Dust-tight/Water-jet-proof (IP69K Equivalent)

# Electric Actuator/ Rod Type

AC Servo Motor

New

— For details, refer to page 21. —

RoHS

## Enclosure: IP69K equivalent

**External parts** Stainless steel 304 **Grease** NSF-H1 grade


## Equipment for the Food Manufacturing Industry

**HF2A- Series**

- Lubricants or rust proof agents are not used for the external parts. Otherwise, lubricants or rust proof agents for the food machinery are being used.
- US FDA compliant materials are used.

AC Servo Motor **Drivers**

### For absolute encoders

- Pulse input type/ Positioning type ***LECSB-T Series***
- CC-Link direct input type ***LECSC-T Series***
- Network card type ***LECSN□-T Series***
- SSCNETⅢ/H type ***LECSS-T Series***

### For incremental encoders

- Pulse input type/ Positioning type ***LECSA Series***

* For details, refer to page 21.

Click here for details

# *HF2A-LEY Series*

SMC

CAT.ES100-171A A

Dust-tight/Water-jet-proof (IP69K Equivalent) **Rod Type *HF2A-LEY* Series**

AC Servo Motor

# Enclosure: IP69K equivalent

## Smooth design for less residual liquid accumulation

| | |
|---|---|
| External parts | Stainless steel 304 |
| Scraper, Static seal | US FDA compliant material (Blue) |
| Grease | NSF-H1 grade |


IP69K is the degree of protection against dust and high-temperature/high-pressure water washdown specified in DIN 40050-9 and currently specified in ISO 20653 and JIS D 5020.

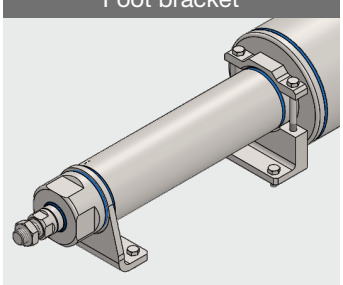
* Test environment: Temperature 75 to 85°C, water pressure 8 to 10 MPa, flow rate 14 to 16 L/min, four nozzle angles (0°, 30°, 60°, 90°), turntable rotating at 4 to 6 r/min, test duration 30 seconds per surface at 10 to 15 cm distance.

## Variations

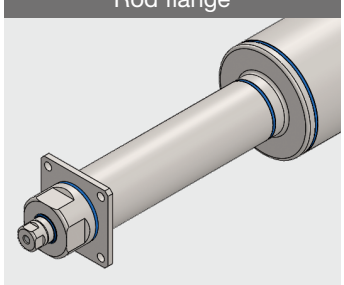
| Size | Screw lead [mm] | Stroke [mm] | Work load (Horizontal/Vertical) [kg] | Force [N] | Max. speed [mm/s] | Mounting | Rod end thread |
|---|---|---|---|---|---|---|---|
| **25** | 12 | 50 to 400 | 18/8 | 65 to 131 | 900 | Foot bracket<br>Rod flange | Male thread<br>Female thread |
| | 6 | | 50/16 | 127 to 255 | 450 | | |
| | 3 | | 50/30 | 242 to 485 | 225 | | |
| **32** | 20 | 50 to 500 | 30/9 | 79 to 157 | 1200 | | |
| | 10 | | 60/19 | 154 to 308 | 600 | | |
| | 5 | | 60/37 | 294 to 588 | 300 | | |
| **63** | 20 | 50 to 800 | 40/19 | 156 to 521 | 1000 | | |
| | 10 | | 70/38 | 304 to 1012 | 500 | | |
| | 5 | | 80/72 | 573 to 1910 | 250 | | |

Mounting Variations

Foot bracket



Rod flange



## Work load

**Max. 80 kg** *1

## Stroke

**Max. 800 mm** *2

*1 Size 63, Lead C *2 Size 63

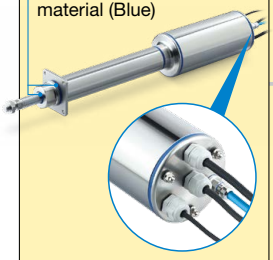
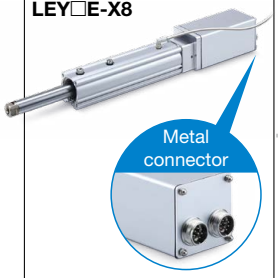
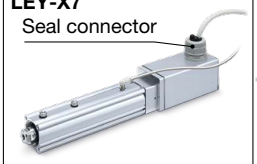
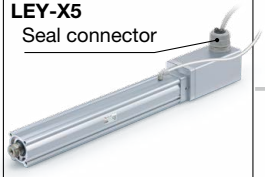
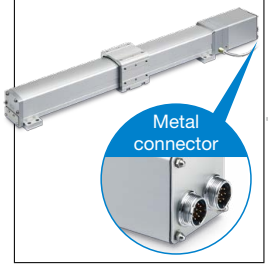


SMC

# Related Products

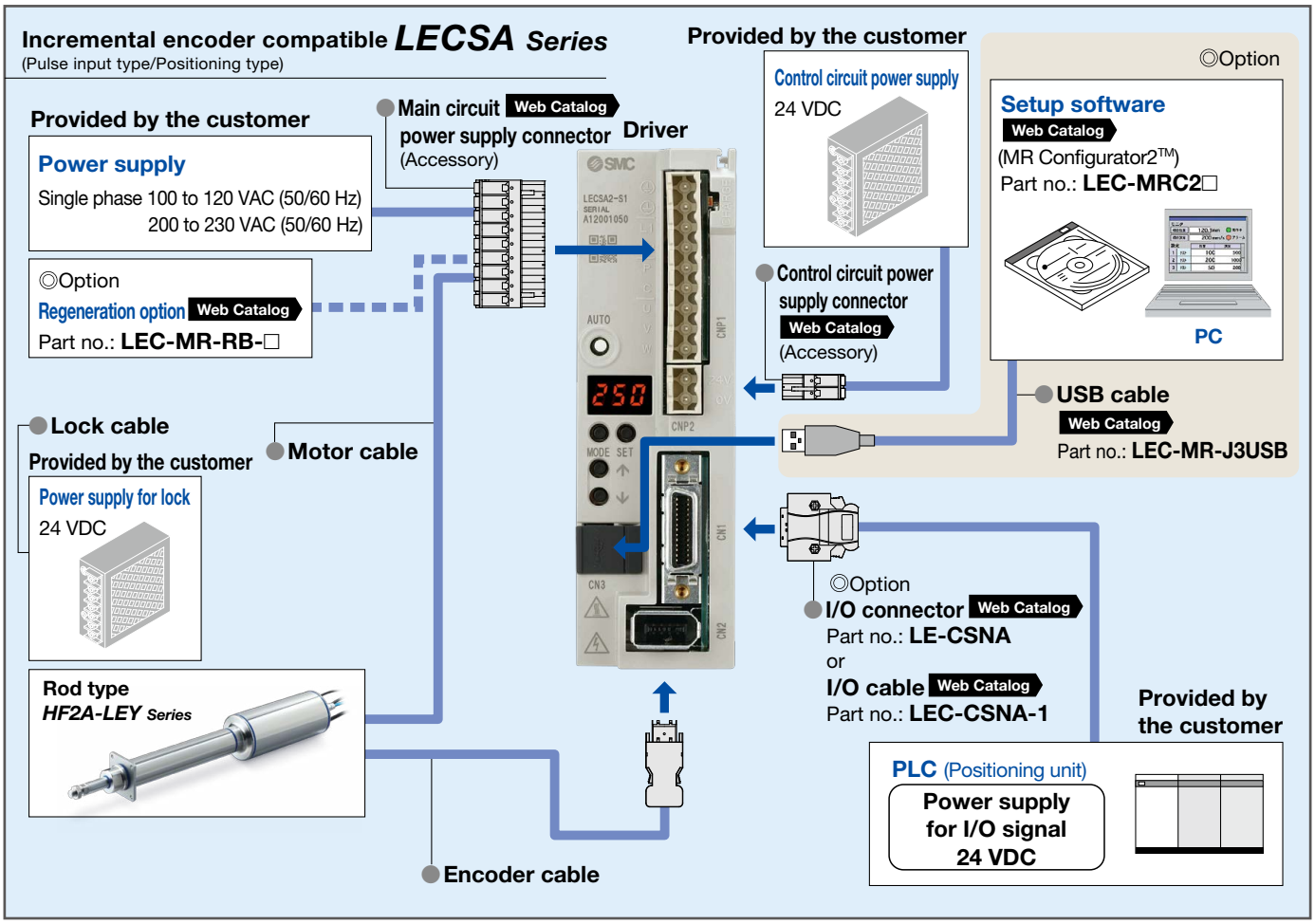
## Dust-tight/Water-jet-proof (IP69K Equivalent), Dust-tight/Water-jet-proof (IP65 Equivalent/IP67 Equivalent), Dust-tight/Water-jet-proof (IP65 Equivalent)

