IAI
Quality and Innovation

Position Controller with I/O Control Function

MSEP-LC
First Step Guide First Edition

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

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

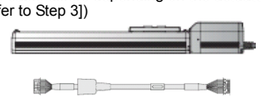
When using this product for the first time, refer to the processes shown below and make sure not to have any missing in checking or mistake in wiring.

Step1 Confirm all the necessary things are prepared (Contact us or our sales agency in case of any missing)

Refer to Section "Product Check" in this manual for details.

☆MSEP-LC

☆Actuator and Connection Cable
(The cable differs depending on the actuator type [Refer to Step 3])



☆CD-ROM (Enclosed in RCM-101-□□)
(The following software is included)
1) RC PC Software
2) Gateway parameter setting tool

☆DVD Instruction Manual
(The following instruction manual is included)
1) MSEP Instruction Manual (M□0299)

2) MSEP-LC Ladder Edit Software Manual (M□0330)

☆Ladder Edit Program (LC-LDS-01)
Download it in IAI homepage
(http://www.iai-robot.co.jp)

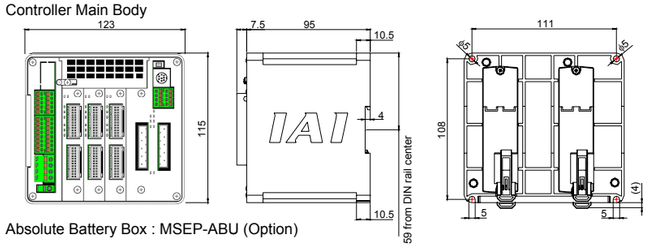
3) MSEP-LC Programming Manual (M□0329)

Step2 Installation

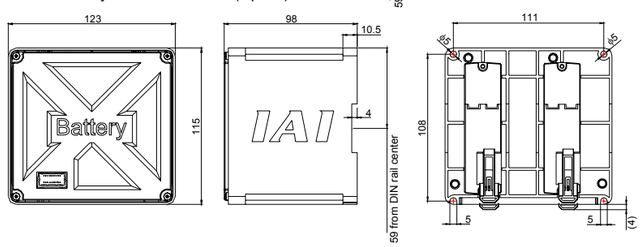
Refer to "Installation Environment" and "Installation and Noise Elimination" in this manual, or "1.7 Installation and Storage Environment" and "Noise Elimination and Mounting Method" in MSEP Instruction Manual

• External Dimensions

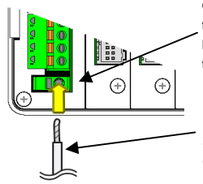
Controller Main Body



Absolute Battery Box : MSEP-ABU (Option)

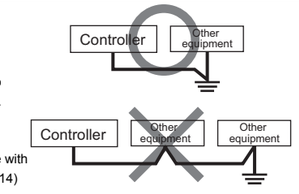


1. Noise Elimination Grounding (Frame Ground)



Connect the ground line to the FG terminal block on the controller unit. Put a tool such as a screwdriver into the square slot and connect the line.

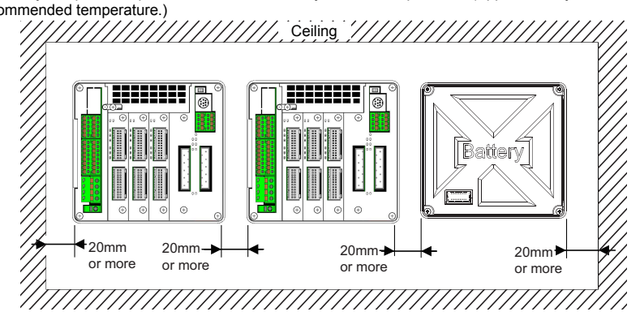
Copper wire: Connect a ground wire with a diameter of 1.6 mm (2mm²: AWG 14) or larger.

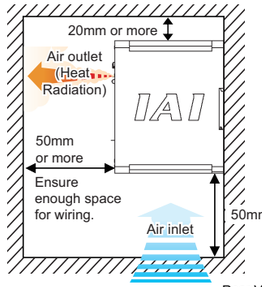


Do not share the ground wire with or connect to other equipment. Ground each controller.

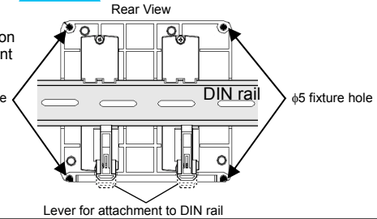
Earth Terminal: Class D grounding (Formerly Class-III grounding : Grounding resistance at 100Ω or less)

2. Cooling Factors and Installation
Keep the ambient temperature of the controller at 40°C or less.
Especially, keep the temperature around the battery at room temperature. (Approximately 20°C is the recommended temperature.)





