Oriental motor

HL-14115-2

Motorized Actuator

Compact Motorized Cylinder

- **DR Series**
- **DRS2 Series**

Function Setting Edition

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.

Table of contents

1 Introduction 3

1-1 Before use 3

1-2 How to use this manual 3

1-3 Related operating manuals 3

1-4 Setting procedure 4

■ Actuators equipped with the **AZ** Series 4

■ Actuators equipped with the **PKP** Series 4

1-5 Traveling direction of the moving part 5

1-6 How to describe the model name in this manual 5

2 When using the DR Series 6

2-1 When the equipped motor is the **AZ** Series 6

■ How to read the table 6

■ Mechanism limit 7

■ **DR20□1** (lead 1 mm) 8

■ **DR28□1** (lead 1 mm) 10

■ **DR28□2.5** (lead 2.5 mm) 12

2-2 When the equipped motor is the **PKP** Series 14

■ Setting of minimum travel amount 14

3 When using the DRS2 Series 15

3-1 When the equipped motor is the **AZ** Series 15

■ How to read the table 15

■ Mechanism limit 16

■ **DRSM42□□-□□2** (lead 2 mm) 17

■ **DRSM60□□-□□4** (lead 4 mm) 18

■ **DRSM42□□-□□8** (lead 8 mm) 19

4 Operation (Actuators equipped with the AZ Series only) 21

4-1 Push-motion return-to-home operation 21

■ Actuator movement 21

■ Operating speed 22

■ Push force 22

4-2 Push-motion operation 22

■ Maximum push force 22

■ Operating speed 22

■ Relationship between the push force and current 23

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

⚠CAUTION	Handling the product without observing the instructions that accompany a "CAUTION" symbol may result in injury or property damage.
Note	The items under this heading contain important handling instructions that the user should observe to ensure the safe use of the product.
memo	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, contact your nearest Oriental Motor sales office or download from Oriental Motor Website Download Page.

- **Motorized actuator equipped with AZ Series**

Name	Included or not included with product
OPERATING MANUAL Actuator	Included
Motorized Actuator Compact Motorized Cylinder Function Setting Edition (this document)	Not included
AZ Series/Motorized actuator equipped with **AZ** Series Function Edition	Not included

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

- **Motorized actuator equipped with PKP Series**

Name	Included or not included with product
OPERATING MANUAL Actuator	Included
Motorized Actuator Compact Motorized Cylinder Function Setting Edition (this document)	Not included

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

1-4 Setting procedure

■ Actuators equipped with the AZ Series

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

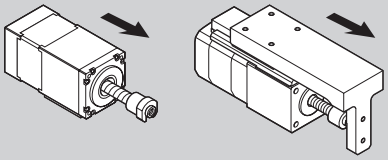
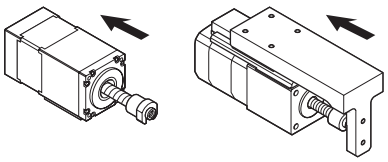
1	**Install and connect a motorized actuator and a driver.**
2	**Connect and start the support software MEXE02.**
3	**Copy the ABZO information (fixed value) to the driver.** Parameters such as the traveling direction and minimum travel amount have been set in the ABZO sensor at the time of shipment.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

■ Actuators equipped with the PKP Series

1	**Install and connect a motorized actuator and a driver.**
2	**Use the switches on the driver to set the minimum travel amount.**
3	**Check the movement of the motorized actuator.**

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
Operation by setting of parameter Set the travel amount to the positive (+) direction.	Move to the opposite the motor side. 
Operation by pulse signal • 2-pulse input mode Input the pulse signal to the CW input. • 1-pulse input mode Input the pulse signal to the PLS input when the DIR input is ON.	
Operation by setting of parameter Set the travel amount to the negative (–) direction.	Move to the motor side. 
Operation by pulse signal • 2-pulse input mode Input the pulse signal to the CCW input. • 1-pulse input mode Input the pulse signal to the PLS input when the DIR input is OFF.	

1-6 How to describe the model name in this manual

The setting values of parameters for the motorized actuator vary depending on the frame size or ball screw lead. Alphanumeric characters other than the frame size or ball screw lead of the motorized actuator are omitted from the model names described in this manual.

