


PCON-CB/CFB

**Position Controller for RCP6/RCP5/
RCP4 (PowerCon Applicable) /RCP3/RCP2**



Features

1 High-resolution battery-less absolute encoder compatible

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

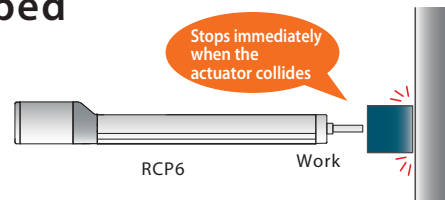


2 PowerCon Equipped

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

3 Collision Detection Function Equipped

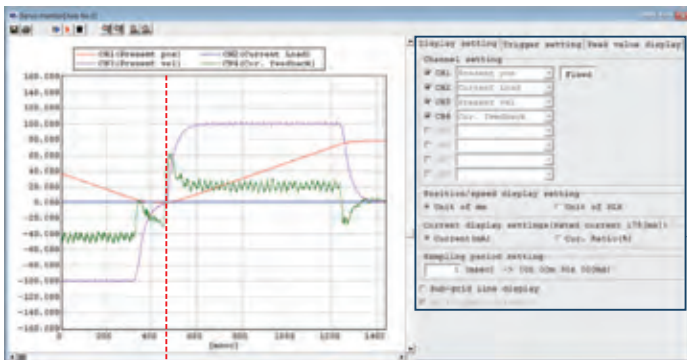
This function stops the operation immediately when the actuator comes into contact with an object. The actuator stops without crashing, so that damage to the actuator can be minimized.



4 Enhanced Monitor Functions

The PC compatible software can display information about the actuator and controller in operation as waveforms. *Information that can be displayed: Command current value, current speed/position, and PIO signals (start, positioning completion, alarm, etc.) Using the trigger function, the end user can specify a particular moment, either a change in PIO signals or a designated moment during the actuator's operation time, to begin displaying the waveforms.

Monitor function screen (example)



Signal: CSTR (start) turned ON


Display settings

Items to be monitored can be selected.

Trigger settings

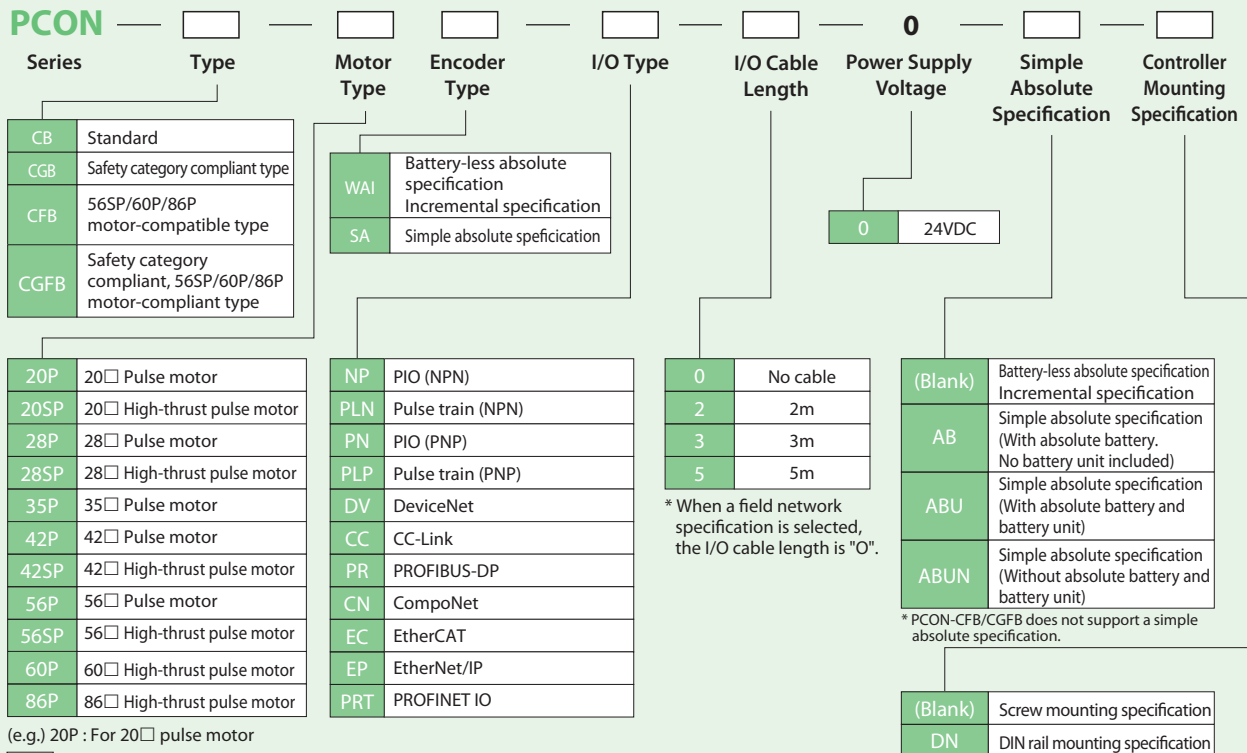
* Data acquiring starts from time of change of selected items.

