IAI
Quality and Innovation

POWER CON

PCON-CA

First Step Guide Third Edition

Thank you for purchasing our product.
Make sure to read the Safety Guide and detailed Instruction Manual (CD/DVD) included with the product in addition to this First Step Guide to ensure correct use.
This Instruction Manual is original.

⚠ Warning : Operation of this equipment requires detailed installation and operation instructions which are provided on the CD/DVD Manual included in the box this device was packaged in. It should be retained with this device at all times.
A hardcopy of the Manual can be requested by contacting your nearest IAI Sales Office listed at the back cover of the Instruction Manual or on the First Step Guide.

Product Check

The standard configuration of this product is comprised of the following parts.
If you find any fault with the product you have received, or any missing parts, contact us or our distributor.

1. Parts

No.	Part Name	Model	Reference
1	Controller Main Body	Refer to “How to read the model plate”, “How to read the model of the controller”	
Accessories			
2	I/O Flat Cable	CB-PAC-PIO***	*** shows the cable length
3	Power Connector	FMC1.5/8-ST-3.5 (Supplier : PHOENIX CONTACT)	Recommended cable size AWG16 to 20 (1.25 to 0.5mm^2)
4	Absolute Battery (Option)	AB-7	If applicable for Simple Absolute Type
5	First Step Guide		
6	Instruction Manual (CD/DVD)		
7	Safety Guide		

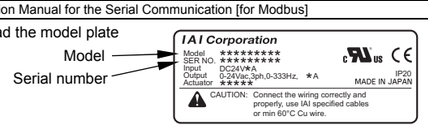
2. Teaching Tool (to be purchased separately)
A teaching tool such as PC software is necessary when performing the setup for position setting, parameter setting, etc. that can only be done on the teaching tool.
Please prepare either of the following teaching tools.

No.	Part Name	Model
1	PC Software (with RCS232C converter adapter + external equipment communication cable)	RCM-101-MW
2	PC Software (with USB converter adapter + USB cable + external equipment communication cable)	RCM-101-USB
3	Teaching Pendant (Touch Panel Teaching)	CON-PTA
4	Teaching Pendant (Touch Panel Teaching with deadman switch)	CON-PDA
5	Teaching Pendant (Touch Panel Teaching with deadman switch + TP Adapter (RCB-LB-TG))	CON-PGA

3. Instruction Manuals related to this product, which are contained in the Instruction Manual (CD/DVD).

No.	Name	Manual No.
1	PCON-CA Controller Instruction Manual	ME0289
2	PC Software RCM-101-MW/ RCM-101-USB Instruction Manual	ME0155
3	Touch Panel Teaching CON-PTA/PDA/PGA Instruction Manual	ME0295
4	Instruction Manual for the Serial Communication [for Modbus]	ME0162

4. How to read the model plate



5. How to read the model of the controller

PCON-CA-56P I-NP-2-0-ABU-**

<Series>
<Type>
CA : High Performance Type

<Detail of Connected Axis>
[Motor Type]
20P : 20□ pulse motor
20SP: 20□ pulse motor
28P : 28□ pulse motor
28SP: 28□ pulse motor
42P : 42□ pulse motor
56P : 56□ pulse motor
[Encoder Type]
I : Incremental

<I/O Type>
NP : NPN Specification (Sync. Type) (Standard)
PN : PNP Specification (Source Type)
PLN : Pulse Train Control NPN Specification (Sync. Type)
PLP : Pulse Train Control PNP Specification (Source Type)

<I/O Cable Length>
0 : Equipped with no cable
2 : 2m (Standard)
3 : 3m
5 : 5m

<Power-supply Voltage>
0 : 24V DC

<Applicable to Simplified Absolute Unit>
AB : Simple Absolute Type (With the Absolute Battery)
ABUN : Simple Absolute Type (With no Absolute Battery)

