

***Orientalmotor***

Electric Gripper  
**EH Series**  
*αSTEP AZ Series Equipped*



Delicate grip.



Delicate, human-like grip.

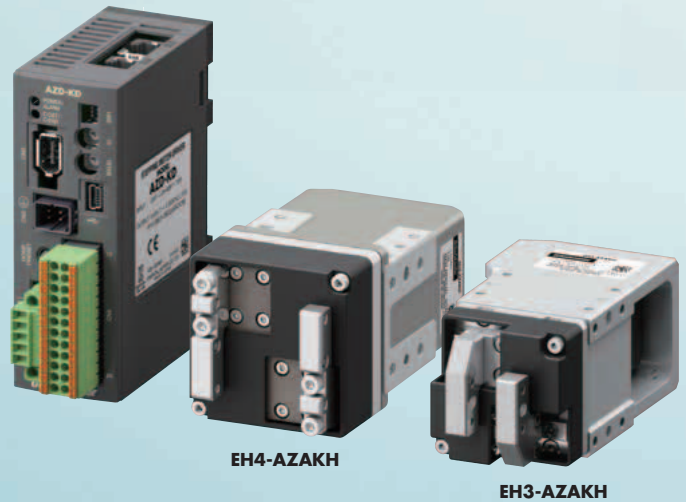


## Electric Gripper **EH Series**

*αSTEP AZ* Series Equipped

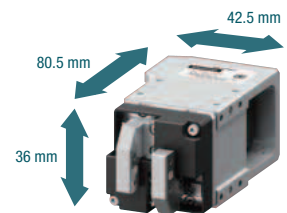
An *αSTEP AZ* Series motor equipped with a battery-free absolute sensor combined with an **EH Series** electric gripper.

Its delicate grip, like that of a human hand, assists in automation and labor-saving.



### Compact and Lightweight Gripper

- Size: 80.5 mm×36 mm×42.5 mm
- Mass: 200 g
- The **EH3-AZAKH** is shown



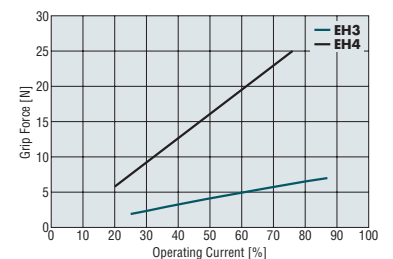
### Differentiating “Light and Gentle” from “Firm and Secure”

Minimum grip force 2 N\*<sup>1</sup>. Maximum grip force 25 N\*<sup>2</sup>.

Current control allows the grip force to be minutely changed and regulated. Appropriately grips loads either gently or firmly, whether delicate or slippery.

\*<sup>1</sup> **EH3-AZAKH** (reference value)

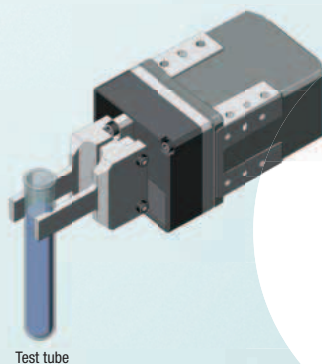
\*<sup>2</sup> **EH4-AZAKH**



## The On-Board AZ Series Provides a Delicate Grip

A delicate grip is achieved by fine-tuning the grip force in 1% operating current increments and implementing a slow approach to the load.

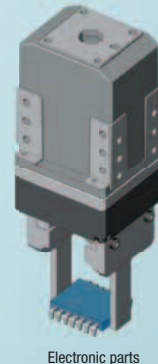
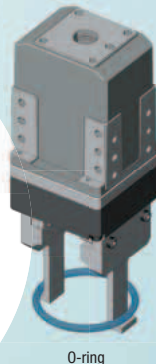
●Please prepare attachments (hooks) separately.



1

### Grip

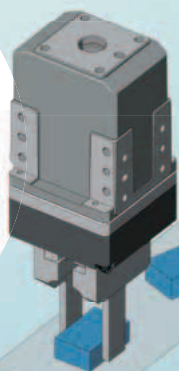
Delicate loads that may be damaged or deform easily can be gripped.



2

### Adjust

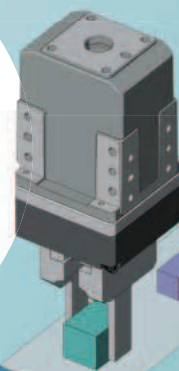
The direction and position of the load can be coordinated.



3

### Measure

It is possible to measure the size of a load.



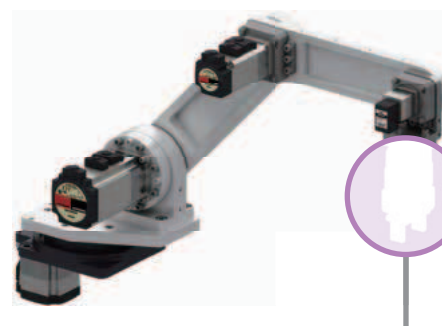
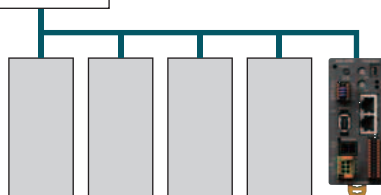
## Useful as a Network Compatible End Effector

EtherNet/IP, EtherCAT, and PROFINET compatible drivers are available.

It is optimal as an end effector for equipment or robots controlled over a single network.



Host Controller



- Installation Flanges for Robots are Available for Installation on Commercially Available Industrial Robots (Collaborative robots). Flanges on the robot side conform to ISO9409-1 (JIS B 8436). For product details on product, refer to page 15.

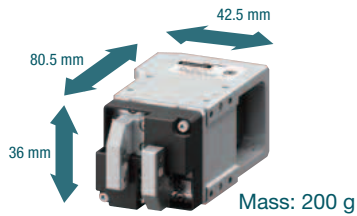


Main Compatible Manufacturers  
Yaskawa Electric Corporation  
Seiko Epson Corporation

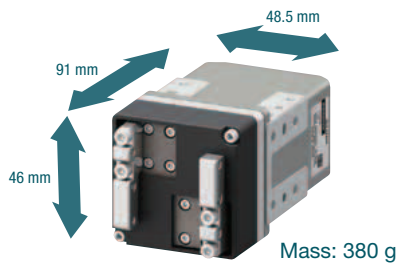
# Basic Performance of the EH Series of Electric Gripper

