PMEC 3-position, AC100/200V controller for RCP2/RCP3 Series

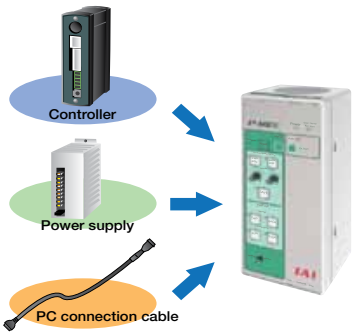
AMEC 3 position, AC100V controller for RCA/RCA2/RCL Series

# ROBO Cylinder 3-position controller MEC (Mechanical Engineer Control)

## Feature

### 1 Low Cost

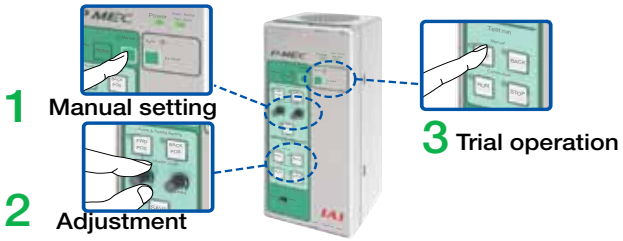
The PMEC package, which comes with a controller, power supply, acceleration/speed change function and PC connection cable, among others, is at an affordable price. The MEC PC software can be downloaded free of change from IAI's website.




### 2 Easy Operation

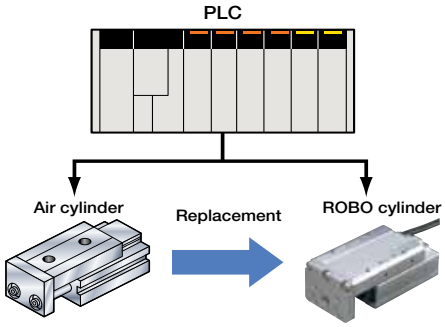
Even a beginner can set up the controller without reading the operation manual. The acceleration and speed can be changed using the knobs on the controller.

* Setting range for acceleration/speed varies depending on the actuator.
Please refer to the instruction manual for further detail.



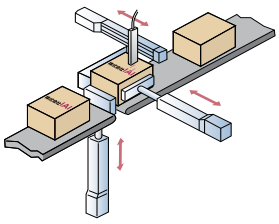

### 3 Easy Replacement from your Air-cylinder System

Operation signals are exactly the same as those used to operate air cylinders. This means that you can use the program of your current PLC directly.




### 4 Push-motion Operation/Intermediate Stopping

Push-motion operation can be performed in the same manner as you would with any air-cylinder system. Also, you can cause the actuator to stop at any desired intermediate point between the home position and stroke end by changing the setting of the intermediate point using the MEC PC software.



## Model List

| Series | PMEC | | AMEC |
|---|---|---|---|
| External View |  | |  |
| Applicable actuators | RCP2 / RCP3 | | RCA / RCA2 / RCL |
| Power supply voltage | 100V | 100-240V | 100V |
| Price | – | – | – |
| Accessories | AC power supply cable (2m)<br>USB cable (3m)<br>I/O cable (2m)<br>I/O connector<br>EMG connector<br>Standard mounting bracket | | |

## Model

**PMEC — C — ☐ I — ☐ — 2 — ☐**

| Series | Type | Motor type | Encoder type | I/O type | I/O cable length | Power supply voltage |
|---|---|---|---|---|---|---|

| Type | |
|---|---|
| C | Standard |

| Encoder type | |
|---|---|
| I | Incremental |

| I/O type | |
|---|---|
| NP | NPN type |
| PN | PNP type |

| Power supply voltage | |
|---|---|
| 1 | Single phase AC100V |
| 2 | Single phase AC100～240V |

| Motor type | |
|---|---|
| 20P | For 20 ☐ pulse motor |
| 28P | For 28 ☐ pulse motor |
| 28SP | For 28 ☐ pulse motor (dedicated for RA3C) |
| 35P | For 35 ☐ pulse motor |
| 42P | For 42 ☐ pulse motor |
| 56P | For 56 ☐ pulse motor |

| I/O cable length | |
|---|---|
| 2 | 2m |

**AMEC — C — ☐ I — ☐ — 2 — 1**

| Series | Type | Motor type | Encoder type | I/O type | I/O cable length | Power supply voltage |
|---|---|---|---|---|---|---|

