Position Controller for RoboCylinder

PCON·ACON·DCON CYB/PLB/POB

BENEFIT

**Compact controller that can be connected
to the battery-less absolute encoder.
Equipped with useful functions, low price.**

BENEFIT 1 ACON PCON — For products with battery-less absolute encoder

Battery maintenance is not required, since it does not need a battery. Home return is not required during the initial setting, after emergency stop output, or when the device is restarted after failure. Down time can be shortened, and manufacturing costs can be reduced. In addition, the price is the same as the existing incremental encoder.

Advantages of Absolute Encoder

1. Home return is not required since the position storage system is installed.
2. Home (-position) check sensor is not necessary because it does not return to home position when starting up.
3. It is not necessary to remove the payload during operation even if the machine stops due to emergency stop etc.
4. It is not necessary to create a troublesome home return program even when it stops inside a complicated machine.

Battery-less Absolute Encoder
No Battery, No Maintenance,
No Homing, and No Price Increase.
No Going Back to Incremental.

Advantages of Battery-less

1. No battery maintenance required
2. No battery space required

Built-in position storage system

BENEFIT 2 PCON — Power CON® type

All controllers are compatible with the high-output driver "Power CON"
that can improve the performance of RCP4, RCP5, and RCP6 actuators.
Using "Power con" will increase stepper motor output by 50%.
It can shorten the cycle time and improve the productivity of the equipment.

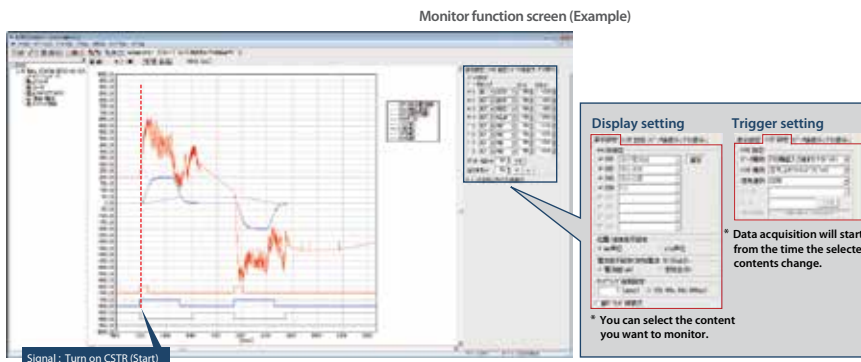## BENEFIT 3 ACON PCON — Equipped with Smart tuning function

Supports the smart tuning function, allowing optimal setting of the speed
and acceleration/deceleration values based on the payload.[*]

[*] When using the smart tuning function, PC software or TB - 02 (teaching tool) is required.

BENEFIT 4 — Enhanced monitor function

Monitor function screen (Example)

Signal : Turn on CSTR (Start)

Display setting   **Trigger setting**

* Data acquisition will start from the time the selected contents change.

* You can select the content you want to monitor.

It is possible to display the information of the actuator and the controller during operation by using the PC software as a waveform on the PC screen.
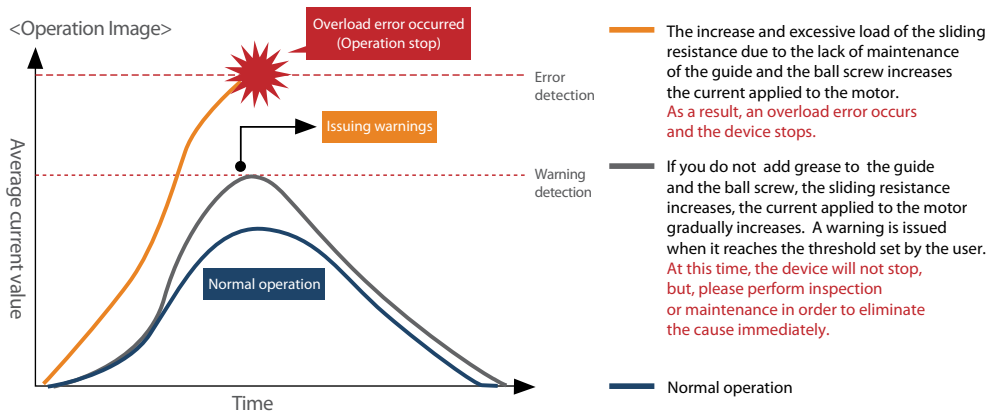
* Displayable information: Command current value, Current speed/Position, PIO signal (Start, Positioning complete, Alarm, and others)

By setting the change point and operating time of the PIO signal arbitrarily, the trigger function which can start the waveform display on the PC screen is also provided.

BENEFIT 5 — Preventative maintenance

Warning is issued before an overload error is generated from a change in the average current value.

<Operation Image>

Overload error occurred (Operation stop)

Error detection

Issuing warnings

Warning detection

Normal operation

Average current value

Time

— The increase and excessive load of the sliding resistance due to the lack of maintenance of the guide and the ball screw increases the current applied to the motor. As a result, an overload error occurs and the device stops.

— If you do not add grease to the guide and the ball screw, the sliding resistance increases, the current applied to the motor gradually increases. A warning is issued when it reaches the threshold set by the user. At this time, the device will not stop, but, please perform inspection or maintenance in order to eliminate the cause immediately.

— Normal operation

● By using predictive maintenance function, it enables you to prevent urgent stops in your system.

● It effectively reduces labor costs because maintenance personnel can be minimized to the minimum required amount.

BENEFIT 6 — More function from previous models

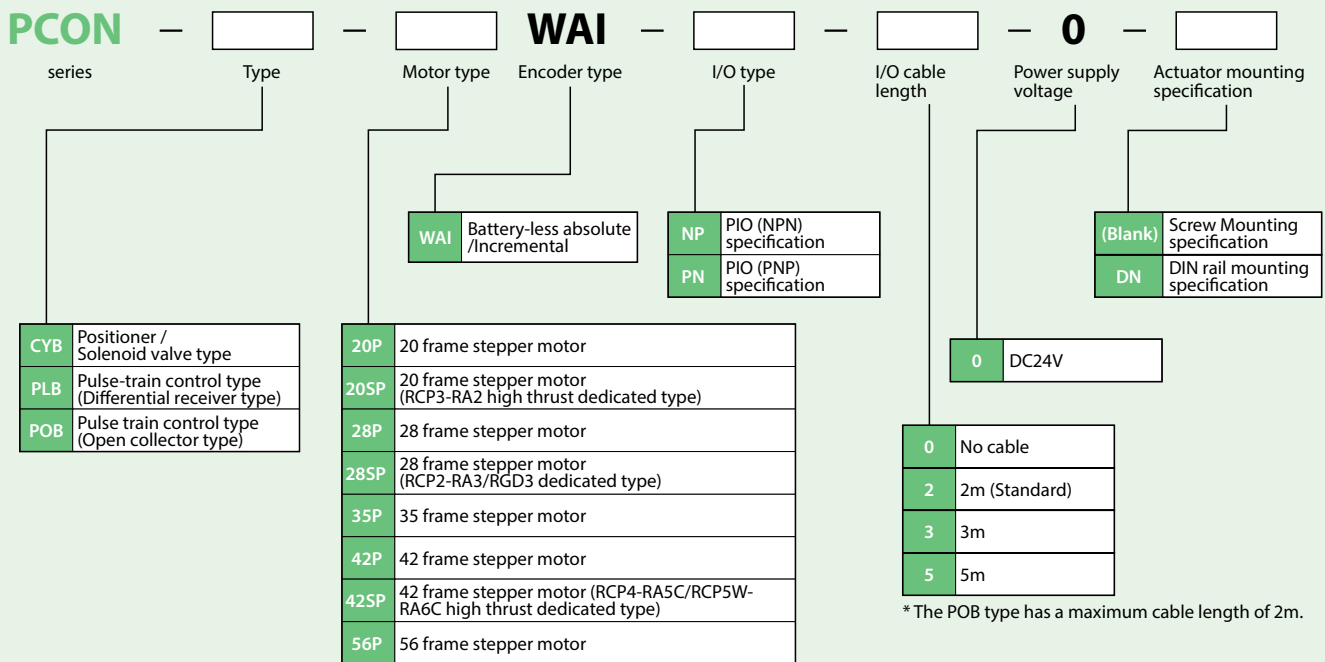|		POWERCON (High output driver)	Battery-less Absolute Encoder	Simple absolute specification	Calendar function	Maintenance function	I/O point	Positioning point	Field network
PCON	CYB/PLB/POB	○	○	×	×	○	Non insulated 8IN/8OUT	Standard 16 points Max. 64 points	×
	CB	○	○	○	○	○	Insulated 16IN/16OUT	Standard 64 points Max. 512 points	○
ACON	CYB/PLB/POB	-	○	×	×	○	Non insulated 8IN/8OUT	Standard 16 points Max. 64 points	×
	CB	-	○	○	○	○	Insulated 16IN/16OUT	Standard 64 points Max. 512 points	○
DCON	CYB/PLB/POB	-	×	×	×	○	Non insulated 8IN/8OUT	Standard 16 points Max. 64 points	×
	CB	-	×	×	○	○	Insulated 16IN/16OUT	Standard 64 points Max. 512 points	○
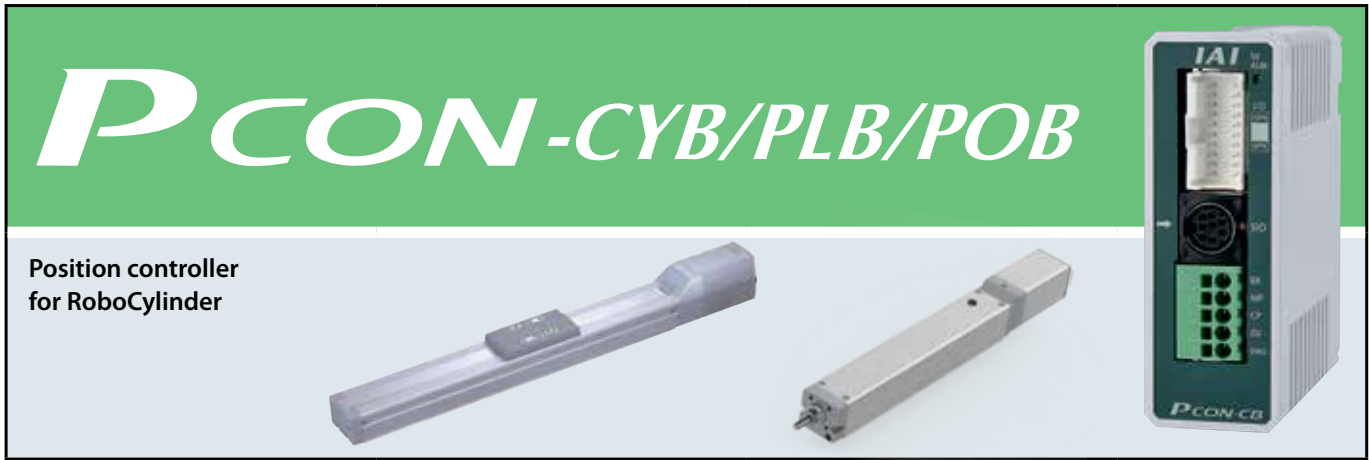
PCON-CYB/PLB/POB

