Oriental motor

Electric Gripper

# EH Series

αSTEP AZ Series Equipped

Delicate grip.

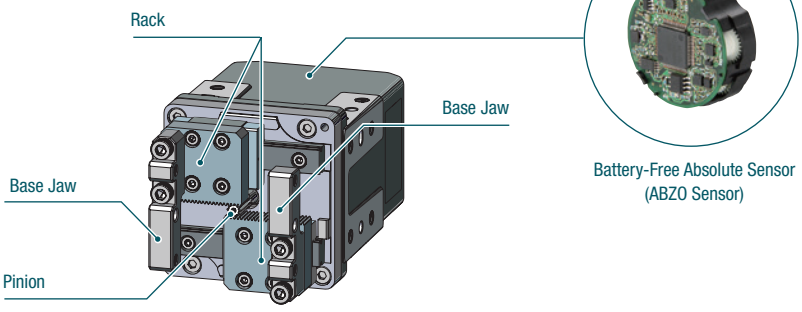
Delicate, human-like grip.

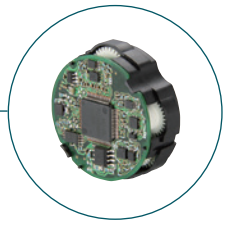

# Electric Gripper
# EH Series
## αSTEP AZ Series Equipped

A rack-and-pinion mechanism equipped with an **AZ** Series motor combined with an **EH** Series electric gripper. Its delicate grip, like that of a human hand, assists in automation and labor-saving.

## Driven by an αSTEP 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)

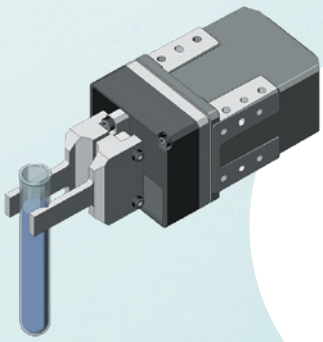
The electric gripper driver and cables are the same as for the **AZ** Series.


Please see the individual catalog for the **AZ** Series or the Oriental Motor website for the following.

- Driver specifications
- RS-485 Communication specifications
- Dimensions (driver, connection cable)
- Connection and Operation
- Cables

## 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.

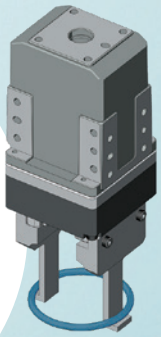


Test tube

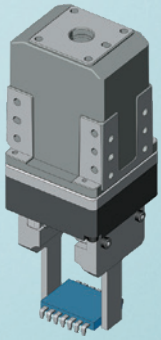
1

**Grip**

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



O-ring

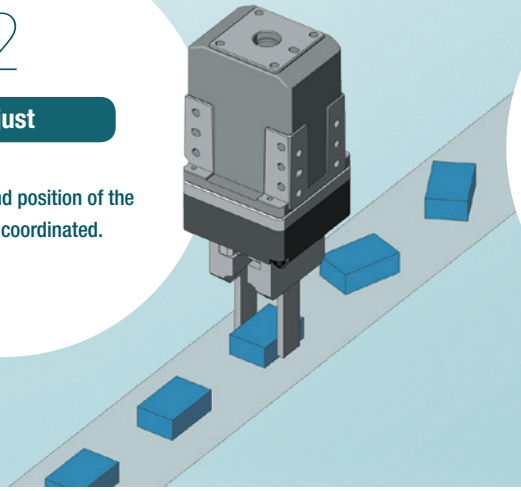


Electronic parts

2

**Adjust**

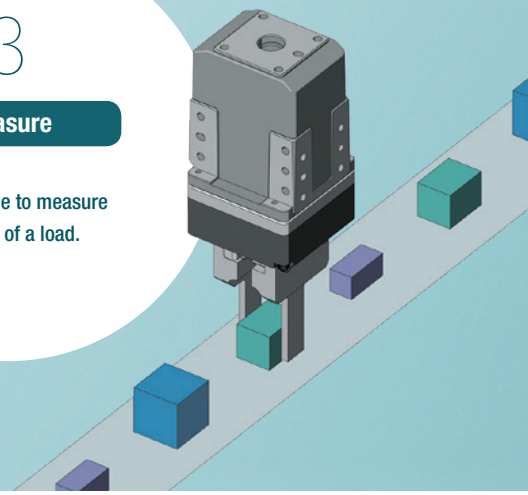
The direction and position of the load can be coordinated.