## Compact and Lightweight Minimizes the Burden on the Robot

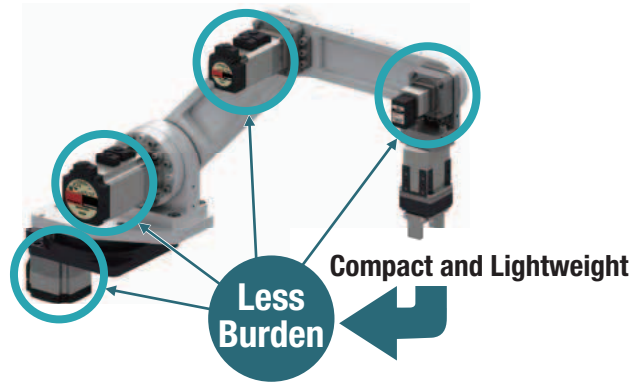
### ●EH3-AZAKH



### ●EH4-AZAKH

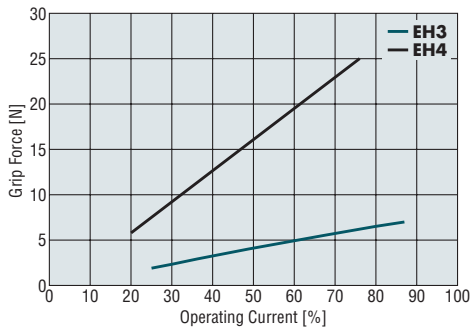


- Reduces the Burden on Each Articulation, Decreasing the Overall Size and Cost of the Robot



## Fine-tuned Grip Force Control Real Grip, Like that of a Human Hand

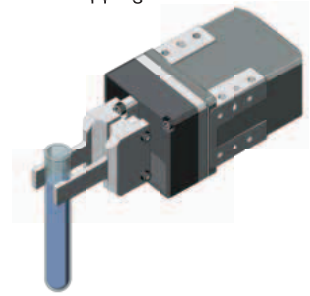
- Grip Force and Running Current (Reference values)



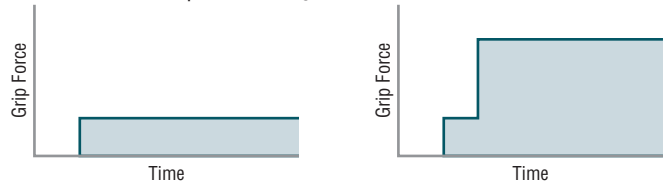
- Grips Gently without Causing Damage



- Two-Stage Gripping without Dropping the Load

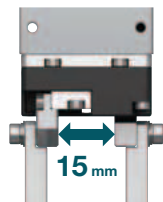


- Transitions in Grip Force <Image>

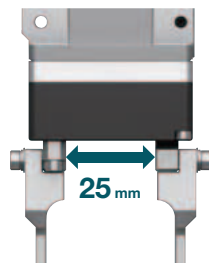


## Long Stroke Compatible with Loads of Different Configurations

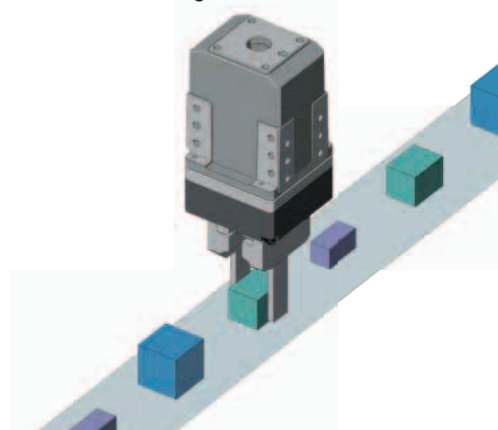
### ●EH3-AZAKH



### ●EH4-AZAKH



- Continuous Operation without Replacing Attachments, Even for Loads with Uneven Configurations



●Please prepare attachments (hooks) separately.

# Applications Using the Electric Gripper's "Delicate Grip"

## 1 Grip

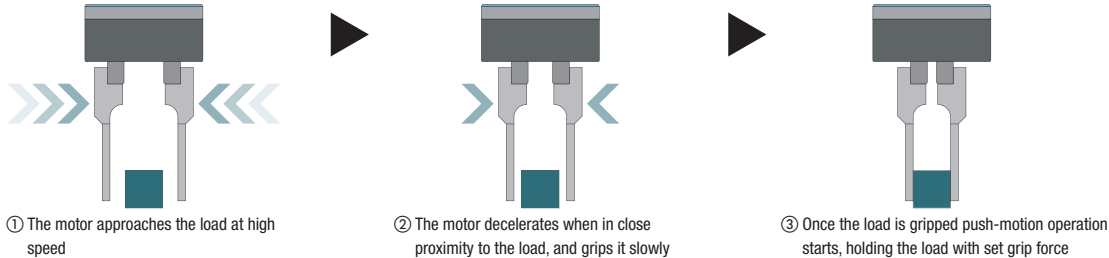
Reliably Grip Loads that may Easily Deform or Break.

Easily set the grip force, grip time, and speed according to the object being gripped.

Safely and reliably grip objects that may easily break, such as glass, and objects that easily deform, such as plastic or springs.

### Quick Approach, Slow Grip

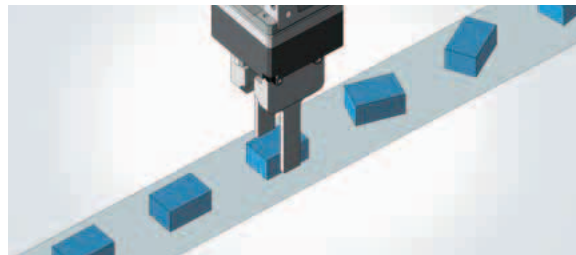
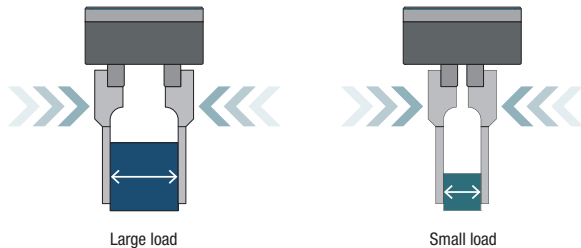
The motor approaches the load at high speed. The motor decelerates just before hitting the surface at low speed.



## 2 Adjust

The Direction and Position of the Load can be Coordinated.

The minimum travel distance of the fingers is 0.02 mm. The direction and position of components can be coordinated by gripping them according to their size.

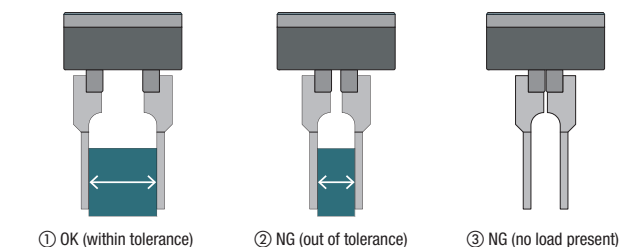


## 3 Measure

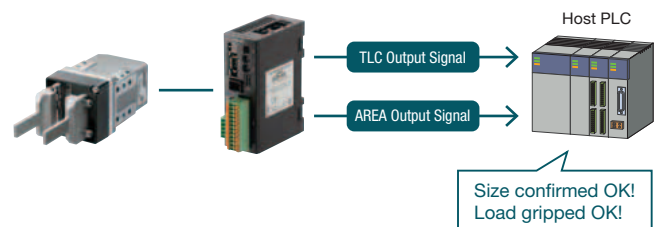
The Size of the Load can be Verified without an External Sensor.

### The Size and Presence of a Load are Determined within the Operational Range of the Fingers

The operational range of the pincer is confirmed by the output signal (TLC output, AREA output) from the driver, allowing the size and presence of a load to be determined.



