ACON-C/CG, PCON-C/CG/CF
First Step Guide Ninth 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

This product is comprised of the following parts if it is of standard configuration.
If you find any fault in the contained model or any missing parts, contact us or our distributor.

1. Parts

No.	Part Name	Model
1	Controller	Refer to “How to read the model plate” and “How to read the model of the controller.”
Accessories		
2	I/O cable for positioner	CB-PAC-PIO*** (*** indicates the cable length.)
3	First Step Guide	
4	Instruction Manual (CD/DVD)	

2. Teaching Tool

The PC software or teaching pendant is necessary to perform setup operations such as position and parameter settings through teaching or other means.
Prepare any PC software or teaching pendant.

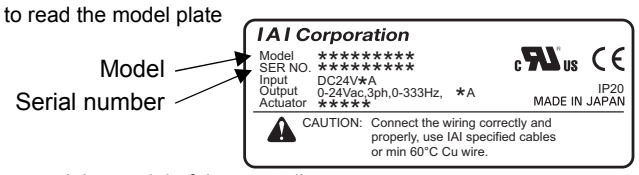
No.	Part Name	Model
1	PC software	RCM-101-MW
2	PC software	RCM-101-USB
3	Teaching pendant	CON-T
4	Teaching pendant	CON-TG
5	Teaching pendant	CON-PT
6	Teaching pendant (with deadman switch)	CON-PD
7	Teaching pendant (with deadman switch + TP adapter (RCB-LB-TG))	CON-PG
8	Teaching pendant	RCM-T
9	Teaching pendant (with deadman switch)	RCM-TD
10	Simple teaching pendant	RCM-E
11	Data setter	RCM-P

* The mounting-type touch panel display (RCM-PM-01), which enables data input/change and monitoring, has also been prepared. However, please note that only some parameters can be set by using it.

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

No.	Name		Manual No.
1	ACON-C/CG Controller Instruction Manual		ME0176
2	PCON-C/CG/CF Controller Instruction Manual		ME0170
3	PC Software	RCM-101-MW/RCM-101-USB	ME0155
4	Teaching Pendant	CON-T/TG	ME0178
5	Teaching Pendant	CON-PT/PD/PG	ME0227
6	Teaching Pendant	RCM-T/TD	ME0173
7	Simple Teaching Pendant	RCM-E	ME0174
8	Data Setter	RCM-P	ME0175
9	Touch Panel Display	RCM-PM-01	ME0182

*How to read the model plate



*How to read the model of the controller

[ACON-C/CG]

ACON-C-20IHA-NP-2-0-ABU

<Series name>
<Type name>
C: Positioner type with internal drive-power cutoff relay
CG: Positioner type with external drive-power cutoff relay
<Actuator characteristics>
[Motor wattage]
2 : 2W
5 : 5W
10 : 10W
20 : 20W
20S : 20W (for RCA-RA3 RCA2-SA4/TA5)
30 : 30W
[Encoder type]
I: Incremental
[Option]
No description : Standard Type
HA : High Accel/Decel Type
LA : Less Power consumption Type
<Input/Output signal pattern>
NP: NPN (Sink type)
PN: PNP (Source type)
DV: DeviceNet Wiring Specification
CC: CC-Link Wiring Specification
PR: PROFIBUS Wiring Specification
CN: CompoNet Wiring Specification
ML: MECHATROLINK Wiring Specification
<I/O flat cable length>
<Power-supply voltage>
0: 24VDC
For simple absolute unit connection

[PCON-C/CG/CF]

PCON-C-56PI-NP-2-0-ABU-H

<Series name>
<Model name>
C: Positioner type with internal drive-power cutoff relay
CG: Positioner type with external drive-power cutoff relay
CF: High-output positioner type with internal drive-power cutoff relay
<Actuator characteristics>
20P: 20, square
28P: 28, square
28SP: 28, square (RA3 type only)
35P:35, square
42P: 42, square
56P: 56, square
86P: 86, square
[Encoder type]
I: Incremental
<Input/Output signal pattern>
NP: NPN (Sink type)
PN: PNP (Source type)
DV: DeviceNet Wiring Specification
CC: CC-Link Wiring Specification
PR: PROFIBUS Wiring Specification
CN: CompoNet Wiring Specification
ML: MECHATROLINK Wiring Specification
<I/O flat cable length>
0: No cable
2: 2m
3: 3m
5: 5m
<Power-supply voltage>
0: 24VDC
For simple absolute unit connection
High Acceleration Transport Type

Basic Specifications

Characteristics

(1) This is a position controller which can set 64 positioning points as standard and 512 points at maximum. The position number depends on the PIO pattern which can be selected by the parameter.
(2) Zone output boundaries can be set for each position.
(3) Acceleration and deceleration can be set separately for each position.
(4) The feed speed to be used in trial run and adjustment can be limited to ensure safety.
(5) The power-saving mode can be selected by the parameter in situations where the actuator must stand by for a long time period.

