IAI
Quality and Innovation

GB

MCON

8-axis Position Controller for RoboCylinder
RCP6/RCP5/RCP4/RCP3/RCP2/RCA2/RCA/RCD

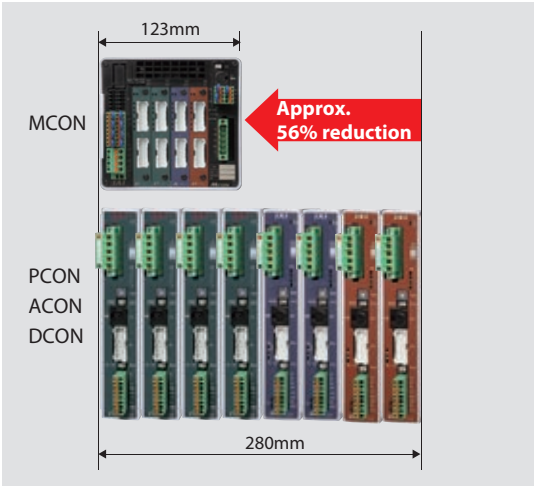
www.robocylinder.de

1 unit can control the pulse motor, AC servo motor, and brush-less DC motor

8-axis controller that achieves the small size and high functionality

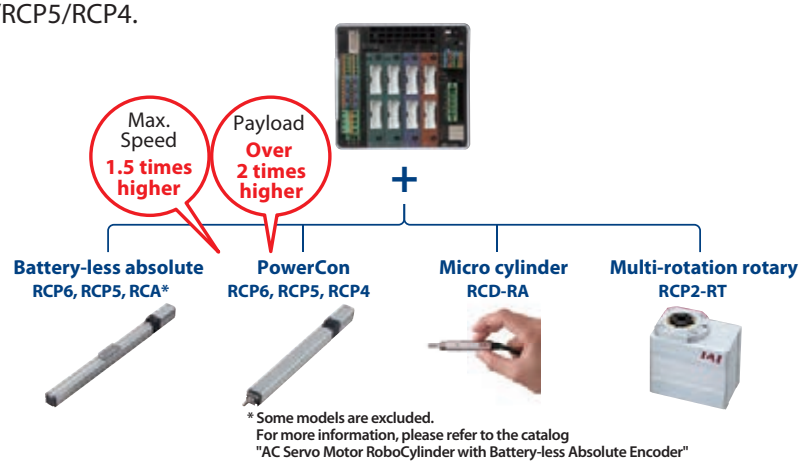
1 Saves space and reduces cost

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



2 Accommodates a wide range of actuators

It corresponds to actuators with battery-less absolute encoders, ultra-compact micro cylinders, multi-rotation rotaries and the like, expanding the operable actuators from small to large.
In addition, it is equipped with the PowerCon (high-output driver), and achieves the maximum speed of 1.5 times higher and maximum load capacity of over 2 times higher than the conventional models by using in combination with the RCP6/RCP5/RCP4.



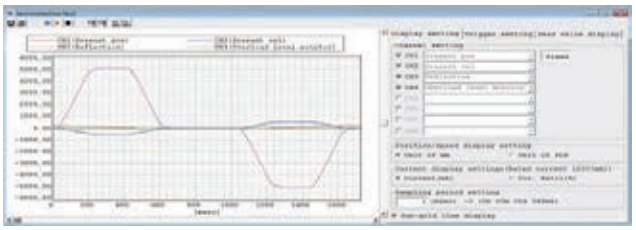
* Some models are excluded.
For more information, please refer to the catalog
"AC Servo Motor RoboCylinder with Battery-less Absolute Encoder"

Allows the installation of 7 types of driver boards

(1) Battery-less absolute/incremental driver boards for pulse motor
(2) Simple absolute driver board for pulse motor
(3) Battery-less absolute/incremental driver boards for PowerCon
(4) Simple absolute driver board for PowerCon
(5) Battery-less absolute/incremental driver boards for 24VAC servo motor
(6) Simple absolute driver board for 24VAC servo motor
(7) Incremental driver board for brush-less DC servo motor

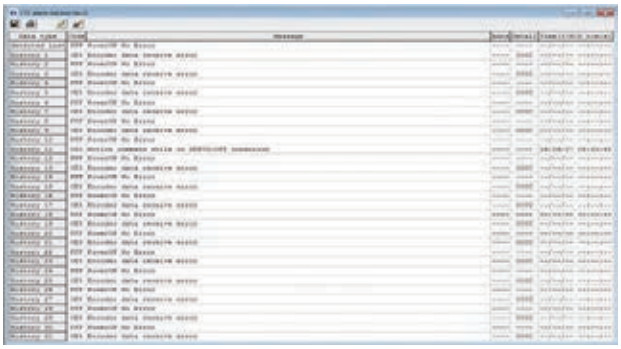
3 Allows the servo monitoring in the AUTO mode

The AUTO mode status monitoring and servo monitoring that were only supported by single-axis controllers can now be performed using multi-axis controllers. In addition, the monitoring can start from the moment that the condition of a selected signal changed. (Trigger function)
You can easily save the data to be monitored.



4 The calendar function allows the alarm occurrence time to be retained

With the addition of the clock function, the alarm history is displayed with the time of occurrence, making it easier for the alarm to be analyzed.
(The retention period of the time data is 10 days after the power is cut.)
The number of alarms stored in the history is up to 32 per axis.



5 Many useful functions

Smart tuning function (for pulse motor)
- The optimum acceleration and deceleration are set according to the payload to be conveyed.

Off-board tuning function (for 24VAC servo motor)
- The optimum gain is set according to the payload.

Vibration control function (for 24VAC servo motor)
- It reduces the shaking (vibration) of the workpiece attached to the slider.

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

Axis name display function
- The axis name can be displayed in the PC compatible software and touch panel teaching box.

6 It can be moved by specified values via fieldbus

- The number of positioning points per axis is 256.
- It can be operated by specifying the position to reach and speed in numerical values.
- The current position can be checked in real time.

DeviceNet
PROFIBUS
CompoNet
CC-Link
EtherNet/IP
EtherCAT
PROFINET

List of Models

Type name	C/CG						
I/O type	DV	CC	PR	CN	EC	EP	PRT
Name	DeviceNet connection specification	CC-Link connection specification	PROFIBUS-DP connection specification	CompoNet connection specification	EtherCAT connection specification	EtherNet/IP connection specification	PROFINET IO connection specification
External view	 * The fieldbus connector will be changed depending on the I/O type.						
Description	It is operated in connection with various fieldbus. The PIO control can be performed by serial communication or by sending position, speed, and acceleration data.						
Number of positioning points	256/axis (There is no limit when operated by directly sending data) * The number of positioning points varies depending on the operation mode selection set by the parameter.						