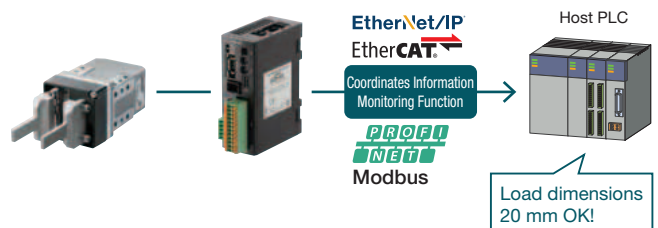
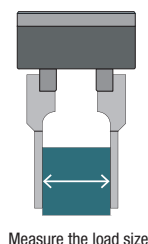
- ①② Determine the size of the load  
The position of the attachment when the load is confirmed, allowing for sorting by size.
- ③ Detect the presence of a load  
Determine whether or not a load is gripped.



\*AREA output: This signal is output when the motor is in a set area.  
TLC output: This signal is output during push-motion operation when the output torque reaches a set torque limit value.

### Monitor the Gripper Position to Measure Size

The Coordinates Information Monitoring Function in the driver sends data from the gripper to the host PLC, allowing the size of the load to be measured.



\*Coordinates information monitoring function: This function sends position data to the host system.

●Please prepare attachments (hooks) separately.

## Register the Gripper's Operation Program in the Driver to Distribute the Load on the Host System

●Targets: Built-in controller type drivers and network compatible drivers (excluding EtherCAT)

The **EH** Series can register the state of sensors and other external input signals, as well as its own output signals, in the driver with a simple sequence program while in use.

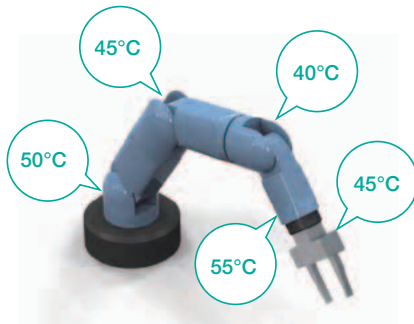
In simple applications, operation is possible with only a START/STOP command.

## Real-time Monitoring of the State of the Motor

Actuators equipped with an **QSTEP AZ** Series, including the **EH** Series, are able to constantly monitor the state of a motor over a network.

### Motor Temperature Monitor

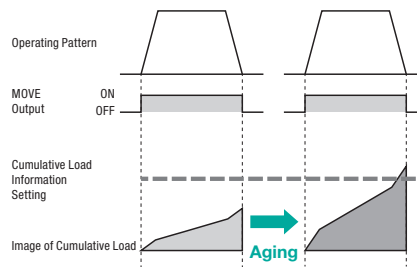
Real-time temperature monitoring is possible, even if the robot is inside a case, etc.



●For monitoring details, refer to the **AZ** Series operating manual.

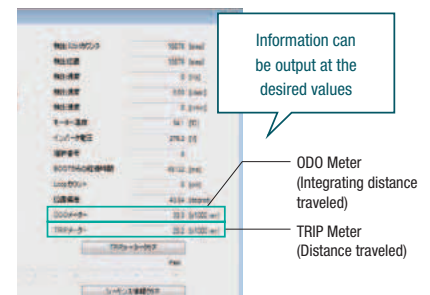
### Cumulative Load Monitor

Besides an instantaneous load factor monitor, the load factor in the motor's operating pattern can also be obtained via area and detected as a value. This allows long-term changes in load due to age deterioration and other factors to be understood.



### ODO/TRIP Monitor

The cumulative number of rotations can be monitored, like with a car's gauges. An information signal can be output when a set threshold is reached. This is useful for maintenance and other applications.



## ◆ Dedicated Support Software **MEXE02** (Free download)

Operating data editing, parameter setting, and other such basic settings can be easily made on a computer. Simple sequence programs can also be created.

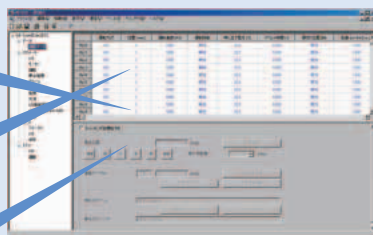


Users love that it is easy to operate even without a background in electrical design!

Display and input the traveling amount, speed, etc. in the desired units (mm, deg)

Simplified program with simple sequence function

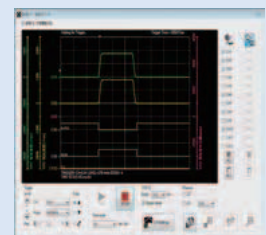
Copy and back up settings



Easy-to-understand and easy-to-use  
Intuitive operability



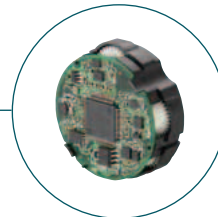
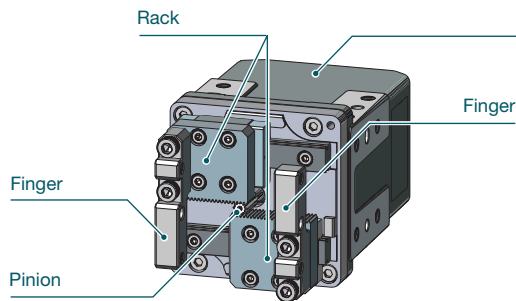
Teaching is also possible from a  
computer



Check the signal's input status  
Also equipped with waveform monitor

## Driven by an $\alpha$ STEP AZ Series Motor

- Built-in battery-free absolute sensor, for constant monitoring of motor position information without an external sensor
- High reliability with closed loop control
- High efficiency technology reduces motor heat generation and saves energy

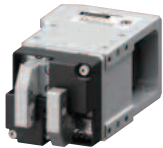


Battery-free Absolute Sensor (ABZO sensor)

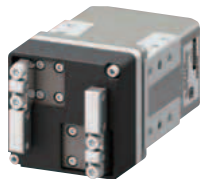
## Product Line of EH Series

### Electric Grippers






#### EH3-AZAKH



#### EH4-AZAKH



### Drivers DC Input

<p><b>Built-in Controller Type</b> <u>FLEX</u></p> <p>Set the positioning data in the driver (256 points). FA network control is possible with a network converter (sold separately).</p> 	<p><b>Pulse Input Type with RS-485 Communication</b></p> <p>The motor's position, speed, torque, alarms, and temperature can be monitored via RS-485 communication.</p> 	<p><b>Pulse Input Type</b></p> <p>The motor is controlled from a positioning module (pulse generator).</p> 	<p><b>Network Compatible</b></p> <p>The driver can be directly controlled from a host control device over an FA network.</p>  <p>EtherNet/IP EtherCAT PROFINET</p>	<p><b>mini Driver</b></p> <p>Modbus (RTU) compatible</p> 
---	---	--	---	--

### ◆ For Delicate Operations, We Recommend the EH Series Over a Pneumatic Gripper!

#### Adjust the Grip Force in 1% Increments

Adjustment with a pneumatic gripper's regulator (pressure reducing valve) is unnecessary. The grip force can be easily and finely adjusted with digital settings.

