		007	Program Specification (PRG No. 1)
10		008	Program Specification (PRG No. 2)
11		009	Program Specification (PRG No. 4)
12		010	Program Specification (PRG No. 8)
13		011	Program Specification (PRG No. 10)
14		012	Program Specification (PRG No. 20)
15		013	Program Specification (PRG No. 40)
16		014	General Purpose Input
17	Input	015	General Purpose Input
18		016	General Purpose Input
19		017	General Purpose Input
20		018	General Purpose Input
21		019	General Purpose Input
22		020	General Purpose Input
23		021	General Purpose Input
24		022	General Purpose Input
25		023	General Purpose Input
26		024	General Purpose Input
27		025	General Purpose Input
28		026	General Purpose Input
29		027	General Purpose Input
30		028	General Purpose Input
31		029	General Purpose Input
32		030	General Purpose Input
33		031	General Purpose Input
34		300	Alarm Output
35		301	Ready Output
36		302	Emergency Stop Output
37		303	General Purpose Output
38		304	General Purpose Output
39		305	General Purpose Output
40		306	General Purpose Output
41		307	General Purpose Output
42	Output	308	General Purpose Output
43		309	General Purpose Output
44		310	General Purpose Output
45		311	General Purpose Output
46		312	General Purpose Output
47		313	General Purpose Output
48		314	General Purpose Output
49		315	General Purpose Output
50		—	(J/P/Q type: 0V connection/K type: NC)

Extension I/O Signal Table (when N1 or P1 is selected)

Pin No.	Classification	Standard Settings
1		(J/P/Q type: 24V connection / K type: NC)
2		General Purpose Input
3		General Purpose Input
4		General Purpose Input
5		General Purpose Input
6		General Purpose Input
7		General Purpose Input
8		General Purpose Input
9		General Purpose Input
10		General Purpose Input
11		General Purpose Input
12		General Purpose Input
13		General Purpose Input
14		General Purpose Input
15		General Purpose Input
16		General Purpose Input
17	Input	General Purpose Input
18		General Purpose Input
19		General Purpose Input
20		General Purpose Input
21		General Purpose Input
22		General Purpose Input
23		General Purpose Input
24		General Purpose Input
25		General Purpose Input
26		General Purpose Input
27		General Purpose Input
28		General Purpose Input
29		General Purpose Input
30		General Purpose Input
31		General Purpose Input
32		General Purpose Input
33		General Purpose Input
34		General Purpose Output
35		General Purpose Output
36		General Purpose Output
37		General Purpose Output
38		General Purpose Output
39		General Purpose Output
40		General Purpose Output
41		General Purpose Output
42	Output	General Purpose Output
43		General Purpose Output
44		General Purpose Output
45		General Purpose Output
46		General Purpose Output
47		General Purpose Output
48		General Purpose Output
49		General Purpose Output
50		(J/P/Q type: 0V connection/K type: NC)

Extension I/O Signal Table (when N2 or P2 is selected)

Pin No.	Classification	Standard Settings
1		(J/P/Q type: 24V connection / K type: NC)
2		General Purpose Input
3		General Purpose Input
4		General Purpose Input
5		General Purpose Input
6		General Purpose Input
7		General Purpose Input
8		General Purpose Input
9	Input	General Purpose Input
10		General Purpose Input
11		General Purpose Input
12		General Purpose Input
13		General Purpose Input
14		General Purpose Input
15		General Purpose Input
16		General Purpose Input
17		General Purpose Input
18		General Purpose Output
19		General Purpose Output
20		General Purpose Output
21		General Purpose Output
22		General Purpose Output
23		General Purpose Output
24		General Purpose Output
25		General Purpose Output
26		General Purpose Output
27		General Purpose Output
28		General Purpose Output
29		General Purpose Output
30		General Purpose Output
31		General Purpose Output
32		General Purpose Output
33		General Purpose Output
34	Output	General Purpose Output
35		General Purpose Output
36		General Purpose Output
37		General Purpose Output
38		General Purpose Output
39		General Purpose Output
40		General Purpose Output
41		General Purpose Output
42		General Purpose Output
43		General Purpose Output
44		General Purpose Output
45		General Purpose Output
46		General Purpose Output
47		General Purpose Output
48		General Purpose Output
49		General Purpose Output
50		(J/P/Q type: 0V connection/K type: NC)

Standard Multipoint I/O Signal Table

■ Note: Dedicated to J (Compact) Type

Pin No.	Classification	Port No.	Standard Settings
1	—	—	External Power Supply (DC24V) for Pin No. 2-25/ 51-74
2	Input	000	Program Start
3		001	General Purpose Input
4		002	General Purpose Input
5		003	General Purpose Input
6		004	General Purpose Input
7		005	General Purpose Input
8		006	General Purpose Input
9		007	Program Specification (PRG No.1)
10		008	Program Specification (PRG No.2)
11		009	Program Specification (PRG No.4)
12		010	Program Specification (PRG No.8)
13		011	Program Specification (PRG No.10)
14		012	Program Specification (PRG No.20)
15		013	Program Specification (PRG No.40)
16		014	General Purpose Input
17		015	General Purpose Input
18		016	General Purpose Input
19		017	General Purpose Input
20		018	General Purpose Input
21		019	General Purpose Input
22		020	General Purpose Input
23		021	General Purpose Input
24		022	General Purpose Input
25		023	General Purpose Input
26	—	—	External Power Supply (DC24V) for Pin No. 27-50/ 76-99
27	Input	024	General Purpose Input
28		025	General Purpose Input
29		026	General Purpose Input
30		027	General Purpose Input
31		028	General Purpose Input
32		029	General Purpose Input
33		030	General Purpose Input
34		031	General Purpose Input
35		032	General Purpose Input
36		033	General Purpose Input
37		034	General Purpose Input
38		035	General Purpose Input
39		036	General Purpose Input
40		037	General Purpose Input
41		038	General Purpose Input
42		039	General Purpose Input
43		040	General Purpose Input
44		041	General Purpose Input
45		042	General Purpose Input
46		043	General Purpose Input
47		044	General Purpose Input
48		045	General Purpose Input
49		046	General Purpose Input
50		047	General Purpose Input
51	Output	300	Alarm Output
52		301	Ready Output
53		302	Emergency Stop Output
54		303	General Purpose Output
55		304	General Purpose Output
56		305	General Purpose Output
57		306	General Purpose Output
58		307	General Purpose Output
59		308	General Purpose Output
60		309	General Purpose Output
61		310	General Purpose Output
62		311	General Purpose Output
63		312	General Purpose Output
64		313	General Purpose Output
65		314	General Purpose Output
66		315	General Purpose Output
67		316	General Purpose Output
68		317	General Purpose Output
69		318	General Purpose Output
70		319	General Purpose Output
71		320	General Purpose Output
72		321	General Purpose Output
73		322	General Purpose Output
74		323	General Purpose Output
75	—	—	External Power Supply (0V) for Pin No. 2-25/ 51-74
76	Output	324	General Purpose Output
77		325	General Purpose Output
78		326	General Purpose Output
79		327	General Purpose Output
80		328	General Purpose Output
81		329	General Purpose Output
82		330	General Purpose Output
83		331	General Purpose Output
84		332	General Purpose Output
85		333	General Purpose Output
86		334	General Purpose Output
87		335	General Purpose Output
88		336	General Purpose Output
89		337	General Purpose Output
90		338	General Purpose Output
91		339	General Purpose Output
92		340	General Purpose Output
93		341	General Purpose Output
94		342	General Purpose Output
95		343	General Purpose Output
96		344	General Purpose Output
97		345	General Purpose Output
98		346	General Purpose Output
99		347	General Purpose Output
100	—	—	External Power Supply (0V) for Pin No. 27-50/ 76-99

Expansion Multipoint I/O Signal Table

■ Note: Dedicated to J (General Purpose) Type

Pin No.	Classification	Port No.	Standard Settings
1	—	—	External Power Supply (DC24V) for Pin No. 2-25/ 51-74
2	Input		General Purpose Input
3			General Purpose Input
4			General Purpose Input
5			General Purpose Input
6			General Purpose Input
7			General Purpose Input
8			General Purpose Input
9			General Purpose Input
10			General Purpose Input
11			General Purpose Input
12			General Purpose Input
13			General Purpose Input
14			General Purpose Input
15			General Purpose Input
16			General Purpose Input
17			General Purpose Input
18			General Purpose Input
19			General Purpose Input
20			General Purpose Input
21			General Purpose Input
22			General Purpose Input
23			General Purpose Input
24			General Purpose Input
25			General Purpose Input
26	—	—	External Power Supply (DC24V) for Pin No. 27-50/ 76-99
27	Input		General Purpose Input
28			General Purpose Input
29			General Purpose Input
30			General Purpose Input
31			General Purpose Input
32			General Purpose Input
33			General Purpose Input
34			General Purpose Input
35			General Purpose Input
36			General Purpose Input
37			General Purpose Input
38			General Purpose Input
39			General Purpose Input
40			General Purpose Input
41			General Purpose Input
42			General Purpose Input
43			General Purpose Input
44			General Purpose Input
45			General Purpose Input
46			General Purpose Input
47			General Purpose Input
48			General Purpose Input
49			General Purpose Input
50			General Purpose Input
51	Output		General Purpose Output
52			General Purpose Output
53			General Purpose Output
54			General Purpose Output
55			General Purpose Output
56			General Purpose Output
57			General Purpose Output
58			General Purpose Output
59			General Purpose Output
60			General Purpose Output
61			General Purpose Output
62			General Purpose Output
63			General Purpose Output
64			General Purpose Output
65			General Purpose Output
66			General Purpose Output
67			General Purpose Output
68			General Purpose Output
69			General Purpose Output
70			General Purpose Output
71			General Purpose Output
72			General Purpose Output
73			General Purpose Output
74			General Purpose Output
75	—	—	External Power Supply (0V) for Pin No. 2-25/ 51-74
76	Output		General Purpose Output
77			General Purpose Output
78			General Purpose Output
79			General Purpose Output
80			General Purpose Output
81			General Purpose Output
82			General Purpose Output
83			General Purpose Output
84			General Purpose Output
85			General Purpose Output
86			General Purpose Output
87			General Purpose Output
88			General Purpose Output
89			General Purpose Output
90			General Purpose Output
91			General Purpose Output
92			General Purpose Output
93			General Purpose Output
94			General Purpose Output
95			General Purpose Output
96			General Purpose Output
97			General Purpose Output
98			General Purpose Output
99			General Purpose Output
100	—	—	External Power Supply (0V) for Pin No. 27-50/ 76-99

XSEL Controller

Table of Specifications

■ J (Compact) / K (General Purpose)