Model

Details of slot 0 (1st axis: Top connector) (2nd axis: Bottom connector) — **Details of slot 1~3**

MCON – Series □ – Type □ – Number of Axes □ – Motor Type □ – Encoder Type □ – Option □ – Motor Type □ – Encoder Type □ – Option – (Details of the 3rd~8th axis) – I/O Type □ – I/O Cable Length 0 – Power Supply Voltage 0 – Simple Absolute Option □

Type

C	Standard
CG	Safety category compliant type

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□ Pulse motor	2	2W Servo motor
20SP	20□ High-thrust pulse motor	5	5W Servo motor
28P	28□ Pulse motor	5S	5W Servo motor
28SP	28□ High-thrust pulse motor	10	10W Servo motor
35P	35□ Pulse motor	20	20W Servo motor
42P	42□ Pulse motor	20S	20W Servo motor
42SP	42□ High-thrust pulse motor	30	30W Servo motor
56P	56□ Pulse motor	A	Unused AC servo motor axis
P	Unused pulse motor axis	N	Code for no connected axis (*)
3D	3W BLDC servo motor	Refer to P.4 for (*)	
D	Unused BLDC servo motor axis		

Encoder Type

WAI	Battery-less absolute/incremental (*1)
SA	Simple absolute (*1)
I	Incremental (*2)

(*1) Pulse motor/24VAC servo motor types only.
(*2) BLDC servo motor type only.

Option

HA	Hi-accel./decel. supported
LA	Power-saving
T	High-output spec. (PowerCon)

* HA/LA are for RCA only while T is for RCP6/RCP5/RCP4.

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
PRT	PROFINET IO connection specification

I/O Cable Length

O	No cable

Power Supply Voltage

O	24VDC

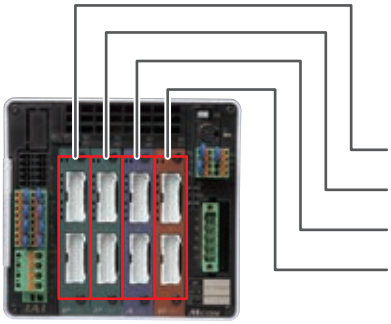
Simple Absolute Option

ABB	Absolute battery box included (Simple absolute specification)
ABBN	Absolute battery box not included (Simple absolute specification)
(Blank)	Battery-less absolute or incremental specification

* RCD series does not support the simple absolute specification.

Details of MCON Slots

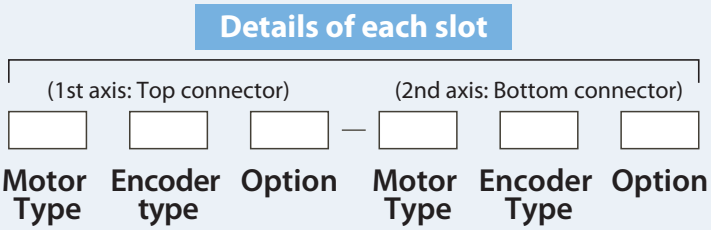
(1) MCON has 4 slots:



Slot 0 (Top connector: AX0/Bottom connector: AX1)
Slot 1 (Top connector: AX2/Bottom connector: AX3)
Slot 2 (Top connector: AX4/Bottom connector: AX5)
Slot 3 (Top connector: AX6/Bottom connector: AX7)

MCON
(Up to 4 slots)

(2) How to fill out the model name for each slot:



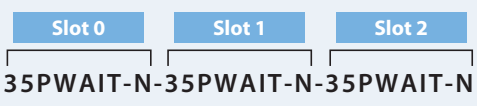
1. One driver board is used per one slot, and different motor types (Pulse motor/24VAC servo motor/Brush-less DC motor) or different encoder types (WAI/SA/I) cannot be connected on the same driver board.
2. Depending on the type of actuator, there are those that allow for 2 axes to be connected to 1 slot or only allow for 1 axis to be connected.

Number of axes that can be connected to 1 slot	Actuator type
1 axis	RCP6, RCP5, RCP4 (with **enabled** high-output setting for each series)
2 axes	RCP6, RCP5, RCP4 (with **disabled** high-output setting for each series); RCP3, RCP2, RCA2, RCA, RCD

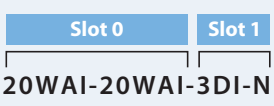
3. If only 1 axis is connected to 1 slot, the model name of the second axis/bottom connector will be "N".
4. When using RCP6/RCP5/RCP4 with high-output setting enabled, please enter "T" in the option column.

■ Entry examples for each slot

E.g. 1 When connecting 3 axes of RCP5-SA4C-WA-35P (high-output setting enabled)



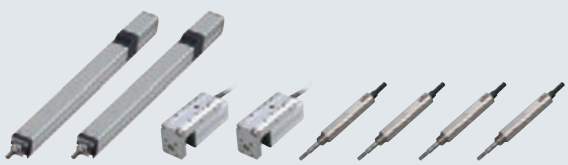
E.g. 2 When connecting 2 axes of RCA-SA5C-I-20 or 1 axis of RCD-RA1DA-I-3

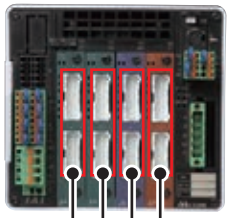


Please refer to the next page for the combination examples of each axis.

MCON Driver Board Combination Examples

The table below shows driver board combination examples of MCON-C/CG.

Combination Examples	Model Names of the Connected Actuators	Number of axes	
 RCP5-SA6C RCP5-RA4C	1st axis: RCP5-SA6C-WA-42P PowerCon/Battery-less abs. 2nd axis: RCP5-RA4C-WA-35P PowerCon/Battery-less abs.	2	
 RCP5-SA6C RCP5-RA4C RCA-SA6C	1st axis: RCP5-SA6C-WA-42P Pulse motor/Battery-less abs. 2nd axis: RCP5-RA4C-WA-35P Pulse motor/Battery-less abs. 3rd axis: RCA-SA6C-WA-30 AC servo/Battery-less abs.	3	
 RCP5-SA4C RCP5-RA4C	1st axis: RCP5-SA4C-WA-35P PowerCon/Battery-less abs. 2nd axis: RCP5-SA4C-WA-35P PowerCon/Battery-less abs. 3rd axis: RCP5-RA4C-WA-35P PowerCon/Battery-less abs. 4th axis: RCP5-RA4C-WA-35P PowerCon/Battery-less abs.	4	
 RCP5-SA4C RCA2-TCA4NA RCD-RA1DA	1st axis: RCP5-SA4C-WA-35P PowerCon/Battery-less abs. 2nd axis: RCP5-SA4C-WA-35P Pulse motor/Battery-less abs. 3rd axis: RCA2-TCA4NA-I-20 AC servo motor/Simple abs. 4th axis: RCD-RA1DA-I-3D BLDC servo motor/Incremental	4	
 RCP5-SA6 RCP5-RA4C RCA2-TCA4NA RCD-RA1DA	1st axis: RCP5-SA6C-WA-42P PowerCon/Battery-less abs. 2nd axis: RCP5-RA4C-WA-35P Pulse motor/Battery-less abs. 3rd axis: RCP5-RA4C-WA-35P Pulse motor/Battery-less abs. 4th axis: RCA2-TCA4NA-I-20 AC servo motor/Simple abs. 5th axis: RCD-RA1DA-I-3D BLDC servo motor/Incremental	5	
 RCP5-RA4C RCA2-TCA4NA RCD-RA1DA	1st/2nd axes: RCP5-RA4C-WA-35P Pulse motor/Battery-less abs. 3rd/4th axes: RCA2-TCA4NA-I-20 AC servo motor/Incremental 5th/6th axes: RCD-RA1DA-I-3D BLDC servo motor/Incremental	6	
 RCP5-RA4C	1st~7th axes: RCP5-RA4C-WA-35P Pulse motor/Battery-less abs.	7	
 RCP5-RA4C RCA2-TCA4NA RCD-RA1DA	1st/2nd axes: RCP5-RA4C-WA-35P Pulse motor/Battery-less abs. 3rd/4th axes: RCA2-TCA4NA-I-20 AC servo motor/Simple abs. 5th~8th axes: RCD-RA1DA-I-3D BLDC servo motor/Incremental	8	



Note: RCD series does not support the simple absolute specification.