- **Examples for description of DR Series**

To describe so that the frame size can be understand	**DR28**
To describe so that the frame size and the ball screw lead can be understand	**DR28□1** (lead 1 mm) **DR28□2.5** (lead 2.5 mm)

- **Examples for description of DRS2 Series**

To describe so that the frame size can be understand	**DRSM42**, **DRSM60**
To describe so that the frame size and the ball screw lead can be understand	**DRSM42□□-□□2** (lead 2 mm) **DRSM60□□-□□4** (lead 4 mm) **DRSM42□□-□□8** (lead 8 mm)

2 When using the DR 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.

Note Do not perform push-motion operation with the **DR20□1** and **DR28□1** (ball screw lead 1 mm) equipped with the **AZ** Series. The TLC output may be turned ON before push-motion operation is complete. (Push-motion return-to-home operation can be performed.)

memo
- Set the operating speed by checking the specification of the maximum speed.
- The maximum speed may decrease depending on the ambient temperature or the motor cable length.
- Rod type:
  Be sure to set the home position before starting operation since it is not set at the time of shipment. [For actuators other than the rod type, the home position (factory home position) is set at the time of shipment.]
- 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 "0.001 mm" at the time of shipment. It makes easier to calculate the travel amount and others since the actuator moves 0.001 mm per one step.

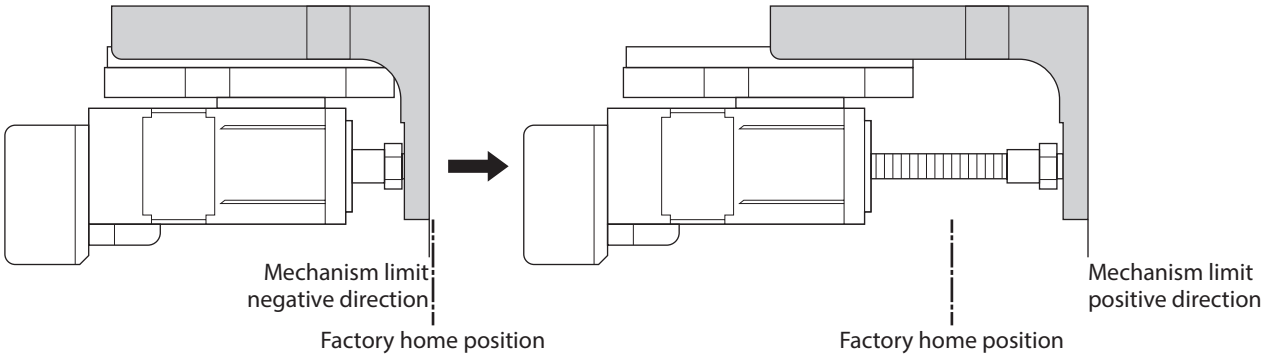
Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
(JOG) Operating speed	2 [mm/s]	2 [kHz]
(JOG) Acceleration/deceleration	0.5 [m/s^2]	500 [kHz/s]
(JOG) Starting speed	0.5 [mm/s]	500 [Hz]

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.

■ Mechanism limit

The home position is set at the time of shipment for actuators other than the rod type of the **DR** 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 part may strike the mechanical end or the ball screw shaft may not move with being jammed in the nut part, causing damage to the product. Operate with enough care.



* The figure shows the table type.

⚠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.

memo 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.

■ DR20□1 (lead 1 mm)

● Product specifications

Item		Factory setting
Lead		1 [mm]
Minimum travel amount *1		0.001 [mm]
Mechanism limit positive direction *2	Table type	26 [mm] (26,000 [step])
	Rod type	None
Mechanism limit negative direction *2	Table type	−1 [mm] (−1,000 [step])
	Rod type	None

*1 The minimum travel amount is determined by the "Electronic gear" parameter and the ball screw 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 [mm/s]	6 [kHz]
Maximum operating speed	20 [mm/s]	20 [kHz]
Maximum pushing return-to-home speed	6 [mm/s]	6 [kHz]
Maximum push current	90 [%] *	90 [%] *

* It is the upper limit value when push-motion return-to-home operation is performed.

