IAI
Quality and Innovation

Position Controller for ROBO Cylinder
SEP series 8-axis Type

MSEP

8 AXES in ONE

www.intelligentactuator.com

MSEP controller

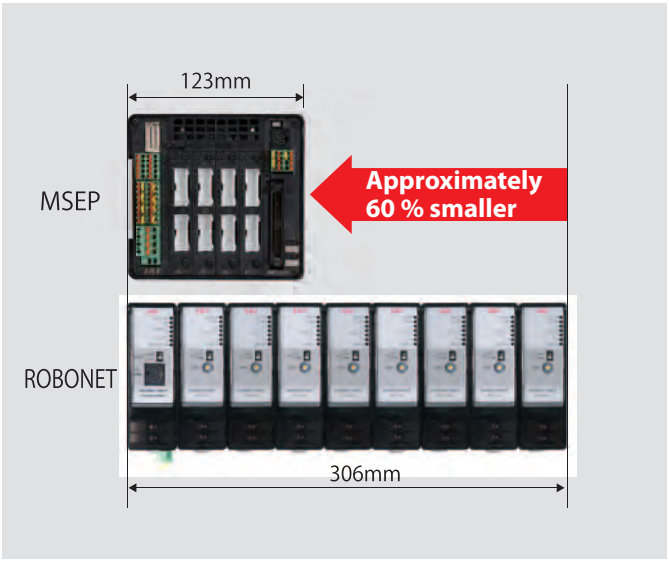
8 AXES in ONE

Achieving High-Performance in a Compact Design Network Connectable Controller

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.