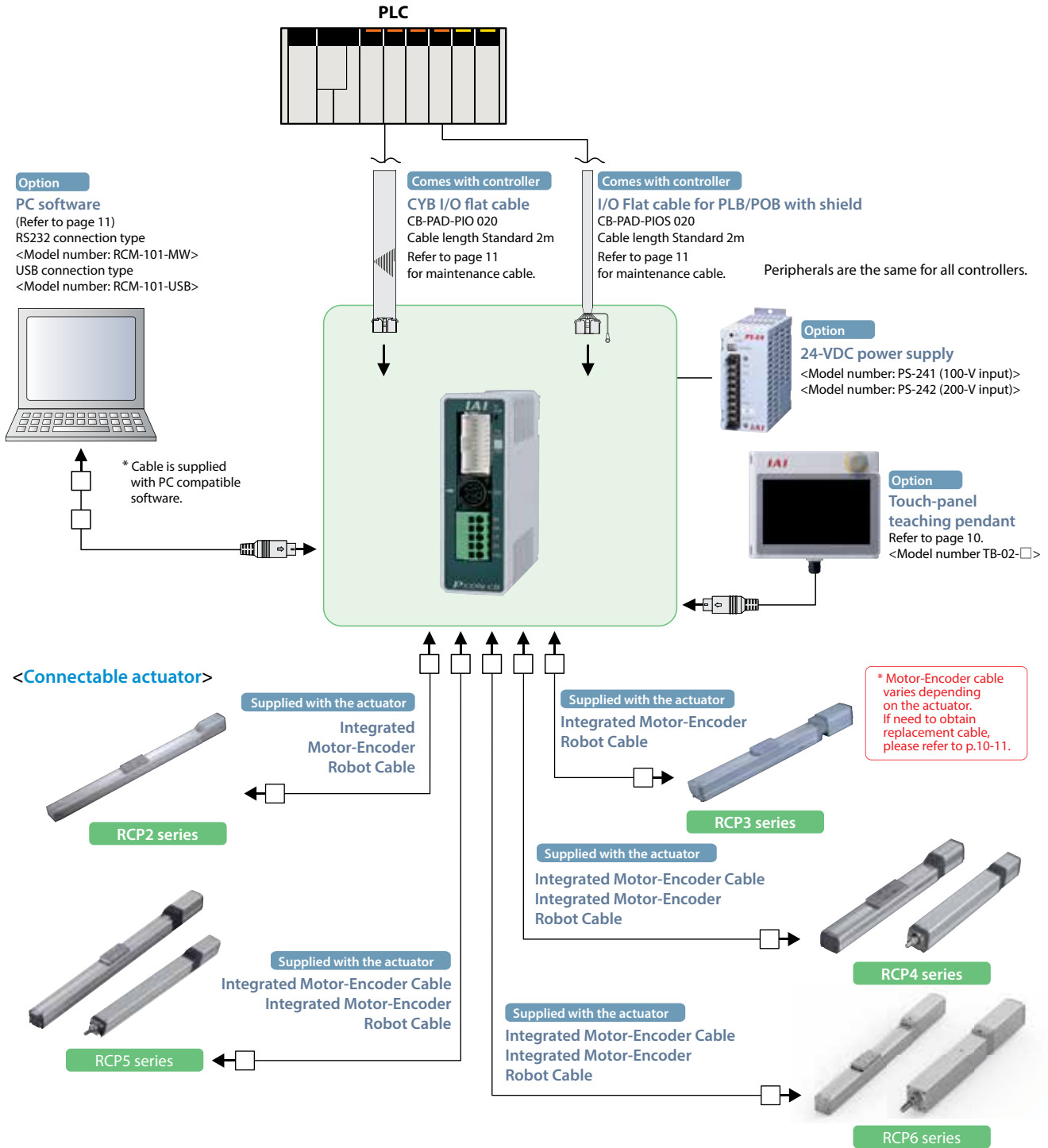**Position controller for RoboCylinder**

List of Models

Positioner Controller that can operate RCP6/RCP5/RCP4/RCP3/RCP2. Lineup for 3 types that can support various control.

Model	CYB	PLB / POB
Type	Positioner/ Solenoid valve type	Pulse-train control type
External view		
Number of positions	64 points	–

Model

PCON – ☐ – ☐ **WAI** – ☐ – ☐ – **0** – ☐

series — Type — Motor type — Encoder type — I/O type — I/O cable length — Power supply voltage — Actuator mounting specification

WAI	Battery-less absolute /Incremental

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

(Blank)	Screw Mounting specification
DN	DIN rail mounting specification

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

20P	20 frame stepper motor
20SP	20 frame stepper motor (RCP3-RA2 high thrust dedicated type)
28P	28 frame stepper motor
28SP	28 frame stepper motor (RCP2-RA3/RGD3 dedicated type)
35P	35 frame stepper motor
42P	42 frame stepper motor
42SP	42 frame stepper motor (RCP4-RA5C/RCP5W-RA6C high thrust dedicated type)
56P	56 frame stepper motor

0	DC24V

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

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

System configuration

PLC

Option

PC software
(Refer to page 11)
RS232 connection type
<Model number: RCM-101-MW>
USB connection type
<Model number: RCM-101-USB>

Comes with controller

CYB I/O flat cable
CB-PAD-PIO 020
Cable length Standard 2m
Refer to page 11
for maintenance cable.

Comes with controller

I/O Flat cable for PLB/POB with shield
CB-PAD-PIOS 020
Cable length Standard 2m
Refer to page 11
for maintenance cable.

Peripherals are the same for all controllers.

Option

24-VDC power supply
<Model number: PS-241 (100-V input)>
<Model number: PS-242 (200-V input)>

Option

Touch-panel teaching pendant
Refer to page 10.
<Model number TB-02-□>

* Cable is supplied
  with PC compatible
  software.

<**Connectable actuator**>

Supplied with the actuator

Integrated
Motor-Encoder
Robot Cable

RCP2 series

Supplied with the actuator

Integrated Motor-Encoder
Robot Cable

RCP3 series

* Motor-Encoder cable
  varies depending
  on the actuator.
  If need to obtain
  replacement cable,
  please refer to p.10-11.

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

I/O signals in positioner / solenoid valve type (PCON-CYB)

Pin number	Category		Parameter (PIO pattern) selection						
			0	1	2	3	4	5	6
			Positioning mode	Solenoid valve mode 1	Solenoid valve mode 2	Single solenoid mode	Double solenoid mode	User Selection mode	Serial communication
		Number of positioning points	16 points	7 points	3 points	2 points	2 points	One of 4, 8, 16, 32, 64 points (Selection)	768 points
		Zone signal	△	×	△	△	△	△	Serial communication (Modbus) Refer to operation manual
		Position zone signal	△	×	△	△	△	△	
5	Input	IN0	PC1	ST0	ST0	ST0	ST0	Any signal other than the command position No., CSTR can be selected in the input.	
6		IN1	PC2	ST1	ST1(JOG+)	-	ST1 (-)		
7		IN2	PC4	ST2	ST2 (-)	-	ASTR		
8		IN3	PC8	ST3	-	-	-		
9		IN4	HOME	ST4	SON	SON	SON		
10		IN5	*STP	ST5	-	*STP	*STP		
11		IN6	CSTR	ST6	-	-	-		
12		IN7	RES	RES	RES	RES	RES		
13	Output	OUT0	PM1 （ALM1）	PE0	LS0	LS0/PE0	LS0/PE0	Any signal other than the completed position No., PEND can be selected in the input.	
14		OUT1	PM2 （ALM2）	PE1	LS1(TRQS)	LS1/PE1	LS1/PE1		
15		OUT2	PM4 （ALM4）	PE2	LS2 (-)	PSFL	PSFL		
16		OUT3	PM8 （ALM8）	PE3	HEND	HEND	HEND		
17		OUT4	HEND	PE4	SV	SV	SV		
18		OUT5	PZONE/ZONE1	PE5	PZONE/ZONE1	PZONE/ZONE1	PZONE/ZONE1		
19		OUT6	PEND	PE6	*ALML	*ALML	*ALML		
20		OUT7	*ALM	*ALM	*ALM	*ALM	*ALM		

(Note 1) In the table above, the asterisk* symbol next to the code indicates a reverse logic signal.
(Note 2) In all PIO patterns other than 1, this signal can be switched with PZONE by setting Parameter No. 149 accordingly.
(Note 3) Signals in () are effective before home return complete when set to increment specification. (ALM 1 to 8 are excluded.)
(Note 4) Pin number 13 and 14 of PIO pattern 3 or 4 , can select PE * and LS * by by setting Parameter No. 186.

I/O signals in positioner / solenoid valve type (PCON-CYB)

Depending on the controller settings, the available signals are different.
Please check the available functions by referring to the signal table

Category	Signal abbreviation	Signal name	Function description
Input	PC1 ～ PC8	Command position No.	Enter the target position number (binary input).
	HOME	Home return	Home return operation is performed when this signal is turned ON.
	*STP	Pause	The actuator decelerates to a stop when this signal is turned OFF. During the stop, the remaining motion is on hold. It restarts when the signal is turned ON.
	CSTR	PTP Strobe (Start signal)	Start moving to the position set in the command position.
	RES	Reset	Current alarms are reset when this signal is turned ON. In addition, it is possible to cancel the remaining travel amount when it is turned ON during the pause state (* STP is OFF.).
	ST0 ～ 6	Start signal	In the solenoid valve mode, it moves to the position specified when this signal is turned ON. (Start signal is not required.)
	SON	Servo ON	The servo is ON while this signal is ON, and OFF while the signal is OFF.
	ASTR	Continuous cycling operation signal	When this signal is turned ON, continuous cycling between two points is performed. If this signal is turned OFF while moving, it stops after arriving at the current target position.
Output	PM1 ～ PM8	Completed position No.	It outputs (binary output) the number of the position reached after positioning is complete.
	HEND	Home return complete	This signal turns ON upon completion of home return.
	ZONE1	Zone signal 1	This signal turns ON when the current position of the actuator falls within the parameter-set range.
	PZONE	Position zone	This signal turns ON when the current position of the actuator enters desired zone set by the position data when moving to the position. It is possible to select with ZONE 1, PZONE is effective only when moving to the set position.
	PEND	Positioning complete	This signal turns ON when it reaches within the positioning band after moving. It remains ON even if it exceeds the positioning band.
	*ALM	Alarm	This signal turns ON when the controller is normal, and turns OFF when an alarm generates.
	PE0 ～ 6	Current position No.	In solenoid valve mode 1, this signal turns ON after movement is complete.
	LS0 ～ 2	Limit switch output	This signal turns ON when the current position of the actuator reaches within the positioning band. In home return complete status, this signal is output even before the movement command or in the servo OFF status.
	SV	Servo ON	This signal turns ON when the servo is ON.
	*ALML	Minor failure alarm	This signal is ON in normal conditions and turns OFF when a message-level alarm generates. (Operation will continue.)
	PSFL	Unloaded push-motion	This signal turns ON when push-motion is unloaded.
	ALM1 ～ ALM8	Alarm code	When an alarm generates equal or higher than the operation release level, this signal outputs the alarm details using a binary code.

(Note) The above signals marked with (*) are normally ON and turn OFF at operation.

