				5. How to read the model of the controller				Rasic Specifications	
			PROFINET-IO	PCON     BCON CA FEB WALEB	2 0 A D II D N **	DOONLI'L (O	· · · ·		
	Quality and Innovation	EtherNet/IP		FCON-CA-56F WAI-EF	- <u>Z-V-ABO-DN-</u>	PCON List of Sp	ecifications	Desc	cription
				<series></series>	* There is no identification in some cases.		Item	PCON-CA/CB/CGB/CBP/CGBP	PCON-CFA/CFB/CGFB
	PCON-CA	CFA/CB/CFB/CBP		<type></type>	Type of Installation>	Number of controlle	ed axes	1-axis	
				CFA/CFB : High-Thrust Actuator	(Not Specified) : Screw Attachment Type DN DIN Rail Mounting Type	Load RCP	age 2 Motor 20P. 28P. 28S	P MAX. 1A	
		CB/CGB DCON-CA		CGB : Safety Categories Complied Type		Capacity RCP	3 Type 42P, 56P	MAX. 2A	
影망립				CGFB : High-Thrust Actuator Connection Safety Categories	AB : Simple Absolute Type	control side	86P	Link thrust function	Rated 4.2A / MAX. 6A
o XX	First Sta	n Guida Savanth F	dition	Complied Type	(With the Absolute Battery)	current RCP consumption) RCP	5 Type 56P	is disabled MAX.2.0A	
				CBP : Pulse Pressing Connection Applicable Type	(With the Absolute Type	(Note1) RCP	6	High-thrust function Rated 3.5A /	
				CGBP : Pulse Pressing Connection	(SEP-ABU)) ABUN : Simple Absolute Type		60P. 86P	Is enabled MAX. 4.2A	Rated 4.2A / MAX. 6A
	Make sure to read the Safety Guide	duct. e and detailed Instruction Manual as well as this First Step Gu	ide to ensure correct use.		(With no Absolute Battery)	Power Supply for E	Electromagnetic Brake	24V DC +10% 0 15A (MAX )	
	This Instruction Manual is original.			<detail axis="" connected="" of=""></detail>	Power-supply Voltage>	(for actuator equip)	PCP2 RCP3	5W	26.4W
	Warning : Read the instruction	n manual carefully and follow the instruction manual when ha	Indling this equipment.	20P : 20□ pulse motor, 20SP : 20□ pulse motor,	0 : 24V DC	Theat Generation	RCP4 to RCP6	3W	20.400
	Please downloade You can download	ed the user's manual from our website. d it free of change. User registration is required for first time	users.	35P : 35⊡ pulse motor	<i cable="" length="" o=""></i>	Rush Current (Note2	)	8.3A	10A
	URL:www Keep a printout of	w.iai-robot.co.jp/data_dl/CAD_MANUAL/	roduct is installed so that	42P : 42□ pulse motor, 42SP : 42□ pulse motor	2 : 2m (Standard)	Iransient Power C	utoff Durability	MAX. 500µs	
	it can be checked	at all times, or display it on your computer, tablet terminal,	etc. so that you can	60P : 60□ pulse motor, 86P : 86□ pulse motor	3 : 3m 5 : 5m	Corresponding	RCP2 to RCP5	Incremental Encoder, Battery-less Abso	olute Encoder Resolution 800pulse/rev
	If you need a bour	ery. nd copy of the instruction manual, order it from the nearest	sales office listed in the	[Encoder Type]	0.0	Encoder	RCP6	Battery-less Absolute Encoder Resolu	ution 8192pulse/rev
	First Step Guide o	or at the end of the instruction manual. It will be provided for	r a fee.	WAI: Incremental / Battery-less Absolute Shared		Actuator Cable Ler	ngth	MAX. 20m	
	Using or copying all or part of thi	is Instruction Manual without permission is prohibited.		SA : Simple Absolute		Serial Communicat	tion Interface	RS485 : 1 CH (based on Modbus Proto	col RTU/ASCII)
	<ul> <li>The company names, names of trademarks.</li> </ul>	products and trademarks of each company shown in the se	entences are registered	*PCON-CBP/CGBP is not applicable for <i o="" type=""> — the simple absolute type. NP : NPN Typ</i>	e (Sync, Type) (Standard).	(0.0100)		Control available with serial communication	ation in the modes other than the pulse
	EtherCAT® is a registered mark o	of Beckoff Automation GmbH.		PN : PNP Typ	e (Source Type),	External Interface	PIO Type	train Signal I/O dedicated for 24V DC (selec	ted from NPN/PNP) Input 16 points
I.	<ul> <li>EtherNet/IP is a trademark used up</li> </ul>	under the license of ODVA.		PLN : Puise Tra PLP : Puise Tra	ain Control NPN Type (Sync. Type PCON-CBP/CGBP Except) ain Control PNP Type (Source Type PCON-CBP/CGBP Except)			max., output 16 points max.	
