IAI
Quality and Innovation

MEC
First Step Guide   Sixth Edition

Thank you for purchasing our product.
Make sure to read the Safety Guide and detailed Instruction Manual (CD) 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 Manual included in the box this device was packaged in. It should be retained with this device at all times.
A copy of the CD 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.

- Using or copying all or part of this Instruction Manual without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.

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	Remarks
1	Controller Main Body			"How to read the model plate", "How to read the model No."
Accessories				
2	Power Cable	100V AC Type	EST-ECCB-VCT-7AL2000	2m For AMEC, PMEC 100V AC
		200V AC Type	CB-APMEC-PW020-TM	2m For PMEC 100V to 240V AC
3	10-pin Plug for PIO		FMC1,5/10-ST-3,5 (Maker: PHOENIX CONTACT)	Applicable Cable Size 0.2 to 1.5mm²
4	Flat Cable for PIO		CB-APMEC-PIO020-NC	2m
5	USB Cable for MEC PC Software		CB-SEL-USB030	3m
6	2-pin Plug for EMG		FMC1,5/2-ST-3,5 (Maker: PHOENIX CONTACT)	Applicable Cable Size 0.2 to 1.5mm² (shorted when shipped out)
7	Standard Mounting Bracket 2pcs		MEC-AT-H	Attachment screws (4pcs) included
8	First Step Guide			
9	Instruction Manual (CD)			
10	Safety Guide			

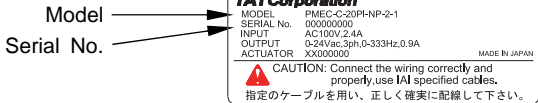### 2. Teaching Tool (to be purchased separately)
For the setups such as position setting and parameter setting using the teaching operation, the teaching tool is required.

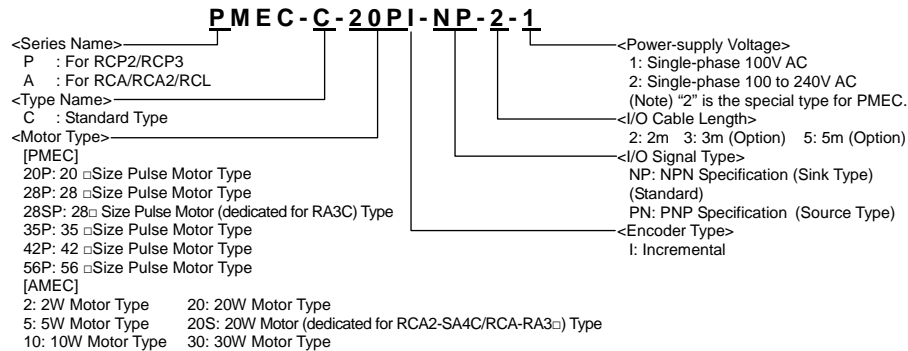| No.	Part Name	Model	Remarks
1	Touch panel teaching	CON-PT	
2	Touch panel teaching (with deadman switch)	CON-PD	
3	Touch panel teaching (Includes deadman switch + TP adapter (RCB-LB-TG))	CON-PG	
4	Touch panel teaching	SEP-PT	
5	DIN Rail Mounting Bracket	MEC-AT-D	Attachment screws (8pcs) included

3. Instruction manuals related to this product, which are contained in the instruction manual (CD)

No.	Name	Manual No.
1	MEC Instruction Manual	ME0245
2	Touch panel teaching CON-PT/PD/PG	ME0227
3	Touch panel teaching SEP-PT	ME0217
4	MEC PC Interface Software	ME0248

4. How to read the model plate

Model
Serial No.

IAI Corporation
MODEL   PMEC-C-20PI-NP-2-1
SERIAL No.   000000000
INPUT   AC100V,2.4A
OUTPUT   0-24Vac,3ph,0-333Hz,0.9A
ACTUATOR   XX000000
MADE IN JAPAN
⚠ CAUTION: Connect the wiring correctly and properly,use IAI specified cables.
指定のケーブルを用い、正しく確実に配線して下さい。

5. How to read the model No.

PMEC-C-20PI-NP-2-1

<Series Name>
P : For RCP2/RCP3
A : For RCA/RCA2/RCL
<Type Name>
C : Standard Type
<Motor Type>
[PMEC]
20P: 20 □Size Pulse Motor Type
28P: 28 □Size Pulse Motor Type
28SP: 28□ Size Pulse Motor (dedicated for RA3C) Type
35P: 35 □Size Pulse Motor Type
42P: 42 □Size Pulse Motor Type
56P: 56□Size Pulse Motor Type
[AMEC]
2: 2W Motor Type   20: 20W Motor Type
5: 5W Motor Type   20S: 20W Motor (dedicated for RCA2-SA4C/RCA-RA3□) Type
10: 10W Motor Type   30: 30W Motor Type

<Power-supply Voltage>
1: Single-phase 100V AC
2: Single-phase 100 to 240V AC
(Note) "2" is the special type for PMEC.
<I/O Cable Length>
2: 2m 3: 3m (Option) 5: 5m (Option)
<I/O Signal Type>
NP: NPN Specification (Sink Type) (Standard)
PN: PNP Specification (Source Type)
<Encoder Type>
I: Incremental

Basic Specifications

Characteristics
1) The signal used for activating the actuator is the same as one used for activating the air cylinder (electromagnetic valve). Therefore, the currently used PLC program can be used without any modification. This unit can be applicable both to single solenoid/double solenoid system.
2) Data input for moving position setting and other commands is easily performed by using a teaching tool such as MEC PC software.