I/O signals in pulse-train control type (PCON-PLB/POB)

Pin number	Category		Parameter (PIO pattern) selected	
			0	1
			Incremental Axis Connection mode	Absolute Axis Connection mode
		Number of positioning points	0	1
		Zone signal	1	1
1	Pulse-train input		/PP	/PP
2			PP	PP
3			/NP	/NP
4			NP	NP
5	Input	IN0	SON	SON
6		IN1	RES	RES
7		IN2	HOME	HOME
8		IN3	TL	TL
9		IN4	CSTP	CSTP
10		IN5	DCLR	DCLR
11		IN6	BKRL	BKRL
12		IN7	-	RSTR
13	Output	OUT0	PWR	PWR
14		OUT1	SV	SV
15		OUT2	INP	INP
16		OUT3	HEND	HEND
17		OUT4	TLR	TLR
18		OUT5	ZONE1	ZONE1
19		OUT6	*ALML	REND
20		OUT7	*ALM	*ALM

(Note) The above signals marked with (*) are normally ON and turn OFF at operation.

I/O signals in pulse-train control type (PCON-PLB/POB)

Depending on the controller type and setting, the available signals are different. Please check the available functions by referring to the signal table.

Category	Signal abbreviation	Signal name	Function description
Pulse-train input	/PP	Pulse-train input (−)	Pulses are input from the host. • Differential (PLB type) ≤ 200kpps • Open collector (PLB type) ≤ 60kpps
	PP	Pulse-train input (+)	
	/NP	Pulse-train input (−)	
	NP	Pulse-train input (+)	
Input	SON	Servo ON	The servo is ON while this signal is ON, and OFF while the signal is OFF.
	RES	Reset	Current alarms are reset when this signal is turned ON.
	HOME	Home return	When the signal is ON, home return operation is performed.
	TL	Torque limit selection	When this signal is turned ON, the motor torque is limited to the value set by the parameter.
	CSTP	Forced stop	The actuator is forcibly stopped when this signal has remained ON for 16 ms or more. The actuator decelerates to a stop at the torque set in the controller and the servo turns OFF.
	DCLR	Deviation counter clear	This signal clears the deviation counter.
	BKRL	Forced brake release	The brake is forcibly released.
	RSTR	Reference position move command	Move to the position set to parameter No. 167 when signal turns ON. (PIO pattern 1 only)
Output	PWR	System ready	This signal turns ON when the controller becomes ready after the main power has been turned on.
	SV	Servo ON status	This signal turns ON when the servo is ON.
	INP	Positioning complete	This signal turns ON when the amount of remaining travel pulses in the deviation counter falls within the in-position band.
	HEND	Home return complete	This signal turns ON upon completion of home return.
	TLR	Torque limited	This signal turns ON upon reaching the torque limit while the torque is limited.
	ZONE1	Zone signal 1	This signal turns ON when the current position of the actuator falls within the parameter-set range.
	*ALML	Minor failure alarm	This signal is ON in normal conditions and turns OFF when a message-level alarm generates. (Operation will continue.)
	REND	Reference position move complete	This signal turns ON when moving to the position set to parameter No. 167 is completed. (PIO pattern 1 only)
	*ALM	Alarm	This signal turns ON when the controller is normal, and turns OFF when an alarm generates.

(Note) The above signals marked with (*) are normally ON and turn OFF at operation.

I/O Specification

The three types (CYB, PLB/POB) controllers are distinguished by their I / O specifications. In addition,
the positioner mode and solenoid valve mode can change the I / O signal content according to the controller setting,
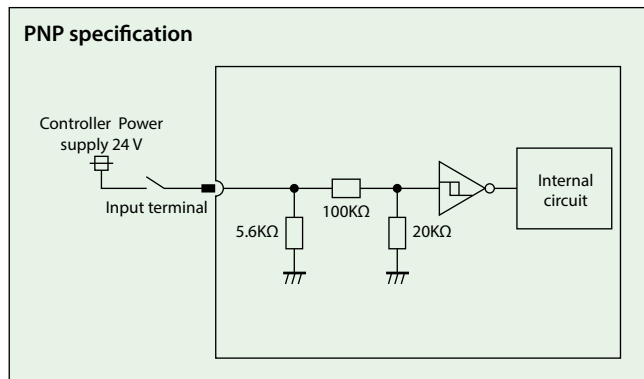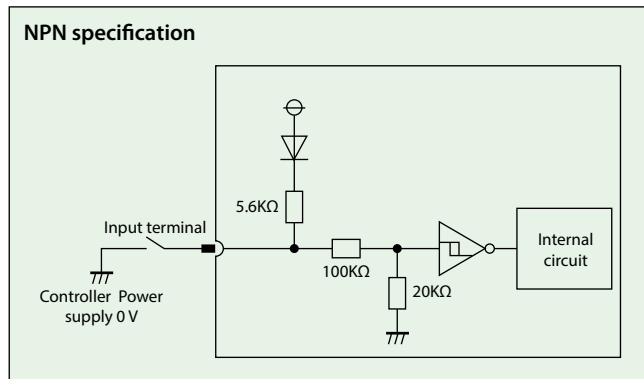so it is possible to use multiple functions.

Function by controller type

Model	CYB	PLB / POB	Summary
Name	Positioner / Solenoid valve type	Pulse-train control type	
Positioner mode	○	×	It is the basic operation mode that operates by specifying the position number and inputting the start signal.
Solenoid valve mode	○	×	It is possible to move just by turning ON/OFF the position signals. This mode operates with the same controls as the solenoid valves on air cylinders.
Pulse-train mode	×	○	This mode can operate freely with your pulse train control without inputting position data.

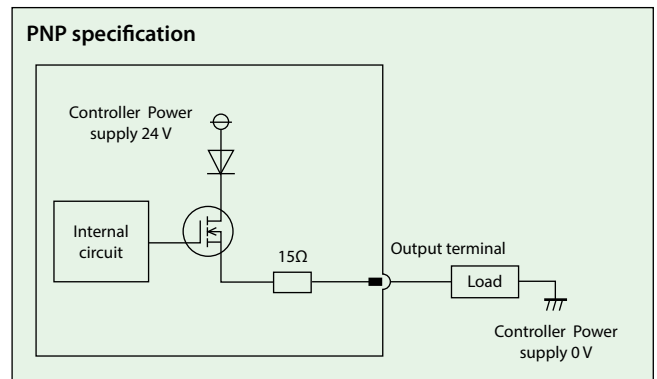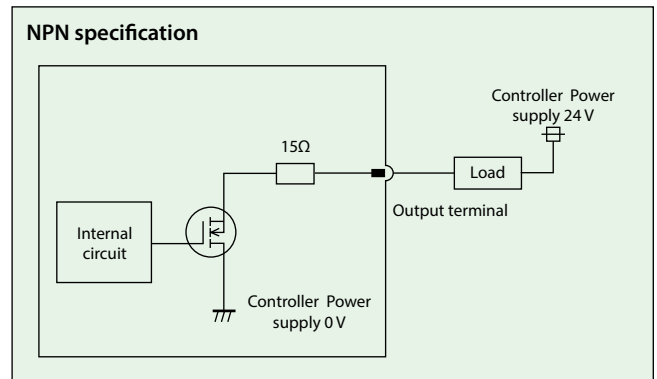## PIO Input/output circuit (Other than |pulse-train input)

Input Part   External Input Specifications

Item	Specification
Input voltage	DC24V ±10%
Input current	5mA, 1 circuit
ON/OFF voltage	ON voltage: 18 VDC min. OFF voltage: 6 VDC max.
Leakage current	1 mA or less / 1point
Isolation method	Non-insulated

Output Part   External Output Specifications

Item	Specification
Load voltage	DC24V ±10%
Maximum load current	50mA, 1 circuit
Residual voltage	2V or less
Isolation method	Non-insulated

NPN specification / PNP specification (Input Part)

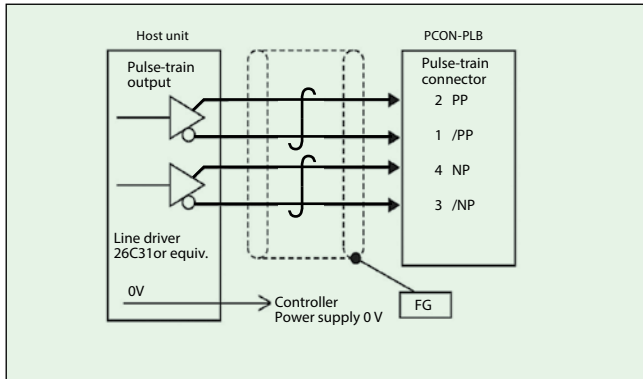
NPN specification / PNP specification (Output Part)

Pulse-train input circuit

■ Differential line driver

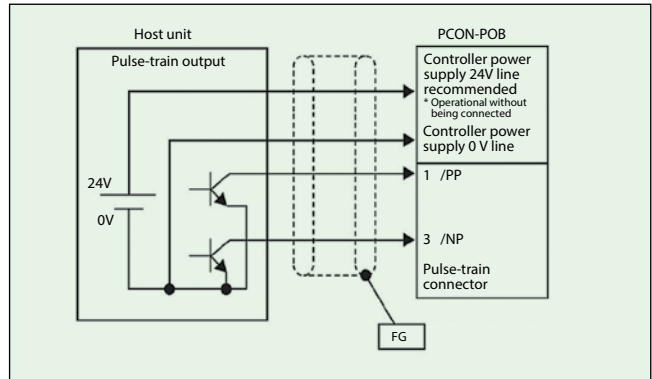| Maximum number of input pulse | : Differential line driver max 200kpps |
| Isolation method | : Non-insulated |
| Maximum cable length | : 10m |

* The power supply of the pulse train output unit on the PLC side and the control power supply of the controller or the GND line must be the same.

■ Open collector

Maximum number of input pulse	: Open collector max 60kpps
Isolation method	: Non-insulated
Maximum cable length	: 2m

* The power supply of the pulse train output unit on the PLC side and the control power supply of the controller or the GND line must be the same.
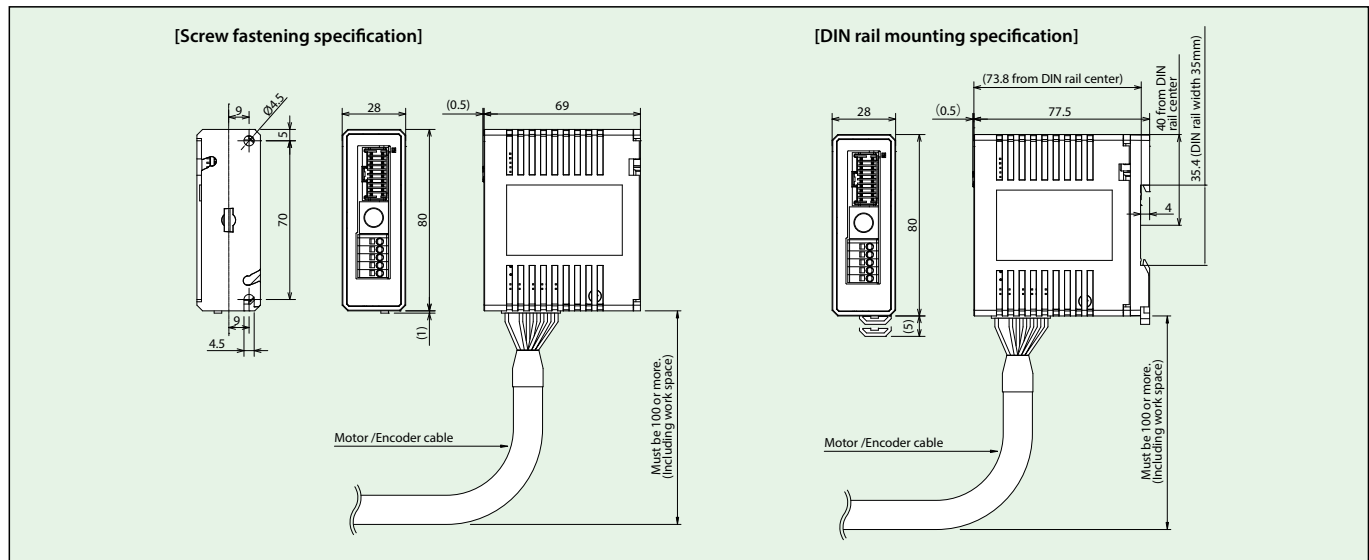