		Dreadwat Chaole			et Connection Type, CC : CC-Link Connection Type,		Fieldbus Type	DeviceNet CC-Link PROFIBUS-DP C	CompoNet_MECHATROLINK-I/I
		Product Check		ML : MECHAT	ROLINK- I / II Connection Type, EC : EtherCAT Connection Type,			EtherCAT, EtherNet/IP, PROFINET-IO,	MECHATROLINK-II
T	he standard configuration of this	s product is comprised of the following parts.		EP : EtherNet ML3 : MECHA	/IP Connection Type, PRT : PROFINE I-IO Connection Type FROLINK-III Connection Type (Except for PCON-CA/CFA/CBP/CGBP)	Loadcell Interface		(Except for PCON-CA/CFA/CBP/CGBF	r)
1	you find any fault with the prod	luct you have received, or any missing parts, conta	ict us or our distributor.			(dedicated for PCC	N-CBP/CGBP)	K3465 Communication	
	No. Part Name	Model	Reference	● ACON		Data Setting and In	nput	PC Software, Touch Panel Teaching, Te	eaching Pendant
	1 Controller Main Body	Refer to "How to read the model plate", "How to read the model of the controller"		<u>ACON-CA-30 1-EC-2</u>	- <u>0</u> - <u>AB</u> - <u>DN</u> - <u>**</u>	Data Retention Me	inory	(There is no limitation to the number of	times data may be written.)
/	Accessories			<series></series>	Identification for IAI use only> * There is no identification in some cases.	Operation Mode		Positioner Mode/Pulse Train Control M	ode (selected by parameter setting)
	2 I/O Flat Cable	CB-PAC-PIO	□□shows the cable length	<type></type>		Number of Position	is in Positioner Mode	Standard 64 points, MAX. 512 points (I (Note) Number of positions differs dep	PIO Type) ending on the selection in PIO pattern.
	3 Power Connector	FMC1.5/8-ST-3.5 (Supplier : PHOENIX CONTACT)	ecommended cable size VG16 to 20 (1.25 to 0.5mm <sup>2</sup> )	CAVCB : Standard Type CGB : Safety Categories Complied Type	(Not Specified) : Screw Attachment Type	Pulse Train Input	t Pulse Frequency	Differential System (Line Driver System	1) : MAX. 200kpps
	4 Dummy plug	DP-5 Fo	or the safety category	< Detail of Connected Avic>	DN : DIN Rail Mounting Type	Interface		Cable length MAX. 10m Open Collector System : Not applicable	e.
-	5 Absolute Battery (Ontion)	AR 7 or SEP ARUX	mpliant type	[Motor Type]	Applicable to Simplified Absolute Unit>			* If the host applies the open collector of	output, prepare AK-04 (option) separately
-	6 Sorial Absolute Battery (Option)		applicable for Serial Absolute	2 : 2W AC servo motor 5 : 5W AC servo motor	(With the Absolute Type	Com	mand Pulse Multiplying	to convert to the differential type. 1/50 < A/B < 50/1	
-	7 Eirot Stop Cuido	Ту МЕО204	pe (for ACON only)	10 : 10W AC servo motor	ABU : Simple Absolute Type (With the Absolute Battery Unit	Facto	or	Setting Range of A and B (set to param	leter) : 1 to 4096
F	8 Safety Guide	ME0304 M0194		20 : 20W AC servo motor	(SEP-ABU))	Feed	Iback Pulse Output	None	
2	. Teaching Tool (to be purchase	ed separately)		30 : 30W AC servo motor	ABUN : Simple Absolute Type (With no Absolute Battery)	LED Display		SV (GN)/ALM (RD) : Servo ON/Alarn	n generated
	A teaching tool, such as PC S such as editing position data	offware, is necessary when performing programmi	ing and commissioning,	WAI : Incremental/Battery-less Absolute Shared	Power-sunnly Voltage>	(mounted on Front	Parlei)	RDY (GN)/ALM (RD) : Absolute function	on in normal / absolute function error (for
	Please utilise any of the follow	ving teaching tools.		I : Incremental	0 : 24V DC			the simple abso 1.0 (GN) (RD) · Absolute function	ute type)
	No.	Part Name	Model	A : Absolute				type)	
	PC teaching software (equipped device communication cable)	ed with USB conversion adaptor + USB cable + external	IA-OS-C	<i o="" type=""></i>	0:Equipped with no cable 2:2m (Standard)	Electromagnetic Br Release Switch (m	rake Compulsory ounted on Front Panel)	Switching NOM (standard)/BK RLS (co	mpulsory release)
F	2 PC teaching software (equippe	ed with RS232C conversion adaptor + external device	RCM-101-MW	NP : NPN Type (Sync. Type) (Standard), PN : PNP Type (Source Type),	3 : 3m	Insulation Resistan	ice	500V DC 10MΩ or more	