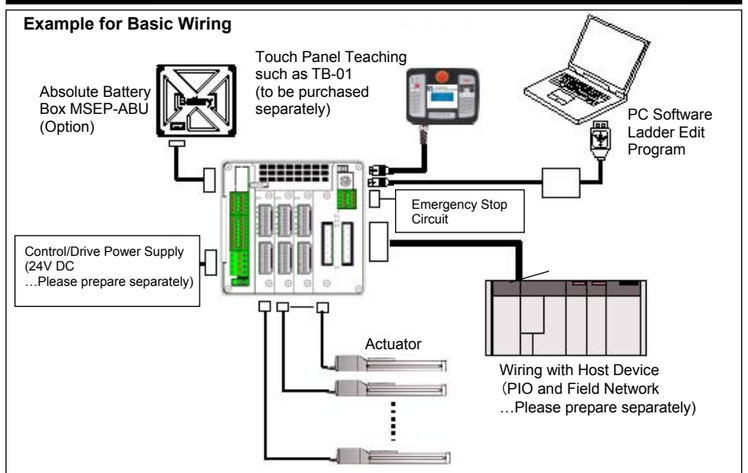
For the attachment of the unit, use the fixture holes on the four corners or attach on the DIN rail. (Attachment should be the same for the absolute battery box.)



Step3 Wiring

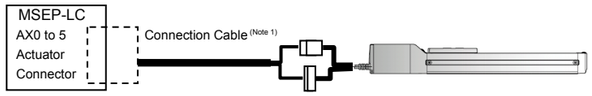
Refer to the contents below or Chapter 2 "Wiring" in MSEP Instruction Manual

Example for Basic Wiring

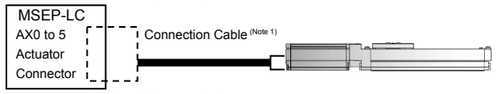


Connection of Actuator • • Connect the actuator following the contents described on the model code card.

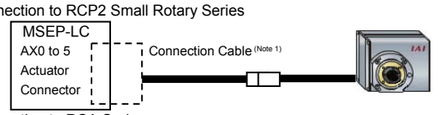
1) Connection to RCP2 Series



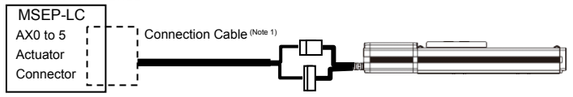
2) Connection to RCP3, RCP4, RCP5, RCA2 and RCL Series



3) Connection to RCP2 Small Rotary Series



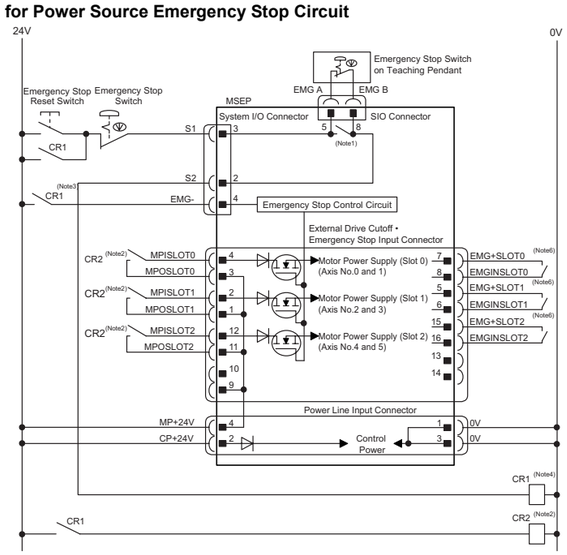
4) Connection to RCA Series



Note 1 Connection Cable Model Codes

Model	Cable□□□: Cable Length	Remarks
RCP2 (Other than Small Rotary)	CB-PSEP-MPA□□□	Robot cable from 0.5 to 20m
Small Rotary Type RCP2-RTBL, RTCL, RTBSL, RTCSL, RTBBL, RTCBL	CB-RPSEP-MPA□□□	Robot cable from 0.5 to 20m
RCA	CB-ASEP-MPA□□□	Robot cable from 0.5 to 20m
RCP3, RCA2, RCL	CB-APSEP-MPA□□□	Robot cable from 0.5 to 20m
	CB-APSEP-MPA□□□-LC	Standard cable from 0.5 to 20m
RCP4 (Other than GR* Type), RCD (Applicable Controller Symbol : D3)	CB-CA-MPA□□□-RB	Robot cable from 0.5 to 20m
	CB-CA-MPA□□□	Standard cable from 0.5 to 20m
RCP4 (GR* Type), RCP5, RCD (Applicable Controller Symbol : D5)	CB-CAN-MPA□□□-RB	Robot cable from 0.5 to 20m
	CB-CAN-MPA□□□	Standard cable from 0.5 to 20m

Example for Power Source Emergency Stop Circuit



Note 1 When the teaching pendant is not connected, S1 and S2 become short-circuited inside the controller.
Note 2 When the motor driving source is cut off externally, connect a contact such as a contactor to the wires between MPISLOT* and MPOSLOT*.
Note 3 The rating for the emergency stop signal (EMG-) to turn ON/OFF at contact CR1 is 24V DC and 10mA.
Note 4 For CR1, select the one with coil current 0.1A or less.
Note 5 When supplying the power by turning on/off the 24V DC, keep the 0V being connected and have the +24V supplied/disconnected (cut one side only).
Note 6 By having a disconnection between EMG+SLOT* and EMGINSLOT+, it is possible to have only the disconnected slot number in emergency stop condition. (*:slot number)

Wiring of I/O (When using Input and output of PIO)
Refer to "Wiring of I/O" in this manual or Chapter 2 "Wiring" in MSEP Instruction Manual.

Wiring of Field Network (When using Field Network)
Refer to the section for wiring of each field network or Chapter 2 "Wiring" in MSEP Instruction Manual.