Specifications

Specification Item		AMEC	PMEC	
Number of controlled axes		1-axis		
Power-supply Voltage		100V AC±10%	100V AC to 115V±10%	100V AC to 240V±10%
Rated Current		2.4A	1.3A	0.67A (100V AC)/ 0.36A (200V AC)
Load Current		15A	30A	15A (100V AC)/ 30A (200V AC)
Leakage Current		0.5mA MAX.	0.5mA MAX.	0.4mA MAX. (100V AC)/ 0.75mA MAX. (200V AC)
Heating Value		10W	11W	11W (100V AC)/ 11W (200V AC)
Number of positioning points		2 or 3 points		
Backup Memory		Save the position data and parameters onto the non-volatile memory.(Serial EEPROM) About 100,000 times of rewriting		
PIO Interface		24V DC I/O		
Communication Ports		USB Connector : Dedicated for MEC PC software		
		Teaching Connector : Dedicated for touch panel teaching		
Cable Length		Actuator Cable : 20m or less		
		I/O Flat Cable : 10m or less		
Voltage Durability		1500V AC for 1 minute		
Insulation Strength		500V DC 10MΩ or less		
Environ-ment	Surrounding air temperature	0 to 40°C		
	Surrounding humidity	10 to 85%RH or less (non-condensing)		
	Surrounding environment	There should be no corrosive gas.		
	Surrounding storage temperature	–25 to 65°C		
	Surrounding storage humidity	90%RH or less (non-condensing)		
	Vibration resistance	10 to 57 Hz in XYZ Each direction/Pulsating amplitude 0.035mm (continuous), 0.075mm (intermittent) 57 to150Hz 4.9m/s²(continuous) 9.8m/s²(intermittent)		
Protection Class		IP20		
Cooling Method		Internal cooling fan		
Weight		614g	500g	508g
External Dimensions		85W×200H×80D (mm)		

⚠ Note

- Position data and parameters are written to EEPROM. The limitation for the rewrite is about 100,000 times. Take the greatest care or select different controller product if position data is to be updated excessively. Do not turn OFF the power to the unit during the rewriting operation.
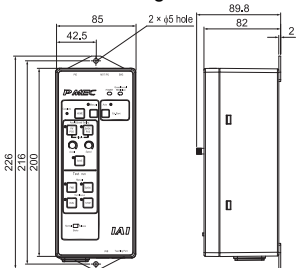
External Dimensions
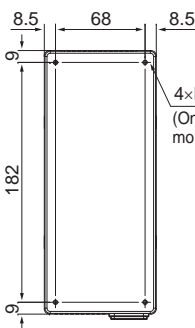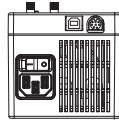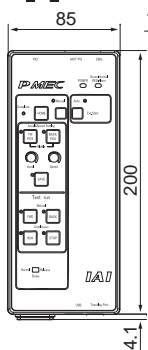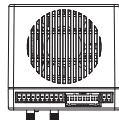
Pictures show PMEC. It should be the same for AMEC.

4×M3 hole for tapping screw
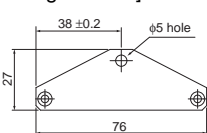(Only screws packaged with mounting bracket are applicable)

Mounting Bracket

Pictures show PMEC. It should be the same for AMEC.
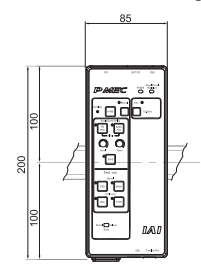
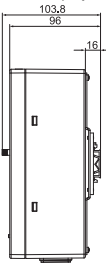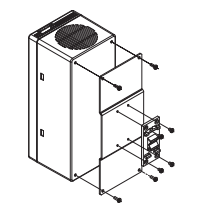### 1. Standard Mounting Bracket

[Mounting Bracket]

Attach bracket with the packaged attachment screws to the dedicated holes on the controller. (One each on top and bottom, 2pcs in total)
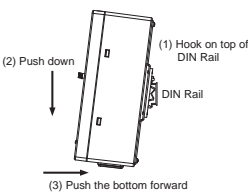
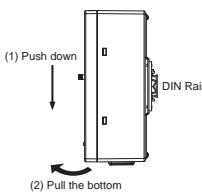### 2. DIN Rail Mounting Bracket (Option: Model   MEC-AT-D)

[How to Assemble]   [How to Install]   [How to Detach]

(1) Hook on top of DIN Rail
(2) Push down
(3) Push the bottom forward
DIN Rail

(1) Push down
(2) Pull the bottom
DIN Rail

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)

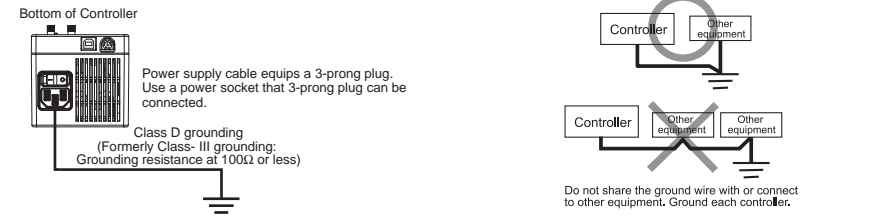Do not use this product in the following environment.
- Location where the surrounding air temperature exceeds the range of 0 to 40°C
- Location where condensation occurs due to abrupt temperature changes
- Relative humidity less than 10%RH or greater than 85%RH
- Location exposed to corrosive gases 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

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

Installation and Noise Elimination

1. Noise Elimination Grounding

Power supply cable equips a 3-prong plug. Use a power socket that 3-prong plug can be connected.

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.

⚠ Caution: If having terminal block for power supply connection, cut off 3-prong plug and make sure to connect the ground line.

2. Precautions regarding wiring method
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]   Attach the Noise Killer in parallel with the coil.
2) DC solenoid valves, magnet switches and relays
   [Measure]   Attach the diode in parallel with the coil.
   For the DC relay, use the built-in diode type.

4. There is no water-proof type. (IP20)

### 5. The product is equipped with a cooling fan. Do not block the air outlet and inlet.
Exercise precaution so that no foreign substance gets into the air outlet and inlet.