<Identification for IAI use only>
* There is no identification in some cases

Basic Specifications

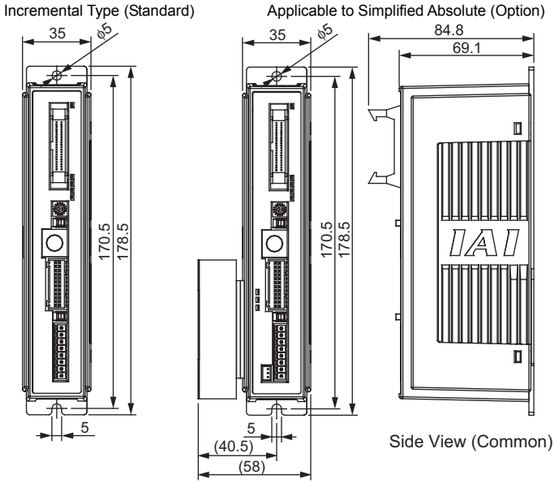
List of Specifications

Item				Description	
Number of controlled axes				1-axis	
Power-supply Voltage				24V DC ±10%	
Load Capacity (including control side current consumption)	RCP2 RCP3	Motor Type	20P, 28P, 28SP	MAX. 1A	
			42P, 56P	MAX. 2A	
	RCP4	Motor Type	20P, 28P, 28SP	MAX. 1A	
			42P, 56P	High-thrust function is disabled	MAX.2.0A
				High-thrust function is enabled	Rated 3.5A / MAX. 4.2A
Power Supply for Electromagnetic Brake (for actuator equipped with brake)				24V DC ±10% 0.15A (MAX.)	
Heat Generation		RCP2, RCP3		5W	
		RCP4		8W	
Rush Current(Note1)				8.3A	
Transient Power Cutoff Durability				MAX. 500μs	
Motor Control System				Weak field-magnet vector control	
Corresponding Encoder				Incremental Encoder Resolution 800pulse/rev	
Actuator Cable Length				MAX. 20m	
Serial Communication Interface (SIO Port)				RS485 : 1 channel (based on Modbus Protocol RTU/ASCII) Speed : 9.6 to 230.4Kbps Control available with serial communication in the modes other than the pulse train	
External Interface		PIO Specification		Signal I/O dedicated for 24V DC (selected from NPN/PNP) … Input 16 points max., output 16 points max. Cable length MAX. 10m	
		Fieldbus Specification		Not Corresponding	
Data Setting and Input				PC Software, Touch Panel Teaching, Teaching Pendant	
Data Retention Memory				Saves position data and parameters to non-volatile memory (There is no limitation in number of writing)	
Operation Mode				Positioner Mode/Pulse Train Control Mode (selected by parameter setting)	
Number of Positions in Positioner Mode				Standard 64 points, MAX. 512 points (PIO Specification) (Note) Number of positions differs depending on the selection in PIO pattern and fieldbus operation mode.	
Pulse Train Interface		Input Pulse Frequency		Differential System (Line Driver System) : MAX. 200kpps Cable length MAX. 10m	
				Open Collector System : Not applicable. * If the host applies the open collector output, prepare AK-04 (option) separately to convert to the differential type.	
		Command Pulse Multiplying Factor (Electrical Gear : A/B)		1/50 < A/B < 50/1 Setting Range of A and B (set to parameter) : 1 to 4096	
		Feedback Pulse Output		None	
LED Display (mounted on Front Panel)				SV (GN)/ALM (RD) : Servo ON/Alarm generated STS0 to 3 : Status display RDY (GN)/ALM (RD) : Absolute function in normal / absolute function error (for the simple absolute type) 1, 0 (GN) (RD) : Absolute function status display (for the simple absolute type)	
Electromagnetic Brake Compulsory Release Switch (mounted on Front Panel)				Switching NOM (standard)/BK RLS (compulsory release)	
Insulation Resistance				500V DC 10MΩ or more	
Protection Function against Electric Shock				Class I basic insulation	
Cooling Method				Natural air-cooling	
Environment		Ambient Air Temperature		0 to 40°C	
		Ambient Humidity		85%RH or less (non-condensing)	
		Ambient Environment		[Refer to Installation Environment]	
		Ambient Storage Temperature		-20 to 70°C (Excluding battery)	
		Usage Altitude		1000m or less	
		Protection Class		IP20	
		Vibration Durability		Frequency 10 to 57Hz / Swing width : 0.075mm Frequency 57 to 150Hz / Acceleration 9.8m/ S^2 XYZ directions Sweep time : 10 minutes Number of sweep : 10 times	
		Weight		250g or less, 450g or less for Simple Absolute Type (including 190g for battery)	
		External Dimensions		35W × 178.5H × 68.1D [mm]	

Note1 In-rush current will flow for approximately 5msec after the power is turned on (at 40°C).
Note that the value of in-rush current differs depending on the impedance of the power supply line.

External Dimensions

Incremental Type (Standard) / Applicable to Simplified Absolute (Option)



Installation Environment

This product is capable for use in the environment of pollution degree 2*1 or equivalent.
*1 Pollution Degree 2: Environment that may cause non-conductive pollution or transient conductive pollution by frost (IEC60664-1)

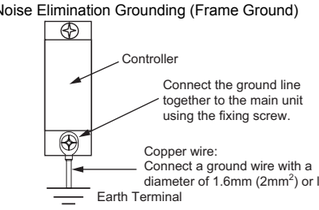
1. Installation Environment
Do not use this product in the following environment
- Location where the surrounding air temperature exceeds the range of 0 to 40°C
- Location where condensation occurs due to abrupt temperature changes
- Location where relative humidity exceeds 85%RH
- Location exposed to corrosive gases or combustible gases
- Location exposed to significant amount of dust, salt or iron powder
- Location subject to direct vibration or impact
- Location exposed to direct sunlight
- Location where the product may come in contact with water, oil or chemical droplets
- Environment that blocks the air vent [Refer to Installation and Noise Elimination]

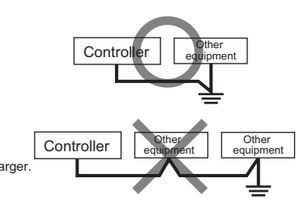
When using the product in any of the locations specified below, provide a sufficient shield.
- Location subject to electrostatic noise
- Location where high electrical or magnetic field is present
- Location with the mains or power lines passing nearby

2. Storage and Preservation Environment
- Storage and preservation environment follows the installation environment. Especially in a long-term storage, consider to avoid condensation of surrounding air.
Unless specially specified, moisture absorbency protection is not included in the package when the machine is delivered. In the case that the machine is to be preserved in an environment where dew condensation is anticipated, take the condensation preventive measures from outside of the entire package, or directly after opening the package.