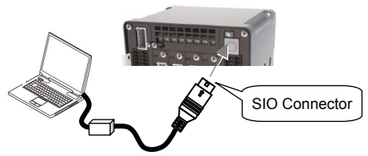
Step4 Establish MSEP-LC Initial Setting • • If none of (1) or (2) is applicable, go to Step 5.

Software Necessary for Initial Setting

1) RC PC Software
(It is necessary when operation is to be made with the operation mode (positioner mode) to register the stop position in advance)

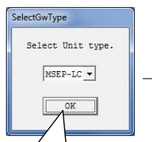
2) Gateway Parameter Setting Tool
(It is necessary when the field network is selected on the extended I/O)

Connect the PC to MSEP-LC with the dedicated cable enclosed in the PC software.



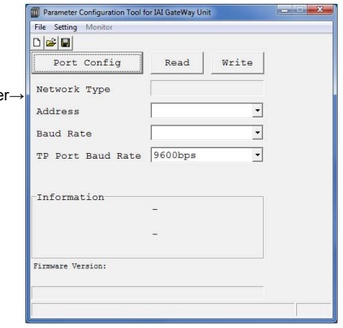
(1) Setting of Field Network (Note) Conduct it only when the field network is mounted on the extended I/O.

1) Start up Gateway Parameter Setting Tool.



Select MSEP-LC and press OK.

→After checking connected unit number→

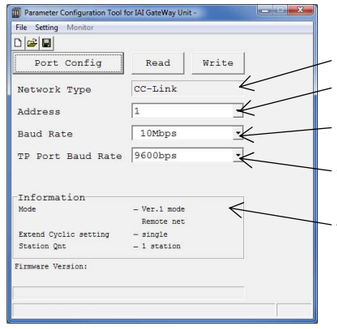


Initial Screen

2) Read in the settings for MSEP-LC.

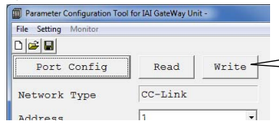
Press the Read button to read in the settings

3) Check the node address, baud rate setting and occupation information of the field network.



- Check network type
- Set node address (Box is in white only when setting is available)
- Baud rate (Box is in white only when setting is available)
- Baud rate setting of SIO connector
- Occupation information of each field network is shown (Make sure to have a memo for the information necessary for the host controller settings)

4) Write in the set information to MSEP-LC.

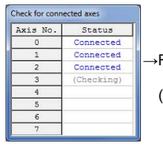


Press the Write button.
Select "Yes" when confirmation is asked.

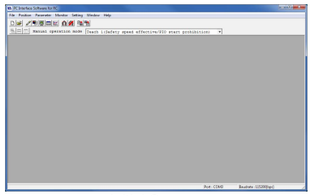
After write, finish Gateway Parameter Setting Tool.

(2) Setting of Target Position (Note) Conduct it only when an operation is made in the positioner mode.

1) Start up RC PC Software.

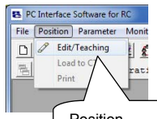


→For the number of connectable actuators→ (Connect even in invalid axis setting)

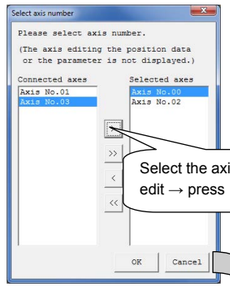


Initial Screen

2) Open the position table.

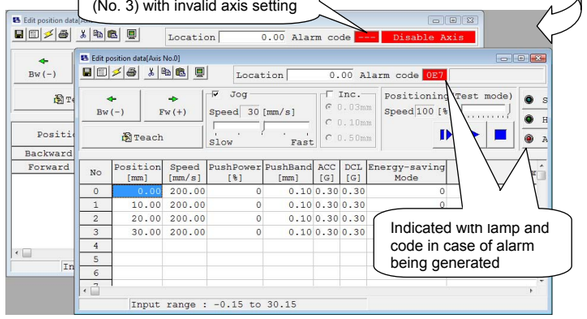


Position → Select Edit/Teaching



Select the axis number to edit → press [>]

For position table of axis number (No. 3) with invalid axis setting

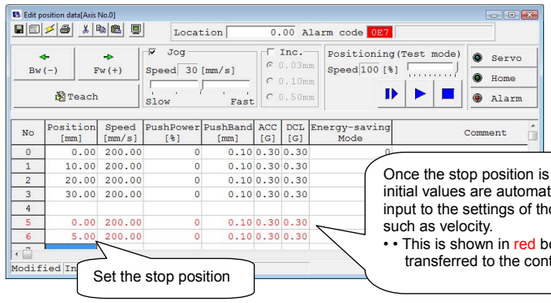


Indicated with lamp and code in case of alarm being generated

Position table of the selected axis number opens (No. 0 and 3 in this example)

Caution: If there are only two to three areas of the lines to input the position for the open position table, conduct Steps 1 to 4 in 3.2.2 "Initial Setting" of MSEP Instruction Manual to establish the settings in Operation Pattern 6.

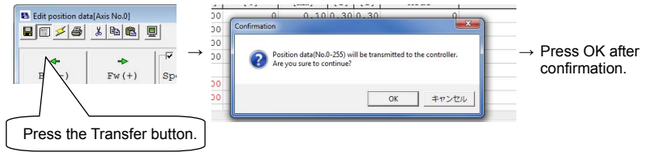
3) Establish the settings such as stop position in the position table.
Refer to 3.3 "Setting o Position Data" in MSEP Instruction Manual for the details of the position table.