	<ul> <li>PC teaching software (equipped)</li> </ul>	ped with USB conversion adaptor + USB cable + extern		PLN : Pulse Train Control NPN Type (Sync. Type), PLP : Pulse Train Control PNP Type (Source Type)	5.00	Protection Function	n against Electric Shock	Class I basic insulation	Correy fixed type + 270g or loss
_	<sup>3</sup> device communication cable)		RCM-101-USB	DV : DeviceNet Connection Type, CC : CC-	Link Connection Type,	weight (weight (incre	mental Type	DIN rail fixed type : 285g or less	DIN rail fixed type : 270g or less
	4 Touch Panel Teaching		TB-01/D/DR	PR : PROFIBUS-DP Connection Type, CN : Cor ML : MECHATROLINK- I / II Connection Type, EC : Eth	npoNet Connection Type, erCAT Connection Type,	Simp	le Absolute Type	Screw fixed type : 450g or less	
F	6 Data Setter		TB-03	EP : EtherNet/IP Connection Type, PRT : PR(	DFINET-IO Connection Type	Cooling Method	iding 190g for battery)	Natural air-cooling	Forced air-cooling
3	. Instruction Manuals related to	this product				External dimensior	IS	Screw fixed type : 35W×178.5H×69.1D	Screw fixed type : 35W×190H×69.1D
-	No. 1 PCON-CA/CEA Controller Instr	Name ruction Manual	Manual No. ME0289	• DCON		Environment	Surrounding Air	DIN fail fixed type : 35W×185H×77.6D 0 to 40°C	DIN fail fixed type : 35W×196.3H×77.6D
	2 PCON-CB/CFB Controller Inst	ruction Manual	ME0342	<u> DCON-CA-3 I-PRT-2</u>	- <u>0</u> - <u>D N - * *</u>		Temperature		
	3 ACON-CA, DCON-CA Controll	ler Instruction Manual	ME0326	<series></series>	Identification for IAI use only> * There is no identification in some cases		Surrounding Humidity	y 5%RH to 85%RH or less (There should [Refer to Installation Environment]	be no condensation or freeze)
	4 ACON-CB Series Controller, D 5 PC Software RCM-101-MW/R0	CON-CB Series Controller, Instruction Manual CM-101-USB Instruction Manual	ME0343 ME0155	<type></type>			Environment		
	6 Touch Panel Teaching TB-01 P	Position Controller Instruction Manual	ME0324	CA/CB : Standard Type	Type of Installation> (Not Specified) : Screw Attachment Type		Surrounding Storage Temperature	-20 to 70°C (Excluding battery)	
	7 Touch Panel Teaching TB-02 P	Position Controller Instruction Manual	ME0355		DN : DIN Rail Mounting Type		Usage Altitude	1000m or less	
	9 Instruction Manual for the Seria	al Communication [for Modbus]	ME0376 ME0162	<pre><detail axis="" connected="" of=""> [Motor Type]</detail></pre>	Power-supply Voltage>		Protection Class		0.075
	10 CC-Link Instruction Manual		ME0254	3 : 2.5W DC Brushless motor	0 : 24V DC		Vibration Durability	Frequency 10 to 57Hz / Swing width : C Frequency 57 to 150Hz / Acceleration 9	9.8m/s <sup>2</sup>
	11 DeviceNet Instruction Manual	word .	ME0256	I : Incremental				XYZ directions Sweep time : 10 minu	tes Number of sweep : 10 times
F	12 PROFIBUS-DP Instruction Man 13 CompoNet Instruction Manual	nual	ME0238 ME0220	<i o="" type=""></i>	2 : 2m (Standard)	Note1 Add an ad	dditional 0.3A inrush for	Fieldbus Types.	
Ē	14 MECHATROLINK- I / II Instru	iction Manual	ME0221	NP : NPN Type (Sync. Type) (Standard),	ວ : ວm 5 : 5m	Note2 In-rush cu Note that	urrent will flow for appro the value of in-rush cur	ximately 5ms after the power is turned on rent differs depending on the impedance of	(at 40°C). of the power supply line.
F	15 EtherCAT Instruction Manual		ME0273	PLN : Pulse Train Control NPN Type (Sync. Type),		Note3 Add an ad	dditional 30g for Fieldbu	s Type of CA/CB/CGB Type. Add an addit	ional 10g for Fieldbus Type of
F	10 EtherNet/IP Instruction Manual	nual	ME0278 ME0333	PLP : Pulse Train Control PNP Type (Source Type),	I ink Connection Type	CFA/CFB	исств туре.		
F	18 MECHATROLINK-II Instruction	on Manual	ME0317	PR : PROFIBUS-DP Connection Type, CN : Co	npoNet Connection Type,				
4	. How to read the model plate		\	ML : MECHATROLINK- I / II Connection Type, EC : Eth EP : EtherNet/IP Connection Type, PRT : PR	erCAL Connection Type, DFINET-IO Connection Type				
	Madal			ML3 : MECHATROLINK-III Connection Type (Except for DC	ON-CA)				
		SER NO. ********* CTAUS CC							
	Serial number —	Actuator ***** MADE IN JAPAN							
		properly, use IAI specified cables							
		or min oo o ou wile.	1						