Item	Description							
Controller Series, Type	J (Compact) Type				K (General Purpose) Type / KE (CE Compatible) Type			
Connecting actuator	RCS2 / ISA / ISPA / ISP / ISDA / ISDACR / ISPDACR / IF / FS / RS							
Compatible Motor Output (W)	20 / 30 / 60 / 100 / 150 / 200 / 300 / 400 / 600 / 750							
Number of control axes	1-axis	2-axis	3-axis	4-axis	1-axis	2-axis	3-axis	4-axis
Maximum Connected Axes Output (W)	Max. 800 (When power supply voltage is 200V) Max. 400 (When power supply voltage is 100V)				Max 800	Max. 1600 (When power supply voltage is 200V) Max. 800 (When power supply voltage is 100V)		
Input Voltage	100V Specification: Single-phase AC100 to 115V 200V Specification: Single-phase AC200 to 230V							
Motor Power Input	±10%							
Power Supply Frequency	50Hz/60Hz							
Power Supply Capacity	Max 1670VA		Max 1720VA	Max 1810VA	Max 1670VA	Max 3120VA	Max 3220VA	Max 3310VA
Position detection method	Incremental Encoder (Serial encoder) Absolute encoder with a rotational data backup (Serial encoder)							
Speed setting	1mm/sec and up, the maximum depends on actuator specifications							
Acceleration setting	0.01G and up, the maximum depends on the actuator							
Programming language	Super SEL language							
Number of programs	64 Programs							
Number of program steps	6,000 Steps (total)							
Number of multi-tasking programs	16 Programs							
Number of Positions	3,000 positions							
Data memory device	FLASH ROM+SRAM Battery Backup							
Data input method	Teaching pendant or PC software							
Standard Input/Output	32 points (total of dedicated inputs + general-purpose inputs) / 16 points (total of dedicated outputs + general-purpose outputs)							
Expansion Input/Output	None	48 points per unit (1 more unit can be installed)			48 points per unit (3 more units can be installed)			
Serial communications function	Teaching Port (25-pin D-sub) Standard Equipment				Teaching Pendant + Expansion SIO Board Installable (optional)			
Other Input/Output	System I/O (Emergency Stop Input, Enable Input, System Ready Output)							
Protection function	Motor overcurrent, Motor driver temperature check, Overload check, Encoder open-circuit check soft limit over, system error, battery error, etc.							
Ambient Operating Temp./Humidity	Temperature 0 to 40°C, Humidity 30 to 85%							
Ambient atmosphere	Free from corrosive gases. In particular, there shall be no significant dust.							
Weight	2.6kg	3.3kg	5.0kg		6.0kg		7.0kg	
Accessory	I/O Flat Cable							

■ P (Large-Capacity Standard Type) / Q (Large-Capacity Global Type)

Item	Description											
Controller Series, Type	P (Standard) Type						Q (Global) Type					
Connecting actuator	RCS2 / ISA / ISPA / ISP / ISDA / ISDACR / ISPDACR / IF / FS / RS / LSA											
Compatible Motor Output	20 / 30 / 60 / 100 / 150 / 200 / 300 / 400 / 600 / 750											
Number of Controlled Axes	1-axis	2-axis	3-axis	4-axis	5-axis	6-axis	1-axis	2-axis	3-axis	4-axis	5-axis	6-axis
Maximum Connected Axes Output (W)	Max 2400W (The single-phase AC200V specification is 1600W)											
Control Power Input	Single-phase AC170V to AC253V											
Motor Power Input	Single-phase/3-phase AC180V to AC253V						Single-phase/3-phase AC180V to AC253V					
Power Supply Frequency	50 / 60Hz											
Insulation Resistance	10MΩ or more (between the power-supply terminal and I/O terminals, and between all external terminals and case, at 500VDC)											
Withstand Voltage	AC1500V (1 minute)											
Power Supply Capacity (*1)	Max 1744VA	Max 3266VA	Max 4787VA	Max 4878VA	Max 4931VA	Max 4998VA	Max 1744VA	Max 3266VA	Max 4787VA	Max 4878VA	Max 4931VA	Max 4998VA
Position detection method	Incremental Encoder (Serial encoder) Absolute encoder with a rotational data backup (Serial encoder)											
Safety Circuit Configuration	Redundancy not supported						Double Redundant Enabled					
Drive Source Breaker System	Internal cutoff relay											
Enable Input	B Contact Input (Internal Power Supply Model)						B Contact Input (External Power Supply Model, Double Redundant)					
Speed setting	1mm/sec and up, the maximum depends on actuator specifications											
Acceleration/Deceleration Setting	0.01G and up, the maximum depends on the actuator											
Programming language	Super SEL language											
Number of programs	128 Programs											
Number of program steps	9,999 Steps (total)											
Number of multi-tasking programs	16 Programs											
Number of Positions	20,000 Positions (Total)											
Data memory device	FLASH ROM+SRAM Battery Backup											
Data input method	Teaching pendant or PC software											
Standard Input/Output	48-point I/O PIO Board (NPN/PNP), 96-point I/O PIO Board (NPN/PNP), 1 board can be installed											
Expansion Input/Output	48-point I/O PIO Board (NPN/PNP), 96-point I/O PIO Board (NPN/PNP), Up to 3 boards can be installed											
Serial communications function	Teaching Pendant (25-pin D-sub) Port + 2ch RS232C Port (9-pin D-sub x 2)											
Protection function	Motor overcurrent, overload, motor driver temperature check, overload check encoder open-circuit check, soft limit over, system error, battery error, etc.											
Ambient Operating Temp. Humidity, Atmosphere	0 to 40°C, 10 to 95% (non-condensing). Free from corrosive gases. In particular, there shall be no significant dust.											
Weight (*2)	5.2kg				5.7kg		4.5kg				5.0kg	
Accessory	I/O Flat Cable											

*1 When the connected axes represent the maximum wattage.
*2 Including the absolute-data backup battery, brake mechanism and expansion I/O box.

Table of Specifications

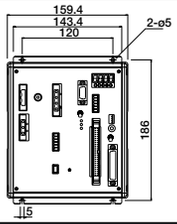
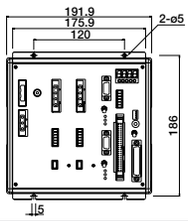
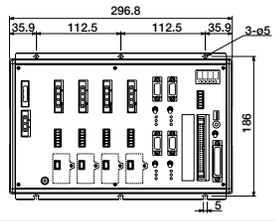
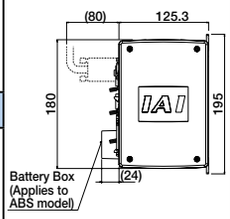
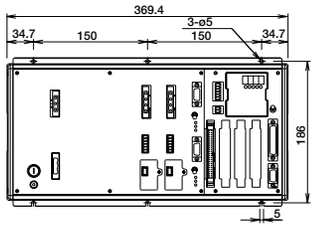
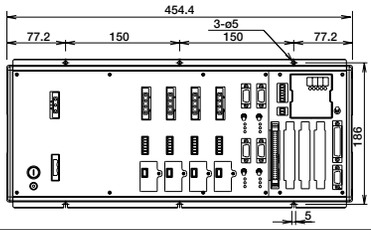
■ R (High-functionality type) / S (Safety-category compliant, high-functionality type)

Item	Description	
Controller Type	R Type	S Type
Applicable motor output	12W to 750W	
Number of control axes	1 to 8 axes	
Maximum connected axes output	[Three-phase specification] 2400W max. [Single-phase specification] 1600W max.	[Three-phase specification] 2400W max. [Single-phase specification] 1600W max.
Control power-supply input	Single-phase AC200/230V ± 10%	
Power supply frequency	50/60 Hz	
Insulation resistance	10 MΩ or more (500-VDC reading between the power-supply terminal and I/O terminal, and between all external terminals and the case)	
Withstand voltage	AC1500 V (1 minute)	
Power-supply capacity (max.)	5094 VA (at the maximum output of connected axes)	
Position detection method	Only incremental/absolute encoders of serial communication type are supported (for all axes).	
Safety circuit configuration	Redundancy not supported	Double Redundant Enabled
Drive source breaker system	Internal cutoff relay	External safety circuit
Emergency stop input	B Contact Input (Internal Power Supply Model)	B Contact Input (External Power Supply Model, Double Redundant)
Enable input	B Contact Input (Internal Power Supply Model)	B Contact Input (External Power Supply Model, Double Redundant)
Speed setting	1 mm/sec and up, the maximum depends on the actuator specifications	
Acceleration/ Deceleration setting	0.01 G and up, the maximum depends on the actuator specifications	
Programming language	Super SEL language	
Number of programs	128 programs	
Number of program steps	9,999 steps (total)	
Number of multi-tasking programs	16 programs	
Number of positions	Varies depending on the number of controlled axes. 6 axes: 20,000 positions, 8 axes: 16,000 positions (total)	
Data memory device	Flash ROM + non-volatile RAM (FRAM): System battery (button battery) not required	
Data input method	Teaching pendant or PC	
Standard input/output	2 boards can be installed, including a PIO board of 48 I/O points (NPN/PNP) and a PIO board of 96 I/O points (NPN/PNP)	
Expansion input/output	None (A separate expansion I/O unit can be used to add up to 4 PIO boards.)	
Serial communications function	Teaching port (D-sub 25 pins), 2-channel RS232C ports (D-sub 9 pins) Baud rate: 115.2 kbps max.	
IA net	Number of connected units: 64 controllers / Baud rate: 12 Mbps, fixed	
RC Gateway function	Channel 1 RS485 Port (D-sub 9 pins) or Channel 2 RS232C serial communication can be used. They cannot be used simultaneously.	
Fieldbus communication function	DeviceNet, CC-LINK, Profibus, EtherNet/IP, EtherCAT (One of EtherNet/IP and EtherCAT, and one of DeviceNet, CC-LINK and Profibus, can be supported at the same time.)	
Clock function	Retention time: Approx. 10 days Charge time: Approx. 100 hours	
Display unit	Optional panel unit (PU-1) can be connected.	
Regenerative resistance	Built-in regenerative resistor of 1 kΩ/20 W (External regenerative resistor unit(s) can be connected.)	
Absolute battery	AB-5 (built into the controller)	
Protection function	Motor overcurrent, overload, motor driver temperature check, overload check encoder open-circuit check, soft limit over, system error, battery error, etc.	
Ambient operating temp/humidity	0 to 40°C, 85% RH or less (non-condensing). Free from corrosive gases. In particular, there shall be no significant dust.	

* Refer to the operation manual or contact us for the power-supply capacity, etc.