ACON Specifications (Controller for RCA2/RCA/RCL Series)

Specification Item		ACON-C (Internal drive-power cutoff relay type)/ ACON-CG (External drive-power cutoff relay type)				
Number of control items		1 axis/unit				
Supply voltage		24VDC +10%/-10%				
Motor Power Capacity *1	Actuator	Motor Type	Standard specification/High acceleration/deceleration		Power-saving	
			Rated [A]	Peak [A] *2	Rated [A]	Peak [A] *2
	RCA/RCA2	10W	1.3	4.4	1.3	2.5
		20W [Model No. : 20]	1.3	4.4	1.3	2.5
		30W	1.3	4.0	1.3	2.2
		20W [Model No. : 20S] Dedicated to HA3, HA4 and TA5 Types	1.7	5.1	1.7	3.4
	RCL	2W	0.8	4.6		
		5W	1.0	6.4		
		10W	1.3	6.4		
Heating value		8.4W				
Encoder resolution	RCA	All types	800 Pulse/rev			
	RCA2	RCA2-□□□N	1048 Pulse/rev			
		Excluding RCA2-□□□N	800 Pulse/rev			
	RCL	RA1L · SA1L · SA4L · SM4L	715 Pulse/rev			
		RA2L · SA2L · SA5L · SM5L	855 Pulse/rev			
		RA3L · SA3L · SA6L · SM6L	1145 Pulse/rev			
Positioning command		Position number specification 64 points (standard), 512 points (maximum) * The position number varies depending on the selection of the PIO pattern.				
Backup memory		Position data and parameters are saved in nonvolatile memory. Serial EEPROM can be rewritten 100,000 times. (NOTE 1)				
PIO interface		24VDC, input/output				
LED indicators		SV (Green) – Servo ON, ALM (Red) – Alarm present				
Serial communication		RS485, 1 channel (conforming to the Modbus protocol)				
Forced release of electromagnetic brake		NOM/BK RLS switch (on the front panel)				
Cable length		Actuator cable: 20m or less				
		I/O flat cable: 10m or less				
Insulation strength		500VDC, 10MΩ				
Environment	Surrounding air temperature	0 to 40°C				
	Surrounding humidity	85%RH or less (non-condensing)				
	Surrounding environment	Refer to Installation Environment				
	Surrounding storage temperature	-10 to 65°C				
	Surrounding storage humidity	90%RH or less (non-condensing)				
	Vibration Durability	10 to 57Hz in XYZ directions/Pulsating amplitude 0.035mm (continuous), 0.075mm (intermittent) 57 to 150Hz/4.9m/s^2 (continuous), 9.8m/s^2 (intermittent)				
Protection class		IP20				
Cooling method		Natural air-cooling				
Weight		300g or less				
External dimensions		35W x 178.5H x 68.1D (mm)				

*1: The rush current, which is approx. 5 to 12 times the rated current, flows for approx. 1 to 2msec after power-on. Please note that the rush current value varies depending on the impedance of the power line.
*2: The current becomes maximum during the detection of the excitation phase of the servo motor performed in the initial servo ON processing after power-on. (Normal: Approx. 1 to 2sec, Maximum: 10sec)

As a +24V DC power supply, select the power supply of the “peak load support” specification or one with sufficient capacity. In particular, in the case of the unit with the remote sensing function, the greatest care is required.

⚠ NOTE 1: Position data and parameters are written to EEPROM. Please note that the rewrite limit is around 100,000 times.

PCON Specifications (Controller for RCA3/RCP2 Series)

Specification Item		PCON-C (Internal drive-power cutoff relay type)		PCON-CG (External drive-power cutoff relay type)		PCON-CF (Internal drive-power cutoff relay type)	
Number of controlled axes		1 axis/unit					
Supply voltage		24VDC ±10%					
Power-source capacity *1	Actuator	Rated	Peak *2	Rated	Peak *2	Rated	Peak *3
	20/28P motor	0.4A	2.0A	0.4A	2.0A		
	42/56P motor	1.2A		1.2A			
	86P motor					4.2A	6.0A
Heating value		9.6W		9.6W		26.4W	
Control method		Weak field-magnet vector control					
Encoder resolution		Incremental specification 800 P/rev					
Positioning command		Position number specification 64 points (standard), 512 points (maximum) *The position number varies depending on the selection of the PIO pattern.					
Backup memory		Position data and parameters are saved in nonvolatile memory. Serial EEPROM can be rewritten 100,000 times. (NOTE 1)					
PIO interface		24VDC, input/output					
LED indicators		SV (Green) – Servo ON, ALM (Red) – Alarm present					
Serial communication		RS485, 1 channel (conforming to the Modbus protocol)					
Forced release of electromagnetic brake		NOM/BK RLS switch (on the front panel)					
Cable length		Actuator cable: 20m or less					
		I/O flat cable: 10m or less					
Insulation strength		500VDC, 10MΩ					
Environment	Surrounding air temperature	0 to 40°C					
	Surrounding humidity	85%RH or less (non-condensing)					
	Surrounding environment	Refer to Installation Environment					
	Surrounding storage temperature	-10 to 65°C					
	Surrounding storage humidity	90%RH or less (non-condensing)					
	Vibration Durability	10 to 57Hz in XYZ directions/Pulsating amplitude 0.035mm (continuous), 0.075mm (intermittent) 57 to 150Hz/4.9m/s^2 (continuous), 9.8m/s^2 (intermittent)					
Protection class		IP20					
Cooling method		Natural air-cooling				Forced air-cooling	
Weight		300g or less		300g or less		320g or less	
External dimensions		35W x 178.5H x 68.1D (mm)					