#### ACON, DCON List of Specifications

Item					Desc	ription			
Number of co	ntrolled a	axes	1-axis						
Power-supply	/ Voltage		24V DC ±10	%					
Load	Series	Motor Type	Rated	Max. Power	MAX.(Note5)	Rated	MAX.		
(It does not	RCA,	2W	0.8A	Consumption	4.6A	/			
including control side	RCA2,	5W	1.0A		6.4A				
current	NOL	10W (RCL)	1.3A		6.4A				
(Note1)		10W (RCA/ RCA2)	1.3A	2.5A	4.4A				
		20W	1.3A	2.5A	4.4A				
		20W (Model: 20S)	1.7A	3.4A	5.1A				
	202	30W	1.3A	2.2A	4.4A				
Power Supply	(for Elec	3W				0.7A	1.5A		
(for actuator e	equipped	with brake)	24V DC ±10	% 0.15A (MA	λX.)				
Heat Generat	tion		8.4W			4W			
Rush Current	(Note2)	<b>7 D</b>	10A						
Transient Pov	Ver Cutor	T Durability	MAX. 500µs	lau afarma (AC)	Drive	Destangular Ways			
	r System		Sinusoidal W	Vavelorm (AC)	Drive	Rectangular wave	Iorm (DC) Drive		
Correspondin	ig Encoa	er	Serial Absolu	Encoder ute Encoder		Incremental Encod	ler		
		r	Battery-less	Absolute Enco	oder				
Corresponding	RCA	Incremental Type	800pulse/rev	/			/		
Resolution	DOAS	Serial Absolute Type	16384pulse/	rev					
	RCA2	RCA2_*** N	1048pulse/re	ev					
		RCA2_*** N	800pulse/rev	/			/		
	RCA	Battery-less	16384nulse/	'rev		/			
	/RCA2	Absolute Type	74C						
	RCL	RA1, RA4, SA1, SA4	715pulse/rev						
		RAZ, RAS, SAZ, SAS	855pulse/rev	/					
	RCD	RAJ, RAO, SAJ, SAO	1145puise/re	ev.					
Actuator Cabl	le Lenath		MAX, 20m			40000136/164			
Serial Commu	unication	Interface	RS485 : 1 CH (based on Modbus Protocol RTU/ASCII)						
(SIO Port)			Speed : 9.6 to 230.4Kbps Control available with serial communication in the modes other than the pulse train						
External Inter	face	PIO Type	Signal I/O dedicated for 24V DC (selected from NPN/PNP) Input 16 points						
		Field Nationals Trans	max., output 16 points max. Cable length MAX. 10m						
		Field Network Type	EtherCAT, EtherNet/IP, PROFINET-IO						
Data Setting a	and Input	t	PC Software	, Touch Panel	Teaching, Te	aching Pendant			
Data Retentio	on Memo	ry	Saves positio	on data and pa	arameters to	non-volatile memory	(ritton)		
Operation Mo	de		Positioner M	ode/Pulse Tra	in Control Mo	de (selected by para	ameter setting)		
Number of Po	ositions ir	Positioner Mode	Standard 64 points, MAX. 512 points (PIO Type)						
Pulse Train	Input Pi	Ilse Frequency	(Note) Number of positions differs depending on the selection in PIO pattern. Differential System (Line Driver System) : MAX. 200kpps Cable length MAX. 10m						
Interface	mputit	lise i requeriey	Open Collector System : Not applicable.						
(Note4)	Command Pulse Multiplying		<ul> <li>If the host applies the open collector output, prepare AK-04 (option) separately</li> </ul>						
			to convert to the differential type. 1/50 < A/B < 50/1						
	Factor (	Electrical Gear : A/B)	Setting Range of A and B (set to parameter) : 1 to 4096						
	Feedba	ck Pulse Output							
(mounted on )	Front Pa	nel)	SV (GN)/ALM (RD) : Servo ON/Alarm generated STS0 to 3 : Status display						
(		,	RDY (GN)/AL	M (RD) : Abso	lute function in	normal / absolute fun	ction error (for the		
			1, 0 (GN) (RD	simpi ) : Abso	e absolute typ lute function st	<i>= )</i> atus display (for the s	imple absolute type)		
Electromagne	etic Brake	Compulsory	Switching NO	OM (standard)	/BK RLS (cor	mpulsory release)			
Release Swite	cn (mour sistance	uted on ⊢ront Panel)		0MO or more					
Protection Function against Electric Shock			Class I basic insulation						
Weight (Note3)	Increme	ntal Type	Screw fixed	type : 230g or	less DIN ra	il fixed type : 265g c	r less		
(Other than Field	Simple /	Absolute Type	Battery (AB-	7) : 190g or le	SS P-ABLIN				
Network	L		140g or less	allory Case (SE	- <u>-</u>				
iype)	Serial A	bsolute Type	Battery (AB-	5) : 20g					
Cooling Method			Natural air-cooling						
External dimensions			DIN rail fixed	type : 35W×17 type : 35W×1	185H×78.1D				
External dime	1 -	nding Air Temperature	0 to 40°C						
External dime Environment	Surrour		5%RH to 85	%RH or less (	There should	be no condensation	or freeze)		
External dime Environment	Surrour	nding Humidity	[Refer to Installation Environment]						
External dime Environment	Surrour Surrour Surrour	nding Humidity nding Environment	[Refer to Inst	Excluding bot	-20 to 70°C (Excluding battery)				
External dime Environment	Surrour Surrour Surrour Surrour Temper	nding Humidity nding Environment nding Storage ature	[Refer to Inst -20 to 70°C (	(Excluding bat	tery)				
External dime Environment	Surrour Surrour Surrour Temper Usage	nding Humidity nding Environment nding Storage ature Altitude	[Refer to Inst -20 to 70°C ( 1000m or les	(Excluding bat	tery)				
External dime Environment	Surrour Surrour Surrour Surrour Temper Usage Protecti	nding Humidity nding Environment nding Storage ature Altitude ion Class n Durability	[Refer to Inst -20 to 70°C ( 1000m or les IP20	(Excluding bat	tery)	075mm			
External dime Environment	Surrour Surrour Surrour Temper Usage Protecti Vibratio	nding Humidity nding Environment ding Storage ature Altitude ion Class n Durability	[Refer to Insi -20 to 70°C ( 1000m or les IP20 Frequency 1 Frequency 5	(Excluding bat (Excluding bat)) (Excluding bat (Excluding bat)) (Excluding bat (Excluding bat)) (Excluding bat (Excluding bat)) (Excluding bat)) (Excluding bat) (Excluding bat)) (Excluding bat) (Excluding bat)) (Excluding bat) (Excluding bat)) (Excluding bat)) (Ex	tery) ving width : 0 Acceleration 9	.075mm .8m/s <sup>2</sup>			

Serial absolute type is not applicable for the pulse train control mode.

Note5 The current reaches the maximum at the excitation phase detection of the motor conducted when the servo is turned on for the first time after the power is supplied. (TYP 1 to 2 second, MAX. 10 second)

External Dimensions (ACON, DCON, PCON-CA/CB/CGB/CBP/CGBP) \* There is only Incremental Type in DCON.

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Simplified Absolute Type

(Option)

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(40.5)

(58)

Screw fixed type

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→ 5

DIN rail fixed type

Battery-less Absolute/ Incremental Type

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Battery-less Absolute/ Incremental Type Simplified Absolute Type (Option)



Serial Absolute Type

(Option)

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78.