External Dimensions

■ J (Compact) Type / K (General Purpose) Type

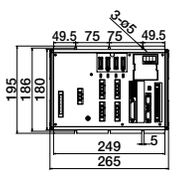
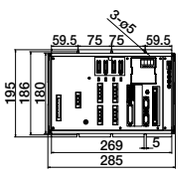
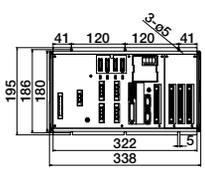
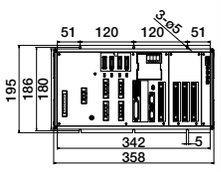
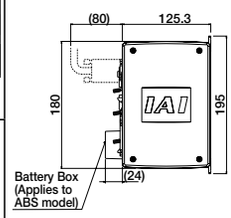
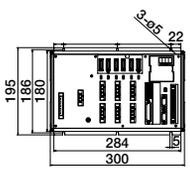
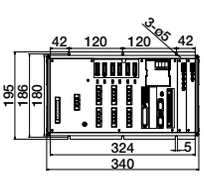
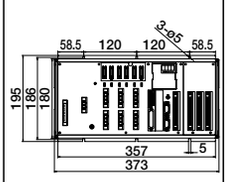
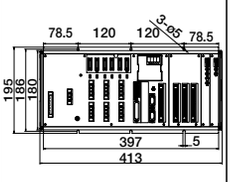
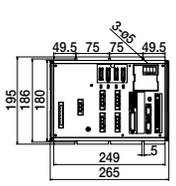
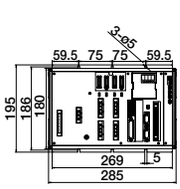
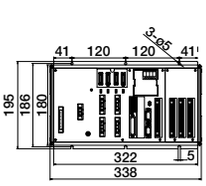
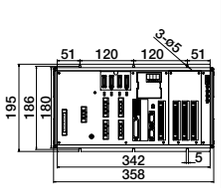
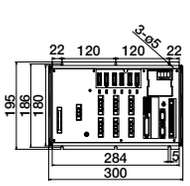
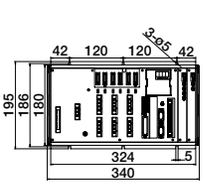
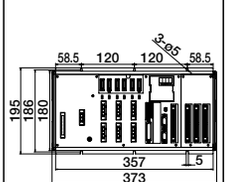
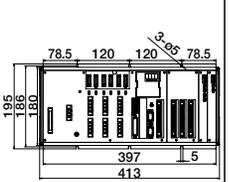
	1-axis specification	2-axis specification	3/4-axis specification	Side View
J type (Compact Type)				
	1/2-axis specification	3/4-axis specification		
K type (General Purpose Type)				

■ P (high-capacity standard type) / Q (high-capacity global type)

The XSEL-P/Q types have different shapes and dimensions in accordance with the controller specifications (encoder type, with/without brake, and with/without I/O expansion).
The 4 layouts below are available. Confirm dimensions to match the desired type and number of axes.

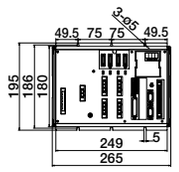
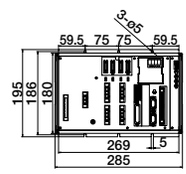
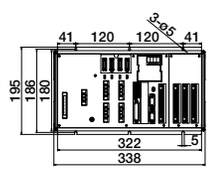
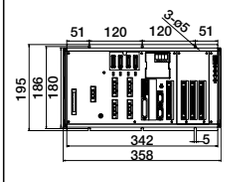
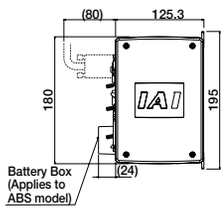
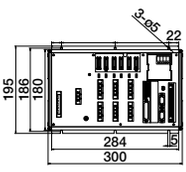
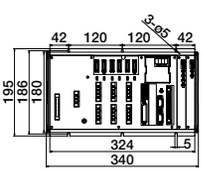
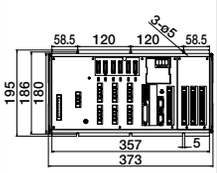
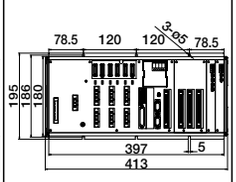
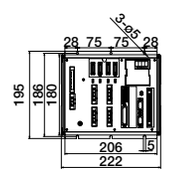
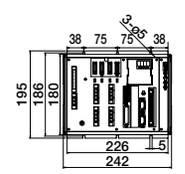
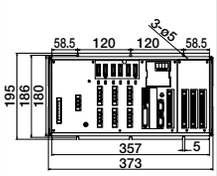
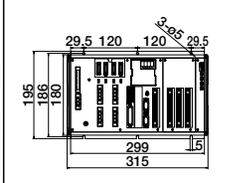
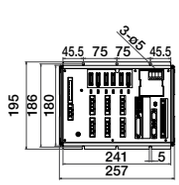
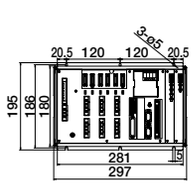
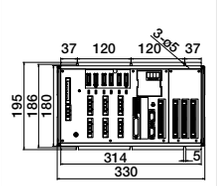
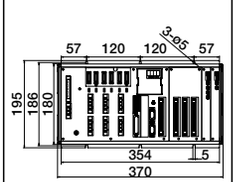
Caution
The specifications of the single phase 200V in Q type is the exterior dimension of P type.

[P Type]

		Basic Layout (Incremental Specification)	With brake/absolute unit	Basic Layout + I/O expansion base	With brake/absolute unit + I/O expansion base	Side View
Controllers Specifications	Encoder	Incremental	Absolute	Incremental	Absolute	
	Brake	None	Yes	None	Yes	
	I/O	Standard only	Standard only	Standard + Expansion		
Single phase Specifications	1 to 4 axis Specifications					
	5 to 6 axis Specifications					
3 phases Specifications	1 to 4 axis Specifications					
	5 to 6 axis Specifications					

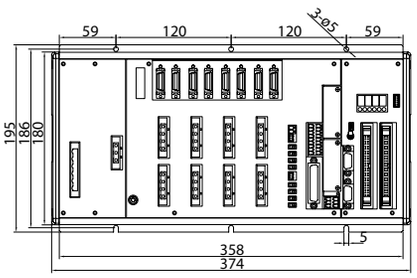
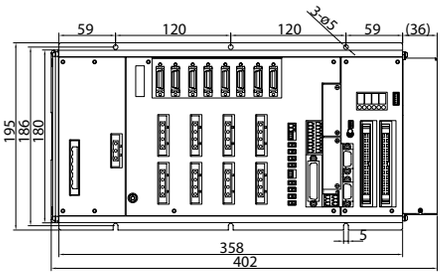
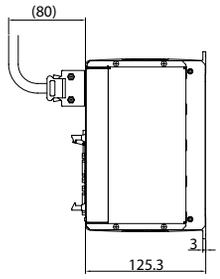
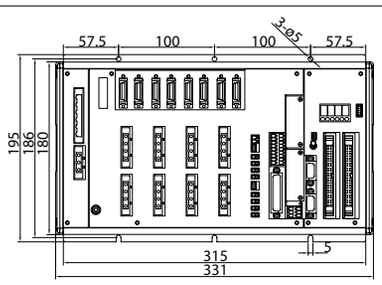
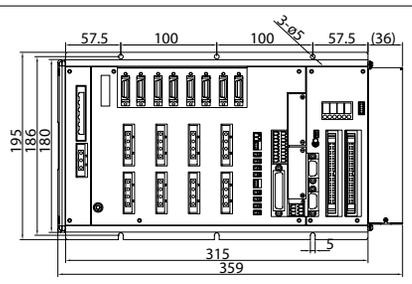
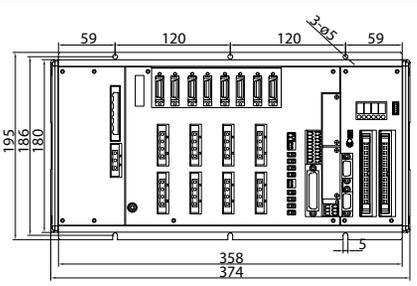
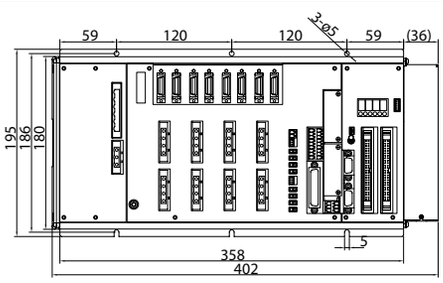
External Dimensional Drawing

[Q Type]

		Basic Layout (Incremental Specification)	With brake/absolute unit	Basic Layout + I/O expansion base	With brake/absolute unit + I/O expansion base	Side View
Controllers Specifications	Encoder	Incremental	Absolute	Incremental	Absolute	
	Brake	None	Yes	None	Yes	
	I/O	Standard only	Standard only	Standard + Expansion	Standard + Expansion	
Single phase Specifications	1 to 4 axis Specifications					
	5 to 6 axis Specifications					
3 phases Specifications	1 to 4 axis Specifications					
	5 to 6 axis Specifications					

External Dimensions

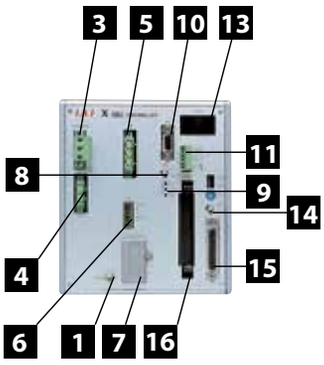
■ R (High-functionality type) / S (Safety-category compliant, high-functionality type)

		Front view		Side view
		Incremental specification	Absolute specification	
R (Note 1)	3-phase Single-phase			 (Common)
S (Note 1)	3-phase			
	Single-phase			

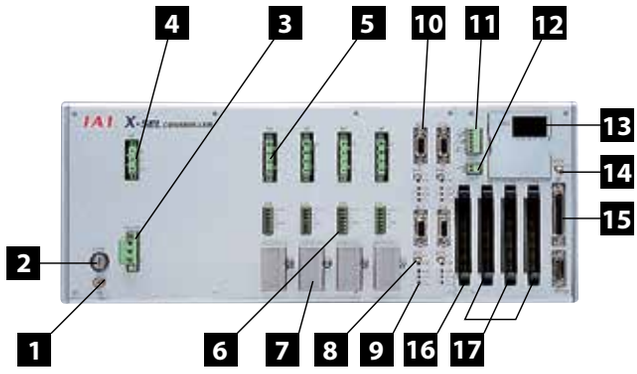
(Note 1) If any one of the connected axes is of absolute specification, the external dimensions for absolute specification shall apply.

Part Names

J type (Compact)



K type (General)



1 FG Connection Terminal

A terminal for connecting to the FG terminal on the enclosure.
The PE of the AC input are connected to the enclosure inside the controller.

2 FG Connection Terminal

This is the single-pole fuse holder for overcurrent protection in the AC input.

3 Main Power Input Connector

This connector is for the AC100/200V single-phase input.

4 Regeneration Resistance Unit Connector

This connector is for the regenerative resistance unit (optional/REU-1) that is connected when there is insufficient capacity with the built-in regenerative resistor for high-acceleration/high-loads, etc.