Installation and Noise Elimination

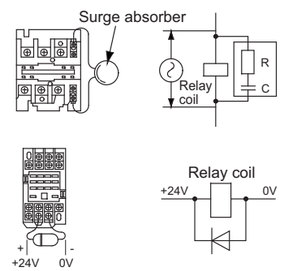
1. Noise Elimination Grounding (Frame Ground)



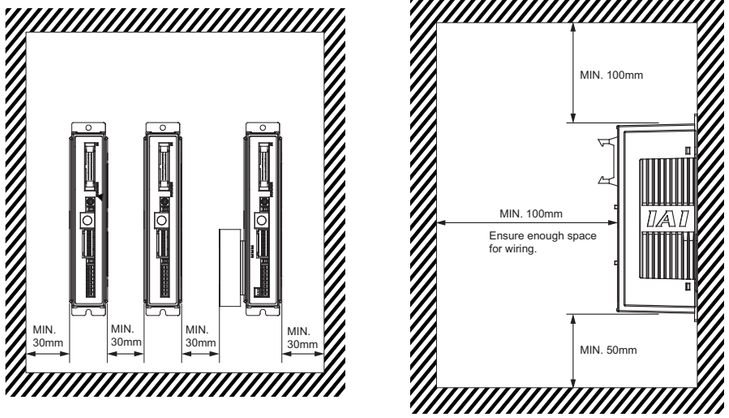


2. Precautions regarding wiring method
1) Wire is to be twisted for the 24V DC power supply.
2) Separate the signal and encoder lines from the power supply and power lines.

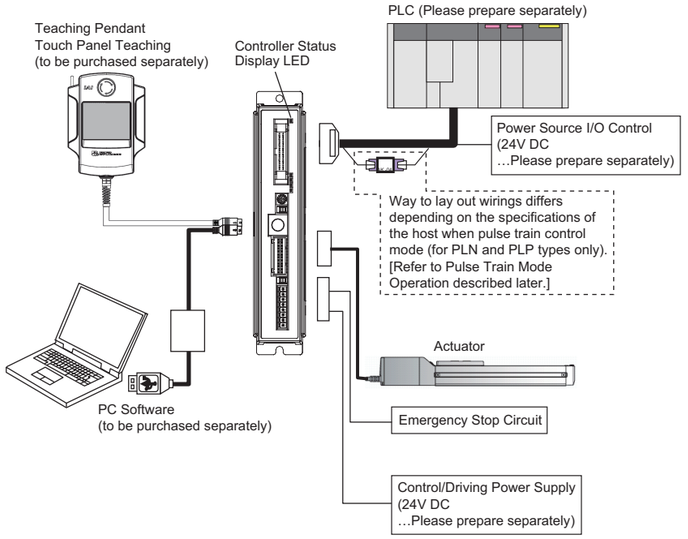
3. Noise Sources and Elimination
Carry out noise elimination measures for power devices on the same power path and in the same equipment.
The following are examples of measures to eliminate noise sources.
1) AC solenoid valves, magnet switches and relays
[Measure] Install a Surge absorber parallel with the coil.
2) DC solenoid valves, magnet switches and relays
[Measure] Install a diode parallel with the coil. Use a DC relay with a built-in diode.



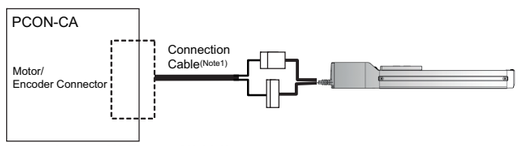
4. Heat Radiation and Installation
Design and Build the system considering the size of the controller box, location of the controller and cooling factors to keep the ambient temperature around the controller below 40°C



