

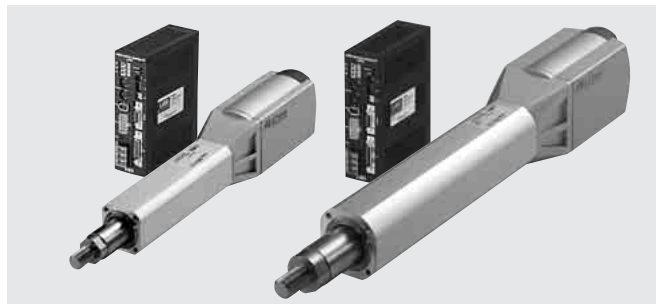
Motorized Cylinders

EZ limo EZHP Series

● Additional Information ●
 Technical reference → Page F-1
 Safety standards → Page G-2



● List of safety standard approved products (Model, Standards, File No., Certification Body)
 → Page G-11



Features

● Adopting a Closed Loop Control

The motor end houses a stepping motor with a rotor position detection sensor. When a condition presenting the possibility of a misstep is detected, the motor performs closed loop control, thereby ensuring stable operation.

● Prevention of Hunting When Stopping

Unlike conventional servomotors, the motor used in the **EZ limo** system is free from hunting.

● Low Vibration/Low Noise Even during Low Speed Operation

The **EZHP** Series adopts software-based smooth drive control to suppress vibration and noise even during low speed operation, such as return to home operation.

● Long-Term Maintenance-Free

The drive method uses THK's ball screw, which employs the QZ™ lubrication system. These mechanisms give the system a considerable duration of maintenance-free performance.

● QZ™ lubrication system (THK): High-density fiber net supplies appropriate amounts of oil, thereby preventing oil waste and reducing environmental burden.

● Space-Saving Cable Outlet Orientation

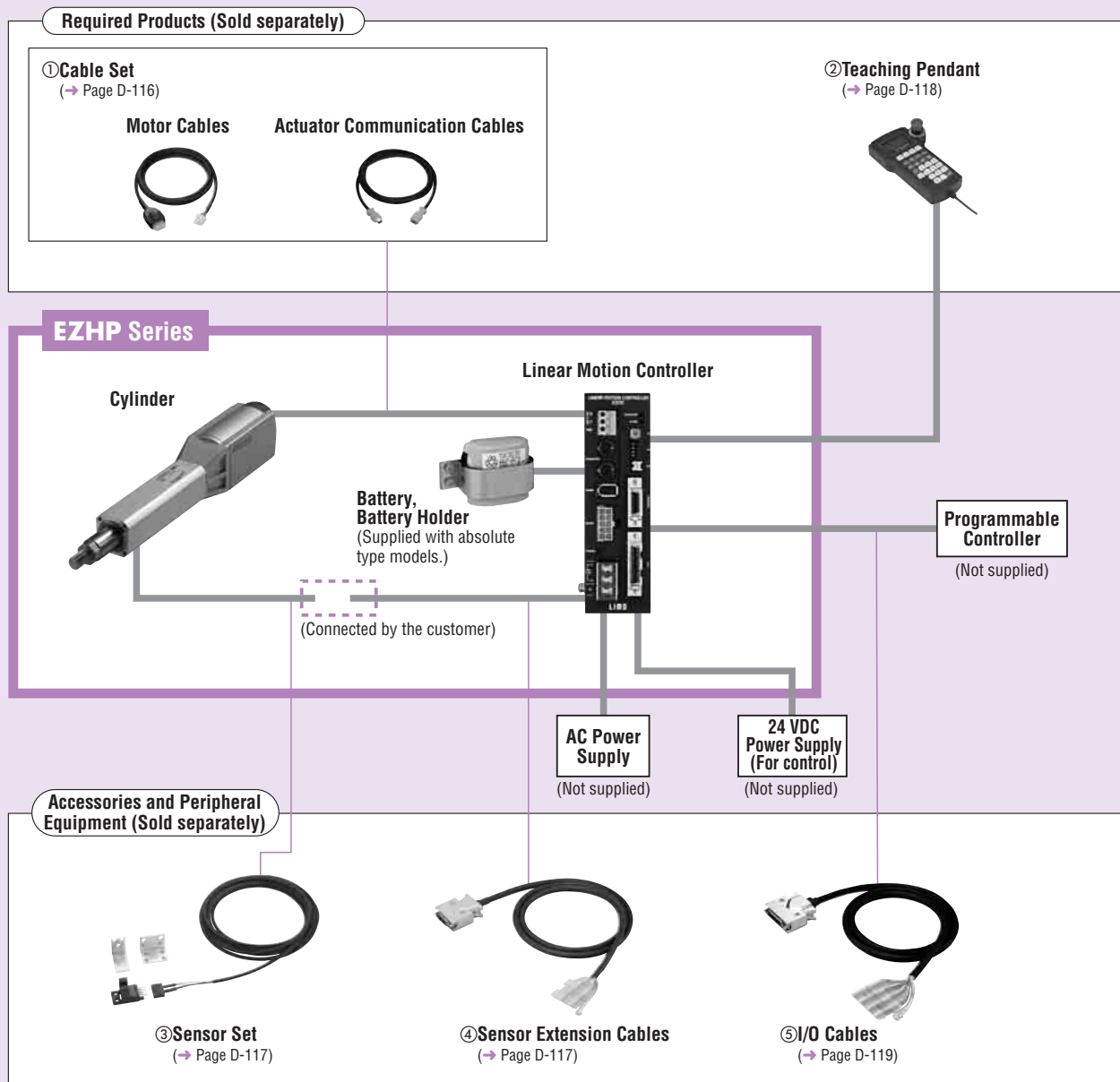
The cable outlet is facing downward, which contributes to the overall space savings by reducing the space needed to wire the cables.