List of Models

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

Model Specification Items

< Controller >



(e.g.) 20P : For 20□ pulse motor

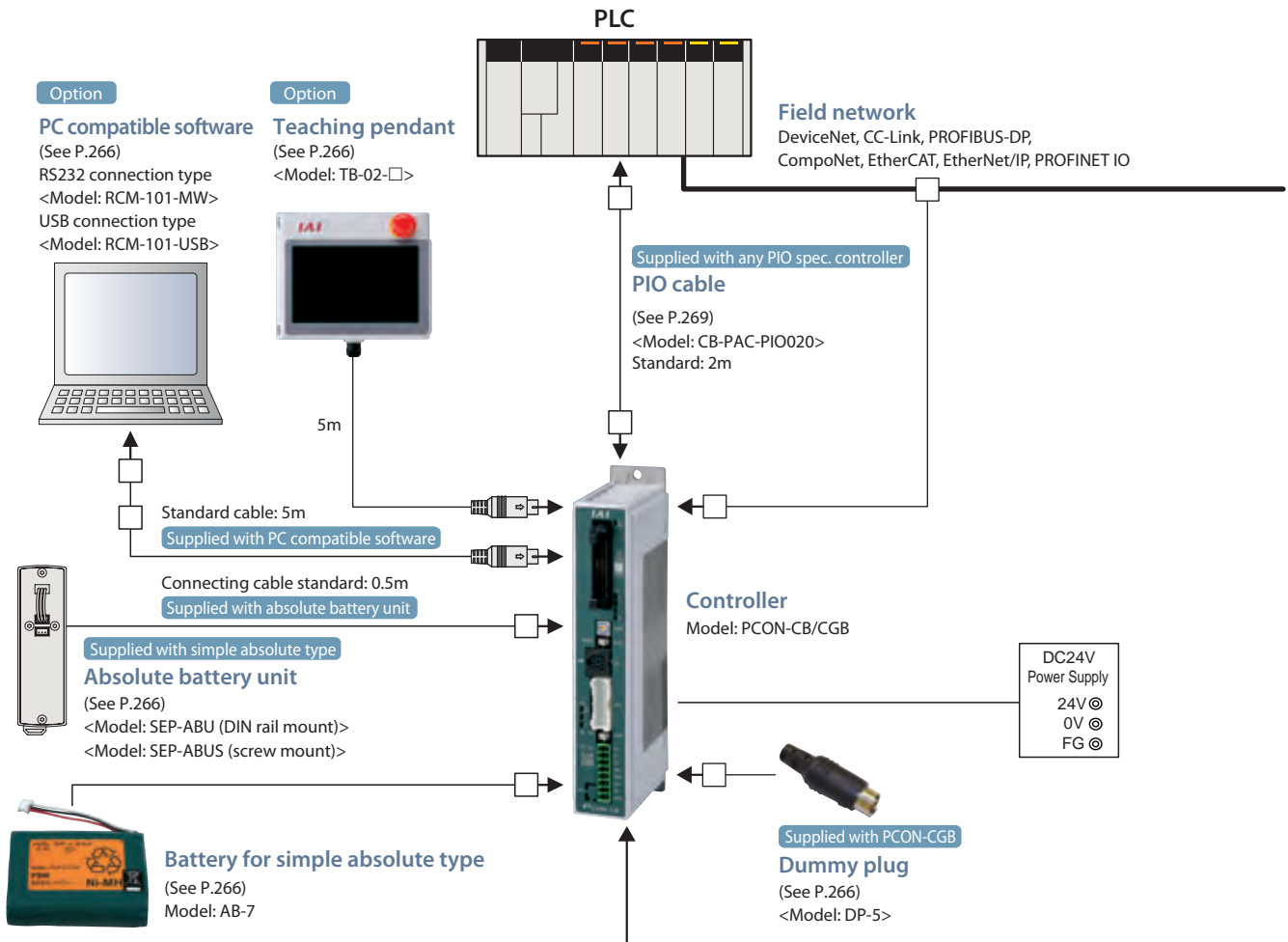
Note

In general, the model number for motor type will be the same as the model number of the actuator's motor, but there is a few exceptions which the model number of controller and actuator do not match. Below is the list of those models. Please be careful when these item(s) are selected.
 <28SP applicable actuator> • Controller Motor Type [28SP] RCP2-RA3C

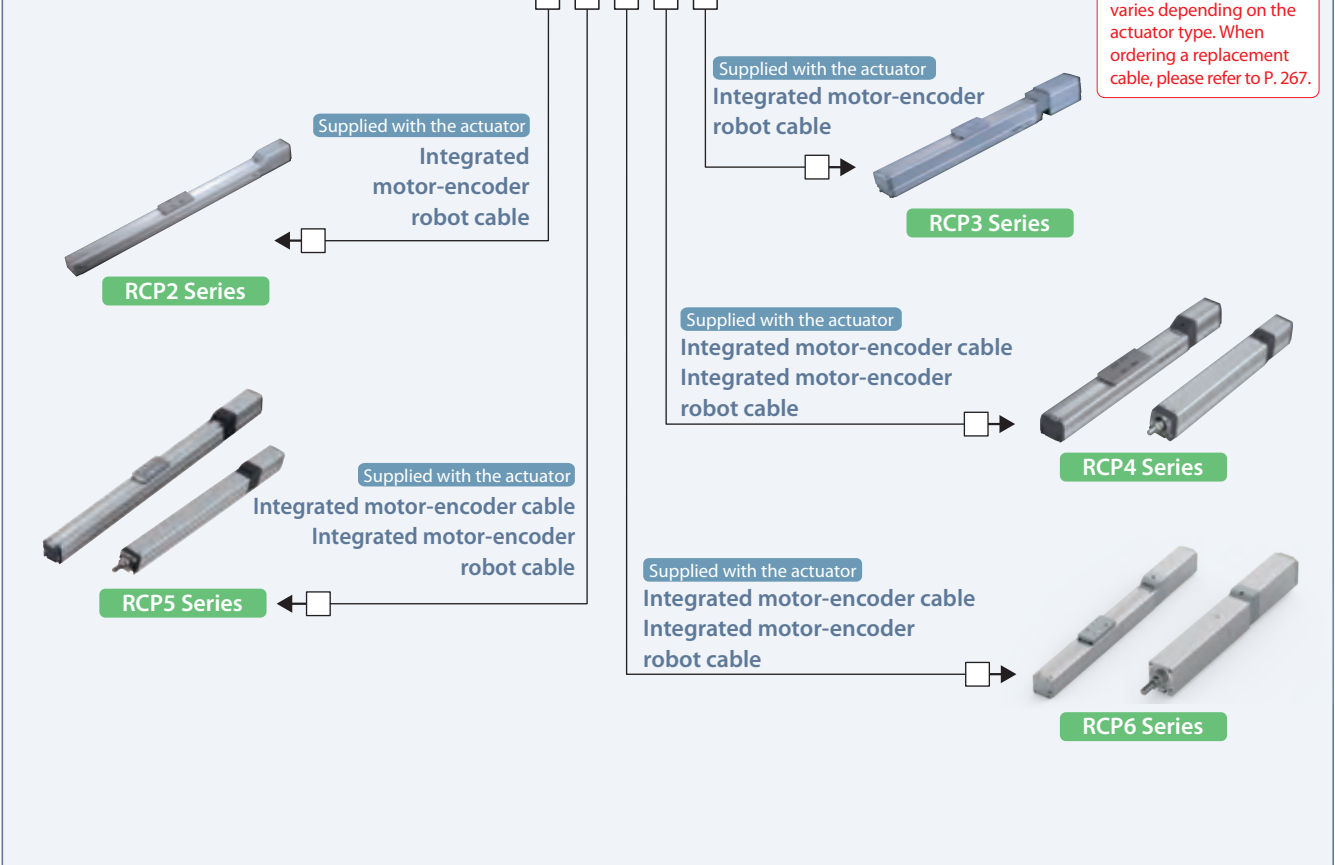
* The mounting type (screw or DIN rail) of the absolute battery unit and the controller must be the same.