Command pulse-train pattern

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

Note) The operational number of encoder pulses is are followings.
RCP5·RCP4·RCP3·RCP2…800 pulse/rev
RCP6…8192 pulse/rev

PCON-CYB/PLB/POB Controller

Specification Table

Item	Specification		
Controller type	CYB	PLB	POB
Number of controlled axes	1 axis		
Operation method	Positioner/Solenoid valve type	Pulse-train control type	
Number of positioning points	Up to 64 points	—	
Back up memory	FRAM		
I/O connector (PIO connecter)	20 pin connector		
Number of I/Os	8 input points/8 output points	8 input points/8 output points	
I/O power supply	External supply DC24V±10%		
Serial communication (SIO connector)	RS485 1ch		
Command pulse-train input method	—	Differential line driver	Open collector
Maximum input pulse frequency	—	Max 200kpps	Max 60kpps
Position detection method	Incremental encoder/Battery-less absolute encoder		
Forced electromagnetic brake release	Supply 24 VDC 150 mA to the BK terminal in the power connector to release		
Input power	DC24V±10%		
Power supply capacity	2.2A (High-output setting enabled: 3.5A rated / 4.2 max.)		
Insulation voltage	DC500V 10MΩ		
Anti-vibration	XYZ direction 10 ~ 57hz One side width 0.035 mm (continuous), 0.075 mm (intermittent) 57 to 150 Hz 4.9 m / s^2 (continuous), 9.8 m / s^2 (intermittent)		
Ambient operating temperature	0 to 40℃		
Ambient operating humidity	10-95% (non-condensing)		
Operating ambience	Not exposed to corrosive gases		
Degree of protection	IP20		
Mass	250g (DIN rail mounting specification 285g)		

External Dimensions

[Screw fastening specification]

[DIN rail mounting specification]

Motor /Encoder cable

Must be 100 or more.
(Including work space)

Names of each part

1 Controller status display LED
Displays the operation status of the controller.
○:ON ×:OFF ☆:Blinking

LED		Operation status
SV (Green)	ALM (Red)	
×	×	Power supply OFF
		Servo OFF
×	○	Alarm (More than the operational level)
		Motor drive power OFF
		Emergency stop
○	×	Servo ON
☆	×	Automatic servo OFF
○ (Orange)		Initializing when the power turns on
×	☆	Detecting collision

2 PIO connector
Connector for input/output signal connection for control.
PLB / POB type for pulse train control is also used as pulse signal input.

3 SIO connector (SIO)
Connector for communication cable connection of teaching tool.

4 Power connector
Connector for the main power supplier for the controller, actuator, brake, and emergency stop.

5 motor encoder connector
Connector for the actuator's motor and encoder cable

Option

Touch panel teaching box

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

▊**Model** **TB-02-C (Dedicated CON type)***

▊**Setting**

5m

* Please refer to
TB-02 catalogue (CJ0239-1A)
for other types.
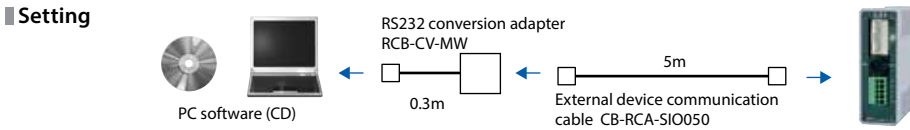
▊**Specification**

Rated voltage	24V DC
Power consumption	3.6 W or less (150 mA or less)
Ambient operating temperature	0 ～ 40℃
Ambient operating humidity	20 to 85%RH (Non-condensing)
Degree of protection	IP20
Weight	470g (TB-02 only)

PC software (Windows only)
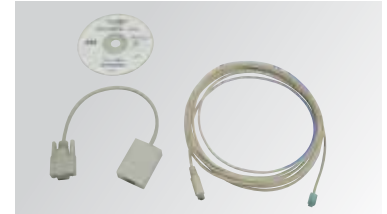
Windows : XP SP2/Vista/7/8 or later

▊**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)**
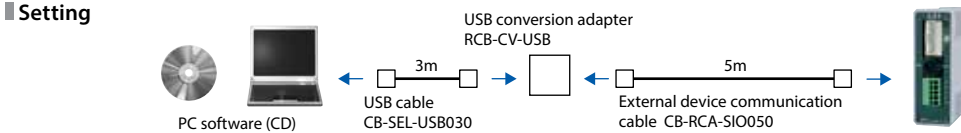
Please contact IAI for the current supported versions.

▊**Setting**

PC software (CD)

RS232 conversion adapter
RCB-CV-MW
0.3m

External device communication
cable CB-RCA-SIO050
5m

▊**Model** **RCM-101-USB (External device communication cable**
＋**USB conversion adapter ＋USB cable)**

Please contact IAI for the current supported versions.

▊**Setting**

PC software (CD)

USB cable
CB-SEL-USB030
3m

USB conversion adapter
RCB-CV-USB

External device communication
cable CB-RCA-SIO050
5m

Maintenance parts

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

■ **Cable table**

	Product model	Integrated Motor-Encoder Cable	Integrated Motor-Encoder Robot Cable
①	RCP6/RCP5/RCP5CR/RCP5W	CB-CAN-MPA □□□	CB-CAN-MPA □□□ -RB
② RCP4	SA3/RA3/GR/ST		
③	RCP4/RCP4CR/RCP4W (Model other than ②)	CB-CA-MPA □□□	CB-CA-MPA □□□ -RB
④	RCP3	–	CB-APSEP-MPA □□□
⑤ RCP2	GRSS/GRLS/GRST/GRHM/GRHB/SRA4R/SRGS4R/SRGD4R		
⑥	RTBS/RTBSL RTCS/RTCSL	–	CB-RPSEP-MPA □□□
⑦ RCP2CR RCP2W	GRS/GRM GR3SS/GR3SM	CB-CAN-MPA □□□	CB-CAN-MPA □□□ -RB
⑧	RTBS/RTBSL RTCS/RTCSL/RTB/RTBL/RTC/RTCL/RTBB/RTBBL/RTCB/RTCBL		
⑨	RCP2 (Model other than ⑤～⑧)	–	CB-PSEP-MPA □□□

	Product model	I/O flat cable for CYB (Without shield)	I/O cable for PLB/POB (With shield)
⑩	PCON-CYB/PLB/POB	CB-PAD-PIO □□□	CB-PAD-PIOS □□□

Model CB-CAN-MPA□□□/CB-CAN-MPA□□□-RB   * Please indicate cable length (L) in □□□, (e.g. 080=8m) maximum 20m.

(12)
(13)
(18)
(φ8.5)(Note 1)
(10)
(26)

(Front view)
Actuator end

(Front view)
Controller end
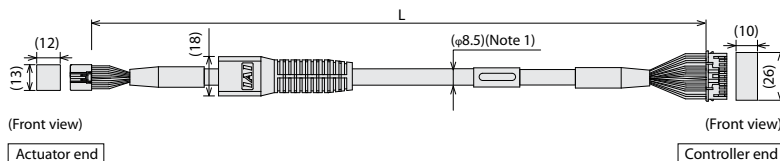
Minimum bend radius 5m or less r = 68 mm or more (for movable use)
5m or more r = 73 mm or more (for movable use)

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

(Note1) If the cable length is 5 m or more, the diameter of the non-robot cable becomes ø9.1, while that of the robot cable becomes ø10.

Pin number	Signal name		Pin number	Signal name
3	φA		1	φA
5	VMM		2	VMM
10	φB		3	φB
9	VMM		4	VMM
4	φ_A		5	φ_A
15	φ_B		6	φ_B
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			21	
23	—		23	—
24	FG		24	FG

PCON-CYB/PLB/POB Controller

Model CB-CA-MPA☐☐☐/ CB-CA-MPA☐☐☐-RB

* Please indicate cable length (L) in ☐☐☐, (e.g. 080=8m) maximum 20m.
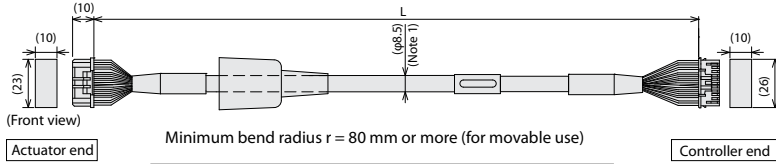
(Note1) If the cable length is 5 m or more, the diameter of the non-robot cable becomes ø9.1, while that of the robot cable becomes ø10.

(Front view)
Actuator end

Minimum bend radius r = 80 mm or more (for movable use)

Controller end

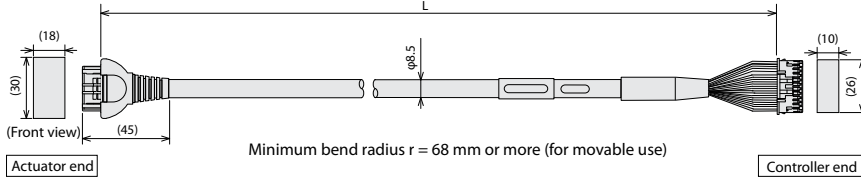*Robot cables are cables resistant to flexing forces.
If the cable must be guided in a cable track, use a robot cable.

Actuator end 1-1827863-1 (AMP)			Controller end PADP-24V-1-S (JST)		
Pin number	Signal name	Color	Pin number	Signal name	Color
A1	φA/U	Blue (Black)	1	φA/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	φB/-	Brown (Green)	3	φB/-	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 (Black)	14	A-/B-	Brown (Black)
A8	B+/Z+	Gray (Black)	15	B+/Z+	Gray (Black)
B8	B-/Z-	Red (Brown)	16	B-/Z-	Red (Brown)
A5	BK+/LS+	Blue (Black)	9	BK+/LS+	Blue (Black)
B5	BK-/LS-	Orange (Brown)	10	BK-/LS-	Orange (Brown)
A9	LS_GND	Green (Green)	20	LS_GND	Green (Green)
B9	VPS	Brown (Red)	18	VPS	Brown (Red)
A10	VCC	Gray (White)	17	VCC	Gray (White)
B10	GND	Red (Yellow)	19	GND	Red (Yellow)
A11			21	—	—
B11	FG	Black(-)	22	—	—
			23	—	—
			24	FG	Black(-)

* Colors of robot cables are shown in ( ).

Model CB-APSEP-MPA☐☐☐

* The default specification of this cable is robot cable.　* Please indicate cable length (L) in ☐☐☐, (e.g. 080=8m) maximum 20m.