#### Adjust the Speed in 0.02 mm/s Increments

Adjustment with a pneumatic gripper's speed controller (speed control valve) is unnecessary. Speed regulation is easy as a result of control with a stepper motor, making gripping possible at low speeds.

#### Adjust the Traveling Amount in 0.02 mm Increments

This gripper utilizes the height of the stepper motor's positioning accuracy. This allows loads of various configurations to be approached.

#### Position Monitoring with an Absolute Sensor

Feedback of detailed position information allows for not only grip and transportation, but also the size of the load to be determined.

## System Configuration

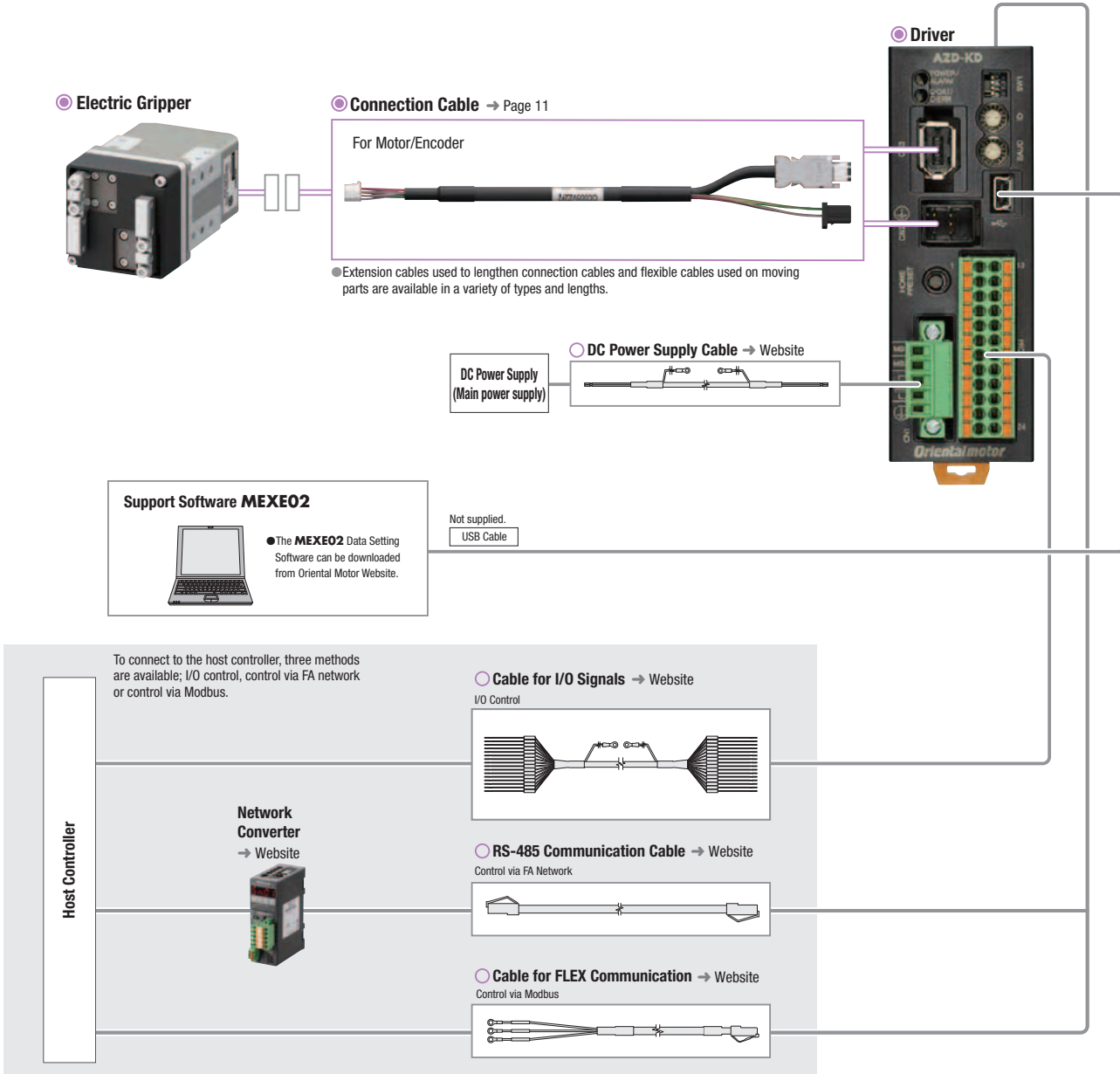
### Combination of Electric Gripper and Built-in Controller Type Driver, or Pulse Input Type Driver with RS-485 Communication

An example of a configuration using I/O control or RS-485 communication is shown below.

Electric gripper, driver, and a connection cable/flexible connection cable are ordered separately.

For a pulse input type driver system configuration, please see the Oriental Motor website.

- Required for operation
- Optional accessory



### Example of System Configuration

Electric Gripper	Driver	Cables	
		Connection Cable (1 m)	Cable for I/O Signals Connector Type (1 m)
<b>EH4-AZAKH</b>	<b>AZD-KD</b>	<b>CC010VZ2F2</b>	<b>CC16D010B-1</b>
\$835.00	\$485.00	\$39.00	\$28.00
<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