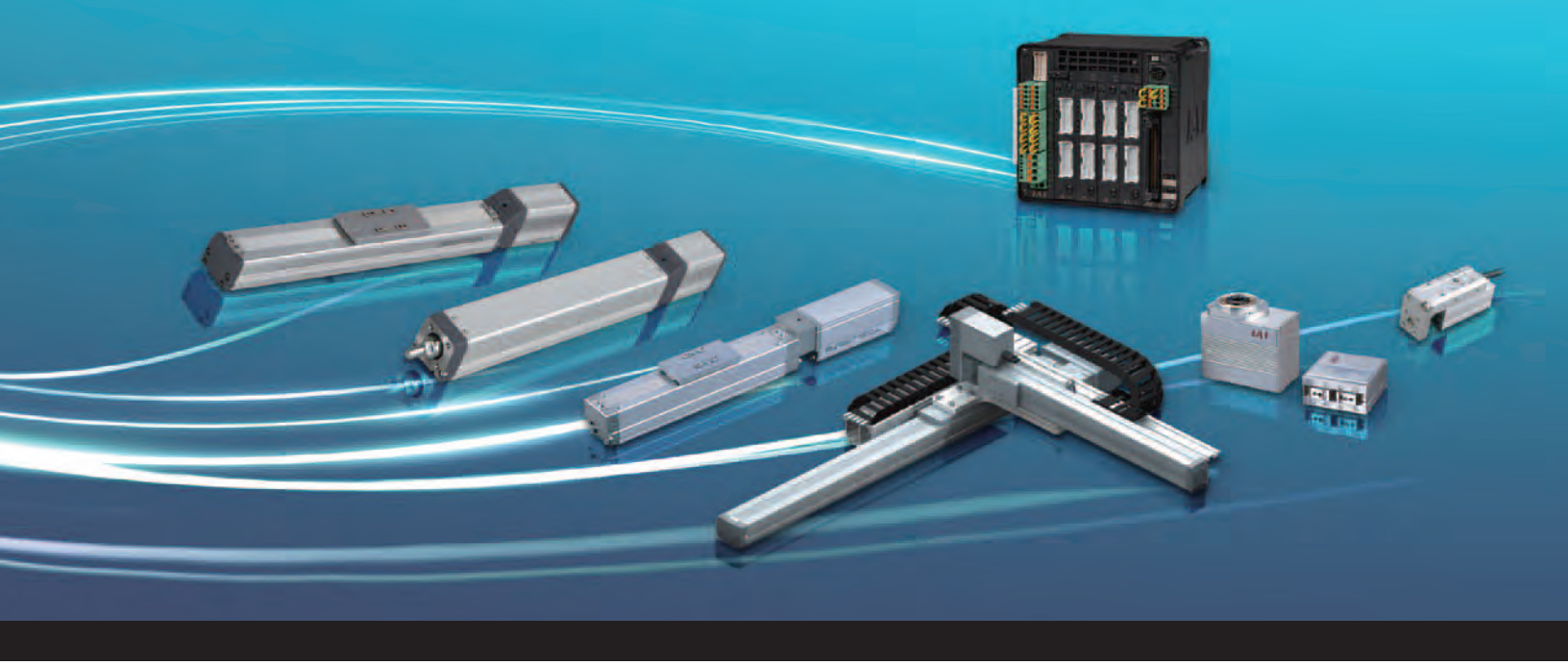
2 Supports major field networks

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

Network Specification Features

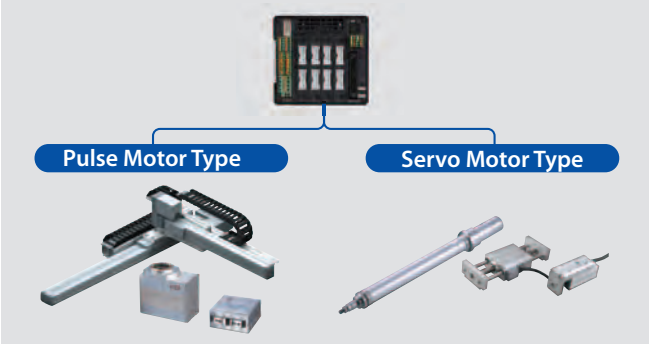
- 256 positioning points per each axis
- Allows designation of position and speed navigation numerically
- Ability to verify current position in real-time
- Significant communication time reduction within the controller (Approximately by 1/10 compared to the predecessor model)

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



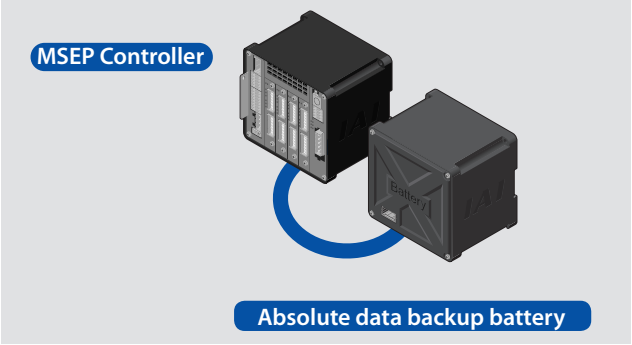
3 Supports both the pulse motor and the servo motor

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.



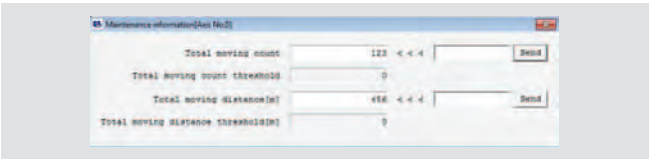
4 Simple absolute option

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.



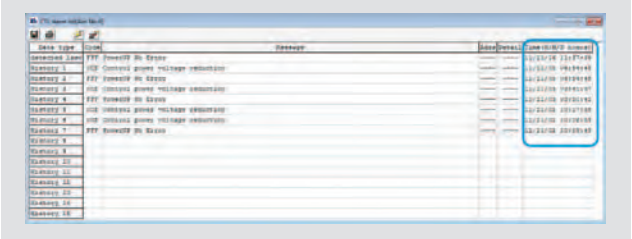
5 Checking when to maintain based on the total number of movements and total distance travelled

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.



6 Recording the alarm occurrence time with the calendar function

An additional clock function facilitates the alarm analysis from the convenience of the display screen that shows the time of the alarm occurrence. (The retention period of the date and time data is 10 days)



Models

Type	C								
I/O category	NP	PN	DV	CC	PR	CN	ML	EC	EP
Item name	PIO specification (NPN type)	PIO specification (PNP type)	DeviceNet Specification	CC-Link Specification	PROFIBUS-DP Specification	CompoNet Specification	MECHATROLINK 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	-								

Configuration

* 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)

MSEP — C — □ — □ — I — □ — (**□ — I — □**) **— □ — □ — 0 — □**

Series	Type	Total number of axes	Motor type	Encoder type	Option	Motor type	Encoder type	Option	I/O type	Type of I/O cable	Power-supply voltage	Absolute position encoder option

(Description of the 2nd to 8th axis)

1	1-axis specification
2	2-axis specification
3	3-axis specification
4	4-axis specification
5	5-axis specification
6	6-axis specification
7	7-axis specification
8	8-axis specification

HA	High acceleration/ deceleration capability
LA	Power-saving

* The above options are only available with the actuator.