(Front view)
Actuator end

Minimum bend radius r = 68 mm or more (for movable use)

Controller end

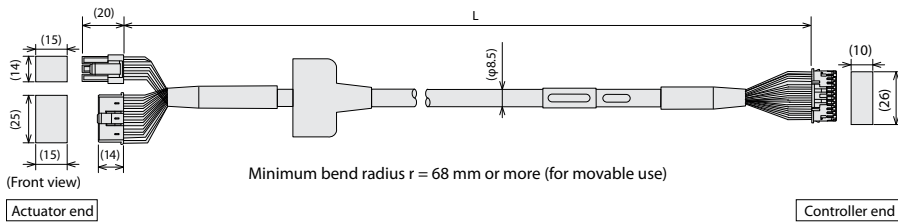| Actuator end Pin number	[PCON] (ACON)	Controller end Pin number
A1	Black [ΦA] (U)	1
B1	White [VMM] (V)	2
A2	Brown [Φ/A] (W)	5
B2	Green [ΦB] (-)	3
A3	Yellow [VMM] (-)	4
B3	Red [Φ/B] (-)	6
A4	Orange [LS+] (BK+)	7
B4	Gray [LS-] (BK-)	8
A6	White [-] (A+)	11
B6	Yellow [-] (A-)	12
A7	Red [A+] (B+)	13
B7	Green [A-] (B-)	14
A8	Blue [B+] (Z+)	15
B8	Brown [B-] (Z-)	16
A5	Black (identification tape) [BK-] (LS-)	9
B5	Brown (identification tape) [BK-] (LS-)	10
A9	Green (identification tape) (GNDLS) (GNDLS)	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

Model CB-PSEP-MPA☐☐☐

* The default specification of this cable is robot cable.　* Please indicate cable length (L) in ☐☐☐, (e.g. 080=8m) maximum 20m.

(Front view)
Actuator end

Minimum bend radius r = 68 mm or more (for movable use)

Controller end

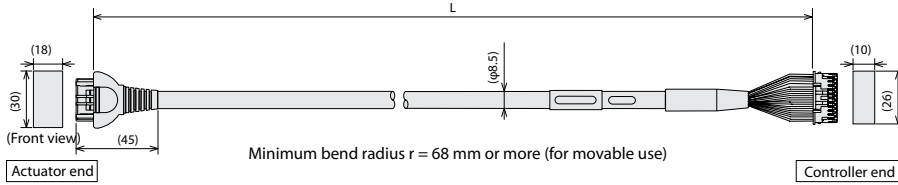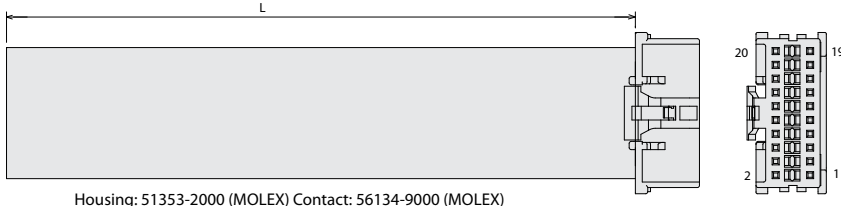| Actuator end Pin number		Controller end Pin number
1	Black [ΦA]	1
2	White [VMM]	2
4	Red [ΦB]	5
5	Green [VMM]	3
3	Brown [Φ/A]	4
6	Yellow [Φ/B]	6
16	Orange [BK+]	9
17	Gray [BK-]	10
5	NC	11
6	NC	12
13	Black [LS+]	7
14	Brown [LS-]	8
1	White [A+]	13
2	Yellow [A-]	14
3	Red [B+]	15
4	Green [B-]	16
10	White (identification tape) [VCC]	17
11	Yellow (identification tape) [VPS]	18
9	Red (identification tape) [GND]	19
12	Green (identification tape) [(spare)]	20
15	NC	21
7	NC	22
8	NC	23
18	Shield [FG] (FG)	24

Model CB-RPSEP-MPA☐☐☐

* The default specification of this cable is robot cable.　* Please indicate cable length (L) in ☐☐☐, (e.g. 080=8m) maximum 20m.

(Front view)
Actuator end

Minimum bend radius r = 68 mm or more (for movable use)

Controller end

Actuator end Pin number		Controller end Pin number
A1	Black [ΦA] (U)	1
B1	White [VMM] (V	2
A2	Brown [Φ/A]	5
B2	Green [ΦB]	3
A3	Yellow [VMM]	4
B3	Red [Φ/B]	6
A6	Orange [LS+]	7
B6	Gray [LS-]	8
A7	Red [A+]	13
B7	Green [A-]	14
A8	Black [B+]	15
B8	Brown [B-]	16
A4	NC	—
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	22
	NC	23

Model CB-PAD-PIO☐☐☐

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

Housing: 51353-2000 (MOLEX) Contact: 56134-9000 (MOLEX)

No.	Cable color	Wiring	No.	Cable color	Wiring
1	Brown-1		11	Brown-2	
2	Red-1		12	Red-2	
3	Orange-1		13	Orange-2	
4	Yellow-1	Flat cable AWG28	14	Yellow-2	Flat cable AWG28
5	Green-1		15	Green-2	
6	Blue-1		16	Blue-2	
7	Purple-1		17	Purple-2	
8	Gray-1		18	Gray-2	
9	White-1		19	White-2	
10	Black-1		20	Black-2	

Model CB-PAD-PIOS☐☐☐

* Please indicate cable length (L) in ☐☐☐, (e.g. 080=8m) maximum 10m.
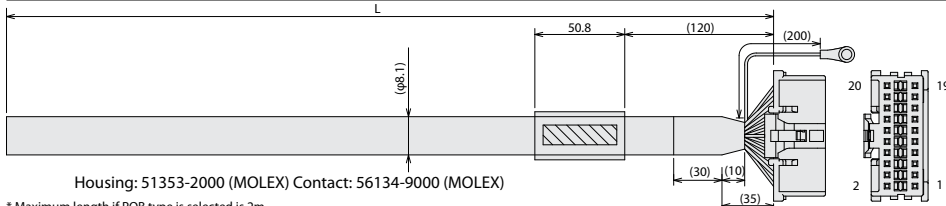
Housing: 51353-2000 (MOLEX) Contact: 56134-9000 (MOLEX)

* Maximum length if POB type is selected is 2m.

51353-2000 (MOLEX)			
No.	Signal name	Color	Wiring
1	/PP	Black	
2	PP	White/Black	
3	/NP	Red	
4	NP	White/Red	
5	IN0	Green	
6	IN1	White/Green	
7	IN2	Yellow	
8	IN3	White/Yellow	
9	IN4	Brown	
10	IN5	White/Brown	0.2sq
11	IN6	Blue	
12	IN7	White/Blue	
13	OUT0	Gray	
14	OUT1	White/Gray	
15	OUT2	Orange	
16	OUT3	White/Orange	
17	OUT4	Purple	
18	OUT5	White/Purple	
19	OUT6	Light green	
20	OUT7	White/Light green	

		0.5-5 (JST)		
Shield	1	FG	White/Gray	AWG22

ACON-CYB/PLB/POB
DCON-CYB/PLB/POB

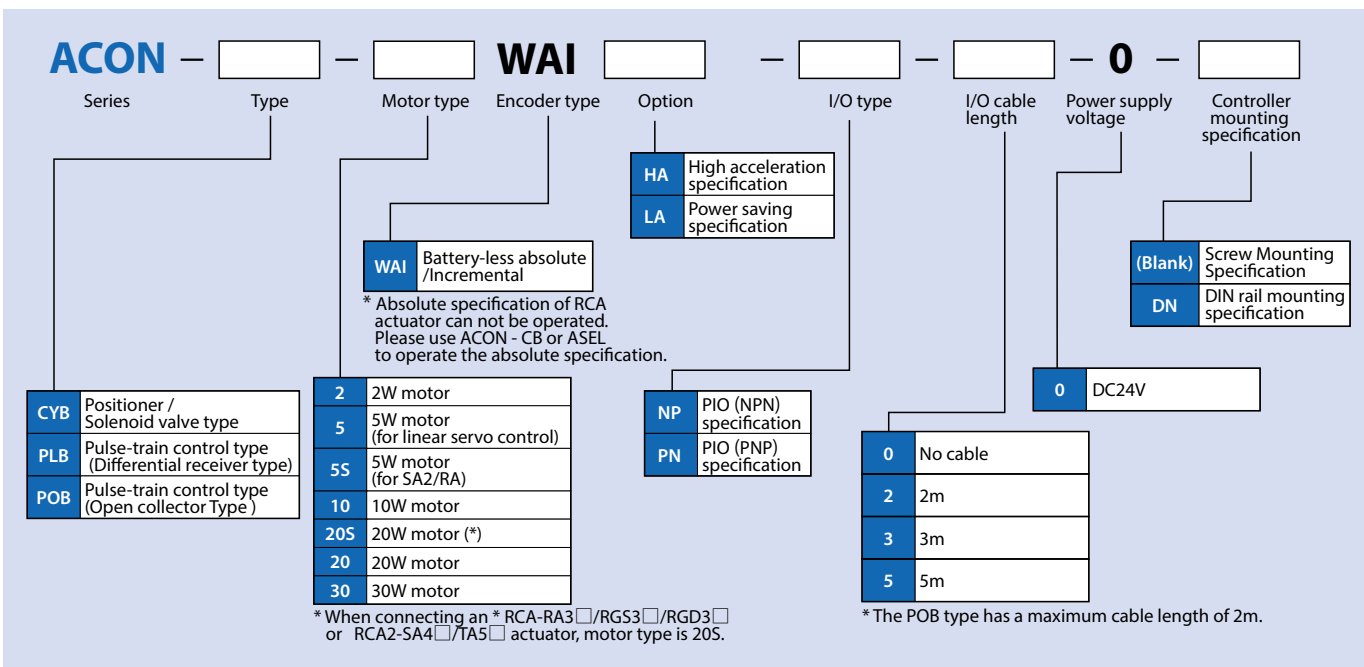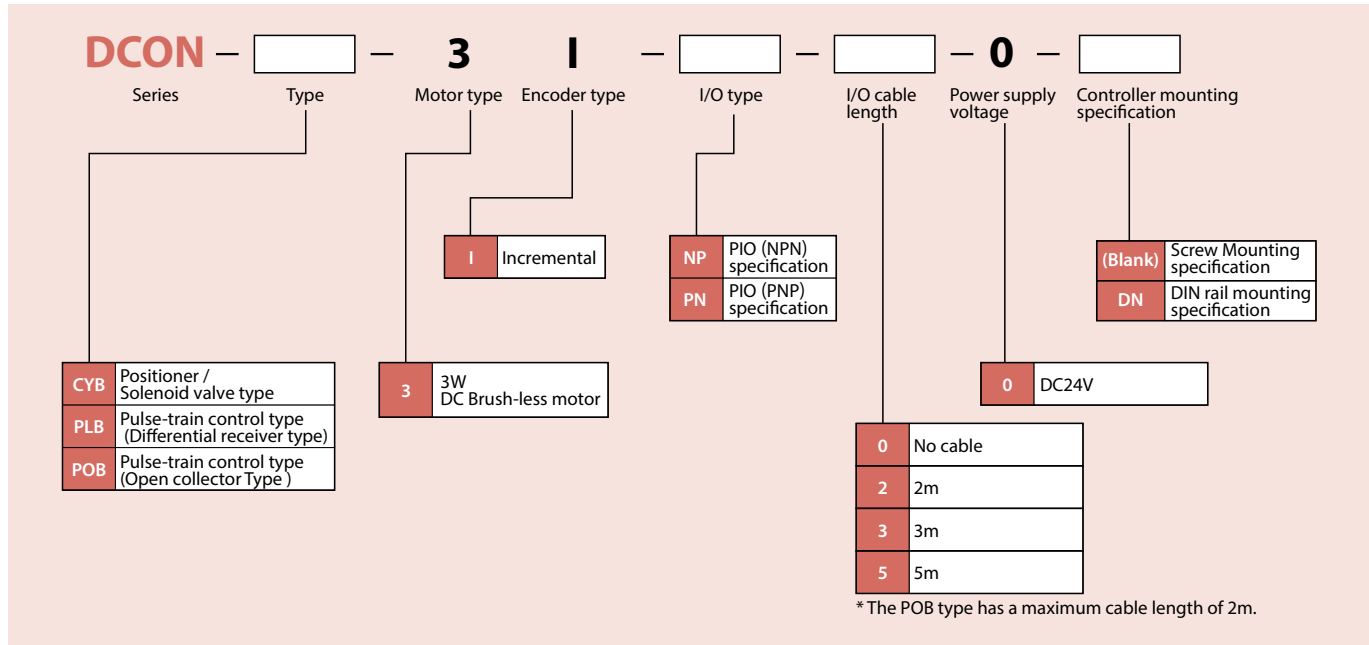**Position controller for RoboCylinder**

List of Models

Positioner Controller that can operate the actuator of RCA2 / RCA / RCL / RCD series.
Lineup for 3 types that can support various control.