Side View

69.9

Refer to Basic Specification

DAD

04

4

8.5

DIN rail fixed

1. Installation Environment

- Location subject to direct vibration or impact Location exposed to direct sunlight
- A place with its altitude more than 1000m

2. Storage and Preservation Environment

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.



- 3. Noise Sources and Elimination sources.

#### <u>мз</u> 😂 (for FG cable (for FG cable (for FG cable (5) (2) (2) attachment) attachment) attachment) (58) (52) External Dimensions (PCON-CFA/CFB/CGFB Type)

#### • Screw fixed type

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# Installation Environment

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

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 5%RH to 85%RH

Location exposed to corrosive gases or combustible gases
Location exposed to significant amount of dust, salt or iron powder

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

Storage and preservation environment follows the installation environment. Especially in a long-term storage, consider

# Installation and Noise Elimination

### 1. Noise Elimination Grounding (Frame Ground)



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

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.



P

+24V 0V



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 surrounding temperature around the controller below 40°C.



### **Connection Diagram**





- STP (with shield) is recommended for Ethernet cable. (Note 1)
- It is necessary to prepare a power supply cable and the cables for the emergency stop circuit (Note 2) wiring as well as this cable. [Refer to power supply and emergency stop circuit.]
- For EtherNet/IP and PROFINET-IO



STP (with shield) is recommended for Ethernet cable. (Note 1)

It is necessary to prepare a power supply cable and the cables for the emergency stop circuit wiring as well as this cable. [Refer to power supply and emergency stop circuit.] (Note 2)



Connection to RCP3, RCP4, RCP5, RCP6 and RCA2 Series





BCD2	CB-APSEP-MPA	Robot cable from 0.5 to 20m	
KCF3	CB-APSEP-MPA	Standard cable from 0.5 to 20m	
RCP4 (Other Than GR*Type)	CB-CAN-MPA	Robot cable from 0.5 to 20m (Note1)	
RCD (Applicable Controller Symbol : D3)	CB-CAN-MPA	Standard cable from 0.5 to 20m (Note1)	
RCP4 (GR*Type), RCP5	CB-CAN-MPA	Robot cable from 0.5 to 20m (Note1)	
RCP6 (Including Pulse Press) RCD (Applicable Controller Symbol : D5)	CB-CAN-MPA	Standard cable from 0.5 to 20m (Note1)	
High Thrust	CB-CFA-MPA	Standard cable for CFA type from 0.5 to 20r	
High-Thrust	CB-CFA-MPA	Robot cable for CFA type from 0.5 to 20m	
RCA, RCL (Incremental Type)	CB-ASEP-MPA	Robot cable from 0.5 to 20m	
RCA (Serial Absolute Type)		Babat apple from 0 5 to 20m	
RCA2			

Note1 Up to 10m for RCD

## **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.

In the example below, uses PCON-CA. It is the same in case of except for PCON-CA.



The safety categories complied type (CGB Type, etc.) is not equipped with the relay to have the controller Note 1: automatically identify that a teaching tool was plugged in and switch the wiring layout. Those other than the safety categories complied type do the automatic identification and have S1 and S2 short-circuited. When the motor driving source is cut off externally for a compliance with the safety category, connect a contact

Note 2 : such as a contactor to the wires between MPI and MPO. Also, the ratings for the emergency stop signal that turns ON/OFF at the contact CR1 are 24V DC and 10mA or less.

Note 3 For CR1, select the one with coil current 0.1A or less.

Caution If supplying power with using a 24V DC, having it turned ON/OFF, keep the 0V connected and have the +24V supplied/cut (cut one side only).





# It is a pressing force measurement unit used in the force control. It should be used by connecting to an actuator applicable for the force control or servo pressing. [Specification]

	Item	Specification		
Loadcell Syster	n	Strain Gauge		
Rated Capacity	/ [N]	600	2000	
Total Accuracy	[% F.S.]	±1		
Allowable Over	load [% F.S.]	20	0	
	Surrounding Air Temperature	0 to 40 °C		
	Surrounding Humidity	85%RH or less (non-condensing)		
Environmental	Surrounding Environment	Should be no corrosive gas		
Specifications	Surrounding Storage Temperature	-10 to 60 °C		
	Ambient Humidity for Storage	90%RH less (non-condensing)		
	Vibration Resistance	10 to 57Hz in X, Y and Z directions		
<b>Dielectric Withs</b>	standing Voltage [V]	DC50V		

F.S.(Withstand Load)

(1) Remote I/O Mode (2) Position/ Simple Direct mode

(5) Remote I/O Mode 2 (6) Position/

Simple Direct mode 2 (7) Half Direct Value Mode : (8) Remote I/O Mode 3

### **Operation Modes and Main Functions**

		Choice in Parameter No. 84 (Fieldbus Operation Mode)						
Main Functions	0	1	2	3	4	5	6	7
	Remote I/O Mode	Position/Simple Direct Value Mode	Half Direct Value Mode	Full Direct Value Mode	Remote I/O Mode 2	Position/Simple Direct Value Mode 2	Half Direct Value Mode	Remote I/O Mode 3
No. of Occupied Bytes	2	8	16	32	12	8	16	12
Operation with the Position Data Specified	×	O <sup>(Note2)</sup>	0	0	×	O <sup>(Note2)</sup>	0	×
Speed and Acceleration Direct Setup	×	×	0	0	×	×	0	×
Pressing Operation	0	0	0	0	0	0	0	0
Current Position Read	×	0	0	0	0	0	0	0
Current Speed Read	×	×	0	0	×	×	0	×
Operation with the Position No. Specified	0	0	×	×	0	0	×	0
Completion Position No. Read	0	0	×	×	0	0	×	0
Max. Number of position table	512	768	Unused	Unused	512	768	Unused	512
Force Control (None1)	△(Note3)	×	×	0	△(Note3)	0	0	△(Note3)

select only in PCON-CBP/CGBP.