*1: The rush current, which is approx. 5 to 12 times the rated current, flows for approx. 1 to 2msec after power-on. Please note that the rush current value varies depending on the impedance of the power line.

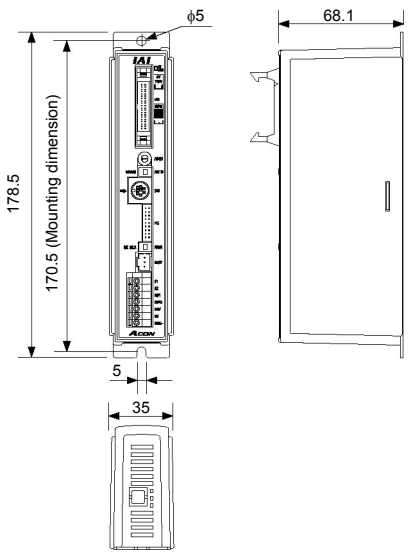
*2: Excitation phase detection is performed after power-on. In such a case, the current becomes maximum (normally 100msec).
However, a current of approx. 6.0A flows (for approx. 1 to 2msec) if the motor driving power is turned on again after its shutdown.

*3: Excitation phase detection is performed after power-on. In such a case, the current becomes maximum (normally 100msec).
However, a current of approx. 10.0A flows (for approx. 1 to 2msec) if the motor driving power is turned on again after its shutdown.

As a +24V DC power supply, select the power supply of the "peak load support" specification or one with sufficient capacity. In particular, in the case of the unit with the remote sensing function, the greatest care is required.

⚠ NOTE 1: Position data and parameters are written to EEPROM. Please note that the rewrite limit is around 100,000 times.

External Dimensions



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 Section]

When using the product in any of the locations specified below, provide a sufficient shield.

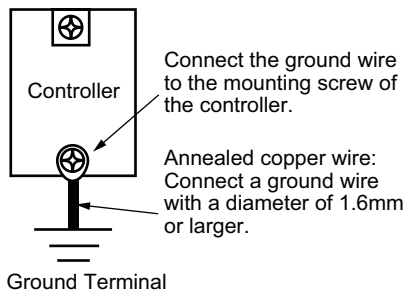
- Location subject to electrostatic noise
- Location where high electrical or magnetic field is present
- Location with the mains or power lines passing nearby

2. Storage and Preservation Environment

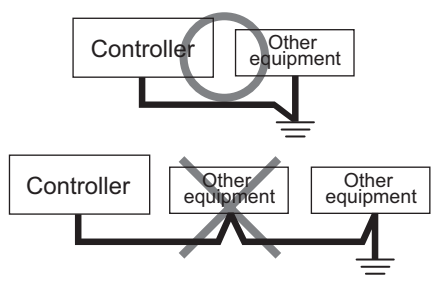
The storage and preservation environment should comply with the same standards as those for the installation environment. In particular, when the machine is to be stored for a long time, pay close attention to environmental conditions so that no condensation forms. Unless specially specified, moisture absorbency protection is not included in the package when the machine is delivered. In the case that the machine is to be stored and preserved in an environment where 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)



Class D grounding
(Formerly Class-III grounding:
Grounding resistance at 100Ω or less)



Do not share the ground wire with or connect to other equipment.
Ground each controller.

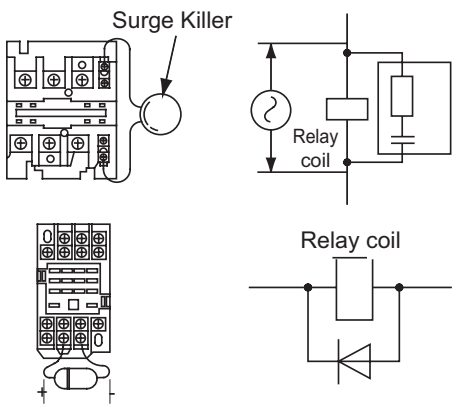
2. Precautions Regarding Wiring Method

(1) Use a twisted cable for connection to the 24V DC power supply.
(2) Separate signal lines and encoder cables from high-power lines such as the power wire.