● 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	1	1
Electronic gear B	1	1
Motor rotation direction	Positive side=Clockwise	Positive side=Clockwise
Mechanism lead pitch	1	1
Mechanism lead decimal digit setting	×1 [mm]	×1 [mm]
JOG/HOME/ZHOME operation setting	Prioritize ABZO setting	Prioritize ABZO setting
(JOG) Operating speed	2 [mm/s]	2 [kHz]
(JOG) Acceleration/deceleration	0.2 [m/s^2]	200 [kHz/s]
(JOG) Starting speed	0.2 [mm/s]	200 [Hz]
(JOG) Operating speed (high)	10 [mm/s]	10 [kHz]
(ZHOME) Operating speed	10 [mm/s]	10 [kHz]
(ZHOME) Acceleration/deceleration	0.2 [m/s^2]	200 [kHz/s]
(ZHOME) Starting speed	0.2 [mm/s]	200 [Hz]
(HOME) Home-seeking mode	Push	Push
(HOME) Starting direction	Negative direction	Negative direction
(HOME) Acceleration/deceleration	0.2 [m/s^2]	200 [kHz/s]
(HOME) Starting speed	0.2 [mm/s]	200 [Hz]
(HOME) Operating speed	6 [mm/s]	6 [kHz]
(HOME) Last speed	0.2 [mm/s]	200 [Hz]
(HOME) Backward steps in 2 sensor home-seeking	0.5 [mm]	500 [step]

Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
(HOME) Operating amount in uni-directional home-seeking	0.5 [mm]	500 [step]
(HOME) Operating current for push-home-seeking	90 [%] *	90 [%] *
(HOME) Backward steps in push-home-seeking	1 [mm]	1,000 [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.

■ DR28□1 (lead 1 mm)

● Product specifications

Item		Factory setting
Lead		1 [mm]
Minimum travel amount *1		0.001 [mm]
Mechanism limit positive direction *2	Wide table type Table type Rod type with guide	31 [mm] (31,000 [step])
	Rod type	None
Mechanism limit negative direction *2	Wide table type Table type Rod type with guide	−1 [mm] (−1,000 [step])
	Rod type	None

*1 The minimum travel amount is determined by the "Electronic gear" parameter and the ball screw 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 [mm/s]	6 [kHz]
Maximum operating speed	40 [mm/s]	40 [kHz]
Maximum pushing return-to-home speed	6 [mm/s]	6 [kHz]
Maximum push current	55 [%] *	55 [%] *

* It is the upper limit value when push-motion return-to-home operation is performed.

● 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	1	1
Electronic gear B	1	1
Motor rotation direction	Positive side=Clockwise	Positive side=Clockwise
Mechanism lead pitch	1	1
Mechanism lead decimal digit setting	×1 [mm]	×1 [mm]
JOG/HOME/ZHOME operation setting	Prioritize ABZO setting	Prioritize ABZO setting
(JOG) Operating speed	2 [mm/s]	2 [kHz]
(JOG) Acceleration/deceleration	0.2 [m/s^2]	200 [kHz/s]
(JOG) Starting speed	0.2 [mm/s]	200 [Hz]
(JOG) Operating speed (high)	10 [mm/s]	10 [kHz]
(ZHOME) Operating speed	10 [mm/s]	10 [kHz]
(ZHOME) Acceleration/deceleration	0.2 [m/s^2]	200 [kHz/s]
(ZHOME) Starting speed	0.2 [mm/s]	200 [Hz]
(HOME) Home-seeking mode	Push	Push
(HOME) Starting direction	Negative direction	Negative direction
(HOME) Acceleration/deceleration	0.2 [m/s^2]	200 [kHz/s]
(HOME) Starting speed	0.2 [mm/s]	200 [Hz]

Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
(HOME) Operating speed	6 [mm/s]	6 [kHz]
(HOME) Last speed	0.2 [mm/s]	200 [Hz]
(HOME) Backward steps in 2 sensor home-seeking	0.5 [mm]	500 [step]
(HOME) Operating amount in uni-directional home-seeking	0.5 [mm]	500 [step]
(HOME) Operating current for push-home-seeking	55 [%] *	55 [%] *
(HOME) Backward steps in push-home-seeking	1 [mm]	1,000 [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.