The cable outlet is facing downward.

System Configuration

Controller Mode



No.	Product Name	Overview	Page
①	Cable Set	Cable for extending the wiring distance between the cylinder and linear motion controller (2 to 10 m). Each set consists of a motor cable and an actuator communication cable.	D-116
②	Teaching Pendant	This pendant (EZT1) lets you set and operate various data at your fingertips. Cable length 5 m.	D-118
③	Sensor Set	Three sets of sensors, sensor mounting brackets and cables with connector (2 m), as well as a shielding plate.	D-117
④	Sensor Extension Cables	Cable used for connection between the linear motion controller and the sensor (1 m, 2 m).	D-117
⑤	I/O Cables	Cable used for connection between the linear motion controller and the host controller (1 m, 2 m).	D-119

Example of System Configuration

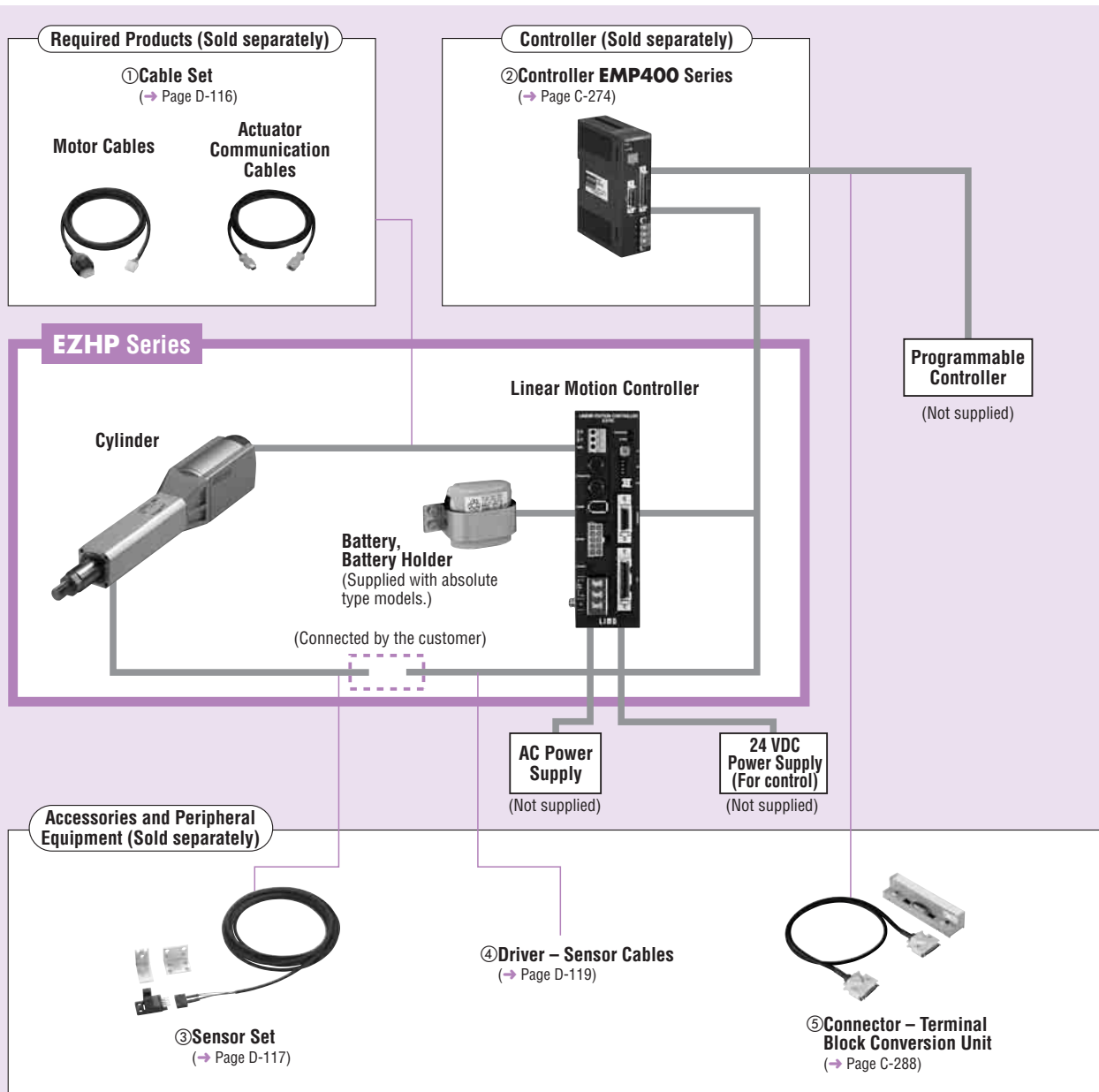
(Sold separately)			(Sold separately)			
EZHP Series	Cable Set*1 (2 m)	Teaching Pendant	+	I/O Cable (1 m)	Sensor Extension Cable*2 (2 m)	Sensor Set*2 (2 m)
EZHP4A-05A	CC02EZ2	EZT1		CC36D1-1	CC20D2-1	PAES-S