3

**Measure**

It is possible to measure the size of a load.

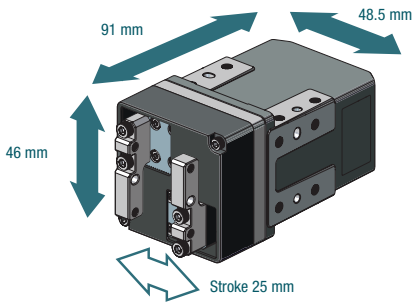


## Contributes to the Reduction of Equipment Size.

### Small and Lightweight

**91 mm × 46 mm × 48.5 mm in size, and weighs 380 g.**

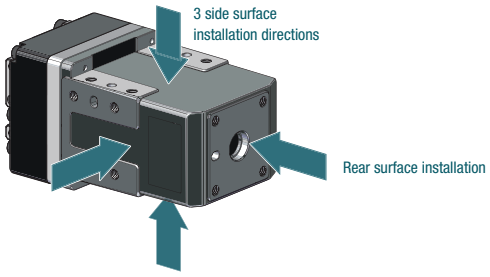
The combination of a motor with a frame size of 28 mm and the rack-and-pinion mechanism results in smaller equipment. With a 25 mm stroke available to grip the load.




### Multi-Surface Installation OK

**Installation in various directions is possible.**

The design is compatible with multi-surface installation, making it ideal for installation on robotic arms, etc.



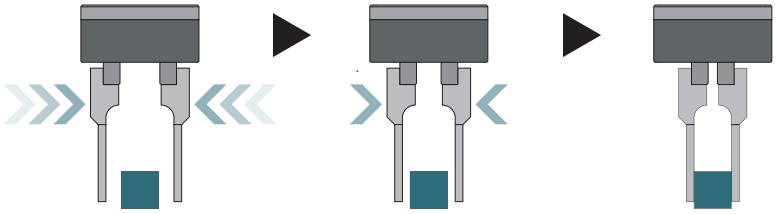
## 1 Grip — Reliably Grip Loads that may Easily Deform or Break.

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

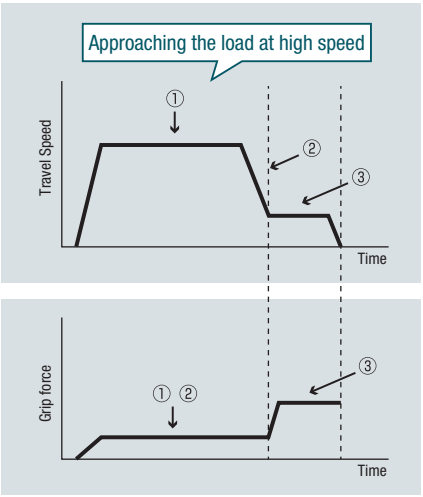
The motor approaches the load at high speed, then decelerates just before contacting the surface at low speed.



① The motor approaches the load at high speed.

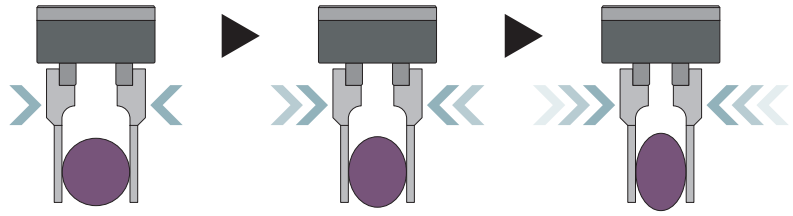
② The motor decelerates when in close proximity to the load, and grips it slowly.

③ Once the load is gripped push-motion operation starts, holding the load with set grip force.




### Grips at Low Grip Force, then Gradually Increases the Force

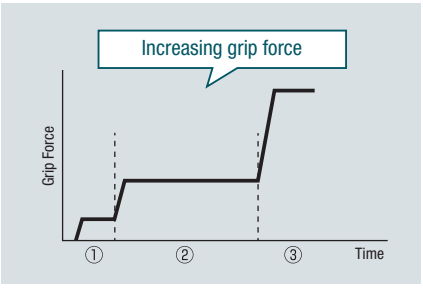
Pushing force and timing can be easily changed.