System Configuration

PowerCON150 <PCON-CB/CGB>

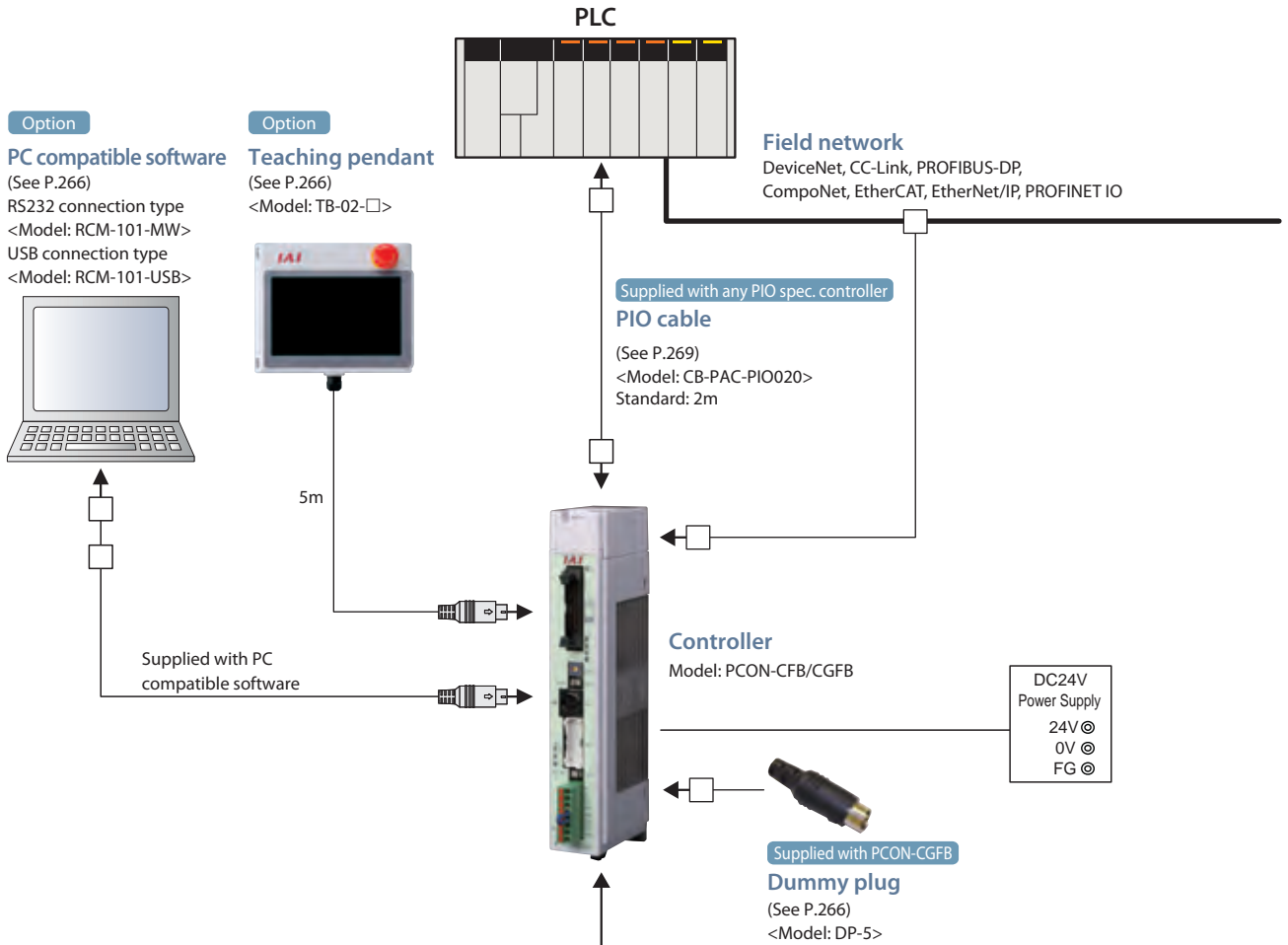


< Connectable actuators >



System Configuration

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

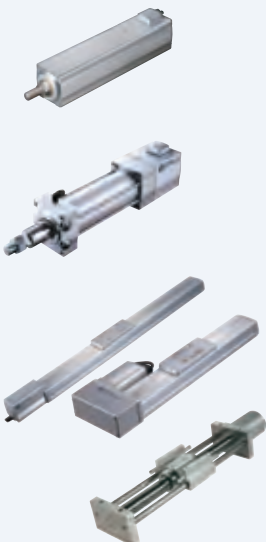


< Connectable actuators >

Supplied with the actuator

Integrated motor-encoder cable
Integrated motor-encoder robot cable

RCP2 Series



Supplied with the actuator

Integrated motor-encoder cable
Integrated motor-encoder robot cable

RCP4 Series



Supplied with the actuator

Integrated motor-encoder cable
Integrated motor-encoder robot cable

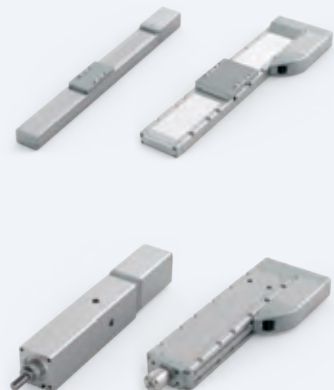
RCP5 Series



Supplied with the actuator

Integrated motor-encoder cable
Integrated motor-encoder robot cable

RCP6 Series

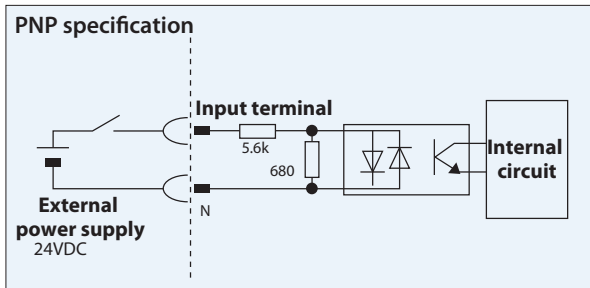
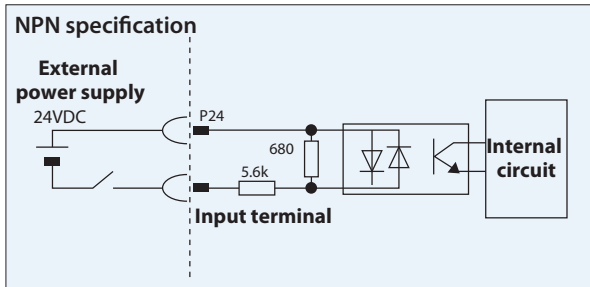


*Motor/encoder cable type varies depending on the actuator type. When ordering a replacement cable, please refer to P. 267.

PIO I/O Interface

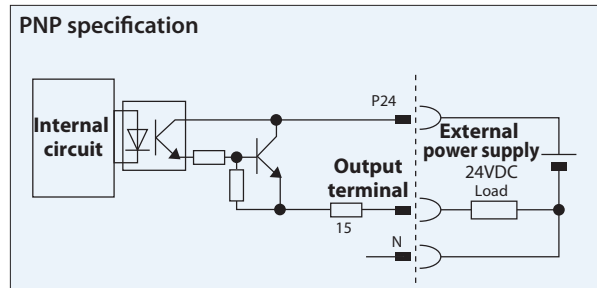
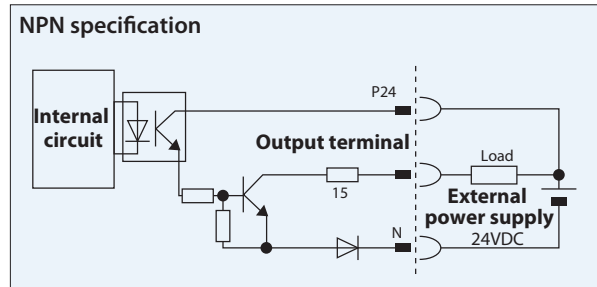
Input part External input specification

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



Output part External output specification

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



Types of PIO Patterns (Control Patterns)

This controller has eight different control methods.

Please select the PIO pattern that best suits your application in Parameter No.25, "PIO Pattern Selection".