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

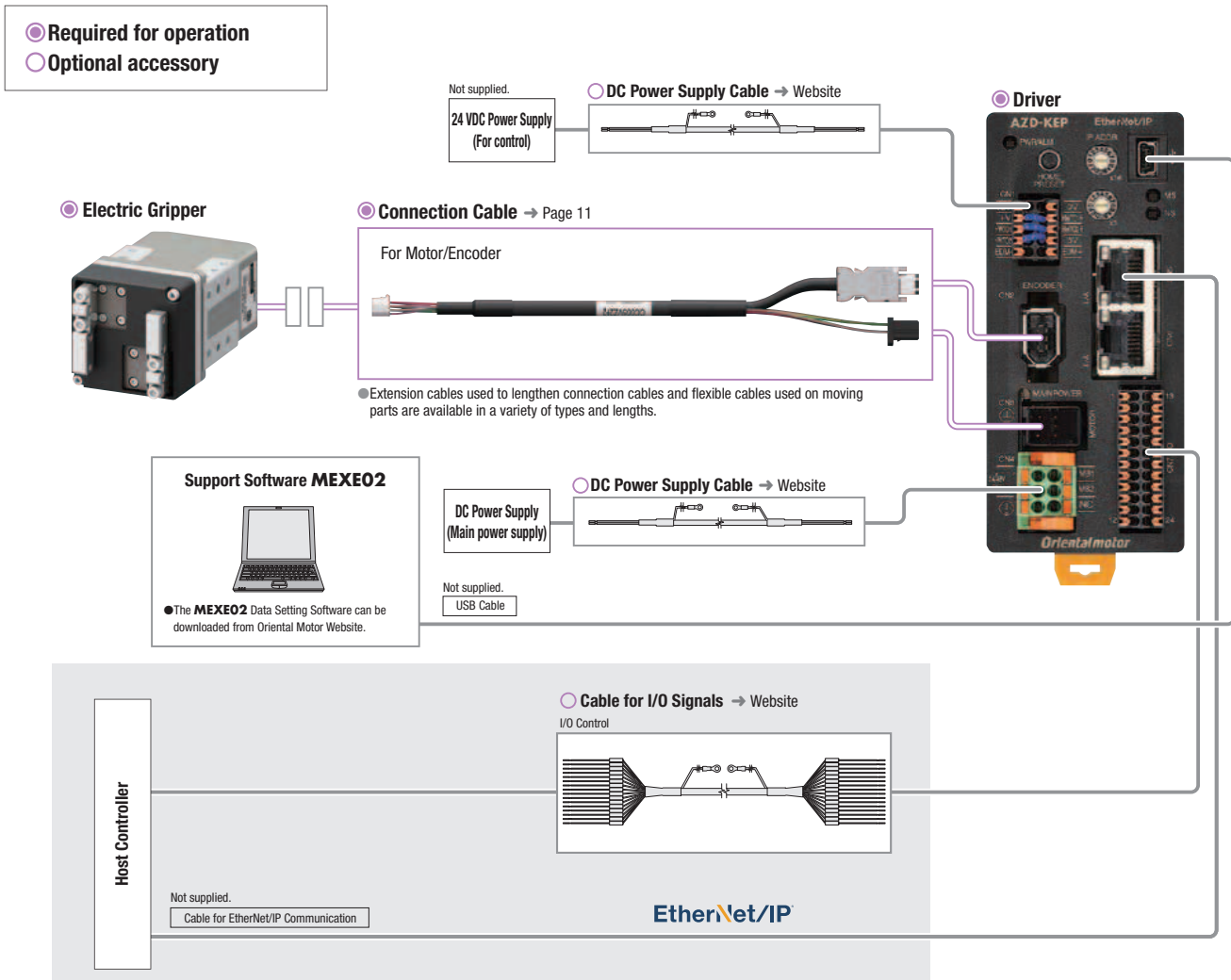
#### Note

The motor cable and encoder cable from the motor cannot be connected directly to the driver. When connecting to a driver, use a connection cable.



● **Combination of Electric Gripper and Network Compatible Driver**

An example of a configuration using I/O control with an EtherNet/IP-compatible driver or EtherNet/IP is shown below. Electric gripper, driver, and a connection cable/flexible connection cable are ordered separately.



● **Example of System Configuration**

Electric Gripper	Driver	Cables	
		Connection Cable (1 m)	Cable for I/O Signals General-Purpose Type (1 m)
<b>EH4-AZAKH</b>	<b>AZD-KEP</b>	<b>CC010VZ2F2</b>	<b>CC16D010B-1</b>
\$835.00	\$557.00	\$39.00	\$28.00
○	○	○	○

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

**Note**

● The motor cable and encoder cable from the motor cannot be connected directly to the driver. When connecting to a driver, use a connection cable.

## Product Number

### Electric Gripper

**EH 4 - AZ A K H**

① ② ③ ④ ⑤ ⑥

### Driver

**AZD - K D**

① ② ③

### Connection Cable/Flexible Connection Cable

**CC 050 V Z 2 F 2**

① ② ③ ④ ⑤ ⑥ ⑦

①	Series Name	<b>EH: EH Series</b>
②	Product Number	<b>3:</b> 36 mm (W)×36 mm (H) (Finger side) <b>4:</b> 46 mm (W)×46 mm (H) (Finger side)
③	Motor	<b>AZ: AZ Series</b>
④	Additional Function	<b>A:</b> Without Additional Function
⑤	Motor Type	<b>K:</b> DC Power Supply Input
⑥	Cable Outlet Direction	<b>H:</b> Horizontal Direction

①	Driver Type	<b>AZD: AZ Series Driver</b>
②	Power Supply Input	<b>K:</b> 24 VDC
③	Product Line	<b>D:</b> Built-in Controller Type <b>X:</b> Pulse Input Type with RS-485 Communication Blank: Pulse Input Type <b>EP:</b> EtherNet/IP Compatible <b>ED:</b> EtherCAT Drive Profile Compatible <b>PN:</b> PROFINET Compatible

①		<b>CC: Cable</b>
②	Length	<b>005:</b> 0.5 m <b>010:</b> 1 m <b>015:</b> 1.5 m <b>020:</b> 2 m <b>025:</b> 2.5 m <b>030:</b> 3 m <b>040:</b> 4 m <b>050:</b> 5 m <b>070:</b> 7 m <b>100:</b> 10 m <b>150:</b> 15 m <b>200:</b> 20 m
③	Reference Number	
④	Applicable Model	<b>Z: AZ Series</b>
⑤	Reference Number	<b>2:</b> Frame Size 20 mm, 28 mm
⑥	Cable Type	<b>F:</b> Connection Cable <b>R:</b> Flexible Connection Cable
⑦	Cable Specifications	<b>2:</b> DC Power Supply Input

## Product Line

### Electric Gripper



Product Name	List Price
<b>EH3-AZAKH</b> <b>EH4-AZAKH</b>	\$835.00

### Driver

#### ◇ Built-in Controller Type



Product Name	List Price
<b>AZD-KD</b>	\$485.00

#### ◇ Pulse Input Type with RS-485 Communication



Product Name	List Price
<b>AZD-KX</b>	\$485.00

#### ◇ Pulse Input Type



Product Name	List Price
<b>AZD-K</b>	\$423.00

#### ◇ EtherNet/IP Compatible



Product Name	List Price
<b>AZD-KEP</b>	\$557.00

#### ◇ EtherCAT Drive Profile Compatible



Product Name	List Price
<b>AZD-KED</b>	\$557.00

#### ◇ PROFINET Compatible



Product Name	List Price
<b>AZD-KPN</b>	\$557.00

### Connection Cable/Flexible Connection Cable

Use a flexible connection cable if the cable will be bent.

#### ◇ For Motor/Encoder



Product Line	Length (m)	Product Name	List Price
Connection Cable	0.5	<b>CC005VZ2F2</b>	\$39.00
	1	<b>CC010VZ2F2</b>	\$39.00
	1.5	<b>CC015VZ2F2</b>	\$47.00
	2	<b>CC020VZ2F2</b>	\$55.00
	2.5	<b>CC025VZ2F2</b>	\$61.00
	3	<b>CC030VZ2F2</b>	\$68.00
	4	<b>CC040VZ2F2</b>	\$105.00
	5	<b>CC050VZ2F2</b>	\$120.00
	7	<b>CC070VZ2F2</b>	\$149.00
	10	<b>CC100VZ2F2</b>	\$194.00
	15	<b>CC150VZ2F2</b>	\$268.00
20	<b>CC200VZ2F2</b>	\$340.00	

Product Line	Length (m)	Product Name	List Price
Flexible Connection Cable	0.5	<b>CC005VZ2R2</b>	\$92.00
	1	<b>CC010VZ2R2</b>	\$92.00
	1.5	<b>CC015VZ2R2</b>	\$99.00
	2	<b>CC020VZ2R2</b>	\$109.00
	2.5	<b>CC025VZ2R2</b>	\$114.00
	3	<b>CC030VZ2R2</b>	\$121.00
	4	<b>CC040VZ2R2</b>	\$138.00
	5	<b>CC050VZ2R2</b>	\$155.00
	7	<b>CC070VZ2R2</b>	\$198.00
	10	<b>CC100VZ2R2</b>	\$259.00
	15	<b>CC150VZ2R2</b>	\$365.00
20	<b>CC200VZ2R2</b>	\$469.00	

## Included Items

### Electric Gripper

Operating Manual: 1 Copy

### Driver

Type	Included Items	Connector
Built-in Controller Type Pulse Input Type with RS-485 Communication Pulse Input Type		CN1 Connector (1 pc.) CN4 Connector (1 pc.)
EtherNet/IP Compatible EtherCAT Drive Profile Compatible PROFINET Compatible		CN1 Connector (1 pc.) CN4 Connector (1 pc.) CN7 Connector (1 pc.)