① Starts with low grip. force

② The grip force is gradually increased.

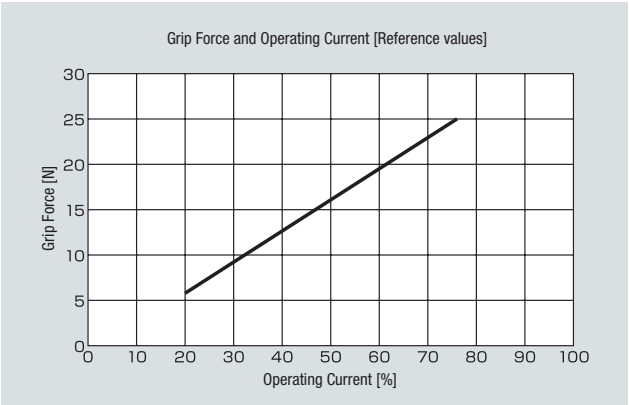
③ Maximum grip force




### Grip Force Characteristics during Push-Motion Operation

The grip movement of the electric gripper works by utilising push-motion operation.

The pushing force (grip force) is set according to the running current of the motor.



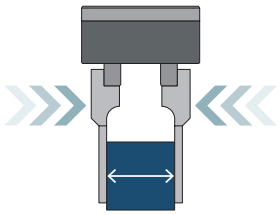

Maximum grip force **25 N**

[Grip force range (reference value) Approx. 6 N~25 N]

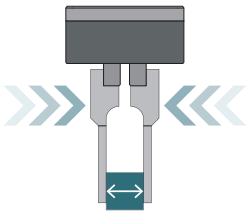
● Push-motion operation speed max. 10 mm/s (per side)

## 2 Adjust — The Direction and Position of the Load can be Coordinated.

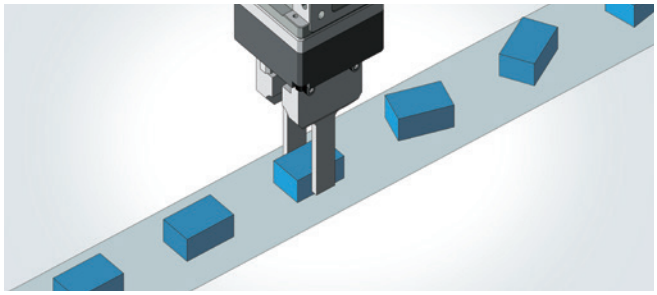
The minimum travel distance between the pincers - attached to the base jaws - is 0.02 mm. The direction and position of components can be coordinated by gripping them according to their size.



Large load



Small load

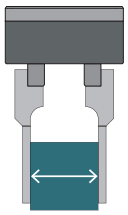


Pincers are not included with the product, and must be supplied by the customer.

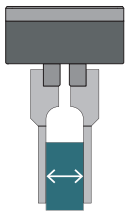
## 3 Measure — The Size of the Load can be Verified without an External Sensor.

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

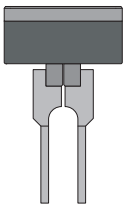
The operational range of the pincer is confirmed by the output signal (TLC output, AREA output) from the driver, allowing the size and presence of a load to be determined.



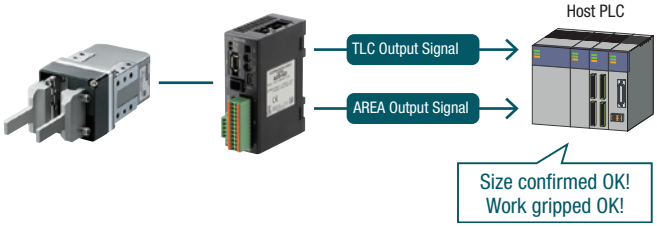
① OK (within tolerance)



② NG (out of tolerance)



③ NG (no load present)



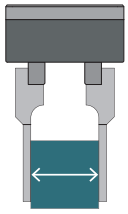

①② **Determine of size of load**
The position of the attachment when the load is gripped is confirmed, allowing for sorting by size.

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.