6. Operation panel applies a PET sheet switch thus easy to get scratched. Be careful not to do so.

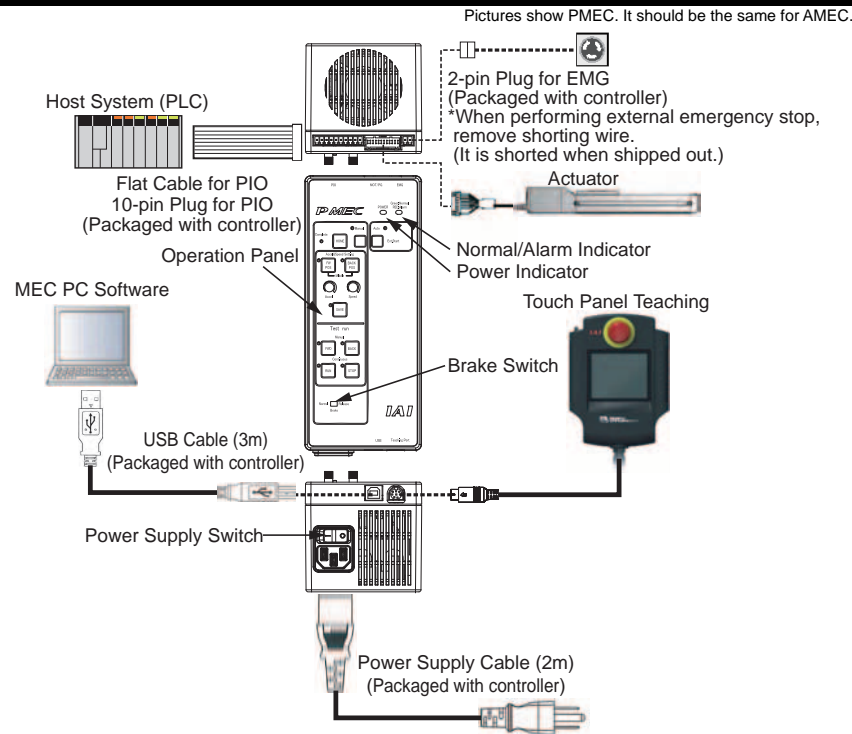### 7. Certainly fix the AC cable to ensure it would not come off.

8. 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.
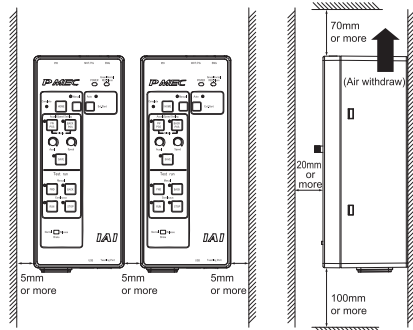
Pictures show PMEC. It should be the same for AMEC.

Wiring Layout

Pictures show PMEC. It should be the same for AMEC.

- Host System (PLC)
- 2-pin Plug for EMG (Packaged with controller) *When performing external emergency stop, remove shorting wire. (It is shorted when shipped out.)
- Flat Cable for PIO 10-pin Plug for PIO (Packaged with controller)
- Actuator
- Operation Panel
- MEC PC Software
- Normal/Alarm Indicator
- Power Indicator
- Touch Panel Teaching
- Brake Switch
- USB Cable (3m) (Packaged with controller)
- Power Supply Switch
- Power Supply Cable (2m) (Packaged with controller)

⚠ Do not connect the touch panel teaching and MEC PC software at the same time. It may cause malfunction or operation error.

Operation Pattern and PIO Signal

1. Operation Pattern
The PMEC or AMEC controller has 2 operation patterns.
Each of these 6 patterns is described as in the table. Also, the corresponding air cylinder circuit is described for reference.

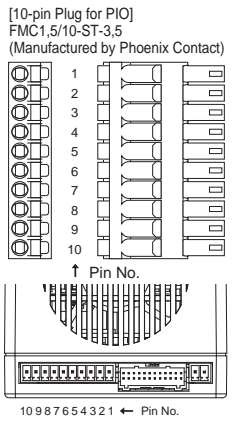| Operation Pattern		Contents	Air Cylinder Circuit (Reference)	Electric Cylinder Connection Procedure
2-Point Stop (2-Point Positioning)	1-Input, 2-Point Movement [Single Solenoid System]	The actuator 2-Point movement is available using the same control function as for the air cylinder. End and start points can be determined. Speed and acceleration settings in the actuator movement are available. The pressing operation is available. Set ST0 ON to move to the end point and OFF to return to the start point.		
3-Point Stop (3-Point Positioning)	2-Input, 2-Point Movement [Double Solenoid System]	The actuator 2-Point movement is available using the same control function as for the air cylinder. End and start points can be determined. Setting of intermediate point is available, and positioning to the intermediate point is also available. Speed and acceleration settings in the actuator movement are available. The pressing operation is available. Set ST1 ON to move to the end point and ST0 ON to start point.		
	2-Input, 2-Point Movement [3-Point Positioning]	[Both switches ON to move to intermediate point] Set both ST0 and ST1 ON to stop at intermediate point for positioning. Set both ST0 and ST1 OFF and it stops on the way. [Both switches OFF to move to intermediate point] Set both ST0 and ST1 OFF to stop at intermediate point for positioning. Set both ST0 and ST1 ON and it stops on the way.		

2. Details of PIO Signal

Signal Type	Signal Name	Content of Signal	Function		
			2-Point Stop (2-Point Positioning)	3-Point Stop (3-Point Positioning)	
			1-Input, 2-Point Movement [Single Solenoid System]	2-Input, 2-Point Movement [Double Solenoid System]	2-Input, 3-Point Movement [3-Point Positioning]
PIO Power supply	24V	I/O Power supply +	It is the common power source for I/O circuit. The positive (+) side of 24V DC is connected.		
	0V	I/O Power supply –	It is the common power source for I/O circuit. The negative (–) side of 24V DC is connected.		
Input	ST0	Movement Signal 1	Performs positioning at the end point when ON level is detected. Performs positioning at the start point when OFF level is detected.	Performs positioning at a corresponding point when ON level is detected. ST0: OFF, ST1: ON to move to end point ST0: ON, ST1: OFF to move to start point	Performs positioning at a corresponding point when ON level is detected. ST0: OFF, ST1: ON to move to end point ST0: ON, ST1: OFF to move to start point
	ST1	Movement Signal 2		[Both switches ON to move to intermediate point] ST0: OFF, ST1: OFF to stop on the way ⚠Note ST0: ON, ST1: ON for positioning at intermediate point.	[Both switches ON to move to intermediate point] ST0: ON, ST1: ON to move to intermediate point ST0: OFF, ST1: OFF to stop on the way [Both switches OFF to move to intermediate point] ST0: OFF, ST1: OFF to move to intermediate point ST0: ON, ST1: ON to stop on the way
	RES	Alarm Reset	When the signal leading edge created in the mode change from OFF to ON, is detected, the currently issued alarm is reset. *Depending on the alarm level, alarm reset might not be available. [Refer to the Instruction Manual for the details.		
Output	Pressing Function — Unused	LS0	Start Point Detection	The same operation as of the sensor of the air cylinder is performed. It is turned ON when the current position is within the positioning width for each position detection output.		
		LS1	End Point Detection			
		LS2	Intermediate Point Detection			
	Pressing Function — Used	PE0	Completion of Start Point Positioning	This signal is turned ON when the current position goes within the positioning width, and the positioning to the target position is complete. It is turned OFF in the Servo-Motor OFF mode or the Emergency Stop Mode.		
		PE1	Completion of End Point Positioning			
		PE2	Intermediate Point Positioning Completion			
		HEND	Home return completion	This signal is turned ON when the home return operation is completed. This signal should not exist when operation pattern of 3-point stop (3-point positioning) is chosen.		
		*ALM	Alarm Output Signal	This signal is turned ON when the controller is in the normal condition and turned OFF when the controller is in the alarm condition.		