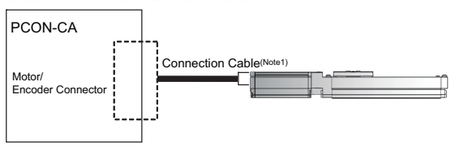
Connection Diagram



- Connection to RCP2 Series



- Connection to RCP3 and RCP4 Series

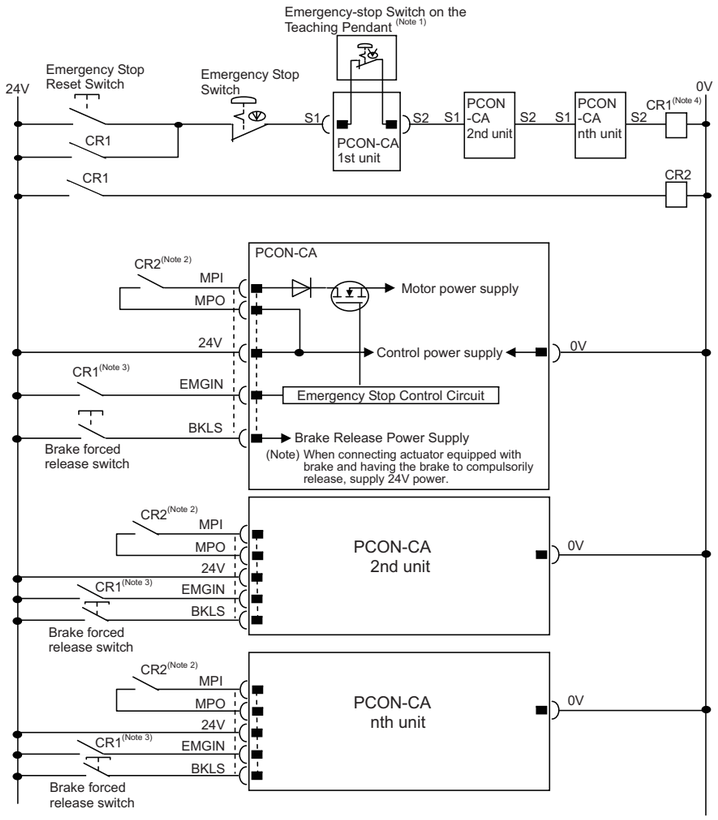


Note 1 Applicable Connection Cable Model Codes □□□ : Cable Length Example) 030 = 3m

Model Name	Cable	Reference
RCP2	CB-PSEP-MPA□□□	Robot cable from 0.5 to 20m
RCP3	CB-APSEP-MPA□□□	Robot cable from 0.5 to 20m
RCP3	CB-APSEP-MPA□□□-LC	Standard cable from 0.5 to 20m
RCP4	CB-CA-MPA□□□-RB	Robot cable from 0.5 to 20m
RCP4	CB-CA-MPA□□□	Standard cable from 0.5 to 20m

Power Supply and Emergency Stop Circuit

This shows the circuit example when the emergency stop switch in the teaching pendant is enabled on the emergency stop circuit to be built up by the client.



Note 1 When the teaching pendant is not connected, S1 and S2 become short-circuited inside the controller.
Note 2 When the motor driving source is cut off externally for a compliance with the safety category, connect a contact such as a contactor to the wires between MPI and MPO.
Note 3 The rating for the emergency stop signal to turn ON/OFF at contact CR1 is 24V DC and 10mA.
Note 4 For CR1, select the one with coil current 0.1A or less.
Note 5 When rebooting after shutting down, leave for 1sec or more.