Type	Set value of parameter No.25	Mode	Overview
PIO Pattern 0	0 (Factory setting)	Positioning mode (Standard type)	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> Number of positioning points: 7 points Zone signal output^{*1}: 1 point Position number command: Individual number signal ON Position zone signal output^{*2}: 1 point
PIO Pattern 5	5	Solenoid valve mode 2 (3-point type)	<ul style="list-style-type: none"> 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 1)	6	Pulse-train control mode for incremental	<ul style="list-style-type: none"> Differential pulse input (200 kpps max.) Home return function Zone signal output^{*1}: 2 points No feedback pulse output
PIO Pattern 7 (Note 1)	7	Pulse-train control mode for absolute	<ul style="list-style-type: none"> Reference point setting (1 point) Home return function Differential pulse input (200 kpps max.) No feedback pulse output Zone signal output^{*1}: 2 points

*1 Zone signal output: Please set the desired zone range in Parameter No.1/2 or 23/24, and it will remain effective once home return is completed.

*2 Position zone signal output: This command function relates to the position number. Set the desired zone range in the position table, and this function will only become enabled when the corresponding position is specified; it will be disabled for all other position commands.

(Note 1) Pulse train control mode is available only the pulse train control type is specified (PCON-CB-PLN and 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 No.	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)	—	○	—	—	—	—
	Output	Brake release	○	—	○	○	○	○
		Moving signal	○	○	—	—	—	—
		Zone signal	○	△ (Note 1)	△ (Note 1)	—	○	○
		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 (Non-Functional)
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 (Note2)
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~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.

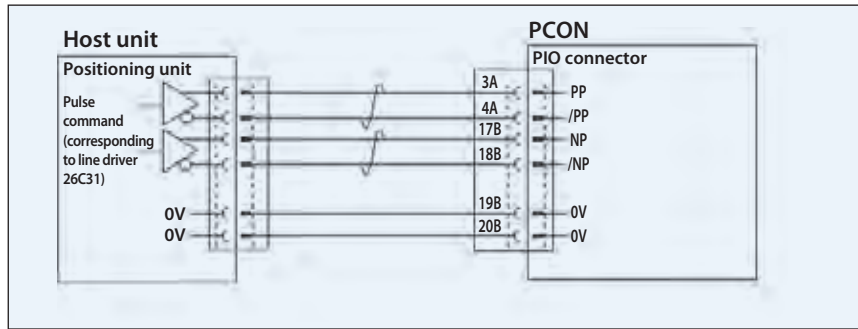
(Note 2) The setting will not become effective until the home return is completed.

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.

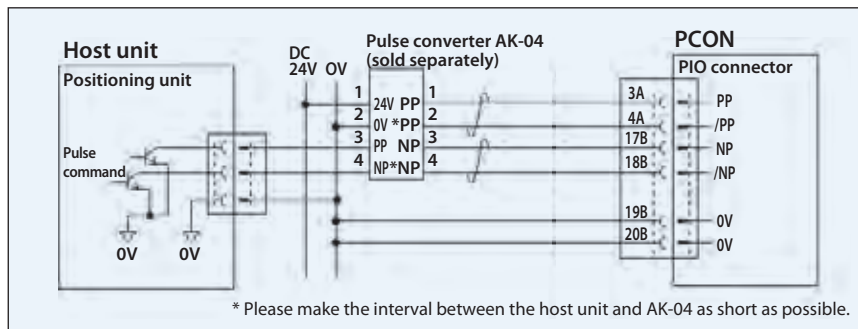
Pulse-train Control Circuit

■ 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.						
Positive logic	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.					
	Forward pulse-train		PP-/PP			
	Reverse pulse-train		NP-/NP			
Positive logic	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 6/7"
1A	24V		P24	Power supply	I/O power supply +24V
2A	24V		P24	Power supply	I/O power supply +24V
3A	Pulse Input		PP	Differential pulse-train input (+)	Differential pulses are input from the host. Up to 200kpps 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 16ms 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	RSTR*1	Reference position movement command	When this signal turns on, the actuator moves to the reference position set in parameter No.167. *1: Used only in PIO Pattern 7.
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 supply 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	RMD5	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		
14B		OUT13	REND*1	Reference position movement complete	This signal turns ON when movement to the reference point set in parameter No. 167 is completed. *1: Used only in PIO Pattern 7.
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 200kpps can be input.
18B			/NP	Differential pulse-train input (-)	
19B	0V		N	Power supply	I/O power supply 0V
20B	0V		N	Power supply	I/O power supply 0V

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.

Field Network Specification: Explanation of Operation Modes

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

Mode Description

	Mode	Description
0	Remote I/O mode	Similarly to the PIO specification, this mode operates by directing bytes to ON/OFF via a network. The number of positioning points and functions will vary depending on the operation patterns (PIO patterns) set by the controller's parameters.
1	Position/simple direct value mode	The target position value is directly input, while all other operational conditions (speed, acceleration, etc) are set by indicating the position number corresponding to the desired operating conditions from the position data table.
2	Half direct value mode	The actuator is operated by directly inputting values for speed, acceleration rate and push current, as well as the target position.
3	Full direct value mode	The actuator is operated by directly inputting values for the target position, speed, acceleration rate and push current, etc. In addition, you are able to read the current position, current speed, and the specified current, etc.
4	Remote I/O mode 2	This mode is the same as the remote I/O mode above, with the added functionality of reading current position and the command motor current.

Required Data Size for Each Network

		DeviceNet	CC-Link	PROFIBUS-DP	CompoNet	EtherCAT	EtherNet/IP	PROFINET IO
0	Remote I/O mode	2 bytes	1 station	2 bytes	2 bytes	2 bytes	2 bytes	2 bytes
1	Position/simple direct value mode	8 bytes	1 station	8 bytes	8 bytes	8 bytes	8 bytes	8 bytes
2	Half direct value mode	16 bytes	2 stations	16 bytes	16 bytes	16 bytes	16 bytes	16 bytes
3	Full direct value mode	32 bytes	4 stations	32 bytes	32 bytes	32 bytes	32 bytes	32 bytes
4	Remote I/O mode 2	12 bytes	1 station	12 bytes	12 bytes	12 bytes	12 bytes	12 bytes

List of Functions by Operation Mode

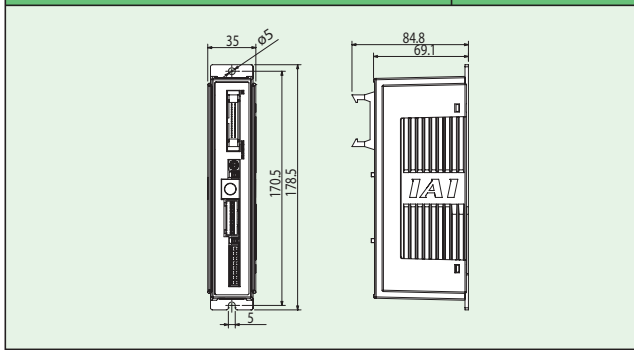
	Remote I/O mode	Position/simple direct value mode	Half direct value mode	Full direct value mode	Remote I/O mode 2
Number of positioning points	512 points	768 points	Unlimited	Unlimited	512 points
Operation by direct position data input	—	○	○	○	—
Direct speed/acceleration input	—	—	○	○	—
Push-motion operation	○	○	○	○	○
Current position read	—	○	○	○	○
Current speed read	—	—	○	○	—
Operation by position number input	○	○	—	—	○
Completed position number read	○	○	—	—	○

* ○ indicates that the operation is supported, and — indicates that it is not supported.