*1 Motor cable and actuator communication cable are available separately. → Page D-116
 *2 Not required if return to home operation is performed without sensors.

● The system configuration shown above is an example. Other combinations are available

● **Driver Mode**

An example of a single-axis system configuration with the **EMP400** Series controller.



No.	Product Name	Overview	Page
①	Cable Set	Cable for extending the wiring distance between the cylinder and linear motion controller (2 to 10 m). Each set consists of a motor cable and an actuator communication cable.	D-116
②	Controller	This controller gives commands needed to drive the cylinder.	C-274
③	Sensor Set	Three sets of sensors, sensor mounting brackets and cables with connector (2 m), as well as a shielding plate.	D-117
④	Driver - Sensor Cables	Cable for connecting the linear motion controller and the EMP Series controller (0.5 m).	D-119
⑤	Connector - Terminal Block Conversion Unit	Set of terminal block and cable for connecting the EMP Series controller and the host controller (1 m).	C-288

● **Example of System Configuration**

(Sold separately)

(Sold separately)

EZHP Series	Cable Set* (2 m)	+	Controller	Driver - Sensor Cable (0.5 m)	Sensor Set (2 m)	Connector - Terminal Block Conversion Unit (1 m)
EZHP4A-05A	CC02EZ2		EMP401-1	CC005EZ6-EMPD	PAES-S	CC50T1

* Motor cable and actuator communication cable are available separately. → Page D-116

● The system configuration shown above is an example. Other combinations are available

Product Number Code

EZHP 4 A - 10 M I

- ① ② ③ ④ ⑤ ⑥

①	Series	EZHP: EZHP Series
②	Cylinder Size	
③	Power Supply Input	A: Single-Phase 100-115 VAC C: Single-Phase 200-230 VAC
④	Stroke	05: 50 mm 10: 100 mm 20: 200 mm 30: 300 mm
⑤	Electromagnetic Brake	Blank: Without Electromagnetic Brake M: With Electromagnetic Brake
⑥	Type	I: Incremental Type A: Absolute Type

Product Line

Incremental Type

◇ Without Electromagnetic Brake

Stroke	Single-Phase 100-115 VAC		Single-Phase 200-230 VAC
	Model	Model	Model
50 mm	EZHP4A-05I	EZHP6A-05I	EZHP6C-05I
100 mm	EZHP4A-10I	EZHP6A-10I	EZHP6C-10I
200 mm	EZHP4A-20I	EZHP6A-20I	EZHP6C-20I
300 mm	EZHP4A-30I	EZHP6A-30I	EZHP6C-30I

◇ With Electromagnetic Brake

Stroke	Single-Phase 100-115 VAC		Single-Phase 200-230 VAC
	Model	Model	Model
50 mm	EZHP4A-05MI	EZHP6A-05MI	EZHP6C-05MI
100 mm	EZHP4A-10MI	EZHP6A-10MI	EZHP6C-10MI
200 mm	EZHP4A-20MI	EZHP6A-20MI	EZHP6C-20MI
300 mm	EZHP4A-30MI	EZHP6A-30MI	EZHP6C-30MI