5 Motor Cable Connector

A connector for the motor power-supply cable of the actuator.

6 Actuator Sensor Input Connector

A connector for axis sensors such as LS, CREEP and OT.

7 Absolute-data backup battery

This is the encoder backup battery unit when an absolute encoder is used.
This battery is not connected for a non-absolute axis.

8 Brake Release Switch (Brake-equipped specification only)

Locking toggle switch for releasing the axis brake. Pull the switch forward and then tilt it up or down.
Set the switch to the top position (RLS) to forcibly release the brake, or to the bottom position (NOM) to have the brake automatically controlled by the controller.

9 Axis Driver Status LED

This LED is for monitoring the operating status of the driver CPU that controls the motor drive.
Features the following three LEDs.

Name	Color	Function description
ALM	Orange	Indicates when an error has been detected by the driver.
SVON	Green	Indicates that the servo is ON and the motor is driven.
BATT ALM	Orange	Indicates low absolute battery charge.

10 Encoder sensor cable connector

15-pin D-sub connector for the actuator encoder cable.

11 System I/O Connector

A connector for three input/output points including two inputs used to for the controller operation, and one system status output.

Name		
EMG	Emergency stop input	ON=operation enabled, OFF=emergency stop
ENB	Safety Gate Input	ON=operation enabled, OFF=servo OFF
RDY	System Ready Relay Output	This signal outputs the status of this controller. Cascade connection is supported. Short=ready, Open=not ready

12 I/O 24V Power Connector (K Type only)

16 , 17 This connector is for supplying external I/O power to the insulator when DIs and DOs are installed in the I/O boards.

13 Panel Window

This window has a 4-digit, 7-segment LED and five LED lamps showing the system status.

14 Mode switch

This is a locking toggle switch for designating the controller operating mode.
Pull the switch forward and then tilt it up or down.
The top position indicates the MANU (manual operation) mode, while the bottom position indicates the AUTO (automatic operation) mode.
Teaching can only be performed in manual operation, and automatic operation using external I/Os is not possible in the MANU mode.

15 Teaching Connector

This is a 25-pin D-sub connector for connecting a teaching pendant or PC cable to enter programmed positions.

16 Standard I/O Slot (Slot 1)

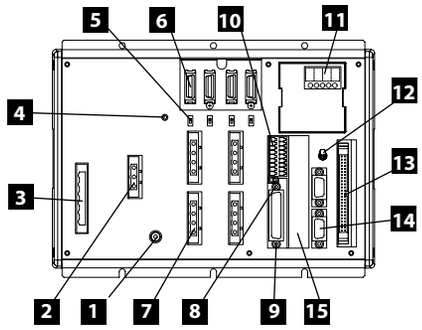
A 32-point input / 16-point output PIO board is installed as standard equipment.

17 Expansion I/O Slots (Slot 2, Slot 3, Slot 4)

Install an expansion I/O board. (Option)

Part Names

Type P (Standard 4-axis)



1 FG Connection Terminal

A terminal for connecting to the FG terminal on the enclosure. The PE of the AC input are connected to the enclosure inside the controller.

2 External regeneration unit connector

A connector for the regenerative resistor that must be connected when the built-in regenerative resistor alone does not offer sufficient capacity in high-acceleration/ high-load operation, etc. Whether or not an external regenerative resistor is necessary depends on the conditions of your specific application such as the axis configuration.

3 AC Power Input Connector

AC200V 3-phase input connector. It consists of six terminals including motor power-supply, control power-supply and PE terminals.
Standard equipment only includes a terminal block.
Due to risk of electrical shock, do not touch this connector while power is supplied.

4 Control Power Monitor LED

A green light illuminates while the control power supply is properly generating internal controller power.

5 Enable/Disable Switch for Absolute Battery

This switch is for enabling/disabling the encoder backup using the absolute data backup battery. The encoder backup has been disabled prior to shipment. After connecting the encoder/axis-sensor cables, turn on the power, and then set this switch to the top position.

6 Encoder/Axis Sensor Connector

A connector for axis sensors such as LS, CREEP and OT. *: LS, CREEP, and OT are options.

7 Motor connector

A connector for driving the motor in the actuator.

8 Teaching Pendant Type Selection Switch

This switch is for selecting the type of teaching pendant to connect to the teaching connector. Switch between an IAI standard teaching pendant and the ANSI-compatible teaching pendant. Operate the switch on the front face of the board in accordance with the teaching pendant used.

9 Teaching Connector

The teaching interface is used for connecting the IAI teaching pendant or the software on a PC to operate and configure the system, etc.

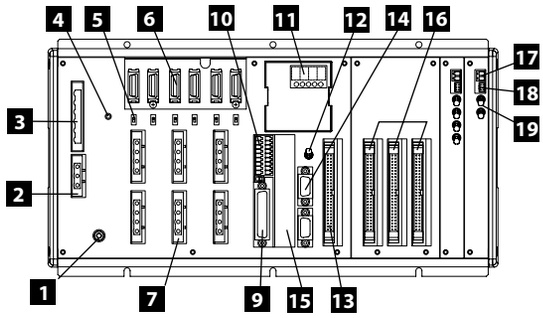
10 System I/O connector

A connector for managing the safety operation functions of the controllers. Controllers of the global specification let you configure a safety circuit conforming to safety categories of up to 4 using this connector and an external safety circuit.

11 Panel Window

This window consists of a 4-digit, 7-segment LED and five LED lamps showing the system status.

Type Q (Absolute brake unit + expansion base, 6-axis)



Description of five LEDs

Name	Status when LED is lit
RDY	CPU Ready (programs can be run)
ALM	CPU Power (System Down Level Error) CPU Hardware Problem
EMG	Emergency stop status, CPU hardware problem, or power system hardware problem
PSE	Power supply hardware problem
CLK	System clock problem

12 Mode switch

This is a locking toggle switch for designating the controller operating mode. Pull the switch forward and then tilt it up or down. The top position indicates the MANU (manual operation) mode, while the bottom position indicates the AUTO (automatic operation) mode. Teaching can only be performed in manual operation, and automatic operation using external I/Os is not possible in the MANU mode.

13 Standard I/O connector

50-pin flat connector structure, comprised of 32 input / 16 output DIOs.

Overview of Standard I/O Interface Specifications

Item	Details
Connector Name	I/O
Applicable connector	50-Pins, Flat Connector
Power Supply	Power is supplied through connector pins No. 1 and No. 50.
Input	32 points (including general-purpose and dedicated inputs)
Output	16 points (including general-purpose and dedicated inputs)
Connected to	External PLC, sensors, etc.

14 General-purpose RS232C Port Connector

This port is for connecting general-purpose RS232C equipment. (2-channels are available)

15 Field network board slot

A slot that accepts a fieldbus interface module.

16 Expansion I/O Board (optional)

Slots that accept optional expansion I/O boards.

17 Brake Power Input Connector

A power input connector for driving the actuator brake. DC 24V must be supplied externally. If this power supply is not provided, the actuator brake cannot be released. Be certain that power is supplied to the brake-equipped axis. Use a shielded cable for the brake power cable, and connect the shielding on the 24V power supply side.

18 Brake Release Switch Connector

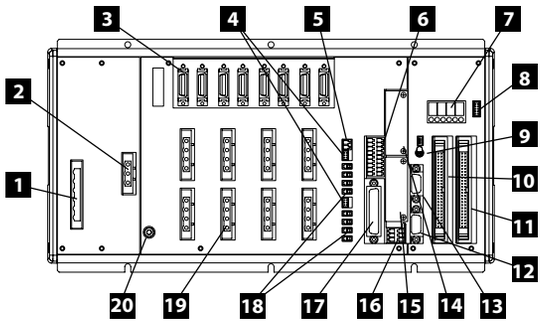
This switch is for A connector for the switch that releases the actuator brake externally to the controller. Shorting the COM terminal and BKMRL* terminal of this connector will release the brake. Use this method if you wish to manually operate the actuator after the controller has experienced a power failure or malfunction.

18 Brake Switch

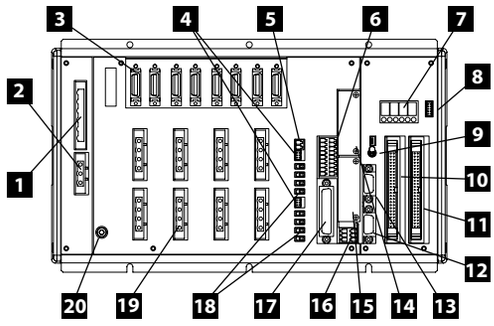
Locking toggle switch for releasing the axis brake. Pull the switch forward and then tilt it up or down. Setting it to the top position (RLS side) forcibly releases the brake, while setting it to the bottom position (NOM side) causes the controller to automatically control the brake.

Part Names

R type (High-functionality)



S type (Safety-category compliant, high-functionality)



1 AC Power Input Connector

AC200V to 230V single or 3-phase input connector. It consists of six terminals including motor power-supply, control power-supply and PE terminals.
Due to risk of electrical shock, do not touch this connector while power is supplied.

2 External Regeneration Unit Connector

This connector is used to connect a regenerative unit.

3 Encoder Connector

It is the connector to connect the actuator and encoder cable.

4 Brake Release Switch Connector

The signals of such as an external switch mounted externally to the controller are to be connected and the brake of the actuator equipped with a brake can compulsorily be released (Excitation release).

5 Brake Power Input Connector

It is a connector to connect the power supply for brake release for the actuator equipped with a brake. Supply 24V DC, 0.35A (per axis).

6 System I/O Connector

An I/O connector that controls the safety operations of the controller. With the S type (safety category compliant), a safety circuit complying with up to category 4 can be configured by having this connector and an external safety circuit.

7 Panel Window

This shows the controller status with four digits of seven-segment displays and six LED lamps.

8 Panel Unit Connector

This is a connector to connect Panel Unit PU-1 (option) for controller status display and error number display.

9 Mode Switch

This switch is used to specify an operation mode of the controller. It is a toggle switch with safety lever lock. Pull it towards you for operation.

Switch Position		Function
MANU (Manual Mode)	Upper	Teaching tool is activated.
AUTO (Automatic Mode)	Bottom Side	Teaching tool is inactivated. (Note) For S/SX/SD types, put the enclosed dummy plug to the teaching connector of 19. Unless it is plugged, the emergency stop would not be released.

10 I/O Slots 1

Either of PIO board (option) or RC Gateway fieldbus board (option) is to be inserted.

11 I/O Slots 2

PIO board (Option) is inserted.

12 General-purpose RS232C Port Connectors 1

This is a port for connections with external RS232C devices.

13 General-purpose RS232C Port Connectors 2

This is a port for connections with external RS232C devices.
This port is to be used when using RC Gateway SIO functions (standard).