#### [Reference] Example for operating an actuator by using the standard type (CA or CB Type) with optimum

(Note) In this example, the emergency stop switch on the teaching pendant would not work.

### Loadcell (PCON-CBP/CGBP Dedicated Option)

The number of actuators available to connect should differ depending on the rated capacity of a loadcell. [Check in an instruction manual of an actuator for how to install and details of dimensions.]

# **Operation Modes and Functions (Common to Each Fieldbus)**

The machine can be operated selecting one mode from the following eight operation modes

: This is the method where the operation through PIO (24V I/O) is performed using the fieldbus. : This is the method where the machine is operated by means of directly specifying the target position using numerical values. For the speed, acceleration, deceleration, or positioning

 (3) Half Direct Value Mode : In this operation mode, in addition to the target position, the speed, acceleration, deceleration and push current value are directly specified using numerical values. (4) Full Direct Value Mode : In this operation mode, all the values related to the position control, are directly specified using

Additionally, the current position and current speed reading functions are added to the remote I/O mode The setting should be established when the force control is to be conducted in Position/Simple Direct Modes

The setting should be established when the force control is to be conducted in Semi Direct Mode. : The setting should be established when the force control is to be conducted in Remote I/O Mode.

(Note1) The force control is a feature available for use only in the PCON-CBP/CGBP types.

(Note2) Position data except for data related to positions should indicate the position number to operate.

(Note3) It is available for use in the PCON-CBP/CGBP types when 6 or 7 is set in PIO Pattern.

(\*)Position/Simple Direct Mode 2, Semi Direct Mode 2 and Remote I/O Mode 3 should be available to

(\*)MECHATROLINK-I/II are not applicable for Full Direct Mode

## **EtherCAT**®

<ul> <li>Specification</li> </ul>	
Item	Specification
Communication Protocol	IEC61158Type12
Physical Layer	100BASE-TX (IEEE802.3)
Communication Frequency	Automatic following to the Master
Communication Cable Length	Depends on EtherCAT® Type (Distance between each node: 100m max.)
Slave Type	I/O slave
Applicable Node Address	0 to 127 (17 to 80 : When connected to the master (CJ1W-NC*81) manufactured by OMRON)
Communication Cable	Category 5 or more (Double shielded cable braided with aluminum foil recommended)
Connection Connector	RJ45 Connector $\times$ 2pcs (Input $\times$ 1, Output $\times$ 1)
Connection	Daisy chain only

Interface Section



(Note) For the details of the LED displays refer to the LED display below or the instruction manual

<ul> <li>Status</li> </ul>	Status LED Displays of EtherCAT® Type					
Name	Indication Color	Description				
	OFF	Initial condition (EtherCAT® communication in "INIT" condition) or the power is OFF				
	Green (Illuminating)	In normal operation (EtherCAT® communication in "OPERATION" condition)				
RUN	Green (Flashing) (ON: 200ms/OFF: 200ms)	(EtherCAT® communication in "PRE-OPERATION" condition)				
	Green (Flashing) (ON: 200ms/OFF: 1000ms)	(EtherCAT® communication in "SAFE-OPERATION" condition)				
	Orange (Illuminating)	Communication component (module) error				
	OFF	No abnormality or the power is OFF				
	Orange (Flashing) (ON: 200ms/OFF: 200ms)	Construction information (settings) error (Information received from the master cannot be set)				
ERR	Orange (Flashing) (ON: 200ms/OFF: 1000ms)	Synchronizing Event Error for EtherCAT Motion Connectivity Type only				
	Orange (Flashing) (ON: 200ms × 2 times/ OFF: 1000ms)	Communication section circuit error (Watchdog timer timeout)				
	Orange (Illuminating)	Communication component (module) error				
	OFF	Link status not detected or the power is OFF				
Link/	Green (Illuminating)	Linked (No network congestion)				
Activity	Green (Flashing) (ON: 50ms/OFF: 50ms)	Linked (Network in congestion)				

EtherCAT® Connector

	[]	Pin No.	Signal Name	Abbreviated Code
8		1	Data sending +	TD+
		2	Data sending -	TD-
		3	Data receiving +	RD+
		4	Not used	
1		5	Not used	
		6	Data receiving -	RD-
		7	Not used	
	R.145 8-pin	8	Not used	
	Modular Connector	Connector Hood	Security grounding	FG

(Controller side)

• Operation Mode Setting and Address Allocation

The operation mode is set using the parameters.

Set the mode changeover switch on the controller front panel to MANU side and establish the setting in Parameter No. 84 "FMOD: Fieldbus Operation Mode" in a teaching tool such as the PC teaching software. [Refer to the Instruction Manual for the details]

Node address setting

Node address can be set with the parameter.

Set Parameter No.85 "NADR: Fieldbus Node Address" with a teaching tool such as PC software for RC. Settable Range: 0 to 127 (It is set to 17 which is the I/O slave top address of EtherCAT® at the delivery.) Communication Speed Setting

The setting for the communication speed is not required because it automatically follows the master's communication speed.

(Note) After parameter setting, reset the controller mode change witch to "AUTO" side, and then cycle the controller power.