Once the stop position is set, initial values are automatically input to the settings of those such as velocity.
• • This is shown in red before transferred to the controller.

Set the stop position

4) Transfer the settings to MSEP-LC.



→ Press OK after confirmation.

Press the Transfer button.

After transfer, finish RC PC software.

Step5 Creating of Ladder Program

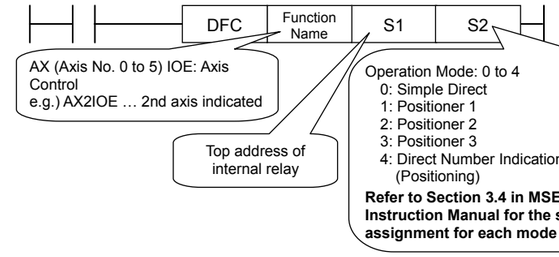
Software and instruction manuals necessary for creating (Installed in DVD Instruction Manuals)

- Ladder Edit Program (LC-LDS-01)
- MSEP-LC Ladder Edit Software Manual (M□0330)
- MSEP-LC Programming Manual (ME0329)
- MSEP Controller Instruction Manual (ME0299)

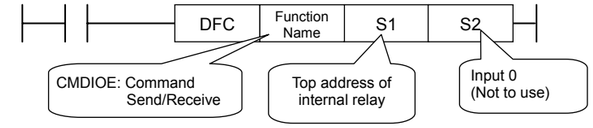
☆ Edit the ladder program by referring to the MSEP-LC ladder edit software manuals above.

[Point]
For the axis control (actuator operation mode indication and operation), writing and reading of position data and fieldbus control, use the dedicated command "DFC". [Refer to the section of the dedicated command in MSEP-LC Programing Manual]

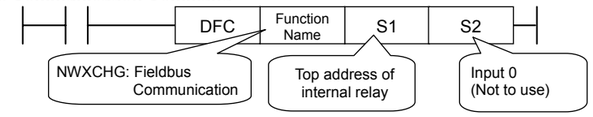
• Axis Control • • [Refer to the section of the operation patterns in this manual and Section 3.2.1 in MSEP Instruction Manual]



•Position Data Reading/Writing • • Refer to 3.4.9 About "Command" in MSEP Instruction Manual



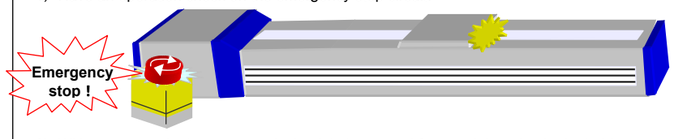
• Fieldbus Communication Command



☆The communication data area of the field network is assigned with one station one time of the remote device station for internal relay top address to CC-Link, and 8 bytes for each input and output for others.

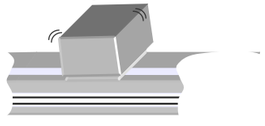
Step6 Test Run

1) Have an operation check on the emergency stop circuit.



2) Without any work piece mounted, check in low speed for any debugging in the ladder, operation of the actuator, and also the cooperation with peripheral devices.

3) Check the operation in the desired speed with a work piece loaded. Check the condition of the actuator attachment and adjust the servo if there is any abnormal noise.



4) Put the operation mode setting switch on MSEP-LC to AUTO, and have an operation with a command of the host.

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	Refer to “How to read controller model code”	
	Accessories		
2	Power Connector	FKC2.5HC/4-ST-5.08 (Supplier: PHOENIX CONTACT)	Recommended cable size • Control Power Supply 0.5 to 0.3mm²(AWG20～22) • Motor Driving Power Supply 2.5 to 0.5mm²(AWG12～20)
3	External Brake Input Connector	FMCD1.5/5-ST-3.5 (Supplier: PHOENIX CONTACT)	Recommended cable size 0.5 to 0.2mm²(AWG20～24)
4	Drive Cutoff/Emergency Stop Input Connector	FMCD1.5/8-ST-3.5 (Supplier: PHOENIX CONTACT)	Recommended cable size • Emergency Stop 0.5 to 0.2mm²(AWG20～24) • Motor Power External Input 1.25 to 0.5mm²(AWG16～20)
5	System I/O Connector	FMCD1.5/4-ST-3.5 (Supplier: PHOENIX CONTACT)	Recommended cable size 0.5 to 0.2mm²(AWG20～24)
6	I/O Flat Cable (For PIO Type)	CB-PAC-PIO***	***shows the cable length (Example) *** : 020 = 2 [m]
7	CC-Link Connector (For CC-Link Type)	MSTB2.5/5-STF-5.08 AU (Supplier: PHOENIX CONTACT)	Terminal Resistance (130Ω1/2W, 110Ω1/2W) enclosed one unit each
8	DeviceNet Connector (For DeviceNet Type)	MSTB2.5/5-STF-5.08 AU (Supplier: PHOENIX CONTACT)	Prepare a terminal resistor separately if this controller is to be allocated at the terminal.
9	Absolute Battery Box (Option)	MSEP-ABU (Battery AB-7)	For Simple Absolute Type
10	First Step Guide		
11	Instruction Manual (CD/DVD)		
12	Safety Guide		