| Type | |
|---|---|
| C | Standard |

| Encoder type | |
|---|---|
| I | Incremental |

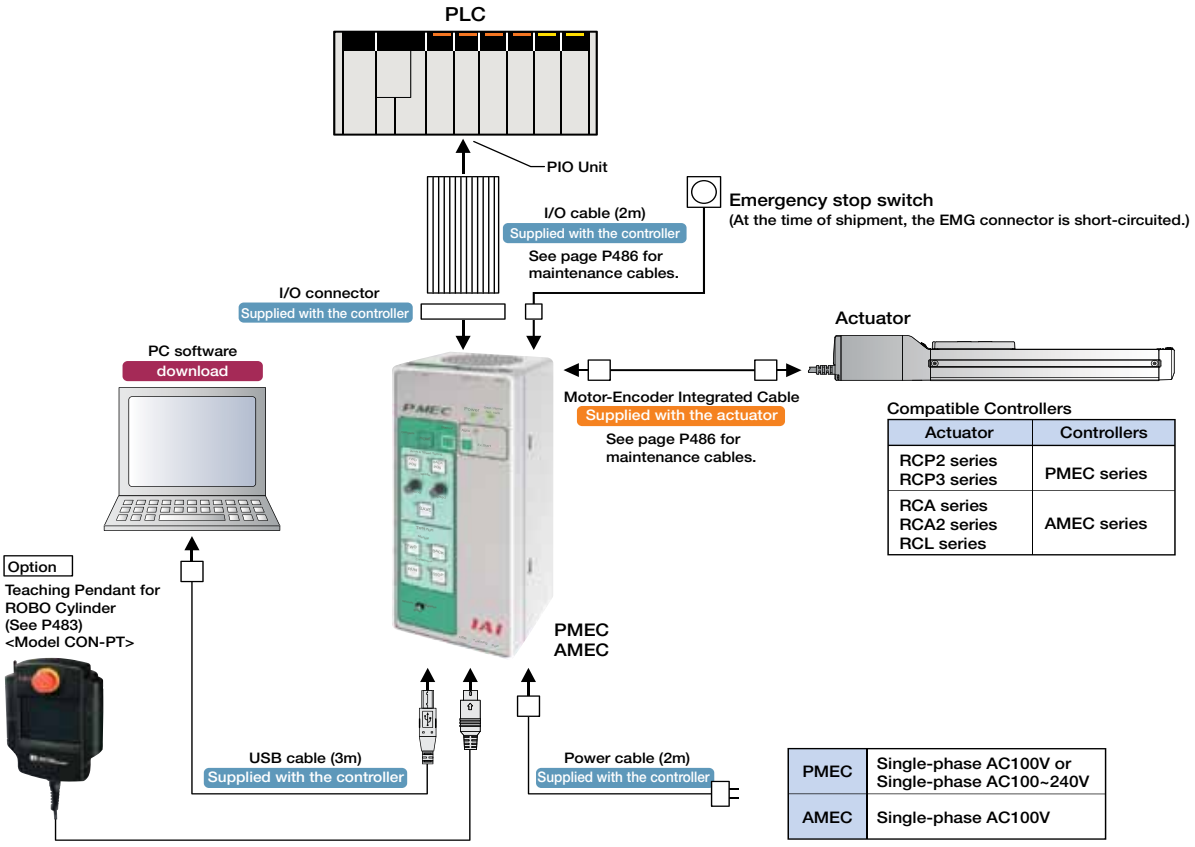
| I/O type | |
|---|---|
| NP | NPN type |
| PN | PNP type |

| Power supply voltage | |
|---|---|
| 1 | Single phase AC100V |

| Motor type | |
|---|---|
| 2 | For 2W motor |
| 5 | For 5W motor |
| 10 | For 10W motor |
| 20 | For 20W motor |
| 20S | For 20W motor (dedicated for RCA2-SA4C/TA5C/RCA-RA3☐) |
| 30 | For 30W motor |

| I/O cable length | |
|---|---|
| 2 | 2m |

## System Configuration




Compatible Controllers

| Actuator | Controllers |
|---|---|
| RCP2 series<br>RCP3 series | PMEC series |
| RCA series<br>RCA2 series<br>RCL series | AMEC series |

| | |
|---|---|
| PMEC | Single-phase AC100V or Single-phase AC100~240V |
| AMEC | Single-phase AC100V |

## I/O Signal Table

| Motion Pattern | | | 2-Position Travel | 3-Position Travel |
|---|---|---|---|---|
| Pin No. | Wire Color | Signal Type | Signal Name | Signal Name |
| 1 | Brown | PIO power | 24V | 24V |
| 2 | Red | | 0V | 0V |
| 3 | Orange | Input | ST0 (Solenoid A: ON moves to end position, OFF moves to home position) | ST0 (Solenoid A: Move signal 1) |
| 4 | Yellow | | — | ST1 (Solenoid B: Move signal 2) |
| 5 | Green | | RES (Alarm reset) | RES (Alarm reset) |
| 6 | Blue | | — | — |
| 7 | Purple | Output | LS0 (home position detection)/PE0 (home positioning complete)*1 | LS0 (home position detection)/PE0 (home positioning complete)*1 |
| 8 | Gray | | LS1 (end position detection)/PE1 (end positioning complete)*1 | LS1 (end position detection)/PE1 (end positioning complete)*1 |
| 9 | White | | HEND (Homing complete) | LS2 (intermediate point detection)/PE2 (intermediate positioning complete)*1 |
| 10 | Black | | * ALM (alarm)*2 | * ALM (alarm)*2 |

*1: Signals PE0 through PE2 will be output if the pushing motion was enabled in the initial setting. Otherwise, LS0 through LS2 will be output.
*2: * ALM is ON when normal, and OFF when it is activated.

