



# **Motorized Actuator**

## **Electric Gripper**

- **EH Series**

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# **Function Setting Edition**

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Thank you for purchasing an Oriental Motor product.  
This Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.

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# 1 Introduction

## 1-1 Before use

Only qualified personnel of electrical and mechanical engineering should work with the product. Use the product correctly after thoroughly reading the section "Safety precautions" on the OPERATING MANUAL Actuator. In addition, be sure to observe the contents described in caution and note in this manual. The motorized actuators described in this manual have been designed and manufactured to be incorporated in general industrial equipment. Do not use for any other purpose. Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.

### Notation on this manual

 <b>CAUTION</b>	Handling the product without observing the instructions that accompany a "CAUTION" symbol may result in injury or property damage.
 <b>Note</b>	The items under this heading contain important handling instructions that the user should observe to ensure the safe use of the product.
 <b>memo</b>	The items under this heading contain related information and contents to gain a further understanding of the text in this manual.

## 1-2 How to use this manual

This manual explains about parameters required for operation of motorized actuators. Use it in the following cases.

- To check the factory setting for parameters.
- To check the upper limit values for parameters.
- To change the traveling direction of the moving part.
- To perform push-motion return-to-home operation.
- To perform push-motion operation.

## 1-3 Related operating manuals

For operating manuals not included with the product, download from Oriental Motor Website Download Page or contact your nearest Oriental Motor sales office.

Name	Included or not included with product
OPERATING MANUAL Actuator	Included
Motorized Actuator Electric Gripper Function Setting Edition (this document)	Not included
<b>AZ</b> Series/Motorized actuator equipped with <b>AZ</b> Series OPERATING MANUAL Function Edition	Not included

Refer to the operating manual of the driver for contents not described in these manuals.

## 1-4 Setting procedure

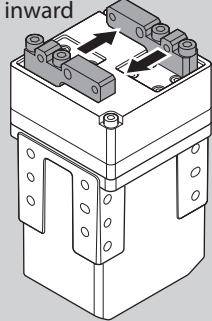
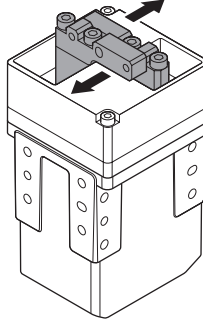
The motorized actuator equipped with the **AZ Series** can be used with the parameters at the time of shipment.

1	<b>Install and connect a motorized actuator and a driver.</b>
2	<b>Connect and start the support software MEXE02.</b>
3	<b>Copy the ABZO information (fixed value) to the driver.</b> Parameters such as the traveling direction and minimum travel amount have been set in the ABZO sensor at the time of shipment. Using the <b>MEXE02</b> , match the ABZO information (fixed value) and the setting value of the driver parameter.
4	<b>Set the software limit when no sensor is used.</b>
5	<b>Write the set data to the driver.</b>
6	<b>Check the movement of the motorized actuator.</b>
7	<b>Save the set data.</b>

## 1-5 Traveling direction of the moving part

The traveling direction of the moving part varies depending on the setting of the travel amount or the input method of the pulse signal. Check in the table.

The table describes examples when an actuator is used with the factory setting.

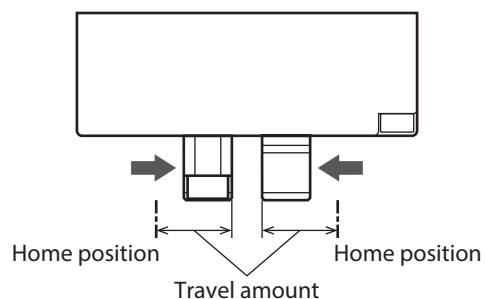
Setting	Traveling direction
<b>Operation by setting of parameter</b> Set the travel amount to the positive (+) direction.	Moves inward 
<b>Operation by pulse signal</b> <ul style="list-style-type: none"> <li>• 2-pulse input mode Input the pulse signal to the CW input.</li> <li>• 1-pulse input mode Input the pulse signal to the PLS input when the DIR input is ON.</li> </ul>	
<b>Operation by setting of parameter</b> Set the travel amount to the negative (-) direction.	Moves outward 
<b>Operation by pulse signal</b> <ul style="list-style-type: none"> <li>• 2-pulse input mode Input the pulse signal to the CCW input.</li> <li>• 1-pulse input mode Input the pulse signal to the PLS input when the DIR input is OFF.</li> </ul>	

## 1-6 Setting of travel amount

Set the travel amount as a distance that one side of the moving parts (fingers) is moved.