■ DR28□2.5 (lead 2.5 mm)

● Product specifications

Item		Factory setting
Lead		2.5 [mm]
Minimum travel amount *1		0.001 [mm]
Mechanism limit positive direction *2	Wide table type Table type Rod type with guide	31 [mm] (31,000 [step])
	Rod type	None
Mechanism limit negative direction *2	Wide table type Table type Rod type with guide	−1 [mm] (−1,000 [step])
	Rod type	None

*1 The minimum travel amount is determined by the "Electronic gear" parameter and the ball screw 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 [mm/s]	6 [kHz]
Maximum operating speed	100 [mm/s]	10 [kHz]
Maximum pushing speed	6 [mm/s]	6 [kHz]
Maximum pushing return-to-home speed	6 [mm/s]	6 [kHz]
Maximum push current	70 [%] *	70 [%] *

* 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.23.

● 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	2	2
Electronic gear B	5	5
Motor rotation direction	Positive side=Clockwise	Positive side=Clockwise
Mechanism lead pitch	25	25
Mechanism lead decimal digit setting	×0.1 [mm]	×0.1 [mm]
JOG/HOME/ZHOME operation setting	Prioritize ABZO setting	Prioritize ABZO setting
(JOG) Operating speed	2 [mm/s]	2 [kHz]
(JOG) Acceleration/deceleration	0.5 [m/s^2]	500 [kHz/s]
(JOG) Starting speed	0.5 [mm/s]	500 [Hz]
(JOG) Operating speed (high)	10 [mm/s]	10 [kHz]
(ZHOME) Operating speed	10 [mm/s]	10 [kHz]
(ZHOME) Acceleration/deceleration	0.5 [m/s^2]	500 [kHz/s]
(ZHOME) Starting speed	0.5 [mm/s]	500 [Hz]
(HOME) Home-seeking mode	Push	Push
(HOME) Starting direction	Negative direction	Negative direction

Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
(HOME) Acceleration/deceleration	0.5 [m/s^2]	500 [kHz/s]
(HOME) Starting speed	0.5 [mm/s]	500 [Hz]
(HOME) Operating speed	6 [mm/s]	6 [kHz]
(HOME) Last speed	0.5 [mm/s]	500 [Hz]
(HOME) Backward steps in 2 sensor home-seeking	0.5 [mm]	500 [step]
(HOME) Operating amount in uni-directional home-seeking	0.5 [mm]	500 [step]
(HOME) Operating current for push-home-seeking	70 [%] *	70 [%] *
(HOME) Backward steps in push-home-seeking	1 [mm]	1,000 [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.

2-2 When the equipped motor is the PKP Series

■ Setting of minimum travel amount

The minimum travel amount can be set based on a combination of the STEP switch and R2/R1 switch on the driver.

Factory setting 0.0125 mm (STEP switch: 0, R2/R1 switch: R2 side)

Note Do not change the switch while operating. This may cause the motorized actuator to misstep and stop.

Combination of switches and minimum travel (mm)

Dial of STEP switch	R2/R1 switch	
	R2 side	R1 side
0	0.0125	0.005
1	0.00625	0.0025
2	0.003125	0.002
3	0.0025	0.00125
4	0.0015625	0.001
5	0.00125	0.000625
6	0.00078125	0.0005
7	0.0005	0.00025
8	0.000390625	0.0002
9	0.00025	0.000125
A	0.0001953125	0.0001
B	0.000125	0.0000625
C	0.0001	0.00005
D	0.00009765625	0.00004
E	0.00005	0.000025
F	0.000048828125	0.00002

memo
- Values for the minimum travel amount are theoretical values.
- The set switches are enabled after the power is turned on again.

3 When using the DRS2 Series

3-1 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.

memo

- Set the operating speed by checking the specification of the maximum speed.
- The maximum speed may decrease depending on the ambient temperature or the motor cable length.
- Non-guide type:
  Be sure to set the home position before starting operation since it is not set at the time of shipment. [The home position (factory home position) for the guide type is set at the time of shipment.]
- 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.17 and later. Setting the specified values enables operation that satisfies the specifications of the motorized actuator.
The minimum travel amount is set to "0.001 mm" at the time of shipment. It makes easier to calculate the travel amount and others since the actuator moves 0.001 mm per one step.