I/O Signal

Explanation of I/O Signal Functions

Category	Abbreviated Code	Signal Name	Contents of Functions
Input	CSTR	PTP Strobe (Start Signal)	Starts moving toward the position set in Command Position No.
	PC1 to PC256	Command Position No.	To input position No. desired to move (binary input).
	BKRL	Brake Compulsory Release	To release the brake compulsorily.
	RMOD	Operation Mode Changeover	Operation Mode can be changed over when MODE Switch on the controller is on AUTO. (The setting is AUTO when signal is OFF, and MANU when ON.)
	*STP	Pause	When this signal is turned OFF while in move, the actuator decelerates and then stops. The remaining movement is in a hold while the actuator is stopped and will resume when the signal turns back ON.
	RES	Reset	Turn the signal ON to reset the alarm. Also, when it is turned ON in the pause mode (*STP is turned OFF), the remaining movement amount can be cancelled.
	SON	Servo ON	The servo remains ON while this signal is ON, or OFF while this signal is OFF.
	HOME	Home Return	The controller will perform home return operation when this signal is turned ON.
	MODE	Teaching Mode	The operating mode will change to the teaching mode when this signal is turned ON. The mode will not be switched over unless CSTR, JOG+ and JOG– are all OFF and the actuator operation is stopped.
	JISL	Jog/Inching Changeover	Jog Operation can be performed with JOG+ and JOG– while this signal is OFF. Inching Operation is performed with JOG+ and JOG– when it is ON.
	JOG+ JOG–	Jog	Jog Operation is performed to positive direction by detecting ON edge of JOG+ signal and to negative direction by JOG– signal while JISL signal is OFF. The actuator will decelerate and stop if OFF edge is detected while in each Jog Operation. Inching Operation is performed while JISL signal is ON.
	PWRT	Current Position Writing	Write the current position to the indicated position if indicating the written position and turn this signal ON for more than 26ms during the Teaching Mode.
	ST0 to ST6	Start Signal	The actuator moves to the commanded position with this signal ON during the electromagnetic valve mode.
	CSTP	Compulsory Stop	Turning it continuously input for more than 16ms compulsorily stops the actuator.
	TL	Torque Limit Select	Puts torque limitation to the motor with the signal on and the value set to the parameter.
	DCLR	Deviation Counter Clear	This is the signal to clear up the differential counter.
Output	PEND/INP	Position Completion	Turns ON in the positioning band range after actuator operation. The INP signal will turn OFF if the position deviation exceeds the in-position range. PEND and INP can be switched over by the parameter.
	PM1 to PM256	Completion Position No.	The position No. reached after the positioning completion, is output (binary output).
	HEND	Home Return Completion	Turns ON when home-return operation is complete. It will be kept ON unless the home position is lost.
	ZONE1 ZONE2	Zone	Turns ON if the current actuator position is within the range set to the parameter.
	PZONE	Position Zone	Turns ON when the current actuator position gets into the range set to the position data during the move towards the position. Even though it can be used together with ZONE1, PZONE will become only available for operation by the set position number.
	RMDS	Operation Mode Output	Outputs the operation mode status. It turns ON when the controller is ON Manual Mode.
	*ALM	Alarm	Turns ON when controller in normal condition, and OFF when alarm is generated.
	ALM1 to 8	Alarm Code	The detail of the alarm is output with binary code when an alarm more than the operation cancel level is issued.
	MOVE	While in Operation	Turns ON while the actuator is moving (including home return and pressing operations).
	SV	Servo ON	Turns ON when the servo is ON.
	*EMGS	Emergency Stop Output	Turns ON when the controller emergency stop is cancelled, and OFF during the emergency stop (regardless of alarms).
	MODES	Teaching Mode Output	Turns ON when it turns to the Teaching Mode by MODE signal input. It is OFF in the normal mode.
	WEND	Writing Complete	It is OFF during the teaching mode and turns ON when the writing by PWRT Signal is complete. It turns OFF when PWRT Signal turns OFF.
	PE0 to PE6	Current Position Number	Turns ON when moving to the target position is complete in Electromagnetic Valve Mode.
	LS0 to LS2	Limit Switch Output	Turns ON when the current actuator position is within the range of positioning band (±) of the target position. It is output even before the movement command and the servo is OFF if the home-return operation is completed.
	CEND	Loadcell Calibration Complete	Turns ON after loadcell calibration is complete. This signal turns OFF if CLBR signal is turned OFF.
	*ALML	Light Error Output	Outputs when a message level alarm is generated. (Parameter setting necessary)
	LOAD(Note1)	Load Output Judgment Signal	Outputs when current exceeds the value set to “threshold” within range of position data “ZONE+” or “ZONE–” during the pressing operation. Utilize this signal for a judgment of a press-fitting process being properly performed, etc.
	TRQS(Note1)	Torque Level Output	Outputs when current of motor reaches the value set to “threshold” by the slider (or rod) being hit to an obstacle during the pressing movement.
	TLR	Torque Limit Restricted	Turns ON when torque reaches the limit while in torque restriction.

Signal with “*” expresses the signal of active low. It is ON when the power is applied to the controller, and turns OFF when the signal is output.
(Note 1) It is a signal dedicated for High-Thrust Actuator (This controller is not applicable.). Use this as a reference output for other actuators.

Signal Assignment for Each Mode

The signal assignment of I/O flat cable by the PIO pattern is as shown below. Follow the following table to connect the external equipment (such as PLC).