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

No.	Part Name	Model
1	PC Software (Includes RS232C Exchange Adapter + Peripheral Communication Cable)	RCM-101-MW
2	PC Software (Includes USB Exchange Adapter + USB Cable + Peripheral Communication Cable)	RCM-101-USB
3	Teaching Pendant (Touch Panel Teaching)	CON-PTA
4	Teaching Pendant (Touch Panel Teaching with deadman switch)	CON-PDA
5	Teaching Pendant (Touch Panel Teaching with deadman switch + TP Adapter (RCB-LB-TG))	CON-PGA
6	Teaching Pendant (Touch Panel Teaching)	TB-01
7	Teaching Pendant (Touch Panel Teaching with deadman switch)	TB-01D
8	Teaching Pendant (Touch Panel Teaching with deadman switch + TP Adapter (RCB-LB-TG))	TB-01DR

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

No.	Name	Manual No.
1	MSEP Controller Instruction Manual	ME0299
2	PC Software RCM-101-MW/RCM-101-USB Instruction Manual	ME0155
3	Touch Panel Teaching CON-PTA/PDA/PGA Instruction Manual	ME0295
4	Touch Panel Teaching TB-01/TB-01D/TB-01DR Instruction Manual	ME0324
5	MSEP-LC Programming Manual	ME0329
6	MSEP-LC Ladder Edit Software Manual	M□0330

4. How to read the model plate

Model→	MODEL		MSEP-LC-4-20PI-PI-10I-N-NP-2-0-ABB-NP
Serial number→	PRODUCT DATE		2013/12/01
Manual No.→	MANUAL No.		ME***
Input power supply→	CP INPUT		DC24V 2.0A
	MP INPUT		DC24V 5.0A
	AXIS No. /OUTPUT		
Information of the connected axes → (Axis No. 0 to 5)	0	0-24Vac 3ph 0-333Hz 1.0A	
	1		
	2	0-24Vac 3ph 0-333Hz 2.0A	
	3		
	4		
	5		

5. How to read controller model code

(Example) Consists of 4 axes: Axis No.0=pulse motor type, No.1=Ineffective axis, Axis No.2=servo motor type, Axis No.3=No connected axis and Axis

MSEP-LC-3-20PWAI-PWAI-10I-N-NP-2-0-ABB-CC-**

<Series>

<Type>
LC : Ladder Sequence Type

<Connected Axes>
1 to 6: Number of driver axes

<Detail of Connected Axis>
[Pulse Motor Type]
20P :20□ pulse motor
20SP :20□ pulse motor
28P :28□ pulse motor
28SP :28□ pulse motor
35P :35□ pulse motor
42P :42□ pulse motor
56P :56□ pulse motor

[Servo Motor Type]
2 :2W servo motor
5 :5W servo motor
5S :5W servo motor
10 :10W servo motor
20 :20W servo motor
20S :20W servo motor
30 :30W servo motor
3D :3WDC brushless motor

P : Ineffective axis (Pulse motor)
A : Ineffective axis (Servo motor)
N : Not connected

[Encoder Type]
WAI : Incremental / Battery-less Absolute Shared (Pulse Motor Type)
I : Incremental (Servo Motor Type)
SA : Simple Absolute (Pulse Motor / Servo Motor)

[Option]
HA : High Acceleration/Deceleration Type (when servo motor selected)
LA : Low Power Consumption Type (when servo motor selected)
T : High-Output Setting Type (when pulse motor selected)

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

<Extended I/O Type >
NP : NPN Type (Sink type) (Standard)
DV : DeviceNet Type
CC : CC-Link Type
PR : PROFIBUS-DP Type
CN : CompoNet Type
EP : EtherNet/IP Type
EC : EtherCAT Type

<Applicable for Simple Absolute Type>
ABB : Simple Absolute Type (with absolute battery)
ABBN : Simple Absolute Type (with no absolute battery)
No indication : Incremental

<Power Voltage>
0 : 24V DC

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

< Standard I/O Type>
NP : NPN Type (Sink type)

Basic Specifications

List of Specifications

Specification Item		Driver for Servo Motor					Driver for Pulse Motor
Number of Controlled Axes		MAX. 6 axes					
Control/Motor Power Supply Voltage		24V DC ±10%					
Control Power Current Consumption		2A (Brake power supply 0.15A × 8 axes included)					
Control Power In-Rush Current		MAX. 5A 30ms or less					
Motor Current Consumption		Motor Type	Rated	Low power	MAX.(Note 1)	Motor Flange Size	MAX.(Note 2)
		2W	0.8A		4.6A	20P	2.0A
		3W (RCD)	0.7A		1.5A	28P	2.0A
						35P	2.0A (High output invalid) 3.5A (Rated) / 4.2A (MAX.) (High output valid) (Note 4)
		5W	1.0A		6.4A		
		10W(RCL)	1.3A		6.4A	42P	
		10W (RCA/RCA2)		2.5A	4.4A		
		20W	1.3A	2.5A	4.4A	56P	
		20W (20S type)	1.7A	3.4A	5.1A		
		30W	1.3A	2.2A	4.4A		
Motor Power In-Rush Current		Number of slots × MAX. 10A 5ms or less					
Heat Generation		Max. 26W					
Control System		Vector control (Rectangular waveform drive only for 3W of the motor type)					Weak field-magnet vector control
Encoder Resolution	RCP2 to RCP5	All types					800Pulse/rev
	RCA2	RCA2-□□□N					1048Pulse/rev
		Except for RCA2-□□□N					800Pulse/rev
	RCL	RA1L • SA1L • SA4L • SM4L					715Pulse/rev
		RA2L • SA2L • SA5L • SM5L					855Pulse/rev
		RA3L • SA3L • SA6L • SM6L					1145Pulse/rev
	RCD	All types					400Pulse/rev
Actuator Cable Length		MAX. 20m (Note) 10m maximum for Simple Absolute type					
Serial Communication Interface (SIO Port: Only for teaching)		RS485 1CH (based on Modbus Protocol) Speed 9.6 to 230.4kbps					
External Interface	PIO	PIO Type: Signal I/O dedicated for 24V DC (dedicated for NPN Type) Number of max. input: 32 points, Number of max. output: 32points (in total of standard I/O and extension I/O) Cable length MAX. 10m					
	Field Network (Occupied domains or number of points)	CC-Link (Remote device station, 1 station 1 time) DeviceNet, PROFIBUS-DP, CompoNet, EtherNet/IP, EtherCAT (Other than CC-Link: Input and output 64 points (8 bytes))					
Data Setting and Input		PC Software, Touch Panel Teaching, Gateway Parameter Create Tool					

