

# **TSUBAKI POWER CYLINDER<sup>®</sup> LINIPOWER JACK<sup>®</sup>**



# Power Cylinder



## Integrated Actuator

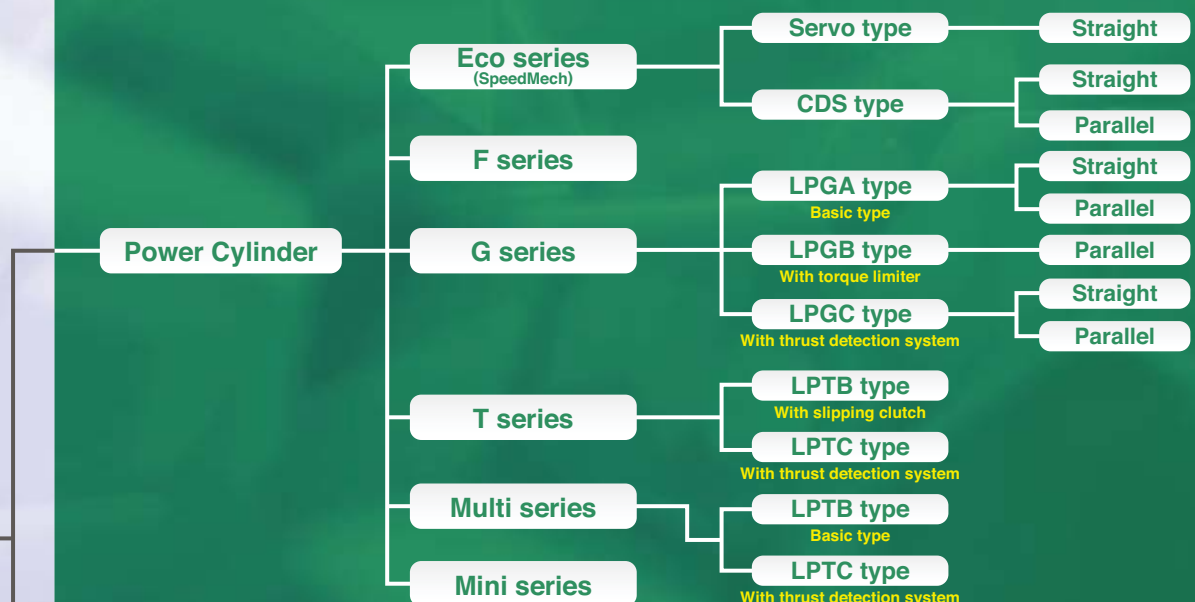
# Linipower Jack



### Series lineup

Power Cylinder

» P.2~



Linipower Jack » P.142~

Linipower Jack

- JWM (Trapezoidal screw)
- JWB (Ball screw)
- JWH (High-lead ball screw)

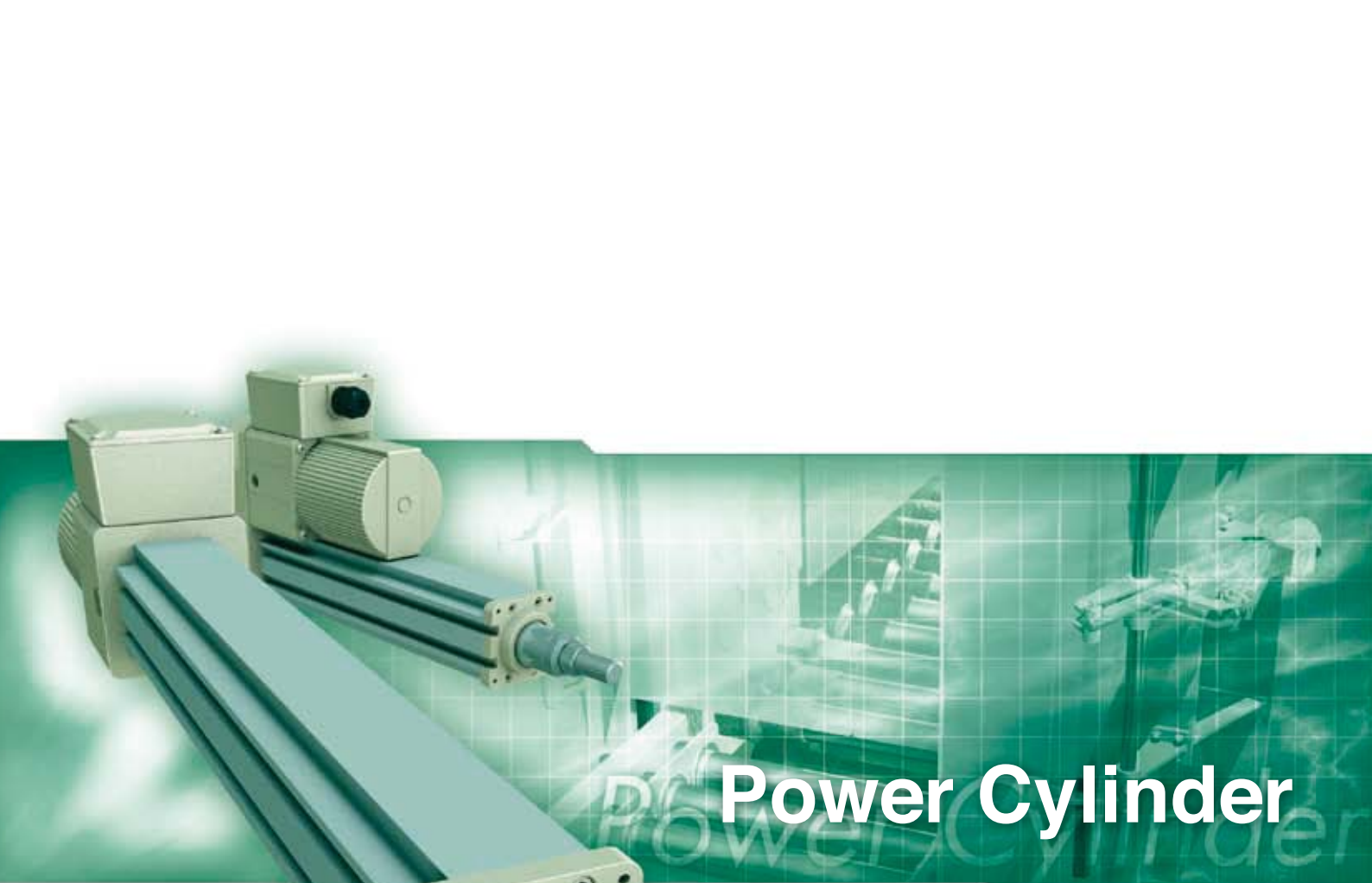
Differences between and how to select the Power Cylinder and Linipower Jack

#### Power Cylinder

- With motor
- Outdoor specifications (except for some models)
- Used to press up or pull up a load.
- The numerical value in the model number indicates thrust (power to press and pull).

#### Linipower Jack

- No (basic) motor (model with motor is optional.)
- Indoor specifications
- Used to support a load.
- The numerical value in the model number shows a basic capacity (load that can be supported).



# Power Cylinder

|                                  |       |            |
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| <b>F series</b>                  | _____ | <b>52</b>  |
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# Power Cylinder



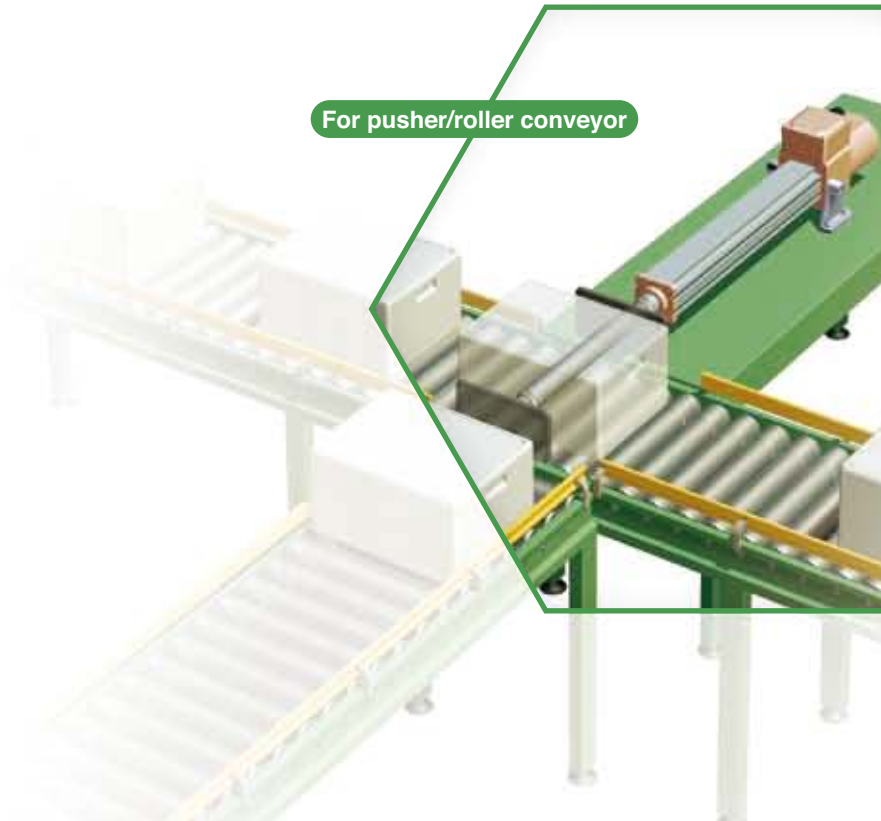
## APPLICATION SOLUTION

TSUBAKI E&M Power Cylinders were born over 40 years ago, and have been used across a variety of industries by a wide range of customers.

By taking advantage of our accumulated experience, we have continued to develop new products as well as upgrade technologies, and proactively address environmental issues to create our present series.

We will continue to create products which are customer-friendly, taking the environment into consideration.

For pusher/roller conveyor

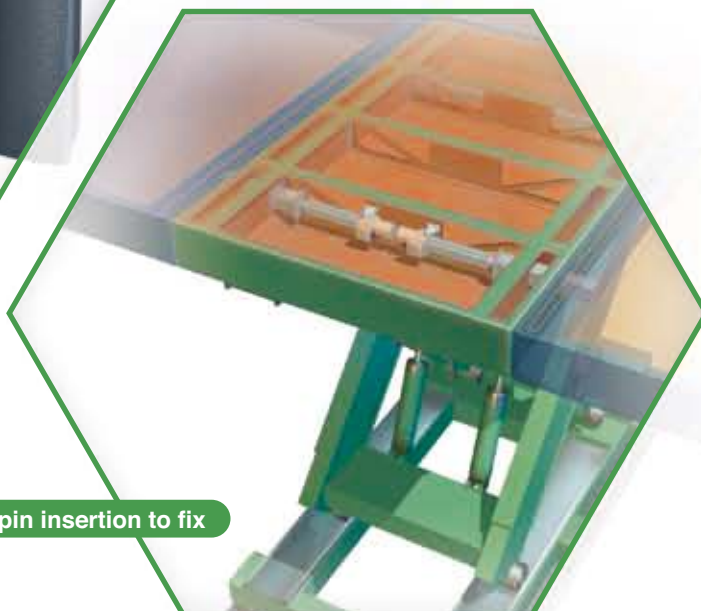


For heat treatment furnace/door opening and closing

LCD TVs



For lifters/pin insertion to fix



For CT scanning/bed elevation



For machine tools/door opening and closing



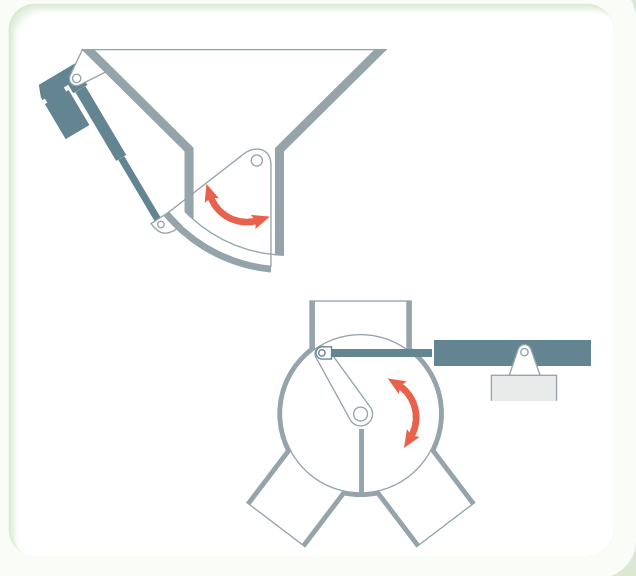
# Power Cylinder

## Examples of use

### Opening and closing

Various types of opening and closing can be performed by changing the linear motion of power cylinders into turning force through link mechanisms or by using the linear motion as it is. The G series (GC type) and T series (TC type) that can press at the end are suitable. Those with a position detecting unit are used to indicate the degree of opening.

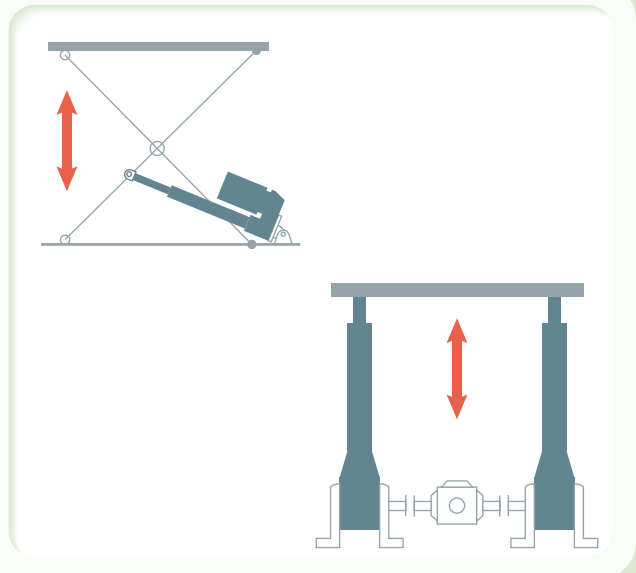
- Opening and closing of hopper gates
- Opening and closing of switching dampers
- Opening and closing of the lids of drying furnaces, incinerators, various kilns, etc.



### Elevation

Various types of elevation can be performed by using the linear motion of power cylinders. Power cylinders are effective for holding loads reliably and in synchronization.

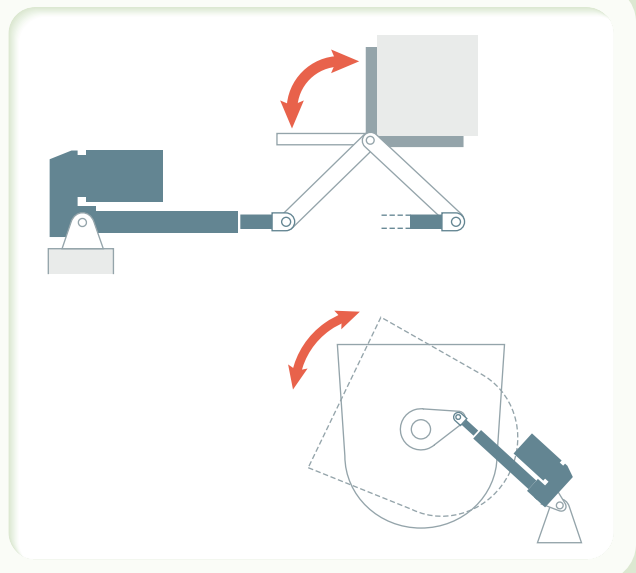
- Pantograph type lifting and lowering devices
- Lifting and lowering devices using fixed pulleys and moving pulleys.
- Lifting and lowering devices directly using the linear motion of power cylinders (telescope type)
- Lifting and lowering devices operating multiple power cylinders synchronously



### Turnover

Conveyed objects can be turned over and transferred by the linear motion of power cylinders and simple supporting arrangements. Smooth operation can be performed with little backlash.

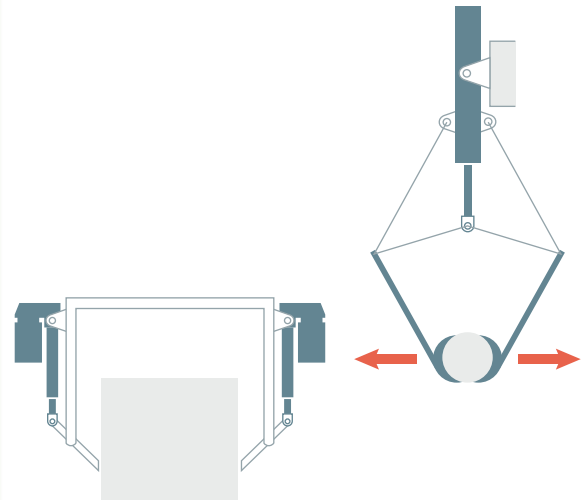
- Turnover devices for steel materials and packaged goods
- Lateral turning of wire bobbins
- Turnover of furnaces



# Handling

Various handling devices can be established by combining power cylinders and link mechanisms. Power cylinders enable reliable fastening.

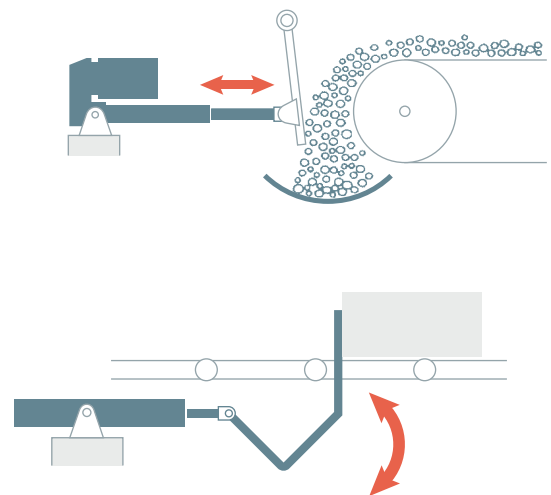
- Chucking of cotton materials, and chucking and transfer of steel materials
- Handling of various automatic apparatuses



# Stopper

Conveyed objects can be stopped or changed in direction mainly through the link mechanisms in addition to the linear motion of power cylinders. Also, they can be stopped directly by power cylinders.

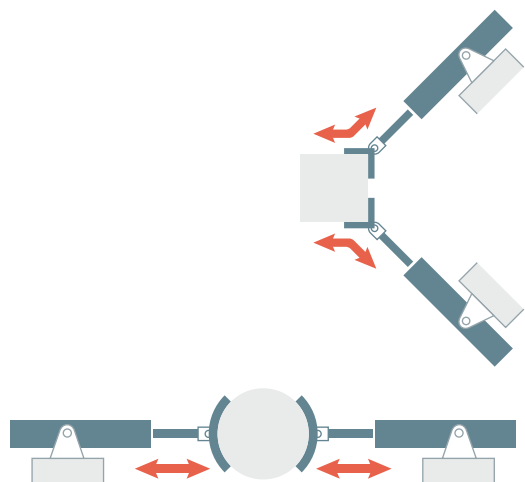
- Directional adjustments of the flows of conveyed objects on belt conveyors
- Stopper for conveyed objects on roller conveyors
- Stopper for materials in material cutting machines



# Positioning

Goods and materials can be moved into place and positioned by using a single or multiple power cylinders. Furthermore, they can be held and fixed in place.

- Positioning of materials, etc., in cutting machines
- Positioning and finishing machines of corrugated cardboard, plated parts, etc.
- Positioning and fixing for taking in and out movable stands in event halls



# Power Cylinder

## Power Cylinder Basic specifications list

TSUBAKI E&M Power Cylinders come in a variety of types and options in our 7 series lineup. Select the optimum model and option for your application.

|                                                                                             |        |                                                                                                         |      |     |      |      |                                                                                                       |         |      |         |      |                                                                                    |      |     |     |     |     |       |                    |                                                                                     |         |       |  |
|---------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------|------|-----|------|------|-------------------------------------------------------------------------------------------------------|---------|------|---------|------|------------------------------------------------------------------------------------|------|-----|-----|-----|-----|-------|--------------------|-------------------------------------------------------------------------------------|---------|-------|--|
| M Power Cylinders<br>variety of types and<br>s lineup.<br>imum model and<br>ur application. |        | Eco series                                                                                              |      |     |      |      |                                                                                                       |         |      |         |      | F series                                                                           |      |     |     |     |     |       |                    | G series                                                                            |         |       |  |
|                                                                                             |        | <div>Servo type</div>  |      |     |      |      | <div>CDS type</div>  |         |      |         |      |  |      |     |     |     |     |       |                    |  |         |       |  |
|                                                                                             |        |                                                                                                         |      |     |      |      |                                                                                                       |         |      |         |      |                                                                                    |      |     |     |     |     |       |                    |                                                                                     |         |       |  |
|                                                                                             |        |                                                                                                         |      |     |      |      |                                                                                                       |         |      |         |      |                                                                                    |      |     |     |     |     |       |                    |                                                                                     |         |       |  |
| *<br>Rated thrust                                                                           | N      | 150N~1500N<br>{15.3~1530kgf}                                                                            |      |     |      |      | 0.25kN~1.00kN<br>{25.5~103kgf}                                                                        |         |      |         |      | 100N~6.00kN<br>{10.2~612kgf}                                                       |      |     |     |     |     |       |                    | 700N~3.00kN<br>{71.4~306kgf}                                                        |         |       |  |
|                                                                                             | {kgf}  | 15.3                                                                                                    | 30.6 | 153 | 306  | 1530 | 25.5                                                                                                  | 51.0    | 51.0 | 102     | 10.2 | 20.4                                                                               | 40.8 | 102 | 204 | 306 | 612 | 70    | 100                | 150                                                                                 | 300     |       |  |
| Speed                                                                                       | Slow   |                                                                                                         |      |     |      |      |                                                                                                       |         |      |         |      |                                                                                    |      |     |     |     |     |       |                    |                                                                                     |         |       |  |
|                                                                                             | Low    |                                                                                                         |      |     |      |      |                                                                                                       |         |      |         |      |                                                                                    | 15   |     |     | 9   | 8   | 25/30 | 25/30              | 25/30                                                                               | 25/30   |       |  |
|                                                                                             | Medium |                                                                                                         |      |     |      |      |                                                                                                       | 90/100  |      | 90/90   |      | 24                                                                                 |      |     | 18  |     |     | 75/90 | 75/90              | 75/90                                                                               | 50/60   |       |  |
|                                                                                             | High   |                                                                                                         |      |     | ~300 |      | ~333                                                                                                  | 160/190 |      | 160/170 |      | 54                                                                                 |      |     | 30  |     |     |       | 100/120<br>200/240 | 100/120<br>200/240                                                                  | 100/120 | 67/80 |  |
| Stroke                                                                                      | 2000mm |                                                                                                         |      |     |      |      |                                                                                                       |         |      |         |      |                                                                                    |      |     |     |     |     |       |                    |                                                                                     |         |       |  |
|                                                                                             | 1500mm |                                                                                                         |      |     |      |      |                                                                                                       |         |      |         |      |                                                                                    |      |     |     |     |     |       |                    |                                                                                     |         |       |  |
|                                                                                             | 1200mm |                                                                                                         |      |     |      |      |                                                                                                       |         |      |         |      |                                                                                    |      |     |     |     |     | ●     | ●                  | ●                                                                                   | ●       |       |  |
|                                                                                             | 1000mm |                                                                                                         |      |     |      |      | ●                                                                                                     |         |      |         |      |                                                                                    |      |     |     |     |     | ●     | ●                  | ●                                                                                   | ●       |       |  |
|                                                                                             | 800mm  |                                                                                                         |      |     |      |      | ●                                                                                                     |         |      |         |      |                                                                                    |      |     |     |     |     | ●     | ●                  | ●                                                                                   | ●       |       |  |
|                                                                                             | 600mm  |                                                                                                         |      |     | ●    | ●    | ●                                                                                                     | ●       | ●    | ●       |      |                                                                                    |      |     |     |     | ●   | ●     | ●                  | ●                                                                                   | ●       |       |  |
|                                                                                             | 500mm  |                                                                                                         |      |     | ●    | ●    | ●                                                                                                     | ●       | ●    | ●       |      |                                                                                    |      |     |     |     | ●   | ●     | ●                  | ●                                                                                   | ●       |       |  |
|                                                                                             | 400mm  |                                                                                                         |      |     | ●    | ●    | ●                                                                                                     | ●       | ●    | ●       |      |                                                                                    |      |     |     |     | ●   | ●     | ●                  | ●                                                                                   | ●       |       |  |
|                                                                                             | 300mm  | ●                                                                                                       | ●    | ●   | ●    | ●    | ●                                                                                                     | ●       | ●    | ●       | ●    | ●                                                                                  | ●    | ●   | ●   | ●   | ●   | ●     | ●                  | ●                                                                                   | ●       |       |  |
|                                                                                             | 200mm  | ●                                                                                                       | ●    | ●   | ●    | ●    | ●                                                                                                     | ●       | ●    | ●       | ●    | ●                                                                                  | ●    | ●   | ●   | ●   | ●   | ●     | ●                  | ●                                                                                   | ●       |       |  |
|                                                                                             | 100mm  | ●                                                                                                       | ●    | ●   | ●    |      | ●                                                                                                     | ●       | ●    | ●       | ●    | ●                                                                                  | ●    | ●   | ●   | ●   | ●   | ●     | ●                  | ●                                                                                   | ●       |       |  |
|                                                                                             | 50mm   |                                                                                                         |      |     |      |      |                                                                                                       |         |      |         | ●    | ●                                                                                  | ●    | ●   | ●   | ●   |     |       |                    |                                                                                     |         |       |  |

\* Thrust means force at which the power cylinder can press and pull.