Pin No.	Category	PIO Functions	Selection in Parameter No. 25 (PIO Pattern) 0 Positioning mode	1 Teaching mode	2 256-point mode	3 512-point mode	4 Electro-magnetic valve mode 1	5 Electro-magnetic valve mode 2	6 Pulse train control mode
	Input	Number of Positioning Points	64 points	64 points	256 points	512 points	7 points	3 points	–
	Input	Home Return Signal	○	○	○	○	○	×	○
	Input	Jog Signal	×	○	×	×	×	×	×
	Input	Teaching Signal (Current Position Writing)	×	○	×	×	×	×	×
	Input	Brake Release	○	×	○	○	○	○	○
	Output	Signal during Operation	○	○	×	×	×	×	×
	Output	Zone Signal	○	△(Note1)	△(Note1)	×	○	○	○
	Output	Position Zone Signal	○	○	○	×	○	○	×
1A	24V		P24						
2A	24V		P24						
3A	–		–						PP
4A	–		–						/PP
5A	Input	IN0	PC1	PC1	PC1	PC1	ST0	ST0	SON
6A	Input	IN1	PC2	PC2	PC2	PC2	ST1	ST1 (JOG+)	RES
7A	Input	IN2	PC4	PC4	PC4	PC4	ST2	ST2(Note2)	HOME
8A	Input	IN3	PC8	PC8	PC8	PC8	ST3	–	TL
9A	Input	IN4	PC16	PC16	PC16	PC16	ST4	–	CSTP
10A	Input	IN5	PC32	PC32	PC32	PC32	ST5	–	DCLR
11A	Input	IN6	–	MODE	PC64	PC64	ST6	–	BKRL
12A	Input	IN7	–	JISL	PC128	P128	–	–	RMOD
13A	Input	IN8	–	JOG+	–	PC256	–	–	–
14A	Input	IN9	BKRL	JOG–	BKRL	BKRL	BKRL	BKRL	–
15A	Input	IN10	RMOD	RMOD	RMOD	RMOD	RMOD	RMOD	–
16A	Input	IN11	HOME	HOME	HOME	HOME	HOME	–	–
17A	Input	IN12	*STP	*STP	*STP	*STP	*STP	–	–
18A	Input	IN13	CSTR	CSTR/PWRT	CSTR	CSTR	–	–	–
19A	Input	IN14	RES	RES	RES	RES	RES	RES	–
20A	Input	IN15	SON	SON	SON	SON	SON	SON	–
1B	Output	OUT0	PM1 (ALM1)	PM1 (ALM1)	PM1 (ALM1)	PM1 (ALM1)	PE0	LS0	PWR
2B	Output	OUT1	PM2 (ALM2)	PM2 (ALM2)	PM2 (ALM2)	PM2 (ALM2)	PE1	LS1 (TRQS)	SV
3B	Output	OUT2	PM4 (ALM4)	PM4 (ALM4)	PM4 (ALM4)	PM4 (ALM4)	PE2	LS2(Note2)	INP
4B	Output	OUT3	PM8 (ALM8)	PM8 (ALM8)	PM8 (ALM8)	PM8 (ALM8)	PE3	–	HEND
5B	Output	OUT4	PM16	PM16	PM16	PM16	PE4	–	TLR
6B	Output	OUT5	PM32	PM32	PM32	PM32	PE5	–	*ALM
7B	Output	OUT6	MOVE	MOVE	PM64	PM64	PE6	–	*EMGS
8B	Output	OUT7	ZONE1	MODES	PM128	PM128	ZONE1	ZONE1	RMDS
9B	Output	OUT8	PZONE/ ZONE2	PZONE/ ZONE1	PZONE/ ZONE1	PM256	PZONE/ ZONE2	PZONE/ ZONE2	ALM1
10B	Output	OUT9	RMDS	RMDS	RMDS	RMDS	RMDS	RMDS	ALM2
11B	Output	OUT10	HEND	HEND	HEND	HEND	HEND	HEND	ALM4
12B	Output	OUT11	PEND	PEND/WEND	PEND	PEND	PEND	–	ALM8
13B	Output	OUT12	SV	SV	SV	SV	SV	SV	*ALML
14B	Output	OUT13	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	–
15B	Output	OUT14	*ALM	*ALM	*ALM	*ALM	*ALM	*ALM	ZONE1
16B	Output	OUT15	LOAD/TRQS *ALML	*ALML	LOAD/TRQS *ALML	LOAD/TRQS *ALML	LOAD/TRQS *ALML	*ALML	ZONE2
17B	–		–						NP
18B	–		–						/NP
19B	0V		N						
20B	0V		N						

(Note) "*" in codes above shows the signal of the active low.
PM1 to PM8 indicate the alarm binary code output signal when an alarm is generated. [Refer to the Instruction Manual for the details]

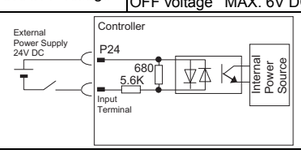
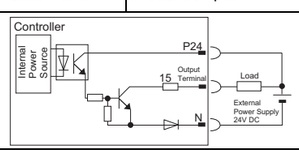
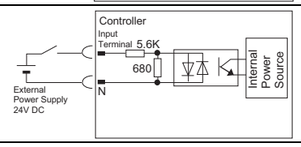
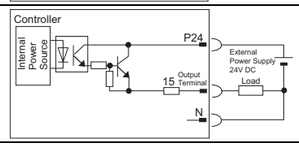
(Note 1) The setting can be changed over to PZONE if set in the parameter setting.

(Note 2) It is invalid before home-return operation.

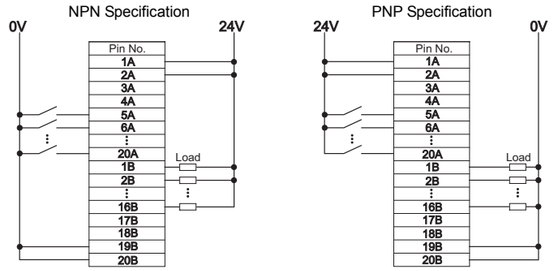
(Reference) Signal of Active Low

Signal with "*" expresses the signal of active low. A signal of active low is a signal that the input signal is processed when it is turned OFF, output signal is ordinary on while the power is ON, and turns OFF when the signal is output.