3. I/O Circuit Section

Specifi-cation	Input section		Output section	
Input voltage	24V DC±10%		Load voltage	24V DC
Input current	4mA 1circuit		Peak load electric current	50mA/1point
ON/OFF voltage	ON voltage 18V DC or more OFF voltage 6V DC or less		Leakage current	MAX.0.1mA/1point
NPN				
PNP				

4. PIO (Input and Output Signal) Connector

Operation Pattern			2-Point Stop (2-Point Positioning)	3-Point Stop (3-Point Positioning)
Function			• 2-Point Movement • Pressing Operation • Adding and Selecting Stop Action • Condition Check	• 2-Point/3-Point Movement • Pressing Operation • Adding and Selecting Stop Action • Condition Check
Pin No.	Wire Color	Signal Type	Signal Name	Signal Name
1	BR	PIO Power supply	24V	24V
2	RD		0V	0V
3	OR	Input	ST0 (Solenoid A: Movement to Start/End Point) [1]	ST0 (Solenoid A: Movement Signal 1)
4	YW		—	ST1 (Solenoid B: Movement Signal 2)
5	GN		RES (Alarm Reset)	RES (Alarm Reset)
6	BL		—	—
7	PL	Output	LS0(Start Point Detection)/ PE0(Completion of Start Point Positioning) [2]	LS0(Start Point Detection)/ PE0(Completion of Start Point Positioning) [2]
8	GY		LS1(End Point Detection)/ PE1(Completion of End Point Positioning) [2]	LS1(End Point Detection)/ PE1(Completion of End Point Positioning) [2]
9	WT		HEND (Home return completion)	LS2 (Intermediate Point Detection)/ PE2 (Intermediate Point Positioning Completion) [2]
10	BK		*ALM (Alarm) [3]	*ALM (Alarm) [3]

[10-pin Plug for PIO] FMC1,5/10-ST-3,5 (Manufactured by Phoenix Contact)


10 9 8 7 6 5 4 3 2 1 ← Pin No.

*1: Set ST0 ON to move to the end point and OFF to the start point.
*2: Output signals LS0 to 2/PE0 to 2 will be set to PE0 to 2 if use pressing function is set in the initial setting, and LS0 to 2 if do not use pressing function is set.
*3: ALM shows ON signal when in normal operation and turns OFF when error is occurred.

Expanded Connection Diagram (Example)

Circuit diagrams shown below are the examples of which the actuator is stopped by an emergency stop commanded from the system side (equipment connected to this controller).
Emergency stop switch on the touch panel teaching is active only to the connected controller, and cannot stop the system side.

1. NPN Connection
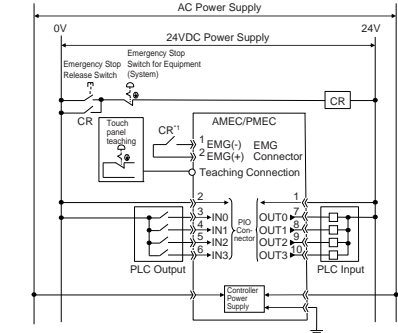
2. PNP Connection
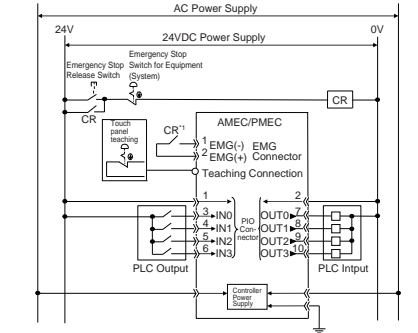
*1 The emergency-stop relay (CR contact) is connected to each controller.
For the contact for CR, use the type of 24V DC, 2A/contact or more.
When satisfaction of the Safety Categories is required, perform an appropriate treatment such as power shutoff.
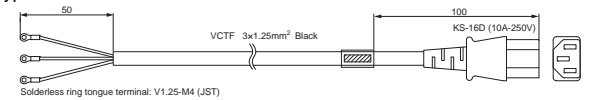
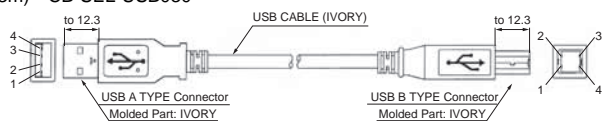## Dimensions of Cables

(1) Power Supply Cable (2m)
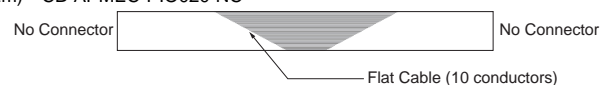1) 100V AC Type: EST-ECCB-VCT-7AL2000 (Maker: ECHO ELECTRIC CO.,LTD)

2) 200V AC Type: CB-APMEC-PW020-TM

VCTF 3x1.25mm² Black   KS-16D (10A-250V)
Solderless ring tongue terminal: V1.25-M4 (JST)

(2) USB Cable (3m)   CB-SEL-USB030

USB CABLE (IVORY)
USB A TYPE Connector Molded Part: IVORY
USB B TYPE Connector Molded Part: IVORY

(3) PIO Cable (2m)   CB-APMEC-PIO020-NC
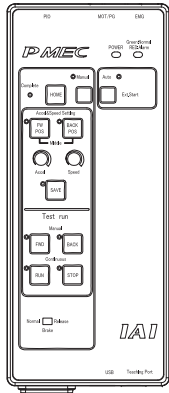

No Connector   No Connector
Flat Cable (10 conductors)

*Determine the cable color on one side and connect to PIO connector FMC 1.5/10-ST-3.5 (manufactured by Phoenix Contact) that is packaged in the product.