Model	CYB	PLB / POB
Type	Positioner / Solenoid valve type	Pulse-train control type
External view		
Description	Operable with control similar to air cylinder	Controller for Pulse-train control
Number of positions	64 points	–

Model

ACON – ☐ – ☐ **WAI** ☐ – ☐ – ☐ – **0** – ☐

Series | Type | Motor type | Encoder type | Option | I/O type | I/O cable length | Power supply voltage | Controller mounting specification

HA	High acceleration specification
LA	Power saving specification

WAI	Battery-less absolute /Incremental

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

(Blank)	Screw Mounting Specification
DN	DIN rail mounting specification

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

2	2W motor
5	5W motor (for linear servo control)
5S	5W motor (for SA2/RA)
10	10W motor
20S	20W motor (*)
20	20W motor
30	30W motor

* When connecting an * RCA-RA3☐/RGS3☐/RGD3☐ or RCA2-SA4☐/TA5☐ actuator, motor type is 20S.

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

0	DC24V

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

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

ACON / DCON-CYB/PLB/POB Controller

Model

DCON – ☐ – **3** **I** – ☐ – ☐ – **0** – ☐

Series	Type	Motor type	Encoder type	I/O type	I/O cable length	Power supply voltage	Controller mounting specification

I	Incremental

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

(Blank)	Screw Mounting specification
DN	DIN rail mounting specification

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

3	3W DC Brush-less motor

0	DC24V

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

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

System configuration

<ACON-CYB/PLB/POB>

PLC

Comes with controller
I/O flat cable for CYB
CB-PAD-PIO
Cable length Standard 2m
Refer to page 22 for maintenance cable.

Comes with controller
Shielded I / O cable for PLB / POB
CB-PAD-PIOS
Cable length Standard 2m
Refer to page 22 for maintenance cable.

Peripherals are the same for all controllers.

Option
PC software
(Refer to 20)
RS232 connection type
<Model: RCM-101-MW>
USB connection type
<Model: RCM-101-USB>

* Cable is supplied with PC compatible software.

Option
24-VDC power supply
<Model number: PS-241 (100-V input)>
<Model number: PS-242 (200-V input)>

Option
Touch-panel teaching pendant
Refer to page 20.
<Model number TB-02-☐>

Supplied with the actuator
Motor/Encoder integrated cable
If you specify the cable length in the actuator type, it is supplied.
Refer to page 21 for maintenance cable.

RCA series

RCA2 series

RCL series

System configuration

<DCON-CYB/PLB/POB>

PLC

Comes with controller
I/O flat cable for CYB
CB-PAD-PIO
Cable length Standard 2m

Refer to page 22
for maintenance cable.

Comes with controller
Shielded I / O cable for PLB / POB
CB-PAD-PIOS
Cable length Standard 2m

Refer to page 22
for maintenance cable.

Peripherals are the same for all controllers.

Option
PC software
(Refer to 20)
RS232 connection type
<Model: RCM-101-MW>
USB connection type
<Model: RCM-101-USB>

* Cable is supplied
  with PC compatible
  software.

Option
24-VDC power supply
<Model number: PS-241 (100-V input)>
<Model number: PS-242 (200-V input)>

Option
**Touch-panel
teaching pendant**
Refer to page 20.
<Model number: TB-02-□>

Comes with the actuator
Motor/encoder integrated cable
If you specify the cable length
in the actuator type, it is supplied.
Refer to page 21
for maintenance cable.

RCD-RA1DA

RCD-GRSNA

I/O signals in positioner / solenoid valve type (ACON-CYB/DCON-CYB)

Pin number	Category		Parameter (PIO pattern) selection						
			0	1	2	3	4	5	6
			Positioning mode	Solenoid valve mode 1	Solenoid valve mode 2	Single solenoid mode	Double solenoid mode	User Selection mode	Serial communication
		Number of positioning points	16 points	7 points	3 points	2 points	2 points	One of 4, 8, 16, 32, 64 points (Selection)	768 points
		Zone signal	△	×	△	△	△	△	Serial communication (Modbus) Refer to operation manual
		Position zone signal	△	×	△	△	△	△	
5	Input	IN0	PC1	ST0	ST0	ST0	ST0	Any signal other than the command position No., CSTR can be selected in the input.	
6		IN1	PC2	ST1	ST1(JOG+)	-	ST1 (-)		
7		IN2	PC4	ST2	ST2 (-)	-	ASTR		
8		IN3	PC8	ST3	-	-	-		
9		IN4	HOME	ST4	SON	SON	SON		
10		IN5	*STP	ST5	-	*STP	*STP		
11		IN6	CSTR	ST6	-	-	-		
12		IN7	RES	RES	RES	RES	RES		
13	Output	OUT0	PM1（ALM1）	PE0	LS0	LS0/PE0	LS0/PE0	Any signal other than the completed position No., PEND can be selected in the input.	
14		OUT1	PM2（ALM2）	PE1	LS1(TRQS)	LS1/PE1	LS1/PE1		
15		OUT2	PM4（ALM4）	PE2	LS2 (-)	PSFL	PSFL		
16		OUT3	PM8（ALM8）	PE3	HEND	HEND	HEND		
17		OUT4	HEND	PE4	SV	SV	SV		
18		OUT5	PZONE/ZONE1	PE5	PZONE/ZONE1	PZONE/ZONE1	PZONE/ZONE1		
19		OUT6	PEND	PE6	*ALML	*ALML	*ALML		
20		OUT7	*ALM	*ALM	*ALM	*ALM	*ALM		

(Note 1) In the table above, the asterisk* symbol next to the code indicates a reverse logic signal.
(Note 2) In all PIO patterns other than 1, this signal can be switched with PZONE by setting Parameter No. 149 accordingly.
(Note 3) The signal of () are effective before home return complete when set to increment specification. (ALM 1 to 8 are excluded.)
(Note 4) Pin number 13 and 14 of PIO pattern 3 or 4 , can select PE * and LS * by by setting Parameter No. 186.

I/O signals in positioner / solenoid valve type (ACON-CYB/DCON-CYB)

Depending on the controller settings, the available signals are different.
Please check the available functions by referring to the signal table

Category	Signal abbreviation	Signal name	Function description
Input	PC1 ～ PC8	Command position No.	Enter the target position number (binary input).
	HOME	Home return	Home return operation is performed when this signal is turned ON.
	*STP	Pause	The actuator decelerates to a stop when this signal is turned OFF. During the stop, the remaining motion is on hold. It restarts when the signal is turned ON.
	CSTR	PTP Strobe (Start signal)	Start moving to the position set in the command position.
	RES	Reset	Current alarms are reset when this signal is turned ON. In addition, it is possible to cancel the remaining travel amount when it is turned ON during the pause state (* STP is OFF.).
	ST0 ～ 6	Start signal	In the solenoid valve mode, it moves to the position specified when this signal is turned ON. (Start signal is not required.)
	SON	Servo ON	The servo is ON while this signal is ON, and OFF while the signal is OFF.
	ASTR	Continuous cycling operation signal	When this signal is turned ON, continuous cycling between two points is performed. If this signal is turned OFF while moving, it stops after arriving at the current target position.
Output	PM1 ～ PM8	Completed position No.	It outputs (binary output) the number of the position reached after positioning is complete.
	HEND	Home return complete	This signal turns ON upon completion of home return.
	ZONE1	Zone signal 1	This signal turns ON when the current position of the actuator falls within the parameter-set range.
	PZONE	Position zone	This signal turns ON when the current position of the actuator enters desired zone set by the position data when moving to the position. It is possible to select with ZONE 1, PZONE is effective only when moving to the set position.
	PEND	Positioning complete	This signal turns ON when it reaches within the positioning band after moving. It remains ON even if it exceeds the positioning band.
	*ALM	Alarm	This signal turns ON when the controller is normal, and turns OFF when an alarm generates.
	PE0 ～ 6	Current position No.	In solenoid valve mode 1, this signal turns ON after movement is complete.
	LS0 ～ 2	Limit switch output	This signal turns ON when the current position of the actuator reaches within the positioning band. In home return complete status, this signal is output even before the movement command or in the servo OFF status.
	SV	Servo ON	This signal turns ON when the servo is ON.
	*ALML	Minor failure alarm	This signal is ON in normal conditions and turns OFF when a message-level alarm generates. (Operation will continue.)
	PSFL	Unloaded push-motion	This signal turns ON when push-motion is unloaded.
	ALM1 ～ ALM8	Alarm code	When an alarm generates equal or higher than the operation release level, this signal outputs the alarm details using a binary code.

(Note) The above signals marked with (*) are normally ON and turn OFF at operation.

I/O signals in pulse-train control type (ACON-PLB/POB DCON-PLB/POB)

Pin number	Category		Parameter (PIO pattern) selected	
			0	1
			Incremental Axis Connection mode	Absolute Axis Connection mode
		Number of positioning points	0	1
		Zone signal	1	1
1	Pulse-train input		/PP	/PP
2			PP	PP
3			/NP	/NP
4			NP	NP
5	Input	IN0	SON	SON
6		IN1	RES	RES
7		IN2	HOME	HOME
8		IN3	TL	TL
9		IN4	CSTP	CSTP
10		IN5	DCLR	DCLR
11		IN6	BKRL	BKRL
12		IN7	-	RSTR
13	Output	OUT0	PWR	PWR
14		OUT1	SV	SV
15		OUT2	INP	INP
16		OUT3	HEND	HEND
17		OUT4	TLR	TLR
18		OUT5	ZONE1	ZONE1
19		OUT6	*ALML	REND
20		OUT7	*ALM	*ALM

(Note) The above signals marked with (*) are normally ON and turn OFF at operation.