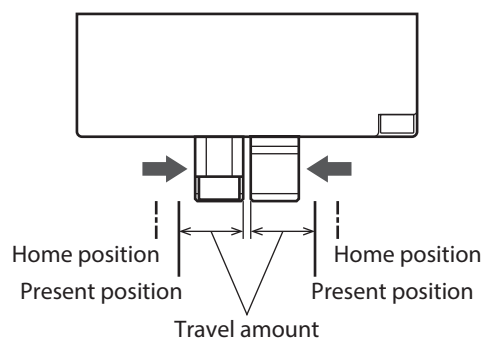
- **Setting with the absolute position**

Set the travel amount of the moving part (finger) with reference to the home position.



- **Setting with the relative position**

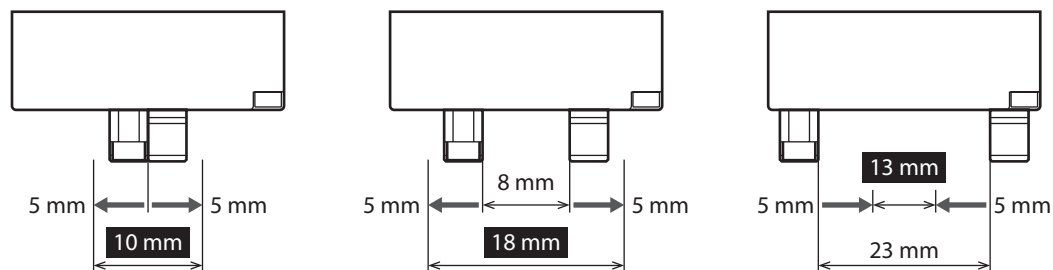
Set the travel amount of the moving part (finger) with reference to the present position.



The operation data and parameters of the **EH** Series are set for one side of the moving parts (fingers). Setting to one side of the moving parts will also move the other side under the same conditions.

- **Setting example: When the travel amount is set to 5 mm**

The moving parts move by 5 mm each even if they start moving from any position.



## 2 When using the EH Series

### 2-1 When the equipped motor is the AZ Series

The motorized actuator equipped with the AZ Series can be used with the parameters at the time of shipment.



- Set the operating speed by checking the specification of the maximum speed.
- The maximum speed may decrease depending on the ambient temperature or the length of the cable for motor.
- When using in combination with the pulse input type driver:  
Use the function setting switch No.1 (resolution setting) with the factory setting as it is. If it is changed, the ABZO information does not apply and the actuator will operate at a certain resolution.

#### ■ How to read the table

Parameters that have set a value dedicated for the motorized actuator are described on p.8 and later. Setting the specified values enables operation that satisfies the specifications of the motorized actuator. The minimum travel amount is set to "0.01 mm" at the time of shipment. It makes easier to calculate the travel amount and others since the actuator moves 0.01 mm per one step.

Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
(JOG) Operating speed	2.04 [mm/s]	204 [Hz]
(JOG) Acceleration/deceleration	0.70500 [m/s <sup>2</sup> ]	70.500 [kHz/s]
(JOG) Starting speed	0.63 [mm/s]	63 [Hz]

These values are set in the motorized actuator at the time of shipment. Set the values in this column when setting in unit of step.



The operation data and parameters of the EH Series are set for one side of the moving parts (fingers). Setting to one side of the moving parts will also move the other side under the same conditions.