Variations

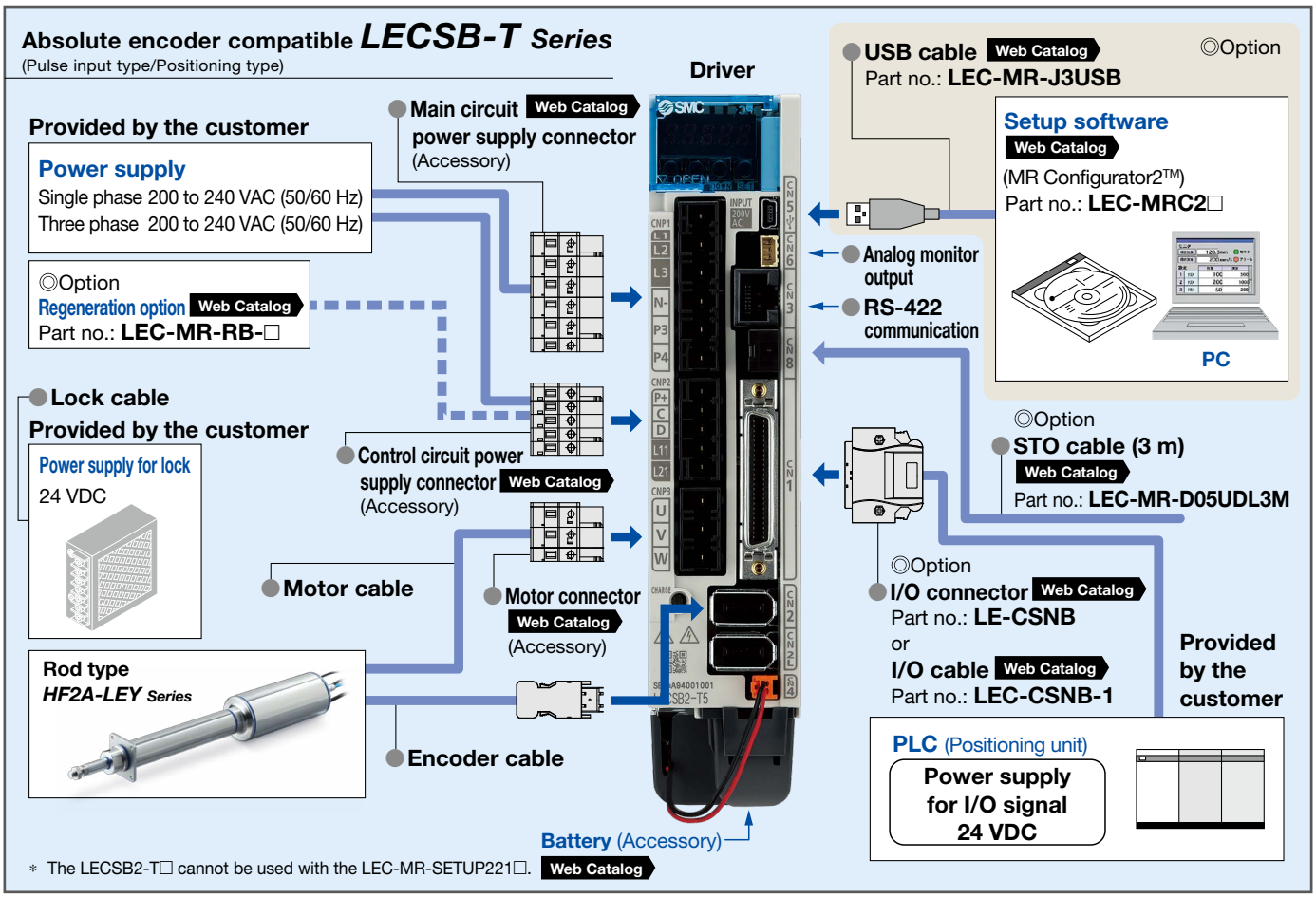
| Series | Dust-tight/Water-jet-proof | | | Size | Battery-less absolute (Step motor 24 VDC) | Incremental (Step motor 24 VDC) | Incremental (Servo motor 24 VDC) | AC servo motor | Page |
|---|---|---|---|---|---|---|---|---|---|
| | IP69K equivalent | IP65 equivalent/ IP67 equivalent | IP65 equivalent | | | | | | |
| **HF2A-LEY**<br>Scraper, Static seal<br>US FDA compliant material (Blue)  | ● | ● | ● | 25<br>32<br>63 | ● | ● | ● | ● | 7 |
| **LEY□E-X8**   | ● | ● | ● | 25<br>32<br>40 | ● | ● | ● | ● | |
| **LEY-X7**<br>Seal connector  | ● | ● | ● | 25<br>32<br>40 | ● | ● | ● | ● | |
| **LEY-X5**<br>Seal connector  | ● | ● | ● | 25<br>32 | ● | ● | ● | ● | |
| **LEY63□□□-□P**  | ● | ● | ● | 63 | ● | ● | ● | ● | |
| **LEFSW**   | ● | ● | ● | 16<br>25<br>32<br>40 | ● | ● | ● | ● | |