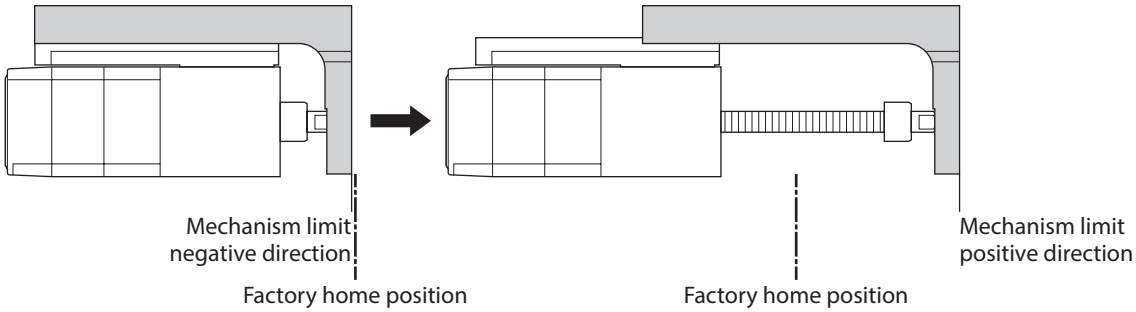
Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
(JOG) Operating speed	2 [mm/s]	2 [kHz]
(JOG) Acceleration/deceleration	0.4 [m/s^2]	400 [kHz/s]
(JOG) Starting speed	0.4 [mm/s]	400 [Hz]

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.

■ Mechanism limit

The home position for the guide type is set at the time of shipment. 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 part may strike the mechanical end or the ball screw shaft may not move with being jammed in the nut part, causing damage to the product. Operate with enough care.



⚠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.

memo 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.

■ DRSM42□□-□□2 (lead 2 mm)

● Product specifications

Item		Factory setting
Lead		2 [mm]
Minimum travel amount *1		0.001 [mm]
Mechanism limit positive direction *2	Guide type	41 [mm] (41,000 [step])
	Non-guide type	None
Mechanism limit negative direction *2	Guide type	−1 [mm] (−1,000 [step])
	Non-guide type	None

*1 The minimum travel amount is determined by the "Electronic gear" parameter and the ball screw 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 [mm/s]	6 [kHz]
Maximum operating speed	50 [mm/s]	50 [kHz]
Maximum pushing speed	6 [mm/s]	6 [kHz]
Maximum pushing return-to-home speed	6 [mm/s]	6 [kHz]
Maximum push current	55 [%] *	55 [%] *

* 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.23.

● Motor & mechanism paramters

Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
Mechanism settings	Prioritize ABZO setting	Prioritize ABZO setting
Electronic gear A	1	1
Electronic gear B	2	2
Motor rotation direction	Positive side=Clockwise	Positive side=Clockwise
Mechanism lead pitch	2	2
Mechanism lead decimal digit setting	×1 [mm]	×1 [mm]
JOG/HOME/ZHOME operation setting	Prioritize ABZO setting	Prioritize ABZO setting
(JOG) Operating speed	2 [mm/s]	2 [kHz]
(JOG) Acceleration/deceleration	0.4 [m/s^2]	400 [kHz/s]
(JOG) Starting speed	0.4 [mm/s]	400 [Hz]
(JOG) Operating speed (high)	10 [mm/s]	10 [kHz]
(ZHOME) Operating speed	10 [mm/s]	10 [kHz]
(ZHOME) Acceleration/deceleration	0.4 [m/s^2]	400 [kHz/s]
(ZHOME) Starting speed	0.4 [mm/s]	400 [Hz]
(HOME) Home-seeking mode	Push	Push
(HOME) Starting direction	Negative direction	Negative direction
(HOME) Acceleration/deceleration	0.4 [m/s^2]	400 [kHz/s]
(HOME) Starting speed	0.4 [mm/s]	400 [Hz]
(HOME) Operating speed	6 [mm/s]	6 [kHz]

Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
(HOME) Last speed	0.4 [mm/s]	400 [Hz]
(HOME) Backward steps in 2 sensor home-seeking	0.4 [mm]	400 [step]
(HOME) Operating amount in uni-directional home-seeking	0.4 [mm]	400 [step]
(HOME) Operating current for push-home-seeking	55 [%] *	55 [%] *
(HOME) Backward steps in push-home-seeking	1 [mm]	1,000 [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.