Slot 0	Slot 1	Slot 2	Slot 3	Model Number
AX0	AX2	AX4	AX6	Bottom connector / Top connector / Top connector / Bottom connector MCON-C-2-42PWAIT-N-35PWAIT-N-DV-0-0 Number of axes / Slot 0 / Slot 1
PowerCon 42 □ Battery-less abs.	PowerCon 35 □ Battery-less abs.	Not in use (Available)	Not in use (Available)	
AX1	AX3	AX5	AX7	
Reserved by PowerCon (Unavailable)	Reserved by PowerCon (Unavailable)	Not in use (Available)	Not in use (Available)	
AX0	AX2	AX4	AX6	MCON-C-3-42PWAI-35PWAI-30WAI-N-DV-0-0 Slot 0 / Slot 1
Pulse motor 42 □ Battery-less abs.	AC servo motor 30W Battery-less absolute	Not in use (Available)	Not in use (Available)	
AX1	AX3	AX5	AX7	
Pulse motor 35 □ Battery-less abs.	Reserved by PowerCon (Unavailable)	Not in use (Available)	Not in use (Available)	
AX0	AX2	AX4	AX6	MCON-C-4-35PWAIT-N-35PWAIT-N- Slot 0 / Slot 1 35PWAIT-N-35PWAIT-N-DV-0-0 Slot 2 / Slot 3
PowerCon 35 □ Battery-less abs.	PowerCon 35 □ Battery-less abs.	PowerCon 35 □ Battery-less abs.	PowerCon 35 □ Battery-less abs.	
AX1	AX3	AX5	AX7	
Reserved by PowerCon (Unavailable)	Reserved by PowerCon (Unavailable)	Reserved by PowerCon (Unavailable)	Reserved by PowerCon (Unavailable)	
AX0	AX2	AX4	AX6	MCON-C-4-35PWAIT-N-35PWAI-N- Slot 0 / Slot 1 20SA-N-3DI-N-DV-0-0-ABB Slot 2 / Slot 3
PowerCon 35 □ Battery-less abs.	Pulse motor 35 □ Battery-less abs.	AC servo motor 20W Simple absolute	BLDC servo motor Incremental	
AX1	AX3	AX5	AX7	
Reserved by PowerCon (Unavailable)	Reserved by PowerCon (Unavailable)	Reserved by PowerCon (Unavailable)	Reserved by PowerCon (Unavailable)	
AX0	AX2	AX4	AX6	MCON-C-5-42PWAIT-N- Slot 0 35PWAI-35PWAI-20SA-N-3DI-N-DV-0-0-ABB Slot 1 / Slot 2 / Slot 3
PowerCon 42 □ Battery-less abs.	Pulse motor 35 □ Battery-less abs.	AC servo motor 20W Simple absolute	BLDC servo motor Incremental	
AX1	AX3	AX5	AX7	
Reserved by PowerCon (Unavailable)	Pulse motor 35 □ Battery-less abs.	Reserved by PowerCon (Unavailable)	Not in use (Available)	
AX0	AX2	AX4	AX6	MCON-C-6-35PWAI-35PWAI- Slot 0 20WAI-20WAI-3DI-3DI-DV-0-0 Slot 1 / Slot 2
Pulse motor 35 □ Battery-less abs.	AC servo motor 20W Incremental	BLDC servo motor Incremental	Not in use (Available)	
AX1	AX3	AX5	AX7	
Pulse motor 35 □ Battery-less abs.	AC servo motor 20W Incremental	BLDC servo motor Incremental	Not in use (Available)	
AX0	AX2	AX4	AX6	MCON-C-7-35PWAI-35PWAI-35PWAI-35PWAI- Slot 0 / Slot 1 35PWAI-35PWAI-35PWAI-N-DV-0-0 Slot 2 / Slot 3
Pulse motor 35 □ Battery-less abs.	Pulse motor 35 □ Battery-less abs.	Pulse motor 35 □ Battery-less abs.	Pulse motor 35 □ Battery-less abs.	
AX1	AX3	AX5	AX7	
Pulse motor 35 □ Battery-less abs.	Pulse motor 35 □ Battery-less abs.	Pulse motor 35 □ Battery-less abs.	Reserved by PowerCon (Unavailable)	
AX0	AX2	AX4	AX6	MCON-C-8-35PWAI-35PWAI-20SA-20SA- Slot 0 / Slot 1 3DI-3DI-3DI-3DI-DV-0-0-ABB Slot 2 / Slot 3
Pulse motor 35 □ Battery-less abs.	AC servo motor 20W Simple absolute	BLDC servo motor Incremental	BLDC servo motor Incremental	
AX1	AX3	AX5	AX7	
Pulse motor 35 □ Battery-less abs.	AC servo motor 20W Simple absolute	BLDC servo motor Incremental	BLDC servo motor Incremental	

Standard Price Chart

Calculate the standard price of the MCON controller based on (1) base price by type as specified below, by adding (2) slot model price, (3) quantity of simple absolute, (4) quantity of batteries for simple absolute, and (5) I/O type.

(1) Base price by type

Select the standard type (MCON-C) or safety category compliant type (MCON-CG).

+

(2) Slot model price

Add the price of the slot types specified in the 0~3 slots.

(1)

Base price by type		
Description	Model number	Price
Standard	MCON-C	
Safety category compliant type	MCON-CG	

+

(2)

Slot model price (Add the total amount of slots to be used)				
Details of slot			Model number	Price
Pulse motor	1-axis	Battery-less absolute/ Incremental (For PowerCon)	☐PWAIT-N	
		Simple absolute (For PowerCon)	☐PSAT-N	
		Battery-less absolute/ Incremental (For standard)	☐PWAI-N	
		Simple absolute (For standard)	☐PSA-N	
	2-axis	Simple absolute (For standard) + Simple absolute (For standard)	☐PSA-☐PSA	
		Battery-less abs./Incremental (For standard) + Battery-less abs./Incremental (For standard)	☐PWAI-☐PWAI	
AC servo motor	1-axis	Battery-less absolute/ Incremental (For standard)	☐WAI-N	
		Simple absolute (For standard)	☐SA-N	
	2-axis	Battery-less abs./Incremental (For standard) + Battery-less abs./Incremental (For standard)	☐WAI-☐WAI	
		Simple absolute (For standard) + Simple absolute (For standard)	☐SA-☐SA	
BLDC servo motor	1-axis	Incremental (For standard)	3DI-N	
	2-axis	Incremental (For standard) + Incremental (For standard)	3DI-3DI	

* ☐ indicates the motor size.

(3) Quantity of simple absolute

Add the price of the number of axes to be operated by the simple absolute.

(4) Quantity of batteries for simple absolute

Add the total battery price of simple absolute (model: ABB) for applicable axes.

(5) I/O type

Select the I/O type of the controller.