Specification				
IEC61158 (IEEE802.3)				
10BASE-T/100BASE-T (Autonegotiation setting is recommended)				
Depends on EtherNet/IP Type (Distance between hub and each node: 100m max.)				
Depends on the master unit				
0.0.0.0 to 255.255.255.255				
Category 5 or more (Double shielded cable braided with aluminum foil recommended)				
RJ45 Connector × 1pc				

EthorNot/IP

Interface Section



(Note) For the details of the LED displays, refer to the LED display below or the instruction manual. 

Sta	Status LED Displays of EtherNet/IP Type						
lame	Indication Color	Description					
	OFF	Power is OFF or IP addresses are not set					
	Green (Illuminating)	Connection is established and the communication under normal condition.					
	Green (Flashing)	Online but network connection is not yet (Network is normal). Check the condition	established. Communication Stop is of master unit.				
NS	Red (Illuminating)	Communication Error. Communication cannot be established due to the error detection such as IP address duplication.	Check the conditions of IP address settings, communication line, the power of hub units, noise prevention,				
	Red (Flashing)	Communication Error. (Communication Time-out Detection)	etc.				
	OFF	Power OFF					
	Green (Illuminating)	The machine is in the normal operation. The machine is under the control of the scanner (master)					
MS	Green (Flashing)	The connection with the scanner (master) is not established. Check the construction information settings. Check if the scanner (master) is in the idle condition.					
	Red (Illuminating)	Hardware Error. The replacement of the board is required. Please contact us.					
	Red (Flashing)	There is an error occurred but is not critical such like a user setting error or configuration error. It can be recovered with a rebuild of the settings.					

EtherNet/IP Connector

~		Pin No.	Signal Name	Abbreviated Code
8		1	Data sending +	TD+
		2	Data sending -	TD-
		3	Data receiving +	RD+
		4	Not used	
1		5	Not used	
'		6	Data receiving -	RD-
		7	Not used	
	RJ45 8-pin	8	Not used	
	Modular Connector	Connector Hood	Security grounding	FG

Operation Mode Setting and Address Allocation

The operation mode is set using the parameters.

Set the mode change switch on the controller front panel to "MANU" side and set the parameter No.84 "FMOD: Fieldbus Operation Mode" using the teaching tool such as PC software for RC.

[Refer to the Instruction Manual for the details]

 Communication Speed Setting The Communication speed can be set with the parameter. There is basically no necessity of establishing this setting as it is set to the automatic negotiation on delivery. If it is required to set the velocity constant, establish the setting in Parameter No. 86 "FBRS: Fieldbus Baud Rate" in a teaching tool such as the PC software. [Refer to the Instruction Manual for the details]

IP Address Setting

IP Address can be set with the parameter. Establish the setting in Parameter No. 140 "IPAD: IP Address" in a teaching tool such as the PC software. Settable Range: 0.0.0.0 to 255.255.255.255 (It is set to "192.168.0.1" when the machine is delivered from the factory.)

Settings for Subnet Mask

Subnet Mask can be set with the parameter.

Establish the setting in Parameter No. 141 "SNMK: Subnet Mask" in a teaching tool such as the PC software

Settable Range: 0.0.0.0 to 255.255.255.255 (It is set to "255.255.255.0" when the machine is delivered from the factory.)

 Settings for Default Gateway software. controller power

• Specification Item ommunication protocol ommunication Speed communication cable length Number of Connection

Applicable node address communication cable

Connection Connector

Interface Section

Name	Indication Color	Description
	OFF	The power is OFF or there is no connectable controller.
NS	Green (Illuminating)	Connection is established, communication in normal condition (RUN status)
	Green (Flashing)	Connection is established, but communication in pause (STOP status: network is in normal condition)
	OFF	Power OFF
	Green (Illuminating)	The machine is in the normal operation.
	Green (Flashing)	In diagnosis of communication system.
	Orange (Illuminating)	There is a hardware error (in EXCEPTION condition). The replacement of the board is required. Please contact us.
MS	Orange (Flashing1)	There is an error in communication setting.
	Orange (Flashing2)	There is an error in IP address setting.
	Orange (Flashing3)	A wrong station name has been applied.
	Orange (Flashing4)	A hardware error is present. (Critical internal error) The board must be replaced. Please contact IAI.
Link/Activity	OFF	No link or activity
(There is limitation in	Green (Illuminating)	Link established
applicable models)	Green (Flashing)	In activity (communication)
Drange (Flash Drange (Flash Drange (Flash	ning 1): Repeat of ning 2): Periodic re ning 3): Periodic re	off for 0.75 sec -> on for 0.25 sec peat for 2 times of off for 0.75 sec -> on for 0.5 sec peat for 3 times of off for 0.75 sec -> on for 0.5 sec

#### PROFINET-IO Connector



RJ45 8-pin Modular Connec (Controller Side)

Default Gateway can be set with the parameter. Establish the setting in Parameter No. 142 "DFGW: Default Gateway" in a teaching tool such as the PC

Settable Range: 0.0.0.0 to 255.255.255.255 (It is set to "0.0.0.0" when the machine is delivered from the factory.) (Note) After parameter setting, reset the controller mode change witch to "AUTO" side, and then cycle the

# **PROFINET-IO**

Specification
IEC61158 (IEEE802.3), IEC61748
100Mbps
Depends on PROFINET-IO Specification
(Distance between each segment: 100m Max.)
Depends on the master unit
0.0.0.0 to 255.255.255.255
Category 5 or more
(Double shielded cable braided with aluminum foil recommended)
RJ45 Connector × 1pc



(Note) For the details of the LED displays, refer to the Trouble Shooting or the instruction manual.