## MEC PC software

By using the MEC PC software you can change the stop position data or run a test operation.
In addition, you can change the setting on the intermediate stop function, pushing function or change the coordinates.

The MEC PC software can be downloaded from the IAI website.

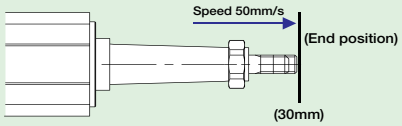
IAI Website: www.intelligentactuator.com

## Explanation of PIO Patterns

### PIO Pattern (2-position travel)

This motion pattern is between two positions, the home position and the end position. The home and end position can be configured numerically (using the MEC PC software or the optional touch panel teaching pendant).
Two motions are possible: A positioning motion moves the rod or the slider to the specified position, and a pushing motion presses the rod against a workpiece.

#### Positioning



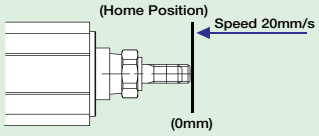

Input Signal

| ST0 | Solenoid A | ON |
|---|---|---|

When ST0 is turned ON, the slider/rod moves at 50mm/s to the end position (30mm position).

End Position Data

| | |
|---|---|
| Position | 30mm |
| Speed | 50mm/s |
| Pushing Force | — |
| Width | — |




Input Signal

| ST0 | Solenoid A | OFF |
|---|---|---|

When ST0 is turned OFF, the slider/rod returns to the home position (0mm position) at 20mm/s.

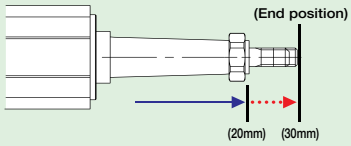
Home Position Data

| | |
|---|---|
| Position | 0mm |
| Speed | 20mm/s |
| Pushing Force | — |
| Width | — |

### PIO Pattern (2-position travel)

This motion pattern is between two positions, the home position and the end position, which enables a pushing motion of the rod against a workpiece.

#### Push




Input Signal

| ST0 | Solenoid A | ON |
|---|---|---|

When the input 0 is turned ON, the actuator moves the rod to the 20mm position at 80mm/s, and from there, pushes it at slower speed to the 30mm position.

End Position Data

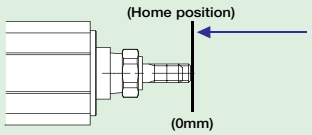
| | |
|---|---|
| Position | 30mm |
| Speed | 80mm/s |
| Pushing Force | 50% |
| Width | 10mm |

* The pushing motion is performed when there is a numerical value in the controller's push force data. (If there is no numerical value, a positioning motion is performed instead.)

### PIO Pattern (3-position travel)

This motion pattern enables moves between three positions: the end position and the home position, as well as an intermediate position.
The positions are switched by combining two signals, ST0 and ST1.

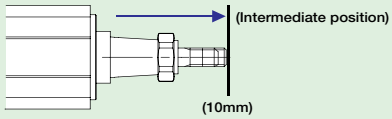
#### Positioning




Input Signal

| ST0 | Solenoid A | ON |
|---|---|---|
| ST1 | Solenoid B | OFF |

When only the ST0 is turned ON, the actuator moves to the starting position at a set acceleration and speed.

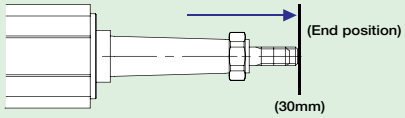



Input Signal

| ST0 | Solenoid A | ON* |
|---|---|---|
| ST1 | Solenoid B | ON* |

When both ST0 and ST1 are turned ON, it will move to the intermediate position at the set acceleration and speed.
When both are turned OFF, it stops at the current position.

* By default, you can configure the MEC where you turn both signals OFF to move to the intermediate position, or both ON to stop at the current position.