(3) Quantity of simple absolute	
Number of axes	Price
1-axis	
2-axis	
3-axis	
4-axis	
5-axis	
6-axis	
7-axis	
8-axis	

(4) Quantity of batteries for simple absolute	
Number of axes	Price
1-axis	
2-axis	
3-axis	
4-axis	
5-axis	
6-axis	
7-axis	
8-axis	

(5) I/O Type		
Type	Model number	Price
DeviceNet connection specification	DV	
CC-Link connection specification	CC	
PROFIBUS-DP connection specification	PR	
CompoNet connection specification	CN	
EtherCAT connection specification	EC	
EtherNet/IP connection specification	EP	
PROFINET IO connection specification	PRT	

Price
Standard price by specification

*No need to add (3) and (4) for the battery-less absolute type.

System Configuration

PLC

Option
PC compatible software
(See P.16)
RS232 connection version
Model Number RCM-101-MW
USB connection version
Model Number RCM-101-USB
* MCON is supported by Ver.10.00.00.00 or later.

Option
Teaching pendant
(See P.16)
Model Number TB-02-C
* MCON is supported by Ver. 1.00 or later.

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

* To connect to a fieldbus, the communication needs to be configured for the controller. Configuration requires the gateway parameter setting tool which comes with the PC compatible software. If you need the gateway parameter setting tool, please contact IAI.
* Customer to furnish the fieldbus connection cable.

5m

Option
Dummy plug
(See P.16)
Model Number DP-5
* For the CG type, if you're not connecting the teaching tool to the SIO connector, please insert a dummy plug.

Supplied with PC compatible software

The cable is supplied with the absolute battery box. 0.5m

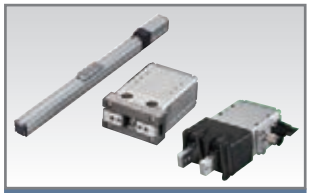
DC24V Power Supply
24V
0V
FG

Option
Absolute battery box
(See P.16)
Model Number MSEP-ABB

Replacement battery
(See P.16)
Model Number AB-7

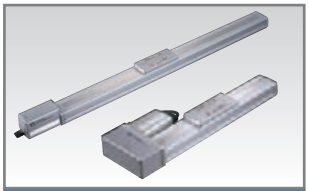
* If the simple absolute specification is selected for a controller model, an absolute battery box will be included. (See P.15 for the dimensions)

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



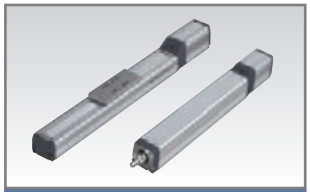
RCP6/RCP5/RCD Series
RCP4-SA3/RA3/GR□
RCP2CR(W)-GR□/RT□

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



RCP2 Series

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

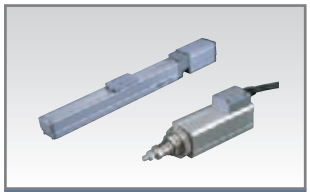


RCP4 Series

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

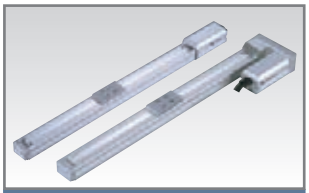
RCP2-RT□S/RT□SL

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



RCP3/RCA2 Series

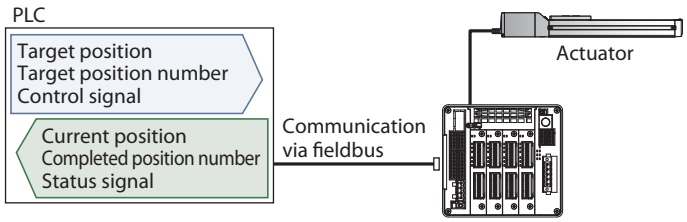
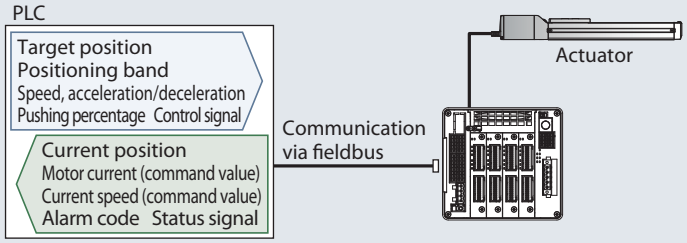
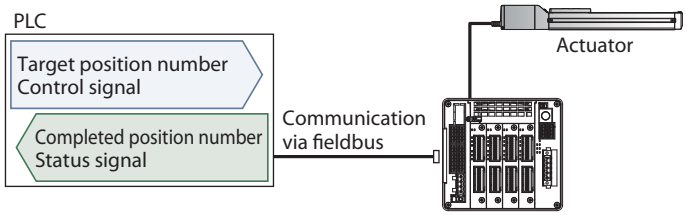
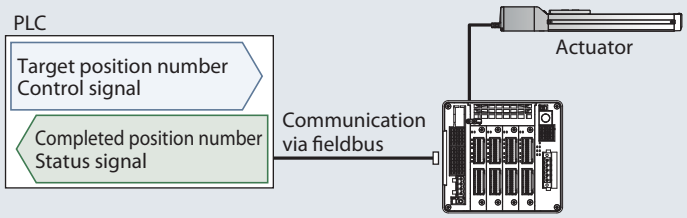
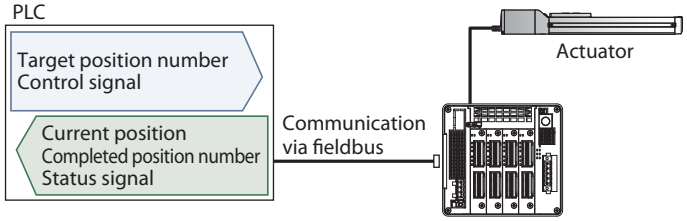
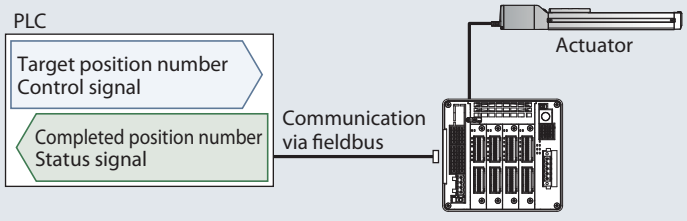
Integrated motor-encoder robot cable
(See P.18)
Model: **CB-ASEP2-MPA□□□ (Robot cable)**
*Only robot cable is available for this model.



RCA Series

Fieldbus Control Operation Modes

The MCON fieldbus control operation mode can be set from the following control modes. Data required for operation (target position, speed, acceleration, push current value, etc.) are written by a PLC or other host controller into the specified addresses.