## ■ Mechanism limit

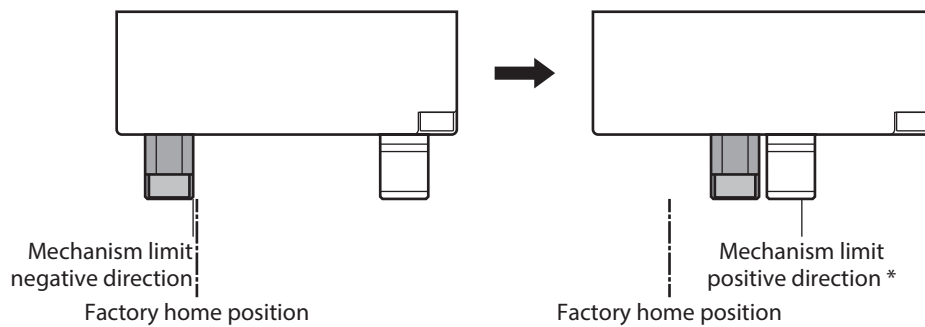
The home position is set at the time of shipment for the **EH** Series. This is called "factory home position."

The mechanism limit (mechanical end) is stored in the ABZO sensor (fixed value) for products that the factory home position is set. If the moving part reaches the mechanism limit during operation, an alarm of mechanical overtravel is generated. The position of the mechanism limit does not change even if the home position is set by the customer side.

To disable the mechanism limit, change the "Mechanism limit parameter setting" parameter to "Disable."

However, if the mechanism limit is disabled, the moving parts may hit the stoppers inside the product, causing damage to the product. Operate with enough care.

The figure shows the factory home position and the mechanism limit with reference to the moving part (finger) on the left.



\* The mechanism limit on the positive side is set outside the moving range.

### **⚠ CAUTION**

When disabling the mechanism limit, be careful not to damage the product or equipment by thoroughly examining the operation data such as the travel amount (position) and the operating speed.



If the moving part reaches the mechanism limit on the negative direction and a state of generating the alarm of mechanical overtravel is continued, an alarm of overload may also be generated.

## ■ EH3-AZAKH

**Note** The operation data and parameters of the **EH** Series are set for one side of the moving parts (fingers). Setting to one side of the moving parts will also move the other side under the same conditions.

### ● Product specifications

Item	Factory setting
Lead	9.425 [mm]
Minimum travel amount *1	0.01 [mm]
Mechanism limit positive direction *2	12.5 [mm] (1,250 step)
Mechanism limit negative direction *2	-0.5 [mm] (-50 step)

\*1 The minimum travel amount is determined by the “Electronic gear” parameter and the lead.

\*2 Distance from the factory home position.

### ● Upper limit value of setting

**Note** If a value exceeding the upper limit value is set to start operation, an alarm of operation data error is generated. The upper limit value can also be checked using the unit information monitor (mechanism protection parameter) of the **MEXE02**.

Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
Maximum starting speed	6.13 [mm/s]	613 [Hz]
Maximum operating speed	78.07 [mm/s]	7,807 [Hz]
Maximum pushing speed	10.05 [mm/s]	1,005 [Hz]
Maximum pushing return-to-home speed	10.05 [mm/s]	1,005 [Hz]
Maximum push current	100 [%] *	

\* It is the upper limit value when push-motion return-to-home operation is performed. When push-motion operation is performed, check the upper limit value with the graph on p.14.

### ● Motor & mechanism parameters

Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
Mechanism settings	Prioritize ABZO setting	Prioritize ABZO setting
Electronic gear A	400	400
Electronic gear B	377	377
Motor rotation direction	Positive side=Clockwise	Positive side=Clockwise
Mechanism lead	9,425	9,425
Mechanism lead decimal digit setting	×0.001 [mm]	×0.001 [mm]
JOG/HOME/ZHOME operation setting	Prioritize ABZO setting	Prioritize ABZO setting
(JOG) Operating speed	2.04 [mm/s]	204 [Hz]
(JOG) Acceleration/deceleration	0.70500 [m/s <sup>2</sup> ]	70.500 [kHz/s]
(JOG) Starting speed	0.63 [mm/s]	63 [Hz]
(JOG) Operating speed (high)	10.05 [mm/s]	1,005 [Hz]
(ZHOME) Operating speed	10.05 [mm/s]	1,005 [Hz]
(ZHOME) Acceleration/deceleration	0.52333 [m/s <sup>2</sup> ]	52.333 [kHz/s]
(ZHOME) Starting speed	0.63 [mm/s]	63 [Hz]
(HOME) Home-seeking mode	Push	Push
(HOME) Starting direction	Positive side	Positive side
(HOME) Acceleration/deceleration	0.50200 [m/s <sup>2</sup> ]	50.200 [kHz/s]
(HOME) Starting speed	5.03 [mm/s]	503 [Hz]



Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
(HOME) Operating speed	10.05 [mm/s]	1,005 [Hz]
(HOME) Last speed	0.63 [mm/s]	63 [Hz]
(HOME) Backward steps in 2 sensor home-seeking	0.50 [mm]	50 [step]
(HOME) Operating amount in uni-directional home-seeking	0.50 [mm]	50 [step]
(HOME) Operating current for push-home-seeking	100 [%] *	100 [%] *
(HOME) Backward steps in push-home-seeking	7.6 [mm]	760 [step]

\* When performing push-motion return-to-home operation, use the actuator with the operating current of the factory setting as much as possible. If the operating current smaller than the factory setting is set, the TLC output may be turned ON before push motion is complete, causing push-motion return-to-home operation to end at an unexpected position.

## ■ EH4-AZAKH



The operation data and parameters of the **EH** Series are set for one side of the moving parts (fingers). Setting to one side of the moving parts will also move the other side under the same conditions.

### ● Product specifications

Item	Factory setting
Lead	9.425 [mm]
Minimum travel amount *1	0.01 [mm]
Mechanism limit positive direction *2	17.5 [mm] (1,750 step)
Mechanism limit negative direction *2	-0.5 [mm] (-50 step)

\*1 The minimum travel amount is determined by the “Electronic gear” parameter and the lead.

\*2 Distance from the factory home position.

### ● Upper limit value of setting



If a value exceeding the upper limit value is set to start operation, an alarm of operation data error is generated. The upper limit value can also be checked using the unit information monitor (mechanism protection parameter) of the **MEXE02**.

Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
Maximum starting speed	6.13 [mm/s]	613 [Hz]
Maximum operating speed	78.07 [mm/s]	7,807 [Hz]
Maximum pushing speed	10.05 [mm/s]	1,005 [Hz]
Maximum pushing return-to-home speed	10.05 [mm/s]	1,005 [Hz]
Maximum push current	100 [%] *	

\* It is the upper limit value when push-motion return-to-home operation is performed. When push-motion operation is performed, check the upper limit value with the graph on p.14.

### ● Motor & mechanism parameters

Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
Mechanism settings	Prioritize ABZO setting	Prioritize ABZO setting
Electronic gear A	400	400
Electronic gear B	377	377
Motor rotation direction	Positive side=Clockwise	Positive side=Clockwise
Mechanism lead	9,425	9,425
Mechanism lead decimal digit setting	×0.001 [mm]	×0.001 [mm]
JOG/HOME/ZHOME operation setting	Prioritize ABZO setting	Prioritize ABZO setting
(JOG) Operating speed	2.04 [mm/s]	204 [Hz]
(JOG) Acceleration/deceleration	0.70500 [m/s <sup>2</sup> ]	70.500 [kHz/s]
(JOG) Starting speed	0.63 [mm/s]	63 [Hz]
(JOG) Operating speed (high)	10.05 [mm/s]	1,005 [Hz]
(ZHOME) Operating speed	10.05 [mm/s]	1,005 [Hz]
(ZHOME) Acceleration/deceleration	0.52333 [m/s <sup>2</sup> ]	52.333 [kHz/s]
(ZHOME) Starting speed	0.63 [mm/s]	63 [Hz]
(HOME) Home-seeking mode	Push	Push
(HOME) Starting direction	Positive side	Positive side
(HOME) Acceleration/deceleration	0.50200 [m/s <sup>2</sup> ]	50.200 [kHz/s]
(HOME) Starting speed	5.03 [mm/s]	503 [Hz]

Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
(HOME) Operating speed	10.05 [mm/s]	1,005 [Hz]
(HOME) Last speed	0.63 [mm/s]	63 [Hz]
(HOME) Backward steps in 2 sensor home-seeking	0.50 [mm]	50 [step]
(HOME) Operating amount in uni-directional home-seeking	0.50 [mm]	50 [step]
(HOME) Operating current for push-home-seeking	100 [%] *	100 [%] *
(HOME) Backward steps in push-home-seeking	12.55 [mm]	1,255 [step]

\* When performing push-motion return-to-home operation, use the actuator with the operating current of the factory setting as much as possible. If the operating current smaller than the factory setting is set, the TLC output may be turned ON before push motion is complete, causing push-motion return-to-home operation to end at an unexpected position.