#### Status LED Displays of PROFINET-IO Type

Orange (Flashing 4): Periodic repeat for 4 times of off for 0.75 sec -> on for 0.5 sec

	Pin No.	Signal Name	Abbreviated Code
	1	Data sending +	TD+
	2	Data sending –	TD-
7	3	Data receiving +	RD+
	4	Not used	
	5	Not used	
	6	Data receiving –	RD-
	7	Not used	
	8	Not used	
tor	Connector Hood	Security grounding	FG

- Operation Mode Setting and Address Allocation
- The operation mode is set using the parameters. Set the mode change switch on the controller front panel to "MANU" side and set the parameter No. 84 "FMOD: Field Bus Operation Mode" using the teaching tool such as PC software for RC. [Refer to the Instruction Manual for the details]
- Communication Speed Setting
- It is not necessary to establish setting. It is fixed at 100Mbps.
- Node address setting It is not necessary to establish setting on the IAI controller side as it should be established on the master side.
- (Note) After parameter setting, reset the controller mode change witch to "AUTO" side, and then cycle the controller power.

### **Starting Procedure**

When using this product for the first time, make sure to avoid mistakes and incorrect wiring by referring to the procedure below.



Communication is now established. Perform an operation check and adjustment for the system

### **Trouble Shooting**

When an error occurs, connect the teaching tool such as PC software or teaching pendant and check it using the status monitor.

All the alarms for the fieldbus related are described as follows. For other alarms, refer to the instruction manual for the controller body and remedy it.

Code	Error Name	ID <sup>(*1)</sup>	RES <sup>(*2)</sup>	<sup>()</sup> Cause/Treatment	
0F2	Fieldbus Module Error	05	×	Cause : An error is detected on Fieldbus module (circuit componen Treatment : Check the parameter.	
0F3	Undetected Fieldbus Module Error	04	×	Cause : Fieldbus module (circuit component) cannot be detected Treatment : Turn ON the power again. If the error is not removed, contact our company.	

(\*1) ID  $\rightarrow$  Simple Alarm Code

(\*2) RES  $\rightarrow$  Alarm Reset Available/Unavailable  $\circ$ : Alarm Reset Available/× : Alarm Reset Unavailable

• Countermeasures in Errors

These are the alarms you will often see during startup. Refer below to take a countermeasure action. For those other than below, refer to the instruction manual.

Error Code	Error Name	Cause and Countermeasure
069	Realtime Clock Vibration Generated Stop Detected	This shows that the calendar feature has stopped and the current clock data has been lost. Establish the clock setting again from a teaching tool.
0B8	Excitation Detection Error	The excitation detection should be performed at the first time to turn the servo on after the power gets supplied. This shows the condition that the detection has not completed even after a certain period of time (set in Parameter No. 29) has passed. ①Connection error or line breakage on the motor/encoder cable ②The brake is not released (for models equipped with a brake) ③Load of an external force on the motor is high ④The power was turned on with the actuator in contact on the mechanical end ⑤Sliding resistance on the actuator is high Such possibilities as described above should be concerned.
0E5	Encoder Reception Error	It shows that data from the encoder side was not replied in normal condition to the request from the controller. Check if there is any line breakage on the connector parts or the condition of connection. Shut off all the power supplies to the peripheral devices to operate this controller and the actuator. In case there is no error occurs, there may be a concern of noise influence.
0E8	A-, B-Phase Line Breakage	It is the condition that the encoder signals cannot be detected properly. Check if there is any line breakage on the connector parts or the condition of connection.
0EE	Absolute Encoder Error Detection 2	It shows the condition that the absolute encoder cannot detect the position data properly. The voltage on the absolute data battery has dropped. Check the battery alarm output on the PIO. If it is turned off, replace the battery. Conduct the absolute reset after the replacement. Check the connectivity of the encoder cable.
20A	Servo-off during Operation	It shows that a movement command was attempted to be issued while the servo is off. Turn the servo on before make operation.



# **IAI** Corporation

Head Office: 577-1 Obane Shimizu-KU Shizuoka City Shizuoka 424-0103, Japan TEL +81-54-364-5105 FAX +81-54-364-2589 website: www.iai-robot.co.jp/

# IAI America, Inc.

Head Office: 2690 W. 237th Street, Torrance, CA 90505 TEL (310) 891-6015 FAX (310) 891-0815 Chicago Office: 110 East State Parkway, Schaumburg, IL 60173 TEL(847) 908-1400 FAX (847) 908-1399 Atlanta Office: 1220 Kennestone Circle, Suite 108, Marietta, GA 30066 TEL (678) 354-9470 FAX (678) 354-9471 website: www.intelligentactuator.com

# IAI Industrieroboter GmbH

Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany TEL 06196-88950 FAX 06196-889524 website: www.iai-automation.com

Technical Support available in Great Britain



Duttons Way, Shadsworth Business Park, Blackburn, Lancashire, BB1 2QR, United Kingdom TEL 01254-685900 website: www.lcautomation.com

# IAI (Shanghai) Co., Ltd.

SHANGHAI JIAHUA BUSINESS CENTER A8-303, 808, Hongqiao Rd. Shanghai 200030, China TEL 021-6448-4753 FAX 021-6448-3992 website: www.iai-robot.com

# IAI Robot (Thailand) Co., Ltd.

825 PhairojKijja Tower 7th Floor, Debaratana RD., Bangna-Nuea, Bangna, Bangkok 10260, Thailand TEL +66-2-361-4458 FAX +66-2-361-4456 website:www.iai-robot.co.th