I	Incremental specification

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

0	DC24V

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

20P	20-frame pulse motor type
20SP	20-frame pulse motor type (RA2AC, RA2BC)
28P	28-frame pulse motor type
28SP	28-frame pulse motor type (RA3C exclusive)
35P	35-frame pulse motor type
42P	42-frame pulse motor type
56P	56-frame pulse motor type
P	Unused pulse motor axis (*)
N	Code for no connected axis (*)

2	2 W servo motor type
5	5 W servo motor type
5S	5 W servo motor type (SA2A □, RA2A □ exclusive)
10	10 W servo motor type
20	20 W servo motor type
20S	20 W servo motor type (RCS2-SA4 □/TA5□, RCA-RA3 □ exclusive)
30	30 W servo motor type
A	Unused servo motor axis (*)

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

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

Guide for the description of the selected configuration

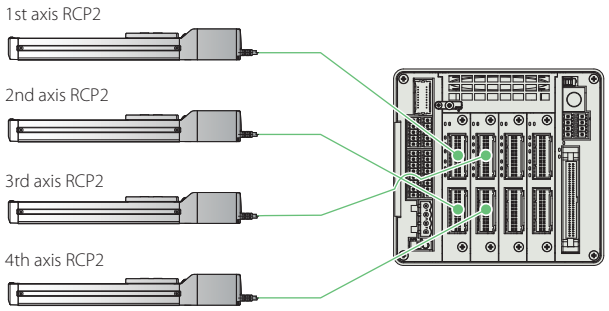
The description of the MSEP controller configuration varies depending on the type of actuator connected to the controller, and the total number of axes installed. Please see the following conditions to configure a desired controller.

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 — 42P — 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 — 42P — N — NP — 2 — 0

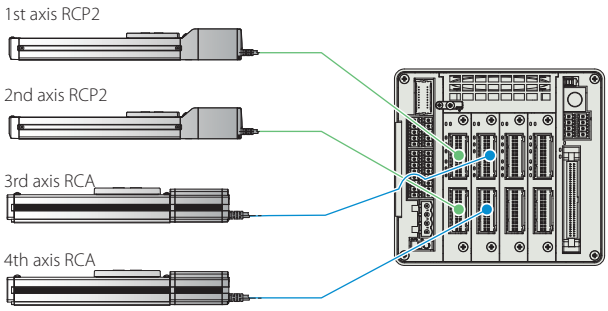
Total number of axes: 3
1st axis: Pulse motor
2nd axis: Pulse motor
3rd axis: No connected axis

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



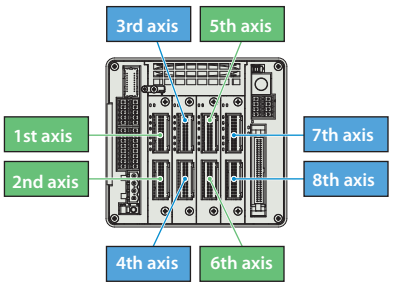
If either motor type is an odd count, please indicate an **[N]** following the last axis description per the corresponding board.

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

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

<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**

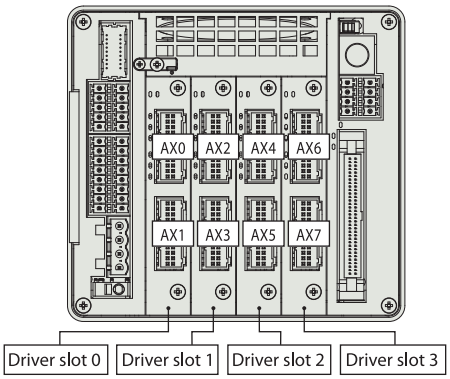
Servo
Servo motor type actuator
- **RCA2 series (*)**
- **RCA series**
- **RCL series**

(*) High-output motion is not available

1-axis to 5-axis specification

Total number of axes		Driver slot 0		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			
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