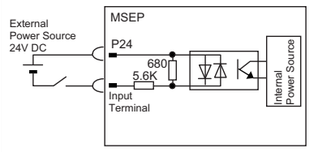
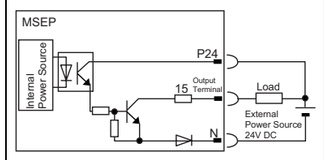
Specification Item		Driver for Servo Motor	Driver for Pulse Motor
Ladder Execution System		Interpreter System	
Program Capacity		2K steps (4 bytes per step)	
Data Retention Memory		Position data and parameters are saved in the nonvolatile memory. (There is no limitation in number of writing) Ladder storage domains: 30,000 times max.	
Number of Positioning Points		256 points (There is no limit for simple direct and direct indication modes) (The number of positioning points differs depending on the operation mode select by the parameter setting.)	
LED Display (Mounted on Front Panel))		8 LED lamps for driver status display (for each driver board) Status LED 9 points	
Electromagnetic Brake Compulsory Release		Brake release available for each axis by compulsory release signal input (24V DC input)	
Protective functions (Note3)		Overcurrent Protection (Equipped with a built-in cutoff circuit using a semiconductor for each slot)	
Protection Function against Electric Shock		Class I basic insulation	
Insulation Resistance		500V DC 10MΩ	
Weight		700g or less, absolute battery box 1650g(for 6-axis type)	
Cooling Method		Forced air-cooling	
External Dimensions		123W × 115H × 95D	
Environment	Surrounding Air Temperature	0 to 40°C	
	Surrounding Humidity	85%RH or less (non-condensing)	
	Surrounding Environment	[Refer to Installation Environment]	
	Surrounding Storage Temperature	-20 to 70°C 0 to 40°C for absolute battery	
	Surrounding storage humidity	85%RH or less (non-condensing)	
	Usable Altitude	1000m or lower above sea level	
	Vibration Durability	Frequency 10 to 57Hz/ Swing width : 0.075mm Frequency 57 to 150Hz/ Acceleration : 9.8m/s² XYZ Each direction Sweep time: 10 min. Number of sweep: 10 times	
	Shock Resistance	150mm/s² 11ms Semi-sine wave pulse XYZ Each direction 3 times	
	Protection Class	IP20	

Note 1 The current becomes maximum when the excitation phase of the servo-motor is detected, which is performed during the initial servo-motor ON processing after the power is injected. (Normal: Approx. 1 to 2 sec, MAX.: 10 sec).
Note 2 The current is maximized at the excitation phase detection conducted in the first servo-on process after the power is supplied (ordinary 100ms).
Note 3 For servo-motor, the protection is triggered with the current greater in 1.4 times than the maximum load current.
Note 4 High-output type driver board can control one axis per board.

< Calculation of 24V DC Power Capacity >
For the calculation of 24V DC power capacity, figure out the numbers for (1) to (5) below, and then follow Step (7).
(1) Control Power Current Consumption: 2A (0.15A × 8 axes included for brake-equipped actuator) ·····1)
(2) Current Consumption of Motor Power Supply:
Total of motor current consumption of connected actuator·····2)
(3) Current Consumption at Excitation Phase Detection:
Maximum current in the total of maximum motor current to turn the servo on at the same time·····3)
(4) Control Power In-Rush Current: 5A·····4)
(5) Motor Power In-Rush Current: Number of slots × 10A·····5)
(6) Current consumption of brake power supply: Number of actuators with brake × 0.15A·····6)
(7) Selection of Power Supply:
Usually, the rated current is to be approximately 1.3 times higher than 1) + 2) above considering approximately 30% of margin to the load current. However, considering the current of 3) to 5), even though it is a short time, select a power supply with “peak load corresponding” type or that with enough capacity. For the current of 3) to 5), it can be avoided from the current consumption occurred at the same time by the timing for the emergency stop release (motor power-on) and servo-on being changed. In the case that the capacity margin is not sufficient, voltage might be dropped in a moment. In particular, be careful of the power unit with the remote sensing function.
(Note) Make short-circuit on 0V side when separate power sources are used for the control power and motor power.