Absolute Type

◇ Without Electromagnetic Brake

Stroke	Single-Phase 100-115 VAC		Single-Phase 200-230 VAC
	Model	Model	Model
50 mm	EZHP4A-05A	EZHP6A-05A	EZHP6C-05A
100 mm	EZHP4A-10A	EZHP6A-10A	EZHP6C-10A
200 mm	EZHP4A-20A	EZHP6A-20A	EZHP6C-20A
300 mm	EZHP4A-30A	EZHP6A-30A	EZHP6C-30A

◇ With Electromagnetic Brake

Stroke	Single-Phase 100-115 VAC		Single-Phase 200-230 VAC
	Model	Model	Model
50 mm	EZHP4A-05MA	EZHP6A-05MA	EZHP6C-05MA
100 mm	EZHP4A-10MA	EZHP6A-10MA	EZHP6C-10MA
200 mm	EZHP4A-20MA	EZHP6A-20MA	EZHP6C-20MA
300 mm	EZHP4A-30MA	EZHP6A-30MA	EZHP6C-30MA

The following items are included in each product.

Cylinder, Linear Motion Controller, Operating Manual, Mounting Bracket for Controller, Hexagonal Nut, User I/O Connector, Sensor I/O Connector, Battery*, Battery Holder*

* Only for absolute type

Specifications

Cylinder Specifications

Model	Incremental Type	EZHP4A-□I		EZHP4A-□MI		EZHP6A-□I, EZHP6C-□I		EZHP6A-□MI, EZHP6C-□MI		
	Absolute Type	EZHP4A-□A		EZHP4A-□MA		EZHP6A-□A, EZHP6C-□A		EZHP6A-□MA, EZHP6C-□MA		
Motor Type	Stepping Motor with Built-In Rotor-Position Sensor									
Drive Method	Rolled Ball Screw									
Electromagnetic Brake	Not equipped				Equipped		Not equipped		Equipped	
Speed Range	mm/s	~200	~300	~200	~300	~200	~300	~200	~300	
Max. Transportable Mass	kg	-		14	9	-		30	12	
		Horizontal Direction*		-		-		-		
Max. Acceleration	m/s ²	-		2.5		-		2.5		
		Horizontal Direction		-		-		-		
Max. Thrust Force	N	140	110	140	110	400	147	400	147	
Push Force	N	140 (Speed: 6 mm/s or less)				400 (Speed: 6 mm/s or less)				
Max. Holding Force	N	140				400				
		Power ON		-		-		-		
		Power OFF		-		-		-		
		Electromagnetic Brake		140		-		400		
Repetitive Positioning Accuracy	mm	±0.02								
Resolution	mm	0.01								
Lead	mm	6								
Stroke	mm	50, 100, 200, 300								
Cylinder Mass [Stroke: Mass]	kg	50: 1.7 (1.9) 100: 2.0 (2.2) 200: 2.5 (2.7) 300: 3.0 (3.2)				50: 3.3 (3.7) 100: 3.7 (4.1) 200: 4.6 (5.0) 300: 5.6 (6.0)				
Figure in the parentheses shows the mass of the model with electromagnetic brake.										

● Enter the stroke length in the box (□) within the model name.

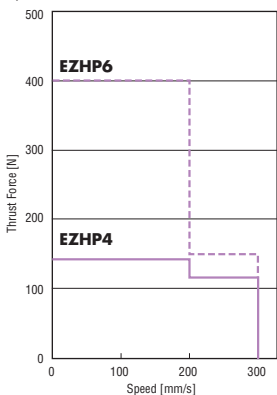
* In a horizontal direction, the value cannot be shown because it varies by frictional resistance of the load supporting mechanism. Always provide an external anti-spin mechanism, such as a guide.