\* For Eco series servo type, this row is the maximum thrust instead.

### Options

| Options                                               | Eco series Servo type | Eco series CDS type | F series | G series |
|-------------------------------------------------------|-----------------------|---------------------|----------|----------|
| With brake                                            |                       | ●                   |          | ●        |
| With shaft for manual operation                       |                       | ●                   |          | ●        |
| Anti-rod rotation                                     | ○                     | ○                   |          | ○        |
| With external limit switch for stroke adjustment      |                       |                     | ○        | ○        |
| With internal limit switch for positioning detection* |                       |                     | ○        | ○        |
| With potentiometer*                                   |                       |                     | ○        | ○        |
| With rotary encoder*                                  |                       |                     |          | ○        |
| With bellows                                          |                       | ○                   | ○        | ○        |
| Clevis fitting                                        |                       |                     | ●        | ○        |
| Trunnion fitting                                      | ○                     | ○                   |          | ○        |
| Foot fitting                                          | ○                     |                     |          |          |
| I-type end fitting                                    | ●                     | ●                   | ○        | ○        |
| U-type end fitting                                    | ○                     | ○                   | ○        | ●        |
| N-type end fitting                                    | ○                     | ●                   |          |          |

\* For options with an \* mark, the clevis fitting cannot be attached.

Note) ● indicates standard. ○ indicates an option.

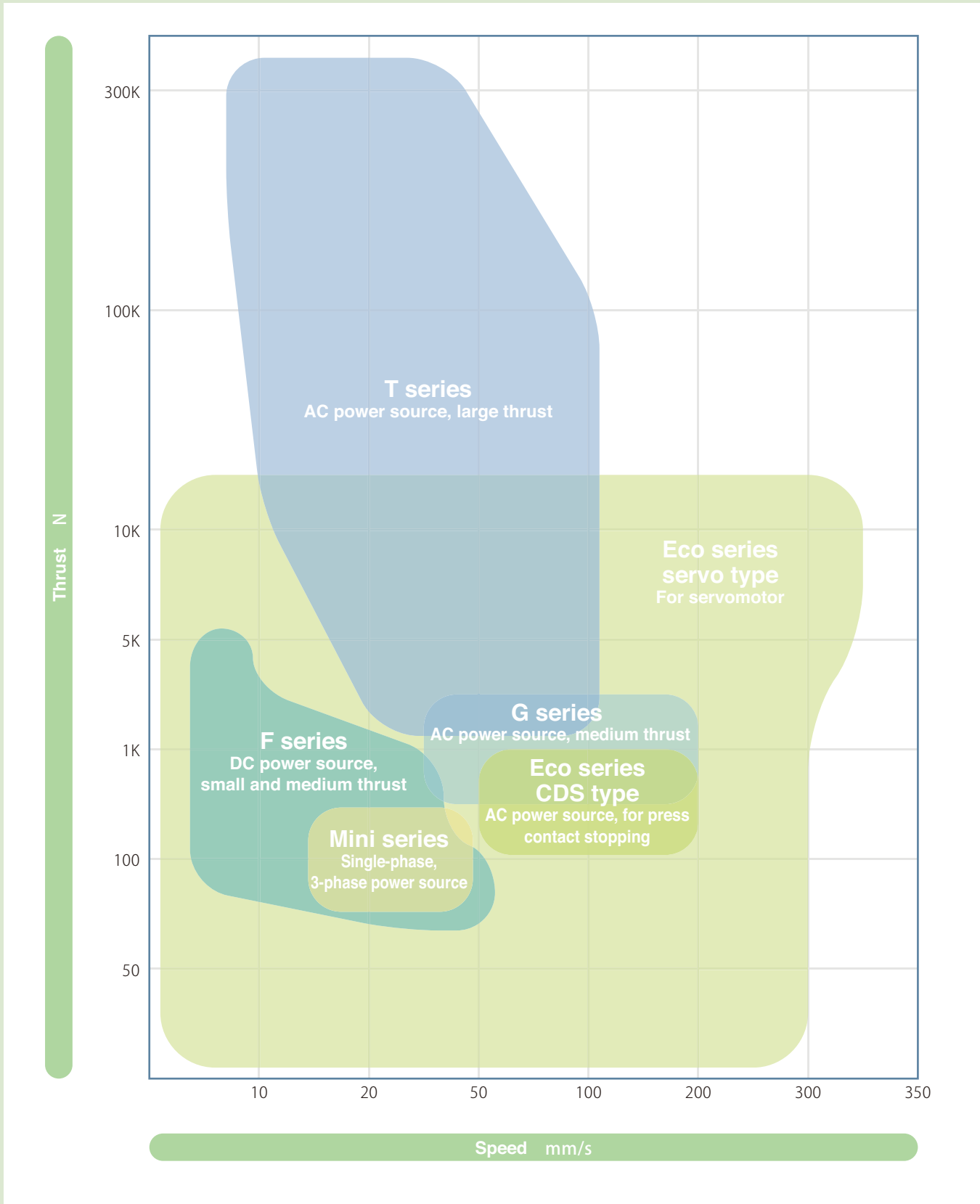


# Power Cylinder

## Power Cylinder capacity range

TSUBAKI E&M Power Cylinders can be used across a wide range of thrusts and speeds.

Refer to the image diagram below and select the optimum model from the basic specifications list on pages 7 and 8.



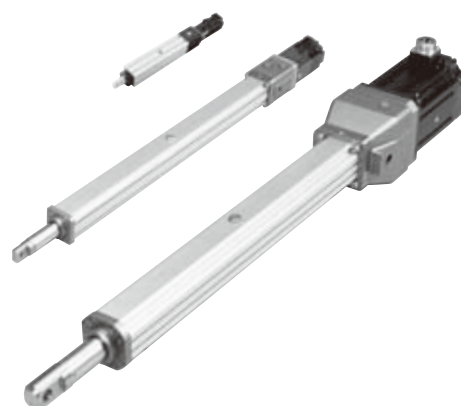
## Power Cylinder

# Eco series

### Eco series servo type

**Thrust : 150N to 15000N {15.3kgf to 1530kgf}**

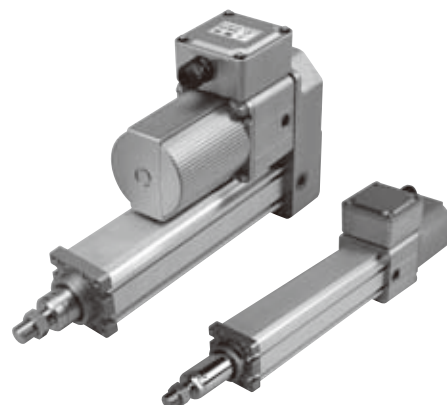
- Maximization of servomotor performance
- Realization of high stopping accuracy
- Selectable servomotor
- Realization of high speeds and wide-ranging thrusts
- Reduction in servomotor capacity with precision planetary reducer



### Eco series CDS type

**Thrust : 250N to 1.00kN {25.5kgf to 102kgf}**

- Self-contained
- Environmentally friendly
- Running cost reduction
- For highly frequent operation and long life
- Simple operation

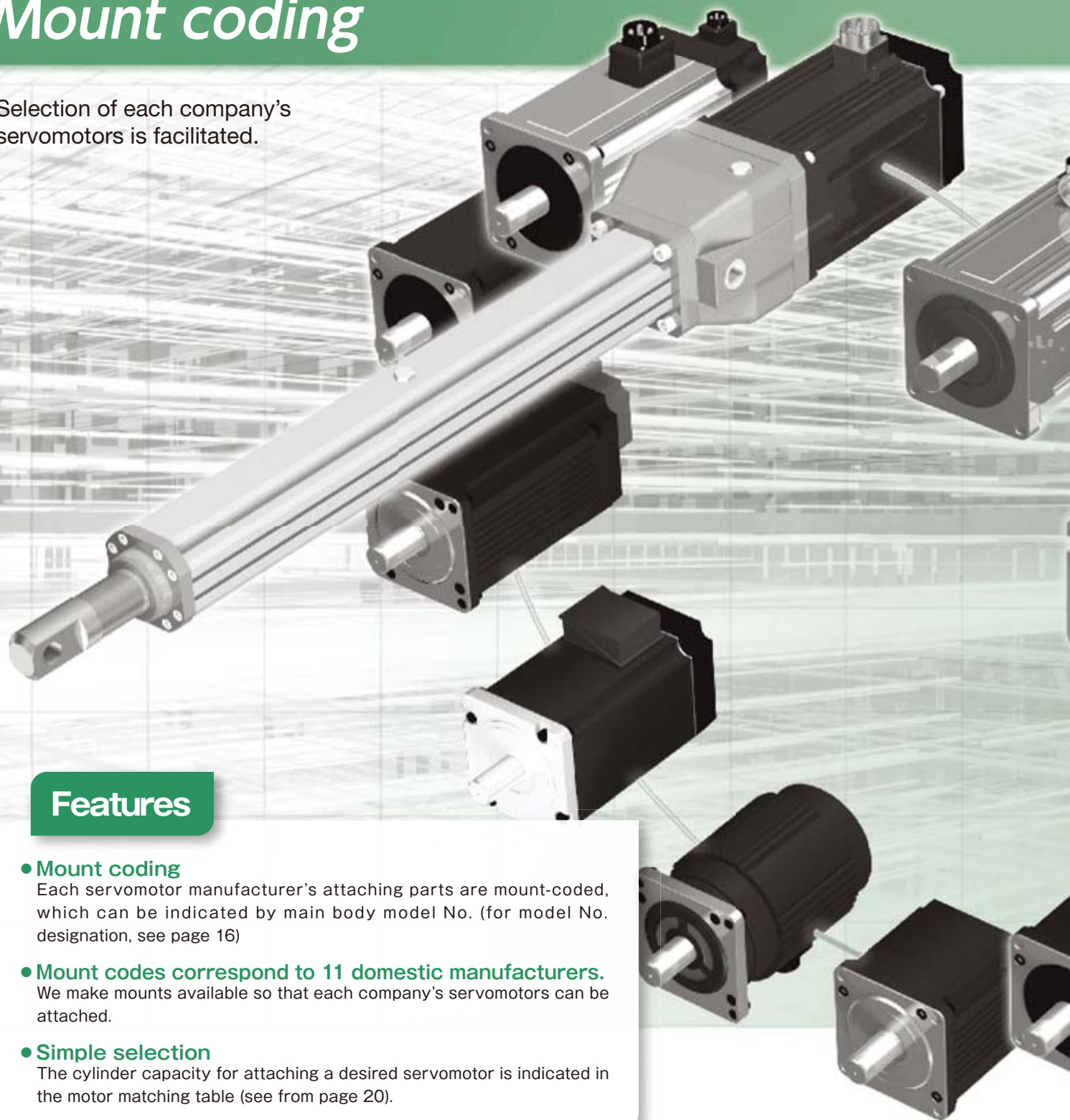


# Power Cylinder Eco Series

New lineup for mount coding and with precision planetary reducer

## Mount coding

Selection of each company's servomotors is facilitated.



### Features

- **Mount coding**

Each servomotor manufacturer's attaching parts are mount-coded, which can be indicated by main body model No. (for model No. designation, see page 16)

- **Mount codes correspond to 11 domestic manufacturers.**

We make mounts available so that each company's servomotors can be attached.

- **Simple selection**

The cylinder capacity for attaching a desired servomotor is indicated in the motor matching table (see from page 20).

# Servo Type

Expanded  
model

## *With precision planetary reducer*

For low-speed uses, the motor capacity can be reduced in combination with our precision planetary reducer PAT-B.

*Size reduction*

*Smart coupling housing*

*Precision planetary reducer*

### Features

- **Equipment cost reduction**

As the servomotor capacity becomes smaller, the amplifier (driver) also becomes smaller, so that the initial cost can be reduced.

- **Light weight and compactness**

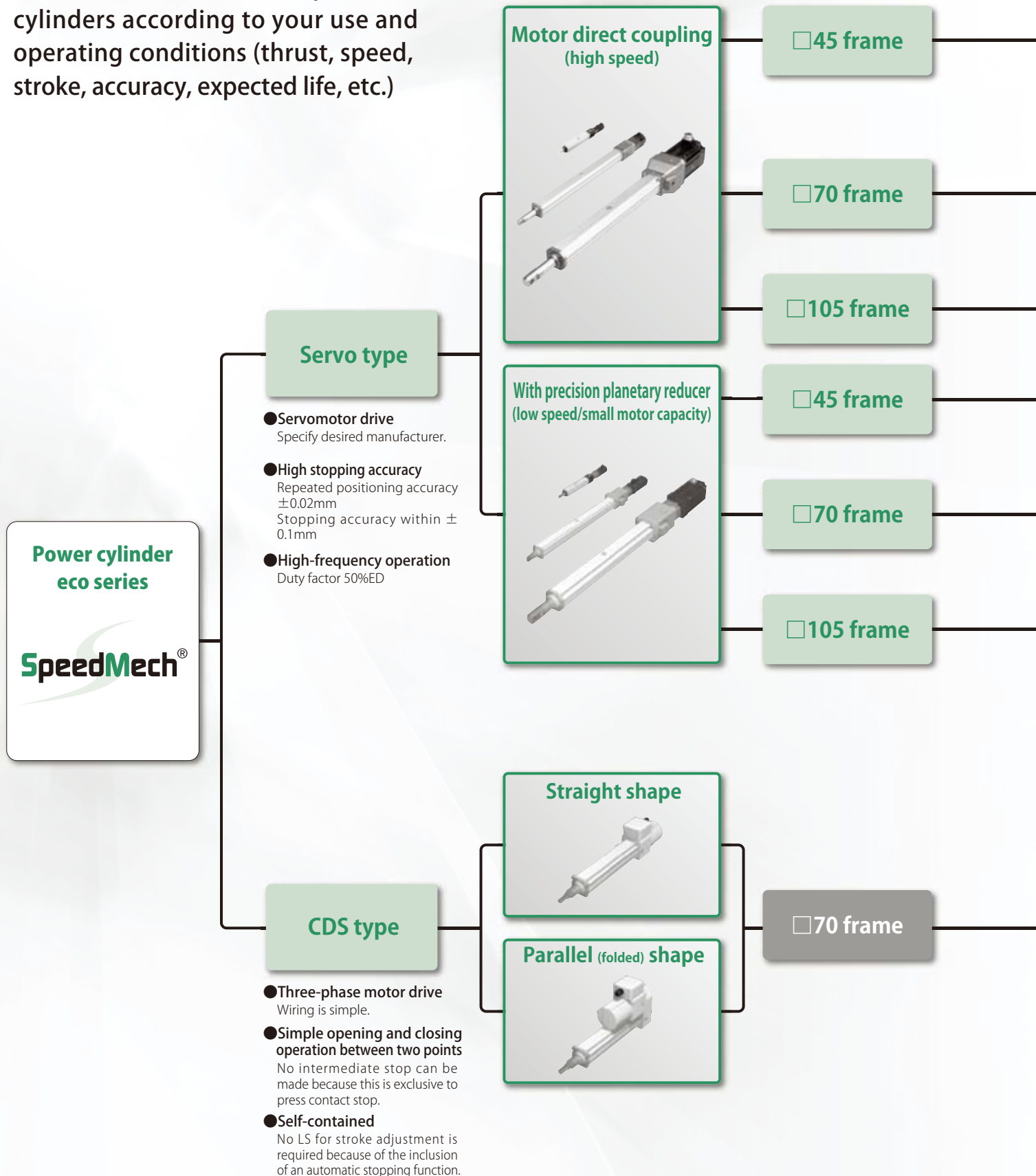
Due to the reduction in servomotor size, a new smart coupling housing is adopted. Mass reduction is up to approximately 30kg (80%).

- **High-precision positioning**

Due to the adoption of our precision planetary reducer (PAT-B), the backlash of the reducer will not affect the cylinder accuracy.

# Guidance for selection

Power cylinder eco series is available in servo type and CDS type for various uses. Select optimum cylinders according to your use and operating conditions (thrust, speed, stroke, accuracy, expected life, etc.)



## Servomotor manufacturers

Mitsubishi Electric → P.20

Yaskawa Electric → P.21

Panasonic → P.22

Fuji Electric → P.23

Omron → P.24

Sanyo Denki → P.25

FANUC → P.26

Keyence → P.27

Nikki Denso → P.28

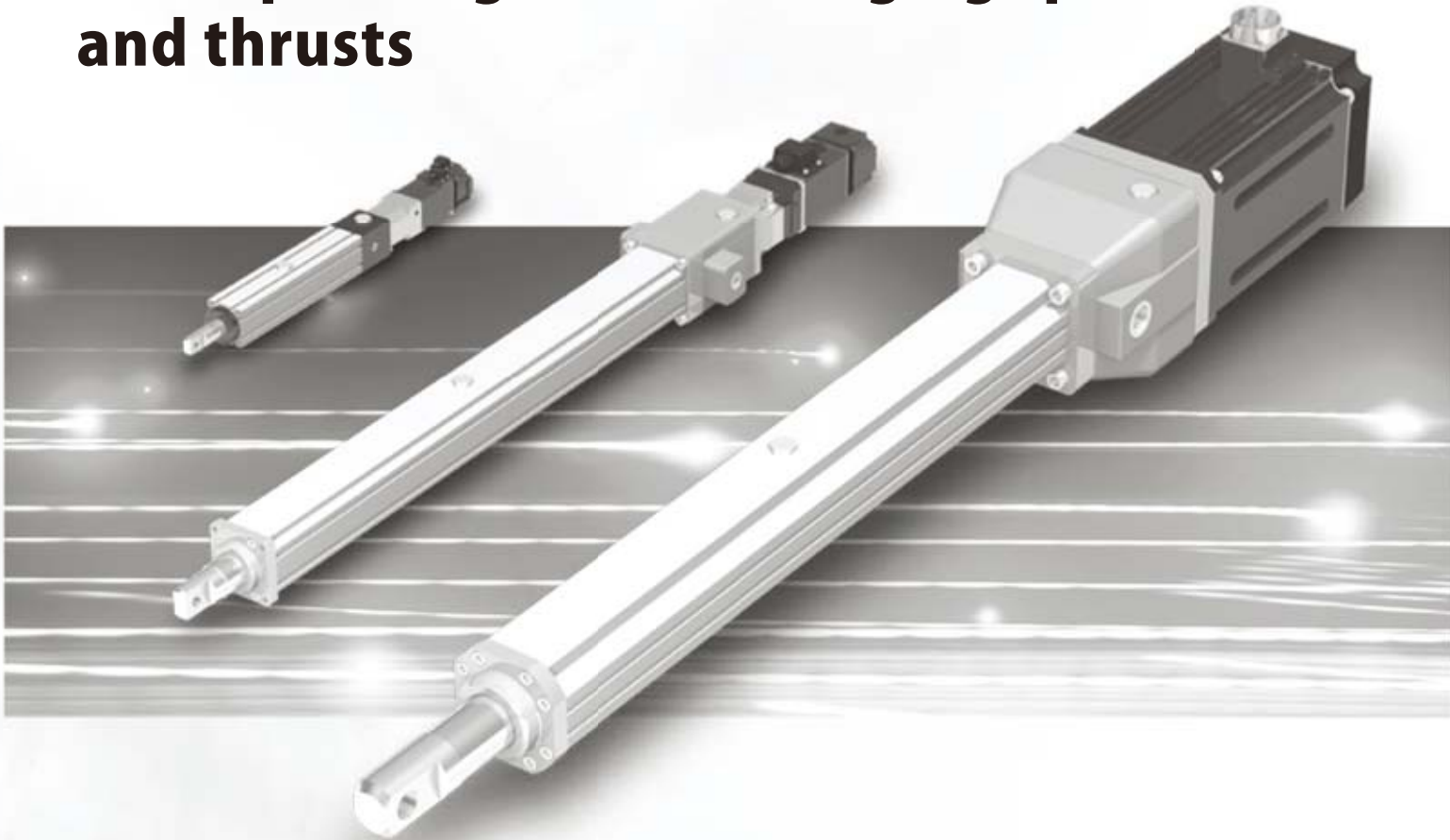
Tamagawa Seiki → P.29

Hitachi Industrial Equipment Systems → P.30

|           | Allowable thrust    | Maximum speed | Motor capacity range | Maximum stroke | Model No. indication | Dimensions table |
|-----------|---------------------|---------------|----------------------|----------------|----------------------|------------------|
| LPES15F   | 150N<br>{15.3kgf}   | 300mm/s       | 0.05~0.1kW           | 300mm          | → P.16               | → P.31           |
| LPES30F   | 300N<br>{30.6kgf}   | 300mm/s       | 0.1~0.35kW           | 300mm          |                      |                  |
| LPES150F  | 1500N<br>{153kgf}   | 300mm/s       | 0.55~0.75kW          | 600mm          |                      | → P.33           |
| LPES300F  | 3000N<br>{306kgf}   | 300mm/s       | 0.3~2kW              | 600mm          |                      |                  |
| LPES1500F | 15000N<br>{1530kgf} | 333mm/s       | 0.85~11kW            | 1000mm         |                      | → P.35           |
| LPES30R   | 300N<br>{30.6kgf}   | 100mm/s       | 0.03~0.2kW           | 300mm          |                      | → P.32           |
| LPES150R  | 1500N<br>{153kgf}   | 100mm/s       | 0.1~0.5kW            | 600mm          |                      | → P.34           |
| LPES300R  | 3000N<br>{306kgf}   | 100mm/s       | 0.13~1.5kW           | 600mm          |                      |                  |
| LPES1500R | 15000N<br>{1530kgf} | 167mm/s       | 0.3~5.5kW            | 1000mm         |                      | → P.36           |

|         | Thrust generated  | Rated speed         | Motor output                   | Maximum stroke | Model No. indication | Dimensions table |
|---------|-------------------|---------------------|--------------------------------|----------------|----------------------|------------------|
| LPE025H | 250N<br>{25.5kgf} | 160/190/200<br>mm/s | 0.25N·m<br>(50W or equivalent) | 600mm          | → P.44               | → P.45           |
| LPE050L | 500N<br>{51.0kgf} | 90/100/110<br>mm/s  | 0.25N·m<br>(50W or equivalent) | 600mm          |                      |                  |
| LPE050H | 500N<br>{51.0kgf} | 160/170/190<br>mm/s | 0.50N·m<br>(90W or equivalent) | 600mm          |                      |                  |
| LPE100L | 1000N<br>{102gf}  | 90/90/110<br>mm/s   | 0.50N·m<br>(90W or equivalent) | 600mm          |                      |                  |

# New models of power cylinders capable of corresponding to wide-ranging speeds and thrusts



### Maximization of servomotor performance

Servomotor performance is maximized by combining high-efficiency ball screw and high-rigidity and light-weight disc coupling.  
Because of clamp type fastening, there is no backlash like key fastening.  
Clamp type fastening also applies even with precision planetary reducer.