(Reference) Selection of Power Supply Protection Circuit Breaker
It is recommended that the power supply protection is conducted on the primary side (AC power side) of the 24V DC power supply unit.
Pay attention to the in-rush current of 24V DC power supply unit and rated cutoff current of the circuit breaker.
• Rated Breaking Current > Short-circuit Current = Primary Power Supply Capacity/Power Voltage
• (Reference) In-rush Current of IAI Power Supply Unit PS241 = 50 to 60A, 3msec

● Specifications of PIO Interface

	Input section		Output section	
Specification	Input Voltage	24V DC ±10%	Load Voltage	24V DC ±10%
	Input Current	5mA 1 circuit	Peak Load Electric Current	50mA 1 circuit
	ON/OFF voltage	ON voltage MIN. 18V DC OFF voltage MAX. 6V DC	Leak Current	MAX. 2mA/1 point
	External circuit insulation with photocoupler			
NPN				

● Extended I/O Field Network type
Refer to Section 1.4 in MSEP Instruction Manual

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).

Installation Environment
Do not use this product in the following environment.

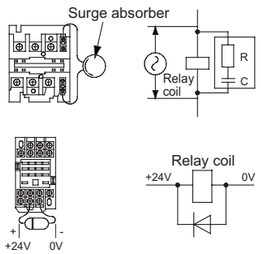
- Location where the surrounding air temperature exceeds the range of 0 to 40°C
- Location where condensation occurs due to abrupt temperature changes
- Location where relative humidity exceeds 85%RH
- Location exposed to corrosive gases or combustible gases
- Location exposed to significant amount of dust, salt or iron powder
- Location subject to direct vibration or impact
- Location exposed to direct sunlight
- Location where the product may come in contact with water, oil or chemical droplets
- Environment that blocks the air vent [Refer to 1.7 Noise Elimination and Mounting Method]

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

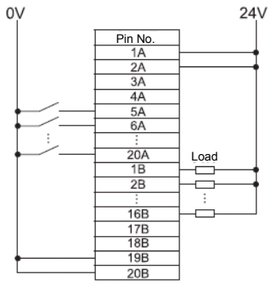
Installation and Noise Elimination

2. Precautions regarding wiring method
   1) Wire is to be twisted for the 24V DC power supply.
   2) Separate the signal and encoder lines from the power supply and power lines.
3. Noise Sources and Elimination
   Carry out noise elimination measures for electrical devices on the same power path and in the same equipment.
   The following are examples of measures to eliminate noise sources.
   1) AC solenoid valves, magnet switches and relays
      [Measure] Install a Surge absorber parallel with the coil.
   2) DC solenoid valves, magnet switches and relays
      [Measure] Mount the windings and diodes in parallel.
      Select a diode built-in type for the DC relay.

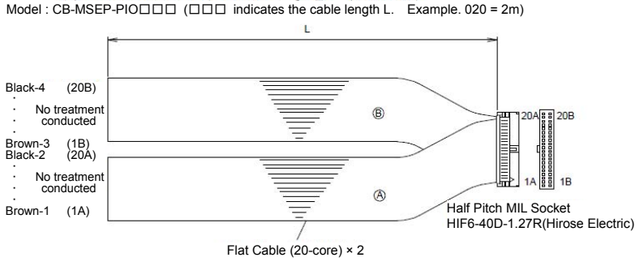


Wiring of I/O

Use the attached cable for the connection.

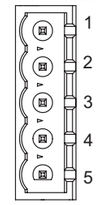


Model : CB-MSEP-PIO□□□ (□□□ indicates the cable length L. Example. 020 = 2m)

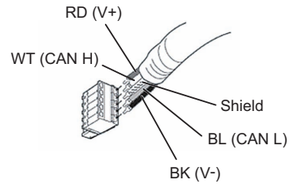


Wiring of DeviceNet

Refer to the instruction manuals for each Field Network master unit and mounted Host Device for the details.



Front View of Connector on Controller side

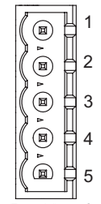


Connector Name	DeviceNet Connector	
Cable Side	MSTB2.5/5-STF-5.08AU	Enclosed in standard package Manufactured by PHOENIX CONTACT
Controller Side	MSTBA2.5/5-GF-5.08AU	

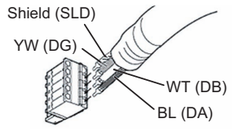
Pin No.	Signal Name (Color)	Description	Applicable cable diameter
1	V- (BK)	Power Supply Cable Negative Side	Dedicated cable for DeviceNet
2	CAN L (BL)	Communication Data Low Side	
3	Shield (None)	Shield	
4	CAN H (WT)	Communication Data High Side	
5	V+ (RD)	Power Supply Cable Positive Side	

Wiring of CC-Link

Refer to the instruction manuals for each Field Network master unit and mounted Host Device for the details.



Front View of Connector on Controller side

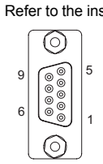


Connector Name	CC-Link Connector	
Cable Side	MSTB2.5/5-STF-5.08AU	Enclosed in standard package Manufactured by PHOENIX CONTACT
Controller Side	MSTBA2.5/5-GF-5.08AU	

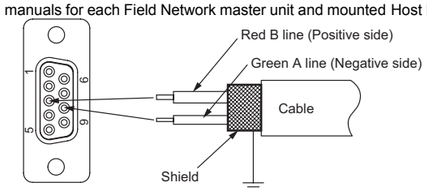
Pin No.	Signal Name (Color)	Description	Applicable cable diameter
1	DA (BL)	Communication Line A	Dedicated cable for CC-Link
2	DB (WT)	Communication Line B	
3	DG (YW)	Digital GND	
4	SLD	Connect the shield of the shielded cable (Connect the FG of the 5 pins and controller FG internally)	
5	FG	Frame Ground (Connect the SLD of the 4 pins and controller FG internally)	

Wiring of PROFIBUS-DP

Refer to the instruction manuals for each Field Network master unit and mounted Host Device for the details.