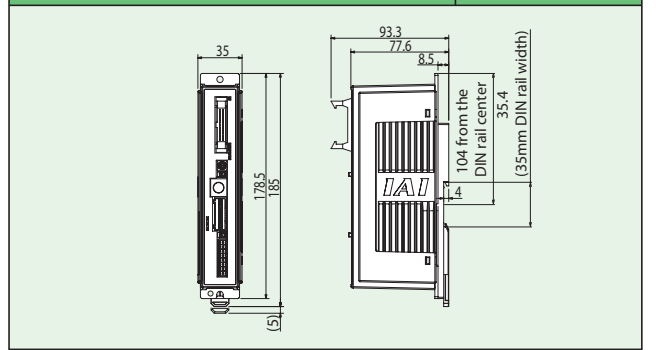
External Dimensions

<PCON-CB/CGB>

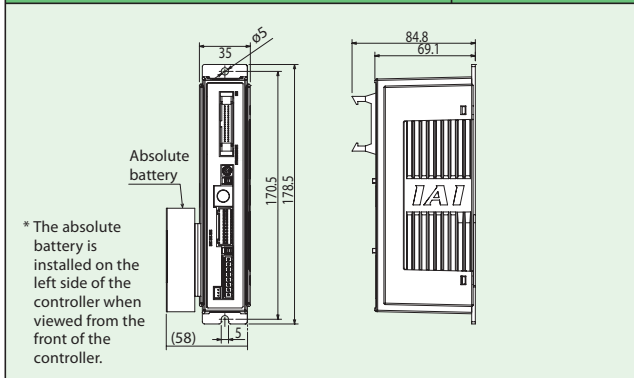
Battery-less Absolute/Incremental Specifications Screw Mounting Spec.



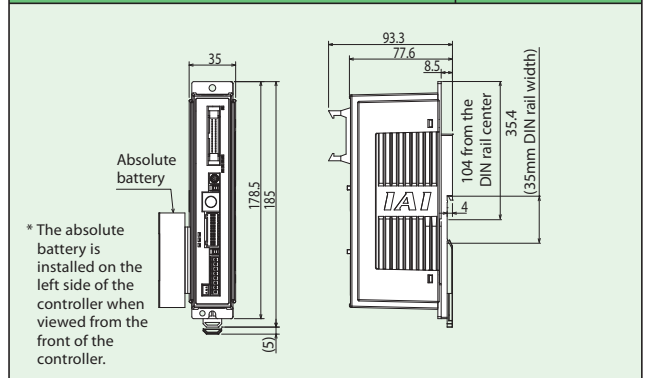
Battery-less Absolute/Incremental Specifications DIN Rail Mounting Spec.



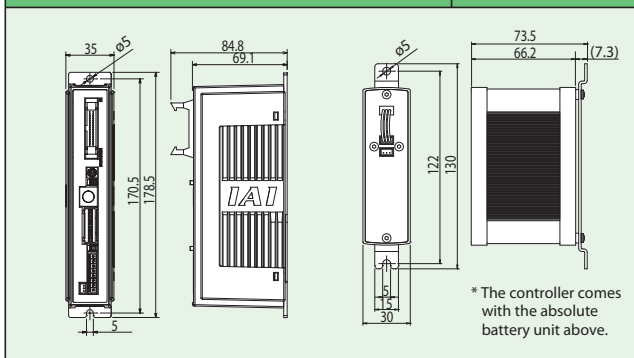
Simple Absolute Specification w/ Absolute Battery Screw Mounting Spec.



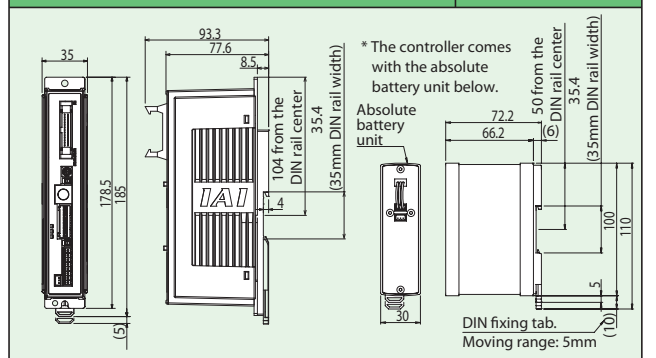
Simple Absolute Specification w/ Absolute Battery DIN Rail Mounting Spec.



Simple Absolute Specification w/ Absolute Battery Unit Screw Mounting Spec.

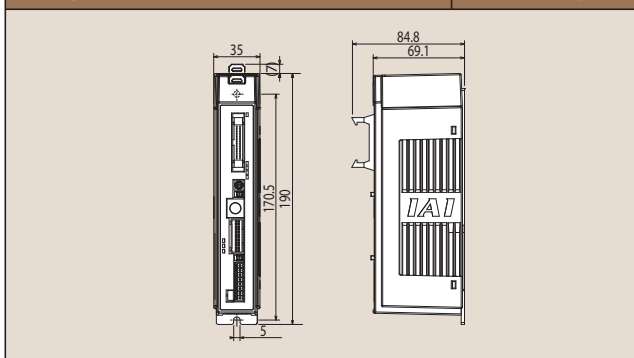


Simple Absolute Specification w/ Absolute Battery Unit DIN Rail Mounting Spec.

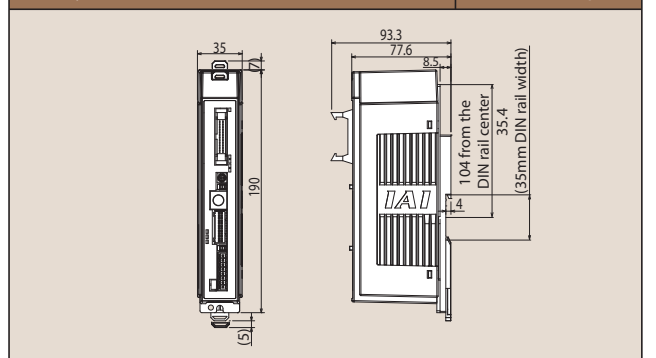


<PCON-CFB/CGFB>

Battery-less Absolute/Incremental Specifications Screw Mounting Spec.



Battery-less Absolute/Incremental Specifications DIN Rail Mounting Spec.