		Driver slot 0		Driver slot 1		Driver slot 2		Driver slot 3		Configuration	Pattern No	Unit price Incremental specification PIO specification
Total number of axes		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)	The prices of combination patterns from page 9 (all incremental axes)
+		
2	Additional price by I/O type	For field network specification, please add the price.
+		
3	Additional price for the absolute position encoder specification	For the absolute position encoder specification, please add the price for the total number of axes in the controller.
+		
4	Additional battery price for the absolute position encoder specification	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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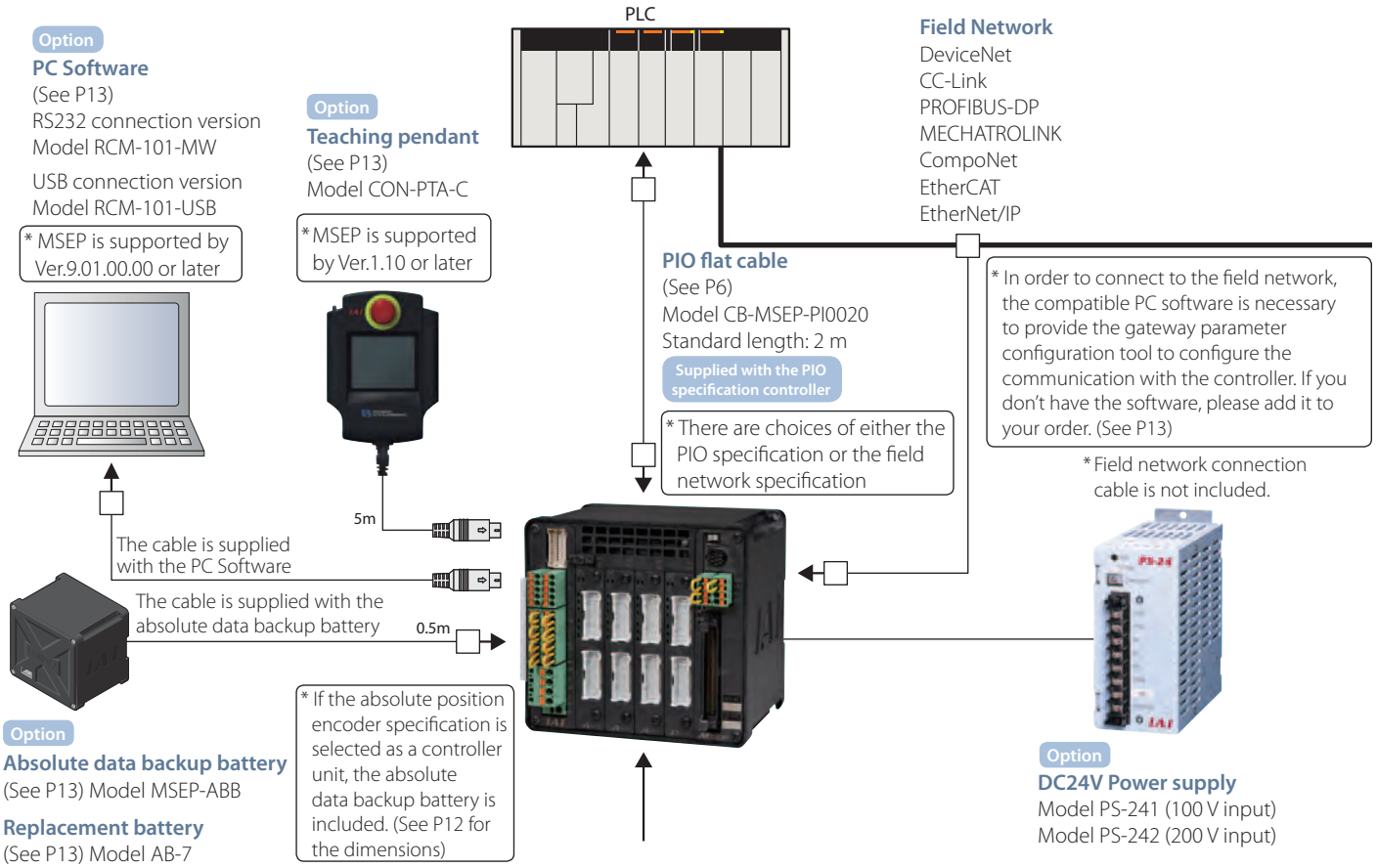
35	-								
36	-								
37	-								
38	-								
39	-								
40	-								

System configuration

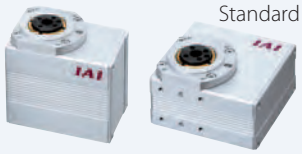


<Connectable actuators>

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

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

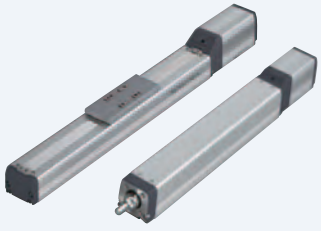
Actuator RCP2 series
Excluding RCP2-RTBS/ RTCS



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

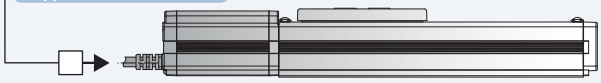
Actuator RCP2 compact rotary
(RCP2-RTBS/ RTCS)

* 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
Model CB-ASEP-MPA □□□
Standard 1 m/ 3 m/ 5 m
Supplied with the actuator

Actuator RCA series

Motor-encoder integrated cable
Model CB-APSEP-MPA □□□
Standard 1 m/ 3 m/ 5 m
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
Model CB-CA -MPA □□□

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

* The Motor/Encoder cable type varies depending on the actuator type. When ordering a replacement cable, please see P14.

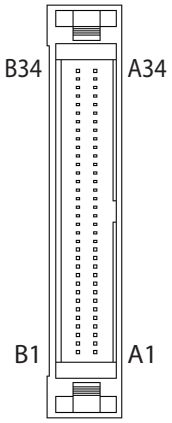
PIO Controlled Motion Mode

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		IN3	A22	Output (Axis No. 1)	OUT4
A6	Input (Axis No. 1)	IN4	A23		OUT5
A7		IN5	A24		OUT6
A8		IN6	A25		OUT7
A9		IN7	A26	Output (Axis No. 2)	OUT8
A10	Input (Axis No. 2)	IN8	A27		OUT9
A11		IN9	A28		OUT10
A12		IN10	A29		OUT11
A13		IN11	A30	Output (Axis No. 3)	OUT12
A14	Input (Axis No. 3)	IN12	A31		OUT13
A15		IN13	A32		OUT14
A16		IN14	A33		OUT15
A17		IN15	A34	0V	For I/O