Operation

Pictures show PMEC. It should be the same for AMEC.

1. Operation Panel Functions

1.1 Switches Used for Mode Selection (Auto ⇔ Manual)

Note that the following operations cannot be performed if a teaching tool is connected to the USB port or teaching connection port.

When Switching to Auto Mode (Manual → Auto)		Hold down the Auto button for more than 1 sec., and it switches to the Automatic Mode. A "beep" noise is made and the Auto indicator turns ON when it is switched over.
When Switching to Manual Mode (Auto → Manual)		Hold down the Manual button for more than 1 sec., and it switches to the Manual Mode. A "beep" noise is made and the Manual indicator turns ON when it is switched over.

1.2 Switch Used for Home-Return Operation

Note that the following operations cannot be performed if a teaching tool is connected to the USB port or teaching connection port.

When Performing Home-Return Operation (Valid in Manual Mode)		Press the HOME button. Complete indicator flashes during home-return operation, and the Complete indicator turns ON when the home-return operation completes.

1.3 Switches Used in Manual Operation

Note that the following operations cannot be performed if a teaching tool is connected to the USB port or teaching connection port.

Move Forward Manually (Valid in Manual Mode)		It moves forward while holding down the button. It stops once the button is released. The indicator flashes while moving forward, and turns ON when it reaches to the end point (or intermediate point).
Move Backward Manually (Valid in Manual Mode)		It moves backwards while holding down the button. It stops once the button is released. The indicator flashes while moving backwards, and turns ON when it reaches to the start point.

1.4 Switch Used for Brake Release

It is the brake compulsory release switch for the actuator equipped with a brake.
Note that the following operations cannot be performed if a teaching tool is connected to the USB port or teaching connection port.

When Release the Brake		Turn the switch to Release side to release the brake. Have the operation of this switch on such occasions that a release of the brake is necessary as when a work piece is to be attached, the actuator needs to be moved for the direct teaching, etc.
		⚠ • When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. • Do not fail to put the switch back to the normal side after the operation is finished.

⚠ **Caution**

Operation on Operation Panel cannot be performed if the touch panel teaching or the USB cable is connected.
Disconnect the touch panel teaching and USB cable before operating the Operation Panel.

1.5 Switches Used to Change Positioning Point Number

Setting for the number of positioning points (2-point or 3-point stops) can be performed.
Note that the following operations cannot be performed if a teaching tool is connected to the USB port or teaching connection port.
(Note) This function is available for Ver. 0002 and later for the panel board application software.

Confirm the current setting of the positioning point number (Valid in Programming Mode)		The indicators stated below blink only during Operation button being pressed, and the number of positioning points currently set is displayed.
		2-point stop : Auto indicator + Manual indicator
		      Makes noise 2 times as "pip, pip"
		3-point stop : Auto indicator + Manual indicator + Complete indicator
		      Makes noise 3 times as "pip, pip, pip"

When changing the positioning point number		Press Homing and Manual buttons together and supply the power. Confirm a buzzer is made for 2 seconds and release the buttons.
		If the current setting is 2-point stop
		    → setting is changed to 3-point stop
		If the current setting is 3-point stop
		    → setting is changed to 2-point stop

⚠ **Caution**

(1) Operation on Operation Panel cannot be performed if the touch panel teaching or the USB cable is connected.
Disconnect the touch panel teaching and USB cable before operating the Operation Panel.

(2) In the case the number of positioning points is changed after the position programming is done, perform the programming again. The actuator may move to an unexpected position thus it is risky.

1.6 Switches Used for Position Programming

By selecting Position Programming Mode, the position (forward, backward and intermediate) can be registered with moving the actuator without using the teaching tool.
There are 2 types in the position programming.
  (1) Direct Teaching
  (2) Jog Teaching
Perform the following operation to switch the mode from Manual Mode to Position Programming Mode.
The following operation cannot be performed if a home-return operation is not completed, or the teaching tool is connected to the USB connector or the teaching connector.
(Note) This function is available for "Ver.0002" and later for the panel board application software.

When Switching to Position Programming Mode (Manual → Programming)		By pressing Manual and Stop buttons together, the mode switches to Position Programming Mode. Save indicator starts blinking once the mode is switched over. Press Manual and Stop buttons together once again to set the mode back to Manual Mode. Save indicator turns OFF once the mode is switched over.
When Canceling Position Programming Mode (Programming → Manual)		

(1) When Registering Position with Direct Teaching
This function is valid in Programming Mode.

When Switching to Servo OFF		Press Manual button to turn the servo OFF. With this condition, the actuator can be moved with hand. Move it with hand to a position where it is desired to be registered.
When Release the Brake		Turn the switch to Release side to release the brake compulsorily.
		⚠ • When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. • Do not fail to put the switch back to the normal side after the operation is finished.
When Registering Forward Position (End Point)		Press FW POS (end point) button to choose. The indicator on the pressed button turns ON once the mode is switched over.
		Press the SAVE button. A "beep" noise is made and the indicator turns ON when registration is complete.
When Registering Backward Position (Start Point)		Press BACK POS (start point) button to choose. The indicator on the pressed button turns ON once the mode is switched over.
		Press the SAVE button. A "beep" noise is made and the indicator turns ON when registration is complete.
When Registering Intermediate position		Press Forward and Backward together. The indicators on both buttons turn ON once the mode is switched over.
		Press the SAVE button. A "beep" noise is made and the indicator turns ON when registration is complete. Intermediate position cannot be registered when the setting is 2-point stop.
When Switching to Servo ON		Press Manual button again to turn the servo ON and the operation becomes available.