■ DRSM60□□-□□4 (lead 4 mm)

● Product specifications

Item	Factory setting
Lead	4 [mm]
Minimum travel amount *1	0.001 [mm]
Mechanism limit positive direction *2	None
Mechanism limit negative direction *2	None

*1 The minimum travel amount is determined by the "Electronic gear" parameter and the ball screw 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 [mm/s]	6 [kHz]
Maximum operating speed	50 [mm/s]	50 [kHz]
Maximum pushing speed	6 [mm/s]	6 [kHz]
Maximum pushing return-to-home speed	6 [mm/s]	6 [kHz]
Maximum push current	75 [%] *	75 [%] *

* 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.23.

● 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	1	1
Electronic gear B	4	4
Motor rotation direction	Positive side=Clockwise	Positive side=Clockwise
Mechanism lead pitch	4	4
Mechanism lead decimal digit setting	×1 [mm]	×1 [mm]
JOG/HOME/ZHOME operation setting	Prioritize ABZO setting	Prioritize ABZO setting
(JOG) Operating speed	2 [mm/s]	2 [kHz]
(JOG) Acceleration/deceleration	0.4 [m/s^2]	400 [kHz/s]

Item	Factory setting	
	Unit of travel amount: mm	Unit of travel amount: step
(JOG) Starting speed	0.8 [mm/s]	800 [Hz]
(JOG) Operating speed (high)	10 [mm/s]	10 [kHz]
(ZHOME) Operating speed	10 [mm/s]	10 [kHz]
(ZHOME) Acceleration/deceleration	0.4 [m/s^2]	400 [kHz/s]
(ZHOME) Starting speed	0.8 [mm/s]	800 [Hz]
(HOME) Home-seeking mode	Push	Push
(HOME) Starting direction	Negative direction	Negative direction
(HOME) Acceleration/deceleration	0.4 [m/s^2]	400 [kHz/s]
(HOME) Starting speed	0.8 [mm/s]	800 [Hz]
(HOME) Operating speed	6 [mm/s]	6 [kHz]
(HOME) Last speed	0.8 [mm/s]	800 [Hz]
(HOME) Backward steps in 2 sensor home-seeking	0.5 [mm]	500 [step]
(HOME) Operating amount in uni-directional home-seeking	0.5 [mm]	500 [step]
(HOME) Operating current for push-home-seeking	75 [%] *	75 [%] *
(HOME) Backward steps in push-home-seeking	1.6 [mm]	1,600 [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.

■ DRSM42□□-□□8 (lead 8 mm)

● Product specifications

Item		Factory setting
Lead		8 [mm]
Minimum travel amount *1		0.001 [mm]
Mechanism limit positive direction *2	Guide type	41 [mm] (41,000 [step])
	Non-guide type	None
Mechanism limit negative direction *2	Guide type	−1 [mm] (−1,000 [step])
	Non-guide type	None

*1 The minimum travel amount is determined by the "Electronic gear" parameter and the ball screw 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 [mm/s]	6 [kHz]
Maximum operating speed	200 [mm/s]	200 [kHz]
Maximum pushing speed	6 [mm/s]	6 [kHz]
Maximum pushing return-to-home speed	6 [mm/s]	6 [kHz]
Maximum push current	65 [%] *	65 [%] *

* 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.23.

- **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	1	1
Electronic gear B	8	8
Motor rotation direction	Positive side=Clockwise	Positive side=Clockwise
Mechanism lead pitch	8	8
Mechanism lead decimal digit setting	×1 [mm]	×1 [mm]
JOG/HOME/ZHOME operation setting	Prioritize ABZO setting	Prioritize ABZO setting
(JOG) Operating speed	2 [mm/s]	2 [kHz]
(JOG) Acceleration/deceleration	0.4 [m/s^2]	400 [kHz/s]
(JOG) Starting speed	0.4 [mm/s]	400 [Hz]
(JOG) Operating speed (high)	10 [mm/s]	10 [kHz]
(ZHOME) Operating speed	10 [mm/s]	10 [kHz]
(ZHOME) Acceleration/deceleration	0.4 [m/s^2]	400 [kHz/s]
(ZHOME) Starting speed	0.4 [mm/s]	400 [Hz]
(HOME) Home-seeking mode	Push	Push
(HOME) Starting direction	Negative direction	Negative direction
(HOME) Acceleration/deceleration	0.4 [m/s^2]	400 [kHz/s]
(HOME) Starting speed	0.4 [mm/s]	400 [Hz]
(HOME) Operating speed	6 [mm/s]	6 [kHz]
(HOME) Last speed	0.4 [mm/s]	400 [Hz]
(HOME) Backward steps in 2 sensor home-seeking	0.4 [mm]	400 [step]
(HOME) Operating amount in uni-directional home-seeking	0.4 [mm]	400 [step]
(HOME) Operating current for push-home-seeking	65 [%] *	65 [%] *
(HOME) Backward steps in push-home-seeking	1 [mm]	1,000 [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.