Input Signal

| ST0 | Solenoid A | OFF |
|---|---|---|
| ST1 | Solenoid B | ON |

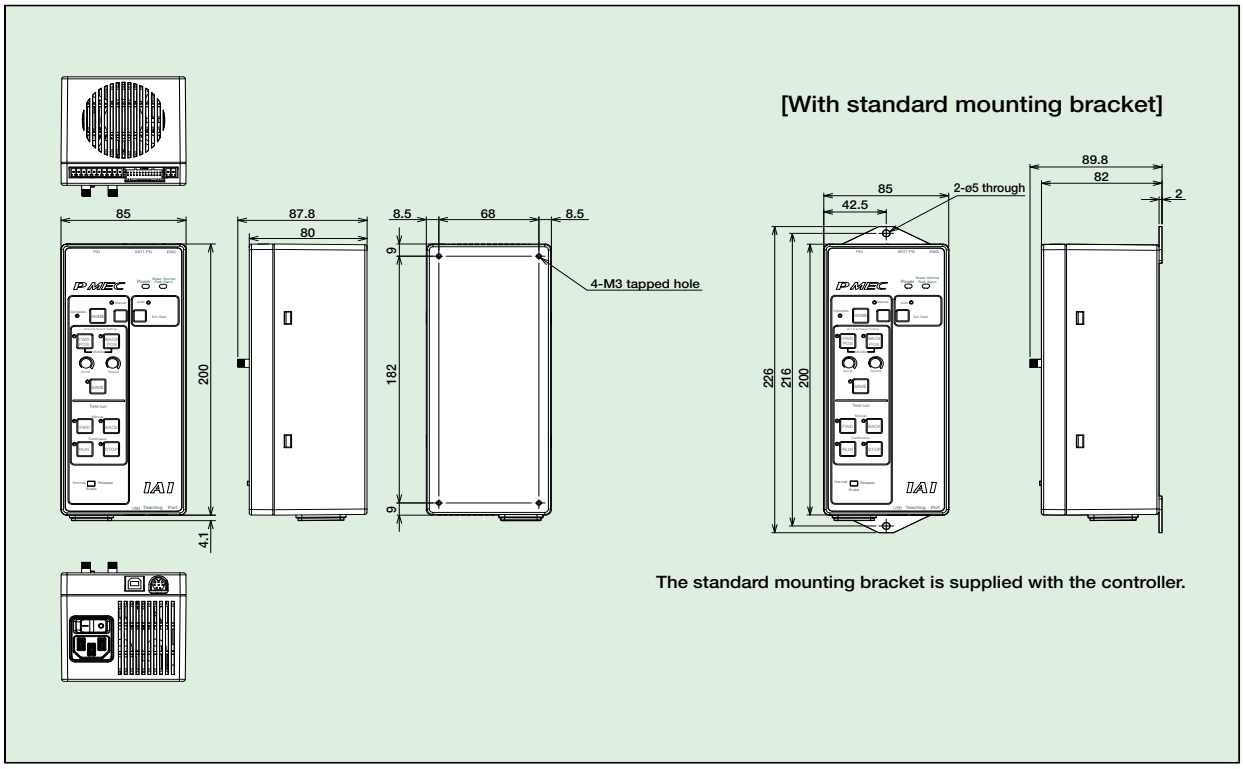
When only ST1 is turned ON, the actuator moves to the end position at a set acceleration and speed.

## Specifications Table

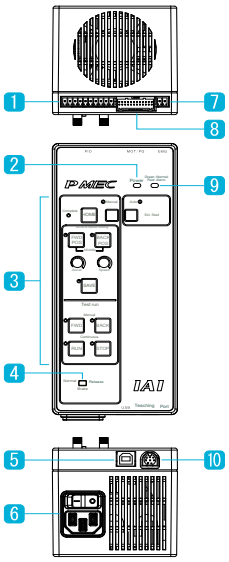
| Item | Type | | |
|---|---|---|---|
| Controller Type | PMEC | | AMEC |
| Connectible Actuators | RCP2/RCP3 Series Actuators | | RCA/RCA2/RCL Series Actuators |
| Number of Controllable Axes | Single axis | | |
| Operation Method | Positioner Type | | |
| Number of Positions | 2 positions / 3 positions | | |
| Backup Memory | EEPROM | | |
| I/O Connector | 10-pin terminal block | | |
| I/O Points | 4 input points / 4 output points | | |
| Power for I/O | Externally supplied DC24V±10% | | |
| Serial Communication | RS485: 1ch/USB: 1ch | | |
| Position Detection Method | Incremental encoder | | |
| Power Supply Voltage | AC100V-115V±10% | AC90V~264V | AC100V-115V±10% |
| Rated Current | 1.3A | 0.67A (AC100V)/0.36A (AC200V) | 2.4A |
| Rush Current | 30A | 15A (AC100V)/30A (AC200V) | 15A |
| Leak Current | 0.50mA max | 0.40mA max (AC100V)<br>0.75mA max (AC200V) | 0.50mA max |
| Dielectric Strength Voltage | DC500V 1MΩ | | |
| Vibration Resistance | XYZ directions 10~57Hz One-side amplitude 0.035mm (continuous), 0.075mm (intermittent)<br>57~150Hz 4.9m/s² (continuous), 9.8m/s² (intermittent) | | |
| Ambient Operating Temperature | 0~40°C | | |
| Ambient Operating Humidity | 10~85% RH (non-condensing) | | |
| Ambient Operating Atmosphere | Free from corrosive gases | | |
| Protection Class | IP20 | | |
| Weight | 500g | 508g | 614g |

Note: The minimum/maximum speeds vary depending on the actuator model. For more information, see the instruction manual, or contact IAI.