Operation mode	Description	Overview
Positioner 1/ Simple direct numerical value mode (Simple direct mode)	Positioner 1 mode can store up to 256 points of position data, and can move to the stored position. Both modes allow monitoring the current position numerically with 0.01mm increments. The simple direct numerical value mode can modify any of the stored target positions by numerical value. Both modes allow monitoring the current position numerically with 0.01mm increments.	
Direct numerical control mode	This mode allows designating the target position, speed, acceleration/deceleration, and motor current percentage for pushing numerically. Also, it is capable of monitoring the current position, current speed, and the motor current command value with 0.01mm increments.	
Positioner 2 mode	Positioner 2 mode can store up to 256 points of position data, and can move to the stored position. This mode does not allow monitoring of the current position. This is a mode that has less in/out data transfer volume than the Positioner 1 mode.	
Positioner 3 mode	Positioner 3 mode can store up to 256 points of position data, and can move to the stored position. This mode does not allow monitoring of the current position. This is a mode that has less in/out data transfer volume than the Positioner 2 mode, and operates with a minimum number of signals.	
Positioner 5 mode	Positioner 5 mode can store up to 16 points of position data, and can move to the stored position. This is a mode that has less in/out data transfer volume than the Positioner 2 mode, and allows monitoring the current position numerically with 0.1mm increments.	
Remote I/O mode	It is an operation mode that's controlled by the ON/OFF of the digital I/Os similar to the PIO ribbon cable. There are 5 control modes available (See P.11). *Different PIO patterns can be set in the parameters.	

* Only the positioner 3 mode and remote I/O mode can be selected for the CompoNet.
* Please note that if the remote I/O mode is selected, all axes will be in the remote I/O mode.

List of Functions by Operation Mode

	Simple direct value mode	Positioner 1 mode	Direct numerical control mode	Positioner 2 mode	Positioner 3 mode	Positioner 5 mode
Number of positioning points	256 points	256 points	Unlimited	256 points	256 points	16 points
Home return operation	○	○	○	○	○	○
Positioning operation	○	△	○	△	△	△
Speed, acceleration/ deceleration settings	△	△	○	△	△	△
Different acceleration and deceleration settings	△	△	—	△	△	△
Pitch feed (Incremental)	△	△	○	△	—	△
Push-motion operation	△	△	○	△	△	△
Speed changes while moving	△	△	○	△	△	△
Pausing	○	○	○	○	○	○
Zone signal output	△	△	△	△	△	△
Position zone signal output	△	△	—	△	—	—
Vibration control (Note 1)	△	△	—	△	△	△
Current position reading (Resolution)	○ (0.01mm)	○ (0.01mm)	○ (0.01mm)	—	—	○ (0.1mm)

* ○: Direct setting is possible, △: Position data or parameter input is required, —: The operation is not supported.
(Note 1) This function is limited to the 24VAC servo motor specification.

Functions of RoboCylinder	Remote I/O mode				
	Positioning mode	Teaching mode	256-point mode	Solenoid valve mode 1	Solenoid valve mode 2
Number of positioning points	64 points	64 points	256 points	7 points	3 points
Home return operation	○	○	○	○	— (Note 2)
Positioning operation	○	○	○	○	○
Speed, acceleration/ deceleration settings	○	○	○	○	○
Different acceleration and deceleration settings	○	○	○	○	○
Pitch feed (Incremental)	○	○	○	○	—
Push-motion operation	○	○	○	○	—
Speed changes while moving	○	○	○	○	○
Pausing	○	○	○	○	○ (Note 3)
Zone signal output	○	○ (Note 4)	○ (Note 4)	○	○
Position zone signal output	○ (Note 4)	○ (Note 4)	○ (Note 4)	○ (Note 4)	○ (Note 4)
Vibration control (Note 1)	○	○	○	○	○
Current position reading	—	—	—	—	—

* ○: Direct setting is possible, △: Position data or parameter input is required, —: The operation is not supported.
(Note 1) This function is limited to the 24VAC servo motor specification.
(Note 2) It returns to home position with the first movement command.
(Note 3) It's possible when the movement command type of the parameter No.27 is set to 0.
(Note 4) Select either the zone signal output or position zone signal output with parameter No.149.

I/O Signal Function Details

The following table shows functions assigned to the controller I/O.
Set to the remote I/O mode and select the PIO patterns from 0-5.
The controller can be operated by turning each port number ON/OFF via the network.

		Setting of the parameter No.25 of MCON									
		Positioning mode		Teaching mode		256-point mode		Solenoid valve mode 1		Solenoid valve mode 2	
		0		1		2		4		5	
Category	Port number	Code	Signal name	Code	Signal name	Code	Signal name	Code	Signal name	Code	Signal name
PLC output ↓ MCON 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/Inching switching	PC128		-	Cannot be used	-	
	8	-		JOG+	+Jog	-	Cannot be used	-		-	
	9	BKRL	Forced brake release	JOG–	-Jog	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	Pausing	#STP	Pausing	#STP	Pausing	#STP	Pausing	-	
	13	CSTR	Positioning start	CSTR/ PWRT	Positioning start/ Position data capture 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
MCON output ↓ PLC input	0	PM1	Completed position number	PM1	Completed position number	PM1	Completed position number	PE0	Position complete 0	LS0	Backward end movement command 0
	1	PM2		PM2		PM2		PE1	Position complete 1	LS1	Backward end movement command 1
	2	PM4		PM4		PM4		PE2	Position complete 2	LS2	Backward 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	Zone 1	ZONE1	Zone 1
	8 (Note 1)	PZONE/ ZONE2	Position zone/ Zone 2	PZONE/ ZONE1	Position zone/ Zone 1	PZONE/ ZONE1	Position zone/ Zone 1	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 capture completed	PEND	Positioning complete signal	PEND	Positioning complete signal	-	Cannot be used
	12	SV	Operation ready	SV	Operation ready	SV	Operation ready	SV	Operation ready	SV	Operation 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	LOAD/ TRQS/ #ALML	Torque detection(Note 2)/ Minor failure output	#ALML	Minor failure output	LOAD/ TRQS/ #ALML	Torque detection(Note 2)/ Minor failure output	LOAD/ TRQS/ #ALML	Torque detection(Note 2)/ Minor failure output	#ALML	Minor failure output

(Note 1) Can be switched by Parameter No. 149 "Zone output switching".
(Note 2) When the driver for stepper motor is selected, it can be switched by the Parameter No. 156 "Torque detection/Minor failure output".
Minor fault output is used for the 24VAC servo motor driver / BLDC servo motor driver.
* In the table above, the # symbol accompanying each code indicates a negative logic signal.
* PIO pattern 3 is not available.