Measure the load size


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

## Product Line

### Electric Gripper

**EH** Series

### **AZ** Series Driver (DC Input)

**Built-in Controller Type** FLEX

The positioning data is set in the driver (256 points). Using a network converter (sold separately) facilitates control via FA network.

**Pulse input type with RS-485 communication**

RS-485 communication allows the motor's position, speed, torque, alarm, and temperature to be monitored.

**Pulse Input Type**

Controls the motor from a positioning module (pulse generator).

**Network-Compatible Multi-Axis Driver**

- SSCNETIII/H-compatible
- MECHATROLINKIII-compatible
- EtherCAT-compatible

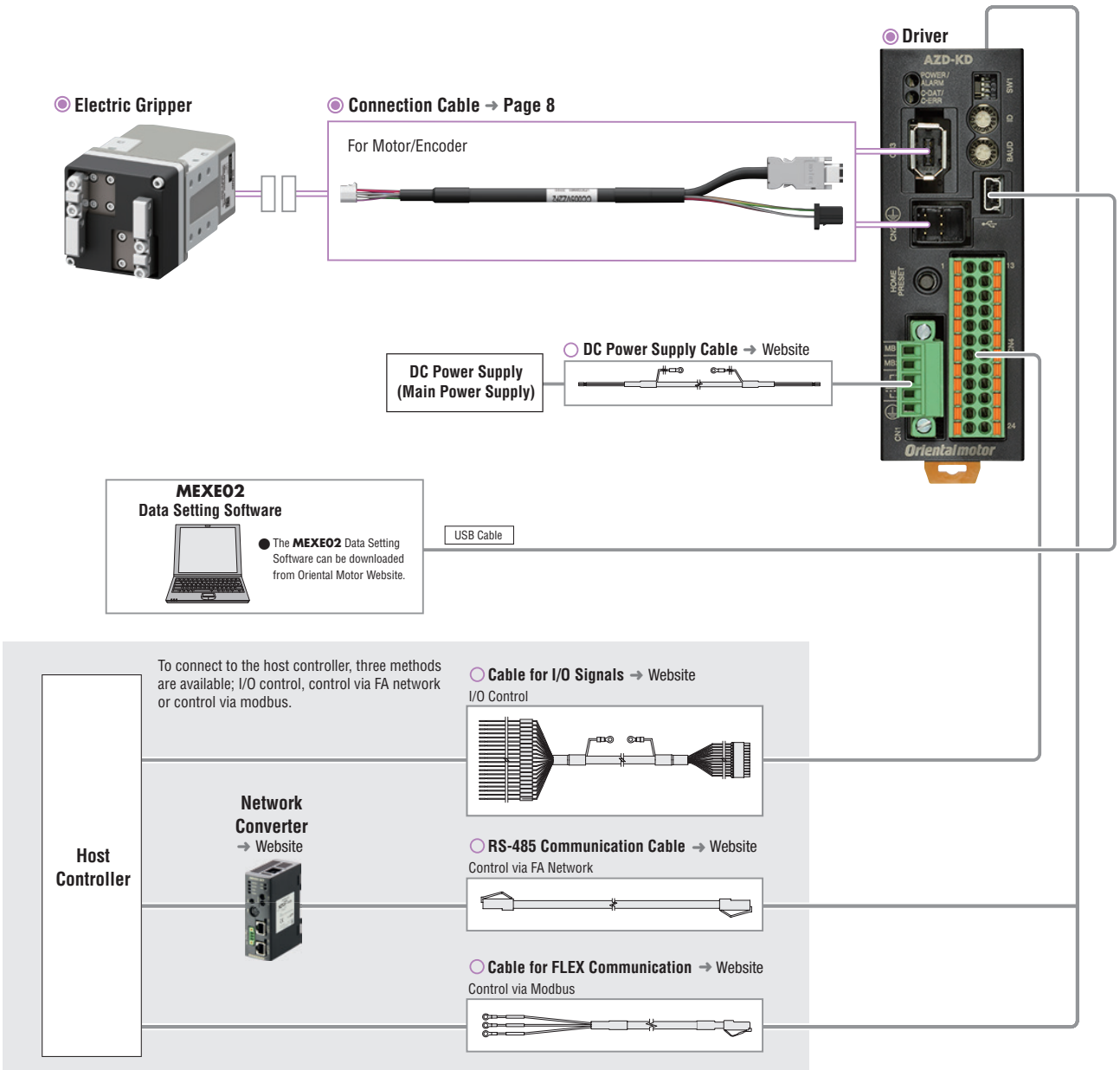
# System Configuration

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

A configuration example of a built-in controller type driver using either I/O control or RS-485 communication is shown below.
Motor, 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 Pricing**