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:

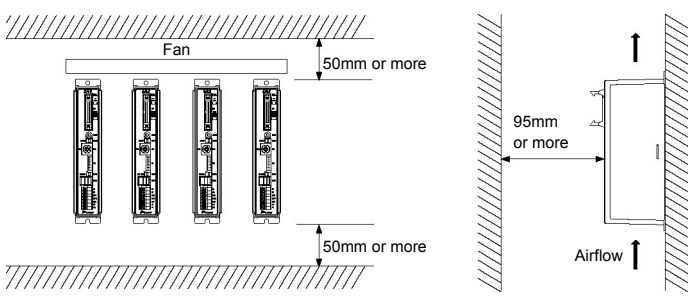
(1) AC solenoid valves, magnet switches and relays
[Measure]
Install a surge killer parallel with the coil.



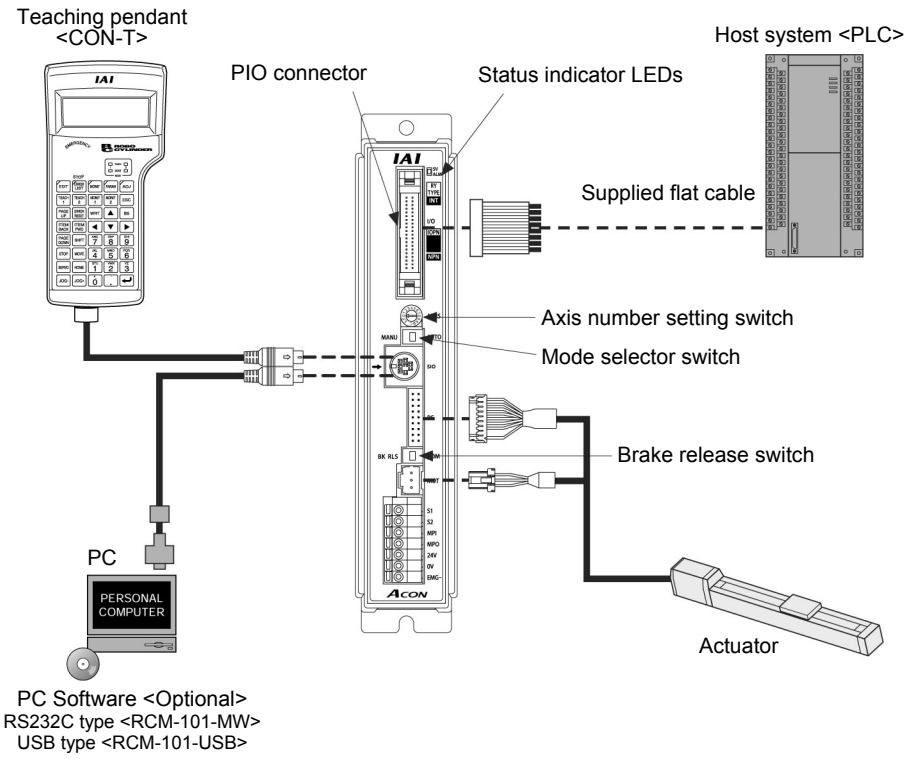
(2) DC solenoid valves, magnet switches and relays
[Measure]
Install a diode parallel with the coil. Use a DC relay with a built-in diode.

4. Heat Radiation and Installation

Conduct design and manufacture in consideration of the control box size, controller layout and cooling in such a way that the temperature around the controller will be 40°C or less.



Connection Diagram



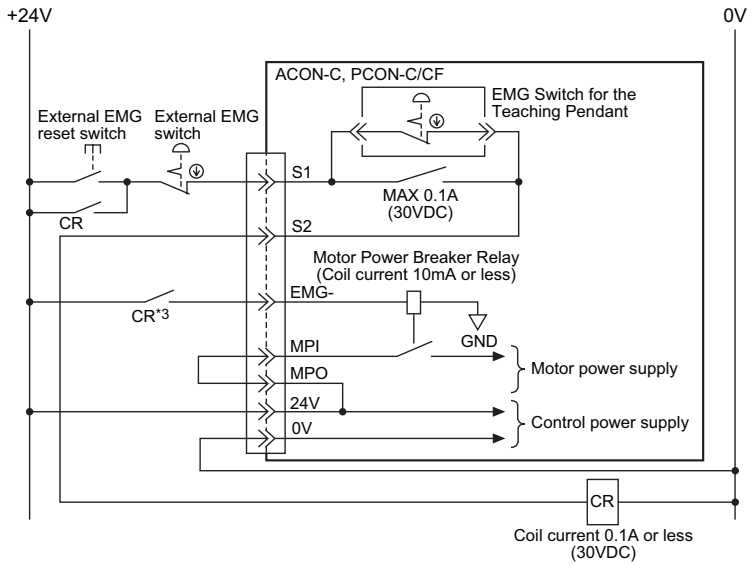
⚠ NOTE:
- A 24V DC power supply is required as the source for the controller and PIO.
- Turn off the power to the controller before inserting or removing the connector for connection between the teaching pendant and controller.
  Inserting or removing the connector while the power is turned ON causes a controller failure.