## System Construction

### Incremental encoder compatible *LECSA Series*
(Pulse input type/Positioning type)



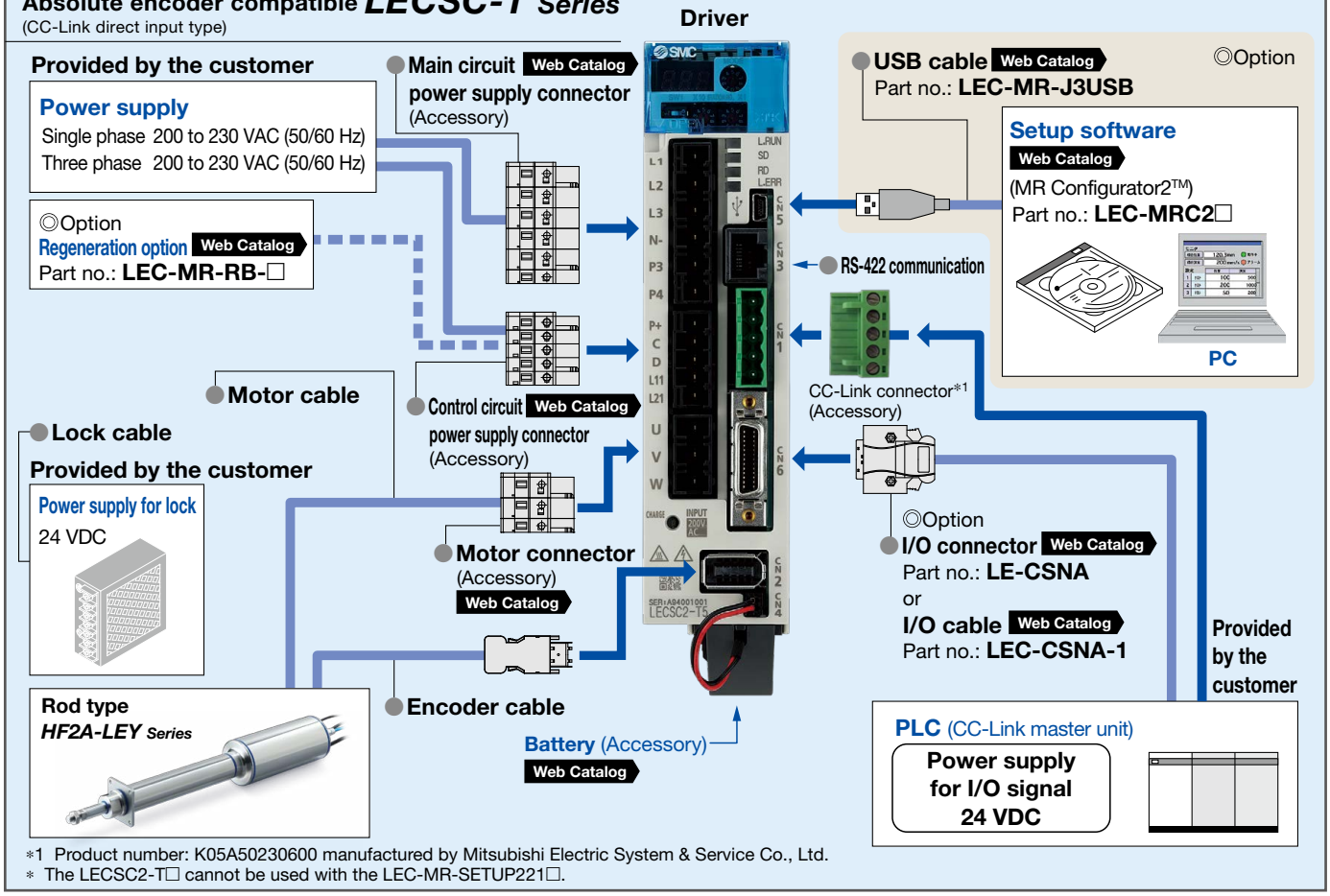

### Absolute encoder compatible *LECSB-T Series*
(Pulse input type/Positioning type)




* The LECSB2-T□ cannot be used with the LEC-MR-SETUP221□. Web Catalog

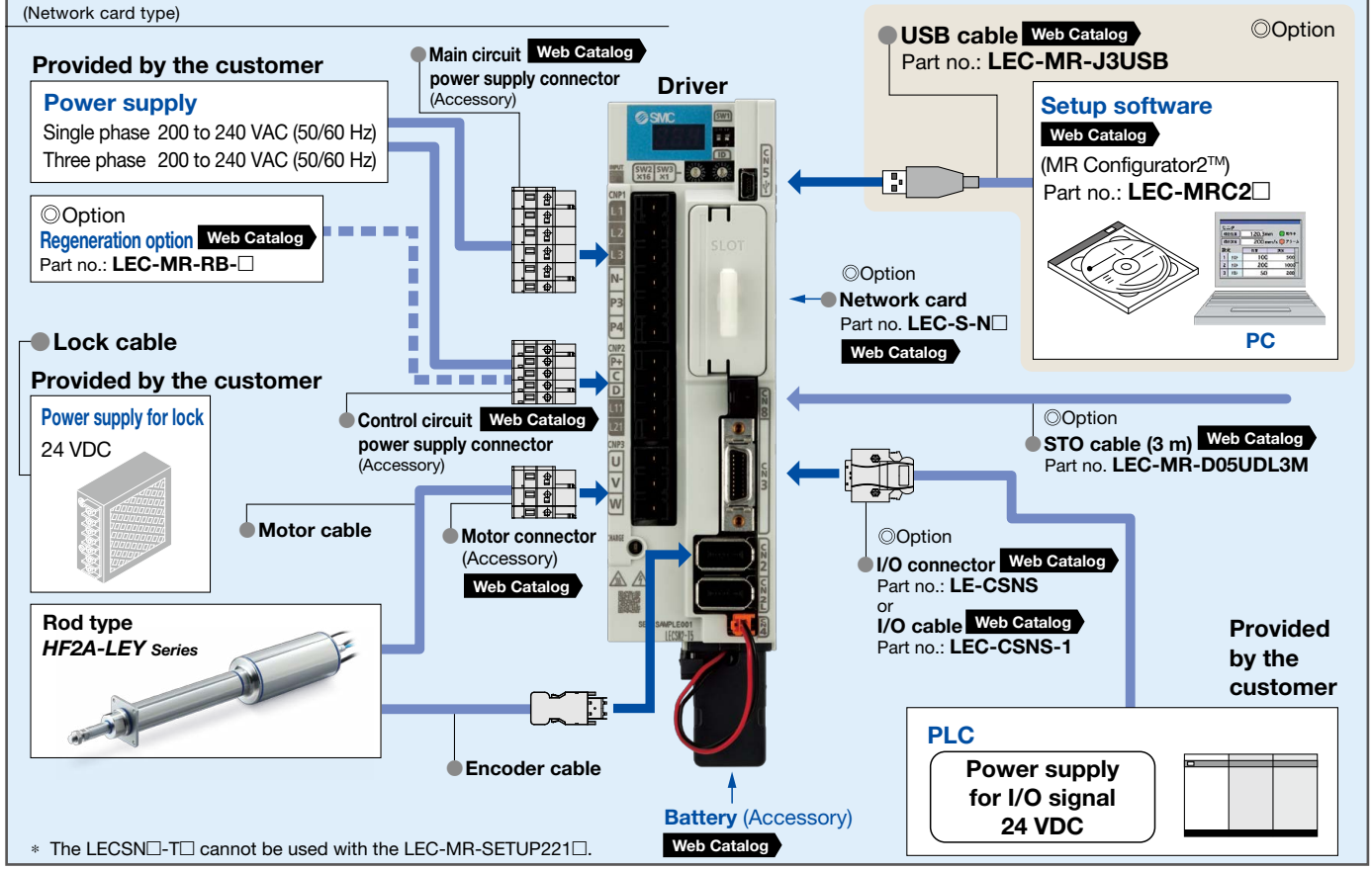
# System Construction

## Absolute encoder compatible *LECSC-T Series*
(CC-Link direct input type)



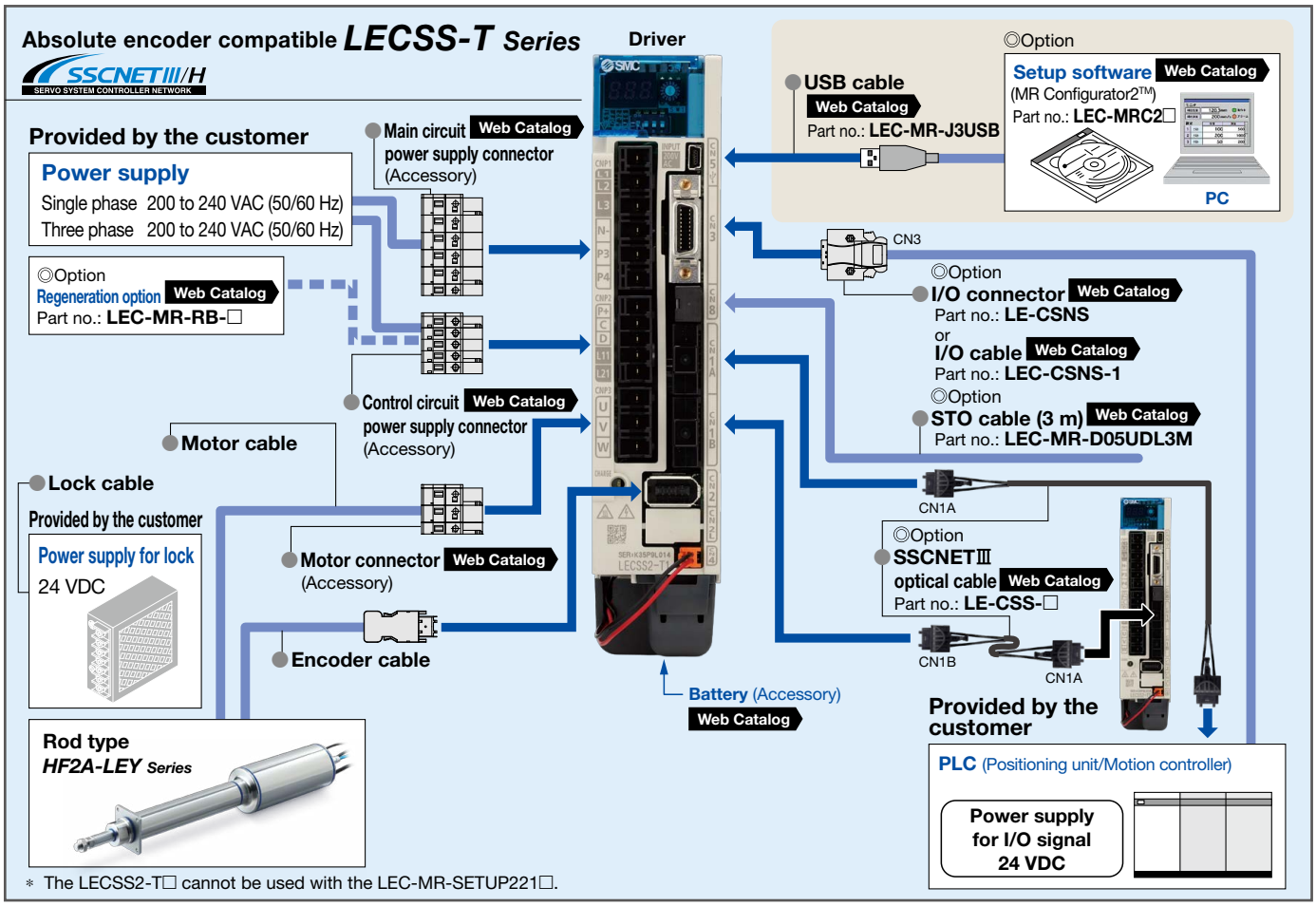

*1 Product number: K05A50230600 manufactured by Mitsubishi Electric System & Service Co., Ltd.
* The LECSC2-T□ cannot be used with the LEC-MR-SETUP221□.

## Absolute encoder compatible *LECSN□-T Series*
(Network card type)




* The LECSN□-T□ cannot be used with the LEC-MR-SETUP221□.

## System Construction




* The LECSS2-T□ cannot be used with the LEC-MR-SETUP221□.

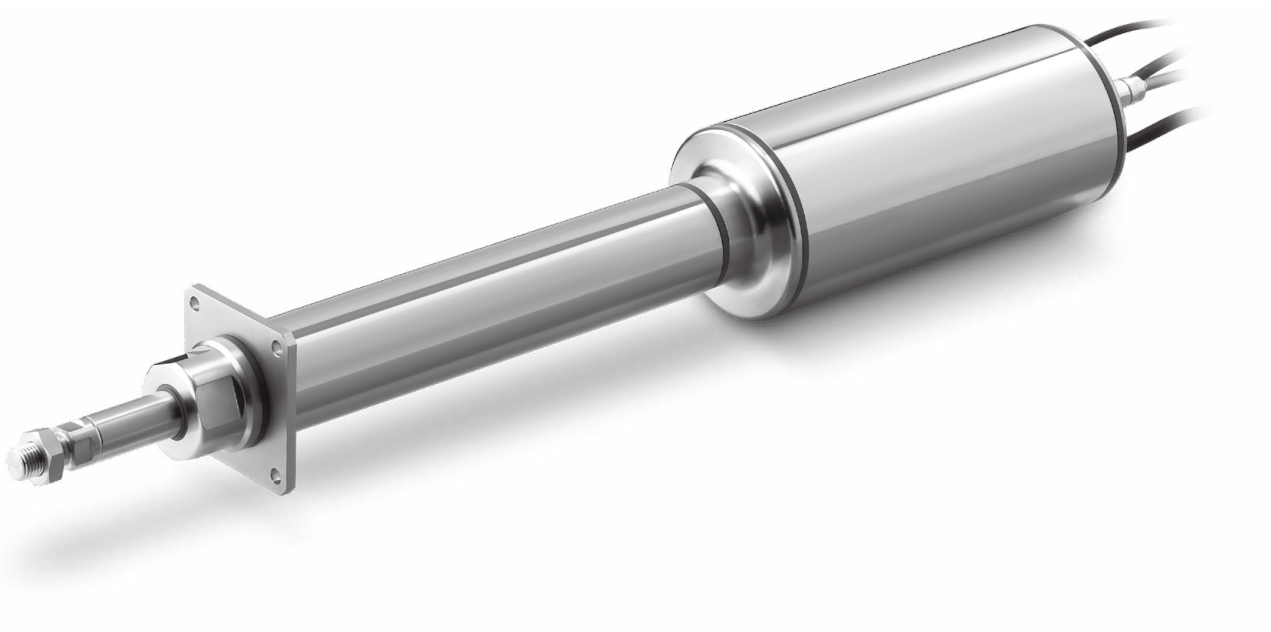
# Electric Actuator

## Dust-tight/Water-jet-proof (IP69K Equivalent) Rod Type

### Dust-tight/Water-jet-proof (IP69K Equivalent) Rod Type *HF2A-LEY Series*

AC Servo Motor

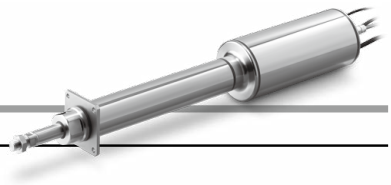
p. 14



## CONTENTS

# Model Selection

Size 25, 32, 63



## Selection Procedure

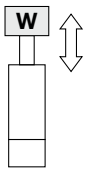
### Positioning Control Selection Procedure

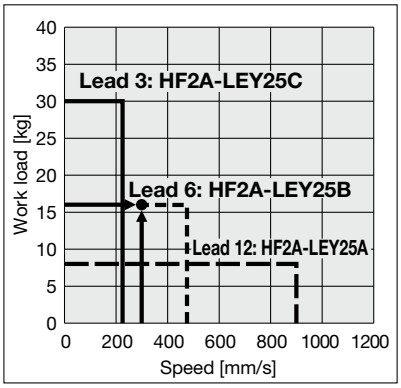
**Step 1** Check the work load–speed. (Vertical transfer) → **Step 2** Check the cycle time.

### Selection Example

**Operating conditions**

- Workpiece mass: 16 [kg]
- Speed: 300 [mm/s]
- Acceleration/Deceleration: 5000 [mm/s²]
- Stroke: 300 [mm]
- Workpiece mounting condition: Vertical upward / downward transfer




**<Speed–Vertical work load graph> (HF2A-LEY25)**

**Step 1** **Check the work load–speed. <Speed–Vertical work load graph>**

Select a model based on the workpiece mass and speed while referencing the speed–vertical work load graph.

Selection example) The **HF2A-LEY25B** can be temporarily selected as a possible candidate based on the graph shown on the right side.

* It is necessary to mount a guide outside the actuator when used for horizontal transfer. When selecting the target model, refer to the horizontal work load in the specifications on pages 15 and 16 and the precautions.

The regeneration option may be necessary. Refer to pages 9 and 10 for the "Required Conditions for the Regeneration Option."

**Step 2** **Check the cycle time.**

Calculate **the cycle time** using the following calculation method.

**Cycle time:**

T can be found from the following equation.

$$T = T1 + T2 + T3 + T4 \text{ [s]}$$

- T1: Acceleration time and T3: Deceleration time can be found by the following equation.

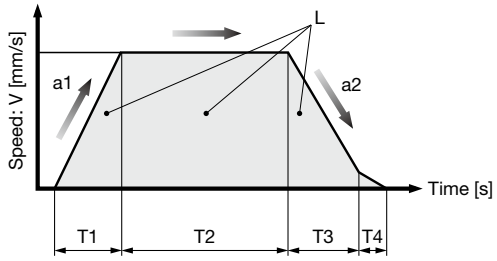
$$T1 = V/a1 \text{ [s]} \qquad T3 = V/a2 \text{ [s]}$$

- T2: Constant speed time can be found from the following equation.

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} \text{ [s]}$$

- T4: Settling time varies depending on the motor type and load. The value below is recommended.

$$T4 = 0.05 \text{ [s]}$$




L : Stroke [mm] ··· (Operating condition)
V : Speed [mm/s] ··· (Operating condition)
a1: Acceleration [mm/s²] ··· (Operating condition)
a2: Deceleration [mm/s²] ··· (Operating condition)

T1: Acceleration time [s] ··· Time until reaching the set speed
T2: Constant speed time [s] ··· Time while the actuator is operating at a constant speed
T3: Deceleration time [s] ··· Time from the beginning of the constant speed operation to stop
T4: Settling time [s] ··· Time until positioning is completed

Calculation example)
T1 to T4 can be calculated as follows.

$T1 = V/a1 = 300/5000 = 0.06$ [s], $T3 = V/a2 = 300/5000 = 0.06$ [s]

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V} = \frac{300 - 0.5 \cdot 300 \cdot (0.06 + 0.06)}{300} = 0.94 \text{ [s]}$$

$T4 = 0.05$ [s]

**The cycle time** can be found as follows.
$T = T1 + T2 + T3 + T4 = 0.06 + 0.94 + 0.06 + 0.05 =$ **1.11 [s]**

**Based on the above calculation result, the HF2A-LEY25DS2B-300□-R□ should be selected.**

## Selection Procedure

### Force Control Selection Procedure

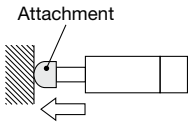
**Step 1** Check the duty ratio. → **Step 2** Check the force. → **Step 3** Check the lateral load on the rod end.