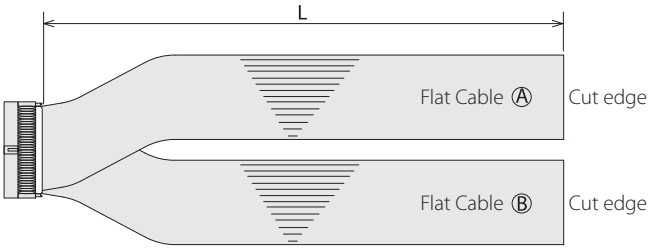
Connector name: HIF6-68PA-1.27DS(Hirose Electric)

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		IN19	B22	Output (Axis No. 5)	OUT20
B6	Input (Axis No. 5)	IN20	B23		OUT21
B7		IN21	B24		OUT22
B8		IN22	B25		OUT23
B9		IN23	B26	Output (Axis No. 6)	OUT24
B10	Input (Axis No. 6)	IN24	B27		OUT25
B11		IN25	B28		OUT26
B12		IN26	B29		OUT27
B13		IN27	B30	Output (Axis No. 7)	OUT28
B14	Input (Axis No. 7)	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 10 m. e.g.) 020=2 m



Connector: HIF6-068D-1.27R

Connection Chart

Connector: HIF6-068D-1.27R

Pin No.	Signal name		Pin No.	Signal name
A1	For I/O +24V		B1	For I/O +24V
A2	IN0		B2	IN16
A3	IN1		B3	IN17
A4	IN2		B4	IN18
A5	IN3		B5	IN19
A6	IN4		B6	IN20
A7	IN5		B7	IN21
A8	IN6		B8	IN22
A9	IN7		B9	IN23
A10	IN8		B10	IN24
A11	IN9		B11	IN25
A12	IN10		B12	IN26
A13	IN11		B13	IN27
A14	IN12		B14	IN28
A15	IN13	Flat cable Ⓐ	B15	IN29
A16	IN14		B16	IN30
A17	IN15		B17	IN31
A18	OUT0		B18	OUT16
A19	OUT1		B19	OUT17
A20	OUT2		B20	OUT18
A21	OUT3		B21	OUT19
A22	OUT4		B22	OUT20
A23	OUT5		B23	OUT21
A24	OUT6		B24	OUT22
A25	OUT7		B25	OUT23
A26	OUT8		B26	OUT24
A27	OUT9		B27	OUT25
A28	OUT10		B28	OUT26
A29	OUT11		B29	OUT27
A30	OUT12		B30	OUT28
A31	OUT13		B31	OUT29
A32	OUT14		B32	OUT30
A33	OUT15		B33	OUT31
A34	GND for I/O		B34	GND for I/O

PIO Input/Output Interface

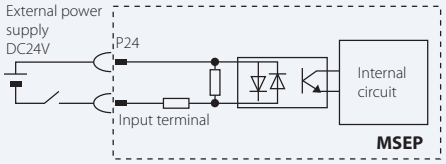
Input External Input Specification

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

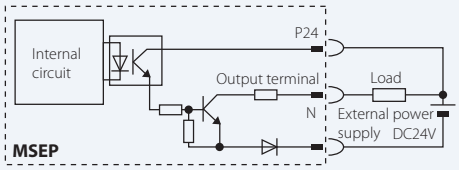
Output External Output Specification

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

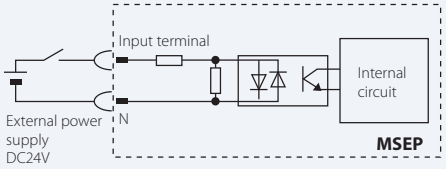
NPN specification



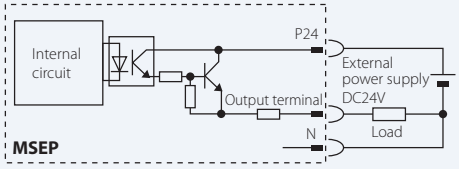
NPN specification



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.