### Connection Cable/Flexible Connection Cable

Type	Included Items	Operating Manual
Connection Cable		—
Flexible Connection Cable		1 Set

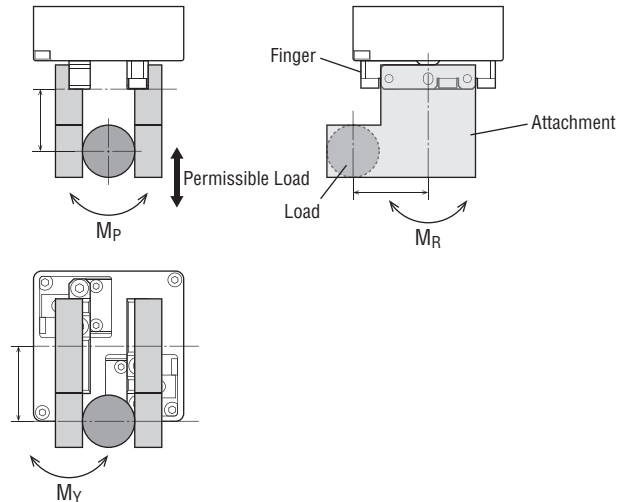
## Specifications

Actuator Product Name		EH3-AZAKH	EH4-AZAKH
Motor (AZ Series)		AZM14	AZM24
Maximum Grip Force [N]		7	25
Repetitive Positioning Accuracy [mm]	each side	±0.02	±0.02
Backlash [mm]	each side	0.2	0.1
	both sides	15	25
Stroke [mm]	each side	7.5	12.5
	both sides	156	156
Max. Speed [mm/s]	each side	78	78
	both sides	20	20
Maximum Acceleration [m/s <sup>2</sup> ]	each side	10	10
	both sides	20	20
Push Speed [mm/s]	each side	10	10
	both sides	0.02	0.02
Minimum Travel Amount [mm]	each side	0.01	0.01
	Permissible Load [N]	2	5
Static Permissible Moment [N·m]*		M <sub>P</sub> : 0.7	M <sub>P</sub> : 1.2
		M <sub>Y</sub> : 0.2	M <sub>Y</sub> : 0.12
		M <sub>R</sub> : 0.2	M <sub>R</sub> : 0.4

\*The static permissible moment at the finger end. The load, attachment mass, grip force (including impact load), etc. should be considered when using.

### Note

- The actual load mass that can be transported varies greatly depending on the attachment, the friction coefficient of the load, and the acceleration. Use it with a sufficient margin, with an upper limit of 1/10 of the grip force.



### ● Load Moment Formula

$$\frac{|\Delta M_P|}{M_P} + \frac{|\Delta M_Y|}{M_Y} + \frac{|\Delta M_R|}{M_R} \leq 1$$

$\Delta M_P$ : Load moment in the pitching direction (N·m)

$\Delta M_Y$ : Load moment in the yawing direction (N·m)

$\Delta M_R$ : Load moment in the rolling direction (N·m)

$M_P$ : Permissible moment in the pitching direction (N·m)

$M_Y$ : Permissible moment in the yawing direction (N·m)

$M_R$ : Permissible moment in the rolling direction (N·m)

## Specification Table Glossary

Maximum Grip Force	This is a maximum force to grip the load.
Repetitive Positioning Accuracy	A value indicating the amount of error that is generated when positioning is performed repeatedly to the same position in the same direction. (The accuracy is measured at a constant temperature under a constant load.)
Backlash	The play of the fingers when the motor shaft is fixed.
Stroke	The maximum distance the fingers can be opened and closed.
Maximum Speed	The maximum speed the fingers can be opened and closed.
Maximum Acceleration	The maximum acceleration the fingers can be opened and closed.
Push Speed	The operation speed during push-motion operation (gripping motion).
Minimum Travel Amount	The amount of movement per pulse set at the time of shipment.
Permissible Load	Allowable external force.
Static Permissible Moment	The moment allowed while gripping.

## Relationship between Push Force (Grip Force) and Current

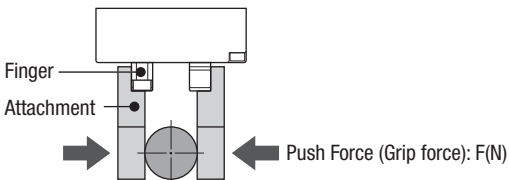
The gripping movement of the electric gripper depends on the push-motion operation.

The push force (grip force) is set by the operating current of the motor.

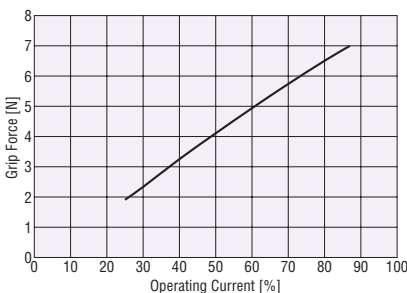
### Actual Push Force (Grip force)

The push force (grip force) and current values are shown below as a reference.

Check it on the actual assembled equipment.

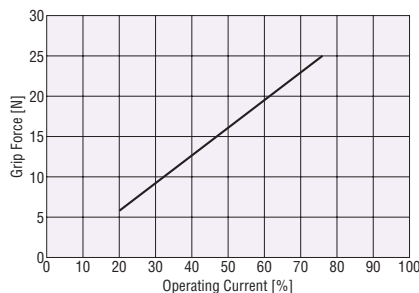


### EH3-AZAKH



- Set the grip force during push-motion operation to 7 N or less.
- Set the operation speed during push-motion operation to 10 mm/s or less (single side).

### EH4-AZAKH



- Set the grip force during push-motion operation to 25 N or less.
- Set the operation speed during push-motion operation to 10 mm/s or less (single side).