∗ The duty ratio is a ratio of the operation time in one cycle.

### Selection Example

**Operating conditions**

- Mounting condition: Horizontal (pushing)
- Attachment weight: 0.5 [kg]
- Force: 255 [N]
- Duty ratio: 60 [%]
- Speed: 100 [mm/s]
- Stroke: 300 [mm]




**Step 1** **Check the duty ratio.**

**<Conversion table of force–duty ratio>**

Select the [Force] from the duty ratio while referencing the conversion table of force–duty ratio.

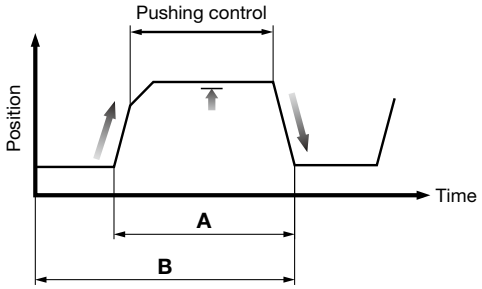
Selection example)
Based on the table below,
- Duty ratio: 10 [%]

Torque limit/Command value will be 30 [%].

**<Conversion table of force–duty ratio>**
**(HF2A-LEY25/AC Servo motor)**

| Ambient temperature | Torque limit/ Command value [%] | Duty ratio [%] | Continuous pushing time [min] |
|---|---|---|---|
| 35°C or less | 15 or less | 100 | No restriction |
| | 30 | 20 | 1.5 or less |
| 40°C | 30 | 10 | 1.5 or less |

∗ [Torque limit/Command value [%]] is the set value for the driver.
∗ [Continuous pushing time] is the time that the actuator can continuously keep pushing.




**Duty ratio = A/B x 100 [%]**

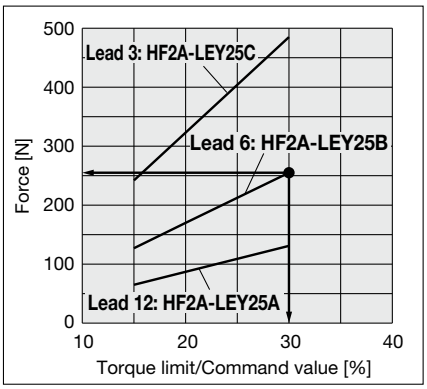
**Step 2** **Check the force.**

**<Force conversion graph>**

Select a model based on the torque limit/command value and pushing force while referencing the force conversion graph.

Selection example)
Based on the graph shown on the right side,
- Torque limit/Command value: 30 [%]
- Force: 255 [N]

The **HF2A-LEY25B** can be temporarily selected as a possible candidate.




**<Force conversion graph>**
**(HF2A-LEY25)**

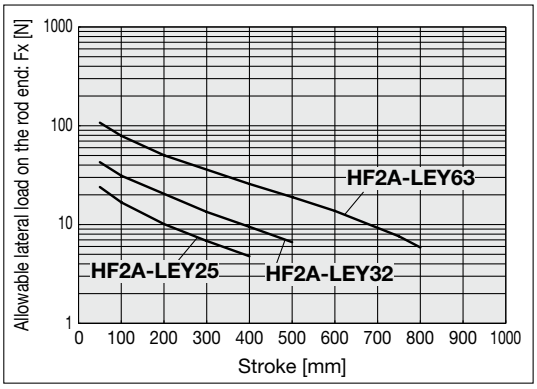
**Step 3** **Check the lateral load on the rod end.**

**<Graph of allowable lateral load on the rod end>**

Confirm the allowable lateral load on the rod end of the actuator: HF2A-LEY25B, which has been selected temporarily while referencing the graph of allowable lateral load on the rod end.

Selection example)
Based on the graph shown on the right side,
- Attachment weight: 0.5 [kg] ≈ 5 [N]
- Product stroke: 300 [mm]

The lateral load on the rod end is in the allowable range.



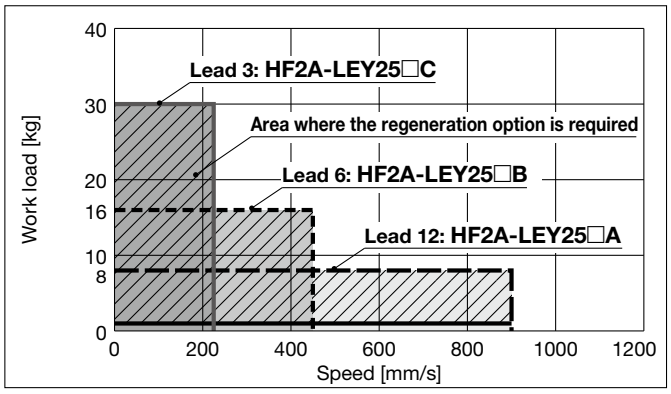

**<Graph of allowable lateral load on the rod end>**

**Based on the above calculation result, the HF2A-LEY25DS2B-300□-R□ should be selected.**

∗ For pushing operations, check the list of applicable drivers.
(Refer to the **Web Catalog**.)

## Speed–Vertical Work Load Graph/Required Conditions for the Regeneration Option

### HF2A-LEY25DS2/T6



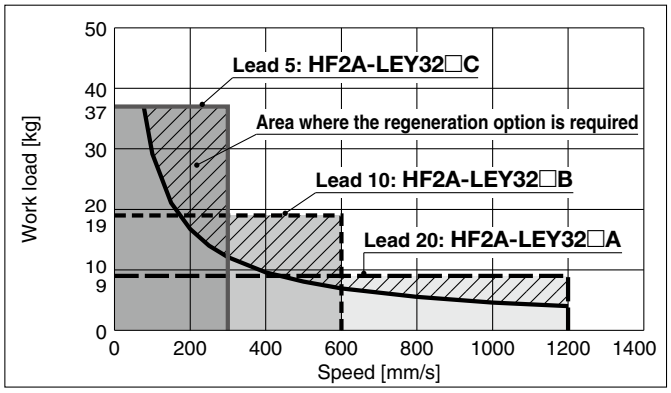

**Required conditions for the regeneration option**

* The regeneration option is required when using the product above the regeneration line in the graph. (It must be ordered separately.)

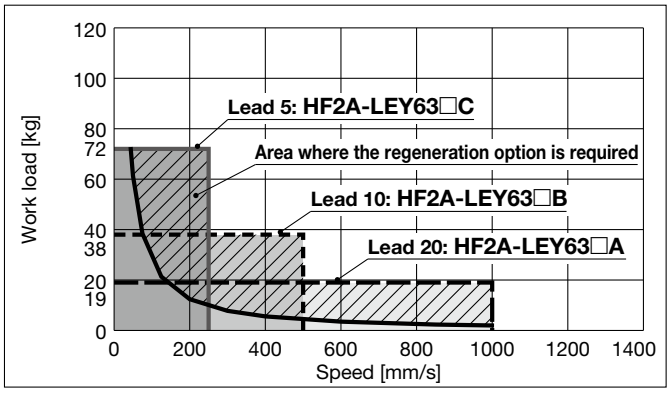
### Regeneration Option Models

| Size | Model |
|---|---|
| **HF2A-LEY25□** | LEC-MR-RB-032 |
| **HF2A-LEY32□** | LEC-MR-RB-032 |
| **HF2A-LEY63□** | LEC-MR-RB-12 |

### HF2A-LEY32DS3/T7

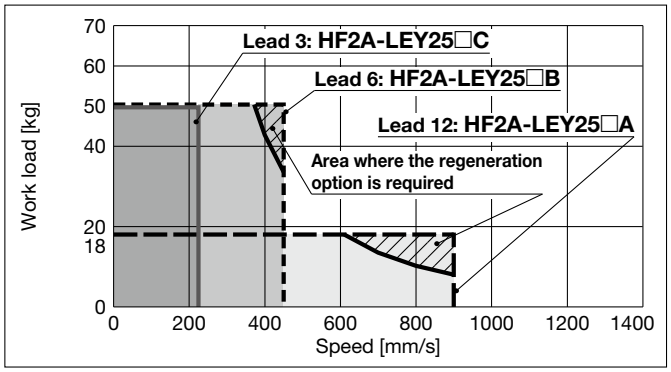



### HF2A-LEY63DS4/T8



## Speed–Horizontal Work Load Graph/Required Conditions for the Regeneration Option

### HF2A-LEY25DS2/T6



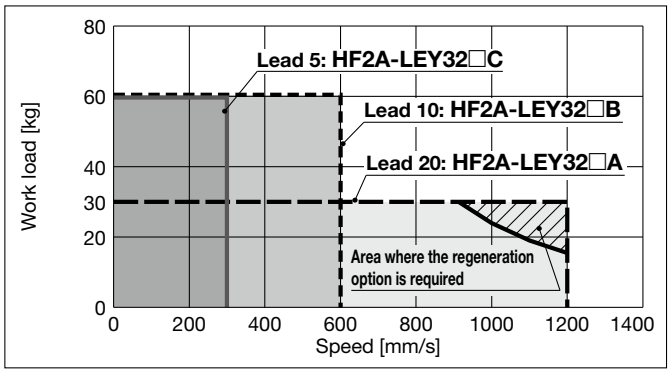

**Required conditions for the regeneration option**

* The regeneration option is required when using the product above the regeneration line in the graph. (It must be ordered separately.)