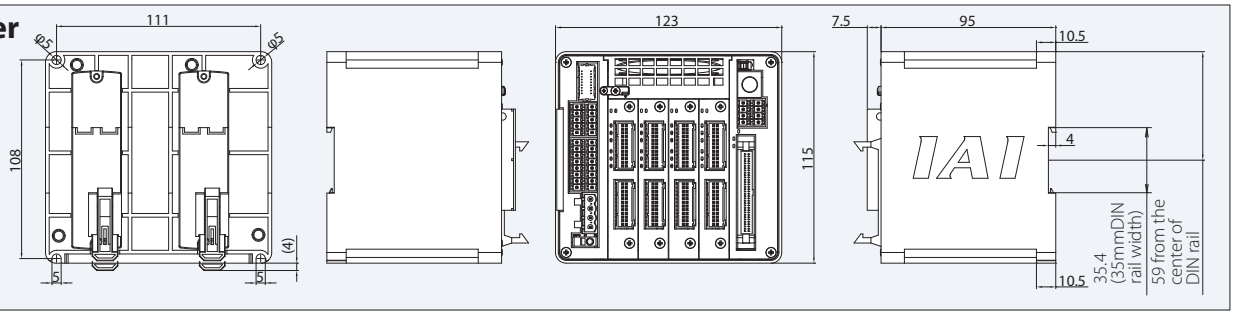
(*1) Only the positioner 3 mode and the SEP I/O mode are available with CompoNet and MECHATROLINK.

Table of General Specification

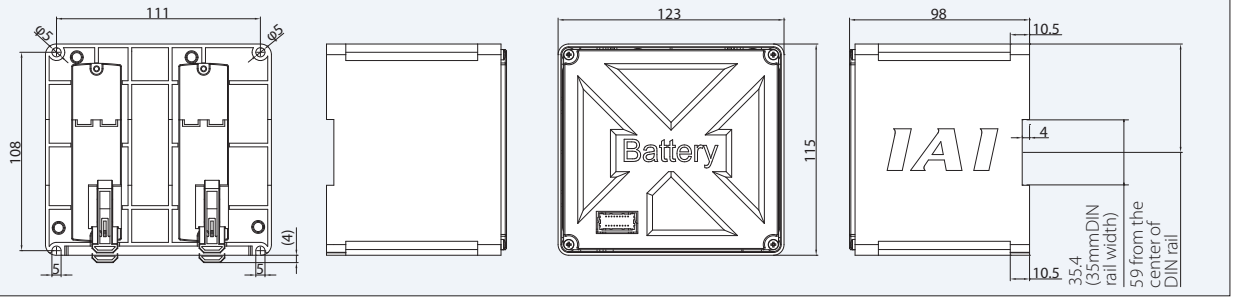
Specification item		Description						
Number of axes in the controller		8 axes MAX						
Controller/ Motor input power		DC24V ±10%						
Controller power supply		2A						
Controller inrush current		5A MAX, under 30 ms						
Motor consumption current		Servo motor type	Rated ampere	Maximum		Pulse motor type	Rated ampere	Maximum
				Energy saver	Standard/ Hi-accel./decel.			
		2W	0.8A		4.6A	20P	1.0A	2.0A
		5W	1.0A		6.4A	28P	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 10 m						
	Field network specification	DeviceNet, CC-Link, PROFIBUS-DP, MECHATROLINK, 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		620, 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						

Exterior Dimensions

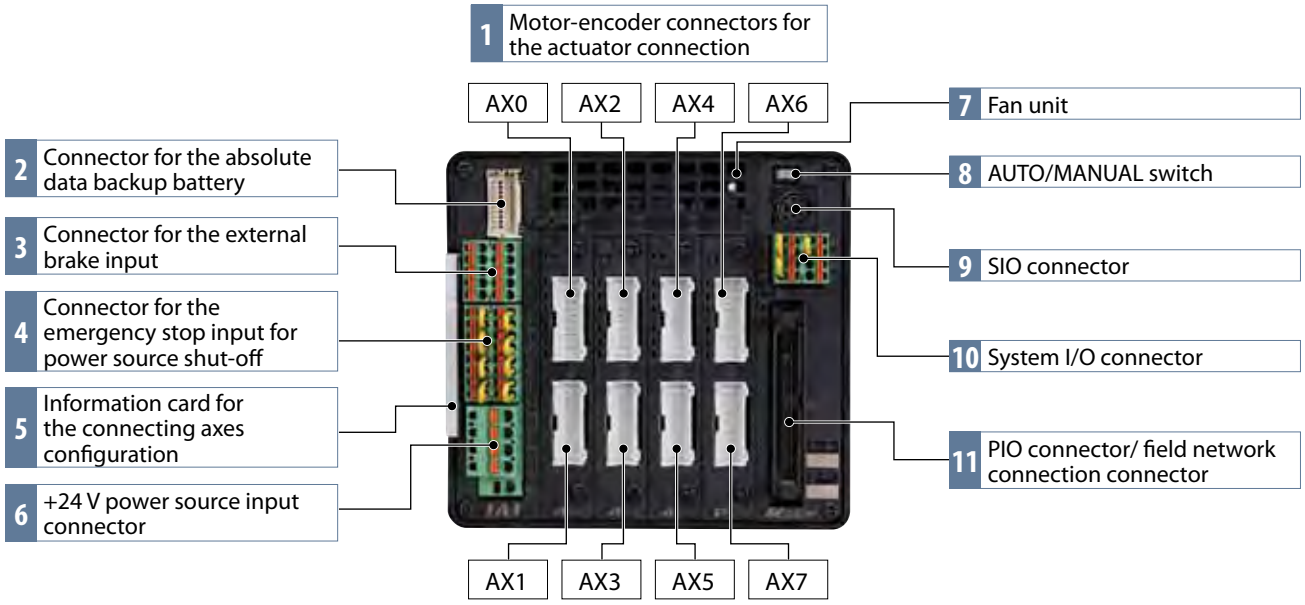
Controller



Absolute data backup battery box



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
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 (*).