| Electric Gripper | | Driver | | Cable | |
|---|---|---|---|---|---|
| | | | | Connection Cable (1 m) | Cable for I/O Signals Connector Type (1 m) |
| **EH4-AZAKH** | + | **AZD-KD** | + | **CC010VZ2F2** | **CC16D010B-1** |
| 590.00 € | | 360.00 € | | 29.00 € | 21.00 € |
| ◉ | | ◉ | | ◉ | ○ |

● 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

| | | |
|---|---|---|
| ① | Series Name | **EH**: **EH** Series |
| ② | Frame Size | **4**: 46 mm (W)×46 mm (H) (Base Jaw Side) |
| ③ | Equipped Motor | **AZ**: **AZ** Series |
| ④ | Additional Function | **A**: Without Additional Function |
| ⑤ | Motor Specifications | **K**: DC Power Supply Input |
| ⑥ | Cable Outlet Direction | **H**: Horizontal Direction |

### Driver

**AZD - K D**

① ② ③

| | | |
|---|---|---|
| ① | Driver Type | **AZD**: **AZ** Series Driver |
| ② | Power Supply Input | **K**: 24 VDC |
| ③ | Type | **D**: Built-in Controller Type<br>**X**: Pulse Input Type with RS-485 Communication<br>Blank: Pulse Input Type |

### Connection Cable/Flexible Connection Cable

**CC 050 V Z 2 F 2**

① ② ③ ④ ⑤ ⑥ ⑦

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

# Product Line

## Electric Gripper

| Product Name | List Price |
|---|---|
| **EH4-AZAKH** | 590.00 € |

## Driver

### ◇Built-in Controller Type

| Product Name | List Price |
|---|---|
| **AZD-KD** | 360.00 € |

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

| Product Name | List Price |
|---|---|
| **AZD-KX** | 360.00 € |

### ◇Pulse Input Type

| Product Name | List Price |
|---|---|
| **AZD-K** | 310.00 € |

## Connection Cable/Flexible Connection Cable

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

### ◇For Motor/Encoder

| Product Line | Name | Product Name | List Price |
|---|---|---|---|
| Connection Cable | 0.5 | **CC005VZ2F2** | 29.00 € |
| | 1 | **CC010VZ2F2** | 29.00 € |
| | 1.5 | **CC015VZ2F2** | 33.00 € |
| | 2 | **CC020VZ2F2** | 38.00 € |
| | 2.5 | **CC025VZ2F2** | 43.00 € |
| | 3 | **CC030VZ2F2** | 48.00 € |
| | 4 | **CC040VZ2F2** | 75.00 € |
| | 5 | **CC050VZ2F2** | 84.00 € |
| | 7 | **CC070VZ2F2** | 100.00 € |
| | 10 | **CC100VZ2F2** | 135.00 € |
| | 15 | **CC150VZ2F2** | 187.00 € |
| | 20 | **CC200VZ2F2** | 237.00 € |

| Product Line | Name | Product Name | List Price |
|---|---|---|---|
| Flexible Connection Cable | 0.5 | **CC005VZ2R2** | 65.00 € |
| | 1 | **CC010VZ2R2** | 65.00 € |
| | 1.5 | **CC015VZ2R2** | 70.00 € |
| | 2 | **CC020VZ2R2** | 76.00 € |
| | 2.5 | **CC025VZ2R2** | 81.00 € |
| | 3 | **CC030VZ2R2** | 85.00 € |
| | 4 | **CC040VZ2R2** | 97.00 € |
| | 5 | **CC050VZ2R2** | 108.00 € |
| | 7 | **CC070VZ2R2** | 138.00 € |
| | 10 | **CC100VZ2R2** | 181.00 € |
| | 15 | **CC150VZ2R2** | 254.00 € |
| | 20 | **CC200VZ2R2** | 326.00 € |