Specification List

Item		Description				
		PCON-CB/CGB	PCON-CFB/CGFB			
Number of controlled axes		1 axis				
Power supply voltage		24VDC±10%				
Load current (including control-side current consumption) (Note 1)	RCP2 RCP3	Motor type	20P, 28P, 28SP	1A max.		
			35P, 42P, 56P	2.2A max.		
			60P, 86P		6A max.	
	RCP4 RCP5	Motor type	28P, 35P, 42P, 42SP, 56P	High-output setting disabled: 2.2A max.		
			56SP, 60P, 86P	High-output setting enabled: 3.5A rated/4.2A max.		6A max.
	RCP6	Motor type	28P, 35P, 42P, 56P	High-output setting disabled: 2.2A max.		
			56SP, 60P	High-output setting enabled: 3.5A rated/4.2A max.		5.7A max.
	Electromagnetic brake power (for actuator with brake)		24VDC±10% 0.15A max.	24VDC±10% 0.5A max.		
Inrush current (Note 2)		8.3A	10A			
Momentary power failure resistance		500µs max.				
Compatible encoder		High-resolution battery-less absolute encoder: Resolution 8192 pulses/rev				
		Battery-less absolute encoder: Resolution 800 pulses/rev				
		Incremental encoder: Resolution 800 pulses/rev				
Actuator cable length		20m max.				
External interface	PIO specification		Dedicated 24VDC signal input/output (NPN/PNP selection) ... Input max. of 16 points, output max. of 16 points, cable length max. of 10m			
	Field network specification		DeviceNet, CC-Link, PROFIBUS-DP, CompoNet, EtherCAT, EtherNet/IP, PROFINET IO			
Data setting, input method		PC compatible software, touch panel teaching pendant				
Data retention memory		Position data and parameters are saved in non-volatile memory. (No limit to rewrite)				
Operation mode		Positioner mode / pulse-train control mode (selectable by parameter setting)				
Number of positioner-mode positions		Up to 512 points for positioner type or up to 768 points for network type *The total number of positioning points varies depending on which PIO pattern is selected.				
Pulse-train interface	Input pulse	Differential type (line-driver type): 200kpps max., cable length up to 10m				
		Open-collector method: Not supported * If the host uses open-collector outputs, use AK-04 (optional, sold separately) to change them to differential outputs.				
	Command pulse magnification (Electronic gear: A/B)	1/50 < A/B < 50/1 Setting range of A and B (set by parameters): 1~4096				
	Feedback pulse output	None				
Insulation resistance		Not less than 10MΩ at 500VDC				
Electric shock protection mechanism		Class I, basic insulation				
Mass (Note 3)	Battery-less absolute specification/ Incremental specification	Screw mounting type: Not more than 250g DIN rail mounting type: Not more than 285g	Screw mounting type: Not more than 270g DIN rail mounting type: Not more than 305g			
	Simple absolute specification (including 190g for battery)	Screw mounting type: Not more than 450g DIN rail mounting type: Not more than 485g				
Cooling method		Natural air cooling	Forced air cooling			
Environment	Ambient operating temperature	0~40°C				
	Ambient operating humidity	Not more than 85% RH (non-condensing)				
	Operating ambience	Free from corrosive gases				
	Degree of protection	IP20				

Note 1) 0.3A higher for the field network specification.

Note 2) Inrush current flows for approx. 5msec after the power is input (at 40°C). Please note that the inrush current value varies depending on the impedance of the power line.

Note 3) 30g heavier for the field network specification.

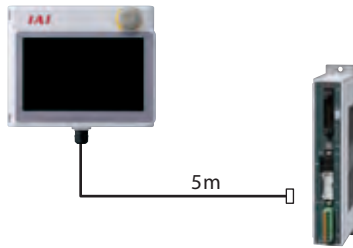
Options

Touch panel teaching pendant

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

Model **TB-02-□**

Configuration



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 unit only)

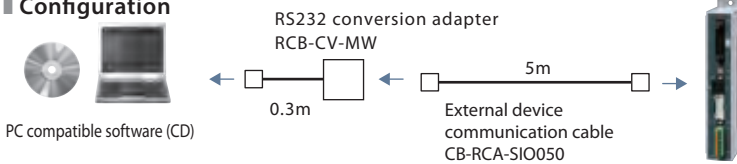
PC compatible software (Windows only)

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.

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

Please contact IAI for the current supported versions.

Configuration



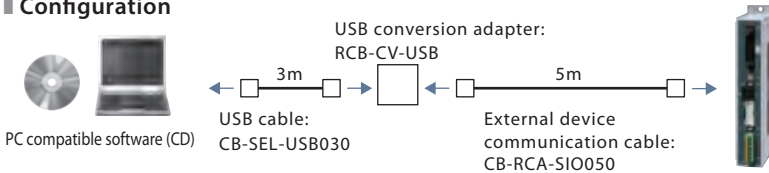
Supported Windows versions:
7 / 8 / 10



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

Please contact IAI for the current supported versions.

Configuration



Absolute battery unit

Overview A battery unit, supplied as an accessory for the simple absolute specification, which serves to back up the current position of the controller.

Model **SEP-ABU** (DIN rail mounting specification)

SEP-ABUS (Screw mounting specification)

Specification

Item	Specification
Ambient operating temp. & humidity	0~40°C (around 20°C is desirable), 95% RH or less (non-condensing)
Operating ambience	Free from corrosive gases
Absolute battery	Model: AB-7 (Ni-MH battery/Life: approx. 3 years)
Absolute battery unit connecting cable	Model: CB-APSEP-AB005 (length: 0.5m)
Weight	Standard type: approx.230g/Dust-proof type: approx.260g

Replacement battery

Overview Replacement battery used with the absolute battery box.

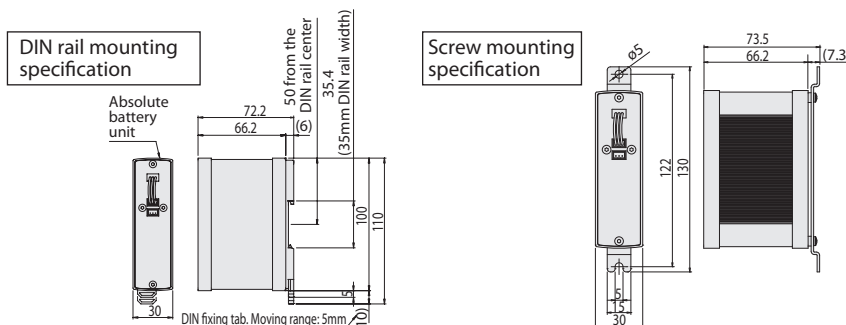
Model **AB-7**



Dummy plug

Overview This plug is required when the safety category specification (PCON-CGB/CGFB) is used.

Model **DP-5**



Maintenance Parts

When placing an order for the replacement cable, please use the model number shown below.