PIO Input and Output Interface

	Input section		Output section	
Specification	Input voltage	24V DC±10%	Load voltage	24V DC
	Input current	5mA 1 circuit	Peak load electric current	50mA/1 point
	ON/OFF voltage	ON voltage MIN. 18V DC OFF voltage MAX. 6V DC	Leak Current	MAX.2mA/1 point
NPN				
PNP				

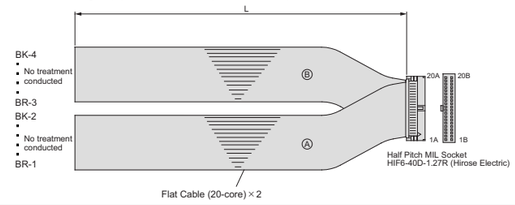
NPN Specification / PNP Specification



I/O Cable

Model : CB-PAC-PIO□□□

(Enter the cable length (L) in □□□ Example. 020 = 2m)



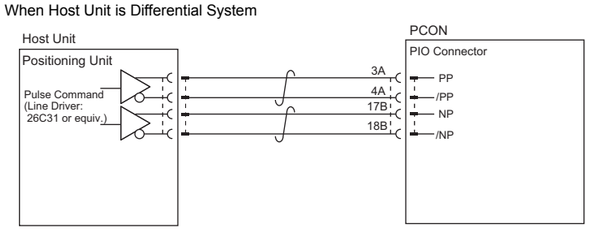
No.	Signal Name	Cable Color	Wiring	No.	Signal Name	Cable Color	Wiring
1A	24V	BR-1	Flat Cable Ⓐ (Insulation-Displacement Connectors) AWG28	1B	OUT0	BR-3	Flat Cable Ⓑ (Insulation-Displacement Connectors) AWG28
2A	24V	RD-1		2B	OUT1	RD-3	
3A	PP	OR-1		3B	OUT2	OR-3	
4A	/PP	YW-1		4B	OUT3	YW-3	
5A	IN0	GN-1		5B	OUT4	GN-3	
6A	IN1	BL-1		6B	OUT5	BL-3	
7A	IN2	PL-1		7B	OUT6	PL-3	
8A	IN3	GY-1		8B	OUT7	GY-3	
9A	IN4	WT-1		9B	OUT8	WT-3	
10A	IN5	BK-1		10B	OUT9	BK-3	
11A	IN6	BR-2		11B	OUT10	BR-4	
12A	IN7	RD-2		12B	OUT11	RD-4	
13A	IN8	OR-2		13B	OUT12	OR-4	
14A	IN9	YW-2		14B	OUT13	YW-4	
15A	IN10	GN-2		15B	OUT14	GN-4	
16A	IN11	BL-2		16B	OUT15	BL-4	
17A	IN12	PL-2		17B	NP	PL-4	
18A	IN13	GY-2		18B	/NP	GY-4	
19A	IN14	WT-2		19B	0V	WT-4	
20A	IN15	BK-2		20B	0V	BK-4	

Operation in Pulse Train Control Mode (function for PLN and PLP Types only)

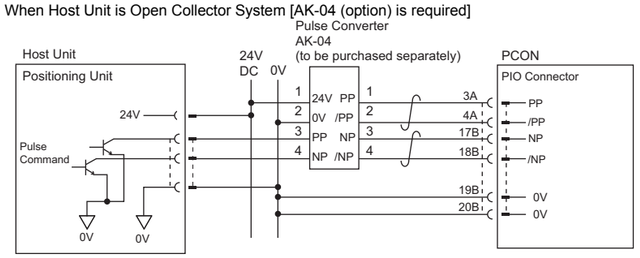
Pulse Train Input and Output Interface

Category	Abbreviated Code	Signal Name	Contents of Functions
Input	PP, /PP	Command Pulse Input	Inputs the command pulse train. Input pulse frequency differs depending on the type. [Refer to Basic Specifications]
	NP, /NP		

● When Host Unit is Differential System



● When Host Unit is Open Collector System [AK-04 (option) is required]



Note1 : Use the same power source (0V) for the host open collector output, AK-04.

Starting Procedures

When using this product for the first time, make sure to avoid mistakes and incorrect wiring by referring to the procedure below. "PC" stated in this section means "PC software".

Check of Packed Items
Are there all the delivered items?
No → Contact us or our distributor.
↓ Yes

Installation and Wiring
Perform the installation of and wiring for the actuator and controller.
→ Point Check Item
• Is frame ground (FG) connected?
• Has the noise countermeasure been taken?
← Yes

Power Supply and Alarm Check
Connect a teaching tool such as PC, turn the operation mode setting switch to "MANU" side and turn the power ON for unit.
Select [Teaching Mode 1 Safety Speed Activated / PIO Operation Invalid] in the teaching tool such as PC.
→ Check Item
Is the Controller Status Display LED turned OFF?
No → Connect the teaching tool such as PC to confirm the content of alarm and have an appropriate treatment.
↓ Yes
Have the settings and checks suitable for the used mode selected from "Positioner Mode" and "Pulse Train Control Mode" below.

[In the case of Positioner Mode]

PIO Pattern Settings
Set the used PIO pattern to Parameter No.25.

Safety Speed Setting
Set the Parameter No.35 if necessary.
The safety speed is set to 100mm/s at the delivery.

Servo ON
Turn the servo ON with the operation on the teaching tool such as PC.
→ Check Item
Is the Controller Status Display LED turned ON in green [SV]?
No → If an alarm is generated, connect the PC or teaching pendant and check the content of the alarm to have the right treatment.