General Specifications

Specification	Description						
Number of controlled axes	8 axes max.						
Controller/Motor input power supply voltage	24VDC ± 10%						
Brake release power consumption current	0.15A × number of axes						
Control power consumption current	1.0A						
Control power inrush current (Note 1)	5A max., 30ms or less						
Motor consumption current	Actuator type				Rating	Maximum	
						Power-saving	Standard/ Hi-accel./decel.
	Pulse motor (Note 2)	RCP2 RCP3	20P~28P				2.0A
			28SP~56P				2.0A
		RCP4 RCP5 RCP6	28P~56P	High-output disabled			2.2A
				High-output enabled (Note 3)	3.5A		4.2A
	24VAC servo motor (Note 2)	2W			0.8A		4.6A
		5W			1.0A		6.4A
		10W (RCL)			1.3A		6.4A
		10W (RCA/RCA2)			1.3A	2.5A	4.4A
		20W			1.3A	2.5A	4.4A
		20W (20S type)			1.7A	3.4A	5.1A
		30W			1.3A	2.2A	4.4A
	BLDC servo motor	3W			0.7A		1.5A
Motor power inrush current (Note 1)	Slot numbers × 10A max., 5ms or less						
Motor-encoder cable length	20m max. *When the simple absolute is selected, 10m will be the maximum length.						
Serial communication (SIO port: teaching only)	RS485: 1ch (Modbus protocol) Speed: 9.6~230.4kbps						
External interface	DeviceNet, CC-Link, PROFIBUS-DP, CompoNet, EtherCAT, EtherNet/IP, PROFINET IO						
Data setting, input method	PC compatible software, touch panel teaching pendant, gateway parameter setting tool						
Data retention memory	Position data and parameters are saved in non-volatile memory. (No limit to rewrite)						
Number of positioning points	256 points (Unlimited for simple numerical control and direct numerical control) (*) The number of positioning points vary depending on the motion mode selection set by the parameter.						
LED display (installed on the front panel)	Status LED for driver: 8 LEDs (for each driver board) Status LED for fieldbus: 7 LEDs						
Electromagnetic brake force release	Enable to force-release by transmitting a deactivation signal to each axis (24VDC input).						
Protection function (Note 4)	Overcurrent protection (each slot has its own solid-state motor cut-off circuit built-in)						
Electric shock protection mechanism	Class I, basic insulation						
Insulation resistance	500VDC 10MΩ						
Weight	620/ 690g when the simple absolute spec. is selected /Additional 1950g when used with the absolute battery box (8-axis spec.)						
Cooling method	Forced air cooling						
External dimensions	123W × 115H × 95D						
Ambient operating temp. & humidity	0~40°C, 85% RH or less (Non-condensing)						
Vibration resistance	Frequency: 10~57Hz/Amplitude: 0.075mm, Frequency: 57~150Hz/Acceleration: 9.8m/s^2 XYZ directions, Sweep time: 10 minutes, Number of sweeps:10 times						
Impact resistance	Drop height: 800mm 1 corner, 3 edges, 6 faces						
Degree of protection	IP20						

(Note 1) Please note that the inrush current value varies depending on the impedance of the power line.
(Note 2) The current will be highest in the exciting phase detection performed in the first servo ON process after the power is turned on.
(Pulse motor: 100ms (normal)/24VAC servo motor: approx. 1~2 seconds (normal), up to 10 seconds)
(Note 3) The driver board of high-output configuration specification can be used to control one axis per slot.
(Note 4) The 24VAC servo motor will function if the load current reaches equal to or greater than 1.4 times the maximum value.

Name of Each Component

1 Connector for the absolute data backup battery

2 Connector for the external brake input

3 Motor power cut-off jumper and emergency stop input connector

4 Information card for configuration of the connecting axes

5 +24V power supply input connector

6 FG terminal block

7 Status LEDs for drivers

8 Fan unit

9 AUTO/MANU switch

10 SIO connector

11 System I/O connector

12 Status LED for fieldbus

13 Fieldbus connector

14 Slot 0 Connectors for actuator connection
Top (1st axis): Axis No.0 (AX0)
Bottom (2nd axis): Axis No.1 (AX1)

15 Slot 1 Connectors for actuator connection
Top (3rd axis): Axis No.2 (AX2)
Bottom (4th axis): Axis No.3 (AX3)

16 Slot 2 Connectors for actuator connection
Top (5th axis): Axis No.4 (AX4)
Bottom (6th axis): Axis No.5 (AX5)

17 Slot 3 Connectors for actuator connection
Top (7th axis): Axis No.6 (AX6)
Bottom (8th axis): Axis No.7 (AX7)

■ Descriptions of Each Component

1 Connector for the absolute data backup battery
This connects the absolute data backup battery box should the controller be the simple absolute type.

2 Connector for the external brake input
This signal input connector is used to release the actuator brake externally.

3 Motor power cut-off jumper and emergency stop input connector
In/out terminals for external relay for motor power cut-off and connectors for emergency stop input, for each slot (2 axes).

4 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.

5 +24V power supply input connector
This is the main power supply connector for the controller:
Motor drive shut-off is possible while restoring power to the controller unit after an emergency stop.
This is because the power supply terminals for the motor and the controller are separate.

6 FG terminal block
It is a terminal block for frame ground.

7 Status LEDs for drivers
The driver status and absolute status are displayed per slot (2 axes).

8 Fan unit
A fan unit that can be easily replaced. (Replacement fan unit Model: MSEP-FU)

9 AUTO/MANU switch
A switch for the automatic / manual operation.

10 SIO connector
A connector for connecting the teaching pendant and PC compatible software cable.

11 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 and an external SIO terminal.

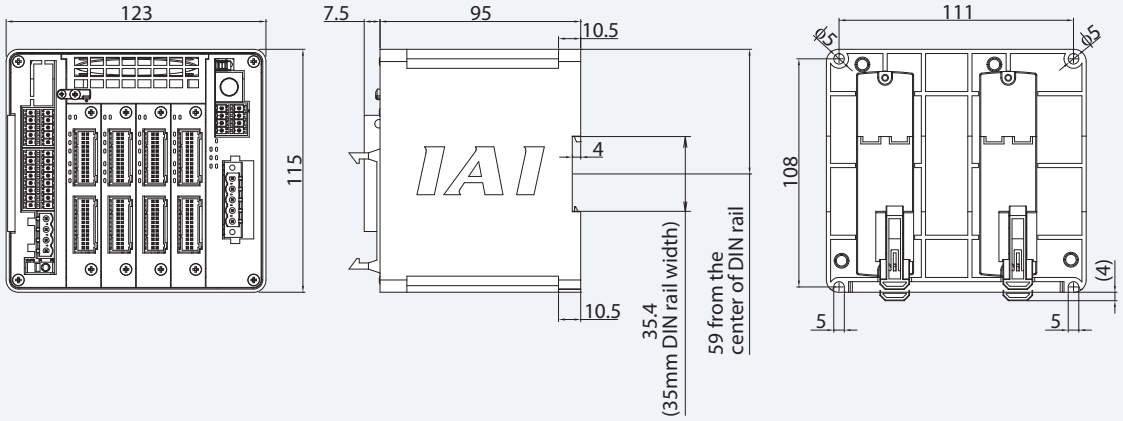
12 Status LEDs for fieldbus
Status display LEDs for controller and fieldbus.

13 Fieldbus connector
Equipped with a connector for connecting various fieldbus.

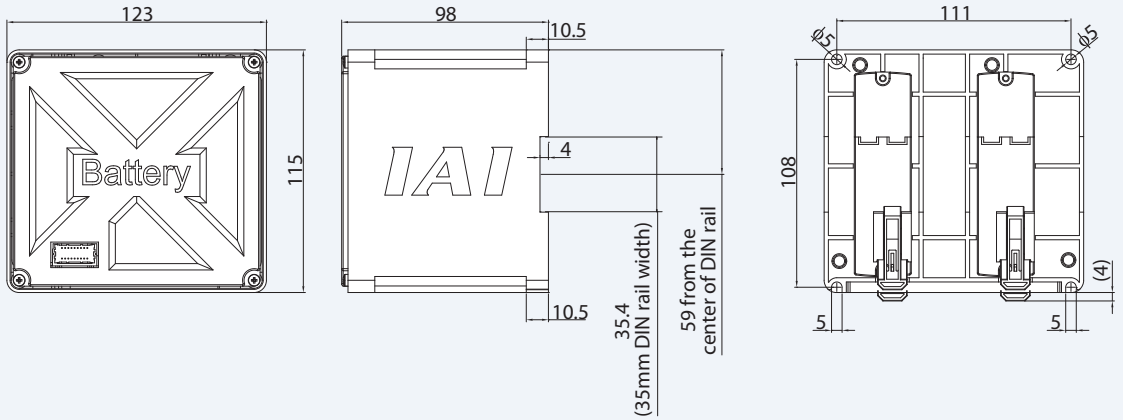
14 ~ 17 Motor-encoder connectors for actuator connections
Connect motor-encoder cables for actuators.