(2) When Registering Position with Jog Teaching (Jog and Inching operations)
This function is valid in Programming Mode.

When Move Forward Manually		Move the actuator forward to a position where it is desired to be registered. Press Forward button and the actuator performs the inching operation [Note 1] in the forward direction. Keep holding the button and the operation changes to the jog operation [Note 1]. Keep holding the button further and the jog operation [Note 1] becomes faster step by step.
When Move Backward Manually		Move the actuator backward to a position where it is desired to be registered. Press Backward button and the actuator performs the inching operation [Note 1] in the backward direction. Keep holding the button and the operation changes to the jog operation [Note 1]. Keep holding the button further and the jog operation [Note 1] becomes faster step by step.

When Registering Forward Position (End Point)		Press FW POS (end point) button to choose. The indicator on the pressed button turns ON once the mode is switched over.
		Press the SAVE button. A "beep" noise is made and the indicator turns ON when registration is complete.
When Registering Backward Position (Start Point)		Press BACK POS (start point) button to choose. The indicator on the pressed button turns ON once the mode is switched over.
		Press the SAVE button. A "beep" noise is made and the indicator turns ON when registration is complete.
When Registering Intermediate position		Press Forward and Backward together. The indicators on both buttons turn ON once the mode is switched over.
		Press the SAVE button. A "beep" noise is made and the indicator turns ON when registration is complete. Intermediate position cannot be registered when the setting is 2-point stop.

(Note 1) When registering the position with using Jog/Inching Mode, press either Forward or Backward button and hold it down, and the operation mode changes in the order stated below;

    1) Inching Movement distance: 0.5mm
            ↓ (after 1.6 seconds passed)
    2) Jog   Speed: 1mm/s
            ↓ (after 1 second passed)
    3) Jog   Speed: 10mm/s
            ↓ (after 1 second passed)
    4) Jog   Speed: 30mm/s
            ↓ (after 1 second passed)
    5) Jog   Speed: 50mm/s
            ↓ (after 1 second passed)
    6) Jog   Speed: 100mm/s

If releasing the button during jog or inching, the operation starts from 1) again.

⚠ **Caution**

Keep pressing Jog button and the speed increases step by step. Therefore, it is recommended to release the button once the actuator gets close to the target point and press the button again to have a more delicate operation. Otherwise, there is a risk to crash the actuator.

In the following cases, it is invalid to select Position Programming functions.

(1) Home-return operation is incomplete
    Perform the operation after performing the home-return operation.
(2) Operation on Operation Panel cannot be performed if the touch panel teaching or the USB cable is connected.
    Disconnect the touch panel teaching and USB cable before operating the Operation Panel.

1.7 Switches and Rotary Knobs Used in Acceleration/Deceleration and Speed Settings

The speed to move and the acceleration/deceleration speed of the actuator to the forward, backward and intermediate positions can be determined.
Note that the following operations cannot be performed if a teaching tool is connected to the USB port or teaching connection port.
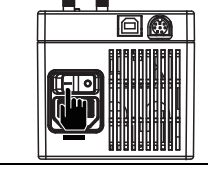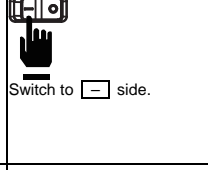
Register Acceleration and Deceleration Speed (Valid in Manual Mode)		Press FW POS (end point) or BACK POS (start point) buttons to choose. For the intermediate point, press FW POS and BACK POS buttons at the same time. The indicator on the pressed button turns ON once the mode is switched over.
		Turn the Acceleration Dial and set it to the preferable position. (Setting Range 1 to 100%)
		Press the SAVE button. A "beep" noise is made and the indicator turns ON when registration is complete. (The setting is registered together with the speed setting)
When Register the Speed (Valid in Manual Mode)		Press FW POS (end point) or BACK POS (start point) buttons to choose. For the intermediate point, press FW POS and BACK POS buttons at the same time. The indicator on the pressed button turns ON once the mode is switched over.
		Turn the Speed Dial and set it to the preferable position. (Setting Range 1 to 100%)
		Press the SAVE button. A "beep" noise is made and the indicator turns ON when registration is complete. (The setting is registered together with the acceleration setting)

1.8 Switches Used in Test Run

Note that the following operations cannot be performed if a teaching tool is connected to the USB port or teaching connection port.

Perform Continuous Operation (Valid in Auto Mode)		It starts the continuous operation when this button is pressed. Continuous operation is performed in the order of end point → start point → end point when it is set to the 2-point positioning. Continuous operation is performed in the order of intermediate point → end point → start point → intermediate point when it is set to the 3-point positioning. The indicator flashes during the continuous operation.
Stop Continuous Operation (Valid in Auto Mode)		Press this button and the operation stops. The indicator turns ON once the operation is stopped.

2. Operation by Operation Panel

Turn on the Power		
		Switch to ⊖ side.
	POWER ⬤ Green:Normal / RED:Alarm	POWER indicator and Normal/Alarm indicator turns to green.
If Error Occurred	POWER ⬤ Green:Normal / RED:Alarm	When an error is occurred, Normal/Alarm indicator turns to red. Confirm the alarm code on MEC PC software or touch panel teaching and perform an appropriate treatment. [Refer to the Instruction Manual for more details]

• To Select the Mode (Auto → Manual)

Switch the setting to Manual Mode.
Hold the Manual button for more than 1 sec.

A "beep" noise is made and the Manual indicator turns ON.

(Note) Confirm the PC or touch panel teaching is not connected.

• Make a Home-Return Operation

Perform the home-return operation.

Press HOME button.
The actuator starts home-return operation. Complete indicator flashes during the operation.
The indicator turns ON once the home-return operation is complete.