14 Field Network Board (option) Mounted Position 1

The EtherNet/IP or EtherCAT Field Network Board (option) is to be mounted.

15 Field Network Board (option) Mounted Position 2

The CC-Link, DeviceNet or PROFIBUS-DP Field Network Board (option) is to be mounted.

16 IA Net Connector

In the case that the IA net (option) function is to be added, the dedicated connector is attached. This connector is to be used for connections of IA-Net and expansion I/O units.

17 Teaching Connector

This is a connector to connect a teaching pendant or PC (PC software) for teaching tools to have operation and setting of actuators.

18 Brake Release Switch

This is a switch to compulsorily release (excitation release) the brake of the actuator equipped with a brake. The brake can be compulsorily released by putting the switch on RLS side when a manual operation of an actuator is required for the system startup, teaching or in an error occurrence.
Unless otherwise necessary, set the switch on NOM side.

Switch Position		Function
RLS (Brake Release)	Left Side	To release the brake compulsorily
NOM (Automatic Mode)	Right Side	Brake is controlled automatically by the controller. Servo ON : Brake release Servo OFF : Brake is activated

Warning

After having a brake compulsory release, make sure to set back on NOM (Automatic Mode) so the automatic control of the brake by the controller can be executed. It is extremely risky to leave it on RLS (brake release) status because the brake would not work when in emergency stop or the servo is turned OFF. For a vertically mounted actuator, slider or rod may drop and cause a critical accident.

19 Motor Cable Connector

It is the connector to connect the actuator motor cable.

20 FG (Frame Ground) Connection Terminal

This connection terminal is used to connect the FG point on the enclosure to ground. Make sure to ground properly for noise proof reasons.

Options

Regenerative Resistance Unit

Model **RESU-1** (Standars specification, second or subsequent unit)
RESUD-1 (DIN rail mount specification, second or subsequent unit)

Features This unit converts regenerative current that generates when the motor decelerates, to heat. Check the total wattage of the actuators to be operated and provide a regenerative resistance unit or units if required.

* Please see MSCON section page 662 for specification information and drawings.

Installation Standards — Determined by the total motor capacity of vertical axes connected.

Horizontal Application

Number of connecting units	P/Q Type	J Type	K Type
0 pc	~ 100W	~ 200W	~ 800W
1 pc	~ 600W	~ 800W	~ 1200W
2 pc	~ 1200W	—	~ 1600W
3 pc	~ 1800W	—	—
4 pc	~ 2400W	—	—

Vertical Application

Number of connecting units	P/Q Type	J Type	K Type
0 pc	~ 100W	~ 200W	~ 400W
1 pc	~ 600W	~ 600W	~ 800W
2 pc	~ 1000W	~ 800W	~ 1200W
3 pc	~ 1400W	—	When exceeding 1200W, please contact IAI.
4 pc	~ 2000W	—	
5 pc	~ 2400W	—	

Absolute Data Retention Battery (For XSEL-J/K/KE/KT/KET)

Model **IA-XAB-BT**

Features A battery that retains the data stored in an absolute type controller.
Replace when the controller battery alarm illuminates.

Packaging 1 Unit (One battery is required for each axis.
Specify a quantity for the number of axes used.)

Absolute Data Retention Battery (For XSEL-P/Q)

Model **AB-5**

Features Absolute data retention battery for operating actuators under absolute specification.

Expansion PIO Board

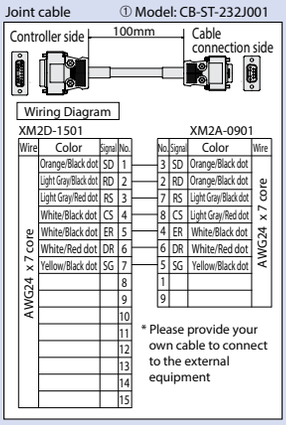
Details An optional board for adding I/O (input/output) points.
With the general-purpose and large-capacity types, up to three expansion PIO boards can be installed in the expansion slots.
(With the compact types, only one expansion PIO board can be installed in the expansion slot, provided that the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

Expansion SIO Board (General-Purpose Type)

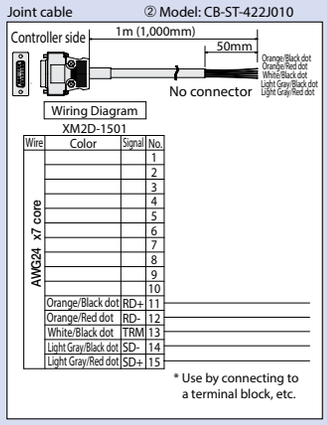
Model/Specifications
IA-105-X-MW-A
(for RS232C connection) (Board + joint cables (1), 2 included)
IA-105-X-MW-B
(for RS422 connection) (Board + joint cables (2), 1 included)
IA-105-X-MW-C
(for RS485 connection) (Board + joint cables (2), 1 included)

Details Board for serial communications with external equipment.
This board has two port channels and implements three communication modes using the supplied joint cable (s).

Joint cable ① Model: CB-ST-232J001



Joint cable ② Model: CB-ST-422J010



Field Network Connection Board

Model **DV/CC/PR/EP/EC** (* Specify in the controller model description)

Details By selecting a field network option in the controller I/O type, the corresponding field network board will be installed to the I/O slot.

< Network Correspondence Table >

	DeviceNet	CC-Link	PROFIBUS-DP	Ethernet	EtherNet/IP	EtherCAT
XSEL-J/K	●	●	●	●		
XSEL-P/Q	●	●	●	●	●	
XSEL-R/S	●	●	●		●	●

RC Gateway function (DeviceNet specification/ SIO specification)

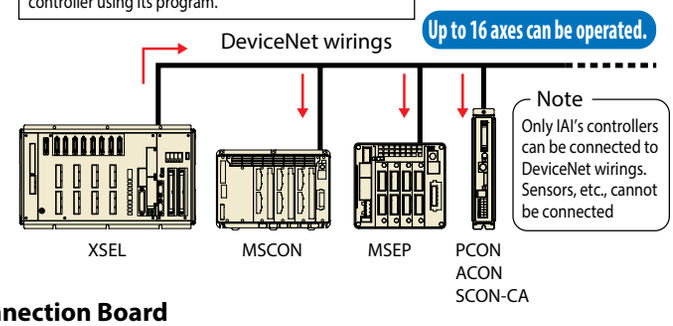
■Features Up to 16 actuator axes can be operated with a XSEL controller program, with the XSEL controller acting as the master and each ROBO Cylinder controller as a slave.

One of the following two methods can be selected for communication among the controllers.

Type	Comm. method	Comm. speed	How to use
DeviceNet specification	DeviceNet	500 kbps	The DeviceNet Gateway master board must be installed in an I/O slot of the XSEL controller. Specify "DG" as the I/O slot type for the XSEL controller.
SIO specification	RS232C	230.4 kbps	Use the 2-channel communication port (standard equipment) of the XSEL controller. To connect slave controllers, the dedicated 2-channel connection port cable is needed. (Model: CB-RS-SIO005, length 0.5m)

* Contact us for the wiring and setting methods for the RC Gateway function.

Able to operate axes connected to MSCON, MSEP and/or PCON/ACON/SCON-CA controllers from an XSEL controller using its program.



■ROBO Cylinder Gateway (DeviceNet specification) Connection Board

Model **DG** (* Specify in the controller model description)

Details (*Dedicated to XSEL-R/S)

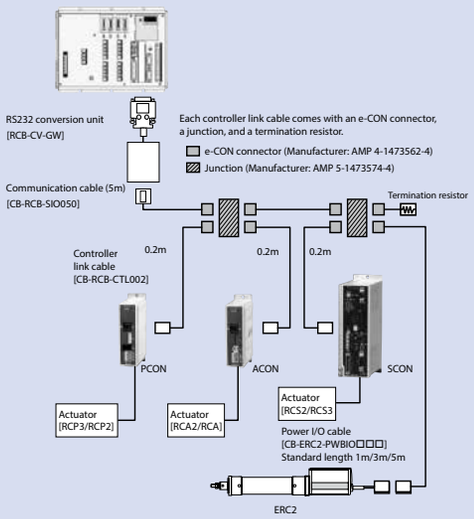
The network board for using the ROBO Cylinder gateway function with the DeviceNet specification XSEL-R/S controllers.

■ROBO Cylinder Gateway SIO Connection Unit

Model **RCB-CV-GW** (RS232 conversion unit)
CB-RCB-SIO050 (Communication cable)
CB-RCB-CTL (Controller link cable)

Details

The connection unit to be required for using the ROBO Cylinder gateway function with the XSEL-P/Q/R/S controllers.
An RS232 conversion unit, and a communication cable are required for each XSEL controller.
The required number of controller link cable corresponds to the number of ROBO Cylinder controller to be connected. (See the diagram to the right)



IA Net Function

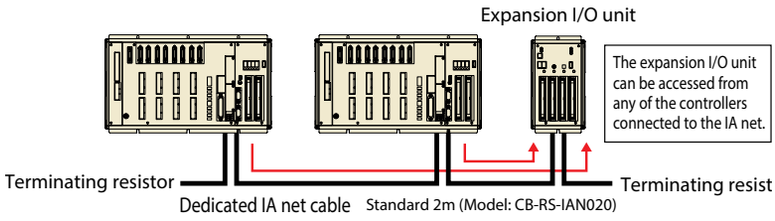
Features XSEL controllers can be interconnected via network to perform I/O communication between the controllers. I/Os can be added using the expansion I/O unit.

■Connection Board for IA Net

Model **IA** (* Specify in the controller model description)

Details

(*Dedicated to XSEL-R/S)
The network board for using the IA net or expansion I/O unit.



Expansion I/O Unit

Features

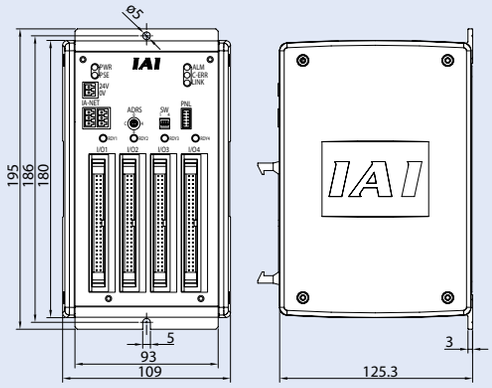
① Up to four expansion I/O boards can be added. (For the I/Os, up to 192 input points/192 output points can be added.)

② The expansion I/O unit can be shared by multiple XSEL controllers(*).
Note: Input signals from one expansion I/O board can be shared by multiple controllers, but output signals from one expansion I/O board should be used by only one controller.

(*Dedicated to XSEL-R/S)

* If the expansion I/O unit is used, select "IA net-compatible" when specifying the controller model.

External dimensional drawing



Model **EIOU-4-**(Slot 1 code) (Slot 2 code) (Slot 3 code) (Slot 4 code)
* Enter in each slot code field the code of the expansion I/Oboard to be added to the expansion I/O unit.