## Outer Dimensions



## Names of Parts and Functions




1 PIO connector ····· Connects with a PLC or other external controllers to communicate inputs and outputs (I/O).

2 Power LED ····· When the power is ON, it illuminates in green.

3 Control panel ····· See below

4 Brake switch

| | |
|---|---|
| Release | Used to release the brake of the actuator |
| Normal | The controller automatically controls the brake of the actuator |

5 USB connector ····· When using MEC PC software, connect to the computer via USB.

6 AC inlet ····· Insert the power supply cable.

7 EMG connector ···· Connect the emergency stop button. Short-circuit it if you will not be using an emergency stop button.

8 M/PG connector ···· Insert the motor / encoder cable that connects with the actuator.

9 Status LED

| | |
|---|---|
| RUN (Green) | Indicates the servo status.<br>On = Servo ON, Off=Servo OFF (Energy-saving) status<br>Flashing (1Hz)=Auto servo OFF |
| ALM (Red)<br>EMG (Red) | The LED illuminates if an alarm is turned ON or if the controller has come to an emergency stop. |

10 SIO Connector ····· Connects with the teaching pendant (CON-PT, SEP-PT).

## Explanation of the Control Panel

**HOME button**
When starting, homing is performed first to confirm the 0mm coordinate.

**Manual button**
Press this button to set the acceleration and/or speed, or to run a test operation. (Press for at least 1 second)

**AUTO button**
Press this button when operating from the MEC PC software or the PLC commands. (Press for at least 1 second)

**Acceleration/Speed Settings**
Configure the actuator's motion.

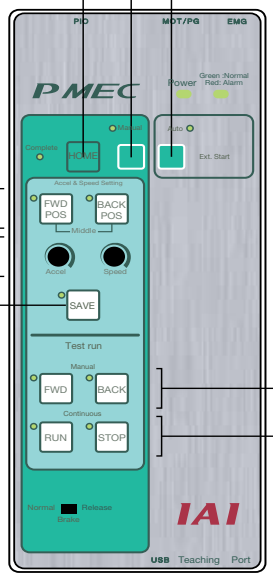
**FWD POS / BACK POS button**
Switch the motion you want to configure (see types below).

FWD POS: Motion toward the end position
BACK POS: Motion toward the home position
Middle: Motion toward an intermediate position

(Enabled from the MEC PC software. simultaneously press "FWD POS" and "BACK POS" to switch.
During a 2-position stop, simultaneous pressing is disabled.)

**Acceleration / Speed knob**
By turning the knob, you can change the speed between 1%~100% of the actuator's maximum speed or rated acceleration / deceleration.
* The minimum speed may be less than 1% in some cases.

**SAVE button**
Saves the speed and acceleration adjusted above.




**Test Operation**
Confirm the saved motion by physically running the actuator.

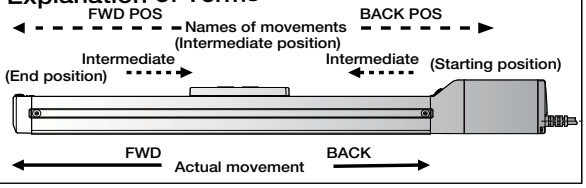
**FWD button**
In a 2-position travel, the actuator moves from the BACK position to the FWD position. In a 3-position travel, the actuator moves from the BACK position to the intermediate position, then to the FWD position.

**BACK button**
The actuator returns to the starting position.

**RUN button**
In a 2-position travel, the actuator moves back and forth between the FWD and BACK positions. In a 3-position travel, the actuator repeats its movement from the BACK position, intermediate position, FWD position, then BACK position.