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.

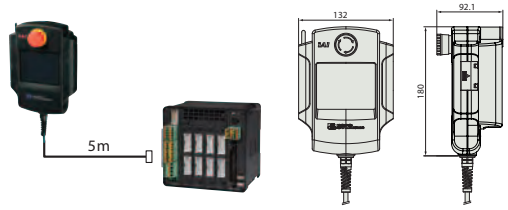
Options

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
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	65536 color White LED back light
Standard price	-

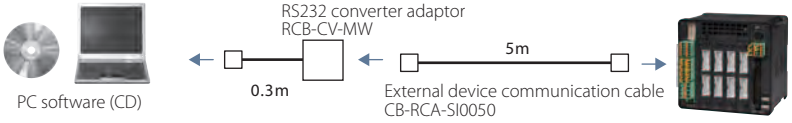
PC software (Windows only) * For the field network specification, the PC software is required.

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

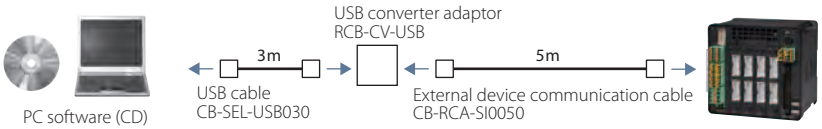
Setting



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



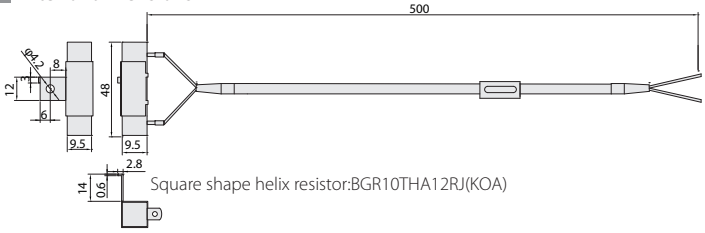
External regeneration resistor

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



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)

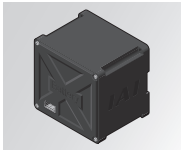
Model

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 P12**

* 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

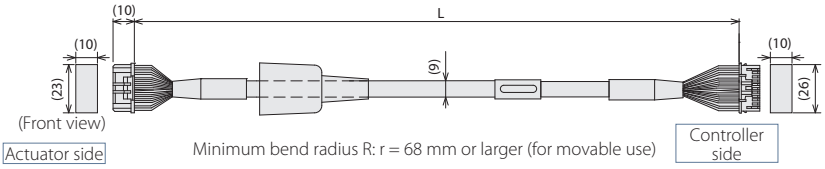
Model: **MSEP-FU**

Service parts

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

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

* Please indicate cable length (L) in □□□, maximum 20 m. e.g.) 080=8 m



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

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

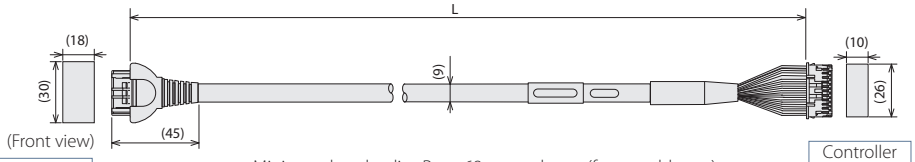
Pin No.	Signal name	Color	Pin No.	Signal name	Color
A1	ØA/U	Blue(Black)	1	ØA/U	Blue (Black)
B1	VMM/V	Orange (White)	2	VMM/V	Orange (White)
A2	Ø A/W	Green (Brown)	5	Ø A/W	Green (Brown)
B2	ØB/-	Brown (Green)	3	ØB/-	Brown (Green)
A3	VMM/-	Gray (Yellow)	4	VMM/-	Gray (Yellow)
B3	Ø B/-	Red (Red)	6	Ø B/-	Red (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 (—)

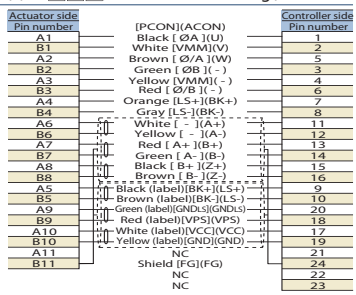
* Color in ( ) indicates color of robot cable