<Expansion I/O board codes>

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

Accessory Cable dedicated for IA net 2m (Model: CB-RS-IAN020)

Options

ANSI standard / CE mark compatible teaching pendant (dedicated to general purpose type)

Model

SEL-T
SEL-TD ANSI compliant
SEL-TD-26H Safety-category compliant, for PSEL/ASEL/SSEL
SEL-TD-25 Safety-category compliant, for XSEL

Features

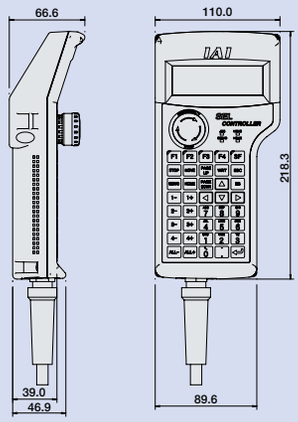
Splash-proof type that corresponds to protection level IP54. Improved operationability with separate keys for different functions. In addition, SEL-TD / SEL-TG has a 3-position enable switch and corresponds to ANSI standard.

Specifications

Item	Specifications
Ambient Operating Temp./Humidity	Temperature: 0 to 40°C Humidity: 30 to 85%RH or lower (non-condensing)
Protection mechanism	IP54 (Cable connector excluded)
Weight	400g or lower (Cable connector excluded)
Cable Length	5m
Indication	32 characters x 8 lines LCD display
Safety Rating	CE mark, ANSI standard (*)

(*) only SEL-TD / SEL-TG corresponds to ANSI standard.

Dimensions



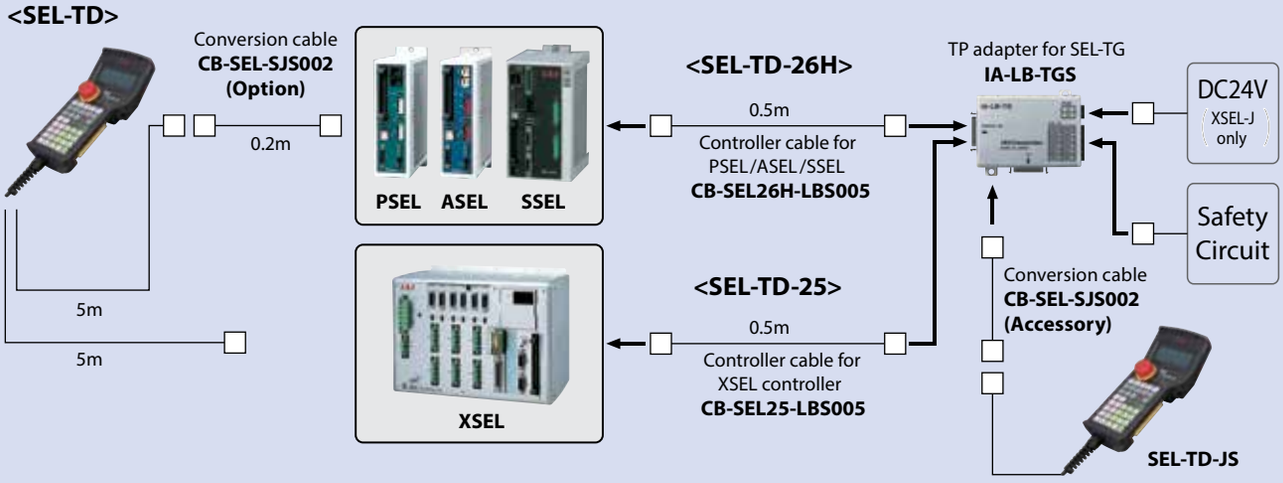
Teaching pendant - controller correspondence table

		SEL-T	SEL-TD	SEL-TD-26H/SEL-TD-25
		Splash-proof type	ANSI compliant splash-proof type	Safety-category compliant type
Program Controllers	PSEL/ASEL/SSEL	○ (Note 1)	○ (Note 1)	◎
	XSEL-J	×	×	○ (Note 2)
	XSEL-K	○	○	○
	XSEL-P	○	○	○
	XSEL-Q	○	◎	◎
	XSEL-KT	○	◎	◎
	XSEL-KE	○	○	○

* ◎ corresponds to safety category B to 4.
○ does not correspond to safety category, but connection is available.
(Note 1) To connect to PSEL/ASEL/SSEL, a conversion cable is necessary.
(Note 2) To connect SEL-TG to the XSEL-J/JX controller, DC24V needs to be applied to TP adaptor.

Wiring drawing

* SEL-TD can be directly connected to the controller. SEL-TG connects to the controller via the TP adapter. Function of the teaching pendant bodies are the same.



Details

The structures of following model options are as follows.

<Model: SEL-TD-26H>
- Teaching pendant <Model: SEL-TD-JS>
- TP adapter for SEL <Model: IA-LB-TGS>
- Controller connection cable <Model: CB-SEL26H-LBS005>
- Dummy plug <Model: DP-4S>

<Model: SEL-TD-25>
- Teaching pendant <Model: SEL-TD-JS>
- TP adapter for SEL <Model: IA-LB-TGS>
- Controller connection cable <Model: CB-SEL25H-LBS005>
- Dummy plug <Model: DP-4S>

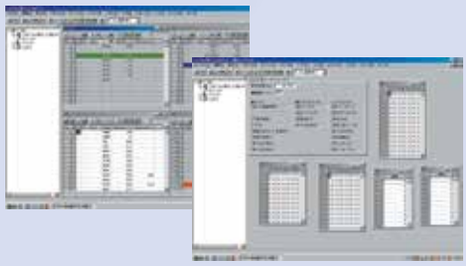
* The SEL-TG teaching pendant body is CE supported, however, IA-LB-TG is not.

PC software (Windows dedicated)

Model **IA-101-X-MW** (DOS/V ver.)

Note
* Versions older than 3.0.0 cannot be used with XSEL-P/Q.
* Versions older than 2.0.0 cannot be used with SCARA.
* Please use IA-101-XA-MW for safety category 4-compliant controller.
* Cannot be used with XSEL-Q/QX types.

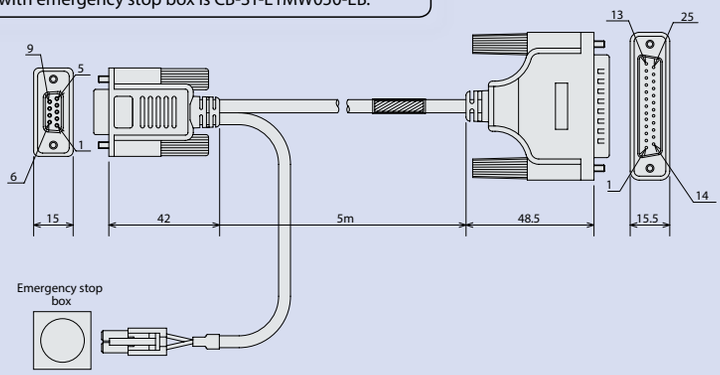
Features A startup support software program offering program/position input function, test operation function, monitoring function, and more.
The functions needed for debugging have been enhanced to help reduce the startup time.



Details Software (CD-ROM)
(Supported Windows OS: 2000 SP4 or later / XP SP2 or later / Vista / 7)
PC connecting cable 5m + Emergency stop box (Model: CB-ST-E1MW050-EB)

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

Note
When ordering a separate replacement PC cable, the model number for cable only is CB-ST-E1MW050, and for cable with emergency stop box is CB-ST-E1MW050-EB.



D-Sub/9-pin socket		Wiring Diagram	D-Sub/25-pin plug	
Connector hood FG			Connector hood FG	
Brown	2		2	Brown
Brown/Black	3		3	Brown/Black
Orange	5		7	Orange
Orange/Black				Orange/Black
	4		4	
	6		5	
	7		6	
	8		20	
			18	
			19	
ELP-02V				
Red	1		13	Red
Black	2		12	Red/Black
			1	Shield FG

(Shield)

Safety Category 4-compatible PC Software

Model **IA-101-XA-MW** (DOS/V version)

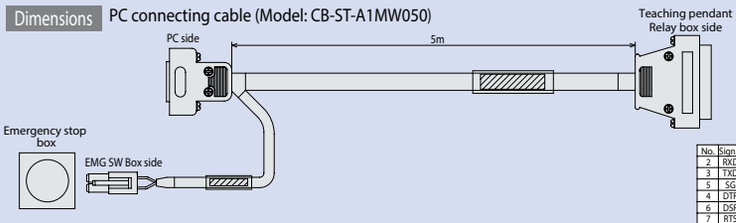
* The software is dedicated to the XSEL-KT/KET/Q/QX. It cannot be used with any other controllers.

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.

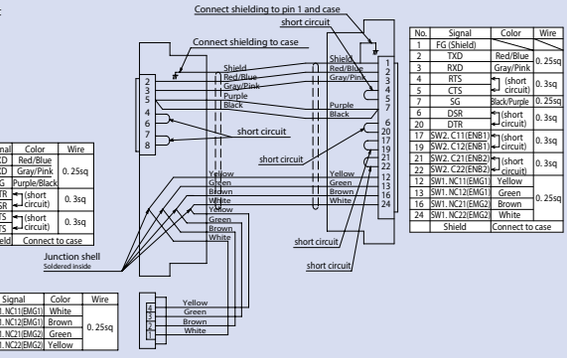
Details (Accessory) Software (CD-ROM)
(Supported Windows OS: 2000 SP4 or later / XP SP2 or later / Vista / 7)
PC connecting cable 5m + Emergency stop box (Model: CB-ST-A1MW050-EB)

Note:
When ordering a separate replacement PC cable, the model number for cable only is CB-ST-A1MW050, and for cable with emergency stop box is CB-ST-A1MW050-EB.