**STOP button**
Stops the above operation.

**Explanation of Terms**



## Option

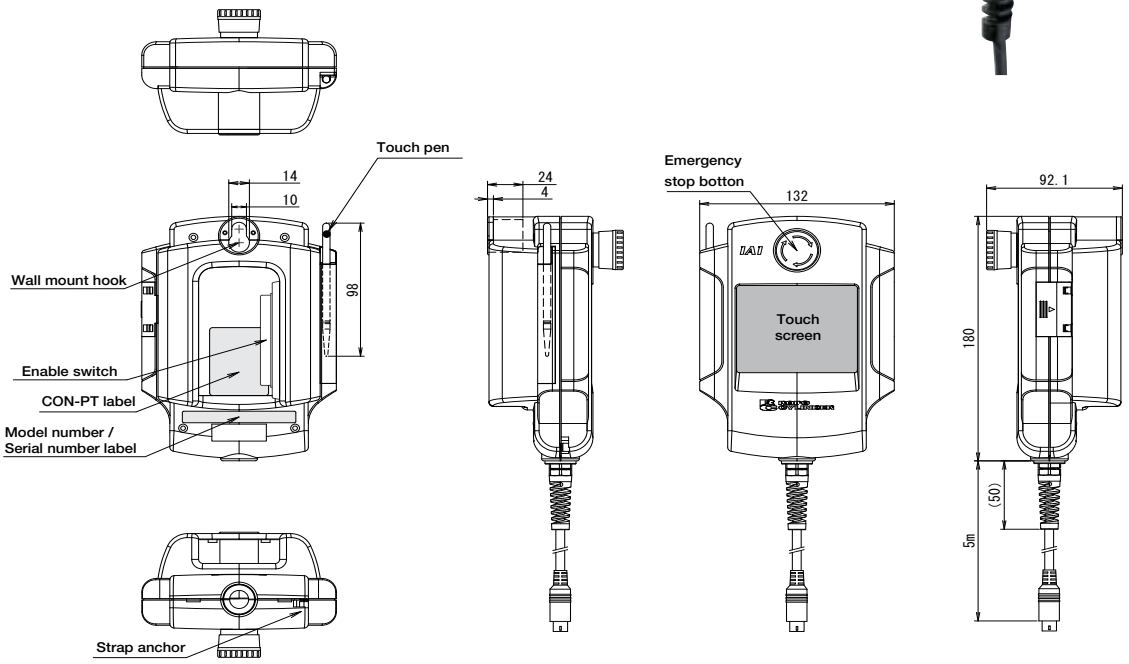
### ● Teaching pendant for position controller

**Features** Data input device easy-to-operate even for beginners with a simple interactive menu screen. Operation arrangements such as positioning of home, end or intermediate position, setting of speed or push force and movement to jog/inching/order position are available.


■ Model/specifications

| Item | | Description |
|---|---|---|
| Model | Japanese edition | CON-PT-M |
| | English edition | CON-PT-M-ENG |
| Type | | Standard |
| Function | | Input/edit position data<br>Movement functions<br>(move to a specified position, jog, inch)<br>Test input and output signals<br>Edit parameters<br>Switch language (Japanese/English) |
| Label | | 3-color LED with backlight |
| Ambient operating temp./humidity | | 0 ~ 50°C 20 ~85%RH (no condensation) |
| Environmental resistance | | IP40 |
| Weight (including cable) | | 750g |
| Accessories | | Touch pen |
| Standard price | | – |