Power Supply and Emergency Stop Circuit

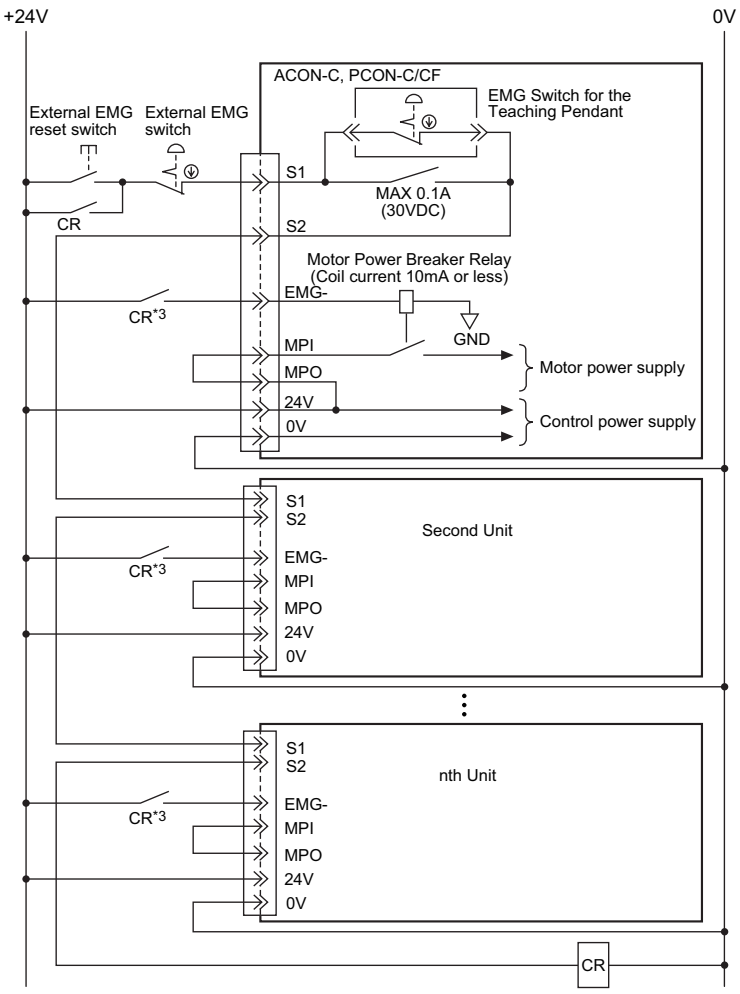
The following is a circuit example where the emergency stop switch on the teaching pendant is incorporated into the emergency stop circuit constructed by the customer:

● Internal drive-power cutoff relay type : ACON-C, PCON-C/CF

• In the case of the use of a single controller:



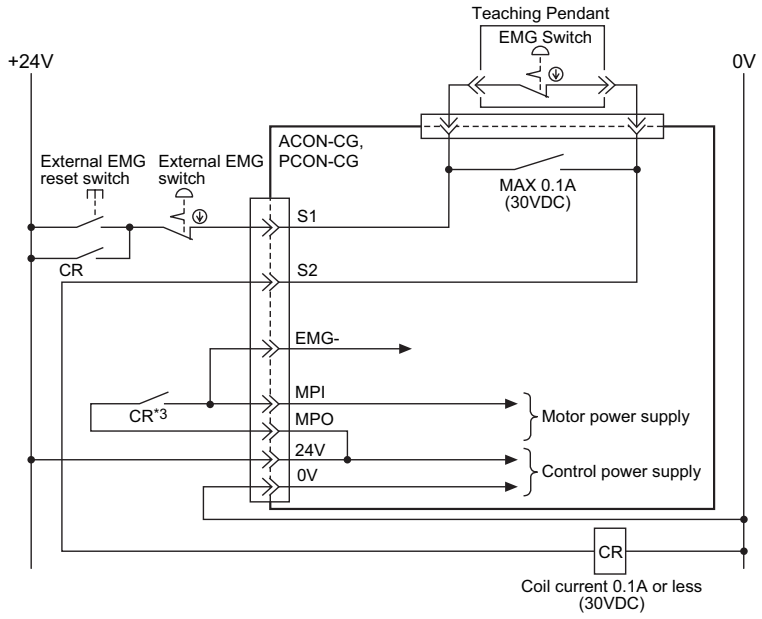
• In the case of the use of two or more controllers:



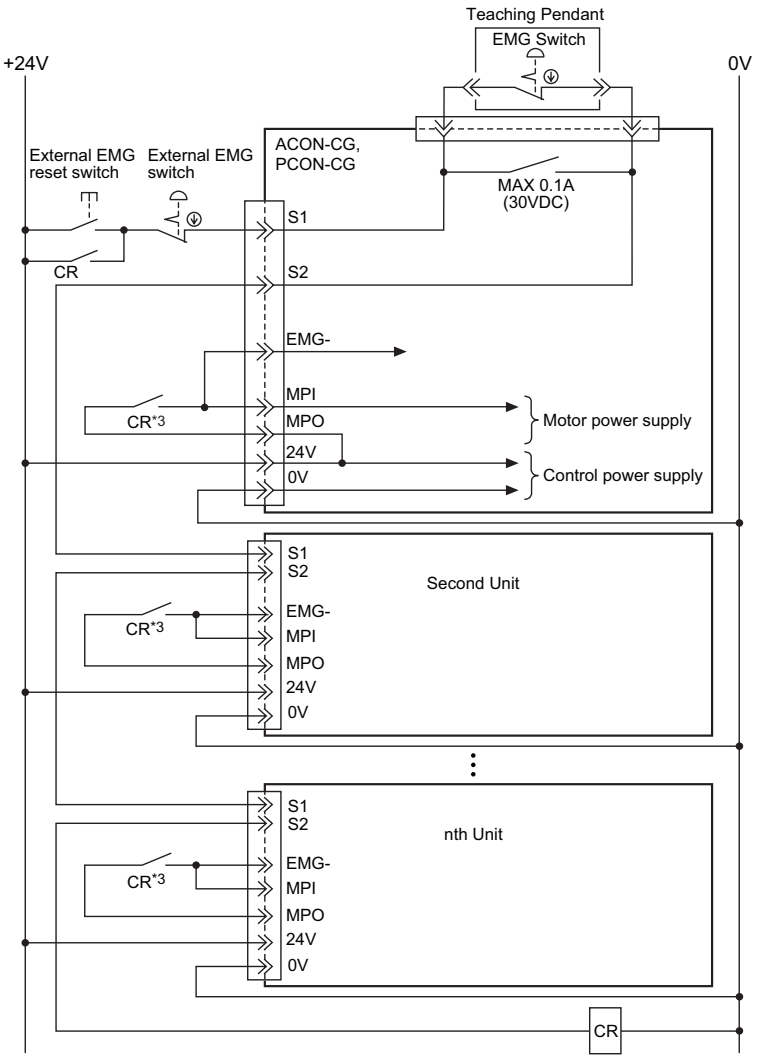
*1 To cut off the motor drive power supply in conformance with safety category 2, connect 24V to the EMG terminal and a contactor or other contact device to the MPI/MPO terminals.
*2 When the teaching pendant is connected to the controller, the controller automatically recognizes it.
*3 For the CR contact, the rated voltage and rated current are “24VDC” and “0.1A”.

● Driving Source Interruption Relay: External Type

• In the case of the use of a single controller:



• In the case of the use of two or more controllers:



*1 To cut off the motor drive power supply in conformance with safety category 2, connect 24V to the EMG terminal and a contactor or other contact device to the MPI/MPO terminals.
*2 When the teaching pendant is connected to the controller, the controller automatically recognizes it.
*3 For the CR contact, the rated voltage and rated current are “24VDC” and “0.1A”.