### Realization of high stopping accuracy

High stopping accuracy is realized through the adoption of high-precision ball screw.  
The repeated positioning accuracy\*<sup>1</sup> is  $\pm 0.02\text{mm}$ .  
The stopping accuracy\*<sup>2</sup> is within  $\pm 0.1\text{mm}$ .  
The accuracies are not affected even with the precision planetary reducer.

\*1) Difference in the position of stopping at one point in the same direction of operation

\*2) Difference between target point and actual stopping position

### Effects with precision planetary reducer

Due to the reduction in servomotor size, the following effects can be expected:

- Peripheral equipment, such as amplifier, can also be made smaller, so that the initial cost can be reduced.
- Electric energy decreases, so that the running cost can also be reduced.
- The coupling housing is also down-sized to be lightweight and compact.

### Selectable servomotor

A desired servomotor can be installed.  
For an estimate, inform us of the servomotor manufacturer or mount code. Also, specify Ⓔ Motor handling in model No. designation.

Note) Each manufacturer has some unsupported models.

### Realization of high speeds and wide-ranging thrusts

Can be used at high speeds in a large thrust area.

- 45 frame 300mm/s at the maximum thrust of 300N {30.6kgf}
- 70 frame 300mm/s at the maximum thrust of 3000N {306kgf}
- 105 frame 333mm/s at the maximum thrust of 15000N {1530kgf}

## Model No. designation

① **LPES** ② **1500** ③ **R** ④ **5** ⑤ **T** ⑥ **10** ⑦ **G5L** ⑧ **A** ⑨ **SUJ**

## ① Product/series name

Power cylinder  
eco series servo type

## ② Allowable thrust

|            |        |        |           |
|------------|--------|--------|-----------|
| □45 frame  | 15 :   | 150N   | {15.3kgf} |
|            | 30 :   | 300N   | {30.6kgf} |
| □70 frame  | 150 :  | 1500N  | {153kgf}  |
|            | 300 :  | 3000N  | {306kgf}  |
| □105 frame | 1500 : | 15000N | {1530kgf} |

## ③ Motor mounting method

F: Motor direct coupling (no reduction gear ratio)  
R: With precision planetary reducer

\* For details, see the motor matching table (from page 20).

## ④ Reduction gear ratio

3 : 1 / 3  
4 : 1 / 4  
5 : 1 / 5  
7 : 1 / 7  
9 : 1 / 9  
A : 1 / 10

## ⑤ Main body shape

T: straight

## ⑥ Stroke

3 : 300mm  
10 : 1000mm

\* The above numerical values are examples.  
For actual strokes, see the standard model list below.

## ⑧ Motor handling

A: Installed by customer  
B: Supplied by customer

## ⑦ Mount code

G5L: Example) 750W manufactured by Mitsubishi Electric

\* For details, see the motor matching table  
(from page 20).

## ⑨ Options

W: Waterproof spec IP65 (□70 and □105 frames only)

M: Anti-rod rotation spec (□45 frame only)

S: With 3 magnetic sensors  
(See the sensor related option on page 17.)

U: U-type end fitting

N: N-type end fitting (□45 frame only)  
(No symbol indicates I-type end fitting.)

J: Bellows (□70 and □105 frames only)

(The strokes do not change even with bellows.)

## Standard model list

| Model No.  | Reduction gear ratio | Allowable thrust N {kgf} | Speed mm/s | Stroke mm                                      | Screw diameter mm | Screw lead mm | Frame size |
|------------|----------------------|--------------------------|------------|------------------------------------------------|-------------------|---------------|------------|
| LPES15F    | —                    | 150 {15.3}               | 300        | 100<br>200<br>300                              | Φ12               | 6             | □45        |
| LPES30F    | —                    | 300 {30.6}               | 300        |                                                |                   |               |            |
| LPES30R3   | 3                    |                          | 100        |                                                |                   |               |            |
| LPES30R4   | 4                    |                          | 75         |                                                |                   |               |            |
| LPES30R5   | 5                    |                          | 60         |                                                |                   |               |            |
| LPES30R7   | 7                    |                          | 43         |                                                |                   |               |            |
| LPES30R9   | 9                    |                          | 33         |                                                |                   |               |            |
| LPES30RA   | 10                   |                          | 30         |                                                |                   |               |            |
| LPES150F   | —                    | 1500 {153}               | 300        | 100<br>200<br>300<br>400<br>500<br>600         | Φ20               | 6             | □70        |
| LPES150R3  | 3                    |                          | 100        |                                                |                   |               |            |
| LPES150R4  | 4                    |                          | 75         |                                                |                   |               |            |
| LPES150R5  | 5                    |                          | 60         |                                                |                   |               |            |
| LPES150R7  | 7                    |                          | 43         |                                                |                   |               |            |
| LPES150R9  | 9                    |                          | 33         |                                                |                   |               |            |
| LPES150RA  | 10                   |                          | 30         |                                                |                   |               |            |
| LPES300F   | —                    | 3000 {306}               | 300        | 200<br>300<br>400<br>500<br>600<br>800<br>1000 | Φ30               | 10            | □105       |
| LPES300R3  | 3                    |                          | 100        |                                                |                   |               |            |
| LPES300R4  | 4                    |                          | 75         |                                                |                   |               |            |
| LPES300R5  | 5                    |                          | 60         |                                                |                   |               |            |
| LPES300R7  | 7                    |                          | 43         |                                                |                   |               |            |
| LPES300R9  | 9                    |                          | 33         |                                                |                   |               |            |
| LPES300RA  | 10                   |                          | 30         |                                                |                   |               |            |
| LPES1500F  | —                    | 15000 {1530}             | 333        | 200<br>300<br>400<br>500<br>600<br>800<br>1000 | Φ30               | 10            | □105       |
| LPES1500R3 | 3                    |                          | 167        |                                                |                   |               |            |
| LPES1500R4 | 4                    |                          | 125        |                                                |                   |               |            |
| LPES1500R5 | 5                    |                          | 100        |                                                |                   |               |            |
| LPES1500R7 | 7                    |                          | 71         |                                                |                   |               |            |
| LPES1500R9 | 9                    |                          | 56         |                                                |                   |               |            |
| LPES1500RA | 10                   |                          | 50         |                                                |                   |               |            |

\* The speeds are values at an input of 3000r/min (except for LPES1500F, the speed of which is a value at an input of 2000r/min).

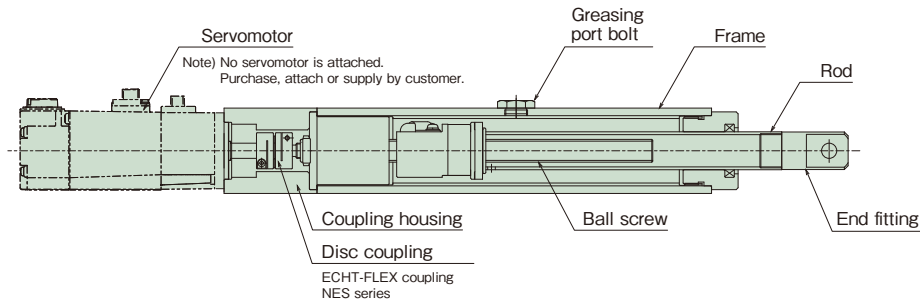
## Standard use environment

| Model Environment       | Indoor type                    |
|-------------------------|--------------------------------|
| Ambient temperature     | 0~40℃                          |
| Relative humidity       | 85% or less (non-condensing)   |
| Impact resistance value | 1G or less                     |
| Installation altitude   | 1000m or lower above sea level |
| Atmosphere              | Normally indoors*              |

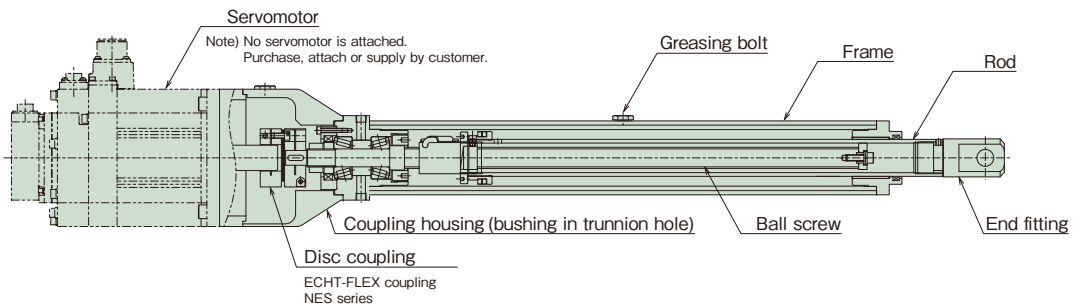
\* "Normally indoors" means no exposure to wind, rain and water, and at a general in-factory level of dust.

## Structure

### 45 frame



### 70 • 105 frame



#### Driving part

##### Motor

A servomotor of almost any manufacturer can be selected. Please attach or supply a servomotor.

#### Coupling part

##### Coupling

ECHT-FLEX coupling NES series is adopted. The industry leader in light weight and high rigidity, servomotor functions are fully exerted.

#### Actuating part

##### Ball screw

Highly efficient ball screw is adopted. It can withstand remarkably frequent operations and a long life can be expected.

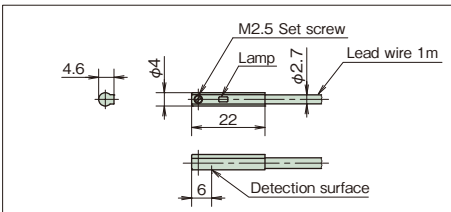
##### Frame

To realize lighter weight, an aluminum frame has been adopted. And the external dimensions of the cylinder are not changed even after mounting a magnetic sensor.

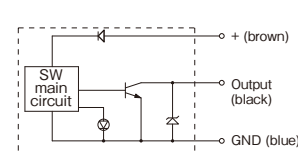
## Sensor related option

### Standard magnetic sensor (S)

#### 45 frame



#### Electric circuit

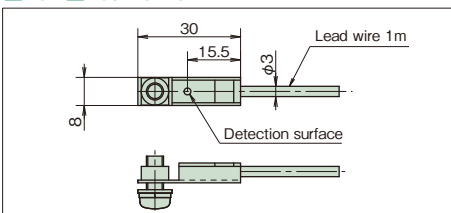


#### Magnetic sensor specifications

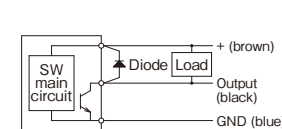
Non-contact switch (DC 3-wire system, lead wire 1m, with lamp)

|                       |                       |
|-----------------------|-----------------------|
| Power voltage         | 5~24V DC              |
| Consumption current   | 10mA or less          |
| Load current          | 40mA or less          |
| Output specifications | Open collector output |

#### 70 • 105 frame



#### Electric circuit



#### Magnetic sensor specifications

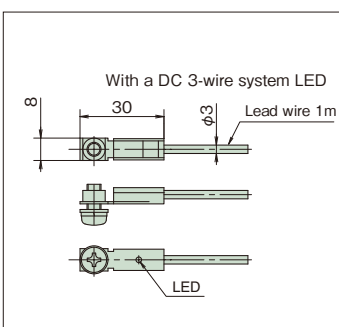
Non-contact switch (DC 3-wire system, lead wire 1m)

|                       |                                            |
|-----------------------|--------------------------------------------|
| Power voltage         | 5~26V DC                                   |
| Consumption current   | 8mA MAX (24V DC)                           |
| Output specifications | 15mA MAX (24V DC)<br>Open collector output |

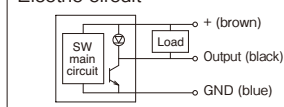
### Special type (for 70 and 105 frames)

#### ① With (LED) lamp

When the sensor detects, a red lamp lights to indicate detection. It is useful when setting the position of the magnetic sensor.



#### Electric circuit



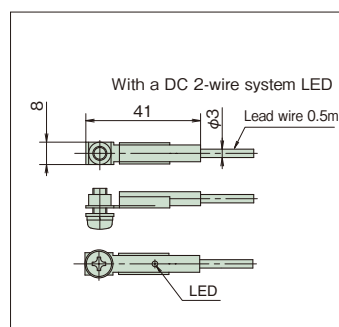
#### Magnetic sensor specifications

For position detection

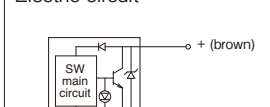
|                       |                                            |
|-----------------------|--------------------------------------------|
| Power voltage         | 5~24V DC                                   |
| Consumption current   | 8mA MAX (24V DC)                           |
| Output specifications | 15mA MAX (24V DC)<br>Open collector output |

#### ② 2-wire system

\* 2-wire system is only with lamp.



#### Electric circuit



#### Magnetic sensor specifications

For position detection

|                       |            |
|-----------------------|------------|
| Power voltage         | 10~28V DC  |
| Load current          | 5~40mA     |
| Internal drop voltage | 4V or less |

## Input shaft conversion inertia moment

| Model No. | Reducer frame No. | Inertia moment $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ |       |       |       |       |       |
|-----------|-------------------|-------------------------------------------------------------|-------|-------|-------|-------|-------|
|           |                   | 100                                                         | 200   | 300   | 400   | 500   | 600   |
| LPES15F   | -                 | 0.086                                                       | 0.102 | 0.119 | -     | -     | -     |
| LPES30F   | -                 | 0.134                                                       | 0.151 | 0.168 | -     | -     | -     |
| LPES30R3  | 120               | 0.045                                                       | 0.047 | 0.049 | -     | -     | -     |
| LPES30R4  |                   | 0.038                                                       | 0.039 | 0.041 | -     | -     | -     |
| LPES30R5  |                   | 0.035                                                       | 0.036 | 0.037 | -     | -     | -     |
| LPES30R7  |                   | 0.033                                                       | 0.033 | 0.033 | -     | -     | -     |
| LPES30R9  |                   | 0.032                                                       | 0.032 | 0.032 | -     | -     | -     |
| LPES30RA  |                   | 0.031                                                       | 0.032 | 0.032 | -     | -     | -     |
| LPES150F  | -                 | 1.039                                                       | 1.166 | 1.292 | 1.418 | 1.545 | 1.671 |
| LPES150R3 | 160               | 0.275                                                       | 0.290 | 0.304 | 0.318 | 0.332 | 0.346 |
| LPES150R4 |                   | 0.205                                                       | 0.213 | 0.221 | 0.229 | 0.237 | 0.244 |
| LPES150R5 |                   | 0.172                                                       | 0.177 | 0.182 | 0.187 | 0.192 | 0.197 |
| LPES150R7 |                   | 0.151                                                       | 0.154 | 0.156 | 0.159 | 0.162 | 0.164 |
| LPES150R9 |                   | 0.143                                                       | 0.144 | 0.146 | 0.148 | 0.149 | 0.151 |
| LPES150RA |                   | 0.140                                                       | 0.142 | 0.143 | 0.144 | 0.145 | 0.147 |
| LPES300F  | -                 | 1.720                                                       | 1.846 | 1.973 | 2.099 | 2.225 | 2.352 |
| LPES300R3 | 160               | 0.351                                                       | 0.365 | 0.379 | 0.393 | 0.407 | 0.421 |
| LPES300R4 |                   | 0.247                                                       | 0.255 | 0.263 | 0.271 | 0.279 | 0.287 |
| LPES300R5 |                   | 0.199                                                       | 0.204 | 0.209 | 0.214 | 0.219 | 0.224 |
| LPES300R7 |                   | 0.165                                                       | 0.168 | 0.170 | 0.173 | 0.175 | 0.178 |
| LPES300R9 |                   | 0.151                                                       | 0.153 | 0.154 | 0.156 | 0.157 | 0.159 |
| LPES300RA |                   | 0.147                                                       | 0.148 | 0.150 | 0.151 | 0.152 | 0.154 |
| LPES300R3 | 220               | 0.801                                                       | 0.815 | 0.829 | 0.843 | 0.857 | 0.871 |
| LPES300R4 |                   | 0.587                                                       | 0.595 | 0.603 | 0.611 | 0.619 | 0.627 |
| LPES300R5 |                   | 0.539                                                       | 0.544 | 0.549 | 0.554 | 0.559 | 0.564 |
| LPES300R7 |                   | 0.485                                                       | 0.488 | 0.490 | 0.493 | 0.495 | 0.498 |
| LPES300R9 |                   | 0.461                                                       | 0.463 | 0.464 | 0.466 | 0.467 | 0.469 |
| LPES300RA |                   | 0.457                                                       | 0.458 | 0.460 | 0.461 | 0.462 | 0.464 |

| Model No.  | Reducer frame No. | Inertia moment $\times 10^{-4} \text{ kg} \cdot \text{m}^2$ |        |        |        |        |        |        |
|------------|-------------------|-------------------------------------------------------------|--------|--------|--------|--------|--------|--------|
|            |                   | 200                                                         | 300    | 400    | 500    | 600    | 800    | 1000   |
| LPES1500F  | -                 | 6.913                                                       | 7.555  | 8.197  | 8.838  | 9.480  | 10.763 | 12.047 |
| LPES1500R3 | 220               | 2.000                                                       | 2.072  | 2.143  | 2.214  | 2.286  | 2.428  | 2.571  |
| LPES1500R4 |                   | 1.262                                                       | 1.302  | 1.342  | 1.382  | 1.423  | 1.503  | 1.583  |
| LPES1500R5 |                   | 0.971                                                       | 0.996  | 1.022  | 1.048  | 1.073  | 1.125  | 1.176  |
| LPES1500R7 |                   | 0.705                                                       | 0.718  | 0.732  | 0.745  | 0.758  | 0.784  | 0.810  |
| LPES1500R9 |                   | 0.594                                                       | 0.602  | 0.610  | 0.618  | 0.626  | 0.642  | 0.658  |
| LPES1500RA |                   | 0.565                                                       | 0.572  | 0.578  | 0.584  | 0.591  | 0.604  | 0.616  |
| LPES1500F  | -                 | 12.513                                                      | 13.155 | 13.797 | 14.438 | 15.080 | 16.363 | 17.647 |
| LPES1500R3 | 320               | 4.640                                                       | 4.712  | 4.783  | 4.854  | 4.926  | 5.068  | 5.211  |
| LPES1500R4 |                   | 3.522                                                       | 3.562  | 3.602  | 3.642  | 3.683  | 3.763  | 3.843  |
| LPES1500R5 |                   | 3.211                                                       | 3.236  | 3.262  | 3.288  | 3.313  | 3.365  | 3.416  |
| LPES1500R7 |                   | 2.875                                                       | 2.888  | 2.902  | 2.915  | 2.928  | 2.954  | 2.980  |
| LPES1500R9 |                   | 2.724                                                       | 2.732  | 2.740  | 2.748  | 2.756  | 2.772  | 2.788  |
| LPES1500RA |                   | 2.695                                                       | 2.702  | 2.708  | 2.714  | 2.721  | 2.734  | 2.746  |
| LPES1500F  | -                 | 16.113                                                      | 16.755 | 17.397 | 18.038 | 18.680 | 19.963 | 21.247 |
| LPES1500R3 | 400               | 11.000                                                      | 11.072 | 11.143 | 11.214 | 11.286 | 11.428 | 11.571 |
| LPES1500R4 |                   | 8.547                                                       | 8.587  | 8.627  | 8.667  | 8.708  | 8.788  | 8.868  |
| LPES1500R5 |                   | 8.065                                                       | 8.090  | 8.116  | 8.142  | 8.167  | 8.219  | 8.270  |
| LPES1500R7 |                   | 7.469                                                       | 7.482  | 7.495  | 7.508  | 7.521  | 7.547  | 7.574  |
| LPES1500R9 |                   | 7.239                                                       | 7.247  | 7.255  | 7.263  | 7.271  | 7.286  | 7.302  |
| LPES1500RA |                   | 7.191                                                       | 7.198  | 7.204  | 7.210  | 7.217  | 7.230  | 7.242  |

The moment of inertia does not include the moment of inertia of the servomotor.

## Operating frequency and duty factor

The working time rate shows a rate of operating time per 30 minutes on a 30-minute basis.

The working time rate is calculated with the right formula.

The allowable cycle number of the Eco series servo type is determined depending on heating of the motor and heating of the ball screw and bearing part. It varies depending on the stroke and thrust in use, use the values specified above as a guide. Additionally, the life of the cylinder is not considered for the values.

|                   |               |
|-------------------|---------------|
| Number of cycles  | 15 times/min. |
| Working time rate | 50%ED         |

$$\text{Working time rate (\%ED)} = \frac{\text{operating time of a cycle}}{\text{operating time of a cycle} + \text{dwell time}} \times 100$$

## Life

The life of the ball screw varies depending on peeling due to fatigue of the rolling surface. Check the approximate life with this expected traveling distance graph. However, when shocks are frequently applied, and when appropriate lubrication or maintenance are not provided, the expected traveling distance becomes considerably shorter.

$$\text{Expected traveling distance (km)} = \frac{\text{actual load stroke (m)} \times \text{operation frequency (times/day)} \times \text{operating number of days/year} \times 10^{-3} \times \text{expected number of years}}{\text{Load (N)}}$$

The graph at the right is on an L10 life basis.

The L10 life means the life that can be reached by 90% or more of all is shown as traveling distance.

When selecting a power cylinder based on the life, select the model No. from this graph.

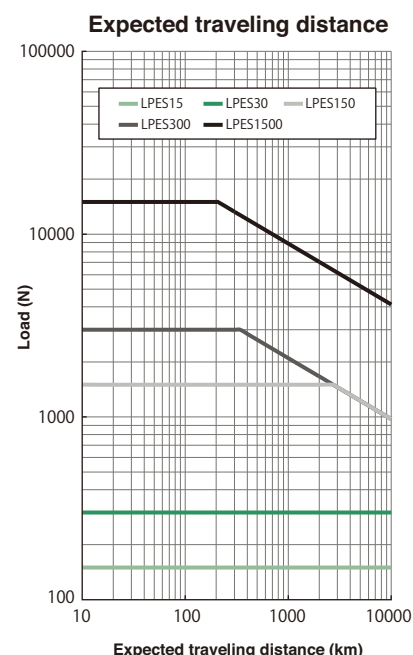
For example, if the expected traveling distance is 1000km and the actual load is 5000N (510kgf), the required power cylinder is LPES1500.

\* Select the servomotor capacity from the motor matching table as the actual load < thrust generated.