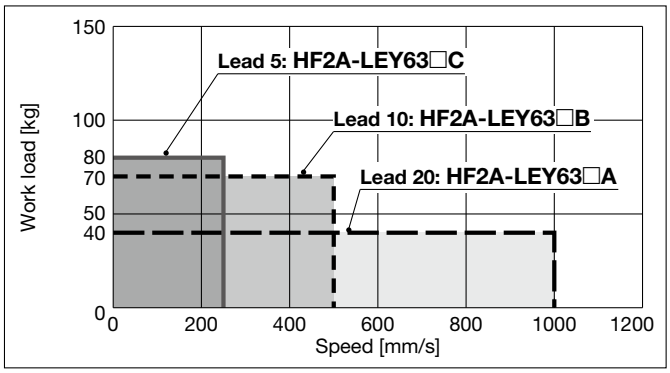
### Regeneration Option Models

| Size | Model |
|---|---|
| **HF2A-LEY25□** | LEC-MR-RB-032 |
| **HF2A-LEY32□** | LEC-MR-RB-032 |
| **HF2A-LEY63□** | — |

### HF2A-LEY32DS3/T7




### HF2A-LEY63DS4/T8



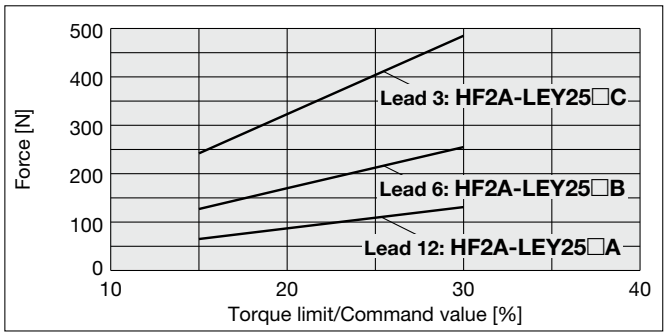

### Allowable Stroke Speed

[mm/s]

| Model | AC servo motor | Lead | | Stroke [mm] | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Symbol | [mm] | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 |
| **HF2A-LEY25DS2/T6** | 100 W /□40 | **A** | 12 | 900 | | | | | | 600 | | — | — | — | — | — |
| | | **B** | 6 | 450 | | | | | | 300 | | — | — | — | — | — |
| | | **C** | 3 | 225 | | | | | | 150 | | — | — | — | — | — |
| | | (Motor rotation speed) | | (4500 rpm) | | | | | | (3000 rpm) | | — | — | — | — | — |
| **HF2A-LEY32DS3/T7** | 200 W /□60 | **A** | 20 | 1200 | | | | | | | | 800 | | — | — | — |
| | | **B** | 10 | 600 | | | | | | | | 400 | | — | — | — |
| | | **C** | 5 | 300 | | | | | | | | 200 | | — | — | — |
| | | (Motor rotation speed) | | (3600 rpm) | | | | | | | | (2400 rpm) | | — | — | — |
| **HF2A-LEY63DS4/T8** | 400 W /□60 | **A** | 20 | 1000 | | | | | | | | | | 800 | 600 | 500 |
| | | **B** | 10 | 500 | | | | | | | | | | 400 | 300 | 250 |
| | | **C** | 5 | 250 | | | | | | | | | | 200 | 150 | 125 |
| | | (Motor rotation speed) | | (3000 rpm) | | | | | | | | | | (2400 rpm) | (1800 rpm) | (1500 rpm) |

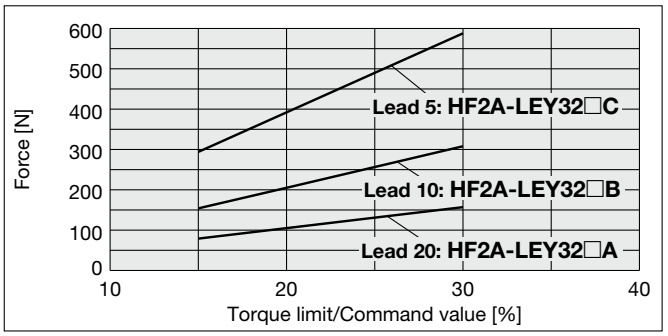
## Force Conversion Graph (Guide) for the LECSA

### HF2A-LEY25DS2



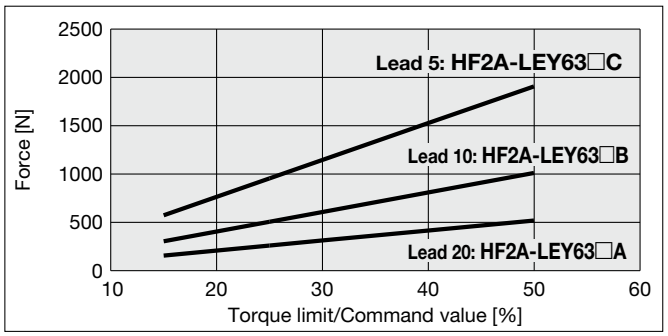

| Ambient temperature | Torque limit/ Command value [%] | Duty ratio [%] | Continuous pushing time [min] |
|---|---|---|---|
| 35°C or less | 15 or less | 100 | No restriction |
| | 30 | 20 | 1.5 or less |
| 40°C | 30 | 10 | 1.5 or less |

### HF2A-LEY32DS3




| Ambient temperature | Torque limit/ Command value [%] | Duty ratio [%] | Continuous pushing time [min] |
|---|---|---|---|
| 40°C | 15 or less | 100 | No restriction |
| | 30 | 40 | 1.5 or less |

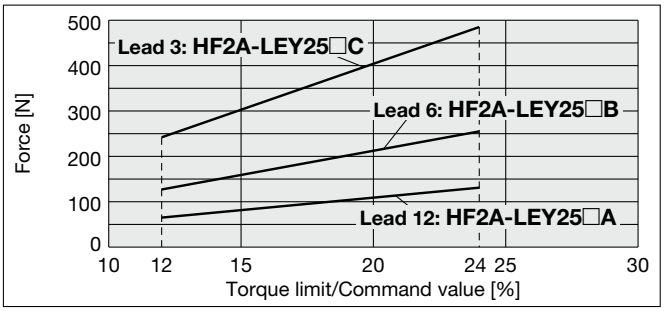
### HF2A-LEY63DS4




| Ambient temperature | Torque limit/ Command value [%] | Duty ratio [%] | Continuous pushing time [min] |
|---|---|---|---|
| 40°C | 15 or less | 100 | No restriction |
| | 30 | 40 | 1.5 or less |
| | 40 | 20 | 0.5 or less |
| | 50 | 10 | 0.16 or less |

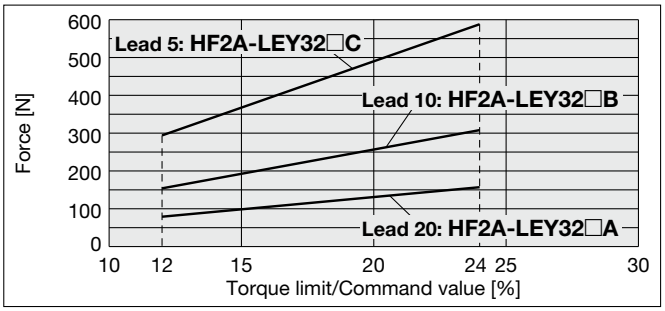
## Force Conversion Graph (Guide) for the LECS□-T

### HF2A-LEY25DT6



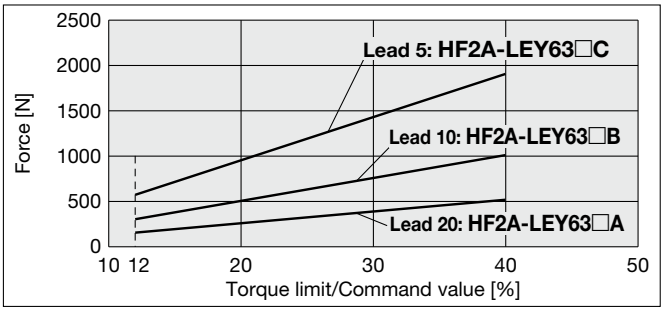

| Ambient temperature | Torque limit/ Command value [%] | Duty ratio [%] | Continuous pushing time [min] |
|---|---|---|---|
| 35°C or less | 12 or less | 100 | No restriction |
| | 24 | 20 | 1.5 or less |
| 40°C | 24 | 10 | 1.5 or less |

### HF2A-LEY32DT7



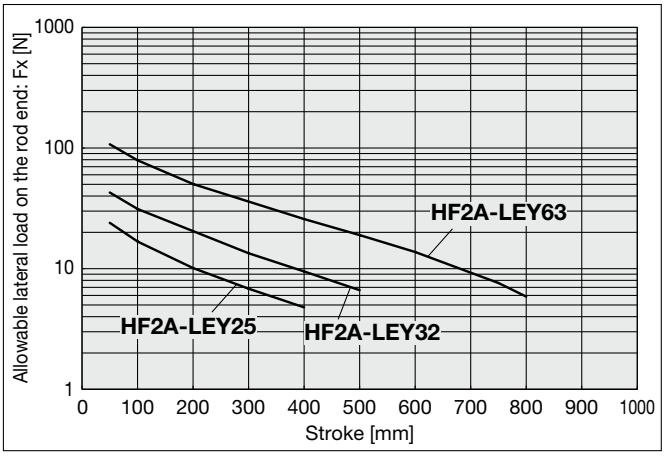

| Ambient temperature | Torque limit/ Command value [%] | Duty ratio [%] | Continuous pushing time [min] |
|---|---|---|---|
| 40°C | 12 or less | 100 | No restriction |
| | 24 | 40 | 1.5 or less |

### HF2A-LEY63DT8

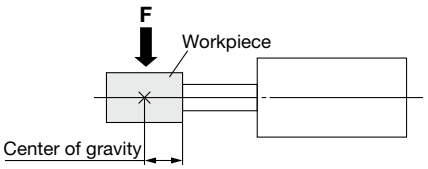



| Ambient temperature | Torque limit/ Command value [%] | Duty ratio [%] | Continuous pushing time [min] |
|---|---|---|---|
| 40°C | 12 or less | 100 | No restriction |
| | 24 | 40 | 1.5 or less |
| | 32 | 20 | 0.5 or less |
| | 40 | 10 | 0.16 or less |

## Graph of Allowable Lateral Load on the Rod End (Guide)



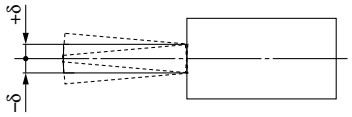

**[Stroke] = [Product stroke] + [Distance from the rod end to the center of gravity of the workpiece]**



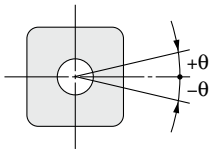

## Rod Displacement: δ [mm]

| Size \ Stroke | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **25** | ±0.4 | ±0.6 | ±0.9 | ±1.1 | ±1.4 | ±1.6 | ±1.8 | ±2.1 | — | — | — | — | — |
| **32** | ±0.3 | ±0.5 | ±0.6 | ±0.8 | ±1.0 | ±1.1 | ±1.3 | ±1.4 | ±1.6 | ±1.8 | — | — | — |
| **63** | ±0.3 | ±0.5 | ±0.7 | ±0.8 | ±1.0 | ±1.1 | ±1.3 | ±1.4 | ±1.6 | ±1.8 | ±2.1 | ±2.4 | ±2.7 |

∗ The values without a load are shown.




## Non-rotating Accuracy of Rod




| Size | Non-rotating accuracy θ |
|---|---|
| **25** | ±1.2° |
| **32** | ±0.8° |
| **63** | ±0.7° |

∗ Avoid using the electric actuator in such a way that rotational torque would be applied to the piston rod.
Failure to do so may result in the deformation of the non-rotating guide, play in the internal guide, or an increase in the sliding resistance.

# Rod Type

Dust-tight/Water-jet-proof (IP69K Equivalent)

* For details, refer to page 21.