## Driver Specifications

Product Name		AZD-KD, AZD-KX, AZD-K	AZD-KEP, AZD-KED, AZD-KPN
Main Power Supply	Input Voltage	24 VDC±5%	
	Input Current	0.5 A	0.4 A
Control Power Supply	Input Voltage	24 VDC±5%	
	Input Current	1.6 A	0.15 A

## General Specifications

		Electric Gripper	Driver
Thermal Class		130 (B)	—
Insulation Resistance		100 MΩ or more when a 500 VDC megger is applied between the following places: • Between the case and motor windings	100 MΩ or more when a 500 VDC megger is applied between the following places: • Between the protective earth terminal and the power supply terminal
Dielectric Strength		Sufficient to withstand the following for 1 minute: • Between the case and motor windings: 0.5 kVAC, 50 Hz or 60 Hz	—
Operating Environment (In operation)	Ambient Temperature	0 to +40°C (Non-freezing)*	0 to +50°C (Non-freezing)
	Ambient Humidity	85% or less (Non-condensing)	
	Atmosphere	Use in an area without corrosive gases and dust. The product should not be exposed to water, oil or other liquids.	
Degree of Protection		—	IP10

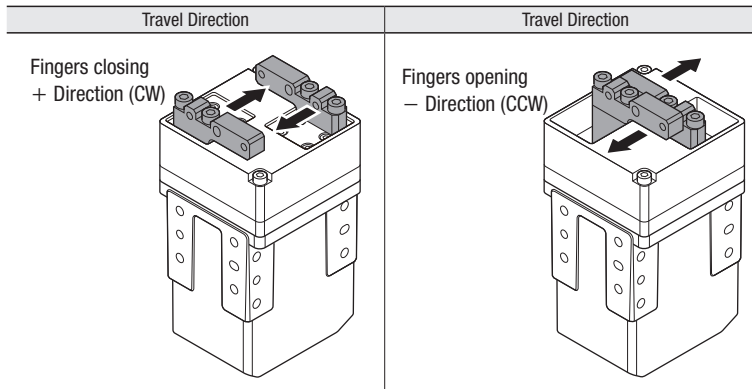
\* Based on Oriental Motor's internal measurement conditions

### Note

● Disconnect the motor and driver when taking an insulation resistance measurement or performing a dielectric voltage withstand test. Also, do not perform these tests on the absolute sensor part of the motor.

## Travel Direction

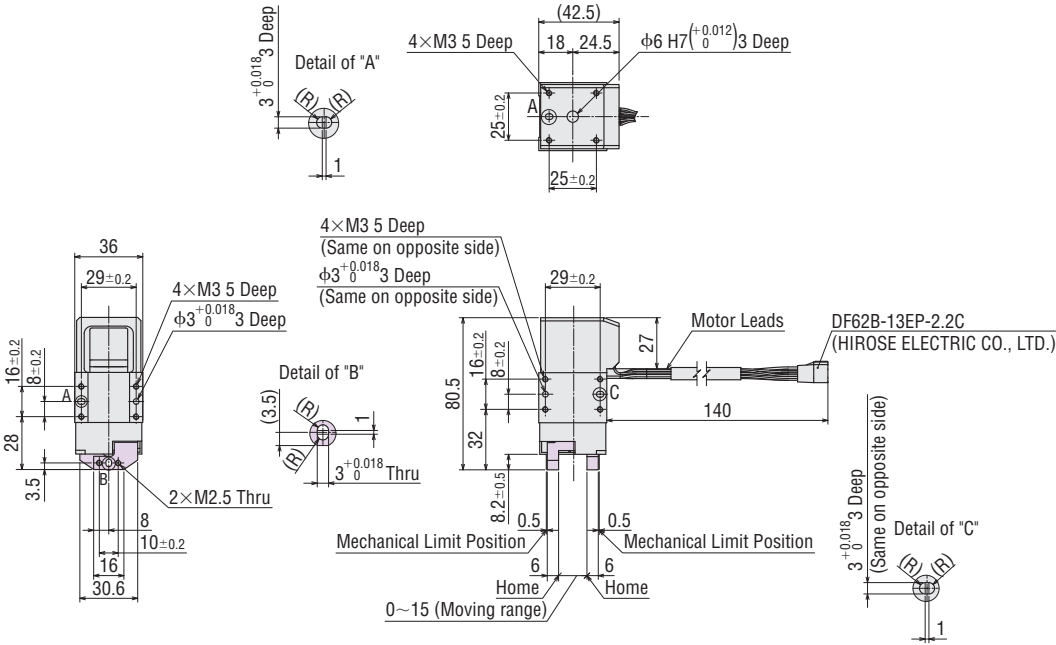
The default factory setting for direction of travel is as follows:



# Dimensions (Unit: mm)

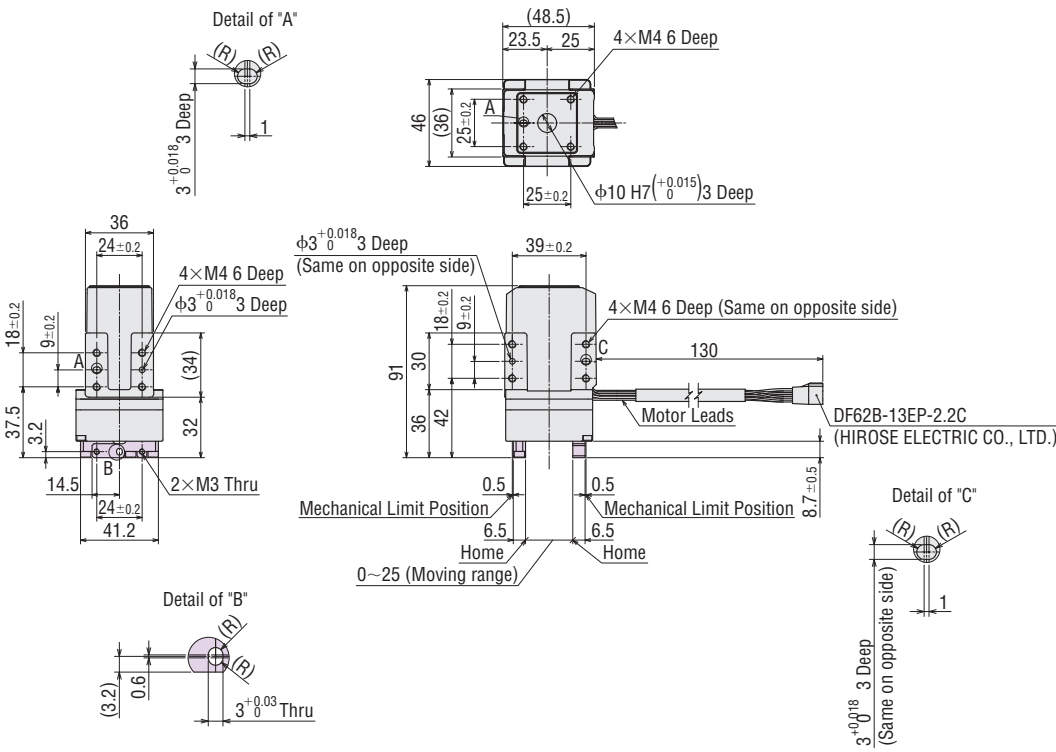
## 2D & 3D CAD

Product Name	Mass kg	2D CAD
<b>EH3-AZAKH</b>	0.2	D7908



## 2D & 3D CAD

Product Name	Mass kg	2D CAD
<b>EH4-AZAKH</b>	0.38	D7903

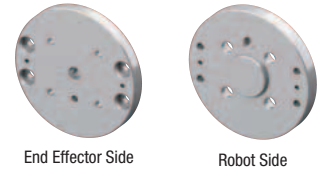


● The shaded areas are moving parts.