External Dimensions

Controller



Absolute battery box



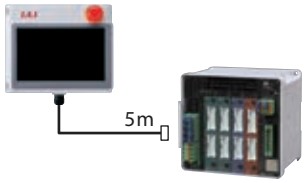
Options

Teaching pendant

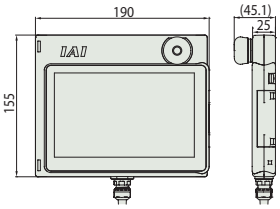
■ **Features** A teaching device equipped with functions such as position teaching, trial operation, and monitoring.

■ **Model** **TB-02-C**

■ **Configuration**



■ **External dimensions**



■ **Specifications**

Rated voltage	24VDC
Power consumption	3.6W or less (150mA or less)
Ambient operating temperature	0~40°C
Ambient operating humidity	20~85% RH (Non-condensing)
Environmental resistance	IP20
Weight	470g (TB-02 box only)

PC compatible software (Windows only)

* The PC compatible software is required for the MCON.

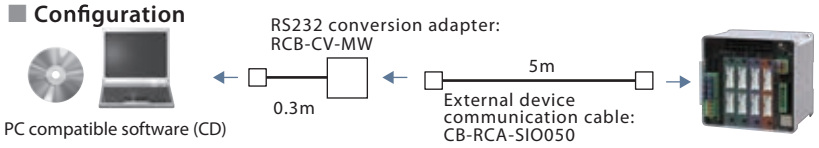
■ **Features** The start-up support software which comes equipped with functions such as position teaching, trial operation, and monitoring.
A complete range of functions needed for making adjustments contributes to a reduced start-up time.

Compatible with Windows XP SP2 or later/Vista/7/8

■ **Model** **RCM-101-MW** (with an external device communication cable + RS232 conversion unit)

MCON is compatible with Ver.10.00.00.00 or later.

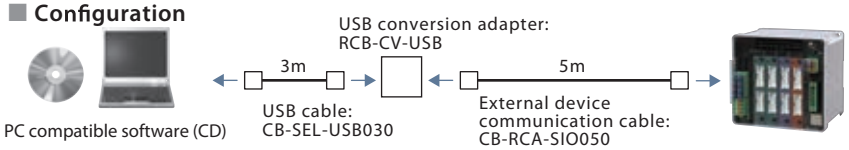
■ **Configuration**



■ **Model** **RCM-101-USB** (with an external device communication cable +USB conversion adapter + USB cable)

MCON is compatible with Ver.10.00.00.00 or later.

■ **Configuration**

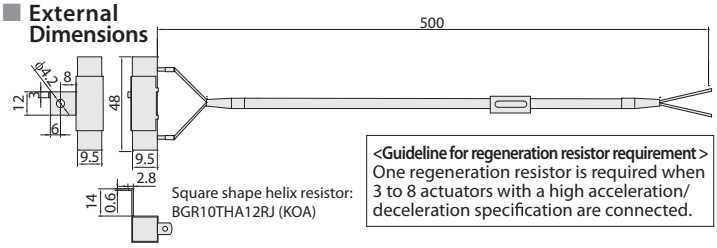


External regeneration resistor

■ **Overview**
As the motor reduces its speed, the resistor will convert dissipated regenerative current into heat. Since the MCON controller has a built-in regeneration resistor, this can be used for normal operations. However, an external resistor can be installed should the capacity of the internal resistor be insufficient.

■ **Model** **RER-1**

■ **External Dimensions**



<Guideline for regeneration resistor requirement>
One regeneration resistor is required when 3 to 8 actuators with a high acceleration/deceleration specification are connected.

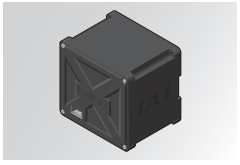
Absolute battery box

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

■ **Model** **MSEP-ABB**
(Battery sold separately)

■ **External Dimensions** **See P.15**

* Cable that connects the absolute battery box and MCON (Cable Model: CB-MSEP-AB005) comes with the absolute battery box.



Dummy plug

■ **Overview**
It is required for the safety category compliant type (CG).

■ **Model** **DP-5**

Driver board

■ **Overview**
The driver board can be supplemented or exchanged in the MCON controller. When just the actuator operated needs to be modified, this can be done by simply replacing the driver board instead of the entire controller. (The parameters will need to be adjusted when the driver board is replaced)

■ **Model**

Motor type	High output type	Encoder type	Number of axes	Model number
Pulse motor	High-output setting enabled	Battery-less absolute/ Incremental	1	MCON-PPD1-W
		Simple absolute	1	MCON-PPD1-A
	High-output Setting disabled	Battery-less absolute/ Incremental	1	MCON-PD1-W
			2	MCON-PD2-W
		Simple absolute	1	MCON-PD1-A
			2	MCON-PD2-A
24VAC servo motor	-	Battery-less absolute/ Incremental	1	MCON-AD1-W
			2	MCON-AD2-W
		Simple absolute	1	MCON-AD1-A
			2	MCON-AD2-A
BLDC servo motor	-	Incremental	1	MCON-DD1-I
			2	MCON-DD2-I

Replacement battery

■ **Overview**
Replacement battery used with the absolute battery box.

■ **Model** **AB-7**

Replacement fan unit

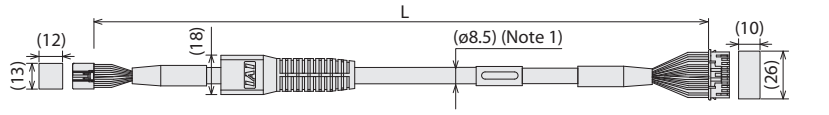
■ **Model** **MSEP-FU**

Maintenance Parts

For RCP6/RCP5/RCD/RCP4-SA3/RA3/RCP4 Gripper Type, etc.

Model Number CB-CAN-MPA□□□/CB-CAN-MPA□□□-RB
Standard cable / Robot cable

* Please indicate the cable length (L) in □□□, maximum 20m (10m when connecting to RCD), E.g.) 080 = 8m



(Front view) Actuator side — (Front view) Controller side

Minimum bending radius: 5m or less — r = 68mm or more (Dynamic bending condition)
5m or longer — r = 73mm or more (Dynamic bending condition)

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

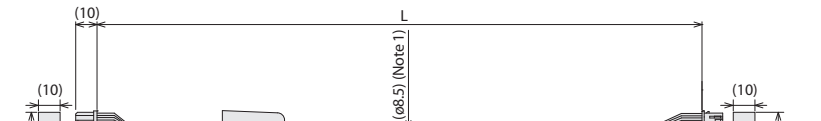
(Note 1) If the cable is 5m or longer, ø9.1 cable diameter applies for a non-robot cable and ø10 for a robot cable.