If the load fluctuates greatly in the middle of stroke, calculate the equivalent load ( $P_M$ ) by the following equation. Also, with LPES30 and below, the expected traveling distance becomes 10000km or longer.

$$P_M = \frac{P_{\text{MIN}} + 2 \times P_{\text{MAX}}}{3}$$

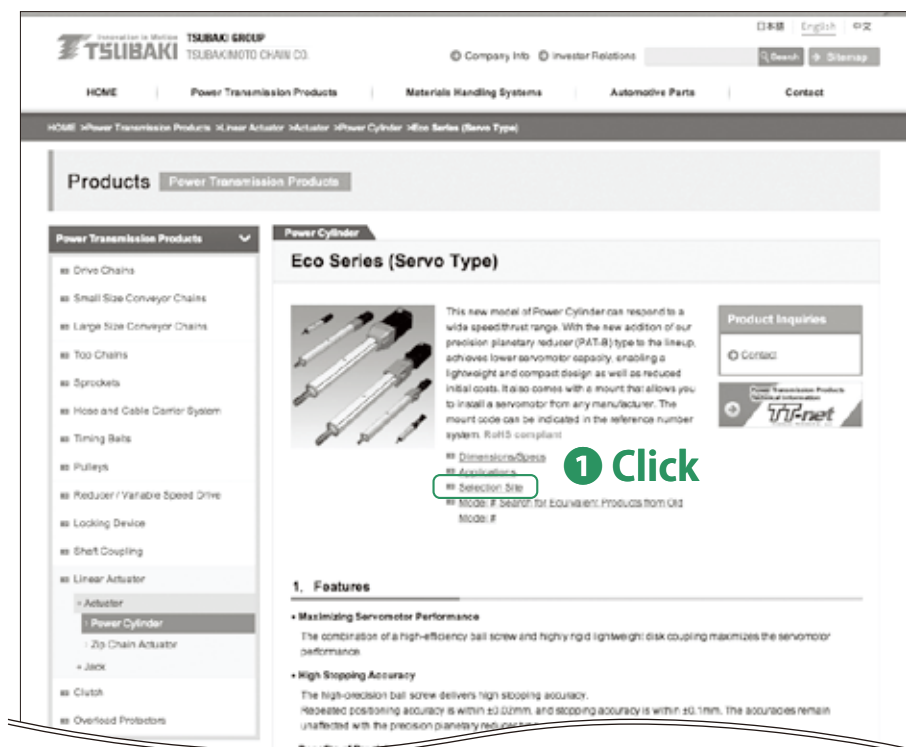
$P_M$  : equivalent load N  
 $P_{\text{MIN}}$  : minimum load N  
 $P_{\text{MAX}}$  : maximum load N



Model No. corresponding required specifications is selected on the website.

HOME > Power Transmission Products > Linear Actuator > Actuator > Power Cylinder > Eco Series (Servo Type)

<http://tsubakimoto.com/power-transmission/linear-actuator/electro-mechanical/power-cylinder/servo/>



HOME > Sizing > Power Cylinder Eco Series Servo Type

[https://tt-net.tsubakimoto.co.jp/tecs/calc/sad/lpe/calc\\_lpes.asp?lang=en](https://tt-net.tsubakimoto.co.jp/tecs/calc/sad/lpe/calc_lpes.asp?lang=en)

The screenshot shows the 'Entering your selection criteria' form on the Tsubaki website. The form includes fields for Thrust, Speed, Stroke, Motor manufacturer, Motor Series, Motor Type, and various options like Waterproof type, Rod Rotation Prevention, and End fitting. A green arrow points to the 'Perform sizing' button, which is highlighted with a green box and the text '2 Click'.

Input necessary conditions and execute selection.

## Servomotor matching table

### Motors manufactured by Mitsubishi Electric

●J4 series HG-KR/HG-MR ●J3 series HF-KP/HF-MP ●J2-Super series HC-KFS/HC-MFS

| Motor type                                                                               | Motor capacity<br>kW | Power cylinder<br>model No. | Mount<br>code | Reducer frame<br>No. | Reduction gear ratio  |                     |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |
|------------------------------------------------------------------------------------------|----------------------|-----------------------------|---------------|----------------------|-----------------------|---------------------|-----------------------|---------------------|-----------------------|---------------------|-----------------------|---------------------|-----------------------|---------------------|-----------------------|---------------------|-----------------------|---------------------|
|                                                                                          |                      |                             |               |                      | Motor direct coupling |                     | 3                     |                     | 4                     |                     | 5                     |                     | 7                     |                     | 9                     |                     | 10                    |                     |
|                                                                                          |                      |                             |               |                      | Thrust generated<br>N | Rated speed<br>mm/s | Thrust generated<br>N | Rated speed<br>mm/s | Thrust generated<br>N | Rated speed<br>mm/s | Thrust generated<br>N | Rated speed<br>mm/s | Thrust generated<br>N | Rated speed<br>mm/s | Thrust generated<br>N | Rated speed<br>mm/s | Thrust generated<br>N | Rated speed<br>mm/s |
| HG-KR053(B)<br>HG-MR053(B)<br>HF-KP053(B)<br>HF-MP053(B)<br>HC-KFS053(B)<br>HC-MFS053(B) | 0.05                 | LPES15F                     | B3D           | -                    | 40                    | 300                 |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |
|                                                                                          |                      | LPES30R                     | B3D           | 120                  |                       |                     | 130                   | 100                 | 220                   | 75                  | 290                   | 60                  | 300                   | 43                  | 300                   | 33                  | 300                   | 30                  |
| HG-KR13(B)<br>HG-MR13(B)<br>HF-KP13(B)<br>HF-MP13(B)<br>HC-KFS13(B)<br>HC-MFS13(B)       | 0.1                  | LPES15F                     | B3D           | -                    | 150                   | 300                 |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |
|                                                                                          |                      | LPES30F                     | B3D           | -                    | 190                   | 300                 |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |
|                                                                                          |                      | LPES30R                     | B3D           | 120                  |                       |                     | 300                   | 100                 | 300                   | 75                  | 300                   | 60                  |                       |                     |                       |                     |                       |                     |
|                                                                                          |                      | LPES150R                    | B3D           | 160                  |                       |                     |                       |                     |                       |                     |                       |                     | 310                   | 43                  | 550                   | 33                  | 810                   | 30                  |
| HG-KR23(B)<br>HG-MR23(B)<br>HF-KP23(B)<br>HF-MP23(B)<br>HC-KFS23(B)<br>HC-MFS23(B)       | 0.2                  | LPES30F                     | E4H           | -                    | 300                   | 300                 |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |
|                                                                                          |                      | LPES150R                    | E4H           | 160                  |                       |                     | 600                   | 100                 | 1100                  | 75                  | 1500                  | 60                  | 1500                  | 43                  | 1500                  | 33                  | 1500                  | 30                  |
|                                                                                          |                      | LPES300R                    | E4H           | 160                  |                       |                     |                       |                     |                       |                     | 1300                  | 60                  | 2100                  | 43                  | 3000                  | 33                  | 3000                  | 30                  |
| HG-KR43(B)<br>HG-MR43(B)<br>HF-KP43(B)<br>HF-MP43(B)<br>HC-KFS43(B)<br>HC-MFS43(B)       | 0.4                  | LPES150R                    | E4H           | 160                  |                       |                     | 1500                  | 100                 | 1500                  | 75                  |                       |                     |                       |                     |                       |                     |                       |                     |
|                                                                                          |                      | LPES300R                    | E4H           | 160                  |                       |                     | 2200                  | 100                 | 3000                  | 75                  | 3000                  | 60                  | 3000                  | 43                  |                       |                     |                       |                     |
| HG-KR73(B)<br>HG-MR73(B)<br>HF-KP73(B)<br>HF-MP73(B)<br>HC-KFS73(B)<br>HC-MFS73(B)       | 0.75                 | LPES150F                    | G5L           | -                    | 1200                  | 300                 |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |
|                                                                                          |                      | LPES300R                    | G5L           | 220                  |                       |                     | 3000                  | 100                 |                       |                     |                       |                     |                       |                     |                       |                     |                       |                     |
|                                                                                          |                      | LPES1500R                   | G5L           | 220                  |                       |                     | 1600                  | 167                 | 2700                  | 125                 | 3900                  | 100                 | 6300                  | 71                  | 8600                  | 56                  | 9800                  | 50                  |

●J4 series HG-SR ●J3 series HF-SP ●J2-Super series HC-SFS

|                                            |      |           |     |     |       |     |       |     |       |    |       |    |       |    |       |    |       |    |
|--------------------------------------------|------|-----------|-----|-----|-------|-----|-------|-----|-------|----|-------|----|-------|----|-------|----|-------|----|
| HG-SR51(B)                                 | 0.5  | LPES300F  | K3Y | -   | 3000  | 100 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | K3Y | 220 |       |     | 5800  | 56  | 8300  | 42 | 11000 | 33 | 15000 | 24 | 15000 | 19 | 15000 | 17 |
| HF-SP51(B)                                 | 0.5  | LPES300F  | K3Y | -   | 3000  | 100 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | K3Y | 220 |       |     | 5700  | 56  | 8200  | 42 | 10900 | 33 | 15000 | 24 | 15000 | 19 | 15000 | 17 |
| HG-SR81(B)<br>HF-SP81(B)<br>HC-SFS81(B)    | 0.85 | LPES1500F | K3Y | -   | 2700  | 167 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | K3Y | 220 |       |     | 11400 | 56  | 15000 | 42 | 15000 | 33 |       |    |       |    |       |    |
| HG-SR121(B)<br>HF-SP121(B)<br>HC-SFS121(B) | 1.2  | LPES1500F | L3R | -   | 4600  | 167 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | L1R | 400 |       |     | 15000 | 56  |       |    |       |    |       |    |       |    |       |    |
| HG-SR201(B)<br>HF-SP201(B)<br>HC-SFS201(B) | 2    | LPES1500F | L3R | -   | 8900  | 167 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | L3R | -   | 14300 | 167 |       |     |       |    |       |    |       |    |       |    |       |    |
| HG-SR301(B)<br>HF-SP301(B)<br>HC-SFS301(B) | 3    | LPES1500F | L3R | -   | 14300 | 167 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | L3R | -   | 14300 | 167 |       |     |       |    |       |    |       |    |       |    |       |    |
| HG-SR52(B)<br>HF-SP52(B)<br>HC-SFS52(B)    | 0.5  | LPES300R  | K3Y | 220 |       |     | 3000  | 67  | 3000  | 50 |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | K3Y | 220 |       |     | 1600  | 111 | 2900  | 83 | 4000  | 67 | 6300  | 48 | 8600  | 37 | 10000 | 33 |
| HG-SR102(B)                                | 1    | LPES300F  | K3Y | -   | 3000  | 200 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | K3Y | 220 |       |     | 5700  | 111 | 8300  | 83 | 10800 | 67 | 15000 | 48 | 15000 | 37 | 15000 | 33 |
| HF-SP102(B)<br>HC-SFS102(B)                | 1    | LPES300F  | K3Y | -   | 3000  | 200 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | K3Y | 220 |       |     | 5600  | 111 | 8200  | 83 | 10700 | 67 | 15000 | 48 | 15000 | 37 | 15000 | 33 |
| HG-SR152(B)                                | 1.5  | LPES1500F | K3Y | -   | 2000  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | K3Y | 220 |       |     | 9700  | 111 | 13700 | 83 | 15000 | 67 |       |    |       |    |       |    |
| HF-SP152(B)<br>HC-SFS152(B)                | 1.5  | LPES1500F | K3Y | -   | 2000  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | K3Y | 220 |       |     | 9700  | 111 | 13600 | 83 | 15000 | 67 |       |    |       |    |       |    |
| HG-SR202(B)                                | 2    | LPES1500F | L3R | -   | 3300  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | L1R | 400 |       |     | 11700 | 111 | 15000 | 83 |       |    |       |    |       |    |       |    |
| HF-SP202(B)<br>HC-SFS202(B)                | 2    | LPES1500F | L3R | -   | 3300  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | L1R | 400 |       |     | 11800 | 111 | 15000 | 83 |       |    |       |    |       |    |       |    |
| HG-SR352(B)<br>HF-SP352(B)<br>HC-SFS352(B) | 3.5  | LPES1500F | L3R | -   | 7400  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | L1R | 400 |       |     | 15000 | 111 |       |    |       |    |       |    |       |    |       |    |
| HG-SR502(B)<br>HF-SP502(B)<br>HC-SFS502(B) | 5    | LPES1500F | L3R | -   | 11500 | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | L3R | -   | 11500 | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
| HG-SR702(B)<br>HF-SP702(B)<br>HC-SFS702(B) | 7    | LPES1500F | L3R | -   | 15000 | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|                                            |      | LPES1500R | L3R | -   | 15000 | 333 |       |     |       |    |       |    |       |    |       |    |       |    |

●J3 series HA-LP

|               |    |           |     |   |       |     |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------|----|-----------|-----|---|-------|-----|--|--|--|--|--|--|--|--|--|--|--|--|
| HA-LP701M(B)  | 7  | LPES1500F | N1S | - | 15000 | 250 |  |  |  |  |  |  |  |  |  |  |  |  |
| HA-LP701M4(B) | 7  | LPES1500F | N1S | - | 15000 | 250 |  |  |  |  |  |  |  |  |  |  |  |  |
| HA-LP502      | 5  | LPES1500F | N1S | - | 11500 | 333 |  |  |  |  |  |  |  |  |  |  |  |  |
| HA-LP702      | 7  | LPES1500F | N1S | - | 15000 | 333 |  |  |  |  |  |  |  |  |  |  |  |  |
| HA-LP11K24(B) | 11 | LPES1500F | N1S | - | 15000 | 333 |  |  |  |  |  |  |  |  |  |  |  |  |

\* Gray-shaded areas show numerical values with precision planetary reducer.

\* Shaded thrusts generated require thrust limits. Make sure to use at the specified thrusts or less.

\* Shaded rated speeds require speed limits. Make sure to use at the specified speeds or less.

## Servomotor matching table

### Motors manufactured by Yaskawa Electric

● Σ V series SGMJV/SGMAV ● Σ II series SGMAH

| Motor type | Motor capacity kW | Power cylinder model No. | Mount code | Reducer frame No. | Reduction gear ratio  |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|------------|-------------------|--------------------------|------------|-------------------|-----------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
|            |                   |                          |            |                   | Motor direct coupling |                  | 3                  |                  | 4                  |                  | 5                  |                  | 7                  |                  | 9                  |                  | 10                 |                  |
|            |                   |                          |            |                   | Thrust generated N    | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s |
| SGMAH-A3   | 0.03              | LPES30R                  | B3B        | 120               |                       |                  |                    |                  |                    |                  |                    |                  |                    |                  | 30                 | 33               | 60                 | 30               |
| SGMJV-A5   | 0.05              | LPES15F                  | B3D        | —                 | 40                    | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMAV-A5   |                   | LPES30R                  | B3D        | 120               |                       |                  | 120                | 100              | 210                | 75               | 290                | 60               | 300                | 43               | 300                | 33               | 300                | 30               |
| SGMAH-A5   |                   | LPES150R                 | B3D        | 160               |                       |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMJV-01   | 0.1               | LPES15F                  | B3D        | —                 | 150                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMAV-01   |                   | LPES30F                  | B3D        | —                 | 190                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMAH-01   |                   | LPES30R                  | B3D        | 120               |                       |                  | 300                | 100              | 300                | 75               | 300                | 60               |                    |                  |                    |                  |                    |                  |
|            |                   | LPES150R                 | B3D        | 160               |                       |                  |                    |                  |                    |                  |                    |                  | 300                | 43               | 530                | 33               | 800                | 30               |
| SGMJV-C2   | 0.15              | LPES30F                  | B3D        | —                 | 300                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMAV-C2   |                   | LPES150R                 | B3D        | 160               |                       |                  |                    |                  | 550                | 75               | 810                | 60               | 1300               | 43               | 1500               | 33               | 1500               | 30               |
|            |                   | LPES300R                 | B3D        | 160               |                       |                  |                    |                  |                    |                  |                    |                  |                    |                  | 1600               | 33               | 2100               | 30               |
| SGMJV-02   | 0.2               | LPES150R                 | E4H        | 160               |                       |                  | 590                | 100              | 1100               | 75               | 1500               | 60               | 1500               | 43               |                    |                  |                    |                  |
| SGMAV-02   |                   | LPES300R                 | E4H        | 160               |                       |                  |                    |                  |                    |                  | 1300               | 60               | 2100               | 43               | 2900               | 33               | 3000               | 30               |
| SGMAH-02   |                   |                          |            |                   |                       |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMAH-03   | 0.3               | LPES150R                 | E4H        | 160               |                       |                  | 1400               | 100              | 1500               | 75               |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES300R                 | E4H        | 160               |                       |                  |                    |                  | 2100               | 75               | 2800               | 60               | 3000               | 43               |                    |                  |                    |                  |
| SGMJV-04   | 0.4               | LPES150R                 | E4H        | 160               |                       |                  | 1500               | 100              | 1500               | 75               |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMAV-04   |                   | LPES300R                 | E4H        | 160               |                       |                  | 2100               | 100              | 3000               | 75               | 3000               | 60               | 3000               | 43               |                    |                  |                    |                  |
| SGMAH-04   |                   |                          |            |                   |                       |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMAV-06   | 0.55              | LPES150F                 | E4H        | —                 | 630                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES300R                 | E4H        | 160               |                       |                  | 3000               | 100              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   |                          |            |                   |                       |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMJV-06   | 0.6               | LPES150F                 | E4H        | —                 | 780                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES300R                 | E4H        | 160               |                       |                  | 3000               | 100              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES150F                 | G5K        | —                 | 930                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMAH-07   | 0.65              | LPES300R                 | G5K        | 160               |                       |                  | 3000               | 100              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES1500R                | G5K        | 220               |                       |                  |                    |                  | 2000               | 125              | 3000               | 100              | 5000               | 71               | 7000               | 56               | 7900               | 50               |
|            |                   | LPES150F                 | G5L        | —                 | 1200                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMJV-08   | 0.75              | LPES1500R                | G5L        | 220               |                       |                  | 1600               | 167              | 2700               | 125              | 3900               | 100              | 6300               | 71               | 8600               | 56               | 9700               | 50               |
| SGMAV-08   |                   |                          |            |                   |                       |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMAH-08   |                   |                          |            |                   |                       |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| SGMAV-10   | 1                 | LPES300F                 | G5L        | —                 | 1800                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES1500R                | G5L        | 220               |                       |                  | 2900               | 167              | 4500               | 125              | 6100               | 100              | 9400               | 71               | 12600              | 56               | 14200              | 50               |

● Σ V series SGMGV

|          |      |           |     |     |       |     |       |    |       |    |       |    |       |    |       |    |       |    |
|----------|------|-----------|-----|-----|-------|-----|-------|----|-------|----|-------|----|-------|----|-------|----|-------|----|
| SGMGV-03 | 0.3  | LPES300R  | H1H | 160 |       |     | 3000  | 50 | 3000  | 38 |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | H4H | 220 |       |     |       |    | 1900  | 63 | 2800  | 50 | 4600  | 36 | 6600  | 28 | 7500  | 25 |
| SGMGV-05 | 0.45 | LPES300F  | H2K | —   | 1700  | 150 |       |    |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | H4K | 220 |       |     | 2500  | 83 | 3900  | 63 | 5300  | 50 | 8100  | 36 | 11200 | 28 | 12600 | 25 |
| SGMGV-09 | 0.85 | LPES300F  | K3L | —   | 3000  | 150 |       |    |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K3L | 220 |       |     | 6800  | 83 | 9600  | 63 | 12500 | 50 | 15000 | 36 | 15000 | 28 | 15000 | 25 |
| SGMGV-13 | 1.3  | LPES1500F | K3M | —   | 2700  | 250 |       |    |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K3M | 220 |       |     | 11800 | 83 | 15000 | 63 | 15000 | 50 |       |    |       |    |       |    |
| SGMGV-20 | 1.8  | LPES1500F | K3Y | —   | 4400  | 250 |       |    |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K3Y | 220 |       |     | 15000 | 83 |       |    |       |    |       |    |       |    |       |    |
| SGMGV-30 | 2.9  | LPES1500F | L3R | —   | 8500  | 250 |       |    |       |    |       |    |       |    |       |    |       |    |
| SGMGV-44 | 4.4  | LPES1500F | L3R | —   | 14000 | 250 |       |    |       |    |       |    |       |    |       |    |       |    |
| SGMGV-55 | 5.5  | LPES1500F | L2S | —   | 15000 | 250 |       |    |       |    |       |    |       |    |       |    |       |    |

● Σ V series SGMZS (explosion-proof type)

|             |      |           |     |     |      |     |       |     |       |     |       |     |       |    |       |    |       |    |
|-------------|------|-----------|-----|-----|------|-----|-------|-----|-------|-----|-------|-----|-------|----|-------|----|-------|----|
| SGMZS-02    | 0.2  | LPES30F   | H1H | —   | 300  | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|             |      | LPES150R  | H1H | 160 |      |     | 590   | 100 | 1100  | 75  | 1500  | 60  | 1500  | 43 | 1500  | 33 | 1500  | 30 |
|             |      | LPES300R  | H1H | 160 |      |     |       |     |       |     | 1300  | 60  | 2100  | 43 | 2900  | 33 | 3000  | 30 |
| SGMZS-05    | 0.5  | LPES300R  | J7Y | 220 |      |     | 2500  | 100 | 3000  | 75  | 3000  | 60  | 3000  | 43 |       |    |       |    |
|             |      | LPES1500R | J7Y | 220 |      |     |       |     |       |     | 1600  | 100 | 3100  | 71 | 4500  | 56 | 5200  | 50 |
| SGMZS-10    | 1    | LPES300F  | J7Y | —   | 1800 | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|             |      | LPES300R  | J7Y | 220 |      |     | 3000  | 100 |       |     |       |     |       |    |       |    |       |    |
|             |      | LPES1500R | J7Y | 220 |      |     | 2900  | 167 | 4500  | 125 | 6100  | 100 | 9400  | 71 | 12600 | 56 | 14200 | 50 |
| SGMZS-18    | 1.8  | LPES300F  | J8Y | —   | 3000 | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|             |      | LPES1500R | J7Y | 220 |      |     | 7200  | 167 | 10300 | 125 | 13300 | 100 | 15000 | 71 | 15000 | 56 | 15000 | 50 |
| SGMZS-30A2A | 2.97 | LPES1500F | M3P | —   | 3300 | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|             |      | LPES1500R | M3P | 320 |      |     | 12100 | 167 | 15000 | 125 | 15000 | 100 |       |    |       |    |       |    |
| SGMZS-30A2B | 2.96 | LPES1500F | M4P | —   | 5900 | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|             |      | LPES1500R | M4P | 320 |      |     | 15000 | 111 | 15000 | 83  | 15000 | 67  |       |    |       |    |       |    |

\* Gray-shaded areas show numerical values with precision planetary reducer.

\* Shaded thrusts generated require thrust limits. Make sure to use at the specified thrusts or less.

\* Shaded rated speeds require speed limits. Make sure to use at the specified speeds or less.

\* Mount codes may change with oil seal. Please contact us or check with the selection tool.