■ Part names / dimensions

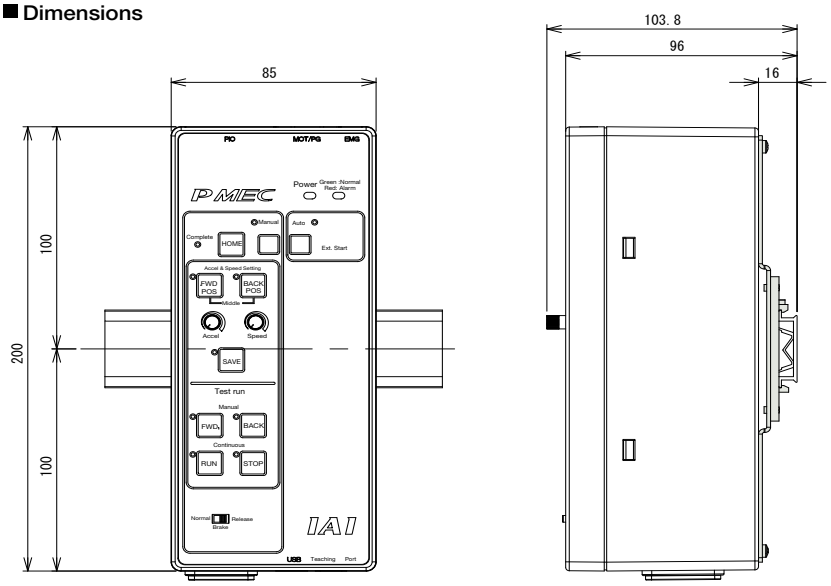



■ Option

• Strap model STR-1

## ● DIN Rail Mounting Bracket MEC-AT-D

■ Dimensions




## ● Maintenance cable

■ List of maintenance cable models

| Type | | Cable length | Model | Standard price |
|---|---|---|---|---|
| Integrated motor-encoder cable | PMEC ←→ RCP3 RCP2-GRSS/GRLS/GRST/SRA4R/SRGS4R/SRGD4R AMEC ←→ RCA2/RCL | 1m | CB-APSEP-MPA010 | – |
| | | 3m | CB-APSEP-MPA030 | – |
| | | 5m | CB-APSEP-MPA050 | – |
| | PMEC ←→ RCP2 | 1m | CB-PSEP-MPA010 | – |
| | | 3m | CB-PSEP-MPA030 | – |
| | | 5m | CB-PSEP-MPA050 | – |
| | PMEC ←→ RCP2-RTBS/RTBSL -RTCS/RTCSL | 1m | CB-RPSEP-MPA010 | – |
| | | 3m | CB-RPSEP-MPA030 | – |
| | | 5m | CB-RPSEP-MPA050 | – |
| | AMEC ←→ RCA | 1m | CB-ASEP-MPA010 | – |
| | | 3m | CB-ASEP-MPA030 | – |
| | | 5m | CB-ASEP-MPA050 | – |
| I/O cable | | 2m | CB-APMEC-PIO020-NC | – |
| | | 3m | CB-APMEC-PIO030-NC | – |
| | | 5m | CB-APMEC-PIO050-NC | – |
| USB cable | | 3m | CB-SEL-USB030 | – |

## Components for maintenance

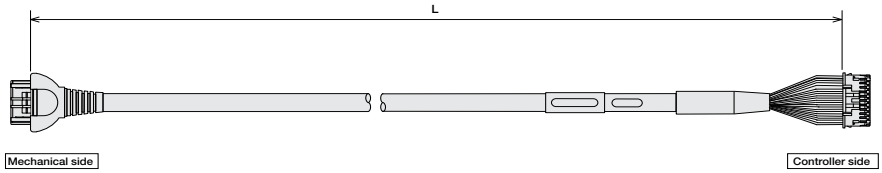
Please refer to the models mentioned below when arrangements such as cable replacement are needed after purchasing the product.

### [RCP3/RCP2 (for specific models*) /RCA2/RCL]-[PMEC/AMEC] Motor encoder integrated cable for indirect connection

Model **CB-APSEP-MPA□□□**

* Enter cable length (L) required in □□□ (compatible for up to max. 20m).
Example: 080=8m

* For RCP2-GRSS/GRLS/GRST/SRA4R/SRGS4R/SRGD4R



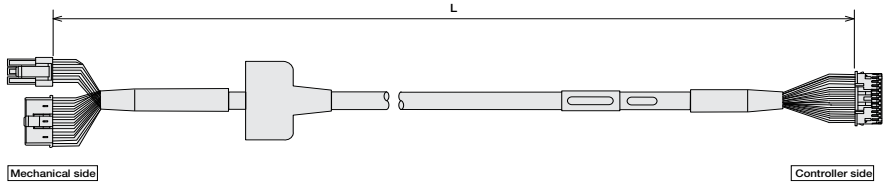

Min. bend radius r=68mm or larger (when movable unit is used)

| Mechanical side Pin number | | Controller side Pin number |
|---|---|---|
| | [PCON](ACON) | |
| A1 | Black [ ØA ](U) | 1 |
| B1 | White [VMM](V) | 2 |
| A2 | Brown [ Ø/A ](W) | 5 |
| B2 | Green [ ØB ]( - ) | 3 |
| A3 | Yellow [VMM]( - ) | 4 |
| B3 | Red [ Ø/B ]( - ) | 6 |
| A4 | Orange [LS+](BK+) | 7 |
| B4 | Gray [LS-](BK-) | 8 |
| A6 | White [ - ](A+) | 11 |
| B6 | Yellow [ - ](A-) | 12 |
| A7 | Red [ A+ ](B+) | 13 |
| B7 | Green [ A- ](B-) | 14 |
| A8 | Black [ B+ ](Z+) | 15 |
| B8 | Brown [ B- ](Z-) | 16 |
| A5 | Black (label)(BK+)(LS+) | 9 |
| B5 | Brown (label)(BK-)(LS-) | 10 |
| A9 | Green (label)(GNDLS)(GNDLS) | 20 |
| B9 | Red (label)(VPS)(VPS) | 18 |
| A10 | White (label)(VCC)(VCC) | 17 |
| B10 | Yellow (label)(GND)(GND) | 19 |
| A11 | NC | 21 |
| B11 | Shield [FG](FG) | 24 |
| | NC | 22 |
| | NC | 23 |

### [RCP2]-[PMEC] Integrated motor-encoder connection cable

Model **CB-PSEP-MPA□□□**

*Enter cable length (L) required in □□□ (compatible for up to max. 20m).
Example: 080=8m