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



No.	Signal	Color	Wire
2	RXD	Red/Blue	0. 25sq
3	TXD	Gray/Pink	
5	SG	Purple/Black	
4	DTR	(short circuit)	0. 3sq
6	DSR	(short circuit)	
7	RTS	(short circuit)	0. 3sq
8	CTS	(short circuit)	
	Shield	Connect to case	



No.	Signal	Color	Wire
1	FG (Shield)		
2	TXD	Red/Blue	0. 25sq
3	RXD	Gray/Pink	
4	RTS	(short circuit)	0. 3sq
5	CTS	(short circuit)	
7	SG	Black/Purple	0. 25sq
6	DSR	(short circuit)	0. 3sq
20	DTR	(short circuit)	
17	SW2. C11(ENB1)	(short circuit)	0. 3sq
19	SW2. C12(ENB1)		
21	SW2. C21(ENB2)	(short circuit)	0. 3sq
22	SW2. C22(ENB2)		
12	SW1. NC11(EMG1)	Yellow	0. 25sq
13	SW1. NC12(EMG1)	Green	
16	SW1. NC21(EMG2)	Brown	
24	SW1. NC22(EMG2)	White	
	Shield	Connect to case	

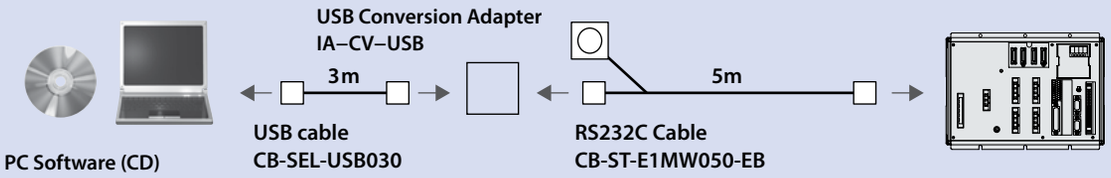
No.	Signal	Color	Wire
1	SW1. NC11(EMG1)	White	0. 25sq
2	SW1. NC12(EMG1)	Brown	
3	SW1. NC21(EMG2)	Green	
4	SW1. NC22(EMG2)	Yellow	

USB-compatible PC software

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

Features Software available by PC USB port by connecting a USB conversion adaptor to a RS232C cable.

Details Software (CD-ROM)
(Supported Windows OS: 2000 SP4 or later / XP SP2 or later / Vista / 7)
PC connecting cable 5m + Emergency stop box + USB conversion adaptor + USB cable 3m



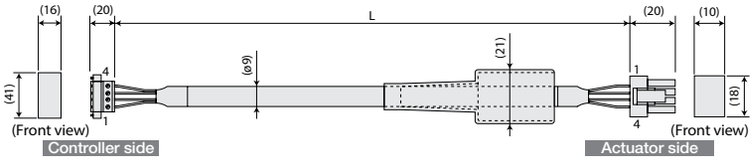
Spare Parts

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

Motor cable/Motor robot cable

Model **CB-RCC-MA □□□ / CB-RCC-MA □□□ -RB**

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8m



Wire	Signal	No.
0.75sq	PE	1
	U	2
	V	3
	W	4

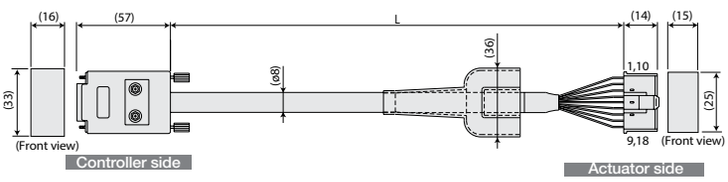
No.	Signal	Wire
1	U	0.75sq (crimped)
2	V	
3	W	
4	PE	

Min. bend radius r = 50mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track

Encoder cable/Encoder robot cable (for XSEL-J/K)

Model **CB-RCBC-PA □□□ / CB-RCBC-PA □□□ -RB**

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m



Wire	Signal	No.
0.15sq (crimped)	A/U	1
	$\overline{A/U}$	2
	B/V	3
	$\overline{B/V}$	4
	Z/W	5
	$\overline{Z/W}$	6
	SD	7
	$\overline{SD}$	8
	BAT+	9
	BAT–	10
	VCC	11
	GND	12
	BK–	13
	BK+	14
	–	15

The shield is connected to the hood by a clamp.
Ground wire and shield braiding

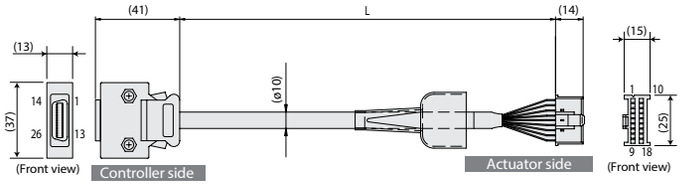
No.	Signal	Wire
1	A/U	0.15sq (crimped)
2	$\overline{A/U}$	
3	B/V	
4	$\overline{B/V}$	
5	Z/W	
6	$\overline{Z/W}$	
7	–	
8	–	
9	FG	
10	SD	
11	$\overline{SD}$	
12	BAT+	
13	BAT–	
14	VCC	
15	GND	
16	–	
17	BK–	
18	BK+	

Min. bend radius r = 50mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track

Encoder cable/Encoder robot cable (for XSEL-P/Q)

Model **CB-RCS2-PA □□□ / CB-X3-PA □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m



Wire	Color	Signal	No.
AWG26 (soldered)	–	–	10
	–	–	11
	–	E24V	12
	Gray/White	0V	13
	Brown/White	LS	26
	–	CREEP	25
	–	OT	24
	–	RSV	23
	–	–	9
	–	–	18
	–	–	19
	Pink	A+	1
	Purple	A–	2
	White	B+	3
	Blue/red	B–	4
	Orange/White	Z+	5
	Green/White	Z–	6
	Blue	SRD+	7
	Orange	SRD-	8
	Black	BAT+	14
	Yellow	BAT–	15
	Green	VCC	16
	Brown	GND	17
	Gray	BKR-	20
	Red	BKR+	21
	–	–	22

The shield is connected to the hood by a clamp.
Ground wire and shield braiding

No.	Signal	Color	Wire
1	A	Pink	AWG26 (crimped)
2	$\overline{A}$	Purple	
3	B	White	
4	$\overline{B}$	Blue/red	
5	Z	Orange/White	
6	$\overline{Z}$	Green/White	
7	LS+	Brown/White	
8	–	–	
9	FG	Ground	
10	SD	Blue	
11	$\overline{SD}$	Orange	
12	BAT+	Black	
13	BAT–	Yellow	
14	VCC	Green	
15	GND	Brown	
16	LS-	Gray/White	
17	BK–	Gray	
18	BK+	Red	

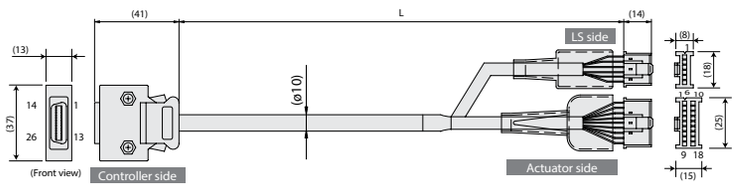
Min. bend radius r = 50mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track

Spare Parts

Rotary Dedicated Encoder Cable / Encoder Robot Cable

Model **CB-RCS2-PLA □□□ / CB-X2-PLA □□□**

* Enter the cable length (L) into □□□ . Compatible to a maximum of 30 meters.
Ex.: 080 = 8m



Wire	Color	Signal	No.
	–	–	10
	–	–	11
White/Orange	E24V		12
White/Green	0V		13
Brown/Blue	LS		26
Brown/Yellow	CREEP		25
Brown/Red	OT		24
Brown/Black	RSV		23
	–	–	9
	–	–	18
	–	–	19
White/Blue	A+		1
White/Yellow	A–		2
White/Red	B+		3
White/Black	B–		4
White/Purple	Z+		5
White/Gray	Z–		6
Orange	SRD+		7
Green	SRD–		8
Purple	BAT+		14
Gray	BAT–		15
Red	VCC		16
Black	GND		17
Blue	BKR–		20
Yellow	BKR+		21
–	–		22

AWG26 (soldered)

The shield is connected to the hood by a clamp.

Ground wire and shield braiding

No.	Signal	Color	Wire
1	E24V	White/Blue	AWG26 (crimped)
2	0V	White/Yellow	
3	LS	White/Red	
4	CREEP	White/Black	
5	OT	White/Purple	
6	RSV	White/Gray	

No.	Signal	Color	Wire
1	A	White/Blue	AWG26 (crimped)
2	A	White/Yellow	
3	B	White/Red	
4	B	White/Black	
5	Z	White/Purple	
6	Z	White/Gray	
7	–	–	
8	–	–	
9	FG	Ground	
10	SD	Orange	
11	SD	Green	
12	BAT+	Purple	
13	BAT–	Gray	
14	VCC	Red	
15	GND	Black	
16	–	–	
17	BK–	Blue	
18	BK+	Yellow	

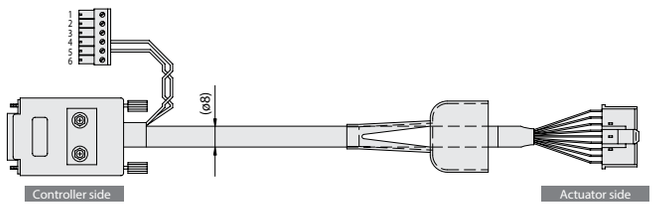
(The wire color "White/Blue" indicates the colors of the band and insulation.)

Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track

Encoder cable (when using a XSEL-J/K type a homing sensor is used)

Model **CB-RCBC-PLA □□□**

* Enter the cable length (L) into □□□ . Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m



MC1.5/6-ST-3.5

Wire	Color	Signal	No.
	–	E24V	6
	Black	0V	5
AWG24 (screwed on)	Red	LS	4
	–	CREEP	3
	–	OT	2
	–	RSV	1

17HE-23150-C-(D13A)

Wire	Color	Signal	No.
White/Blue	A+		1
White/Yellow	A–		2
White/Red	B+		3
White/Black	B–		4
White/Purple	Z+		5
White/Gray	Z–		6
Orange	SRD+		7
Green	SRD–		8
Purple	BAT+		9
Gray	BAT–		10
Red	VCC		11
Black	GND		12
Blue	BKR–		13
Yellow	BKR+		14
–	–		15

AWG26 (crimped)

The shield is connected to the hood by a clamp.

White/Green
White/Orange
Brown/Blue
Brown/Yellow
Brown/Red
Brown/Black

Ground wire and shield braiding

XMP-18V

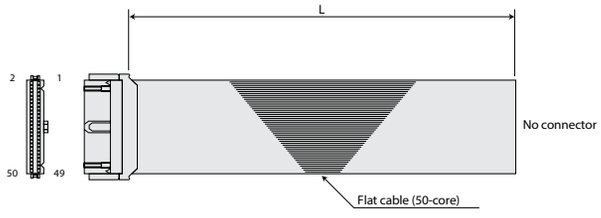
No.	Signal	Color	Wire
1	A	White/Blue	AWG26 (crimped)
2	A	White/Yellow	
3	B	White/Red	
4	B	White/Black	
5	Z	White/Purple	
6	Z	White/Gray	
7	LS+	White/Orange	
8	–	–	
9	FG	Ground	
10	SD	Orange	
11	SD	Green	
12	BAT+	Purple	
13	BAT–	Gray	
14	VCC	Red	
15	GND	Black	
16	LS–	White/Green	
17	BK–	Blue	
18	BK+	Yellow	

*This cable is a standard type.