## Motors manufactured by Panasonic

### ●MINAS A5 series MHMD/MSME/MSMD

| Motor type                 | Motor capacity kW | Power cylinder model No. | Mount code | Reducer frame No. | Reduction gear ratio  |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|----------------------------|-------------------|--------------------------|------------|-------------------|-----------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
|                            |                   |                          |            |                   | Motor direct coupling |                  | 3                  |                  | 4                  |                  | 5                  |                  | 7                  |                  | 9                  |                  | 10                 |                  |
|                            |                   |                          |            |                   | Thrust generated N    | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s |
| MSME5A<br>MSMD5A           | 0.05              | LPES15F                  | B2D        | —                 | 40                    | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                            |                   | LPES30R                  | B2D        | 120               |                       |                  | 130                | 100              | 220                | 75               | 290                | 60               | 300                | 43               | 300                | 33               | 300                | 30               |
| MSME01<br>MSMD01           | 0.1               | LPES15F                  | B2D        | —                 | 150                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                            |                   | LPES30F                  | B2D        | —                 | 190                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                            |                   | LPES30R                  | B2D        | 120               |                       |                  | 300                | 100              | 300                | 75               | 300                | 60               |                    |                  |                    |                  |                    |                  |
| MHMD02<br>MSME02<br>MSMD02 | 0.2               | LPES30F                  | E3G        | —                 | 300                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                            |                   | LPES150R                 | E3G        | 160               |                       |                  | 600                | 100              | 1100               | 75               | 1500               | 60               | 1500               | 43               | 1500               | 33               | 1500               | 30               |
|                            |                   | LPES300R                 | E3G        | 160               |                       |                  |                    |                  |                    |                  | 1300               | 60               | 2100               | 43               | 3000               | 33               | 3000               | 30               |
| MHMD04<br>MSME04<br>MSMD04 | 0.4               | LPES150R                 | E3H        | 160               |                       |                  | 1500               | 100              | 1500               | 75               |                    |                  |                    |                  |                    |                  |                    |                  |
|                            |                   | LPES300R                 | E3H        | 160               |                       |                  | 2200               | 100              | 3000               | 75               | 3000               | 60               | 3000               | 43               |                    |                  |                    |                  |
| MHMD08<br>MSME08<br>MSMD08 | 0.75              | LPES150F                 | G4L        | —                 | 1200                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                            |                   | LPES300R                 | G4L        | 220               |                       |                  | 3000               | 100              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                            |                   | LPES1500R                | G4L        | 220               |                       |                  | 1600               | 167              | 2700               | 125              | 3900               | 100              | 6300               | 71               | 8600               | 56               | 9800               | 50               |
| MSME10                     | 1                 | LPES300F                 | J5L        | —                 | 1800                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                            |                   | LPES1500R                | J5L        | 220               |                       |                  | 2900               | 167              | 4500               | 125              | 6100               | 100              | 9400               | 71               | 12600              | 56               | 14200              | 50               |
| MSME15                     | 1.5               | LPES300F                 | J5L        | —                 | 3000                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                            |                   | LPES1500R                | J5L        | 220               |                       |                  | 5600               | 167              | 8100               | 125              | 10600              | 100              | 15000              | 71               | 15000              | 56               | 15000              | 50               |
| MSME20                     | 2                 | LPES1500R                | J5L        | 220               |                       |                  | 8300               | 167              | 11700              | 125              | 15000              | 100              |                    |                  |                    |                  |                    |                  |
| MSME30                     | 3                 | LPES1500F                | K3M        | —                 | 3300                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                            |                   | LPES1500R                | K3M        | 220               |                       |                  | 13700              | 167              | 15000              | 125              |                    |                  |                    |                  |                    |                  |                    |                  |
| MSME40                     | 4                 | LPES1500F                | K4Y        | —                 | 5100                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                            |                   | LPES1500R                | K4Y        | 220               |                       |                  | 15000              | 167              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| MSME50                     | 5                 | LPES1500F                | K4Y        | —                 | 6900                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |

### ●MINAS A5 series MDME ●MINAS A4 series MDMA

|        |      |           |     |     |       |     |       |     |       |    |       |    |       |    |       |    |       |    |
|--------|------|-----------|-----|-----|-------|-----|-------|-----|-------|----|-------|----|-------|----|-------|----|-------|----|
| MDMA08 | 0.75 | LPES300F  | K3L | —   | 2100  | 200 |       |     |       |    |       |    |       |    |       |    |       |    |
|        |      | LPES1500R | K3L | 220 |       |     | 3600  | 111 | 5500  | 83 | 7300  | 67 | 11000 | 48 | 14600 | 37 | 15000 | 33 |
| MDME10 | 1    | LPES300F  | K3M | —   | 3000  | 200 |       |     |       |    |       |    |       |    |       |    |       |    |
|        |      | LPES1500R | K3M | 220 |       |     | 5600  | 111 | 8200  | 83 | 10700 | 67 | 15000 | 48 | 15000 | 37 | 15000 | 33 |
| MDMA10 | 1    | LPES300F  | K3M | —   | 3000  | 200 |       |     |       |    |       |    |       |    |       |    |       |    |
|        |      | LPES1500R | K3M | 220 |       |     | 5700  | 111 | 8300  | 83 | 10800 | 67 | 15000 | 48 | 15000 | 37 | 15000 | 33 |
| MDME15 | 1.5  | LPES1500F | K3M | —   | 2000  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|        |      | LPES1500R | K3M | 220 |       |     | 9700  | 111 | 13600 | 83 | 15000 | 67 |       |    |       |    |       |    |
| MDME20 | 2    | LPES1500F | K3M | —   | 3300  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|        |      | LPES1500R | K3M | 220 |       |     | 13700 | 111 | 15000 | 83 |       |    |       |    |       |    |       |    |
| MDMA25 | 2.5  | LPES1500F | K4Y | —   | 4600  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|        |      | LPES1500R | K4Y | 220 |       |     | 15000 | 111 | 15000 | 83 | 15000 | 67 |       |    |       |    |       |    |
| MDME30 | 3    | LPES1500F | K4Y | —   | 6000  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|        |      | LPES1500R | K4Y | 220 |       |     | 15000 | 111 |       |    |       |    |       |    |       |    |       |    |
| MDMA35 | 3.5  | LPES1500F | M3P | —   | 7300  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
| MDME40 | 4    | LPES1500F | L1R | —   | 8700  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
| MDMA40 | 4    | LPES1500F | M3P | —   | 8600  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
| MDMA45 | 4.5  | LPES1500F | L1R | —   | 10000 | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
| MDME50 | 5    | LPES1500F | L1R | —   | 11500 | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
| MDMA50 | 5    | LPES1500F | L1R | —   | 11400 | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
| MDME75 | 7.5  | LPES1500F | L2S | —   | 15000 | 250 |       |     |       |    |       |    |       |    |       |    |       |    |

### ●MINAS A5 series MFME ●MINAS A4 series MFMA

|        |      |           |     |     |       |     |       |     |       |    |       |    |       |    |       |    |       |    |
|--------|------|-----------|-----|-----|-------|-----|-------|-----|-------|----|-------|----|-------|----|-------|----|-------|----|
| MFMA04 | 0.4  | LPES300R  | K3L | 220 |       |     | 3000  | 67  | 3000  | 50 | 3000  | 40 |       |    |       |    |       |    |
|        |      | LPES1500R | K3L | 220 |       |     |       |     | 1700  | 83 | 2600  | 67 | 4300  | 48 | 6100  | 37 | 7100  | 33 |
| MFMA08 | 0.75 | LPES300F  | L1M | —   | 2100  | 200 |       |     |       |    |       |    |       |    |       |    |       |    |
|        |      | LPES1500R | L1M | 220 |       |     | 3600  | 111 | 5500  | 83 | 7300  | 67 | 11000 | 48 | 14600 | 37 | 15000 | 33 |
| MFME15 | 1.5  | LPES1500F | L1R | —   | 2000  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|        |      | LPES1500R | L1R | 400 |       |     | 7700  | 111 | 11100 | 83 | 14300 | 67 | 15000 | 48 | 15000 | 37 | 15000 | 33 |
| MFME25 | 2.5  | LPES1500F | P2R | —   | 4700  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|        |      | LPES1500R | P2R | 400 |       |     | 15000 | 111 | 15000 | 83 | 15000 | 67 |       |    |       |    |       |    |
| MFMA25 | 2.5  | LPES1500F | P2R | —   | 4600  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|        |      | LPES1500R | P2R | 400 |       |     | 15000 | 111 | 15000 | 83 | 15000 | 67 |       |    |       |    |       |    |
| MFMA35 | 3.5  | LPES1500F | P2R | —   | 7300  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|        |      | LPES1500R | P2R | 400 |       |     | 15000 | 111 | 15000 | 83 |       |    |       |    |       |    |       |    |
| MFME45 | 4.5  | LPES1500F | P3R | —   | 10100 | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
| MFMA45 | 4.5  | LPES1500F | P3R | —   | 10100 | 333 |       |     |       |    |       |    |       |    |       |    |       |    |

\* Gray-shaded areas show numerical values with precision planetary reducer.

\* Shaded thrusts generated require thrust limits. Make sure to use at the specified thrusts or less.

\* Shaded rated speeds require speed limits. Make sure to use at the specified speeds or less.

## Servomotor matching table

### Motors manufactured by Fuji Electric

#### ●ALPHA 5 series GYS ●FALDIC-α series GYS

| Motor type               | Motor capacity kW | Power cylinder model No. | Mount code | Reducer frame No. | Reduction gear ratio  |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|--------------------------|-------------------|--------------------------|------------|-------------------|-----------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
|                          |                   |                          |            |                   | Motor direct coupling |                  | 3                  |                  | 4                  |                  | 5                  |                  | 7                  |                  | 9                  |                  | 10                 |                  |
|                          |                   |                          |            |                   | Thrust generated N    | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s |
| GYS500D5<br>GYS500DC     | 0.05              | LPES15F                  | B3B        | —                 | 40                    | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES30R                  | B3B        | 120               |                       |                  | 120                | 100              | 210                | 75               | 290                | 60               | 300                | 43               | 300                | 33               | 300                | 30               |
|                          |                   | LPES15F                  | B3D        | —                 | 150                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| GYS101D5<br>GYS101DC     | 0.1               | LPES30F                  | B3D        | —                 | 190                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES30R                  | B3D        | 120               |                       |                  | 300                | 100              | 300                | 75               | 300                | 60               |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES150R                 | B3D        | 160               |                       |                  |                    |                  |                    |                  |                    |                  | 300                | 43               | 530                | 33               | 800                | 30               |
|                          |                   | LPES30F                  | E4H        | —                 | 300                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| GYS201D5<br>GYS201DC     | 0.2               | LPES150R                 | E4H        | 160               |                       |                  | 590                | 100              | 1100               | 75               | 1500               | 60               | 1500               | 43               | 1500               | 33               | 1500               | 30               |
|                          |                   | LPES300R                 | E4H        | 160               |                       |                  |                    |                  |                    |                  | 1300               | 60               | 2100               | 43               | 2900               | 33               | 3000               | 30               |
| GYS401D5-□□6<br>GYS371DC | 0.375             | LPES150R                 | E4H        | 160               |                       |                  | 1500               | 100              | 1500               | 75               | 1500               | 60               |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES300R                 | E4H        | 160               |                       |                  | 1800               | 100              | 2900               | 75               | 3000               | 60               | 3000               | 43               | 3000               | 33               |                    |                  |
| GYS401D5-□□2<br>GYS401DC | 0.4               | LPES150R                 | E4H        | 160               |                       |                  | 1500               | 100              | 1500               | 75               |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES300R                 | E4H        | 160               |                       |                  | 2100               | 100              | 3000               | 75               | 3000               | 60               | 3000               | 43               |                    |                  |                    |                  |
| GYS751D5<br>GYS751DC     | 0.75              | LPES150F                 | G5K        | —                 | 1200                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES300R                 | G5K        | 160               |                       |                  | 3000               | 100              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES1500R                | G5K        | 220               |                       |                  | 1600               | 167              | 2700               | 125              | 3900               | 100              | 6300               | 71               | 8600               | 56               | 9700               | 50               |
| GYS102D                  | 1                 | LPES300F                 | J4Y        | —                 | 1800                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES1500R                | J4Y        | 220               |                       |                  | 2900               | 167              | 4500               | 125              | 6100               | 100              | 9400               | 71               | 12600              | 56               | 14200              | 50               |
| GYS152D                  | 1.5               | LPES300F                 | J4Y        | —                 | 3000                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES1500R                | J4Y        | 220               |                       |                  | 5600               | 167              | 8100               | 125              | 10600              | 100              | 15000              | 71               | 15000              | 56               | 15000              | 50               |
| GYS202D                  | 2                 | LPES1500F                | J4Y        | —                 | 1500                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES1500R                | J4Y        | 220               |                       |                  | 8300               | 167              | 11700              | 125              | 15000              | 100              |                    |                  |                    |                  |                    |                  |
| GYS302D                  | 3                 | LPES1500F                | K4P        | —                 | 3300                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES1500R                | K4P        | 320               |                       |                  | 12300              | 167              | 15000              | 125              |                    |                  |                    |                  |                    |                  |                    |                  |
| GYS402D                  | 4                 | LPES1500F                | K4P        | —                 | 5100                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES1500R                | K4P        | 320               |                       |                  | 15000              | 167              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| GYS502D                  | 5                 | LPES1500F                | K4P        | —                 | 6900                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |

#### ●ALPHA 5 series GYC ●FALDIC-α series GYC

|                      |      |           |     |     |      |     |      |     |       |     |       |     |       |    |       |    |       |    |
|----------------------|------|-----------|-----|-----|------|-----|------|-----|-------|-----|-------|-----|-------|----|-------|----|-------|----|
| GYC101D5<br>GYC101DC | 0.1  | LPES30F   | E5D | —   | 190  | 300 |      |     |       |     |       |     |       |    |       |    |       |    |
|                      |      | LPES30R   | E4D | 120 |      |     | 300  | 100 | 300   | 75  | 300   | 60  |       |    |       |    |       |    |
|                      |      | LPES150R  | E4D | 160 |      |     |      |     |       |     |       |     | 300   | 43 | 530   | 33 | 800   | 30 |
|                      |      | LPES30F   | G2H | —   | 300  | 300 |      |     |       |     |       |     |       |    |       |    |       |    |
| GYC201D5<br>GYC201DC | 0.2  | LPES150R  | G5H | 160 |      |     | 590  | 100 | 1100  | 75  | 1500  | 60  | 1500  | 43 | 1500  | 33 | 1500  | 30 |
|                      |      | LPES300R  | G5H | 160 |      |     |      |     |       |     | 1300  | 60  | 2100  | 43 | 2900  | 33 | 3000  | 30 |
| GYC401D5<br>GYC401DC | 0.4  | LPES150R  | G5H | 160 |      |     | 1500 | 100 | 1500  | 75  |       |     |       |    |       |    |       |    |
|                      |      | LPES300R  | G5H | 160 |      |     | 2100 | 100 | 3000  | 75  | 3000  | 60  | 3000  | 43 |       |    |       |    |
|                      |      | LPES1500R | G5H | 220 |      |     |      |     |       |     |       |     | 1900  | 71 | 2900  | 56 | 3400  | 50 |
| GYC751D5<br>GYC751DC | 0.75 | LPES300R  | J2K | 160 |      |     | 3000 | 100 |       |     |       |     |       |    |       |    |       |    |
|                      |      | LPES1500R | J2K | 220 |      |     | 1600 | 167 | 2700  | 125 | 3900  | 100 | 6300  | 71 | 8600  | 56 | 9700  | 50 |
| GYC102D5<br>GYC102DC | 1    | LPES300F  | K3Y | —   | 1800 | 300 |      |     |       |     |       |     |       |    |       |    |       |    |
|                      |      | LPES1500R | K3Y | 220 |      |     | 2900 | 167 | 4500  | 125 | 6100  | 100 | 9400  | 71 | 12600 | 56 | 14200 | 50 |
| GYC152D5<br>GYC152DC | 1.5  | LPES300F  | K3Y | —   | 3000 | 300 |      |     |       |     |       |     |       |    |       |    |       |    |
|                      |      | LPES1500R | K3Y | 220 |      |     | 5600 | 167 | 8100  | 125 | 10600 | 100 | 15000 | 71 | 15000 | 56 | 15000 | 50 |
| GYC202D5<br>GYC202DC | 2    | LPES1500F | K3Y | —   | 1500 | 333 |      |     |       |     |       |     |       |    |       |    |       |    |
|                      |      | LPES1500R | K3Y | 220 |      |     | 8300 | 167 | 11700 | 125 | 15000 | 100 |       |    |       |    |       |    |

#### ●ALPHA 5 series GYG ●FALDIC-W series GYG

|          |      |           |     |     |      |     |       |     |       |    |       |    |       |    |       |    |       |    |
|----------|------|-----------|-----|-----|------|-----|-------|-----|-------|----|-------|----|-------|----|-------|----|-------|----|
| GYG501C  | 0.5  | LPES300R  | K3L | 220 |      |     | 3000  | 67  | 3000  | 50 |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K3L | 220 |      |     | 1600  | 111 | 2800  | 83 | 4000  | 67 | 6300  | 48 | 8600  | 37 | 9900  | 33 |
| GYG501B  | 0.5  | LPES300F  | K3L | —   | 2000 | 150 |       |     |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES300R  | K3L | 220 |      |     | 3000  | 50  |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K3L | 220 |      |     | 3000  | 83  | 4600  | 63 | 6200  | 50 | 9400  | 36 | 12800 | 28 | 14400 | 25 |
| GYG751C  | 0.75 | LPES300F  | K3L | —   | 2200 | 200 |       |     |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K3L | 220 |      |     | 3600  | 111 | 5500  | 83 | 7400  | 67 | 11000 | 48 | 14600 | 37 | 15000 | 33 |
| GYG851B  | 0.85 | LPES300F  | K3L | —   | 3000 | 150 |       |     |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K3L | 220 |      |     | 6800  | 83  | 9700  | 63 | 12500 | 50 | 15000 | 36 | 15000 | 28 | 15000 | 25 |
| GYG102C  | 1    | LPES300F  | K3M | —   | 3000 | 200 |       |     |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K3M | 220 |      |     | 5600  | 111 | 8200  | 83 | 10700 | 67 | 15000 | 48 | 15000 | 37 |       |    |
| GYG132B  | 1.3  | LPES1500F | K3M | —   | 2600 | 250 |       |     |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K3M | 220 |      |     | 11700 | 83  | 15000 | 63 | 15000 | 50 |       |    |       |    |       |    |
| GYG152C  | 1.5  | LPES1500F | K3M | —   | 2000 | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K3M | 220 |      |     | 9700  | 111 | 13600 | 83 | 15000 | 67 |       |    |       |    |       |    |
| GYG202C  | 2    | LPES1500F | K3M | —   | 3300 | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K3M | 220 |      |     | 13700 | 111 | 15000 | 83 |       |    |       |    |       |    |       |    |
| GYG182BC | 1.8  | LPES1500F | L3R | —   | 4400 | 250 |       |     |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | L1R | 400 |      |     | 15000 | 83  | 15000 | 63 | 15000 | 50 |       |    |       |    |       |    |
| GYG292BC | 2.9  | LPES1500F | L3R | —   | 8400 | 250 |       |     |       |    |       |    |       |    |       |    |       |    |

\* Gray-shaded areas show numerical values with precision planetary reducer.

\* Shaded thrusts generated require thrust limits. Make sure to use at the specified thrusts or less.

\* Shaded rated speeds require speed limits. Make sure to use at the specified speeds or less.

## Motors manufactured by Omron

### ●R88M-K series

| Motor type                           | Motor capacity kW | Power cylinder model No. | Mount code | Reducer frame No. | Reduction gear ratio  |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|--------------------------------------|-------------------|--------------------------|------------|-------------------|-----------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
|                                      |                   |                          |            |                   | Motor direct coupling |                  | 3                  |                  | 4                  |                  | 5                  |                  | 7                  |                  | 9                  |                  | 10                 |                  |
|                                      |                   |                          |            |                   | Thrust generated N    | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s |
| R88M-K05030H (T)                     | 0.05              | LPES15F                  | B3D        | -                 | 40                    | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES30R                  | B3D        | 120               |                       |                  | 130                | 100              | 220                | 75               | 290                | 60               | 300                | 43               | 300                | 33               | 300                | 30               |
| R88M-K10030L (S)<br>R88M-K10030H (T) | 0.1               | LPES15F                  | B3D        | -                 | 150                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES30F                  | B3D        | -                 | 190                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES30R                  | B3D        | 120               |                       |                  | 300                | 100              | 300                | 75               | 300                | 60               |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES150R                 | B3D        | 160               |                       |                  |                    |                  |                    |                  |                    |                  | 310                | 43               | 550                | 33               | 810                | 30               |
|                                      |                   | LPES30F                  | E3G        | -                 | 300                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| R88M-K20030L (S)<br>R88M-K20030H (T) | 0.2               | LPES150R                 | E3G        | 160               |                       |                  | 600                | 100              | 1100               | 75               | 1500               | 60               | 1500               | 43               | 1500               | 33               | 1500               | 30               |
|                                      |                   | LPES300R                 | E3G        | 160               |                       |                  |                    |                  |                    |                  | 1300               | 60               | 2100               | 43               | 3000               | 33               | 3000               | 30               |
| R88M-K40030L (S)<br>R88M-K40030H (T) | 0.4               | LPES150R                 | E3H        | 160               |                       |                  | 1500               | 100              | 1500               | 75               |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES300R                 | E3H        | 160               |                       |                  | 2200               | 100              | 3000               | 75               | 3000               | 60               | 3000               | 43               |                    |                  |                    |                  |
|                                      |                   | LPES300R                 | J4L        | 220               |                       |                  | 3000               | 67               | 3000               | 50               | 3000               | 40               |                    |                  |                    |                  |                    |                  |
| R88M-K40020F (C)                     | 0.4               | LPES1500R                | J4L        | 220               |                       |                  |                    |                  | 1800               | 83               | 2600               | 67               | 4400               | 48               | 6100               | 37               | 7200               | 33               |
| R88M-K60020F (C)                     | 0.6               | LPES300F                 | J5L        | -                 | 1500                  | 200              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | J4L        | 220               |                       |                  | 2400               | 111              | 3900               | 83               | 5300               | 67               | 8100               | 48               | 11000              | 37               | 12600              | 33               |
| R88M-K75030H (T)                     | 0.75              | LPES150F                 | G4L        | -                 | 1200                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES300R                 | G4L        | 220               |                       |                  | 3000               | 100              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | G4L        | 220               |                       |                  | 1600               | 167              | 2700               | 125              | 3900               | 100              | 6300               | 71               | 8600               | 56               | 9800               | 50               |
| R88M-K75030F (C)                     | 0.75              | LPES300R                 | J4L        | 220               |                       |                  | 3000               | 100              | 3000               | 75               |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | J4L        | 220               |                       |                  | 1600               | 167              | 2700               | 125              | 3900               | 100              | 6300               | 71               | 8600               | 56               | 9700               | 50               |
| R88M-K90010H (T)<br>R88M-K90010F (C) | 0.9               | LPES1500F                | K7M        | -                 | 3000                  | 167              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | K3M        | 220               |                       |                  | 12200              | 56               | 15000              | 42               | 15000              | 33               | 15000              | 24               |                    |                  |                    |                  |
| R88M-K1K030H (T)<br>R88M-K1K030F (C) | 1                 | LPES300F                 | J5L        | -                 | 1800                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | J4L        | 220               |                       |                  | 2900               | 167              | 4500               | 125              | 6100               | 100              | 9400               | 71               | 12600              | 56               | 14200              | 50               |
| R88M-K1K020H (T)<br>R88M-K1K020F (C) | 1                 | LPES300F                 | K3M        | -                 | 3000                  | 200              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | K3M        | 220               |                       |                  | 5600               | 111              | 8200               | 83               | 10700              | 67               | 15000              | 48               | 15000              | 37               | 15000              | 33               |
| R88M-K1K530H (T)<br>R88M-K1K530F (C) | 1.5               | LPES300F                 | J5L        | -                 | 3000                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | J4L        | 220               |                       |                  | 5600               | 167              | 8100               | 125              | 10600              | 100              | 15000              | 71               | 15000              | 56               | 15000              | 50               |
| R88M-K1K520H (T)<br>R88M-K1K520F (C) | 1.5               | LPES1500F                | K3M        | -                 | 2000                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | K3M        | 220               |                       |                  | 9700               | 111              | 13600              | 83               | 15000              | 67               |                    |                  |                    |                  |                    |                  |
| R88M-K2K030H (T)<br>R88M-K2K030F (C) | 2                 | LPES1500R                | J4L        | 220               |                       |                  | 8300               | 167              | 11700              | 125              | 15000              | 100              |                    |                  |                    |                  |                    |                  |
| R88M-K2K020H (T)<br>R88M-K2K020F (C) | 2                 | LPES1500F                | K3M        | -                 | 3300                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | K3M        | 220               |                       |                  | 13700              | 111              | 15000              | 83               |                    |                  |                    |                  |                    |                  |                    |                  |
| R88M-K2K010H (T)<br>R88M-K2K010F (C) | 2                 | LPES1500F                | L3R        | -                 | 8900                  | 167              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | L1R        | 400               |                       |                  | 15000              | 56               |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| R88M-K3K030H (T)<br>R88M-K3K030F (C) | 3                 | LPES1500F                | K3M        | -                 | 3300                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | K3M        | 220               |                       |                  | 13700              | 167              | 15000              | 125              |                    |                  |                    |                  |                    |                  |                    |                  |
| R88M-K3K020H (T)<br>R88M-K3K020F (C) | 3                 | LPES1500F                | K4Y        | -                 | 6000                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | K4Y        | 220               |                       |                  | 15000              | 111              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| R88M-K3K010H (T)<br>R88M-K3K010F (C) | 3                 | LPES1500F                | L3R        | -                 | 14400                 | 167              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| R88M-K4K030H (T)<br>R88M-K4K030F (C) | 4                 | LPES1500F                | K4Y        | -                 | 5100                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                      |                   | LPES1500R                | K4Y        | 220               |                       |                  | 15000              | 167              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| R88M-K4K020H (T)<br>R88M-K4K020F (C) | 4                 | LPES1500F                | L1R        | -                 | 8700                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| R88M-K5K030H (T)<br>R88M-K5K030F (C) | 5                 | LPES1500F                | K4Y        | -                 | 6900                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| R88M-K5K020H (T)<br>R88M-K5K020F (C) | 5                 | LPES1500F                | L1R        | -                 | 11500                 | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |

### ●R7M-A/Z series

|                             |      |           |     |     |      |     |      |     |      |     |      |     |      |    |      |    |      |    |
|-----------------------------|------|-----------|-----|-----|------|-----|------|-----|------|-----|------|-----|------|----|------|----|------|----|
| R7M-A03030                  | 0.03 | LPES30R   | B3B | 120 |      |     |      |     |      |     |      |     |      |    | 30   | 33 | 60   | 30 |
| R7M-A05030                  | 0.05 | LPES15F   | B3B | -   | 40   | 300 |      |     |      |     |      |     |      |    |      |    |      |    |
|                             |      | LPES30R   | B3B | 120 |      |     | 120  | 100 | 210  | 75  | 290  | 60  | 300  | 43 | 300  | 33 | 300  | 30 |
| R7M-A10030<br>R7M-Z10030-S1 | 0.1  | LPES15F   | B3D | -   | 150  | 300 |      |     |      |     |      |     |      |    |      |    |      |    |
|                             |      | LPES30F   | B3D | -   | 190  | 300 |      |     |      |     |      |     |      |    |      |    |      |    |
|                             |      | LPES30R   | B3D | 120 |      |     | 300  | 100 | 300  | 75  | 300  | 60  |      |    |      |    |      |    |
|                             |      | LPES150R  | B3D | 160 |      |     |      |     |      |     |      |     | 300  | 43 | 530  | 33 | 800  | 30 |
|                             |      | LPES30F   | E4H | -   | 300  | 300 |      |     |      |     |      |     |      |    |      |    |      |    |
| R7M-A20030<br>R7M-Z20030-S1 | 0.2  | LPES150R  | E4H | 160 |      |     | 590  | 100 | 1100 | 75  | 1500 | 60  | 1500 | 43 | 1500 | 33 | 1500 | 30 |
|                             |      | LPES300R  | E4H | 160 |      |     |      |     |      |     | 1300 | 60  | 2100 | 43 | 2900 | 33 | 3000 | 30 |
| R7M-A40030<br>R7M-Z40030-S1 | 0.4  | LPES150R  | E4H | 160 |      |     | 1500 | 100 | 1500 | 75  |      |     |      |    |      |    |      |    |
|                             |      | LPES300R  | E4H | 160 |      |     | 2100 | 100 | 3000 | 75  | 3000 | 60  | 3000 | 43 |      |    |      |    |
|                             |      | LPES150F  | G5K | -   | 1200 | 300 |      |     |      |     |      |     |      |    |      |    |      |    |
| R7M-A75030<br>R7M-Z75030-S1 | 0.75 | LPES300R  | G5K | 160 |      |     | 3000 | 100 |      |     |      |     |      |    |      |    |      |    |
|                             |      | LPES1500R | G5K | 220 |      |     | 1600 | 167 | 2700 | 125 | 3900 | 100 | 6300 | 71 | 8600 | 56 | 9700 | 50 |

\* Gray-shaded areas show numerical values with precision planetary reducer.

\* Shaded thrusts generated require thrust limits. Make sure to use at the specified thrusts or less.

\* Shaded rated speeds require speed limits. Make sure to use at the specified speeds or less.

## Servomotor matching table

### Motors manufactured by Sanyo Denki

#### ●R2 series

| Motor type               | Motor capacity kW | Power cylinder model No. | Mount code | Reducer frame No. | Reduction gear ratio  |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|--------------------------|-------------------|--------------------------|------------|-------------------|-----------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
|                          |                   |                          |            |                   | Motor direct coupling |                  | 3                  |                  | 4                  |                  | 5                  |                  | 7                  |                  | 9                  |                  | 10                 |                  |
|                          |                   |                          |            |                   | Thrust generated N    | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s |
| R2AA04003F<br>R2EA04003F | 0.03              | LPES30R                  | B4B        | 120               |                       |                  |                    |                  |                    |                  |                    |                  | 30                 | 43               | 50                 | 33               | 90                 | 30               |
| R2AA04005F<br>R2EA04005F | 0.05              | LPES15F                  | B3D        | —                 | 40                    | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES30R                  | B4D        | 120               |                       |                  | 120                | 100              | 210                | 75               | 290                | 60               | 300                | 43               | 300                | 33               | 300                | 30               |
| R2EA04008F               | 0.08              | LPES15F                  | B3D        | —                 | 130                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES30R                  | B4D        | 120               |                       |                  | 300                | 100              | 300                | 75               | 300                | 60               |                    |                  |                    |                  |                    |                  |
| R2AA04010F               | 0.1               | LPES15F                  | B3D        | —                 | 150                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES30F                  | B3D        | —                 | 190                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES30R                  | B4D        | 120               |                       |                  | 300                | 100              | 300                | 75               | 300                | 60               |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES150R                 | B3D        | 160               |                       |                  |                    |                  |                    |                  |                    |                  | 300                | 43               | 530                | 33               | 800                | 30               |
| R2AA06010F               | 0.1               | LPES30F                  | E5D        | —                 | 190                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES30R                  | E4D        | 120               |                       |                  | 300                | 100              | 300                | 75               | 300                | 60               |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES150R                 | E4D        | 160               |                       |                  |                    |                  |                    |                  |                    |                  | 300                | 43               | 530                | 33               | 800                | 30               |
| R2AA06020F<br>R2EA06020F | 0.2               | LPES30F                  | E4H        | —                 | 300                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES150R                 | E4H        | 160               |                       |                  | 590                | 100              | 1100               | 75               | 1500               | 60               | 1500               | 43               | 1500               | 33               | 1500               | 30               |
|                          |                   | LPES300R                 | E4H        | 160               |                       |                  |                    |                  |                    |                  | 1300               | 60               | 2100               | 43               | 2900               | 33               | 3000               | 30               |
| R2AA08020F               | 0.2               | LPES30F                  | G2H        | —                 | 300                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES150R                 | G5H        | 160               |                       |                  | 590                | 100              | 1100               | 75               | 1500               | 60               | 1500               | 43               | 1500               | 33               | 1500               | 30               |
|                          |                   | LPES300R                 | G5H        | 160               |                       |                  |                    |                  |                    |                  | 1300               | 60               | 2100               | 43               | 2900               | 33               | 3000               | 30               |
| R2AA06040F               | 0.4               | LPES150R                 | E4H        | 160               |                       |                  | 1500               | 100              | 1500               | 75               |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES300R                 | E4H        | 160               |                       |                  | 2100               | 100              | 3000               | 75               | 3000               | 60               | 3000               | 43               |                    |                  |                    |                  |
| R2AA08040F               | 0.4               | LPES150R                 | G5H        | 160               |                       |                  | 1500               | 100              | 1500               | 75               |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES300R                 | G5H        | 160               |                       |                  | 2100               | 100              | 3000               | 75               | 3000               | 60               | 3000               | 43               |                    |                  |                    |                  |
|                          |                   | LPES1500R                | G5H        | 220               |                       |                  |                    |                  |                    |                  |                    |                  | 1900               | 71               | 2900               | 56               | 3400               | 50               |
| R2AA08075F               | 0.75              | LPES150F                 | G5K        | —                 | 1200                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES300R                 | G5K        | 160               |                       |                  | 3000               | 100              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                          |                   | LPES1500R                | G5K        | 220               |                       |                  | 1600               | 167              | 2700               | 125              | 3900               | 100              | 6300               | 71               | 8600               | 56               | 9700               | 50               |

#### ●Q1 series

|            |     |           |     |     |       |     |       |     |       |     |       |     |       |    |       |    |       |    |
|------------|-----|-----------|-----|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|----|-------|----|-------|----|
| Q1AA10100D | 1   | LPES300F  | J4M | —   | 1800  | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|            |     | LPES300R  | J4M | 220 |       |     | 3000  | 100 |       |     |       |     |       |    |       |    |       |    |
|            |     | LPES1500R | J4M | 220 |       |     | 2900  | 167 | 4500  | 125 | 6100  | 100 | 9500  | 71 | 12700 | 56 | 14300 | 50 |
| Q1AA12100D | 1   | LPES300F  | K6M | —   | 1800  | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|            |     | LPES300R  | K6M | 220 |       |     | 3000  | 100 |       |     |       |     |       |    |       |    |       |    |
|            |     | LPES1500R | K6M | 220 |       |     | 2900  | 167 | 4500  | 125 | 6100  | 100 | 9500  | 71 | 12700 | 56 | 14300 | 50 |
| Q1AA10150D | 1.5 | LPES300F  | J4M | —   | 3000  | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|            |     | LPES1500R | J4M | 220 |       |     | 5700  | 167 | 8200  | 125 | 10700 | 100 | 15000 | 71 | 15000 | 56 | 15000 | 50 |
| Q1AA10200D | 2   | LPES1500F | J4M | —   | 1500  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|            |     | LPES1500R | J4M | 220 |       |     | 8300  | 167 | 11700 | 125 | 15000 | 100 |       |    |       |    |       |    |
| Q1AA12200D | 2   | LPES300F  | K6M | —   | 3000  | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|            |     | LPES1500F | K6M | —   | 1500  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|            |     | LPES1500R | K6M | 220 |       |     | 8300  | 167 | 11700 | 125 | 15000 | 100 | 15000 | 71 | 15000 | 56 | 15000 | 50 |
| Q1AA10250D | 2.5 | LPES1500F | J4M | —   | 2400  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|            |     | LPES1500R | J4M | 220 |       |     | 11000 | 167 | 15000 | 125 |       |     |       |    |       |    |       |    |
| Q1AA12300D | 3   | LPES1500F | K6P | —   | 3400  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|            |     | LPES1500R | K6P | 320 |       |     | 12400 | 167 | 15000 | 125 |       |     |       |    |       |    |       |    |
| Q1AA13300D | 3   | LPES1500F | K3P | —   | 3300  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|            |     | LPES1500R | K3P | 320 |       |     | 12200 | 167 | 15000 | 125 | 15000 | 100 | 15000 | 71 |       |    |       |    |
| Q1AA13400D | 4   | LPES1500F | K3P | —   | 5100  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|            |     | LPES1500R | K3P | 320 |       |     | 15000 | 167 |       |     |       |     |       |    |       |    |       |    |
| Q1AA18450M | 4.5 | LPES1500F | L1R | —   | 14100 | 250 |       |     |       |     |       |     |       |    |       |    |       |    |
| Q1AA13500D | 5   | LPES1500F | K3P | —   | 6800  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |

#### ●Q2 series

|                          |     |          |     |     |       |     |       |     |       |     |       |     |       |    |       |    |       |    |
|--------------------------|-----|----------|-----|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|----|-------|----|-------|----|
| Q2CA08050H               | 0.5 | LPES300  | H1K | 160 |       |     | 3000  | 67  |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | H1K | 220 |       |     | 1600  | 111 | 2900  | 83  | 4000  | 67  | 6300  | 48 | 8600  | 37 | 10000 | 33 |
| Q2AA08100D               | 1   | LPES300  | H1K | —   | 1800  | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | H1K | 220 |       |     | 2900  | 167 | 4500  | 125 | 6100  | 100 | 9400  | 71 | 12600 | 56 | 14200 | 50 |
| Q2AA10100H<br>Q2CA10100H | 1   | LPES300  | J4M | —   | 3000  | 200 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | J4M | 220 |       |     | 6000  | 111 | 8700  | 83  | 11400 | 67  | 15000 | 48 | 15000 | 37 | 15000 | 33 |
| Q2AA13100H               | 1   | LPES300  | K3M | —   | 3000  | 200 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | K3M | 220 |       |     | 6000  | 111 | 8700  | 83  | 11400 | 67  | 15000 | 48 | 15000 | 37 | 15000 | 33 |
| Q2AA10150H               | 1.5 | LPES1500 | J4M | —   | 2000  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | J4M | 220 |       |     | 9700  | 111 | 13700 | 83  | 15000 | 67  |       |    |       |    |       |    |
| Q2AA13150H<br>Q2CA13150H | 1.5 | LPES1500 | K3M | —   | 2200  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | K3M | 220 |       |     | 10200 | 111 | 14400 | 83  | 15000 | 67  |       |    |       |    |       |    |
| Q2AA13200H<br>Q2CA13200H | 2   | LPES1500 | K3P | —   | 3300  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | K3P | 320 |       |     | 12300 | 111 | 15000 | 83  |       |     |       |    |       |    |       |    |
| Q2AA18200H               | 2   | LPES1500 | L1R | —   | 3300  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | L1R | 400 |       |     | 11700 | 111 | 15000 | 83  | 15000 | 67  | 15000 | 48 | 15000 | 37 |       |    |
| Q2AA22250H               | 2.5 | LPES1500 | P2R | —   | 4700  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | P2R | 400 |       |     | 15000 | 111 | 15000 | 83  | 15000 | 67  |       |    |       |    |       |    |
| Q2AA18350H<br>Q2CA18350H | 3.5 | LPES1500 | L1R | —   | 7400  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | L1R | 400 |       |     | 15000 | 111 |       |     |       |     |       |    |       |    |       |    |
| Q2AA22350H               | 3.5 | LPES1500 | P2R | —   | 7600  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | P2R | —   |       |     |       |     |       |     |       |     |       |    |       |    |       |    |
| Q2AA18450H<br>Q2CA18450H | 4.5 | LPES1500 | L1R | —   | 10100 | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | P2R | —   | 10100 | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
| Q2AA22450R               | 4.5 | LPES1500 | P2R | —   | 10100 | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | P2R | —   |       |     |       |     |       |     |       |     |       |    |       |    |       |    |
| Q2AA18550R<br>Q2AA18550H | 5.5 | LPES1500 | L3S | —   | 15000 | 250 |       |     |       |     |       |     |       |    |       |    |       |    |
|                          |     | LPES1500 | L3S | —   |       |     |       |     |       |     |       |     |       |    |       |    |       |    |

\* Gray-shaded areas show numerical values with precision planetary reducer.

\* Shaded thrusts generated require thrust limits. Make sure to use at the specified thrusts or less.

\* Shaded rated speeds require speed limits. Make sure to use at the specified speeds or less.

## Motors manufactured by FANUC

### ● α is series (straight shaft)

| Motor type                        | Motor capacity kW | Power cylinder model No. | Mount code | Reducer frame No. | Reduction gear ratio  |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|-----------------------------------|-------------------|--------------------------|------------|-------------------|-----------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
|                                   |                   |                          |            |                   | Motor direct coupling |                  | 3                  |                  | 4                  |                  | 5                  |                  | 7                  |                  | 9                  |                  | 10                 |                  |
|                                   |                   |                          |            |                   | Thrust generated N    | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s |
| αiS 2/5000 (HV) (straight shaft)  | 0.75              | LPES300R                 | H1F        | 160               |                       |                  | 3000               | 100              | 3000               | 75               | 2800               | 100              | 4700               | 71               | 6600               | 56               | 7500               | 50               |
| αiS 2/6000 (HV) (straight shaft)  | 1                 | LPES300R                 | H1F        | 160               |                       |                  | 3000               | 100              | 3000               | 75               | 2800               | 100              | 4700               | 71               | 6600               | 56               | 7500               | 50               |
|                                   |                   | LPES1500R                | H4F        | 220               |                       |                  |                    |                  | 1800               | 125              | 2800               | 100              | 4700               | 71               | 6600               | 56               | 7500               | 50               |
| αiS 4/5000 (HV) (straight shaft)  | 1                 | LPES300F                 | Z9Z        | —                 | 2600                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                   |                   | LPES1500R                | H1H        | 220               |                       |                  | 4300               | 167              | 6400               | 125              | 8400               | 100              | 12700              | 71               | 15000              | 56               | 15000              | 50               |
| αiS 8/6000 (HV) (straight shaft)  | 2.2               | LPES1500R                | K3L        | 220               |                       |                  | 11100              | 167              | 15000              | 125              | 15000              | 100              | 15000              | 71               |                    |                  |                    |                  |
| αiS 8/4000 HV (straight shaft)    | 2.3               | LPES1500R                | K3L        | 220               |                       |                  | 11100              | 167              | 15000              | 125              | 15000              | 100              | 15000              | 71               |                    |                  |                    |                  |
| αiS 8/4000 (straight shaft)       | 2.5               | LPES1500R                | K3L        | 220               |                       |                  | 11100              | 167              | 15000              | 125              | 15000              | 100              | 15000              | 71               |                    |                  |                    |                  |
| αiS 12/4000 HV (straight shaft)   | 2.5               | LPES1500F                | Z9Z        | —                 | 4700                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                   |                   | LPES1500R                | K3Y        | 220               |                       |                  | 15000              | 167              | 15000              | 125              | 15000              | 100              |                    |                  |                    |                  |                    |                  |
| αiS 12/4000 (straight shaft)      | 2.7               | LPES1500F                | Z9Z        | —                 | 4700                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                                   |                   | LPES1500R                | K3Y        | 220               |                       |                  | 15000              | 167              | 15000              | 125              | 15000              | 100              |                    |                  |                    |                  |                    |                  |
| αiS 22/4000 (straight shaft)      | 4.5               | LPES1500F                | Z9Z        | —                 | 10400                 | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| αiS 22/4000 HV (straight shaft)   |                   | LPES1500F                | Z9Z        | —                 | 10400                 | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| αiS 50/3000 (HV) (straight shaft) | 5                 | LPES1500F                | Z9Z        | —                 | 15000                 | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| αiS 30/4000 (HV) (straight shaft) | 5.5               | LPES1500F                | Z9Z        | —                 | 14900                 | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| αiS 40/4000 (HV) (straight shaft) | 5.5               | LPES1500F                | Z9Z        | —                 | 15000                 | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |

### ● α iF series (straight shaft)

|                                   |      |           |     |     |       |     |       |     |       |     |       |     |       |    |       |    |       |    |
|-----------------------------------|------|-----------|-----|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|----|-------|----|-------|----|
| αiF 1/5000 (straight shaft)       | 0.5  | LPES150R  | H1F | 160 |       |     | 1500  | 100 | 1500  | 75  | 1500  | 60  |       |    |       |    |       |    |
|                                   |      | LPES300R  | H1F | 160 |       |     | 1600  | 100 | 2500  | 75  | 3000  | 60  | 3000  | 43 | 3000  | 33 | 3000  | 30 |
|                                   |      | LPES1500R | H4F | 220 |       |     |       |     |       |     |       |     |       |    | 1500  | 56 | 1900  | 50 |
| αiF 2/5000 (straight shaft)       | 0.75 | LPES300R  | H1F | 160 |       |     | 3000  | 100 | 3000  | 75  |       |     |       |    |       |    |       |    |
|                                   |      | LPES1500R | H4F | 220 |       |     |       |     | 1800  | 125 | 2800  | 100 | 4700  | 71 | 6600  | 56 | 7500  | 50 |
| αiF 4/4000 (straight shaft)       | 1.4  | LPES300F  | Z9Z | —   | 2700  | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
| αiF 4/4000 HV (straight shaft)    |      | LPES1500R | K3L | 220 |       |     | 4300  | 167 | 6400  | 125 | 8400  | 100 | 12700 | 71 | 15000 | 56 | 15000 | 50 |
| αiF 8/3000 (HV) (straight shaft)  | 1.6  | LPES1500R | K3L | 220 |       |     | 11100 | 167 | 15000 | 125 | 15000 | 100 | 15000 | 71 |       |    |       |    |
| αiF 12/3000 (HV) (straight shaft) | 3    | LPES1500F | Z9Z | —   | 4700  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|                                   |      | LPES1500R | L1R | 400 |       |     | 15000 | 167 |       |     |       |     |       |    |       |    |       |    |
| αiF 22/3000 (HV) (straight shaft) | 4    | LPES1500F | Z9Z | —   | 10400 | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
| αiF 40/3000 (straight shaft)      | 6    | LPES1500F | Z9Z | —   | 15000 | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
| αiF 30/3000 (straight shaft)      | 7    | LPES1500F | Z9Z | —   | 14900 | 333 |       |     |       |     |       |     |       |    |       |    |       |    |

### ● β is series (straight shaft)

|                                      |      |           |     |     |      |     |       |     |       |     |       |     |       |      |       |      |       |    |
|--------------------------------------|------|-----------|-----|-----|------|-----|-------|-----|-------|-----|-------|-----|-------|------|-------|------|-------|----|
| βiS 0.2/5000<br>(straight shaft)     | 0.05 | LPES15F   | Z9Z | –   | 40   | 300 |       |     |       |     |       |     |       |      |       |      |       |    |
|                                      |      | LPES30R   | B4D | 120 |      |     | 130   | 100 | 220   | 75  | 290   | 60  | 300   | 43   | 300   | 33   | 300   | 30 |
| βiS 0.3/5000<br>(straight shaft)     | 0.1  | LPES15F   | Z9Z | –   | 150  | 300 |       |     |       |     |       |     |       |      |       |      |       |    |
|                                      |      | LPES30F   | Z9Z | –   | 190  | 300 |       |     |       |     |       |     |       |      |       |      |       |    |
|                                      |      | LPES30R   | B4D | 120 |      |     | 300   | 100 | 300   | 75  | 300   | 60  |       |      |       |      |       |    |
|                                      |      | LPES150R  | B3D | 160 |      |     |       |     |       |     |       |     | 310   | 43   | 550   | 33   | 810   | 30 |
| βiS 0.4/5000<br>(straight shaft)     | 0.13 | LPES30F   | Z9Z | –   | 270  | 300 |       |     |       |     |       |     |       |      |       |      |       |    |
|                                      |      | LPES150R  | E4E | 160 |      |     |       |     |       | 450 | 60    | 840 | 43    | 1200 | 33    | 1500 | 30    |    |
|                                      |      | LPES300R  | E4E | 160 |      |     |       |     |       |     |       |     |       |      |       | 1500 | 30    |    |
| βiS 0.5/6000<br>(straight shaft)     | 0.35 | LPES30F   | Z9Z | –   | 300  | 300 |       |     |       |     |       |     |       |      |       |      |       |    |
|                                      |      | LPES150R  | E4E | 160 |      |     | 630   | 100 | 1200  | 75  | 1500  | 60  | 1500  | 43   | 1500  | 33   | 1500  | 30 |
|                                      |      | LPES300R  | E4E | 160 |      |     |       |     |       |     | 1300  | 60  | 2200  | 43   | 3000  | 33   | 3000  | 30 |
| βiS 1/5000<br>(straight shaft)       | 0.4  | LPES150R  | E4H | 160 |      |     | 1500  | 100 | 1500  | 75  | 1500  | 60  |       |      |       |      |       |    |
|                                      |      | LPES300R  | E4H | 160 |      |     | 1900  | 100 | 3000  | 75  | 3000  | 60  | 3000  | 43   | 3000  | 33   |       |    |
| βiS 1/6000<br>(straight shaft)       | 0.5  | LPES150R  | E4H | 160 |      |     | 1500  | 100 | 1500  | 75  |       |     |       |      |       |      |       |    |
|                                      |      | LPES300R  | E4H | 160 |      |     | 2100  | 100 | 3000  | 75  | 3000  | 60  | 3000  | 43   |       |      |       |    |
| βiS 2/4000 (HV)<br>(straight shaft)  | 0.5  | LPES300R  | H1F | 160 |      |     | 3000  | 100 | 3000  | 75  |       |     |       |      |       |      |       |    |
|                                      |      | LPES1500R | H4F | 220 |      |     |       |     | 1800  | 125 | 2800  | 100 | 4700  | 71   | 6600  | 56   | 7500  | 50 |
| βiS 4/4000 (HV)<br>(straight shaft)  | 0.75 | LPES300F  | Z9Z | –   | 2100 | 300 |       |     |       |     |       |     |       |      |       |      |       |    |
|                                      |      | LPES1500R | H1H | 220 |      |     | 3500  | 167 | 5200  | 125 | 7000  | 100 | 10700 | 71   | 14200 | 56   | 15000 | 50 |
| βiS 8/3000 (HV)<br>(straight shaft)  | 1.2  | LPES300F  | Z9Z | –   | 3000 | 200 |       |     |       |     |       |     |       |      |       |      |       |    |
|                                      |      | LPES1500R | K3L | 220 |      |     | 9400  | 111 | 13300 | 83  | 15000 | 67  | 15000 | 48   | 15000 | 37   |       |    |
| βiS 12/2000<br>(straight shaft)      | 1.4  | LPES1500F | Z9Z | –   | 3900 | 333 |       |     |       |     |       |     |       |      |       |      |       |    |
|                                      |      | LPES1500R | K3Y | 220 |      |     | 15000 | 111 | 15000 | 83  | 15000 | 67  |       |      |       |      |       |    |
| βiS 22/1500<br>(straight shaft)      | 1.4  | LPES1500F | Z9Z | –   | 9200 | 200 |       |     |       |     |       |     |       |      |       |      |       |    |
|                                      |      | LPES1500R | L1R | 400 |      |     | 15000 | 67  |       |     |       |     |       |      |       |      |       |    |
| βiS 12/3000 (HV)<br>(straight shaft) | 1.8  | LPES1500F | Z9Z | –   | 4200 | 333 |       |     |       |     |       |     |       |      |       |      |       |    |
|                                      |      | LPES1500R | K3Y | 220 |      |     | 15000 | 111 | 15000 | 83  |       |     |       |      |       |      |       |    |
| βiS 22/2000 (HV)<br>(straight shaft) | 2.5  | LPES1500F | Z9Z | –   | 9200 | 333 |       |     |       |     |       |     |       |      |       |      |       |    |

\* Gray-shaded areas show numerical values with precision planetary reducer.