Installation → Page D-121

How to read specifications → Page D-70

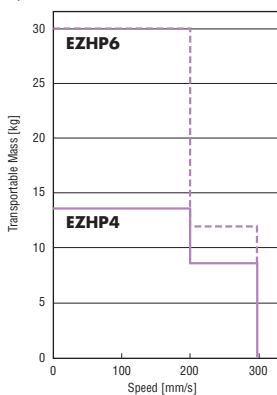
Correlation Diagram of Speed and Thrust Force

◇ Horizontal Direction/Vertical Direction



Correlation Diagram of Speed and Transportable Mass

◇ Vertical Direction

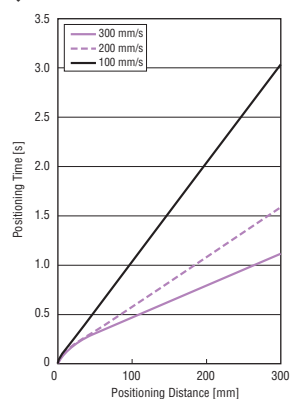


Positioning Distance – Positioning Time

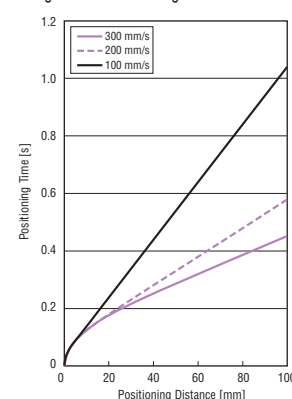
The positioning time (reference value) can be checked from the positioning distance.

The graphs below represent the characteristics when operated at maximum acceleration and maximum speed.

◇ Horizontal Direction/Vertical Direction



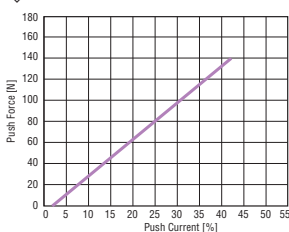
Enlargement of Positioning Distance under 100 mm



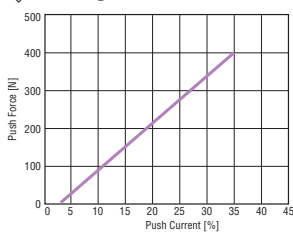
Push Force

Push force can be set through "Push current setting" in a program mode.

◇ EZHP4



◇ EZHP6



● The starting speed should be 3 mm/s or less.

Notes:

- The above value is a reference, not guaranteed.
- When the cylinder is used in a vertical direction, an external force calculated by multiplying the mass of the load by the rate of gravitational acceleration is applied. Therefore, the cylinder push force must be set so as to accommodate this external force. Measure the push force using an actual load, and set an appropriate push current.

● Specifications of Linear Motion Controller

◇ Controller Mode

Model		EZMC13I-A/EZMC13A-A	EZMC24I-A/EZMC24A-A	EZMC12I-C/EZMC12A-C
Type		Stored data type		
Number of Control Axes		1 axis		
Power Supply Input	Control Power	24 VDC ± 10% 1.0 A (Controller only: 0.5 A)*		
	Main Power	Single-Phase 100-115 VAC -15%, +10%		Single-Phase 200-230 VAC -15%, +10%
	Voltage	50/60 Hz		
	Frequency	3.3 A	5.0 A	3.0 A
	Current			
Positioning Data	Setting Mode	Absolute mode (absolute-position specification), Incremental mode (relative-position specification)		
	Number	63		
	Setting Method	Data is set using the accessory teaching pendant (EZT1). (Stored in EEPROM)		
Positioning Control	Mode	Sequential positioning, Selective positioning		
	Travel Amount Setting Range	-83886.08 ~ +83886.07 mm (value set in units of 0.01 mm)		
	Starting Speed Setting Range	0.01 ~ 250.00 mm/s (value set in units of 0.01 mm/s)		
	Operating Speed Setting Range	0.01 ~ 300.00 mm/s (value set in units of 0.01 mm/s)		
	Acceleration/Deceleration Rate Setting Range	0.01 ~ 100.00 m/s ² (value set in units of 0.01 m/s ²)		
Control Modes		<ul style="list-style-type: none"> External input mode (EXT): In this mode, operation by external signal, command position, I/O condition and alarm condition can be monitored. Program mode (PRG): In this mode, operation data can be created, changed or cleared. Parameter mode (PAR): In this mode, operation parameters and function setting parameters can be set or changed. Test mode (TST): In this mode, manual operation and I/O check can be performed. 		
Operation Modes		Positioning operation, Return to home operation, Linked operation (a maximum of 4 data), Push-motion operation, Continuous operation		
Input Signals	Input Mode	24 VDC Photocoupler insulation input, Input resistance: 4.7 kΩ (START, STOP, HOME/PRESET, FREE, M0~M5, REQ, ACL/CK)		
	START	5 VDC Photocoupler insulation input, Input resistance: 180 Ω or 24 VDC Photocoupler insulation input, Input resistance: 2.7 kΩ (FWD, RVS)		
	STOP	Start the positioning operation.		
	HOME/PRESET	Stop the positioning operation and the return to home operation.		
	FREE	HOME: Start the return to home operation. PRESET: Preset the current position.		
	M0~M5	Stop motor excitation and release the electromagnetic brake.		
	REQ	Select the step No.		
	FWD	Request the current position output.		
	RVS	Move the cylinder rod to the counter-motor side.		
	ACL/CK	Move the cylinder rod to the motor side.		
Output Mode		ACL: Cancel the protective function currently active. CK: Used when the current position is output.		
ALM		Transistor output linked to photocoupler (24 VDC, 15 mA or less), Line driver output		
END/OUTR		This signal is output when a protective function has been activated.		
MOVE		END: Turn ON when the positioning operation or return to home operation has ended. OUTR: Turn ON when current position output is ready.		
AREA/OUT0		This signal is output when the cylinder is moving.		
T-UP/OUT1		AREA: This output notifies that the moving part of the cylinder is staying inside a specified area. OUT0: Output current position.		
ASG1, BSG1		T-UP: Output when the push-motion operation has ended. OUT1: Output current position.		
ASG2, BSG2		Output the position of the cylinder rod via pulse signal. (Open-collector output)		
Protective Functions		Output the position of the cylinder rod via pulse signal. (Line driver output)		
Indicators (LED)		Excessive position deviation, Overcurrent protection, Overvoltage protection, Overheat protection, Overload, Motor overheat protection, Sensor error, Overspeed, Nonvolatile memory error, etc.		
Cooling Method		Control power supply, Alarm		
Mass		Natural ventilation		
		0.8 kg		