RoHS

## *HF2A-LEY Series* HF2A-LEY25, 32, 63

Size 25, 32, 63

## How to Order

**HF2A-LEY 25 D S2 B - 100 ❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾ ❿**

Grease for food
US FDA compliant material

### ❶ Size

| |
|---|
| 25 |
| 32 |
| 63 |

### ❷ Motor mounting position

| | |
|---|---|
| D | In-line |

### ❸ Motor type

| Symbol | Type | Output [W] | Size | Compatible drivers*3 |
|---|---|---|---|---|
| S2*1 | AC servo motor (Incremental encoder) | 100 | 25 | LECSA□-S1 |
| S3 | | 200 | 32 | LECSA□-S3 |
| S4 | | 400 | 63 | LECSA2-S4 |
| T6*2 | AC servo motor (Absolute encoder) | 100 | 25 | LECSB2-T5 |
| | | | | LECSC2-T5 |
| | | | | LECSN2-T5-□ |
| | | | | LECSS2-T5 |
| T7 | | 200 | 32 | LECSB2-T7 |
| | | | | LECSC2-T7 |
| | | | | LECSND2-T7-□ |
| | | | | LECSS2-T7 |
| T8 | | 400 | 63 | LECSB2-T8 |
| | | | | LECSC2-T8 |
| | | | | LECSND2-T8-□ |
| | | | | LECSS2-T8 |

*1 For motor type S2, the compatible driver part number suffix is S1.
*2 For motor type T6, the compatible driver part number suffix is T5.
*3 For details on the driver, refer to the **Web Catalog**. The driver should be ordered separately.

### ❹ Lead [mm]

| Symbol \ Size | 25 | 32 | 63 |
|---|---|---|---|
| A | 12 | 20 | 20 |
| B | 6 | 10 | 10 |
| C | 3 | 5 | 5 |

### ❺ Stroke [mm]

| | |
|---|---|
| 50 | 50 |
| to | to |
| 800 | 800 |

* For details, refer to the applicable stroke table below.

### ❻ Motor option

| | |
|---|---|
| Nil | Without option |
| B | With lock |

### ❼ Rod end thread

| | |
|---|---|
| Nil | Rod end female thread |
| M | Rod end male thread (1 rod end nut is included.) |

### ❽ Mounting

| | |
|---|---|
| L | Foot bracket |
| F | Rod flange |

* Do not mount the product using a rod flange when mounting horizontally and fixed at one end.

### ❾ Cable type*1

| | |
|---|---|
| R | Robotic cable |

*1 A motor cable and encoder cable are included with the product. (A lock cable is also included if motor option "B: With lock" is selected.)

### ❿ Cable length*1 [m]

| | |
|---|---|
| 2 | 2 |
| 5 | 5 |
| A | 10 |

*1 The length of the motor, encoder, and lock cables are the same.

### Applicable Stroke Table

●: Standard

| Size \ Stroke [mm] | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 | Manufacturable stroke range |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | ● | ● | ● | ● | ● | ● | ● | ● | – | – | – | – | – | 50 to 400 |
| 32 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | – | – | – | 50 to 500 |
| 63 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | 50 to 800 |

* Please contact SMC for non-standard strokes as they are produced as special orders.

## Specifications: LECSA□

∗ Refer to the next page for the LECS□2-T.

| Model | | | HF2A-LEY25DS2 | | | HF2A-LEY32DS3 | | | HF2A-LEY63DS4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Actuator specifications | Work load [kg] | Horizontal∗1 | 18 | 50 | 50 | 30 | 60 | 60 | 40 | 70 | 80 |
| | | Vertical | 8 | 16 | 30 | 9 | 19 | 37 | 19 | 38 | 72 |
| | Force [N]∗2 (Set value: 15 to 30%)∗10 | | 65 to 131 | 127 to 255 | 242 to 485 | 79 to 157 | 154 to 308 | 294 to 588 | 156 to 521 | 304 to 1012 | 573 to 1910 |
| | Max.∗3 speed [mm/s] | Stroke range: Up to 300 | 900 | 450 | 225 | 1200 | 600 | 300 | 1000 | 500 | 250 |
| | | 305 to 400 | 600 | 300 | 150 | | | | | | |
| | | 405 to 500 | — | — | — | 800 | 400 | 200 | | | |
| | | Up to 500 | — | — | — | — | — | — | | | |
| | | 505 to 600 | — | — | — | — | — | — | 800 | 400 | 200 |
| | | 605 to 700 | — | — | — | — | — | — | 600 | 300 | 150 |
| | | 705 to 800 | — | — | — | — | — | — | 500 | 250 | 125 |
| | Pushing speed [mm/s]∗4 | | 35 or less | | | 30 or less | | | | | |
| | Max. acceleration/deceleration [mm/s²] | | 5000 | | | | | | | | |
| | Positioning repeatability [mm] | | ±0.01 | | | | | | | | |
| | Lost motion [mm]∗5 | | 0.05 or less | | | | | | | | |
| | Lead [mm] | | 12 | 6 | 3 | 20 | 10 | 5 | 20 | 10 | 5 |
| | Impact/Vibration resistance [m/s²]∗6 | | 50/20 | | | | | | | | |
| | Actuation type | | Ball screw | | | | | | | | |
| | Enclosure∗9 | | IP69K equivalent | | | | | | | | |
| | Operating temperature range [°C] | | 5 to 40 | | | | | | | | |
| | Operating humidity range [%RH] | | 90 or less (No condensation) | | | | | | | | |
| | Regeneration option | | May be required depending on speed and work load (Refer to pages 9 and 10.) | | | | | | | | |
| Electric specifications | Motor output/Size | | 100 W/□40 | | | 200 W/□60 | | | 400 W/□60 | | |
| | Motor type | | AC servo motor (100/200 VAC) | | | | | | AC servo motor (200 VAC) | | |
| | Encoder | | Motor type S2, S3, S4: Incremental 17-bit encoder (Resolution: 131072 p/rev) | | | | | | | | |
| | Power [W]∗7 | | Max. power 445 | | | Max. power 724 | | | Max. power 1275 | | |
| Lock unit specifications | Type∗8 | | Non-magnetizing lock | | | | | | | | |
| | Holding force [N] | | 131 | 255 | 485 | 157 | 308 | 588 | 313 | 607 | 1146 |
| | Power [W] at 20°C | | 6.3 | | | 7.9 | | | | | |
| | Rated voltage [V] | | 24 VDC $^{0}_{-10\%}$ | | | | | | | | |

∗1 This is the max. value of the horizontal work load. An external guide is necessary to support the load (Friction coefficient of guide: 0.1 or less). The actual work load changes according to the condition of the external guide. Confirm the load using the actual device.

∗2 The force setting range (set values for the driver) for the force control with the torque control mode. The force and duty ratio change according to the set value. Set it while referencing the "Force Conversion Graph" on page 11.
When the control equivalent to the pushing operation of the JXC51/61 series controller is performed, select "T□" for the motor type and the LECSS2-T or LECSB2-T driver.
The point table no. input method is used for the LECSB2-T. When selecting the LECSS2-T, combine it with a Simple Motion module (manufactured by Mitsubishi Electric Corporation) which has a pushing operation function.

∗3 The allowable speed changes according to the stroke. Set the number of rotations according to speed.

∗4 The allowable collision speed for collision with the workpiece with the torque control mode

∗5 A reference value for correcting errors in reciprocal operation

∗6 Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)

∗7 Indicates the max. power during operation (including the driver)
When selecting the power supply capacity, refer to the power supply capacity in the operation manual of each driver.

∗8 Only when motor option "With lock" is selected

∗9 The cable is equivalent to IP67.

∗10 For motor type S4, the set value is 15 to 50%.

## Weight

### Product Weight (Cables are not included.)

[kg]

| Series | | HF2A-LEY25 | | | | | | | | HF2A-LEY32 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stroke [mm] | | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 |
| Motor type | Incremental encoder | 3.75 | 3.98 | 4.21 | 4.45 | 4.68 | 4.91 | 5.14 | 5.38 | 6.46 | 6.78 | 7.11 | 7.44 | 7.77 | 8.09 | 8.42 | 8.75 | 9.07 | 9.40 |

| Series | | HF2A-LEY63 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stroke [mm] | | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 |
| Motor type | Incremental encoder | 9.21 | 9.73 | 10.25 | 10.78 | 11.30 | 11.82 | 12.34 | 12.86 | 13.39 | 13.94 | 14.98 | 16.00 | 17.04 |

### Additional Weight

[kg]

| Size | | 25 | 32 | 63 |
|---|---|---|---|---|
| Motor option | With lock | 0.4 | 0.59 | 0.59 |
| Rod end thread | Rod end male thread (including a rod end nut) | 0.05 | 0.05 | 0.09 |
| Mounting | Foot bracket (including mounting screws) | 0.43 | 0.76 | 0.97 |

### Cable Weight

[kg]

| Type | Length [mm] | | |
|---|---|---|---|
| | 2 | 5 | 10 |
| Motor cable | 0.18 | 0.40 | 0.80 |
| Encoder cable | 0.22 | 0.60 | 1.20 |
| Lock cable | 0.08 | 0.20 | 0.40 |

## Specifications: LECS□2-T

| Model | | | HF2A-LEY25DT6 | | | HF2A-LEY32DT7 | | | HF2A-LEY63DT8 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Actuator specifications | Work load [kg] | Horizontal*1 | 18 | 50 | 50 | 30 | 60 | 60 | 40 | 70 | 80 |
| | | Vertical | 8 | 16 | 30 | 9 | 19 | 37 | 19 | 38 | 72 |
| | Force [N]*2 (Set value: 12 to 24%)*3 | | 65 to 131 | 127 to 255 | 242 to 485 | 79 to 157 | 154 to 308 | 294 to 588 | 156 to 521 | 304 to 1012 | 573 to 1910 |
| | Max.*4 speed [mm/s] | Stroke range: Up to 300 | 900 | 450 | 225 | 1200 | 600 | 300 | 1000 | 500 | 250 |
| | | 305 to 400 | 600 | 300 | 150 | | | | | | |
| | | 405 to 500 | — | — | — | 800 | 400 | 200 | | | |
| | | Up to 500 | — | — | — | — | — | — | | | |
| | | 505 to 600 | — | — | — | — | — | — | 800 | 400 | 200 |
| | | 605 to 700 | — | — | — | — | — | — | 600 | 300 | 150 |
| | | 705 to 800 | — | — | — | — | — | — | 500 | 250 | 125 |
| | Pushing speed [mm/s]*5 | | 35 or less | | | 30 or less | | | | | |
| | Max. acceleration/deceleration [mm/s²] | | 5000 | | | | | | | | |
| | Positioning repeatability [mm] | | ±0.01 | | | | | | | | |
| | Lost motion [mm]*6 | | 0.05 or less | | | | | | | | |
| | Lead [mm] | | 12 | 6 | 3 | 20 | 10 | 5 | 20 | 10 | 5 |
| | Impact/Vibration resistance [m/s²]*7 | | 50/20 | | | | | | | | |
| | Actuation type | | Ball screw | | | | | | | | |
| | Enclosure*11 | | IP69K equivalent | | | | | | | | |
| | Operating temperature range [°C] | | 5 to 40 | | | | | | | | |
| | Operating humidity range [%RH] | | 90 or less (No condensation) | | | | | | | | |
| | Regeneration option | | May be required depending on speed and work load (Refer to pages 9 and 10.) | | | | | | | | |
| Electric specifications | Motor output/Size | | 100 W/□40 | | | 200 W/□60 | | | 400 W/□60 | | |
| | Motor type | | AC servo motor (200 VAC) | | | | | | | | |
| | Encoder*10 | | Motor type T6, T7, T8: Absolute 22-bit encoder (Resolution: 4194304 p/rev) (For LECSB2-T□, LECSS2-T□, LECSN□-T□)<br>Motor type T6, T7, T8: Absolute 18-bit encoder (Resolution: 262144 p/rev) (For LECSC-T□) | | | | | | | | |
| | Power [W]*8 | | Max. power 445 | | | Max. power 724 | | | Max. power 1275 | | |
| Lock unit specifications | Type*9 | | Non-magnetizing lock | | | | | | | | |
| | Holding force [N] | | 131 | 255 | 485 | 157 | 308 | 588 | 313 | 607 | 1146 |
| | Power [W] at 20°C | | 6.3 | | | 7.9 | | | | | |
| | Rated voltage [V] | | 24 VDC $^{0}_{-10\%}$ | | | | | | | | |

*1 This is the max. value of the horizontal work load. An external guide is necessary to support the load (Friction coefficient of guide: 0.1 or less). The actual work load changes according to the condition of the external guide. Confirm the load using the actual device.