Pin No.	Signal name	Pin No.	Signal name
3	ϕA/U	1	ϕA/U
5	VMM/V	2	VMM/V
10	ϕ_A/W	3	ϕ_A/W
9	ϕB/-	4	ϕB/-
4	VMM/-	5	VMM/-
15	ϕ_B/-	6	ϕ_B/-
8	LS+/BK+	7	LS+/BK+
14	LS-/BK-	8	LS-/BK-
12	-/A+	11	-/A+
17	-/A-	12	-/A-
1	A+/B+	13	A+/B+
6	A-/B-	14	A-/B-
11	B+/Z+	15	B+/Z+
16	B-/Z-	16	B-/Z-
20	BK+/LS+	9	BK+/LS+
2	BK-/LS-	10	BK-/LS-
21	LS_GND	17	LS_GND
7	VPS	19	VPS
1S	VCC	1S	VCC
13	GND	20	GND
19	-	22	-
22	BAT+	21	BAT+
23	-	23	-
24	FG	24	FG

For RCP4

Model Number CB-CA-MPA□□□/ CB-CA-MPA□□□-RB
Standard cable / Robot cable

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



(Front view) Actuator side

Minimum bending radius: 5m or less — r = 68mm or more (Dynamic bending condition)
5m or longer — r = 73mm or more (Dynamic bending condition)

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 the cable is 5m or longer, ø9.1 cable diameter applies for a non-robot cable and ø10 for a robot cable.

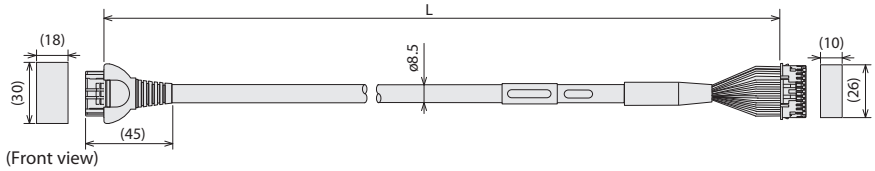
Actuator side: 1-1827863-1 (AMP) — Controller side: PADP-24V-1-S (J.S.T.MFG.CO.,LTD.)

Pin No.	Signal name	Pin No.	Signal name
A1	ϕA/U	1	ϕA/U
B1	VMM/V	2	VMM/V
A2	ϕ_A/W	5	ϕ_A/W
B2	ϕB/-	3	ϕB/-
A3	VMM/-	4	VMM/-
B3	ϕ_B/-	6	ϕ_B/-
A4	LS+/BK+	7	LS+/BK+
B4	LS-/BK-	8	LS-/BK-
A6	-/A+	11	-/A+
B6	-/A-	12	-/A-
A7	A+/B+	13	A+/B+
B7	A-/B-	14	A-/B-
A8	B+/Z+	15	B+/Z+
B8	B-/Z-	16	B-/Z-
A5	BK+/LS+	9	BK+/LS+
B5	BK-/LS-	10	BK-/LS-
A9	LS_GND	20	LS_GND
B9	VPS	18	VPS
A10	VCC	17	VCC
B10	GND	19	GND
A11	-	21	-
B11	FG	22	-
		23	-
		24	FG

For RCP3/RCA2, etc.

Model Number CB-APSEP-MPA□□□ Only robot cable is available for this model.
Robot cable

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



(Front view) Actuator side

Minimum bending radius: r = 68mm or more (Dynamic bending condition)

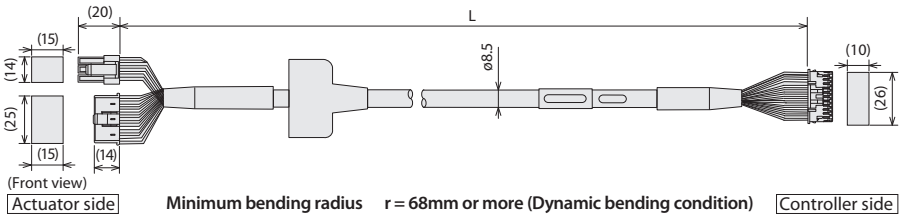
Controller side

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

For RCP2

Model Number CB-PSEP-MPA□□□ Only robot cable is available for this model.
Robot cable

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

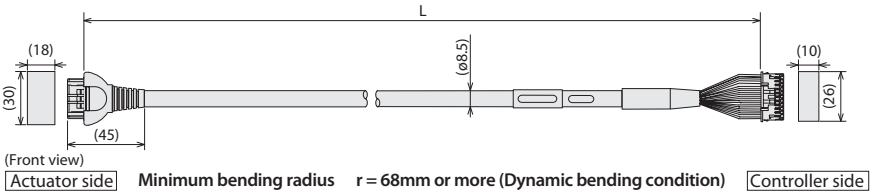


Actuator side Terminal number		Controller side Terminal number
1	[ϕA]	1
2	[VMM]	2
4	[ϕB]	3
5	[VMM]	4
3	[ϕ/A]	5
6	[ϕ/B]	6
16	[BK+]	9
17	[BK-]	10
5	NC	11
6	NC	12
13	[LS+]	7
14	[LS-]	8
1	[A+]	13
2	[A-]	14
3	[B+]	15
4	[B-]	16
10	[VCC]	17
11	[VPS]	18
9	[GND]	19
12	[(reserve)]	20
15	NC	21
7	NC	22
8	NC	23
18	Shield [FG]	24

For RCP2-RTBS/RTBSL/RTCS/RTCSL

Model Number CB-RPSEP-MPA□□□ Only robot cable is available for this model.
Robot cable

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

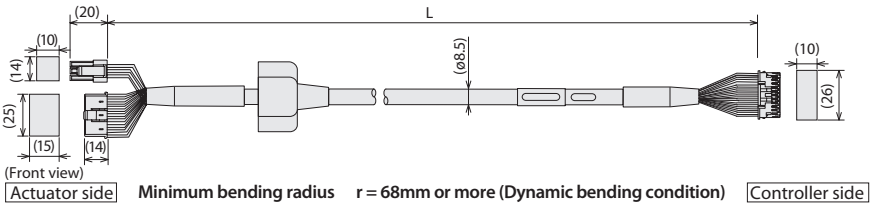


Actuator side Terminal number		Controller side Terminal number
A1	[ϕA]	1
B1	[VMM]	2
A2	[ϕ/A]	5
B2	[ϕB]	3
A3	[VMM]	4
B3	[ϕ/B]	6
A6	[LS+]	7
B6	[LS-]	8
A7	[A+]	13
B7	[A-]	14
A8	[B+]	15
B8	[B-]	16
A4	NC	-
B4	NC	
A5	[BK+]	9
B5	[BK-]	10
A9	[GNDLS]	20
B9	[VPS]	18
A10	[VCC]	17
B10	[GND]	19
A11	NC	21
B11	Shield [FG] (FG)	24
	NC	22
	NC	23

For RCA

Model Number CB-ASEP2-MPA□□□ Only robot cable is available for this model.
Robot cable

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



Actuator side Terminal number		Controller side Terminal number
1	[U]	1
2	[V]	2
	NC	3
	NC	4
3	[W]	5
	NC	6
18	[BK+]	7
17	[BK-]	8
7	[LS+]	9
16	[LS-]	10
1	[A+]	11
2	[A-]	12
3	[B+]	13
4	[B-]	14
10	[Z+]	15
11	[Z-]	16
14	[VCC]	17
13	[VPS]	18
15	[GND]	19
6	[(reserve)]	20
5	NC	21
8	NC	22
12	NC	23
9	Shield [FG]	24

MCON Series
Catalogue No. 0916-E

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