I/O signals in pulse-train control type (ACON-PLB/POB/DCON-PLB/POB)

Depending on the controller type and setting, the available signals are different. Please check the available functions by referring to the signal table

Category	Signal abbreviation	Signal name	Function description
Pulse-train input	/PP	Pulse-train input (−)	Pulses are input from the host. • Differential (PLB type) ≤ 200kpps • Open collector (PLB type) ≤ 60kpps
	PP	Pulse-train input (+)	
	/NP	Pulse-train input (−)	
	NP	Pulse-train input (+)	
Input	SON	Servo ON	The servo is ON while this signal is ON, and OFF while the signal is OFF.
	RES	Reset	Current alarms are reset when this signal is turned ON.
	HOME	Home return	When the signal is ON, home return operation is performed.
	TL	Torque limit selection	When this signal is turned ON, the motor torque is limited to the value set by the parameter.
	CSTP	Forced stop	The actuator is forcibly stopped when this signal has remained ON for 16 ms or more. The actuator decelerates to a stop at the torque set in the controller and the servo turns OFF.
	DCLR	Deviation counter clear	This signal clears the deviation counter.
	BKRL	Forced brake release	The brake is forcibly released.
	RSTR	Reference position move command	Move to the position set to parameter No. 167 when signal turns ON. (PIO pattern 1 only)
Output	PWR	System ready	This signal turns ON when the controller becomes ready after the main power has been turned on.
	SV	Servo ON status	This signal turns ON when the servo is ON.
	INP	Positioning complete	This signal turns ON when the amount of remaining travel pulses in the deviation counter falls within the in-position band.
	HEND	Home return complete	This signal turns ON upon completion of home return.
	TLR	Torque limited	This signal turns ON upon reaching the torque limit while the torque is limited.
	ZONE1	Zone signal 1	This signal is ON in normal conditions and turns OFF when a message-level alarm generates. (Operation will continue.)
	＊ALML	Minor failure alarm	This signal is output when a message-level alarm generates, and turns OFF when an alarm generates.
	REND	Reference position move complete	This signal turns ON when moving to the position set to parameter No. 167 is completed. (PIO pattern 1 only)
	*ALM	Controller alarm status	This signal turns ON when the controller is normal, and turns OFF when an alarm generates.

(Note) The above signals marked with (*) are normally ON and turn OFF at operation.

ACON / DCON-CYB/PLB/POB Controller

I/O Specification

The three types (CYB, PLB/POB) controllers are distinguished by their I / O specifications. In addition,
the positioner mode and solenoid valve mode can change the I / O signal content according to the controller setting,
so it is possible to use multiple functions.

Function by controller type

Model	CYB	PLB / POB	Summary
Name	Positioner / Solenoid valve type	Pulse-train control type	
Positioner mode	○	×	It is the basic operation mode that operates by specifying the position number and inputting the start signal.
Solenoid valve mode	○	×	It is possible to move just by turning ON/OFF the position signals. This mode operates with the same controls as the solenoid valves on air cylinders.
Pulse-train mode	×	○	This mode can operate freely with your pulse train control without inputting position data.

PIO Input/output circuit (Other than |pulse-train input)

Input Part External Input Specifications

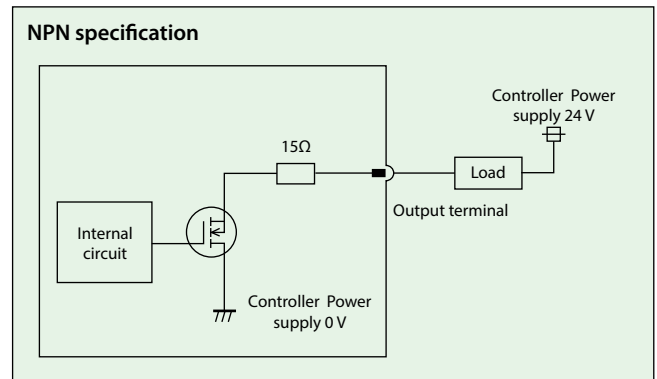| Item	Specification
Input voltage	DC24V ±10%
Input current	5mA, 1 circuit
ON/OFF voltage	ON voltage: 18 VDC min. OFF voltage: 6 VDC max.
Leakage current	1 mA or less / 1point
Isolation method	Non-insulated

Output Part External Output Specifications

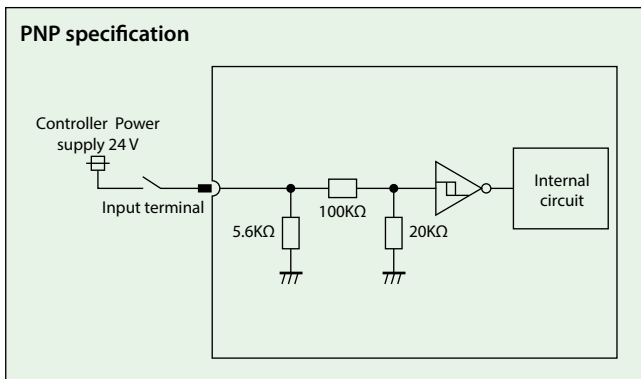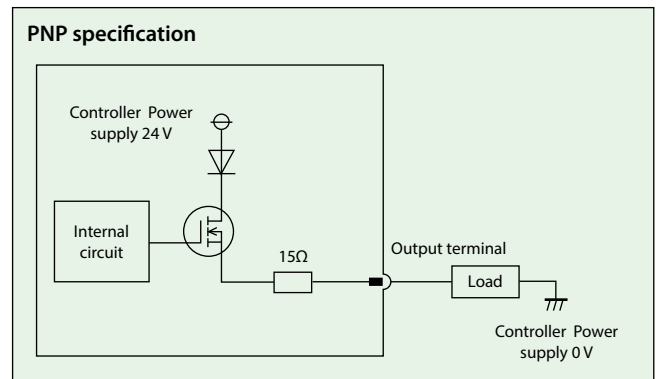| Item	Specification
Load voltage	DC24V ±10%
Maximum load current	50mA, 1 circuit
Residual voltage	2V or less
Isolation method	Non-insulated

NPN specification

NPN specification

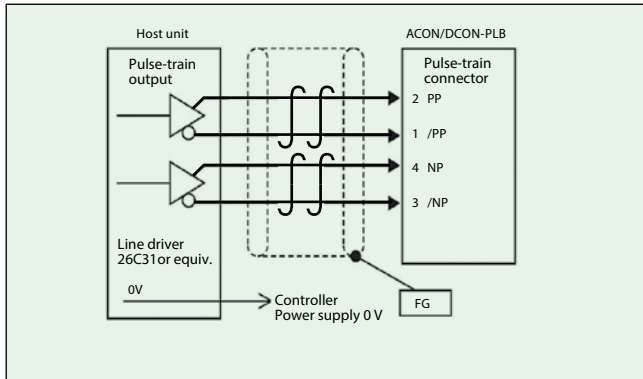PNP specification

PNP specification

Pulse-train input circuit

■ Differential line driver

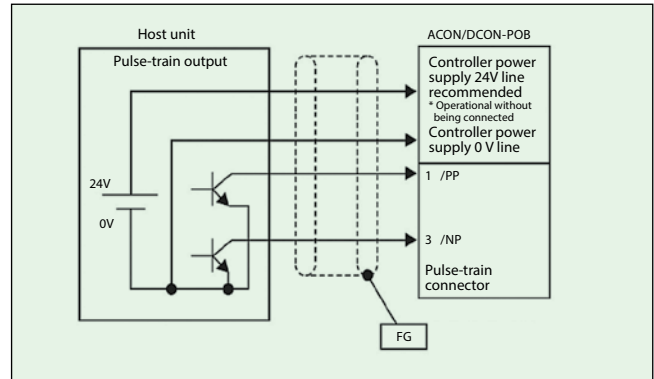| Maximum number of input pulse | : Differential line driver max 200kpps |
| Isolation method | : Non-insulated |
| Maximum cable length | : 10m |

* The power supply of the pulse train output unit on the PLC side and the control power supply of the controller or the GND line must be the same.

```
Host unit                                    ACON/DCON-PLB
Pulse-train                                  Pulse-train
output                                        connector
                                             2  PP
                                             1  /PP
                                             4  NP
                                             3  /NP
Line driver
26C31or equiv.
0V
         Controller
         Power supply 0 V        FG
```

■ Open collector

Maximum number of input pulse	: Open collector max 60kpps
Isolation method	: Non-insulated
Maximum cable length	: 2m

* The power supply of the pulse train output unit on the PLC side and the control power supply of the controller or the GND line must be the same.

```
Host unit                                    ACON/DCON-POB
Pulse-train output                           Controller power
                                             supply 24V line
                                             recommended
                                             * Operational without
                                               being connected
                                             Controller power
                                             supply 0 V line
24V                                          1  /PP
0V
                                             3  /NP
                                             Pulse-train
                                             connector
                        FG
```

Command pulse-train pattern

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

Note) The operational number of encoder pulses are as follows:
RCP5·RCP4·RCP3·RCP2…800 pulse/rev
RCP6…8192 pulse/rev

ACON / DCON-CYB/PLB/POB Controller

Specification Table

Item	Specification		
Controller type	CYB	PLB	POB
Number of controlled axes	1 axis		
Operation method	Positioner/Solenoid valve type	Pulse-train control type	
Number of positioning points	Up to 64 points	—	
Back up memory	FRAM		
I/O connector (PIO connecter)	20 pin connector		
Number of I/Os	8 input points/8 output points	8 input points/8 output points	
I/O power supply	External supply DC24V±10%		
Serial communication (SIO connector)	RS485 1ch		
Command pulse-train input method	—	Differential line driver	Open collector
Maximum input pulse frequency	—	Max 200kpps	Max 60kpps
Position detection method	Incremental encoder/Battery-less absolute encoder		
Forced electromagnetic brake release	Supply 24 VDC 150 mA to the BK terminal in the power connector to release		
Input power	DC24V±10%		
Insulation voltage	DC500V 10MΩ		
Anti-vibration	XYZ direction 10 ~ 57hz One side width 0.035 mm (continuous), 0.075 mm (intermittent) 57 to 150 Hz 4.9 m / s² (continuous), 9.8 m / s² (intermittent)		
Ambient operating temperature	0 to 40℃		
Ambient operating humidity	10-95% (non-condensing)		
Operating ambience	Not exposed to corrosive gases		
Degree of protection	IP20		
Mass	230g (DIN rail mounting specification 265g)		

Motor power capacity

		Motor type	Standard/High-acceleration		Power-saving	
			Rated [A]	Max. [A]	Rated [A]	Max. [A]
ACON	RCA/RCA2	5W (5S)	1.0	3.3	-	-
		10W	1.3	4.4	1.3	2.5
		20W	1.3	4.4	1.3	2.5
		30W	1.3	4.0	1.3	2.2
		20W(20S)	1.7	5.1	1.7	3.4
	RCL	2W	0.8	4.6	-	-
		5W	1.0	6.4	-	-
		10W	1.3	6.4	-	-
DCON	RCD	3W	0.7	1.5	-	-

External Dimensions

[Screw fastening specification]

[DIN rail mounting specification]

Names of each part

1 Controller status display LED
Displays the operation status of the controller.
○:ON ×:OFF ☆:Blinking

LED		Operation status
SV (Green)	ALM (Red)	
×	×	Power supply OFF
		Servo OFF
×	○	Alarm (More than the operational level)
		Motor drive power OFF
		Emergency stop
○	×	Servo ON
☆	×	Automatic servo OFF
○ (Orange)		Initializing when the power turns on
×	☆	Detecting collision

2 PIO connector
Connector for input/output signal connection for control.
PLB / POB type for pulse train control is also used as pulse signal input.