* Take into account safety margin of +0.2 A for the teaching pendant, and/or +0.3 A for the electromagnetic brake type.

◇ Driver Mode

Model		EZMC13I-A/EZMC13A-A	EZMC24I-A/EZMC24A-A	EZMC12I-C/EZMC12A-C
Power Supply Input	Control Power	24 VDC ± 10% 1.0 A (Controller only: 0.5 A)*		
	Main Power	Single-Phase 100-115 VAC -15%, +10%		Single-Phase 200-230 VAC -15%, +10%
	Voltage	50/60 Hz		
	Frequency	3.3 A	5.0 A	3.0 A
	Current			
Maximum Response Frequency		80 kHz (When the pulse duty is 50%)		
Input Signals	Input Mode	5 VDC Photocoupler insulation input, Input resistance: 180 Ω or 24 VDC Photocoupler insulation input, Input resistance: 2.7 kΩ (FP, RP)		
	FP	24 VDC Photocoupler insulation input, Input resistance: 4.7 kΩ (ACL/CK, FREE, C.OFF, PRESET, REQ)		
	RP	Operation command pulse input (The operation command pulse input in counter-motor direction in the 2-pulse input mode)		
	ACL/CK	Pulse width: 2 μs minimum, Pulse rise/fall: 2 μs maximum (Negative logic pulse input)		
	FREE	Direction of movement input (The operation command pulse input in motor direction in the 2-pulse input mode)		
	C.OFF	Pulse width: 2 μs minimum, Pulse rise/fall: 2 μs maximum (Negative logic pulse input)		
	PRESET	ACL: Cancel the protective function currently active. CK: Used when the current position is output.		
	REQ	Stop motor excitation and release the electromagnetic brake.		
Output Mode		The current flow to the motor is cut off.		
TIM./OUT0		Preset the current position.		
OUT1		Request the current position output.		
ALM		Transistor output linked to photocoupler (24 VDC, 15 mA or less), Line driver output		
END/OUTR		TIM.: Signal is output when the excitation sequence is at step "0."		
ASG1, BSG1		(A TIM. signal is output each time the rod moves by 0.12 mm.) OUT0: Output current position.		
ASG2, BSG2		Output current position.		
Protective Functions		This signal is output when a protective function has been activated.		
Indicators (LED)		END: Turn ON when the positioning operation or return to home operation has ended. OUTR: Turn ON when current position output is ready.		
Cooling Method		Output the position of the cylinder rod via pulse signal. (Open-collector output)		
Mass		Output the position of the cylinder rod via pulse signal. (Line driver output)		
		Excessive position deviation, Overcurrent protection, Overvoltage protection, Overheat protection, Overload, Motor overheat protection, Sensor error, Overspeed, Nonvolatile memory error, etc.		
Indicators (LED)		Control power supply, Alarm		
Cooling Method		Natural ventilation		
Mass		0.8 kg		

* Take into account safety margin of +0.2 A for the teaching pendant, and/or +0.3 A for the electromagnetic brake type.

General Specifications

This is the value after rated operation under normal ambient temperature and humidity.