*2 The force setting range (set values for the driver) for the force control with the torque control mode. Set it while referencing the "Force Conversion Graph (Guide)" on page 12.
The torque control mode is not available for the LECSC-T.
The drivers applicable to the pushing operation are "LECSB2-T" and "LECSS2-T." The LECSB2-T is only applicable when the control method is positioning.
The point table is used to set the pushing operation settings. To set the pushing operation settings, an additional dedicated file (pushing operation extension file) must be downloaded separately to be used with the setup software (MR Configurator2™: LEC-MRC2□). Please download this dedicated file from the SMC website: https://www.smcworld.com
When selecting the LECSS2-T, combine it with upper level equipment (such as the Simple Motion module manufactured by Mitsubishi Electric Corporation) which has a pushing operation function.
** For customer-provided PLC and motion controller setting and usage instructions, confirm with the retailer or manufacturer.

*3 For motor type T8, the set value is 12 to 40%.
*4 The allowable speed changes according to the stroke.
*5 The allowable collision speed for collision with the workpiece with the torque control mode
*6 A reference value for correcting errors in reciprocal operation
*7 Impact resistance: No malfunction occurred when the actuator was tested with a drop tester in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
Vibration resistance: No malfunction occurred in a test ranging between 45 to 2000 Hz. The test was performed in both an axial direction and a perpendicular direction to the lead screw. (The test was performed with the actuator in the initial state.)
*8 Indicates the max. power during operation (including the driver)
When selecting the power supply capacity, refer to the power supply capacity in the operation manual of each driver.
*9 Only when motor option "With lock" is selected
*10 The resolution will change depending on the driver type.
*11 The cable is equivalent to IP67.

## Weight

### Product Weight (Cables are not included.)

[kg]

| Series | | HF2A-LEY25 | | | | | | | | HF2A-LEY32 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stroke [mm] | | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 |
| Motor type | Absolute encoder | 3.79 | 4.02 | 4.25 | 4.49 | 4.72 | 4.95 | 5.18 | 5.42 | 6.36 | 6.68 | 7.01 | 7.34 | 7.67 | 7.99 | 8.32 | 8.65 | 8.97 | 9.30 |

| Series | | HF2A-LEY63 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stroke [mm] | | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 |
| Motor type | Absolute encoder | 9.21 | 9.73 | 10.25 | 10.78 | 11.30 | 11.82 | 12.34 | 12.86 | 13.39 | 13.94 | 14.98 | 16.00 | 17.04 |

### Additional Weight

[kg]

| Size | | 25 | 32 | 63 |
|---|---|---|---|---|
| Motor option | With lock | 0.4 | 0.59 | 0.59 |
| Rod end thread | Rod end male thread (including a rod end nut) | 0.05 | 0.05 | 0.09 |
| Mounting | Foot bracket (including mounting screws) | 0.43 | 0.76 | 0.97 |

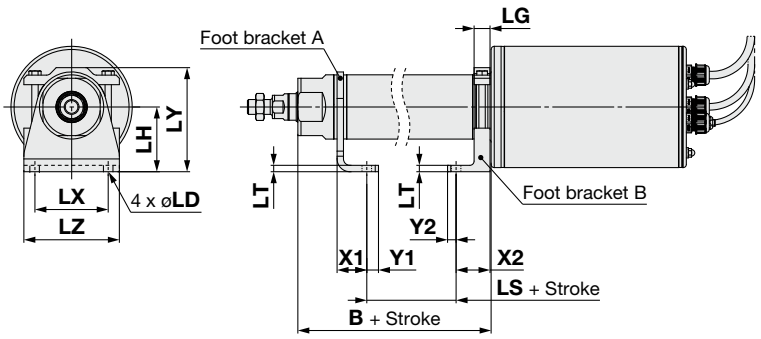
### Cable Weight

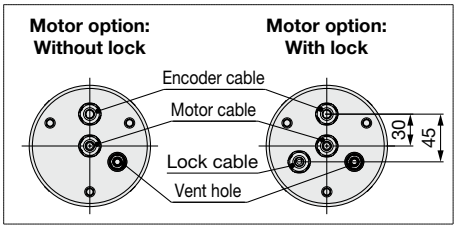
[kg]

| Type | Length [mm] | | |
|---|---|---|---|
| | 2 | 5 | 10 |
| Motor cable | 0.18 | 0.40 | 0.80 |
| Encoder cable | 0.22 | 0.60 | 1.20 |
| Lock cable | 0.08 | 0.20 | 0.40 |

## Dimensions

### Foot bracket: HF2A-LEY□D□□-□□□L-R□

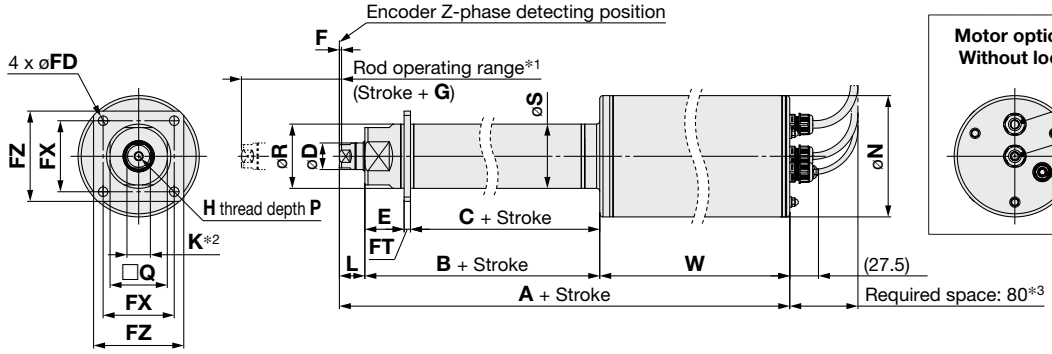


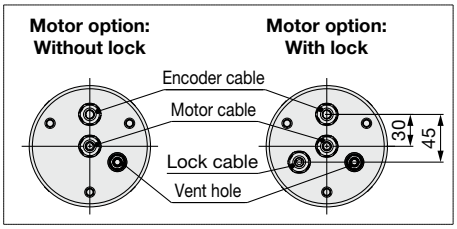




[mm]

| Size | B | LS | LD | LG | LT | LX | LZ | LH | LY | X1 | X2 | Y1 | Y2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **25** | 136.5 | 57 | 6.6 | 12 | 5 | 62 | 79 | 53 | 84 | 23 | 23 | 9 | 6 |
| **32** | 183 | 85 | 9 | 15 | 6 | 69 | 90 | 64 | 101 | 28 | 32 | 11 | 8 |
| **63** | 204 | 105 | 9 | 15 | 10 | 90 | 108 | 61 | 106 | 27 | 32 | 8 | 8 |

### Rod flange: HF2A-LEY□D□□-□□□F-R□



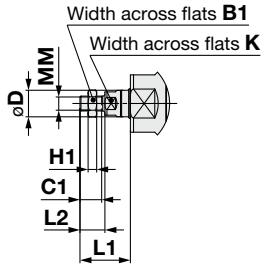

*1 This is the range within which the rod can move. Make sure that workpieces mounted on the rod do not interfere with other workpieces or the facilities around the rod.
*2 The direction of width across flats (□Q, □K) differs depending on the products.
*3 The amount of space required to connect the various cables and mount the product
Provide this amount of space for cable handling.

[mm]

| Size | A | | W | | B | C | D | E | F | G | H | P | L | N | K | Q | R | S | FD | FT | FX | FZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Without lock | With lock | Without lock | With lock | | | | | | | | | | | | | | | | | | |
| **25** | 332 | 369 | 174 | 211 | 136.5 | 100 | 20 | 31.5 | 2 | 4 | M8 x 1.25 | 13 | 21.5 | 89.5 | 17 | 41 | 49 | 49 | 6.6 | 5 | 58 | 73 |
| **32** | 392 | 420 | 185 | 213 | 183 | 140 | 25 | 37 | 2 | 4 | M8 x 1.25 | 13 | 24 | 114.5 | 22 | 54 | 60.5 | 60.5 | 9 | 6 | 67 | 85 |
| **63** | 455 | 483 | 219 | 247 | 204 | 156 | 40 | 38 | 4 | 8 | M16 x 2.0 | 21 | 32 | 114.5 | 36 | 70 | 76.5 | 76.5 | 11 | 10 | 80 | 100 |

* The L measurement is when the unit is in the original position.
At this position, F [mm] at the end.

### End male thread: HF2A-LEY□D□□-□□M□-R□




[mm]

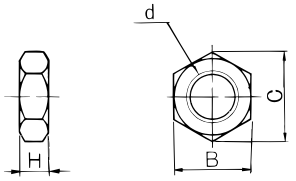
| Size | B1 | C1 | D | H1 | K | L1 | L2 | MM |
|---|---|---|---|---|---|---|---|---|
| **25** | 22 | 20.5 | 20 | 8 | 17 | 45 | 23.5 | M14 x 1.5 |
| **32** | 22 | 20.5 | 25 | 8 | 22 | 47.5 | 23.5 | M14 x 1.5 |
| **63** | 27 | 26 | 40 | 11 | 36 | 63 | 31 | M18 x 1.5 |

* The L1 measurement is when the unit is in the original position.
At this position, F [mm] at the end.

# Accessory Mounting Brackets

## Accessory Brackets

### Rod End Nut




Material: Stainless steel 304

[mm]

| Part no. | Applicable size | d | H | B | C |
|---|---|---|---|---|---|
| **NT-04SUS** | **25, 32** | M14 x 1.5 | 8 | 22 | 25.4 |
| **NT-05SUS** | **63** | M18 x 1.5 | 11 | 27 | 31.2 |

# *HF2A-LEY Series*
# Specific Product Precautions 1

**Be sure to read this before handling the products. Refer to the back cover for safety instructions. For electric actuator precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com**

## Design / Selection

## ⚠Warning

**1. Do not apply a load in excess of the specification limits.**

Select a suitable actuator by work load and allowable lateral load on the rod end. If a load in excess of the specification limits is applied to the piston rod, the generation of play in the piston rod sliding parts, reduced accuracy, etc., may occur and adversely affect the operation and service life of the product.