4 Operation (Actuators equipped with the AZ Series only)

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.

4-1 Push-motion return-to-home operation

⚠CAUTION

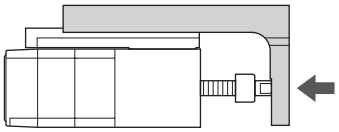
- Perform push-motion return-to-home operation in the specification range of the dynamic permissible moment. Failure to do so may result in injury or damage to equipment. Check on the Oriental Motor Website for the dynamic permissible moment.
- If push-motion return-to-home operation is performed in the direction opposite the motor side, provide an external mechanism where the moving part can press within the moving range. Pressing in excess of the moving range may result in injury or damage to equipment.

memo **DRSM60**:
When operating in a vertical direction, perform push-motion return-to-home operation to the downward direction. The home position may vary if you perform it to the upward direction.

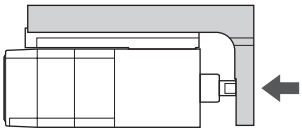
■ Actuator movement

When push-motion return-to-home operation is started, the ball screw shaft moves in the motor side. The set collar (stopper) presses against the pilot section to turn the TLC output ON, and the ball screw shaft reverses the traveling direction and stops after moved according to the value set in the "(HOME) Backward steps after first entry in push-home-seeking" parameter. (factory setting: 0)
The ball screw shaft reverses the traveling direction again, and the set color (stopper) presses against the pilot section to turn the TLC output ON. Then, it reverses the traveling direction once again and stops after moved according to the value set in the "(HOME) Backward steps in push-home-seeking" parameter.
After that, it moves according to the value set in the "(HOME) Position offset" and stops. (factory setting: 0)

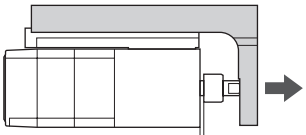
1. Push-motion return-to-home operation starts.



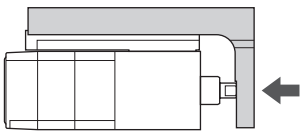
2. The set color (stopper) presses against the pilot section, and the TLC output is turned ON.



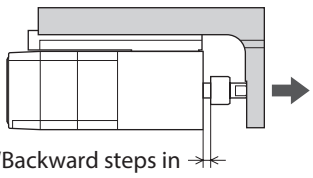
3. The ball screw shaft reverses and stops after moved according to the value set in the "(HOME) Backward steps after first entry in push-home-seeking." (factory setting: 0)



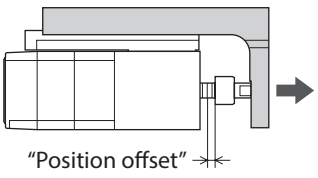
4. It reverses again. The set collar (stopper) presses against the pilot section, and the TLC output is turned ON.



5. It reverses and stops after moving according to the value set in the "(HOME) Backward steps in push-home-seeking."



6. Again, it moves according to the value set in the "(HOME) Position offset" and stops. (factory setting: 0)



■ Operating speed

Set the operating speed of push-motion return-to-home operation to be equal to or less than the value shown in the table.

Series	Upper limit of push-motion return-to-home speed
DR	6 mm/s
DRS2	6 mm/s

■ Push force

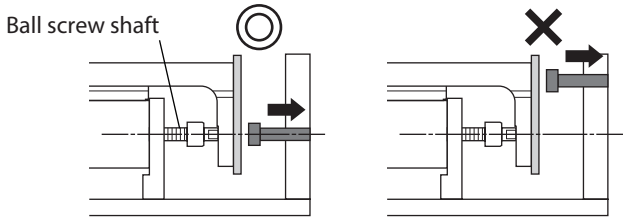
The push force of push-motion return-to-home operation is proportional to the current value. An appropriate current value is set for each actuator at the time of shipment. When changing the push force, set a value with the "(HOME) Operating current for push-home-seeking" parameter not to exceed the upper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

4-2 Push-motion operation

The push force of push-motion operation can be set in the "Operating current" of the operation data.