# Included

## Electric Gripper

Operating Manual: 1 Copy

## Driver

| Type \ Included | Connector | Operating Manual |
|---|---|---|
| Common to All Types | CN4 Connector (1 pc.)<br>CN1 Connector (1 pc.) | 1 Copy |

## Connection Cable/Flexible Connection Cable

| Type \ Included | Operating Manual |
|---|---|
| Connection Cable | – |
| Flexible Connection Cable | 1 Copy |

**AZ Series Catalogue**

The driver and the cable are the same as in the **AZ** Series. Please see our separate catalogue for details of the **AZ** Series product range.

- Driver specifications
- RS-485 communication specifications
- Dimensions
- Connection and operation
- Cable

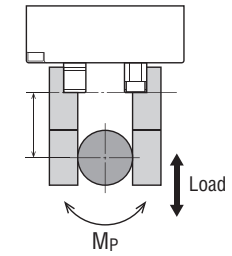
## Specifications

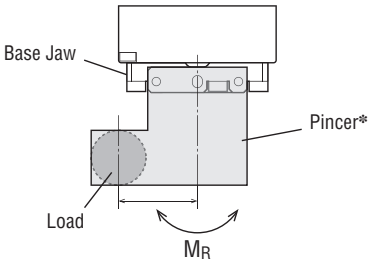
| Actuator Product Name | | EH4-AZAKH |
|---|---|---|
| Maximum Grip Force [N] | | 25 |
| Repetitive Positioning Accuracy [mm] | each side | ±0.02 |
| Backlash [mm] | each side | 0.1 |
| Stroke [mm] | | 25 |
| | each side | 12.5 |
| Maximum Speed [mm/s] | | 156 |
| | each side | 78 |
| Push Speed [mm/s] | | 20 |
| | each side | 10 |
| Minimum Travel Amount [mm] | | 0.02 |
| | each side | 0.01 |
| Permissible Load [N] | | 5 |
| Static Permissible Moment [Nm]* | | $M_P$: 1.2 $M_Y$: 0.12 $M_R$: 0.4 |

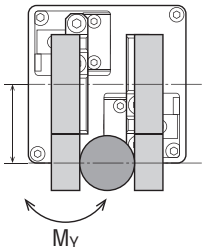
*The static permissible moment at base jaw tip. The load, attachment mass, grip force (including impact load), etc. should be considered when using.

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.




*Pincers are not included with the product, and must be supplied by the customer.

- Load Moment Formula

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

ΔMP: Load moment in the pitching direction (Nm)
ΔMY: Load moment in the yawing direction (Nm)
ΔMR: Load moment in the rolling direction (Nm)
MP: Permissible moment in the pitching direction (Nm)
MY: Permissible moment in the yawing direction (Nm)
MR: Permissible moment in the rolling direction (Nm)

## Specification Table Glossary

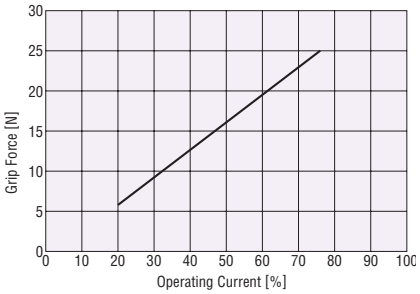
| | |
|---|---|
| Maximum Grip Force | This is a maximum force to grip the load. |
| Repetitive Positioning Accuracy | A value indicating the amount of error that is generated when positioning is performed repeatedly to the same position in the same direction. (The accuracy is measured at a constant temperature under a constant load.) |
| Backlash | The play of the base jaws when the motor shaft is fixed. |
| Stroke | The maximum distance the base jaws can be opened and closed. |
| Maximum Speed | The maximum speed the base jaws 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. |

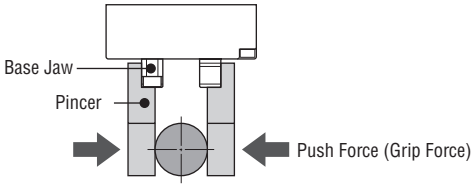
## Relationship between Push Force (Grip Force) and Current

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.