**2. Do not use the product in applications where excessive external force or impact force is applied to it.**

This can cause a malfunction.

## Handling

## ⚠Caution

**1. To conduct a pushing operation, be sure to set the product to force/speed control, and use the product within the specified pushing speed range for each series.**

Do not allow the piston rod to hit the workpiece and end of the stroke in the position control. The lead screw, bearing and internal stopper may be damaged and lead to malfunction.

**2. For pushing operations, the maximum torque value of the motor to be used should be set to 90% or less (150% or less for the HF2A-LEY63) of the rated torque of the reference motor.**

Failure to do so may result in damage or malfunction.

**3. The maximum speed of this actuator is affected by the product stroke.**

Check the model selection section of the catalog.

**4. Do not apply a load, impact, or resistance in addition to the transferred load during return to origin.**

Additional force will cause the displacement of the origin position.

**5. Do not scratch or dent the sliding parts of the piston rod by bumping them or placing objects on them.**

The piston rod and guide rod are manufactured to precise tolerances, so even a slight deformation may result in a malfunction.

**6. When an external guide is used, connect it in such a way that no impact or load is applied to it.**

Use a freely moving connector (such as a floating joint).

**7. Do not operate by fixing the piston rod and moving the actuator body.**

Excessive load will be applied to the piston rod, resulting in damage to the actuator and a reduced service life of the product.

**8. If an abnormal temperature of the servo motor occurs, please consider reducing any of a torque limit/command value, duty ratio, or ambient temperature.**

## Handling

## ⚠Caution

**9. When an actuator is operated with one end fixed (flange type), a bending moment may act on the actuator due to vibration generated at the stroke end, which can damage the actuator. In such cases, install a mounting bracket to suppress the vibration of the actuator body or reduce the speed so that the actuator does not vibrate at the stroke end.**

Also, use a mounting bracket when moving the actuator body or when a long stroke actuator is mounted horizontally and fixed at one end.

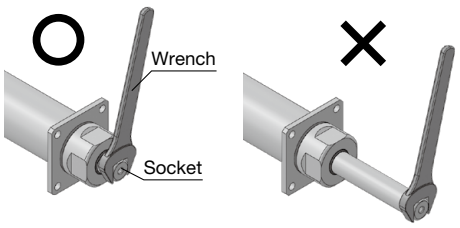
**10. Avoid using the electric actuator in such a way that rotational torque would be applied to the piston rod.**

Failure to do so may result in the deformation of the non-rotating guide, play in the internal guide, or an increase in the sliding resistance.

Refer to the table below for the approximate values of the allowable range of rotational torque.

| Allowable rotational torque [N·m] or less | HF2A-LEY25 | HF2A-LEY32 | HF2A-LEY63 |
|---|---|---|---|
| | 1.1 | 1.4 | 2.8 |

When screwing a bracket or nut into the piston rod end, hold the flats of the end of the "socket" with a wrench (the piston rod should be fully retracted). Do not apply tightening torque to the non-rotating mechanism.




**11. Be sure to mount the tubing to the vent hole. (Applicable tubing size: O.D. ø8 x I.D. ø6)**

Place the end of the tubing in an area where it is not exposed to dust or water. The fitting uses our "KFG2H0806-G02-E." Refer to the product catalog (CAT.ES50-41A) for compatible tubes and handling precautions.

## Operating Environment

## ⚠Warning

**1. Do not use the product in atmospheres of corrosive gases, chemicals*1, sea water, water vapor, or where there is direct contact with any of these.**

*1 Check section on washing and the product component list of the external materials used, and ensure compatibility with any chemicals used in the washing solution.

**2. When installing this product, do not use it in an environment where food in direct contact with this product is treated as a commodity.**

Use this product in an environment where this product does not come in contact with food or where food that comes in direct contact with this product is not treated as a commodity.

# *HF2A-LEY Series*
# Specific Product Precautions 2

**Be sure to read this before handling the products. Refer to the back cover for safety instructions. For electric actuator precautions, refer to the "Handling Precautions for SMC Products" and the "Operation Manual" on the SMC website: https://www.smcworld.com**

## Enclosure

## ⚠Caution

**IP69K is the degree of protection against dust and high-temperature/high-pressure water washdown specified in DIN 40050-9 and currently specified in ISO 20653 and JIS D 5020.**

* Test environment: Temperature 75 to 85°C, water pressure 8 to 10 MPa, flow rate 14 to 16 L/min, four nozzle angles (0°, 30°, 60°, 90°), turntable rotating at 4 to 6 r/min, test duration 30 seconds per surface at 10 to 15 cm distance.
* IEC60529 specifies IP69 for general-purpose electrical products under the same conditions as IP69K except for a distance of 15 to 20 cm. The test conditions are IP69K > IP69.

**1. While an IP69K compatible product offers protection against dust and high-temperature/high-pressure water, be sure to use the product within the ambient temperature range in the specifications.**

**2. IPX9K compliant products do not protect against fluids entering the product under all conditions.**

When washing the product, follow the "Maintenance" section.

## Mounting

## ⚠Caution

**1. When mounting workpieces or attachments to the piston rod end "socket," hold the flats of the "socket" with a wrench so that the piston rod does not rotate. The bolt should be tightened within the specified torque range.**

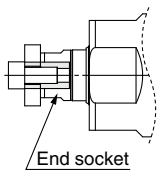
Failure to do so may cause play in the internal guide or an increase in the sliding resistance.

**2. When mounting the product and/or a workpiece, tighten the mounting screws within the specified torque range.**

Tightening the screws with a higher torque than recommended may result in a malfunction, while tightening with a lower torque can result in the displacement of the mounting position or, in extreme conditions, the actuator could become detached from its mounting position.

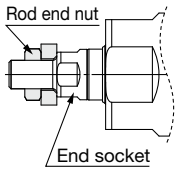
**<HF2A-LEY Series>**

**Workpiece fixed/Rod end female thread**




| Model | Screw size | Max. tightening torque [N·m] | Max. screw-in depth [mm] | End socket width across flats [mm] |
|---|---|---|---|---|
| **HF2A-LEY25** | M8 x 1.25 | 12.5 | 13 | 17 |
| **HF2A-LEY32** | M8 x 1.25 | 12.5 | 13 | 22 |
| **HF2A-LEY63** | M16 x 2 | 106 | 21 | 36 |

**Workpiece fixed/Rod end male thread (When "Rod end male thread" is selected.)**




| Model | Thread size | Max. tightening torque [N·m] | Effective thread length [mm] | End socket width across flats [mm] |
|---|---|---|---|---|
| **HF2A-LEY25** | M14 x 1.5 | 65.0 | 20.5 | 17 |
| **HF2A-LEY32** | M14 x 1.5 | 65.0 | 20.5 | 22 |
| **HF2A-LEY63** | M18 x 1.5 | 97.0 | 26 | 36 |

## Maintenance

## ⚠Warning

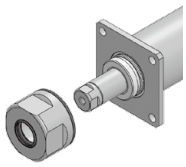
**1. Rod cover assembly maintenance**

Replace the rod cover assembly every 6 months or 800 km, whichever comes first. Be sure to apply screw-locking adhesive when mounting.

* The life of the scraper varies depending on the operating environment, so determine it based on the actual operating conditions.
* Recommended locking agent: Loctite 243

**Rod Cover Assembly**

| Size | Part no. | Width across flats [mm] | Tightening torque [N·m] |
|---|---|---|---|
| **25** | **LEY-D-11-1** | 41 | 14.8 |
| **32** | **LEY-D-11-2** | 54 | 40.5 |
| **63** | **LEY-D-11-3** | 70 | 80.0 |

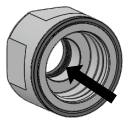


When replacing the rod cover assembly, apply grease to the part of the rod cover assembly shown in the figure below.

**Grease Pack**

| Part no. | Note |
|---|---|
| GR-R-010 | Grease for food processing equipment (10 g) |

| Size | Amount of grease [g] |
|---|---|
| **25** | 0.12 |
| **32** | 0.15 |
| **63** | 0.23 |



Apply to the inner surface of the scraper.

**2. Piston rod maintenance**

Apply grease to the piston rod every month, 100 km, or 0.5 million cycles, whichever comes first.

**Grease Pack**

| Part no. | Note |
|---|---|
| GR-R-010 | Grease for food processing equipment (10 g) |

| Size | Amount of grease [g/stroke per 100 mm] |
|---|---|
| **25** | 0.6 |
| **32** | 0.7 |
| **63** | 1.1 |

**3. Precautions for washing**

The following conditions should be used when washing this product.

· Distance from the nozzle: 15 cm or more
· Water pressure: 8 MPa or less
· Water temperature: 75°C or less
· Water flow rate: 14 L/min or less

Use the lower value in comparison with the operating conditions of the washing machine.

Do not concentrate the washing area in one spot or fix the nozzle in one spot.

# CE/UKCA/UL-compliance List

* For CE, UKCA, and UL-compliant products, refer to the tables below.

As of April 2024

## ■Drivers "○": Compliant

| Compatible motor | Series | CE UKCA | c UL us LISTED | |
|---|---|---|---|---|
| | | | Compliance | Certification No. (File No.) |
| AC servo motor | **LECSA** | ○ | ○ | E466261 |
| | **LECSB-T** | ○ | ○ | E466261 |
| | **LECSC-T** | ○ | ○ | E466261 |
| | **LECSN□-T** | ○ | ○ | E466261 |
| | **LECSS-T** | ○ | ○ | E466261 |

## ■Actuators "○": Compliant

| Compatible motor | Series | CE UKCA | c us | |
|---|---|---|---|---|
| | | | Compliance | Certification No. (File No.) |
| AC servo motor | **HF2A-LEY** | ○ | Not compliant with UL standards | — |

* If the actuator is ordered separately, it does not comply with UL standards.

# ⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

**⚠ Danger :** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

**⚠ Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

**⚠ Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1:Robots
etc.

## ⚠ Warning

**1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

**2. Only personnel with appropriate training should operate machinery and equipment.**

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

**3. Do not service or attempt to remove product and machinery/ equipment until safety is confirmed.**

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

**4. Our products cannot be used beyond their specifications. Our products are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not covered.**

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, fuel equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

## ⚠ Caution

**We develop, design, and manufacture our products to be used for automatic control equipment, and provide them for peaceful use in manufacturing industries.**
**Use in non-manufacturing industries is not covered.**
Products we manufacture and sell cannot be used for the purpose of transactions or certification specified in the Measurement Act.
The new Measurement Act prohibits use of any unit other than SI units in Japan.

## Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

### Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

### Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

| ⚠ Safety Instructions | Be sure to read the "Handling Precautions for SMC Products" (M-E03-3) and "Operation Manual" before use. |
|---|---|

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