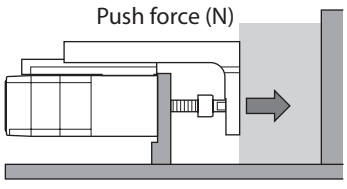
Note
- Do not perform push-motion operation with the **DR20□1** and **DR28□1** (ball screw lead 1 mm) equipped with the **AZ** Series. The TLC output may be turned ON before push-motion operation is complete. (Push-motion return-to-home operation can be performed.)
- Set the push force in order not to exceed the maximum push force. Performing push-motion operation with the current exceeding the maximum push force may cause damage to equipment or deterioration of specifications.
- Perform push-motion operation on an extension of the ball screw shaft. Performing push-motion operation at positions deviating from the extension of the ball screw shaft may cause damage to the product.



■ Maximum push force

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

Series	Model	Maximum push force
DR	**DR28□2.5**	50 N
DRS2	**DRSM42□□-□□2**	400 N
	DRSM60□□-□□4	500 N
	DRSM42□□-□□8	100 N



■ Operating speed

Set the operating speed of push-motion operation to be equal to or less than the value shown in the table.

Series	Upper limit of push-motion speed
DR	6 mm/s
DRS2	6 mm/s

memo If push-motion operation is performed to both ends of the moving range at a speed exceeding the upper limit value of push-motion operation, the ball screw shaft may not move with being jammed in the nut part. In this case, operate at the recommended starting speed in the opposite side and return the ball screw shaft. After that, check whether the ball screw shaft and the load are not damaged.

Recommended starting speed

Series	Model	Recommended starting speed
DR	**DR28□1**	0.2 mm/s
	DR28□2.5	0.5 mm/s
DRS2	**DRSM42□□-□□2**	0.4 mm/s
	DRSM60□□-□□4	0.8 mm/s
	DRSM42□□-□□8	1.6 mm/s

■ Relationship between the push force and current

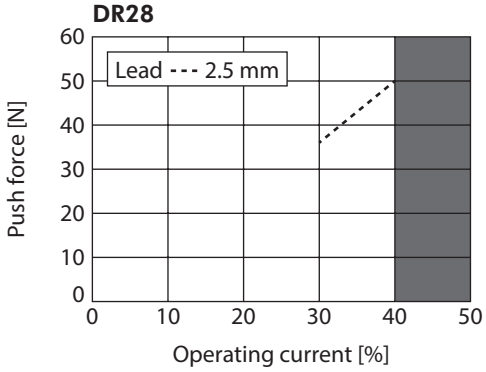
Reference values of the push force and current are shown next. Check the actual push force using the product.

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

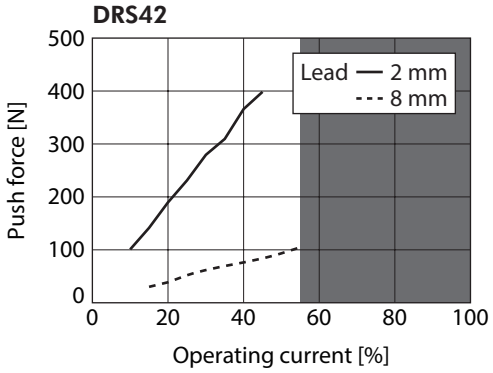
- Installation condition of the actuator (horizontal direction installation, vertical direction installation)
- Customer's load condition such as jig
- Cable length
- Ambient temperature

Measurement result of the push force when the motorized actuator is operated in the horizontal direction (average value)

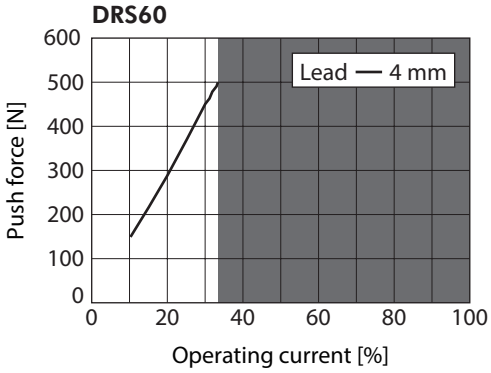
DR28



DRS42



DRS60



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