# 3 Operation

This chapter describes precautions when an actuator equipped with the **AZ** Series is operated. Refer to the [OPERATING MANUAL AZ Series Function Edition](#) for descriptions about operations.

## 3-1 Push-motion return-to-home operation

### ⚠ CAUTION

- Perform push-motion return-to-home operation in the specification range of the static permissible moment. Failure to do so may result in injury or damage to equipment. Check on the Oriental Motor Website for the static permissible moment.
- When push-motion return-to-home operation is performed outward, provide a mechanism that the moving part press against within the stroke. Pressing against exceeding the range of the stroke may result in injury or damage to equipment.



The operation data and parameters of the **EH** Series are set for one side of the moving parts (fingers).

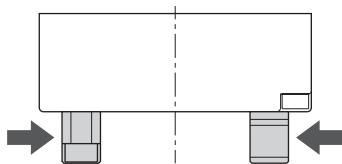
### ■ Actuator movement

Push-motion return-to-home operation is started, and when the moving parts (fingers) press against to turn the TLC output ON, they move in the reverse direction and then stop after moving according to the value set in the "(HOME) Backward steps after first entry in push-home-seeking" parameter. (factory setting: 0)

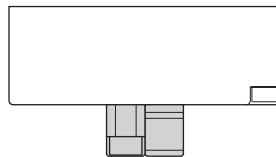
The moving parts (fingers) move in the reverse direction again, and when they press against to turn the TLC output ON, they move in the reverse direction once again and then stop after moving according to the value set in the "(HOME) Backward steps in push-home-seeking" parameter.

After that, they move according to the value set in the "(HOME) Position offset" parameter and stop. (factory setting: 0)  
The figure next describes examples when an actuator is used with the factory setting.

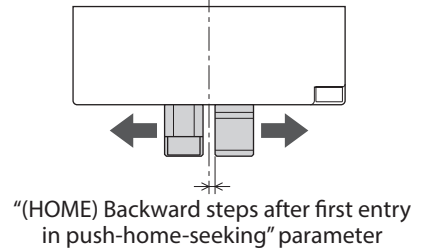
1. Push-motion return-to-home operation starts.



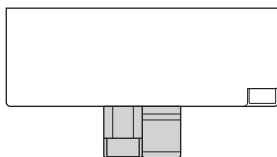
2. The moving parts (fingers) press against and the TLC output is turned ON.



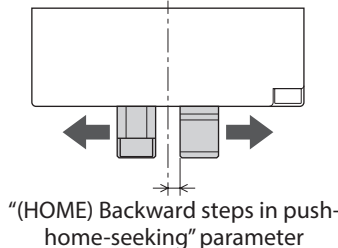
3. They move in the reverse direction and move according to the value set in the "(HOME) Backward steps after first entry in push-home-seeking" and stop.



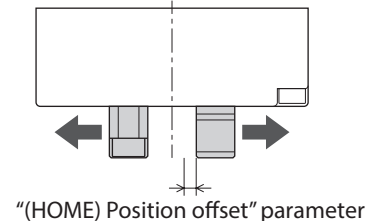
4. The moving parts (fingers) move in the reverse direction again to press against, and the TLC output is turned ON.



5. They reverse and stop after moving according to the value set in the "(HOME) Backward steps in push-home-seeking."



6. Again, they move according to the value set in the "(HOME) Position offset" and stop.



## ■ Push force

The push force of push-motion return-to-home operation is proportional to the current value. An appropriate current value is set for each actuator at the time of shipment. When changing the push force, set a value with the “(HOME) Operating current for push-home-seeking” parameter not to exceed the upper limit value.