\* Shaded thrusts generated require thrust limits. Make sure to use at the specified thrusts or less.

\* Shaded rated speeds require speed limits. Make sure to use at the specified speeds or less.

## Servomotor matching table

### Motors manufactured by Keyence

#### ● MV series

| Motor type   | Motor capacity kW | Power cylinder model No. | Mount code | Reducer frame No. | Reduction gear ratio  |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|--------------|-------------------|--------------------------|------------|-------------------|-----------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
|              |                   |                          |            |                   | Motor direct coupling |                  | 3                  |                  | 4                  |                  | 5                  |                  | 7                  |                  | 9                  |                  | 10                 |                  |
|              |                   |                          |            |                   | Thrust generated N    | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s |
| MV-M05 (B05) | 0.05              | LPES15F                  | B3D        | –                 | 40                    | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|              |                   | LPES30R                  | B3D        | 120               |                       |                  | 120                | 100              | 210                | 75               | 290                | 60               | 300                | 43               | 300                | 33               | 300                | 30               |
| MV-M10 (B10) | 0.1               | LPES15F                  | B3D        | –                 | 150                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|              |                   | LPES30F                  | B3D        | –                 | 190                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|              |                   | LPES30R                  | B3D        | 120               |                       |                  | 300                | 100              | 300                | 75               | 300                | 60               |                    |                  |                    |                  |                    |                  |
|              |                   | LPES150R                 | B3D        | 160               |                       |                  |                    |                  |                    |                  |                    |                  | 300                | 43               | 530                | 33               | 800                | 30               |
| MV-M20 (B20) | 0.2               | LPES30F                  | E4H        | –                 | 300                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|              |                   | LPES150R                 | E4H        | 160               |                       |                  | 590                | 100              | 1100               | 75               | 1500               | 60               | 1500               | 43               | 1500               | 33               | 1500               | 30               |
|              |                   | LPES300R                 | E4H        | 160               |                       |                  |                    |                  |                    |                  | 1300               | 60               | 2100               | 43               | 2900               | 33               | 3000               | 30               |
| MV-M40 (B40) | 0.4               | LPES150R                 | E4H        | 160               |                       |                  | 1500               | 100              | 1500               | 75               |                    |                  |                    |                  |                    |                  |                    |                  |
|              |                   | LPES300R                 | E4H        | 160               |                       |                  | 2100               | 100              | 3000               | 75               | 3000               | 60               | 3000               | 43               |                    |                  |                    |                  |
| MV-M75 (B75) | 0.75              | LPES150F                 | G4K        | –                 | 1200                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|              |                   | LPES300R                 | G4K        | 160               |                       |                  | 3000               | 100              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|              |                   | LPES1500R                | G4K        | 220               |                       |                  | 1600               | 167              | 2700               | 125              | 3800               | 100              | 6200               | 71               | 8500               | 56               | 9700               | 50               |

#### ● SV series

|                  |      |           |     |     |       |     |       |     |       |     |       |     |       |    |       |    |       |    |
|------------------|------|-----------|-----|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|----|-------|----|-------|----|
| SV-M005 (B005)   | 0.05 | LPES15F   | B3D | –   | 40    | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|                  |      | LPES30R   | B3D | 120 |       |     | 120   | 100 | 210   | 75  | 290   | 60  | 300   | 43 | 300   | 33 | 300   | 30 |
| SV-M010 (B010)   | 0.1  | LPES15F   | B3D | –   | 150   | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|                  |      | LPES30F   | B3D | –   | 190   | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|                  |      | LPES30R   | B3D | 120 |       |     | 300   | 100 | 300   | 75  | 300   | 60  |       |    |       |    |       |    |
|                  |      | LPES150R  | B3D | 160 |       |     |       |     |       |     |       |     | 300   | 43 | 530   | 33 | 800   | 30 |
| SV-M020 (B020)   | 0.2  | LPES30F   | E4H | –   | 300   | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|                  |      | LPES150R  | E4H | 160 |       |     | 590   | 100 | 1100  | 75  | 1500  | 60  | 1500  | 43 | 1500  | 33 | 1500  | 30 |
|                  |      | LPES300R  | E4H | 160 |       |     |       |     |       |     | 1300  | 60  | 2100  | 43 | 2900  | 33 | 3000  | 30 |
| SV-M040 (B040)   | 0.4  | LPES150R  | E4H | 160 |       |     | 1500  | 100 | 1500  | 75  |       |     |       |    |       |    |       |    |
|                  |      | LPES300R  | E4H | 160 |       |     | 2100  | 100 | 3000  | 75  | 3000  | 60  | 3000  | 43 |       |    |       |    |
| SV-M075 (B075)   | 0.75 | LPES150F  | G5L | –   | 1200  | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|                  |      | LPES300R  | G5L | 220 |       |     | 3000  | 100 |       |     |       |     |       |    |       |    |       |    |
|                  |      | LPES1500R | G5L | 220 |       |     | 1600  | 167 | 2700  | 125 | 3900  | 100 | 6300  | 71 | 8600  | 56 | 9700  | 50 |
| SV-M100A (B100A) | 0.85 | LPES300F  | K3L | –   | 3000  | 150 |       |     |       |     |       |     |       |    |       |    |       |    |
|                  |      | LPES1500R | K3L | 220 |       |     | 6800  | 83  | 9600  | 63  | 12500 | 50  | 15000 | 36 | 15000 | 28 | 15000 | 25 |
| SV-M150A (B150A) | 1.3  | LPES1500F | K3M | –   | 2700  | 250 |       |     |       |     |       |     |       |    |       |    |       |    |
|                  |      | LPES1500R | K3M | 220 |       |     | 11800 | 83  | 15000 | 63  | 15000 | 50  |       |    |       |    |       |    |
| SV-M200A (B200A) | 1.8  | LPES1500F | K3Y | –   | 4400  | 250 |       |     |       |     |       |     |       |    |       |    |       |    |
|                  |      | LPES1500R | K3Y | 220 |       |     | 15000 | 83  |       |     |       |     |       |    |       |    |       |    |
| SV-M300A (B300A) | 2.9  | LPES1500F | L3R | –   | 8500  | 250 |       |     |       |     |       |     |       |    |       |    |       |    |
| SV-M500A (B500A) | 4.4  | LPES1500F | L3R | –   | 14000 | 250 |       |     |       |     |       |     |       |    |       |    |       |    |

\* Gray-shaded areas show numerical values with precision planetary reducer.

\* Shaded thrusts generated require thrust limits. Make sure to use at the specified thrusts or less.

\* Shaded rated speeds require speed limits. Make sure to use at the specified speeds or less.

## Motors manufactured by Nikki Denso

### ●NA100 series

| Motor type       | Motor capacity kW | Power cylinder model No. | Mount code | Reducer frame No. | Reduction gear ratio  |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|------------------|-------------------|--------------------------|------------|-------------------|-----------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
|                  |                   |                          |            |                   | Motor direct coupling |                  | 3                  |                  | 4                  |                  | 5                  |                  | 7                  |                  | 9                  |                  | 10                 |                  |
|                  |                   |                          |            |                   | Thrust generated N    | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s |
| NA100-110F(B)-10 | 1.2               | LPES1500F                | K4Z        | —                 | 4600                  | 167              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                  |                   | LPES1500R                | Z9P        | 320               |                       |                  | 15000              | 56               | 15000              | 42               | 15000              | 33               |                    |                  |                    |                  |                    |                  |
| NA100-180F(B)-10 | 1.9               | LPES1500F                | L1Z        | —                 | 8400                  | 167              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                  |                   | LPES1500R                | K4Z        | —                 | 3900                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| NA100-110F(B)    | 2.2               | LPES1500R                | Z9P        | 320               |                       |                  | 13900              | 111              | 15000              | 83               | 15000              | 67               | 15000              | 48               |                    |                  |                    |                  |
| NA100-270F(B)-10 | 2.8               | LPES1500F                | Z9Z        | —                 | 13300                 | 167              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| NA100-370F(B)-10 | 3.7               | LPES1500F                | Z9Z        | —                 | 15000                 | 167              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                  |                   | LPES1500R                | L1Z        | —                 | 8000                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| NA100-180F(B)    | 3.7               | LPES1500R                | Z9P        | 320               |                       |                  | 15000              | 111              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| NA100-110F-40    | 3.7               | LPES1500F                | K4Z        | —                 | 2900                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                  |                   | LPES1500R                | Z9P        | 320               |                       |                  | 11000              | 167              | 15000              | 125              | 15000              | 100              | 15000              | 71               | 15000              | 56               |                    |                  |
| NA100-270F(B)    | 5.5               | LPES1500F                | Z9Z        | —                 | 12800                 | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                  |                   | LPES1500R                | L1Z        | —                 | 5400                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| NA100-180F-40    | 5.5               | LPES1500R                | Z9P        | 320               |                       |                  | 15000              | 167              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| NA100-370F(B)    | 7.5               | LPES1500F                | Z9Z        | —                 | 15000                 | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| NA100-370AF(B)   |                   |                          |            |                   |                       |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| NA100-270F-40    | 7.5               | LPES1500F                | Z9Z        | —                 | 8100                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| NA100-370F-40    | 11                | LPES1500F                | Z9Z        | —                 | 12800                 | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |

### ●NA80 series

|           |      |           |     |     |       |     |       |     |       |     |       |     |       |    |       |    |       |    |
|-----------|------|-----------|-----|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|----|-------|----|-------|----|
| NA80-05   | 0.05 | LPES15F   | B3D | —   | 40    | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|           |      | LPES30R   | Z9D | 120 |       |     | 120   | 100 | 210   | 75  | 290   | 60  | 300   | 43 | 300   | 33 | 300   | 30 |
| NA80-10   | 0.1  | LPES15F   | B3D | —   | 150   | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|           |      | LPES30F   | B3D | —   | 190   | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|           |      | LPES30R   | Z9D | 120 |       |     | 300   | 100 | 300   | 75  | 300   | 60  |       |    |       |    |       |    |
| NA80-20   | 0.2  | LPES150R  | Z9D | 160 |       |     |       |     |       |     |       |     | 300   | 43 | 530   | 33 | 800   | 30 |
|           |      | LPES30F   | E4H | —   | 300   | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|           |      | LPES150R  | Z9H | 160 |       |     | 600   | 100 | 1100  | 75  | 1500  | 60  | 1500  | 43 | 1500  | 33 | 1500  | 30 |
| NA80-40   | 0.4  | LPES300R  | Z9H | 160 |       |     | 1500  | 100 | 1500  | 75  | 1300  | 60  | 2100  | 43 | 3000  | 33 | 3000  | 30 |
|           |      | LPES300R  | Z9H | 160 |       |     | 2100  | 100 | 3000  | 75  | 3000  | 60  | 3000  | 43 |       |    |       |    |
|           |      | LPES150F  | G7L | —   | 780   | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
| NA80-60   | 0.6  | LPES300R  | Z9L | 220 |       |     | 3000  | 100 |       |     |       |     |       |    |       |    |       |    |
|           |      | LPES1500R | Z9L | 220 |       |     |       |     | 1600  | 125 | 2500  | 100 | 4400  | 71 | 6100  | 56 | 7000  | 50 |
|           |      | LPES150F  | G7L | —   | 1200  | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
| NA80-75   | 0.75 | LPES1500R | Z9L | 220 |       |     | 1600  | 167 | 2700  | 125 | 3900  | 100 | 6300  | 71 | 8600  | 56 | 9700  | 50 |
|           |      | LPES300F  | K2M | —   | 3000  | 300 |       |     |       |     |       |     |       |    |       |    |       |    |
|           |      | LPES1500R | Z9M | 220 |       |     | 6200  | 167 | 8800  | 125 | 11500 | 100 | 15000 | 71 | 15000 | 56 | 15000 | 50 |
| NA830-332 | 3.3  | LPES1500F | K2M | —   | 3900  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
|           |      | LPES1500R | Z9M | 220 |       |     | 15000 | 167 | 15000 | 125 | 15000 | 100 |       |    |       |    |       |    |
|           |      | LPES1500F | L1Q | —   | 8700  | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
| NA820-402 | 4    | LPES1500R | Z9Q | 320 |       |     | 15000 | 111 |       |     |       |     |       |    |       |    |       |    |
| NA820-602 | 6    | LPES1500F | L1Q | —   | 14100 | 333 |       |     |       |     |       |     |       |    |       |    |       |    |
| NA820-752 | 7.5  | LPES1500F | L1Q | —   | 15000 | 333 |       |     |       |     |       |     |       |    |       |    |       |    |

\* Gray-shaded areas show numerical values with precision planetary reducer.

\* Shaded thrusts generated require thrust limits. Make sure to use at the specified thrusts or less.

\* Shaded rated speeds require speed limits. Make sure to use at the specified speeds or less.

## Servomotor matching table

### Motors manufactured by Tamagawa Seiki

#### ●TBL-i II series

| Motor type | Motor capacity kW | Power cylinder model No. | Mount code | Reducer frame No. | Reduction gear ratio  |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|------------|-------------------|--------------------------|------------|-------------------|-----------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
|            |                   |                          |            |                   | Motor direct coupling |                  | 3                  |                  | 4                  |                  | 5                  |                  | 7                  |                  | 9                  |                  | 10                 |                  |
|            |                   |                          |            |                   | Thrust generated N    | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s |
| TS4601     | 0.03              | LPES30R                  | B4D        | 120               |                       |                  |                    |                  |                    |                  |                    |                  |                    |                  | 30                 | 33               | 60                 | 30               |
| TS4602     | 0.05              | LPES15F                  | B3D        | —                 | 40                    | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES30R                  | B4D        | 120               |                       |                  | 120                | 100              | 210                | 75               | 290                | 60               | 300                | 43               | 300                | 33               | 300                | 30               |
| TS4603     | 0.1               | LPES15F                  | B3D        | —                 | 150                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES30F                  | B3D        | —                 | 190                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES30R                  | B4D        | 120               |                       |                  | 300                | 100              | 300                | 75               | 300                | 60               |                    |                  |                    |                  |                    |                  |
|            |                   | LPES150R                 | B3D        | 160               |                       |                  |                    |                  |                    |                  |                    |                  | 300                | 43               | 530                | 33               | 800                | 30               |
| TS4606     | 0.1               | LPES30F                  | E5D        | —                 | 190                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES30R                  | E4D        | 120               |                       |                  | 300                | 100              | 300                | 75               | 300                | 60               |                    |                  |                    |                  |                    |                  |
|            |                   | LPES150R                 | E4D        | 160               |                       |                  |                    |                  |                    |                  |                    |                  | 300                | 43               | 530                | 33               | 800                | 30               |
| TS4607     | 0.2               | LPES30F                  | E4H        | —                 | 300                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES150R                 | E4H        | 160               |                       |                  | 600                | 100              | 1100               | 75               | 1500               | 60               | 1500               | 43               | 1500               | 33               | 1500               | 30               |
|            |                   | LPES300R                 | E4H        | 160               |                       |                  |                    |                  |                    |                  | 1300               | 60               | 2100               | 43               | 3000               | 33               | 3000               | 30               |
| TS4611     | 0.2               | LPES30F                  | G2H        | —                 | 300                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES150R                 | G5H        | 160               |                       |                  | 600                | 100              | 1100               | 75               | 1500               | 60               | 1500               | 43               | 1500               | 33               | 1500               | 30               |
|            |                   | LPES300R                 | G5H        | 160               |                       |                  |                    |                  |                    |                  | 1300               | 60               | 2100               | 43               | 3000               | 33               | 3000               | 30               |
| TS4609     | 0.4               | LPES150R                 | E4H        | 160               |                       |                  | 1500               | 100              | 1500               | 75               |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES300R                 | E4H        | 160               |                       |                  | 2100               | 100              | 3000               | 75               | 3000               | 60               | 3000               | 43               |                    |                  |                    |                  |
| TS4612     | 0.4               | LPES150R                 | G5H        | 160               |                       |                  | 1500               | 100              | 1500               | 75               |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES300R                 | G5H        | 160               |                       |                  | 2100               | 100              | 3000               | 75               | 3000               | 60               | 3000               | 43               |                    |                  |                    |                  |
|            |                   | LPES1500R                | G5H        | 220               |                       |                  |                    |                  |                    |                  |                    |                  | 1900               | 71               | 2900               | 56               | 3400               | 50               |
| TS4613     | 0.6               | LPES150F                 | G7L        | —                 | 780                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES300R                 | G5L        | 220               |                       |                  | 3000               | 100              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES1500R                | G5L        | 220               |                       |                  |                    |                  | 1600               | 125              | 2500               | 100              | 4400               | 71               | 6100               | 56               | 7000               | 50               |
| TS4614     | 0.75              | LPES150F                 | G7L        | —                 | 1200                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES1500R                | G5L        | 220               |                       |                  | 1600               | 167              | 2700               | 125              | 3900               | 100              | 6300               | 71               | 8600               | 56               | 9700               | 50               |
| TS4813     | 1                 | LPES300F                 | J2M        | —                 | 1900                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES1500R                | J4M        | 220               |                       |                  | 3100               | 167              | 4800               | 125              | 6400               | 100              | 9900               | 71               | 13200              | 56               | 14900              | 50               |
| TS4815     | 1.5               | LPES300F                 | J2M        | —                 | 3000                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES1500R                | J4M        | 220               |                       |                  | 5700               | 167              | 8200               | 125              | 10700              | 100              | 15000              | 71               | 15000              | 56               | 15000              | 50               |
| TS4833     | 1.6               | LPES1500R                | K3M        | 220               |                       |                  | 6200               | 167              | 8800               | 125              | 11500              | 100              |                    |                  |                    |                  |                    |                  |
| TS4817     | 2                 | LPES1500F                | J2M        | —                 | 1800                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES1500R                | J4M        | 220               |                       |                  | 9100               | 167              | 12700              | 125              | 15000              | 100              |                    |                  |                    |                  |                    |                  |
| TS4882     | 2                 | LPES1500F                | L1Q        | —                 | 3300                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES1500R                | L1Q        | 320               |                       |                  | 12000              | 111              | 15000              | 83               | 15000              | 67               | 15000              | 48               |                    |                  |                    |                  |
| TS4836     | 3.3               | LPES1500F                | K2M        | —                 | 3900                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES1500R                | K3M        | 220               |                       |                  | 15000              | 167              | 15000              | 125              |                    |                  |                    |                  |                    |                  |                    |                  |
| TS4884     | 4                 | LPES1500F                | L1Q        | —                 | 8700                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|            |                   | LPES1500R                | L1Q        | 320               |                       |                  | 15000              | 111              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| TS4839     | 5                 | LPES1500F                | K2Z        | —                 | 6900                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| TS4887     | 6                 | LPES1500F                | L1Q        | —                 | 14100                 | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| TS4889     | 7.5               | LPES1500F                | L1Q        | —                 | 15000                 | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |

#### ●TRE series

|                            |      |          |     |     |     |     |     |     |      |    |      |    |      |    |      |    |      |    |
|----------------------------|------|----------|-----|-----|-----|-----|-----|-----|------|----|------|----|------|----|------|----|------|----|
| TS3253<br>TS3353<br>TS1983 | 0.03 | LPES30R  | B2C | 120 |     |     |     |     |      |    |      |    | 30   | 43 | 50   | 33 | 90   | 30 |
| TS3252<br>TS3352<br>TS1982 | 0.06 | LPES30R  | E2D | 120 |     |     | 210 | 100 | 300  | 75 | 300  | 60 | 300  | 43 | 300  | 33 | 300  | 30 |
| TS3251<br>TS3351<br>TS1981 | 0.1  | LPES30F  | E2D | —   | 190 | 300 |     |     |      |    |      |    |      |    |      |    |      |    |
|                            |      | LPES30R  | E2D | 120 |     |     | 300 | 100 |      |    |      |    |      |    |      |    |      |    |
|                            |      | LPES150R | E2D | 160 |     |     |     |     |      |    |      |    | 300  | 43 | 540  | 33 | 810  | 30 |
| TS3250<br>TS3350<br>TS1980 | 0.2  | LPES30F  | G1Z | —   | 300 | 300 |     |     |      |    |      |    |      |    |      |    |      |    |
|                            |      | LPES150R | G1Z | 160 |     |     | 590 | 100 | 1100 | 75 | 1500 | 60 | 1500 | 43 | 1500 | 33 | 1500 | 30 |
|                            |      | LPES300R | G1Z | 160 |     |     |     |     |      |    | 1300 | 60 | 2100 | 43 | 2900 | 33 | 3000 | 30 |

\* Gray-shaded areas show numerical values with precision planetary reducer.

\* Shaded thrusts generated require thrust limits. Make sure to use at the specified thrusts or less.

\* Shaded rated speeds require speed limits. Make sure to use at the specified speeds or less.