I/O Signals

Function description for I/O Signals

Category	Signal Abbreviation	Signal Name	Function Description
Input	CSTR	PTP strobe signal (start signal)	The actuator will start to move to the position set by the command position number.
	PC1 to PC256	Command position number signal	Input of the position number to move (binary input)
	BKRL	Forced brake release signal	The brake will forcibly be released.
	RMOD	Operating mode selector signal	The operating mode is selectable when the MODE switch of the controller is set to AUTO. (The operating mode of the controller will become AUTO when this signal is turned OFF, or MANU when this signal is turned ON.)
	*STP	Pause signal	When this signal turns OFF while the actuator is moving, the actuator will decelerate to stop. The remaining movement is retained and will resume when the signal is turned ON again.
	RES	Reset signal	An alarm will be reset when this signal is turned ON. The remaining movement can be canceled when the pause signal is OFF (STP is OFF).
	SON	Servo ON signal	The servo remains ON while this signal is ON, or OFF while this signal is OFF.
	HOME	Home return signal	The controller will perform home return operation when this signal is turned ON.
	MODE	Teaching mode signal	The operating mode will change to the teaching mode when this signal is turned ON. (At this time, the mode will not be selected unless all signals of CSTR, JOG+ and JOG- are OFF and the actuator operation has stopped.)
	JISL	Jog/inching selector signal	The actuator will jog with JOG+ or JOG- when this signal is OFF. It will inch with JOG+ or JOG- when this signal is ON.
	JOG +, JOG -	Jog signal	When the JISL signal is OFF, the actuator will jog toward the +/- direction upon detection of an OFF→ON rise edge of this signal. If an ON→OFF fall edge of this signal is detected while the actuator is jogging, the actuator will decelerate to a stop.
	PWRT	Teaching signal	When the write position is specified in the teaching mode and this signal has remained ON for 20msec or longer, the controller will write the current position in the specified position field.
	ST0 to ST6	Start position command	In the electromagnetic valve mode, the actuator will move to the specified position when this signal is ON. (The start signal is not required.)
Output	PEND/INP	Positioning completion signal	This signal will turn ON when the target position has been reached after movement and the actuator has entered the in-position range. The PEND signal will not turn OFF but the INP signal will turn OFF if the position deviation exceeds the in-position range. PEND or INP can be selected by the parameter.
	PM1 to PM256	Completed position number signal	The relevant position number will be output when positioning has been completed (binary output).
	HEND	Home return completion signal	This signal will turn ON when home return has been completed.
	ZONE1	Zone signal	This signal will turn ON when the current actuator position enters the range set by the parameters.
	PZONE	Position zone signal	This signal will turn ON when the current actuator position enters the range specified in the position data after position movement. The combined use with ZONE 1 is possible, but PZONE becomes effective only for movement to the set position.
	RMDS	Operating mode status signal	The operating mode status will be output.
	*ALM	Controller alarm status signal	This signal remains ON in normal conditions of use and turns OFF when an alarm is generated.
	MOVE	Moving signal	This signal will remain ON while the actuator is moving (including home return and push & hold times).
	SV	Servo ON status signal	This signal will remain ON while the servo is ON.
	*EMGS	Emergency stop status signal	This signal remains ON while the controller is under the emergency stop reset condition and turns OFF when the emergency stop condition is enabled.
	MODES	Mode status signal	This signal will turn ON when the teaching mode is enabled by the input of the mode signal and will turn OFF when the mode changes to the normal mode.
	WEND	Write completion signal	This signal will turn OFF after the controller has switched to the teaching mode. It will turn ON when writing in response to the PWRT signal has been completed. When the PWRT signal turns OFF, this signal will also turn OFF.
	PE0 to PE6	Current position number signal	In the electromagnetic valve mode, this signal will turn ON when the actuator completes moving to the target position.
	LS0 to LS2	Limit switch output signal	This signal will turn ON when the current actuator position enters the positioning band of the target position. It will be output even before the movement command if home return has been completed.
	LOAD	Load output judgment status	This signal will be output when the load exceeds the current value set as the “threshold” within the range of zone+ and zone- in the position data during push & hold operation. It is used to judge whether pressing has been performed normally.
	TRQS	Torque level status signal	This signal will be output when the slider (rod) collides against an obstacle during push & hold operation and the motor current value reaches the value set as the “threshold” in the position data.

I/O Signals

Pin No.	Category		Parameter (PIO) Pattern Selection					
			0	1	2	3	4	5
			Positioning mode	Teaching mode	256-point mode	512-point mode	Electromagnetic valve mode 1	Electromagnetic valve mode 2
		Number of positioning points	64 points	64 points	256 points	512 points	7 points	3 points
		Zone signal	○	*	*	*	○	○
		Position zone signal	○	○	○	*	○	○
1A	24V		P24					
2A	24V		P24					
3A	—		MC					
4A	—		MC					
5A	Input	IN0	PC1	PC1	PC1	PC1	ST0	ST0
6A		IN1	PC2	PC2	PC2	PC2	ST1	ST1 (JOG+)
7A		IN2	PC4	PC4	PC4	PC4	ST2	ST2
8A		IN3	PC8	PC8	PC8	PC8	ST3	—
9A		IN4	PC16	PC16	PC16	PC16	ST4	—
10A		IN5	PC32	PC32	PC32	PC32	ST5	—
11A		IN6	—	MODE	PC64	PC64	ST6	—
12A		IN7	—	JISL	PC128	PC128	—	—
13A		IN8	—	JOG+	—	PC256	—	—
14A		IN9	BKRL	JOG-	BKRL	BKRL	BKRL	BKRL
15A		IN10	RMOD	RMOD	RMOD	RMOD	RMOD	RMOD
16A		IN11	HOME	HOME	HOME	HOME	HOME	—
17A		IN12	*STP	*STP	*STP	*STP	*STP	
18A		IN13	CSTR	CSTR/PWRT	CSTR	CSTR		
19A		IN14	RES	RES	RES	RES	RES	RES
20A		IN15	SON	SON	SON	SON	SON	SON
1B	Output	OUT0	PM1	PM1	PM1	PM1	PE0	LS0
2B		OUT1	PM2	PM2	PM2	PM2	PE1	LS1 (TRQS)
3B		OUT2	PM4	PM4	PM4	PM4	PE2	LS2 (-)
4B		OUT3	PM8	PM8	PM8	PM8	PE3	—
5B		OUT4	PM16	PM16	PM16	PM16	PE4	—
6B		OUT5	PM32	PM32	PM32	PM32	PE5	—
7B		OUT6	MOVE	MOVE	PM64	PM64	PE6	—
8B		OUT7	ZONE1	MODES	PM128	PM128	ZONE1	ZONE1
9B		OUT8	PZONE	PZONE	PZONE	PM256	PZONE	PZONE
10B		OUT9	RMDS	RMDS	RMDS	RMDS	RMDS	RMDS
11B		OUT10	HEND	HEND	HEND	HEND	HEND	HEND
12B		OUT11	PEND	PEND/WEND	PEND	PEND	PEND	—
13B		OUT12	SV	SV	SV	SV	SV	SV
14B		OUT13	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS
15B		OUT14	*ALM	*ALM	*ALM	*ALM	*ALM	*ALM
16B		OUT15	LOAD/TRQS *1	—	LOAD/TRQS *1	LOAD/TRQS *1	LOAD/TRQS *1	—
17B	—		NC					
18B	—		NC					
19B	0V		N					
20B	0V		N					

(NOTE) The terms inside parentheses indicate functions before home return.