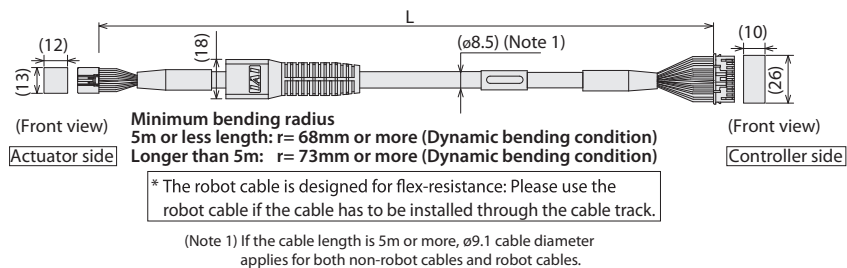
Table of Applicable Cables

Model Number		Integrated Motor-encoder Cable	Integrated Motor-encoder Robot Cable
①	RCP6/RCP6CR/RCP6W/RCP5/RCP5CR/RCP5W (Models other than ③)	CB-CAN-MPA□□□	CB-CAN-MPA□□□-RB
②	RCP4 SA3/RA3/GR		
③	RCP6/RCP6CR RCP6W/RCP5 RCP5W	CB-CFA3-MPA□□□	CB-CFA3-MPA□□□-RB
④	RCP4/RCP4CR/RCP4W (Models other than ②, ⑤, ⑥)	CB-CA-MPA□□□	CB-CA-MPA□□□-RB
⑤	RCP4 RA6C (High-thrust specification)	CB-CFA2-MPA□□□	CB-CFA2-MPA□□□-RB
⑥	RCP4W RA7C (High-thrust specification)		
⑦	RCP3		
⑧	RCP2	GRSS/GRLS/GRST/GRHM/GRHB SRA4R/SRGS4R/SRGD4R	CB-APSEP-MPA□□□
⑨		RTBS/RTBSL RTCS/RTCSL	CB-RPSEP-MPA□□□
⑩	RCP2CR RCP2W	GRS/GRM GR3SS/GR3SM	CB-CAN-MPA□□□-RB
⑪		RTBS/RTBSL RTCS/RTCSL/RTB/RTBL/RTC/RTCL RTBB/RTBBL/RTCB/RTCBL	
⑫	RCP2 RCP2CR RCP2W	CB-CFA-MPA□□□	CB-CFA-MPA□□□-RB
⑬	RCP2W		
⑭	RCP2 (Models other than ⑧ ~ ⑬)		CB-PSEP-MPA□□□

Model Number	PIO Flat Cable
⑮	PCON-CB/CGB, CFB/CGFB CB-PAC-PIO□□□

Model Number CB-CAN-MPA□□□/CB-CAN-MPA□□□-RB

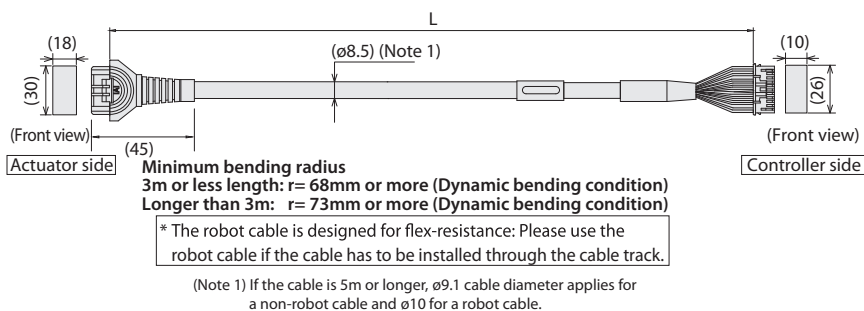
* Please indicate the cable length (L) in □□□, maximum 20m, e.g.) 080 = 8m



Pin No	Signal name	Pin No	Signal name
3	ϕA	1	ϕA
5	VMM	2	VMM
10	ϕB	3	ϕB
9	VMM	4	VMM
4	ϕA	5	ϕA
15	ϕB	6	ϕB
8	LS+	7	LS+
14	LS-	8	LS-
12	SA(mABS)	11	SA(mABS)
17	SB(mABS)	12	SB(mABS)
1	A+	13	A+
6	A-	14	A-
11	B+	15	B+
16	B-	16	B-
20	BK+	9	BK+
2	BK-	10	BK-
21	VCC	17	VCC
7	GND	19	GND
18	VPS	18	VPS
13	LS_GND	20	LS_GND
19	-	22	-
22	-(CFVcc)	21	-(CFVcc)
23	-	23	-
24	FG	24	FG

Model Number CB-CFA3-MPA□□□/CB-CFA3-MPA□□□-RB

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



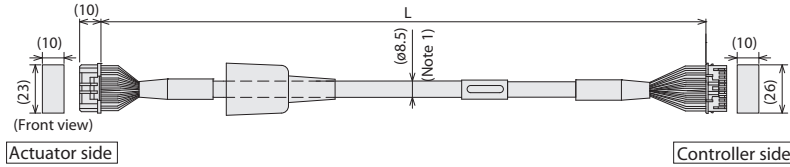
Pin No	Signal name	Pin No	Signal name
A1	ϕA	1	ϕA
B1	VMM	2	VMM
A2	ϕA	5	ϕA
B2	ϕB	3	ϕB
A3	VMM	4	VMM
B3	ϕB	6	ϕB
A4	LS+	7	LS+
B4	LS-	8	LS-
A6	SA(mABS)	11	SA(mABS)
B6	SB(mABS)	12	SB(mABS)
A7	A+	13	A+
B7	A-	14	A-
A8	B+	15	B+
B8	B-	16	B-
A5	BK+	9	BK+
B5	BK-	10	BK-
A9	LS_GND	20	LS_GND
B9	VPS	18	VPS
A10	VCC	21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

Maintenance Parts

When placing an order for the replacement cable, please use the model number shown below.

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

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



Minimum bending radius $r = 80\text{mm}$ 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.

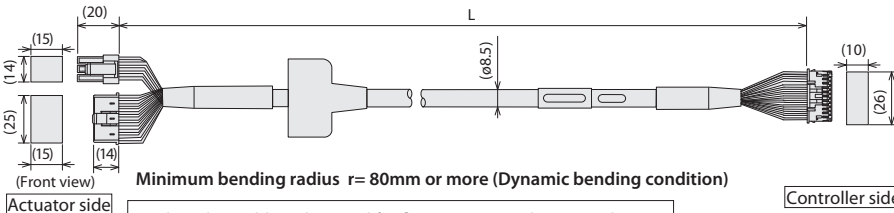
(Note 1) If the cable is 5m or longer, $\phi 9.1$ cable diameter applies for a non-robot cable and $\phi 10$ for a robot cable.

Actuator side 1-1827863-1 (AMP)			Controller side PADP-24V-1-S (J.S.T.MFG.CO.,LTD.)		
Pin No	Signal name	Color	Pin No	Signal name	Color
A1	ϕ A/U	Blue (Black)	1	ϕ A/U	Blue (Black)
B1	VMM/V	Orange (White)	2	VMM/V	Orange (White)
A2	ϕ A/W	Green (Brown)	5	ϕ A/W	Green (Brown)
B2	ϕ B/-	Brown (Green)	3	ϕ B/-	Brown (Green)
A3	VMM/-	Gray (Yellow)	4	VMM/-	Gray (Yellow)
B3	ϕ B/+	Red (Red)	6	ϕ 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 (-)

* () indicates the color of the robot cable.

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

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



Minimum bending radius $r = 80\text{mm}$ or more (Dynamic bending condition)

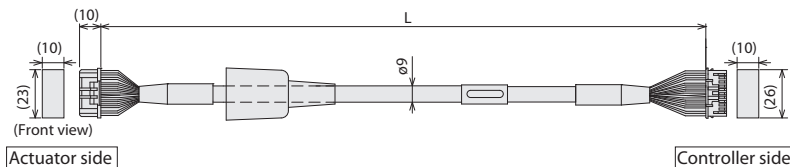
* The robot cable is designed for flex-resistance: Please use the robot cable if the cable has to be installed through the cable track.