Front View of Connector on Controller side

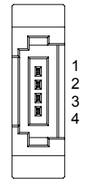


Connector Name	PROFIBUS-DP Connector	
Cable Side	9-pin D-sub Connector (Male)	Please prepare separately
Controller Side	9-pin D-sub Connector (Female)	

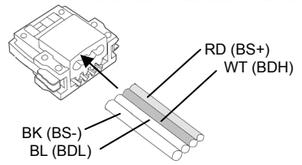
Pin No.	Signal Name	Description	Applicable cable diameter
1	NC	Disconnected	PROFIBUS-DP Dedicated Cable
2	NC	Disconnected	
3	B-Line	Communication Line B (RS485)	
4	RTS	Request for Sending	
5	GND	Signal GND (Insulation)	
6	+5V	+5V Output (Insulation)	
7	NC	Disconnected	
8	A-Line	Communication Line A (RS485)	
9	NC	Disconnected	

Wiring of CompoNet

Refer to the instruction manuals for Field Network master unit and mounted Host Device for the details.



Front View of Connector on Controller side



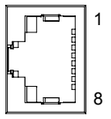
Connector Name	CompoNet Connector	
Cable Side	Prepare a connector complied with CompoNet standards.	
Controller Side	XW7D-PB4-R	Produced by OMRON

Pin No.	Signal Name (Color)	Description	Applicable cable diameter
1	BS+ (RD)	Communication Power Supply + (Note 1)	CompoNet Dedicated Cable
2	BDH (WT)	Signal line H side	
3	BDL (BL)	Signal line L side	
4	BS- (BK)	Communication Power Supply - (Note 1)	

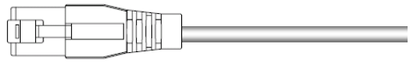
Note 1 It is not necessary to supply the communication power. (Internal power source is used.)
There is no problem if the power supply is connected to BS+ or BS-.

Wiring of EtherNet/IP and EtherCAT

Refer to the instruction manuals for Field Network master unit and mounted Host Device for the details.

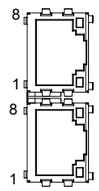


EtherNet/IP, Front View of Connector on Controller side



Connector Name	EtherNet/IP Connector (EtherNet/IP), EtherCAT Connector (EtherCAT)
Cable Side	8P8C Modular Plug
Controller Side	8P8C Modular Jack

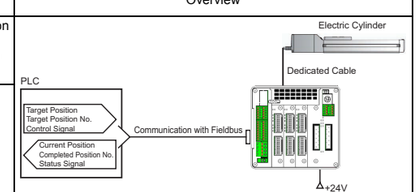
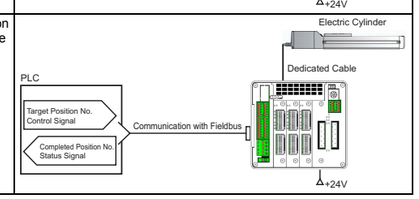
Pin No.	Signal Name	Description	Applicable cable diameter
1	TD+	Data sending +	For EtherNet cable, use a straight STP cable that possesses the performance of Category 5e or more.
2	TD-	Data sending -	
3	RD+	Data receiving +	
4	-	Disconnected	
5	-	Disconnected	
6	RD-	Data receiving -	
7	-	Disconnected	
8	-	Disconnected	

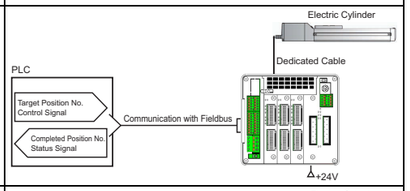
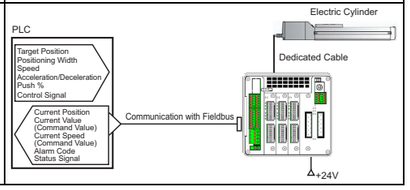


EtherCAT Front View of Connector on Controller side

Operation Pattern

There are five patterns of control systems. Establish the setting in the ladder command (DFC) with the most suitable operation pattern to your purpose of use.

Operation Pattern	Description	Overview
Simple Direct Mode	In Simple Direct Mode, the target position can be indicated directly by inputting a value. Monitoring of the current position is also available.	
Positioner 1 Mode	In Positioner 1 Mode, 256 points of position data can be registered at the maximum and is able to stop at the registered positions. Monitoring of the current position is also available.	
Positioner 2 Mode	This is the operation mode of the position data of 256 points at maximum set in the position table. The monitoring of the current position is not available. This mode is that the transferred data is reduced from Positioner 1 Mode.	

Operation Pattern	Description	Overview
Positioner 3 Mode	This is the operation mode of the position data of 256 points at maximum set in the position table. The monitoring of the current position is not available. This is the mode to control with the minimized number of signals to perform the positioning operation by reducing the amount of sent and received data from Positioner 2 Mode.	
Direct Numeric Specification Mode	The target position, speed acceleration/deceleration and pressing current limit can be indicated with inputting a number. Monitoring of not only the current position, but also the current speed and indicated current are available.	

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