Integrated Motor-Encoder Cable for RCP3/RCA2 and others

Model **CB-APSEP-MPA □□□**

* Robot cable is the standard specification. Please indicate cable length (L) in □□□, maximum 20 m. e.g.) 080=8 m

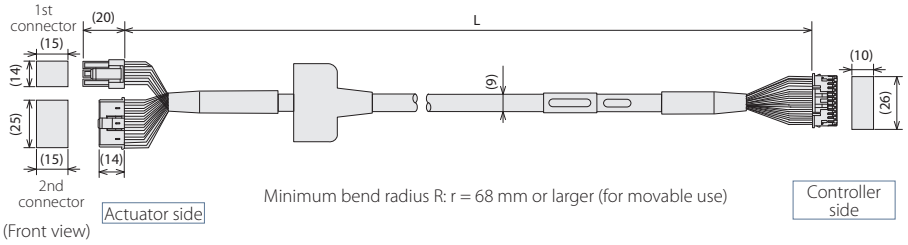


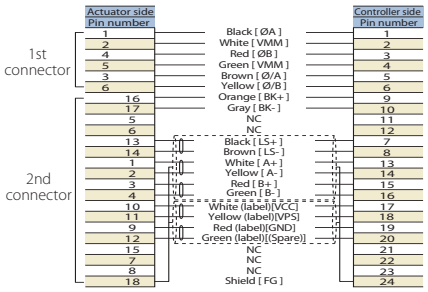


Integrated Motor-Encoder Cable for RCP2

Model **CB-PSEP-MPA □□□**

* Robot cable is the standard specification. Please indicates cable length (L) in □□□, maximum 20 m. e.g.) 080=8 m

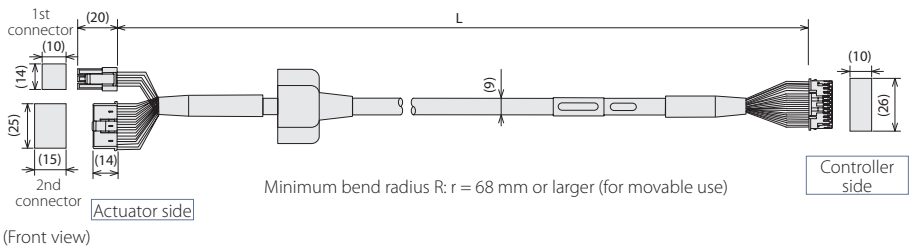


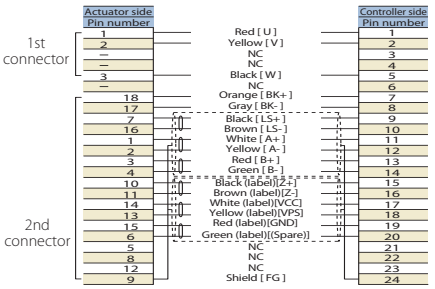


Integrated Motor-Encoder Cable for RCA

Model **CB-ASEP-MPA □□□**

* Robot cable is the standard specification. Please indicates cable length (L) in □□□, maximum 20 m. e.g.) 080=8 m

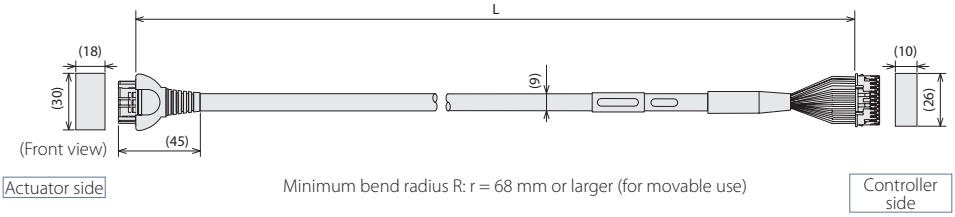


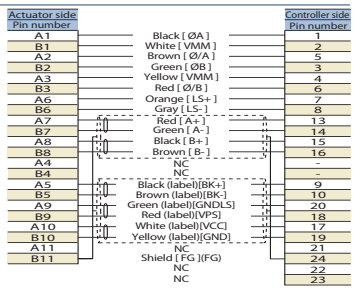


Integrated Motor-Encoder Cable for RCP2 Compact Rotary

Model **CB-RPSEP-MPA □□□**

* Robot cable is the standard specification. Please indicate cable length (L) in □□□, maximum 20 m. e.g.) 080=8 m





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IAI America, Inc.

Headquarters: 2690 W. 237th Street Torrance, CA 90505 (800) 736-1712
Chicago Office: 1261 Hamilton Parkway Itasca, IL 60143 (800) 944-0333
Atlanta Office: 1220 Kennestone Circle, Suite 108, Marietta, GA 30066 (888) 354-9470

IAI Industrieroboter GmbH

Ober der Roth 4, D-65824 Schwalbach am Taunus, Germany

www.intelligentactuator.com