• To Perform Manual Operation

Confirm the Complete indicator is blinking and the home-return operation is completed.
Perform a home-return operation if the Complete indicator is OFF and the home-return operation is not completed.
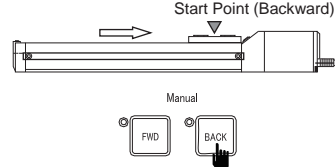
Manual Operation (for 2-Point Positioning)
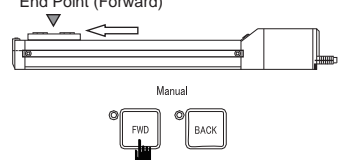
Move forward — End Point (Forward)

Move backward — Start Point (Backward)

While the FWD button is held, the actuator moves forward till it reaches to the end point. Forward indicator keeps flashing during this operation. The operation stops once the button is released.
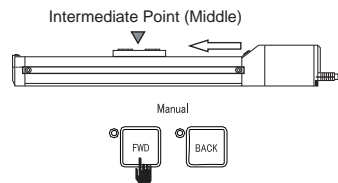
While the BACK button is held, the actuator moves backwards till it reaches to the start point. Backward indicator keeps flashing during this operation. The operation stops once the button is released.

Manual Operation (for 3-Point Positioning)

Move forward (start from the home position) — Intermediate Point (Middle)
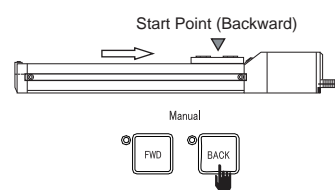
Move backwards — Start Point (Backward)

While the FWD button is held, the actuator moves forward till it reaches to the intermediate point. Forward indicator keeps flashing during this operation. The operation stops once the button is released.

While the BACK button is held, the actuator moves backwards till it reaches to the start point. Backward indicator keeps flashing during this operation. The operation stops once the button is released.

End Point (Forward)
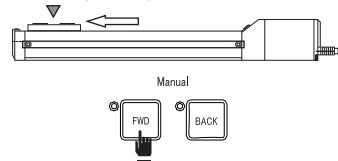
Again, while the FWD button is held, the actuator moves forward till it reaches to the end point. Forward indicator keeps flashing during this operation. The operation stops once the button is released.
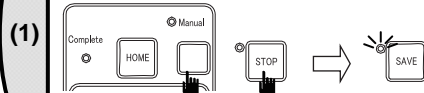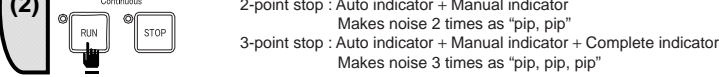

• To Confirm Current Positioning Point Number

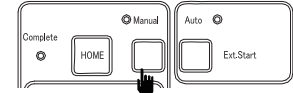**(1)** Switch to Position Programming Mode. Press Manual and Stop buttons together.

"Pip" noise is made and Save indicator starts blinking.

(2) The indicators stated below blink only during Operation button being pressed, and the number of positioning points currently set is displayed.

2-point stop : Auto indicator + Manual indicator
Makes noise 2 times as "pip, pip"
3-point stop : Auto indicator + Manual indicator + Complete indicator
Makes noise 3 times as "pip, pip, pip"

• To Change Positioning Point Number

Press Homing and Manual buttons together and supply the power.
Confirm a buzzer is made for 2 seconds and release the buttons.

If the current setting is 2-point stop
→ setting is changed to 3-point stop
If the current setting is 3-point stop
→ setting is changed to 2-point stop

• Register the Position

Confirm the Complete indicator is blinking and the home-return operation is completed.
Perform a home-return operation if the Complete indicator is OFF and the home-return operation is not completed.

(1) When Registering Position with Direct Teaching

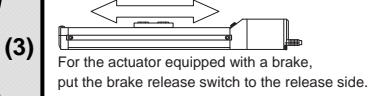**(1)** Switch to Position Programming Mode. Press Manual and Stop buttons together.
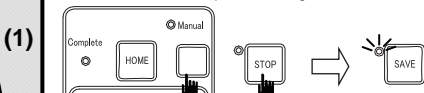
"Pip" noise is made and Save lamp starts blinking.

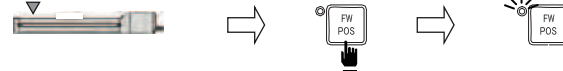**(2)** Press Manual button to turn the servo OFF.

The actuator can be moved with hand.

(3) Move the actuator with hand to a position where it is desired to be registered

For the actuator equipped with a brake, put the brake release switch to the release side.
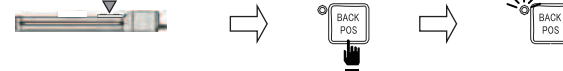
Normal ▢ Release
Brake

⚠ • When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity.
• Do not fail to put the switch back to the normal side after the operation is finished.

(4)

When Registering Forward Position — End Point (Forward)

Press FW POS button.   FW POS indicator turns ON.

When Registering Backward Position — Start Point (Backward)

Press BACK POS button.   BACK POS indicator turns ON.

When Registering Middle Position — Intermediate Point (Middle)

This operation cannot be performed when "2-Point Stop" is selected.

Press FW POS and BACK POS buttons together.   FW POS and BACK POS indicators turn ON.

(5) Register the position.

Press the SAVE button.   A "beep" noise is made and the SAVE indicator turns ON when the registration is finished.

(6) Press Manual button to turn the servo ON.

---

(2) When Registering Position with Jog Teaching (Jog and Inching operations)

(1) Switch to Position Programming Mode. Press Manual and Stop buttons together.

"Pip" noise is made and Save indicator starts blinking.

(2) Move the actuator to a position where it is desired to be registered with pressing either Forward or Backward button.

Forward / Backward

(3)

When Registering Forward Position — End Point (Forward)

Press FW POS button.   FW POS indicator turns ON.

When Registering Backward Position — Start Point (Backward)

Press BACK POS button.   BACK POS indicator turns ON.

When Registering Middle Position — Intermediate Point (Middle)

This operation cannot be performed when "2-Point Stop" is selected.

Press FW POS and BACK POS buttons together.   FW POS and BACK POS indicators turn ON.

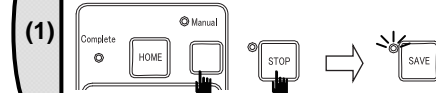**(4)** Register the position.

Press the SAVE button.   A "beep" noise is made and the SAVE indicator turns ON when the registration is finished.

• When Registering Acceleration and Speed

Confirm the Complete indicator is blinking and the home-return operation is completed.
Perform a home-return operation if the Complete indicator is OFF and the home-return operation is not completed.