# Peripheral Equipment

## Installation Flange for Robots

This flange can be installed on commercially available industrial robots. It helps reduce man-hours for jig design and production. Installation flanges on the robot side conform to ISO9409-1 (JIS B 8436). They can be installed on each robot manufacturer's SCARA robots and vertical articulated robots.

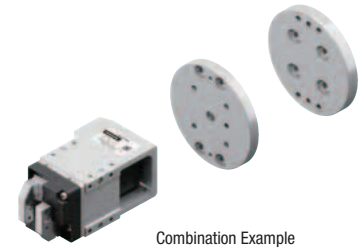


### Product Line

Product Name	List Price	Applicable ISO Standards on Robot Side	Applicable Product
<b>P3F1</b>	Call for pricing	Conforms to ISO 9409-1-31.5-4-M5	<b>EH3</b>
<b>P3F2</b>			<b>EH4</b>
<b>P5F1</b>			<b>EH3</b>
<b>P5F2</b>		Conforms to ISO 9409-1-50-4-M6	<b>EH4</b>

### Included Items

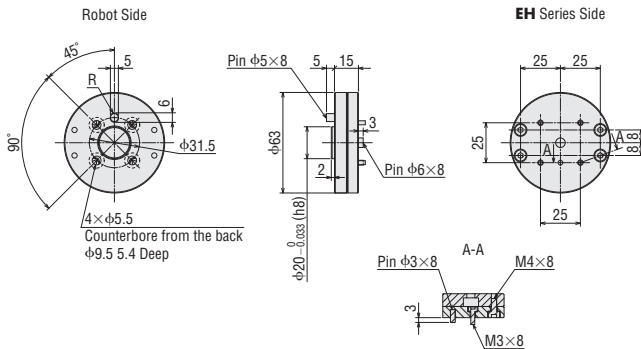
Positioning Pins, Hexagonal Socket Head Screws\*, Operating Manual  
 \*Bolts for connecting the industrial robot and the installation flange for robot are not supplied.



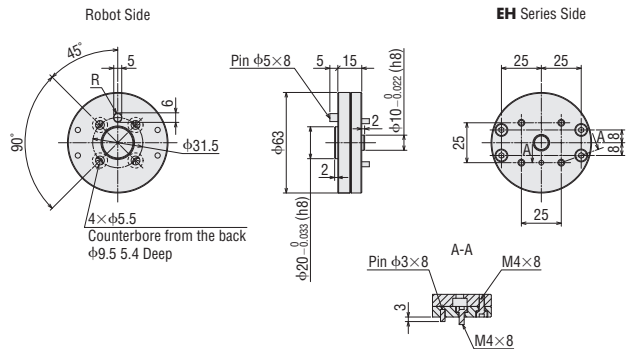
### Dimensions (Unit: mm) 2D & 3D CAD

Product Name	Mass kg	2D CAD
<b>P3F1</b>	0.13	D7919
<b>P3F2</b>		D7920
<b>P5F1</b>		D7921
<b>P5F2</b>		D7922

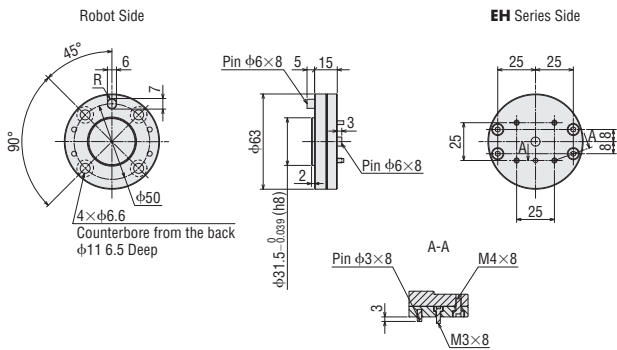
#### ◇ P3F1



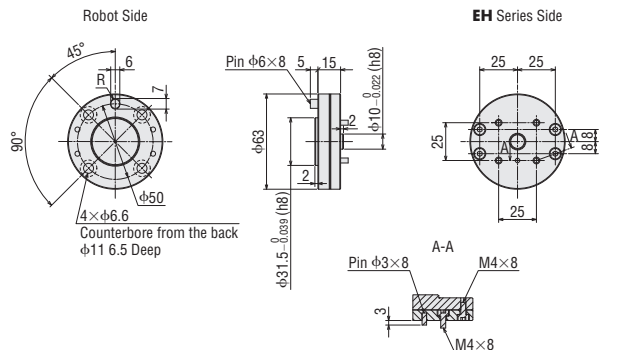
#### ◇ P3F2



#### ◇ P5F1



#### ◇ P5F2



### Examples of Industrial Robots that Can be Combined

#### ◇ Yaskawa Electric Corporation

Example of Compatible Product:  
 -MOTOMAN-HC Series



**YASKAWA**

#### ◇ Seiko Epson Corporation

Example of Compatible Product:  
 -T Series  
 -VT



**EPSON®**

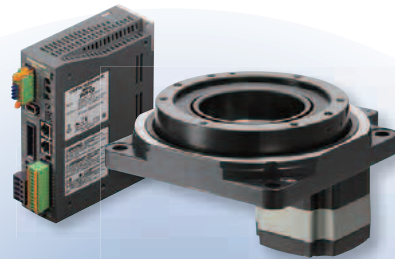
# Product Variation with the **AZ** Series

Controllability is consolidated across all product groups that contain the **AZ** Series.



Battery-Free  
Absolute Sensor

**AZ Series**



Hollow Rotary  
Actuator

**DGII Series**



Compact Linear  
Actuator

**DRS Series**

## Simplify Setup & Control



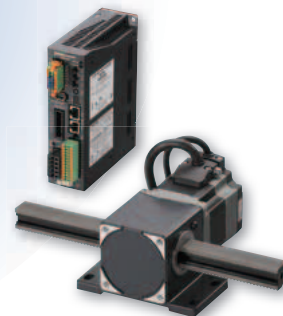
Electric Linear Slides

**EZS Series**



Electric Cylinders

**EAC Series**



Rack & Pinion

**L Series**

Specifications are subject to change without notice. This catalog was published in September, 2022.

## ORIENTAL MOTOR U.S.A. CORP.

### Western Sales and Customer Service Center

Tel: (310) 715-3301 Fax: (310) 225-2594

Los Angeles

Tel: (310) 715-3301

San Jose

Tel: (408) 392-9735

### Midwest Sales and Customer Service Center

Tel: (847) 871-5900 Fax: (847) 472-2623

Chicago

Tel: (847) 871-5900

Toronto

Tel: (905) 502-5333

### Eastern Sales and Customer Service Center

Tel: (781) 848-2426 Fax: (781) 848-2617

Boston

Tel: (781) 848-2426

New York

Tel: (973) 359-1100

### Technical Support

Tel: (800) 468-3982 / 8:30 A.M. to 5:00 P.M., P.S.T. (M-F)  
7:30 A.M. to 5:00 P.M., C.S.T. (M-F)

E-mail: [techsupport@orientalmotor.com](mailto:techsupport@orientalmotor.com)

Obtain Specifications, Online Training  
and Purchase Products at:  
[www.orientalmotor.com](http://www.orientalmotor.com)