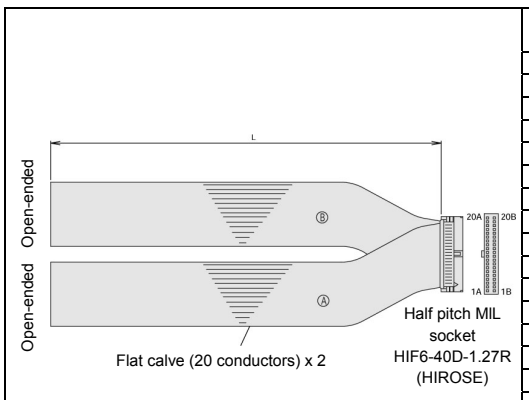
*1: Signal for PCON-CF only

I/O Flat Cable

Model: CB-PAC-PIO□□□

* Enter the cable length (L) in Example) 080 = 8m (up to 10m)

HIF6-40D-1.27R



No.	Signal Name	Cable Color	Wiring	No.	Signal Name	Cable Color	Wiring
1A	24W	BR-1	Flat cable (A) (Press welding)	1B	OUT0	BR-3	Flat cable (B) (Press welding) AWG28
2A	24W	RD-1		2B	OUT1	RD-3	
3A	—	OR-1		3B	OUT2	OR-3	
4A	—	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	—	PL-4	
18A	IN13	GY-2		18B	—	GY-4	
19A	IN14	WT-2		19B	0V	WT-4	
20A	IN15	BK-2		20B	0V	BK-4	

BR: Brown, RD: Red, OR: Orange, YW: Yellow, GN: Green, BL: Blue, PL: Purple, GY: Gray, WT: White, BK: Black

Starting Procedures

When using this product for the first time, pursue work while making sure to avoid omission and incorrect wiring by referring to the procedure below.

1. **Check of Packed Items**
   Check packed items with the packing list. Should there be any incorrect model or insufficient item, contact your dealer.
2. **Installation**
   Install the controller and actuator.
3. **Wiring**
   Connect the 24V DC power supply, earth cable, emergency stop circuit, motor drive power supply, motor cable, encoder cable and I/O flat cable.
4. **Power Supply and Alarm Check**
   (1) Connect the PC or teaching pendant and set the mode selector switch to the MANU side.
   (2) After confirming that the emergency stop circuit is not activated, supply the input power.
   - When the controller functions properly:
     The monitor LED [SV/ALM] illuminates for 2 seconds and then goes out.
   - When an alarm generates:
     The monitor LED [SV/ALM] illuminates in red.
     After checking the contents of the alarm using the PC or teaching pendant, remove the cause.

5. Setting of PIP Pattern/Safety Speed

(1) Select [Teaching mode 1: Enable safety speed/Inhibit PIOs] in the MANU operation mode of the PC or teaching pendant.

(2) Set the PIO pattern.
Parameter No. 25, PIO pattern selection: 0 to 5

(3) Set the safety speed as needed.
Parameter No. 35
(NOTE) The default value of the safety speed is 100mm/sec or less.

6. Servo ON

(1) In the case of the PCON controller, confirm that the slider or rod is not contacting the mechanical end.
If the slider or rod is contacting the mechanical end, move it away in the opposite direction.
(NOTE) If the actuator is equipped with a brake, set the brake release switch to the “BK RLS” side before moving the slider/rod. At this time, exercise caution not to allow work to drop suddenly due to its own weight. Your hand may be caught by the dropped work or the robot hand or work itself may be damaged.

(2) Turn on the servo from the PC or teaching pendant.
If the actuator achieves servo lock and monitor LED “SV/ALM” illuminates in green, the controller is functioning properly.

7. Check of Safety Circuit

Check that the emergency stop circuit (or motor drive-power cutoff circuit) operates normally to turn off the servo.

8. Target Position Setting

Set a target position in the “Position” field for each position in the position table.
When carrying out direct teaching, perform home return operation first.
Determine the target positions while fine adjusting the transferred work and robot hand.

(NOTE) To ensure safety, it is recommended that safety speed be enabled during initial movements.

9. Trial Run Adjustment

(1) Disable the safety speed with the PC software or teaching pendant and perform operation check for each position.

(2) Set the mode selector switch to the “AUTO” side.

(3) Output a movement command from the PLC to the controller to perform system operation check.

(4) If vibration or abnormal sound occurs during a trial run, check that actuator installation has no problems and actuator use conditions have not exceeded the rating.

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