3 SIO connector (SIO)
Connector for communication cable connection of teaching tool.

4 Power connector
Connector for the main power supplier for the controller, actuator, brake, and emergency stop.

5 motor encoder connector
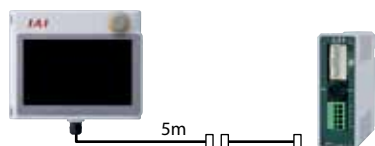Connector for the actuator's motor and encoder cable

Option

Touch panel teaching box

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

▌Model **TB-02-C (Dedicated CON type)***

▌Setting

5m

* Please refer to TB-02 catalogue (CJ0239-1A) for other types.

▌Specification

Rated voltage	24V DC
Power consumption	3.6 W or less (150 mA or less)
Ambient operating temperature	0 ～ 40℃
Ambient operating humidity	20 to 85%RH (Non-condensing)
Degree of protection	IP20
Weight	470g (TB-02 only)

PC software (Windows only)

Windows : XP SP2/Vista/7/8 or later
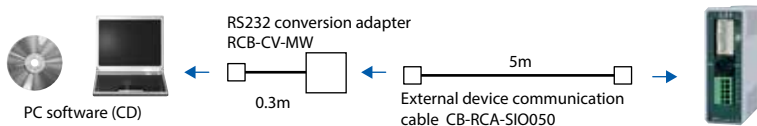
▌Summary A startup support software for inputting positions, performing test runs, and monitoring. With enhancements for adjustment functions, the startup time is shortened.

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

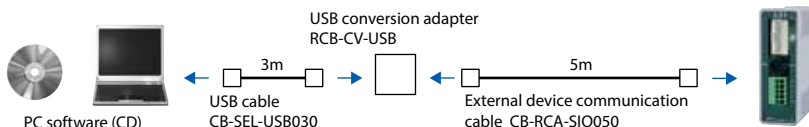Please contact IAI for the current supported versions.

▌Setting

PC software (CD)

RS232 conversion adapter RCB-CV-MW
0.3m
5m
External device communication cable CB-RCA-SIO050

▌Model **RCM-101-USB** (External device communication cable ＋USB conversion adapter ＋USB cable)

Please contact IAI for the current supported versions.

▌Setting

PC software (CD)

3m
USB cable CB-SEL-USB030
USB conversion adapter RCB-CV-USB
5m
External device communication cable CB-RCA-SIO050

IAI

Maintenance parts

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

Cable table

● ACON

	Product model		Integrated Motor-Encoder Cable	Integrated Motor-Encoder Robot Cable
①		RCA2/RCA2W		
②	RCA RCACR RCAW	SRA4R SRGS4R SRGD4R	–	CB-APSEP-MPA □□□
③		Model other than ②	–	CB-ASEP2-MPA □□□
④		RCL	–	CB-APSEP-MPA □□□

● DCON

	Product model		Integrated Motor-Encoder Cable	Integrated Motor-Encoder Robot Cable
①	RCD	RA1DA	CB-CAN-MPA □□□	CB-CAN-MPA □□□ -RB
②		GRSNA		

* When the applicable controller of RCD-RA1DA type uses "D3", the cable type is CB-CA-MPA □□□ /CB-CA-MPA □□□ -RB.
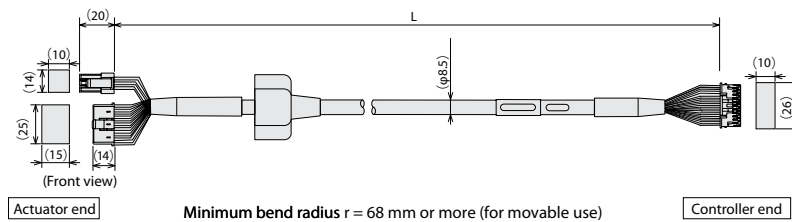
● Common to ACON/DCON

	Product model	I/O flat cable for CYB (Without shield)	I/O cable for PLB/POB (With shield)
①	ACON/DCON	CB-PAD-PIO □□□	CB-PAD-PIOS □□□

Model **CB-ASEP2-MPA**□□□

* The default specification of this cable is robot cable.

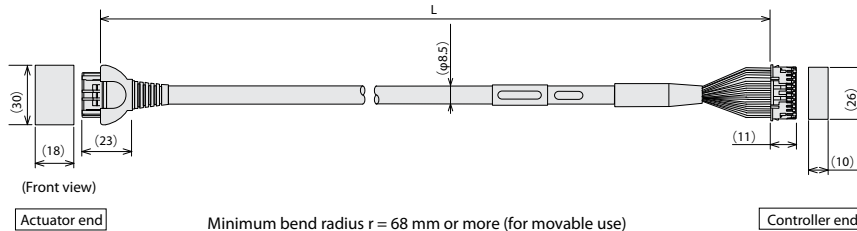* Please indicate cable length (L) in □□□,
(e.g. 080=8m) maximum 20m.

Minimum bend radius r = 68 mm or more (for movable use)

Actuator end | Controller end

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

Model **CB-APSEP-MPA**□□□

* The default specification of this cable is robot cable.

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

Minimum bend radius r = 68 mm or more (for movable use)

Actuator end | Controller end

Actuator end Pin number	[PCON] (ACON)	Controller end Pin number
A1	Black [ΦA] (U)	1
B1	White [VMM] (V)	2
A2	Brown [Φ/A] (W)	5
B2	Green [ΦB] (-)	3
A3	Yellow [VMM] (-)	4
B3	Red [Φ/B] (-)	6
A4	Orange [LS] (BK+)	7
B4	Gray [LS] (BK-)	8
A6	White [-] (A+)	11
B6	Yellow [-] (A-)	12
A7	Red [A+] (B+)	13
B7	Green[A-] (B-)	14
A8	Black [B+] (Z+)	15
B8	Brown [B-] (Z-)	16
A5	Black (identification tape) [BK+] (LS+)	9
B5	Brown (identification tape) [BK-] (LS-)	10
A9	Green (identification tape) [GNDLS] (GNDLS)	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

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

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

(Front view) — Actuator end

(Front view) — Controller end

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

Minimum bend radius r = 68 mm or more (for movable use)

(Note 1) If the cable length is 5 m or more, the diameter of the non-robot cable becomes ø9.1,
while that of the robot cable becomes ø10.
(Note 2) When connecting to RCD, maximum 10m.

| Pin number	Signal name A	Signal name D	Color		Pin number	Signal name A	Signal name D	Color
3	U	U	Blue		1	U	U	Blue
5	V	V	Orange		2	V	V	Orange
10	–	–	Brown		3	–	–	Brown
9	–	–	Gray		4	–	–	Gray
4	W	W	Green		5	W	W	Green
15	–	–	Red		6	–	–	Red
8	BK+	–	Black		7	BK+	–	Black
14	BK-	–	Yellow		8	BK-	–	Yellow
12	A+	A+	Blue		11	A+	A+	Blue
17	A-	A-	Orange		12	A-	A-	Orange
1	B+	B+	Green		13	B+	B+	Green
6	B-	B-	Brown		14	B-	B-	Brown
11	Z+/SA [mABS]	HS1 IN	Gray		15	Z+/SA [mABS]	HS1 IN	Gray
16	Z-/SB [mABS]	HS2 IN	Red		16	Z-/SB [mABS]	HS2 IN	Red
20	LS+	–	Blue		9	LS+	–	Blue
2	LS-	–	Orange		10	LS-	–	Orange
21	VCC	VCC	Gray		17	VCC	VCC	Gray
7	GND	GND	Red		19	GND	GND	Red
18	VPS/BAT-	–	Brown		18	VPS/BAT-	–	Brown
13	LS_GND	HS3 IN	Green		20	LS_GND	HS3 IN	Green
19	–	–	–		22	–	–	–
22	BAT+	–	Pink		21	BAT+	–	Pink
23	–	–	–		23	–	–	–
24	FG	FG	Black		24	FG	FG	Black

with center imposition

Model **CB-PAD-PIO**□□□

Housing: 51353-2000 （MOLEX）
Contact: 56134-9000 （MOLEX）

* Please indicate cable length (L) in □□□,
(e.g. 080=8m) maximum 10m.
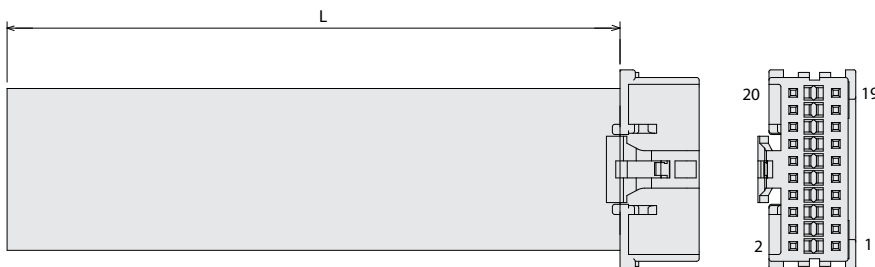
No.	Cable color	Wiring	No.	Cable color	Wiring
1	Brown-1	flat cable AWG28	11	Brown-2	flat cable AWG28
2	Red-1		12	Red-2	
3	Orange-1		13	Orange-2	
4	Yellow-1		14	Yellow-2	
5	Green-1		15	Green-2	
6	Blue -1		16	Blue -2	
7	Purple-1		17	Purple-2	
8	Gray-1		18	Gray-2	
9	White-1		19	White-2	
10	Black-1		20	Black-2	

Model **CB-PAD-PIOS**□□□

Housing: 51353-2000 （MOLEX）
Contact: 56134-9000 （MOLEX）

* Maximum length if ACON·DCON-POB type is selected is 2m.

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

51353-2000（MOLEX）

No.	Signal	Color	Wiring
1	/PP	Black	0.2sq
2	PP	White / Black	
3	/NP	Red	
4	NP	White / Red	
5	IN0	Green	
6	IN1	White / Green	
7	IN2	Yellow	
8	IN3	White / Yellow	
9	IN4	Brown	
10	IN5	White / Brown	
11	IN6	Blue	
12	IN7	White / Blue	
13	OUT0	Gray	
14	OUT1	White / Gray	
15	OUT2	Orange	
16	OUT3	White / Orange	
17	OUT4	Purple	
18	OUT5	White / Purple	
19	OUT6	Bright green	
20	OUT7	White /Bright green	

0.5-5（JST）

	No.	Signal	Color	Wiring
Shield	1	FG	White / Gray	AWG22

IAI America, Inc.
USA Headquarters & Western Region (Los Angeles): 2690 W. 237th Street, Torrance, CA 90505   (800) 736-1712
Midwest Branch Office (Chicago) : 110 E. State Pkwy, Schaumburg, IL 60173   (800) 944-0333
Southeast Branch Office (Atlanta): 1220 Kennestone Circle, Suite 108, Marietta, GA 30066   (678) 354-9470
www.intelligentactuator.com

JAPAN Headquarters: 577-1 Obane, Shimizu-ku, Shizuoka-shi, Shizuoka, 424-0103, JAPAN
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IAI Industrieroboter GmbH
Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany
IAI (Shanghai) Co., Ltd.
Shanghai Jiahua Business Center A8-303, 808,
Hongqiao Rd., Shanghai 200030, China

IAI Robot (Thailand) Co., Ltd.
825 Phairojkijja Tower 7th Floor, Debaratana Rd.,
Bangna Nuea, Bangna, Bangkok 10260, Thailand