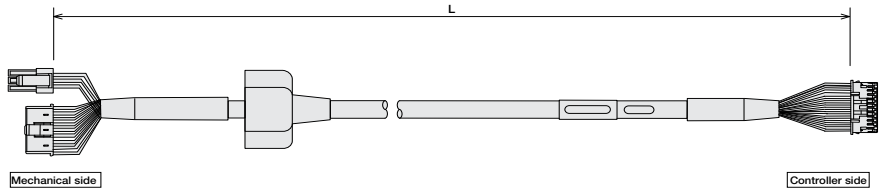

Min. bend radius r=68mm or larger (when movable unit is used)

| Mechanical side Pin number | | Controller side Pin number |
|---|---|---|
| 1 | Black [ ØA ] | 1 |
| 2 | White [ VMM ] | 2 |
| 4 | Red [ ØB ] | 3 |
| 5 | Green [ VMM ] | 4 |
| 3 | Brown [ Ø/A ] | 5 |
| 6 | Yellow [ Ø/B ] | 6 |
| 16 | Orange [ BK+ ] | 9 |
| 17 | Gray [ BK- ] | 10 |
| 5 | NC | 11 |
| 6 | NC | 12 |
| 13 | Black [ LS+ ] | 7 |
| 14 | Brown [ LS- ] | 8 |
| 1 | White [ A+ ] | 13 |
| 2 | Yellow [ A- ] | 14 |
| 3 | Red [ B+ ] | 15 |
| 4 | Green [ B- ] | 16 |
| 10 | White (label)[VCC] | 17 |
| 11 | Yellow (label)[VPS] | 18 |
| 9 | Red (label)[GND] | 19 |
| 12 | Green (label)[(Spare)] | 20 |
| 15 | NC | 21 |
| 7 | NC | 22 |
| 8 | NC | 23 |
| 18 | Shield [ FG ] | 24 |

### [RCA]-[AMEC] Integrated motor-encoder connection cable

Model **CB-ASEP-MPA□□□**

*Enter cable length (L) required in □□□ (compatible for up to max. 20m).
Example: 080=8m



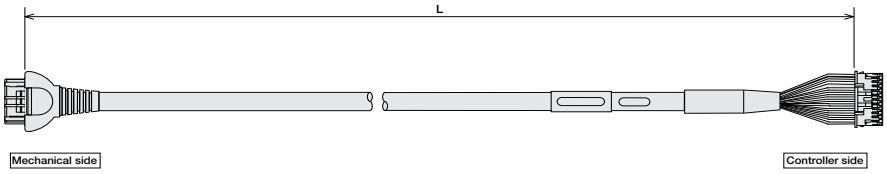

Min. bend radius r=68mm or larger (when movable unit is used)

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

## [RCP2 small rotary]-[PMEC] Motor encoder integrated cable for indirect connection

Model **CB-RPSEP-MPA□□□**

*Enter cable length (L) required in □□□ (compatible for up to max. 20m).
Example: 080=8m



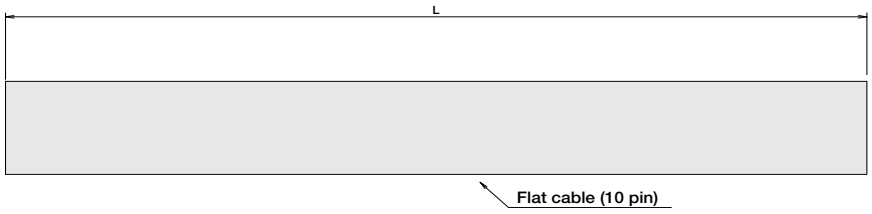

Min. bend radius r=68mm or larger (when movable unit is used)

| Mechanical side Pin number | | Controller side Pin number |
|---|---|---|
| A1 | Black [ ØA ] | 1 |
| B1 | White [ VMM ] | 2 |
| A2 | Brown [ Ø/A ] | 5 |
| B2 | Green [ ØB ] | 3 |
| A3 | Yellow [ VMM ] | 4 |
| B3 | Red [ Ø/B ] | 6 |
| A6 | Orange [ LS+ ] | 7 |
| B6 | Gray [ LS- ] | 8 |
| A7 | Red [ A+ ] | 13 |
| B7 | Green [ A- ] | 14 |
| A8 | Black [ B+ ] | 15 |
| B8 | Brown [ B- ] | 16 |
| A4 | NC | 7 |
| B4 | NC | 8 |
| A5 | Black (label)[BK+] | 9 |
| B5 | Brown (label)[BK-] | 10 |
| A9 | Green (label)[GNDLS] | 20 |
| B9 | Red (label)[VPS] | 18 |
| A10 | White (label)[VCC] | 17 |
| B10 | Yellow (label)[GND] | 19 |
| A11 | NC | 21 |
| B11 | Shield [ FG ](FG) | 24 |
| | NC | 22 |
| | NC | 23 |

## I/O cable for PMEC-C/AMEC-C

Model **CB-APMEC-PIO□□□-NC**

*The 3 types differ in cable length: 020=2m, 030=3m, 050=5m




| Pin NO. | Electric wire color | Signal |
|---|---|---|
| 1 | Brown | PIO Power supply |
| 2 | Red | |
| 3 | Orange | Input |
| 4 | Yellow | |
| 5 | Green | |
| 6 | Blue | |
| 7 | Purple | |
| 8 | Grey | Output |
| 9 | White | |
| 10 | Black | |