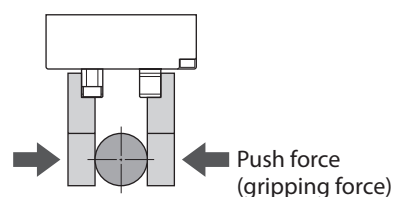
**Note** If a value exceeding the upper limit value is set to start operation, an alarm of operation data error is generated. The upper limit value can also be checked using the unit information monitor (mechanism protection parameter) of the **MEXE02**.

## ■ Operating speed

Set the operating speed of push-motion return-to-home operation to 10 mm/s or less (one side).

## 3-2 Push-motion operation

The gripping movement of the **EH** Series is performed with push-motion operation.  
Set the gripping force with the operating current.



**memo** The operation data and parameters of the **EH** Series are set for one side of the moving parts (fingers).

## ■ Maximum push force (gripping force)

Set the gripping force by push-motion operation to be equal to or less than the value shown in the table.

Model	Maximum push force (gripping force)
<b>EH3</b>	7 [N]
<b>EH4</b>	25 [N]

## ■ Operating speed

Set the operating speed of push-motion operation to 10 mm/s or less (one side).

## ■ Relationship between the push force (gripping force) and current

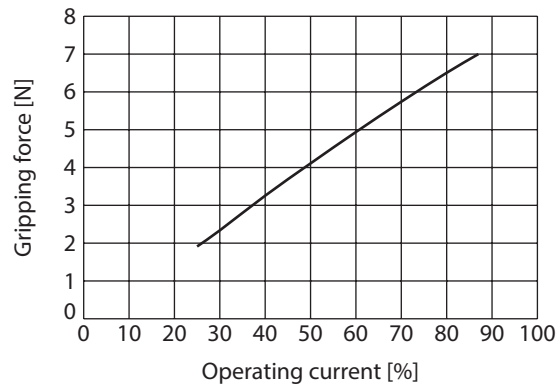
Reference values of the push force (gripping force) and current are shown next. Check the actual push force (gripping force) using the product.

**memo** The relationship between the push force (gripping force) and current varies depending on the following conditions. Check the actual push force (gripping force) using the product.

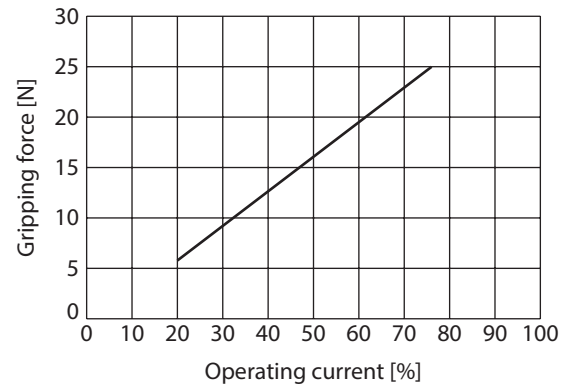
- Installation condition of the actuator (horizontal direction installation, vertical direction installation)
- Customer's load condition such as jig
- Cable length
- Ambient temperature

Push force (gripping force) actual value [reference value]

• EH3



• EH4





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Published in June 2021

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Technical Support Tel:800-468-3982  
8:30am EST to 5:00pm PST (M-F)  
[www.orientalmotor.com](http://www.orientalmotor.com)

ORIENTAL MOTOR (EUROPA) GmbH  
Schießstraße 44, 40549 Düsseldorf, Germany  
Technical Support Tel:00 800/22 55 66 22  
[www.orientalmotor.de](http://www.orientalmotor.de)

ORIENTAL MOTOR (UK) LTD.  
Unit 5 Faraday Office Park, Rankine Road,  
Basingstoke, Hampshire RG24 8QB UK  
Tel:+44-1256347090  
[www.oriental-motor.co.uk](http://www.oriental-motor.co.uk)

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ORIENTAL MOTOR CO., LTD.  
4-8-1 Higashiueno, Taito-ku, Tokyo  
110-8536 Japan  
Tel:+81-3-6744-0361  
[www.orientalmotor.co.jp](http://www.orientalmotor.co.jp)