(1) Choose either one of Forward, Backward or Middle

When Registering Forward Position — End Point (Forward)

Press FW POS button.   FW POS indicator turns ON.

When Registering Backward Position — Start Point (Backward)

Press BACK POS button.   BACK POS indicator turns ON.

When Registering Middle Position — Intermediate Point (Middle)

This operation cannot be performed when "2-Point Stop" is selected.

Press FW POS and BACK POS buttons together.   FW POS and BACK POS indicators turn ON.

(2) Set the acceleration and speed.

Accel   Speed
Turn the dials to adjust.

Acceleration Dial	: Turn clockwise for a quicker start / Turn counterclockwise for a slower start
Speed Dial	: Turn clockwise for a faster move / Turn counterclockwise for a slower move

(3) Resister the setting.

Press the SAVE button.   A "beep" noise is made and the SAVE indicator turns ON when the registration is finished.

• Perform a Test Run.

Switch the mode to Manual Mode if it is remained to Position Programming Mode.
(This process is not necessary if the mode is already on Manual Mode.)

Press Manual and Stop buttons together and the mode switches to Manual Mode.

Save indicator turns OFF once the mode is switched over.

Continuous Operation

Continuous Operation starts when the RUN button is pressed.
Run indicator flashes during the operation.

Press STOP button to stop the continuous operation.

• Perform Automatic Operation.

Press Ext.Start Button.

A "beep" noise is made and the Auto indicator turns ON.

Operation by an external signal (PIO) becomes available.

Initial Setting and Stop Position Setting

Setting of the stop positions (start point, end point and intermediate point) for positioning is performed with a teaching tool (MEC PC software or touch panel teaching) connected.
With a teaching tool connected, not only the settings of the speed and acceleration that are set on the operation panel, but also the settings of stop positions for positioning and pressing can be performed.
For the details of operation, please refer to the Instruction Manual of each teaching tool.

• MEC PC software Instruction Manual	:	ME0248
• Touch panel teaching (CON-PT/PD/PG) Instruction Manual	:	ME0227
• Touch panel teaching) Instruction Manual	:	ME0217

*For MEC PC software Instruction Manual and MEC PC software, please visit our homepage.

Starting Procedures

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

Check of Packed Items
Are there all the delivered Items?   No→   Contact us.

↓Yes

Installation and wiring
Follow the Instruction Manual of the actuator and also this Manual to perform the installation and wiring for the controller and the actuator.   →

Point Check Item
· Installation performed considering the safety protection?
· Has the noise countermeasure been taken?

Yes↓

Power Supply and Alarm Check
Turn on the power supply.
Supplying the power will automatically turns the motor power supply (servo) ON.   →

Check Item
Is the Normal/Alarm indicator showing red light?   Yes →

No↓

Check if the emergency stop switch is released.
If it is already released, check the contents of alarm on MEC PC software or teaching pendant and have an appropriate treatment.

Check of the Safety Citcuit
Confirm that the emergency stop circuit is under normal operation and the motor power supply (servo) turns OFF.   No→   Check the emergency stop circuit.

↓Yes

Stop Position Setting
Adjust the target position with using the MEC PC software or the teaching pendant.
Once the target position is determined, disconnect the USB cable of PC software or the cable of the teaching pendant.

↓

Trial Run Adjustment
Set the speed and acceleration on the operation panel on the front face of the controller.
We suggest that the speed setting should be slow for the first run to confirm there is no problem, and then set to the preferable speed.

Is it condition without any vibration and abnormal noise?   Yes→   Confirm that there is no problem in the actuator installation or the actuator operation condition demands more than the rated voltage.

↓No

Set-up for the operation is completed,
Perform the system operation adjustment.

Troubleshooting

It is an alarm you may often see during the boot. Treat it based on the following description.
For other alarms, please refer to the Instruction Manual.

1. Alarm Level

Alarm Level	Normal/Alarm indicator	What happens when alarm generates	How to reset
Operation cancellation	Red Light is turned ON.	Actuator compulsory stop. Motor power supply (servo) turns OFF after the actuator is decelerated and stopped.	Resetting is to be performed by the reset signal (RES) or a teaching tool such as MEC PC software
Cold Start	Red Light is turned ON.	Actuator compulsory stop (Motor power supply (servo) turns OFF after the actuator is decelerated and stopped. Complete condition of Home return should be cancelled.)	Reconnect the power. (Repeating of home-return operation is necessary.)

2. Alarm Code

Error Level	PMEC	AMEC	Code	Alarm Name	Cause/Treatment
Operation cancelation	○	○	082	Movement Command in Incomplete Home Return	Cause: The movement command is input while the home return has not been completed. Treatment: Input ST0 signal to perform the home return operation.
	○	○	084	Movement Command during Home Return Operation	Cause: The movement command is input during the home return operation. Treatment: Repeat the home-return operation after turning OFF the movement command and resetting the alarm.
Cold Start	○	○	0E5	Encoder Signal Receipt Error	Cause: The missing connector inside the controller is considered. Treatment: In the case that the same error is caused after the power to the controller is re-input, contact our company.
		○	0E7	A-, B- and Z-phase Wire Breaking	The encoder signal is not detected normally. Cause: A looseness in the connection section of the actuator connecting cable or wire breakage is considered. Treatment: Check for the connection condition of the actuator connecting cable and perform the continuity test. If normal, contact our company.
	○		0E8	A and B-phase Wire Breaking	The encoder signal is not detected normally. Cause: A looseness in the connection section of the actuator connecting cable or wire breakage is considered. Treatment: Check for the connection condition of the actuator connecting cable and perform the continuity test. If normal, contact our company
	○		0E9	A-phase Wire Breaking	
	○		0EA	B-phase Wire Breaking	

IAI
Quality and Innovation

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/

Technical Support available in USA, Europe and China

IAI America, Inc.

Head Office: 2690 W, 237th Street Torrance, CA 90505
TEL (310) 891-6015 FAX (310) 891-0815
Chicago Office: 1261 Hamilton Parkway Itasca, IL 60143
TEL (630) 467-9900 FAX (630) 467-9912
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

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

Manual No.: ME0249-6A