(Note 1) If the cable is 3m or longer, $\phi 9.1$ cable diameter applies for a non-robot cable and $\phi 10$ for a robot cable.

Actuator side SLP-06V (NICHATSU)		Controller side PADP-24V-1-S (J.S.T.MFG.CO.,LTD.)	
Pin No	Signal name	Pin No	Signal name
1	ϕ A	1	ϕ A
2	VMM	2	VMM
3	ϕ B	3	ϕ B
4	VMM	4	VMM
5	ϕ A	5	ϕ A
6	ϕ B	6	ϕ 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	18	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

Model Number **CB-CFA2-MPA**□□□/ **CB-CFA2-MPA**□□□-**RB**

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



Minimum bending radius $r = 68\text{mm}$ or more (Dynamic bending condition)

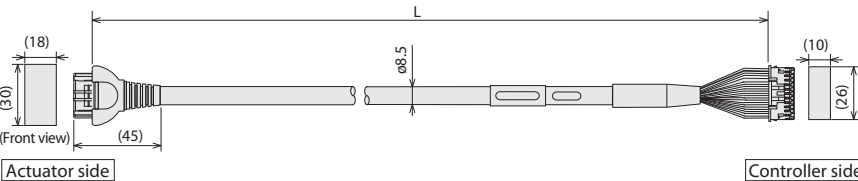
* The robot cable is designed for flex-resistance: Please use the robot cable if the cable has to be installed through the cable track.

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	ϕ A	1	ϕ A
B1	VMM	2	VMM
A2	ϕ A	5	ϕ A
B2	ϕ B	3	ϕ B
A3	VMM	4	VMM
B3	ϕ B	6	ϕ B
A4	LS+	7	LS+
B4	LS-	8	LS-
A6	-	11	-
B6	-	12	-
A7	A+	13	A+
B7	A-	14	A-
A8	B+	15	B+
B8	B-	16	B-
A5	BK+	9	BK+
B5	BK-	10	BK-
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

Model Number **CB-APSEP-MPA**□□□

* Robot cable is standard.

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



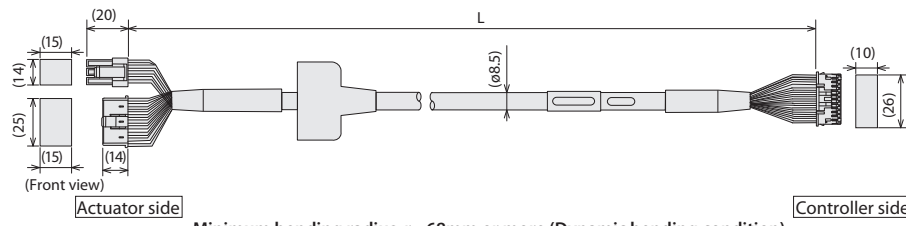
Minimum bending radius $r = 68\text{mm}$ or more (Dynamic bending condition)

* Only robot cable is available for this model.

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

Maintenance Parts

Model Number **CB-PSEP-MPA**□□□

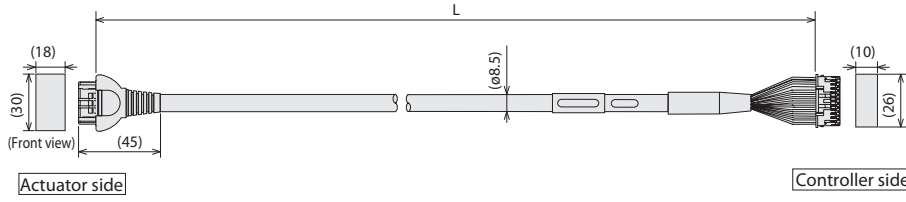


Minimum bending radius $r = 68\text{mm}$ or more (Dynamic bending condition)
 * Only robot cable is available for this model.

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

Actuator side Terminal number		Controller side Terminal number
1	Black (øA)	1
2	White (VMM)	2
4	Red (øB)	3
5	Green (VMM)	4
3	Brown (øA)	5
6	Yellow (øB)	6
16	Orange (BK-1)	9
17	Gray (BK-1)	10
5	NC	11
6	NC	12
13	Black (LS-)	7
14	Brown (LS-)	8
1	White (A+)	13
2	Yellow (A-)	14
9	Red (B-)	15
4	Green (B-)	16
10	White (identification tape) (VCC)	17
11	Yellow (identification tape) (VPS)	18
9	Red (identification tape) (GND)	19
12	Green (identification tape) (reserve)	20
15	NC	21
8	NC	22
18	Shield (FG)	23
		24

Model Number **CB-RPSEP-MPA**□□□

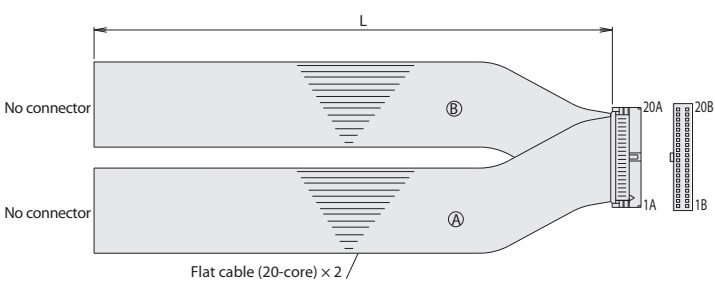


Minimum bending radius $r = 68\text{mm}$ or more (Dynamic bending condition)
 * Only robot cable is available for this model.

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

Actuator side Terminal number		Controller side Terminal number
A1	Black (øA)	1
B1	White (VMM)	2
A2	Brown (øA)	3
B2	Green (øB)	4
A3	Yellow (VMM)	5
B3	Red (øB)	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	-
B4	NC	-
A5	Black (identification tape) (BK-)	9
B5	Brown (identification tape) (BK-)	10
A9	Green (identification tape) (GNDLS)	20
B9	Red (identification tape) (VPS)	18
A10	White (identification tape) (VCC)	17
B10	Yellow (identification tape) (GND)	19
A11	NC	21
B11	Shield (FG) (FG)	24
	NC	23
	NC	22

Model Number **CB-PAC-PIO**□□□



* Please indicate the cable length (L) in □□□, maximum 10m, e.g.) 080 = 8m

HIF6-40D-1.27R

No.	Signal name	Cable color	Wiring	No.	Signal name	Cable color	Wiring
1A	24V	Brown-1	Flat cable (20-core) (pressure-welded)	1B	OUT0	Brown-3	Flat cable (20-core) (pressure-welded) AWG28
2A	24V	Red-1		2B	OUT1	Red-3	
3A	Pulse	Orange-1		3B	OUT2	Orange-3	
4A	Input	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	Pulse	Purple-4	
18A	IN13	Gray-2		18B	input	Gray-4	
19A	IN14	White-2		19B	0V	White-4	
20A	IN15	Black-2		20B	0V	Black-4	