Item	Motor	Linear Motion Controller
Insulation Resistance	100 MΩ or more when 500 VDC megger is applied between the following places: · Motor/Sensor windings – Case · Case – Windings of electromagnetic brake (Only for electromagnetic brake type)	100 MΩ or more when 500 VDC megger is applied between the following places: · Signal I/O, Control power supply, PE – Main power supply terminal · Signal I/O, Control power supply, PE – Motor output terminal · Signal I/O, Control power supply, PE – Battery input terminal
Dielectric Strength	Sufficient to withstand the following for 1 minute: EZHP4 · Motor/Sensor windings – Case 1.0 kVAC 50 Hz · Case – Windings of electromagnetic brake (Only for electromagnetic brake type) 1.0 kVAC 50 Hz EZHP6 · Motor/Sensor windings – Case 1.5 kVAC 50 Hz · Case – Windings of electromagnetic brake (Only for electromagnetic brake type) 1.0 kVAC 50 Hz	Sufficient to withstand the following for 1 minute: · Signal I/O, Control power supply – Main power supply terminal 1.8 kVAC · Signal I/O, Control power supply – Motor output terminal 1.8 kVAC · Signal I/O, Control power supply – Battery input terminal 1.8 kVAC · PE – Main power supply terminal 1.5 kVAC · PE – Motor output terminal 1.5 kVAC · PE – Battery input terminal 1.5 kVAC
Ambient Temperature	0~+40°C (non-freezing)	
Ambient Humidity	85% or less (non-condensing)	

Note:

- Do not measure insulation resistance or perform the dielectric strength test while the cylinder and linear motion controller are connected.

Battery Specifications (For the absolute type only)

Model	PAEZ-BT2
Battery Type	Cylindrical sealed nickel-cadmium storage cell
Nominal Voltage	2.4 V
Rated Capacity	2000 mAh
Mass	180 g
Life	Approx. 4 years*1
Charge Time	48 hours*1
Data Retention Period	Approx. 360 hours (15 days)*1*2
Ambient Temperature	0~+40°C (non-freezing)
Ambient Humidity	20~85% (non-condensing)

*1 At an ambient temperature of 20°C

*2 After the power is cut off with the battery fully charged.

List of Cylinder and Controller Combinations

Model names for cylinder and linear motion controller combinations are shown below.

Type	Electromagnetic Brake	Model	Cylinder Model	Linear Motion Controller Model
Incremental Type	Not equipped	EZHP4A-□	EZHP4A-□	EZMC13I-A
	Equipped	EZHP4A-□MI	EZHP4A-□M	
Absolute Type	Not equipped	EZHP4A-□A	EZHP4A-□	EZMC13A-A
	Equipped	EZHP4A-□MA	EZHP4A-□M	
Incremental Type	Not equipped	EZHP6A-□I	EZHP6A-□	EZMC24I-A
		EZHP6C-□I	EZHP6C-□	EZMC12I-C
	Equipped	EZHP6A-□MI	EZHP6A-□M	EZMC24I-A
Absolute Type	Not equipped	EZHP6A-□A	EZHP6A-□	EZMC24A-A
		EZHP6C-□A	EZHP6C-□	EZMC12A-C
	Equipped	EZHP6A-□MA	EZHP6A-□M	EZMC24A-A
		EZHP6C-□MA	EZHP6C-□M	EZMC12A-C

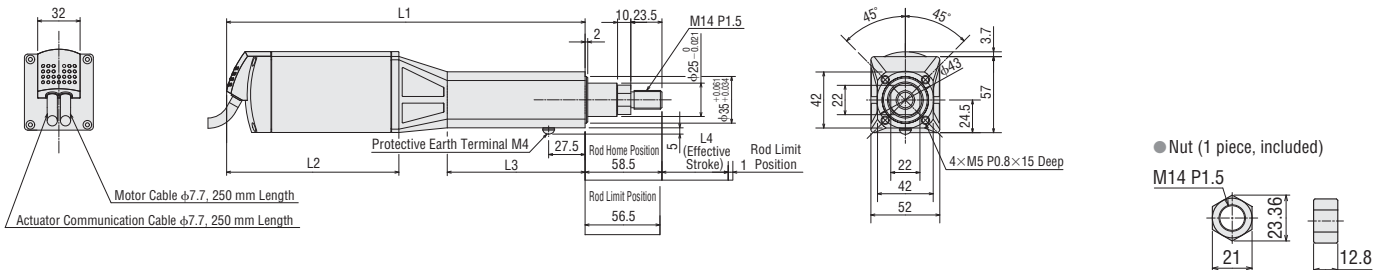
● Enter the stroke length in the box (□) within the model name.