- 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 |
|---|---|---|
| Power Supply Input | Voltage | 24 VDC±5% |
| | Input Current A | 1.4 |

## General Specifications

| | | Electric Gripper | Driver |
|---|---|---|---|
| Thermal Class | | 130 (B) | – |
| Insulation Resistance | | The measured value is 100 MΩ or more when a 500 VDC megger is applied between the following locations:<br>• Between the case and motor windings | The measured value is 100 MΩ or more when a 500 VDC megger is applied between the following locations:<br>• Between the protective earth terminal and the power supply terminal |
| Dielectric Strength | | Sufficient to withstand the following for 1 minute:<br>• Between the case and motor windings: 1.5 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 |

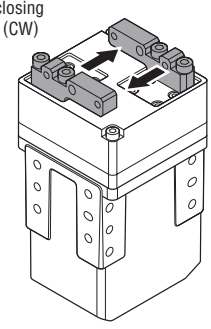
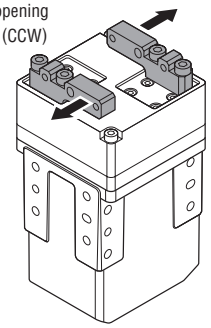
* Based on Oriental Motor's internal measurement conditions

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.

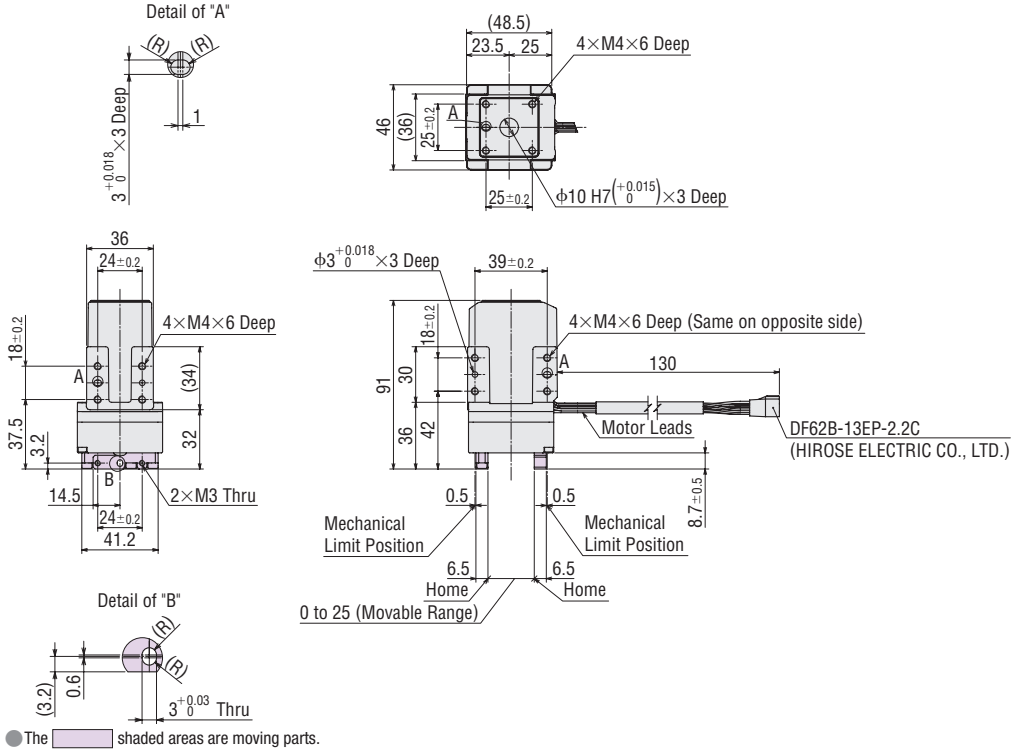
## Travel Direction

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

| Travel Direction | Travel Direction |
|---|---|
| Base jaws closing<br>+Direction (CW) | Base jaws opening<br>−Direction (CCW) |
|  |  |

## Dimensions (Unit: mm)

| Product Name | Mass kg |
|---|---|
| **EH4-AZAKH** | 0.38 |




The shaded areas are moving parts.

Orientalmotor

These products are manufactured at plants certified with the international standards **ISO 9001** (for quality assurance) and **ISO 14001** (for systems of environmental management).

Specifications are subject to change without notice. This catalogue was published in November 2019.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