⚠ Caution
Please perform this process with the actuator away from the mechanical end or interfering subjects as much as possible.
Put the actuator away if it interferes with surroundings. It may generate an alarm if the actuator hit the mechanical end or interfering subjects when the servo is turned ON.
The slider may get slightly dropped by self-weight if servo ON and OFF is repeatedly performed at the same position. Be careful not to pinch the hand or damage the work.
↓ Yes

Safety Circuit Check
Does the emergency stop circuit (drive cutoff circuit) work properly and turn the servo OFF?
No → Check the emergency stop circuit.
↓ Yes

Target Position Setting
Set the target position in "Position" Box in each position table.
Perform a home-return operation first when Direct Teaching is to be performed. When moving the actuator manually, set the Brake Release Switch to "BK RLS" side for the brake equipped type. Put the switch back after the setting is complete.

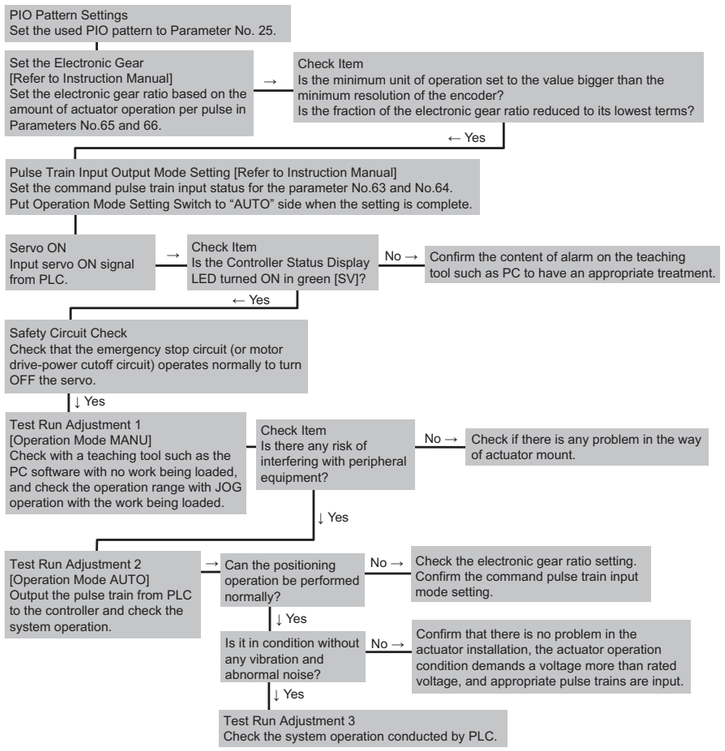
⚠ Warning Be careful not to pinch fingers or damage the work with the dropped actuator when releasing the brake in vertical orientation.

Test Run Adjustment 1
Check the operation without mounting a work and set the safety speed invalid on the teaching tool such as PC, and then check the operation with a work mounted.
→ Check Item
Any vibration or abnormal noise?
No → Check if there is any problem with the installation of the actuator and the condition of the actuator use exceeds the ranges of the rated values.
Adjust the servo if necessary.

⚠ Caution To ensure safety, it is recommended that safety speed be enabled during initial movements.
↓ Yes

Test Run Adjustment 2
1) Set the operation mode setting switch to "AUTO".
2) Output the operation command from PLC to the controller and check the system operation.

[In the case of Pulse Train Control Mode (for PLN and PLP types only)]



● Action to Take When Error Occurred

Shown below are the alarms that you may often see after power up. Have an appropriate treatment following the instructions below.

Please refer to the Instruction Manual for other alarms.

Error Code	Error Description	Cause and Treatment
069	Real Time Clock Operation Stop Detection	It indicates the calendar function has stopped and the current time data has lost. Have the clock settings again from the teaching tool.
0B8	Excitement Detection Error	The detection of excitation is conducted when the servo is turned ON for the first time after the power is supplied. The status is that the detection did not complete even after a certain time (set in Parameter No.29) was passed. 1) Connection error or wire breakage of motor/encoder cables 2) Brake is not released (when equipped with a brake). 3) Load to the motor is high due to external force. 4) Power was turned on while touching to the mechanical end. 5) The slide resistance of the actuator itself is large. Those described above can be considered.
0E5	Encoder Receive Error	This error code appears when the right signal was not received from the encoder side to the controller command. Check if any wire breakage on a connector and the condition of wire connections. If no error is generated under the condition that the power to all the peripheral equipment is shut and operate only this controller and the actuator, noise can be considered as the cause of the problem.
0E8	A- and B-Phases Breakage Error	It is the condition that the encoder signal is not properly detected. Check if any wire breakage on a connector and the condition of wire connections.
0EE	Absolute Encoder Error Detection 2	This error code appears when the absolute encoder PCB cannot detect the position information properly. The voltage for the absolute data battery is dropped. Check the battery alarm output on PIO, and if it is off, replace the battery. Perform Absolute Reset after the replacement. Check the encoder cable connection.
20A	Servo OFF While in Operation	It shows the operation command was generated in the condition that the servo is OFF. Resume the operation after turning the servo ON.

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