Dimensions Unit = mm

● Cylinder

◇ EZHP4

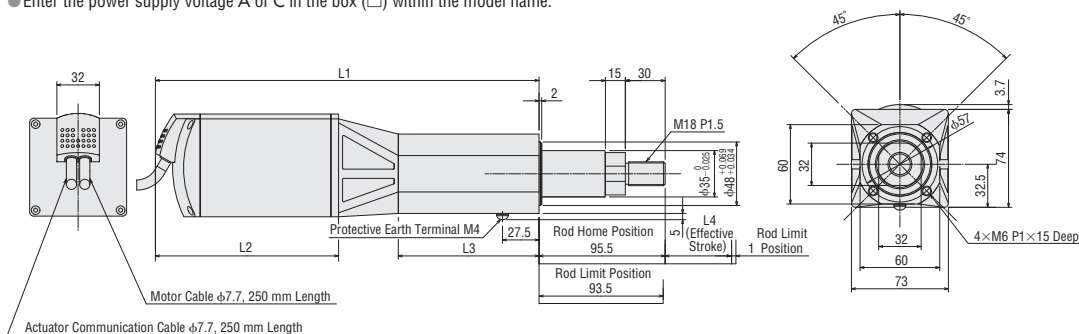
Cylinder Model	L1	L2	L3	L4	DXF
EZHP4A-05	270.5	130	104	50	D396
EZHP4A-05M	300.5	160			D397
EZHP4A-10	320.5	130	154	100	D398
EZHP4A-10M	350.5	160			D399
EZHP4A-20	420.5	130	254	200	D400
EZHP4A-20M	450.5	160			D401
EZHP4A-30	520.5	130	354	300	D402
EZHP4A-30M	550.5	160			D403



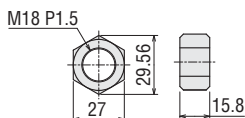
◆EZHP6

Cylinder Model	L1	L2	L3	L4	DXF
EZHP6□-05	289	138	106	50	D404
EZHP6□-05M	324	173			D405
EZHP6□-10	339	138	156	100	D406
EZHP6□-10M	374	173			D407
EZHP6□-20	439	138	256	200	D408
EZHP6□-20M	474	173			D409
EZHP6□-30	539	138			D410
EZHP6□-30M	574	173	356	300	D411

● Enter the power supply voltage A or C in the box (□) within the model name.



● Nut (1 piece, included)

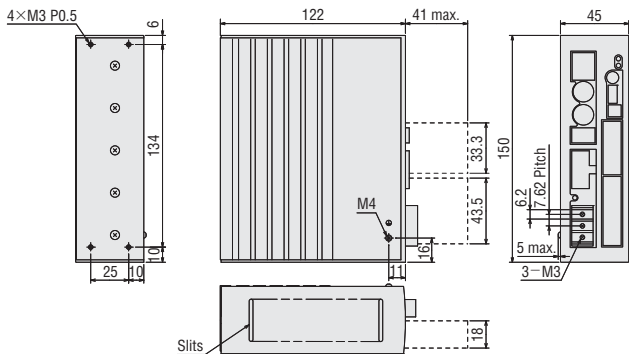


● Linear Motion Controller

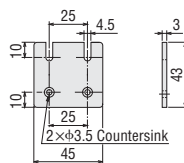
EZMC131-A, EZMC241-A, EZMC121-C
EZMC13A-A, EZMC24A-A, EZMC12A-C

Mass: 0.8 kg

DXF D487



● Mounting Bracket (2 pieces, included)



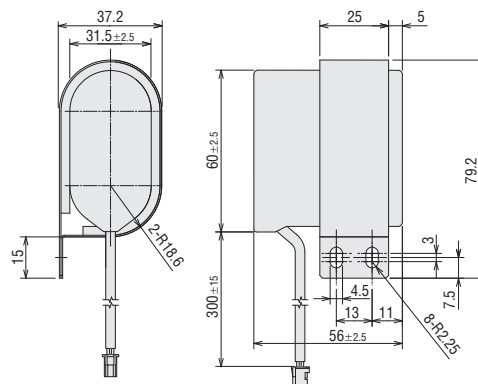
● Control I/O Connector (Included)
Case: 54331-1361 (MOLEX)
Connector: 54306-3619 (MOLEX)

● Sensor I/O Connector (Included)
Case: 54331-1201 (MOLEX)
Connector: 54306-2019 (MOLEX)

● Battery (Supplied with absolute type. Battery holder provided.)

Mass: 0.18 kg

DXF D488



■ Connection and Operation

Common to EZHC Series. Refer to page D-100.