I/O flat cable (for XSEL-J/K/P/Q)

Model **CB-X-PIO □□□**

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



Number	Color	Wire	Number	Color	Wire	Number	Color	Wire
1	Brown 1	Flat cable crimped	18	Gray 2	Flat cable crimped	35	Green 4	Flat cable crimped
2	Red 1		19	White 2		36	Blue 4	
3	Orange 1		20	Black 2		37	Purple 4	
4	Yellow 1		21	Brown-3		38	Gray 4	
5	Green 1		22	Red 3		39	White 4	
6	Blue1		23	Orange 3		40	Black 4	
7	Purple 1		24	Yellow 3		41	Brown-5	
8	Gray 1		25	Green 3		42	Red 5	
9	White 1		26	Blue 3		43	Orange 5	
10	Black 1		27	Purple 3		44	Yellow 5	
11	Brown-2		28	Gray 3		45	Green 5	
12	Red 2		29	White 3		46	Blue 5	
13	Orange 2		30	Black 3		47	Purple 5	
14	Yellow 2		31	Brown-4		48	Gray 5	
15	Green 2		32	Red 4		49	White 5	
16	Blue 2		33	Orange 4		50	Black 5	
17	Purple 2		34	Yellow 4				

PS-24

■Model PS-241/PS-242

DC24V Power supply for ROBO Cylinder

Features

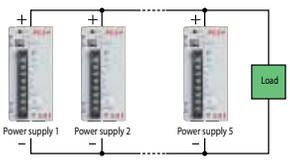
1 Maximum Momentary Output of 17A

Up to 17A of maximum momentary output current is possible at 8.5A rated output current. This lets you select an appropriate power-supply capacity based on the total rated current of actuators, without having to consider the maximum momentary current that may be generated by the actuators during acceleration. Because you no longer need to use an expensive high-capacity power supply, cost can be reduced substantially.

* The maximum momentary output current must be considered if the actuator operating conditions are tight. See the "Selection Guide" at right for details.

2 Parallel Operation Enabled

Up to 5 units can be operated in parallel. Therefore, even if the power capacity is insufficient with one unit, this can be easily remedied by adding one unit, without the need to replace the unit with a larger capacity power supply.



3 Load Detection Function

Load percentage can be detected by the RDY (Ready) display lamp and the RDY output signal.

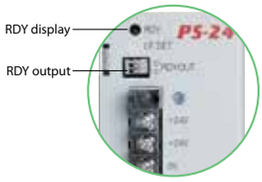


Table 1. PS-24 Rated Current and Allowable Maximum Momentary Electric Current

No. of Connected units	Rated current [A]	Max. momentary current [A]
1	8.5	17
2	15.5	30.6
3	22.95	45.9
4	30.6	61.2
5	38.25	76.5

Note: For the second and subsequent units, add a 10% safety buffer (loss).

Selection target Number of actuators connected

When selecting a power-supply unit for operating multiple actuators, normally a unit with a capacity equal to or exceeding the total maximum current of all actuators is chosen. However, actuators generate their maximum current only momentarily during acceleration, etc., and in many cases the power-supply is over-specified.
On the other hand, the PS-24 power supply provides the following advantages:
1. Supporting maximum momentary current of up to twice the rated current.
2. If you need more power-supply capacity, you can simply add an extra unit or units.
The above features let you select an optimal power-supply capacity.

Number of Power-Supply Units

Basically, how many power-supply units you need should be determined in such a way that the total rated current of all actuators will remain within the rated current of the PS-24. If the load condition is tight, however, the power-supply capacity may still become inadequate. In such cases, add an extra power supply or supplies.

"Severe load conditions" refers to:

- Large load (load is approaching the rated load capacity)
- High acceleration/deceleration
- High speed
- Simultaneous operation of multiple axes
- Use of the RCS2-SRA7 series (Structurally these actuators allow maximum current to flow for a longer period).

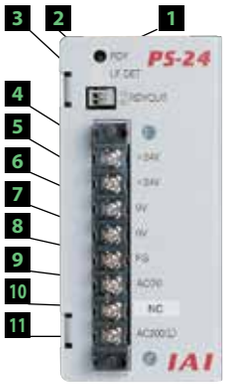
Table 2. Actuator vs. Power Supply Current

Controller type	Actuator type	Motor type	Power supply current [A]	
ACON ASEL ASEP	RCA	SA4, SA5, RA4 (20W) type	Rated	1.3
			Maximum	4.4
		SA6, RA4 (30W) type	Rated	1.3
			Maximum	4.0
		RA3 (20W) type	Rated	1.7
			Maximum	5.1
	RCA2	SA2A□ (5W) type	Rated	1.0
			Maximum	6.4
		SA3 (10W) type	Rated	1.3
			Maximum	4.4
		SA5, TA6 (20W) type	Rated	1.3
			Maximum	4.4
		RN3N, RP3N, GS3N, GD3N, SD3N TCA3N, TWA3N, TFA3N, TA4C, TA4R (10W) type	Rated	1.3
			Maximum	4.4
		SA6, TA7 (30W) type	Rated	1.3
			Maximum	4.4
		RA4, TA5 (20W) type	Rated	1.7
			Maximum	5.1
		RN4N, RP4N, GS4N, GD4N, SD4N TCA4N, TWA4N, TFA4N (20W) type	Rated	1.7
			Maximum	5.1
	RCL	RA1L, SA1L (2W) type	Rated	0.8
			Maximum	4.6
		RA2L, SA2L (5W) type	Rated	1.0
			Maximum	6.4
		RA3L, SA3L (10W) type	Rated	1.3
			Maximum	6.4
PCON PSEL PSEP MSEP	RCP2 RCP3	20P	Rated	0.4
			Maximum	2.0
		28P	Rated	0.4
			Maximum	2.0
		35P	Rated	1.2
			Maximum	2.0
		42P	Rated	1.2
			Maximum	2.0
		56P	Rated	1.2
			Maximum	2.0
PCON-CA	RCP4	42P, 56P High-output setting disabled	Rated	3.5
			Maximum	4.2
		42P, 56P High-output setting enabled	Rated	2.2
			Maximum	
PCON-CFA	RCP2	60P, 86P	Maximum	6.0
DSEP	RCD	RCD (2.5W)	Rated	0.7
			Maximum	1.5
ERC2		SA6, SA7, RA6, RA7	Maximum	2.2
ERC3		SA5, SA7, RA5, RA6 High-output setting disabled	Rated	3.5
			Maximum	4.2
		SA5, SA7, RA5, RA6 High-output setting enabled	Maximum	2.2

Model/Standard Price

Model	PS-241	PS-242
Standard Price	—	—

Names



1 Ready indicating light (RDY)

2 Level setting dial for over load detection (LF.DET)

*Appropriate value settled at shipment. Operation not needed.

3 Ready output signal (RDYOUT)

4 **5** +24V Output terminal (+24V)

*45 connected internally.

6 **7** 0V Output terminal (0V)

*67 connected internally.

8 Frame ground terminal (FG)

Terminal for ground.

9 AC input terminal (AC (N))

10 AC input terminal (AC100V) (AC100 (L))

11 AC input terminal (AC200V) (AC200 (L))

*AC100V input type should be connected to 9 and 0 interval, AC200V to9 andA. Unavailable for combined use.

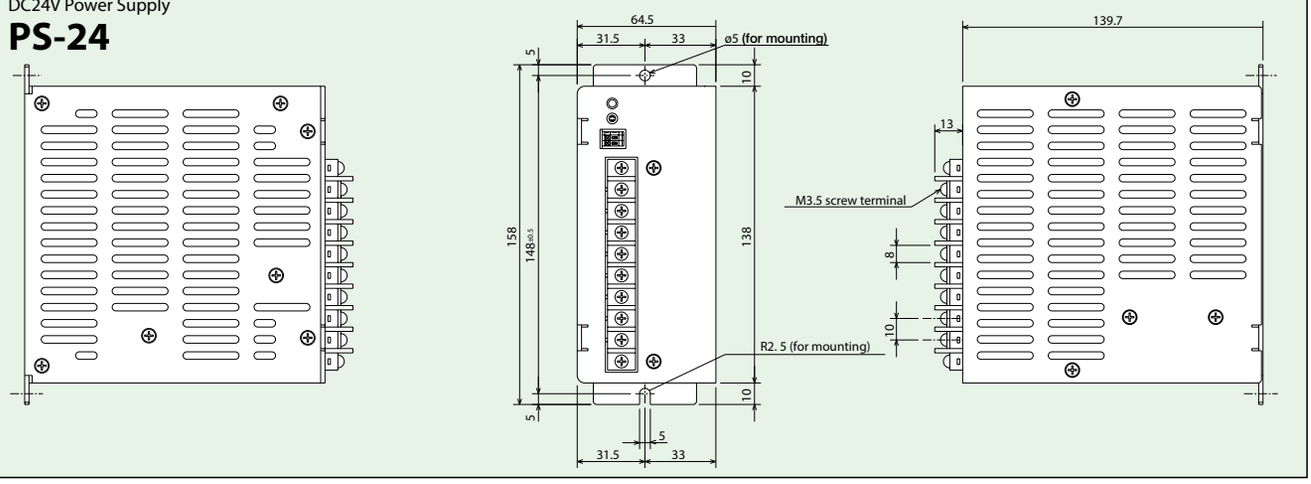
Specification List

Item	PS-241	PS-242
Rated DC output voltage	24V±10% (varied depending on the load)	
Rated DC output current	8.5A	
Instantaneous max. output current	17A	
Rated output capacity	204W	
Efficiency	80%	80%
Rated input (frequency)	AC100~115V (50/60Hz)	AC200~230V (50/60Hz)
Input voltage range	AC85~125V	AC170~250V
Input current	3.50A (100VAC full load)	1.80A (200VAC full load)
Output holding time	20 [msec] (Ambient temperature 25ºC under rated input/output condition)	
Protection circuit	Protection from overcurrent, overvoltage, overheating and overload.	
Parallel operation	Possible	
Operating temperature	0~50ºC (derated)	
Operating humidity	30~85%RH (non-condensing)	
Cooling method	Natural, air cooling	
Voltage resistance	Between input/output···2.0kVA per minute (20mA) Between cabinets···2.0kVA per minute (20mA)	
Insulation resistance	Output - 100MΩ or more between cabinets at 500 VDC	
Circuit method	Separate excitation type flyback converter	
Weight	Aprox. 0.9kg	

Outer dimensions

DC24V Power Supply

PS-24



Caution:

- The PS-24 is not a constant voltage power supply. The output voltage changes with the load (voltage decreases according to the load percentage). Therefore, do not connect any equipment other than ROBO Cylinder actuators.
- Up to 5 units can be operated in parallel. Do not use any power supplies other than the PS-24 at the same time for parallel operation.
- Note that serial operations are not possible.
- As a rule, when operating multiple units in a row, allow at least 20mm space between each power supply.
- This is a natural air-cooled power supply. Please give due consideration to natural convection so that heat does not build up around the power supply.
- The case of this product also has heat a dissipating effect. Do not touch the case after installation as it may result in severe burns.