## Motors manufactured by Hitachi Industrial Equipment Systems

### ●ADMA series

| Motor type           | Motor capacity kW | Power cylinder model No. | Mount code | Reducer frame No. | Reduction gear ratio  |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|----------------------|-------------------|--------------------------|------------|-------------------|-----------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------|
|                      |                   |                          |            |                   | Motor direct coupling |                  | 3                  |                  | 4                  |                  | 5                  |                  | 7                  |                  | 9                  |                  | 10                 |                  |
|                      |                   |                          |            |                   | Thrust generated N    | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s | Thrust generated N | Rated speed mm/s |
| ADMA-R5L             | 0.05              | LPES15F                  | B3D        | -                 | 40                    | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| ADMA-R5M             |                   | LPES30R                  | B3D        | 120               |                       |                  | 130                | 100              | 220                | 75               | 290                | 60               | 300                | 43               | 300                | 33               | 300                | 30               |
| ADMA-01L<br>ADMA-01M | 0.1               | LPES15F                  | B3D        | -                 | 150                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                      |                   | LPES30F                  | B3D        | -                 | 190                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                      |                   | LPES30R                  | B3D        | 120               |                       |                  | 300                | 100              | 300                | 75               | 300                | 60               |                    |                  |                    |                  |                    |                  |
|                      |                   | LPES150R                 | B3D        | 160               |                       |                  |                    |                  |                    |                  |                    |                  | 310                | 43               | 550                | 33               | 810                | 30               |
| ADMA-02L<br>ADMA-02M | 0.2               | LPES30F                  | E4H        | -                 | 300                   | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                      |                   | LPES150R                 | E4H        | 160               |                       |                  | 600                | 100              | 1100               | 75               | 1500               | 60               | 1500               | 43               | 1500               | 33               | 1500               | 30               |
| ADMA-04L<br>ADMA-04M | 0.4               | LPES300R                 | E4H        | 160               |                       |                  | 1500               | 100              | 1500               | 75               | 1300               | 60               | 2100               | 43               | 3000               | 33               | 3000               | 30               |
|                      |                   | LPES150F                 | E4H        | 160               |                       |                  | 2100               | 100              | 3000               | 75               | 3000               | 60               | 3000               | 43               |                    |                  |                    |                  |
| ADMA-08L             | 0.75              | LPES150F                 | G5L        | -                 | 1200                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                      |                   | LPES300R                 | G5L        | 220               |                       |                  | 3000               | 100              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| ADMA-10L             | 1                 | LPES1500R                | G5L        | 220               |                       |                  | 1600               | 167              | 2700               | 125              | 3900               | 100              | 6300               | 71               | 8600               | 56               | 9700               | 50               |
|                      |                   | LPES300F                 | H2Y        | -                 | 1800                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| ADMA-15L             | 1.5               | LPES1500R                | H1Y        | 220               |                       |                  | 5600               | 167              | 8100               | 125              | 10600              | 100              | 15000              | 71               | 15000              | 56               | 15000              | 50               |
|                      |                   | LPES300F                 | H2Y        | -                 | 3000                  | 300              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| ADMA-20L             | 2                 | LPES1500F                | H1Y        | 220               |                       |                  | 8300               | 167              | 11700              | 125              | 15000              | 100              |                    |                  |                    |                  |                    |                  |
|                      |                   | LPES1500R                | H1Y        | 220               |                       |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
| ADMA-30L             | 3                 | LPES1500F                | K4P        | -                 | 3300                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                      |                   | LPES1500R                | K4P        | 320               |                       |                  | 12300              | 167              | 15000              | 125              |                    |                  |                    |                  |                    |                  |                    |                  |
| ADMA-50L             | 5                 | LPES1500F                | K4P        | -                 | 6900                  | 333              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |
|                      |                   | LPES1500R                | K4P        | 320               |                       |                  | 15000              | 167              |                    |                  |                    |                  |                    |                  |                    |                  |                    |                  |

### ●ADMB series

|                      |      |           |     |     |      |     |      |     |      |     |      |     |      |    |       |    |       |    |
|----------------------|------|-----------|-----|-----|------|-----|------|-----|------|-----|------|-----|------|----|-------|----|-------|----|
| ADMB-01L<br>ADMB-01M | 0.1  | LPES30F   | E5D | -   | 190  | 300 |      |     |      |     |      |     |      |    |       |    |       |    |
|                      |      | LPES30R   | E4D | 120 |      |     | 300  | 100 | 300  | 75  | 300  | 60  |      |    |       |    |       |    |
|                      |      | LPES150R  | E4D | 160 |      |     |      |     |      |     |      |     | 310  | 43 | 550   | 33 | 810   | 30 |
| ADMB-02L<br>ADMB-02M | 0.2  | LPES30F   | G2H | -   | 300  | 300 |      |     |      |     |      |     |      |    |       |    |       |    |
|                      |      | LPES150R  | G5H | 160 |      |     | 600  | 100 | 1100 | 75  | 1500 | 60  | 1500 | 43 | 1500  | 33 | 1500  | 30 |
|                      |      | LPES300R  | G5H | 160 |      |     |      |     |      |     | 1300 | 60  | 2100 | 43 | 3000  | 33 | 3000  | 30 |
| ADMB-04L<br>ADMB-04M | 0.4  | LPES150R  | G5H | 160 |      |     | 1500 | 100 | 1500 | 75  |      |     |      |    |       |    |       |    |
|                      |      | LPES300R  | G5H | 160 |      |     | 2100 | 100 | 3000 | 75  | 3000 | 60  | 3000 | 43 |       |    |       |    |
|                      |      | LPES1500R | G5H | 220 |      |     |      |     |      |     |      |     | 1900 | 71 | 2900  | 56 | 3400  | 50 |
| ADMB-08L             | 0.75 | LPES300R  | K3L | 220 |      |     | 3000 | 100 |      |     |      |     |      |    |       |    |       |    |
|                      |      | LPES1500R | K3L | 220 |      |     | 1600 | 167 | 2700 | 125 | 3900 | 100 | 6300 | 71 | 8600  | 56 | 9700  | 50 |
| ADMB-10L             | 1    | LPES300F  | K2L | -   | 1800 | 300 |      |     |      |     |      |     |      |    |       |    |       |    |
|                      |      | LPES1500R | K3L | 220 |      |     | 2900 | 167 | 4500 | 125 | 6100 | 100 | 9400 | 71 | 12600 | 56 | 14200 | 50 |

### ●ADMC series

|          |      |           |     |     |       |     |       |    |       |    |       |    |       |    |       |    |       |    |
|----------|------|-----------|-----|-----|-------|-----|-------|----|-------|----|-------|----|-------|----|-------|----|-------|----|
| ADMC-04L | 0.4  | LPES300F  | H2Y | -   | 1400  | 150 |       |    |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES300R  | H1Y | 220 |       |     | 3000  | 50 | 3000  | 38 |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | H1Y | 220 |       |     | 2000  | 83 | 3200  | 63 | 4400  | 50 | 6900  | 36 | 9600  | 28 | 10800 | 25 |
| ADMC-08L | 0.75 | LPES300F  | H2Y | -   | 3000  | 150 |       |    |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | H1Y | 220 |       |     | 5700  | 83 | 8200  | 63 | 10700 | 50 | 15000 | 36 | 15000 | 28 | 15000 | 25 |
| ADMC-10L | 1    | LPES1500F | H2Y | -   | 1500  | 250 |       |    |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | H1Y | 220 |       |     | 8400  | 83 | 11800 | 63 | 15000 | 50 |       |    |       |    |       |    |
| ADMC-15L | 1.5  | LPES1500F | K4P | -   | 3300  | 250 |       |    |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K4P | 320 |       |     | 12400 | 83 | 15000 | 63 |       |    |       |    |       |    |       |    |
| ADMC-20L | 2    | LPES1500F | K4P | -   | 5100  | 250 |       |    |       |    |       |    |       |    |       |    |       |    |
|          |      | LPES1500R | K4P | 320 |       |     | 15000 | 83 |       |    |       |    |       |    |       |    |       |    |
| ADMC-30L | 2.9  | LPES1500F | L3R | -   | 8400  | 250 |       |    |       |    |       |    |       |    |       |    |       |    |
| ADMC-45L | 4.5  | LPES1500F | L3R | -   | 14100 | 250 |       |    |       |    |       |    |       |    |       |    |       |    |

### ●ADMG series

|           |     |           |     |     |       |     |       |     |       |    |       |    |       |    |       |    |       |    |
|-----------|-----|-----------|-----|-----|-------|-----|-------|-----|-------|----|-------|----|-------|----|-------|----|-------|----|
| ADMG-05HP | 0.5 | LPES300R  | H1K | 160 |       |     | 3000  | 67  |       |    |       |    |       |    |       |    |       |    |
|           |     | LPES1500R | H1K | 220 |       |     | 1600  | 111 | 2900  | 83 | 4000  | 67 | 6300  | 48 | 8600  | 37 | 10000 | 33 |
| ADMG-10HP | 1   | LPES300F  | J4M | -   | 3000  | 200 |       |     |       |    |       |    |       |    |       |    |       |    |
|           |     | LPES1500R | J4M | 220 |       |     | 6000  | 111 | 8700  | 83 | 11400 | 67 | 15000 | 48 | 15000 | 37 | 15000 | 33 |
| ADMG-15HP | 1.5 | LPES1500F | K3M | -   | 2200  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|           |     | LPES1500R | K3M | 220 |       |     | 10300 | 111 | 14400 | 83 | 15000 | 67 |       |    |       |    |       |    |
| ADMG-20HP | 2   | LPES1500F | K3P | -   | 3300  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|           |     | LPES1500R | K3P | 320 |       |     | 12300 | 111 | 15000 | 83 |       |    |       |    |       |    |       |    |
| ADMG-35HP | 3.5 | LPES1500F | L1R | -   | 7400  | 333 |       |     |       |    |       |    |       |    |       |    |       |    |
|           |     | LPES1500R | L1R | 400 |       |     | 15000 | 111 |       |    |       |    |       |    |       |    |       |    |
| ADMG-45HP | 4.5 | LPES1500F | L1R | -   | 10100 | 333 |       |     |       |    |       |    |       |    |       |    |       |    |

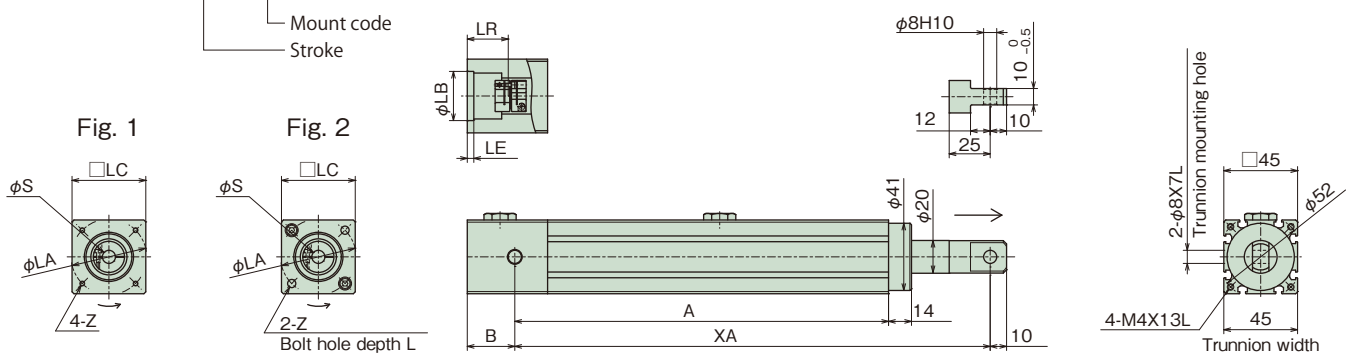
\* Gray-shaded areas show numerical values with precision planetary reducer.

\* Shaded thrusts generated require thrust limits. Make sure to use at the specified thrusts or less.

\* Shaded rated speeds require speed limits. Make sure to use at the specified speeds or less.

## Dimensions table (□45 frame)

### LPES15FT



| Mount code | LC | LB | LE | S | LR | LA | Z      | L  | B  | Unit: mm<br>Drawing |
|------------|----|----|----|---|----|----|--------|----|----|---------------------|
| A3D        | 45 | 22 | 4  | 8 | 24 | 48 | M3X11L | -  | 28 | 1                   |
| B2D        | 45 | 30 | 4  | 8 | 24 | 45 | M3X11L | -  | 28 |                     |
| B3B        | 45 | 30 | 4  | 6 | 25 | 46 | M4X13L | 49 | 29 | 2                   |
| B3D        | 45 | 30 | 4  | 8 | 25 | 46 | M4X13L | 49 | 29 |                     |
| C1C        | 45 | 34 | 4  | 7 | 24 | 48 | M3X11L | -  | 28 | 1                   |
| Z9Z        |    |    |    |   |    |    |        |    |    |                     |

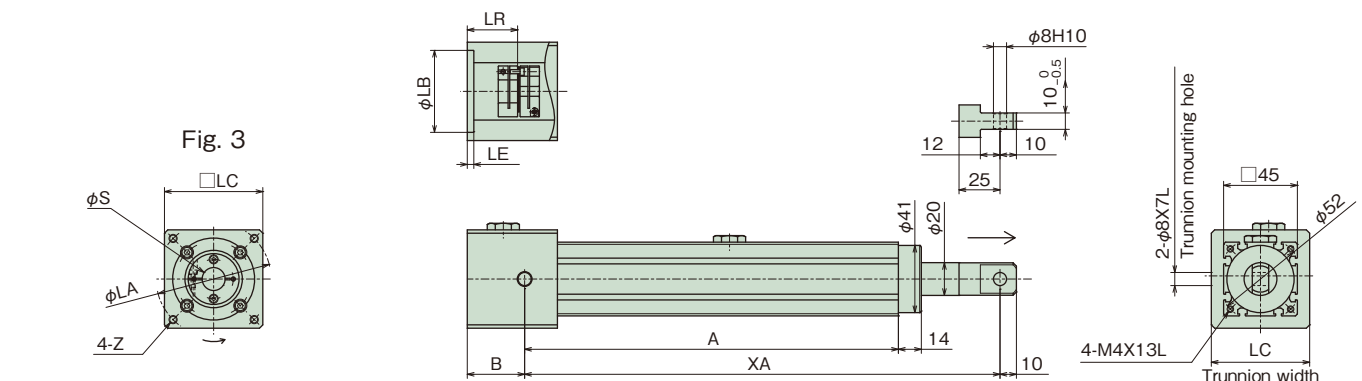
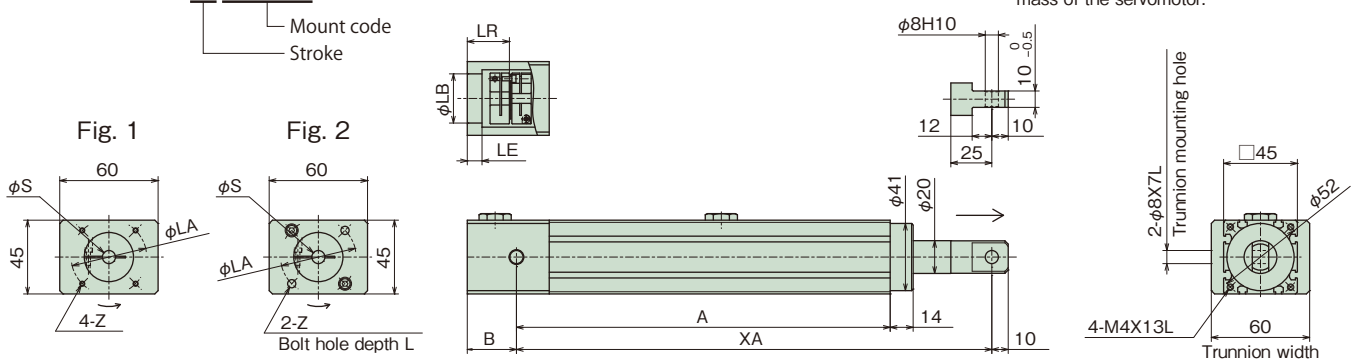
\* For dimensions in blanks, contact us.

| Stroke | A   | Unit: mm<br>XA |     |
|--------|-----|----------------|-----|
|        |     | MIN            | MAX |
| 100    | 228 | 290            | 390 |
| 200    | 328 | 410            | 610 |
| 300    | 428 | 510            | 810 |

| Stroke | Mass | Unit: kg |
|--------|------|----------|
| 100    | 1.5  |          |
| 200    | 1.9  |          |
| 300    | 2.2  |          |

\* The above mass does not include the mass of the servomotor.

### LPES30FT



| Mount code | LC | LB | LE | S  | LR | LA  | Z      | L  | B  | Unit: mm<br>Drawing |
|------------|----|----|----|----|----|-----|--------|----|----|---------------------|
| A3D        | -  | 22 | 8  | 8  | 24 | 48  | M3X11L | -  | 29 | 1                   |
| B2D        | -  | 30 | 9  | 8  | 25 | 45  | M3X11L | -  | 30 |                     |
| B3D        | -  | 30 | 9  | 8  | 25 | 46  | M4X13L | 50 | 30 | 2                   |
| E1C        | 60 | 50 | 5  | 7  | 24 | 60  | M4X12L | -  | 29 |                     |
| E2D        | 60 | 50 | 5  | 8  | 30 | 60  | M4X12L | -  | 35 | 3                   |
| E3D        | 60 | 50 | 5  | 8  | 25 | 70  | M4X12L | -  | 30 |                     |
| E3G        | 60 | 50 | 5  | 11 | 30 | 70  | M4X12L | -  | 35 |                     |
| E4H        | 60 | 50 | 5  | 14 | 30 | 70  | M5X12L | -  | 35 |                     |
| E5D        | 60 | 50 | 5  | 8  | 25 | 70  | M5X12L | -  | 30 |                     |
| G1G        | 80 | 70 | 5  | 11 | 30 | 90  | M5X12L | -  | 35 |                     |
| G1H        | 80 | 70 | 5  | 14 | 30 | 90  | M5X12L | -  | 35 |                     |
| G1Z        | 80 | 70 | 5  | 12 | 30 | 90  | M5X12L | -  | 35 |                     |
| G2H        | 80 | 70 | 5  | 14 | 30 | 90  | M6X17L | -  | 35 |                     |
| H1H        | 90 | 80 | 5  | 14 | 30 | 100 | M6X17L | -  | 35 |                     |
| Z9Z        |    |    |    |    |    |     |        |    |    |                     |

\* For dimensions in blanks, contact us.

| Stroke | A   | Unit: mm<br>XA |     |
|--------|-----|----------------|-----|
|        |     | MIN            | MAX |
| 100    | 228 | 290            | 390 |
| 200    | 328 | 410            | 610 |
| 300    | 428 | 510            | 810 |

| Stroke | Mass | Unit: kg |
|--------|------|----------|
| 100    | 1.6  |          |
| 200    | 2.0  |          |
| 300    | 2.4  |          |

\* The above mass does not include the mass of the servomotor.

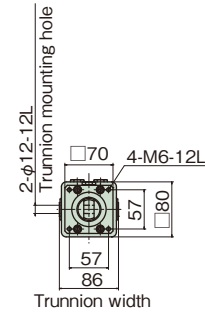
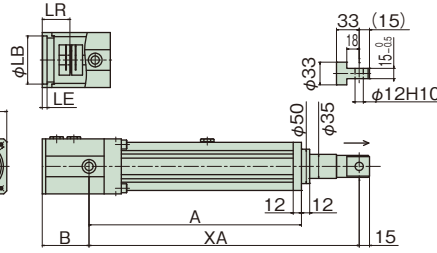
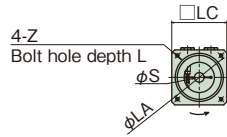


# Motor direct coupling

## Dimensions table (□70 frame)

### LPES150FT

Mount code  
Stroke



| マウントコード | LC | LB | LE | S  | LR | LA | Z      | L  | B  |
|---------|----|----|----|----|----|----|--------|----|----|
| E4H     | 80 | 50 | 8  | 14 | 30 | 70 | M5X8L  | -  | 68 |
| G4K     | 80 | 70 | 5  | 16 | 40 | 90 | M5X16L | 14 | 77 |
| G4L     | 80 | 70 | 5  | 19 | 35 | 90 | M5X16L | 9  | 72 |
| G5K     | 80 | 70 | 5  | 16 | 40 | 90 | M6X16L | 14 | 77 |
| G5L     | 80 | 70 | 5  | 19 | 40 | 90 | M6X16L | 14 | 77 |
| G7L     | 80 | 70 | 5  | 19 | 35 | 90 | M6X16L | 9  | 72 |
| Z9Z     |    |    |    |    |    |    |        |    |    |

\* For dimensions in blanks, contact us.

| Stroke | A   | XA  |      |
|--------|-----|-----|------|
|        |     | MIN | MAX  |
| 100    | 309 | 395 | 495  |
| 200    | 409 | 495 | 695  |
| 300    | 509 | 595 | 895  |
| 400    | 609 | 695 | 1095 |
| 500    | 709 | 795 | 1295 |
| 600    | 809 | 895 | 1495 |

Unit: mm

| Stroke | Mass |
|--------|------|
| 100    | 8.6  |
| 200    | 9.5  |
| 300    | 10.5 |
| 400    | 11.4 |
| 500    | 12.3 |
| 600    | 13.3 |

Unit: kg

\* The above mass does not include the mass of the servomotor.

### LPES300FT

Mount code  
Stroke

Fig. 1

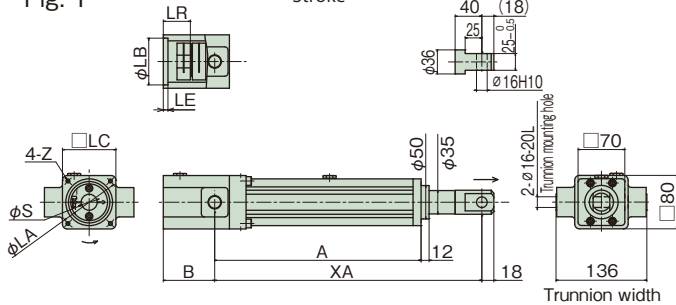
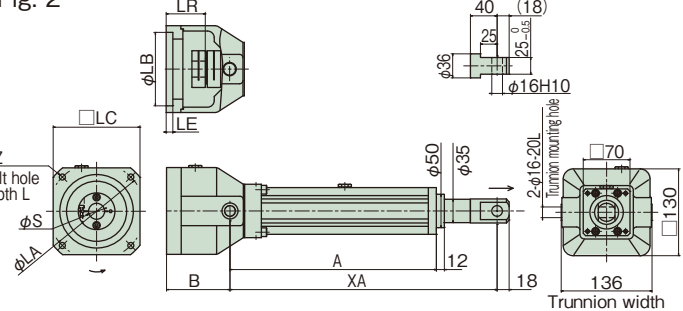


Fig. 2



| Mount code | LC  | LB | LE | S  | LR | LA  | Z      | L | B  | Drawing |
|------------|-----|----|----|----|----|-----|--------|---|----|---------|
| G5K        | 80  | 70 | 5  | 16 | 40 | 90  | M6X16L | - | 77 | 1       |
| G5L        | 80  | 70 | 5  | 19 | 40 | 90  | M6X16L | - | 77 | 1       |
| H1K        | 130 | 80 | 7  | 16 | 35 | 100 | M6X7L  | - | 74 | 1       |
| H2K        | 130 | 80 | 7  | 16 | 40 | 100 | M6X7L  | - | 77 | 1       |
| H2L        | 130 | 80 | 22 | 19 | 55 | 100 | M6X22L | - | 92 | 1       |
| H2Y        | 130 | 80 | 12 | 24 | 45 | 100 | M6X12L | - | 82 | 2       |
| J2M        | 130 | 95 | 10 | 22 | 40 | 115 | M8X10L | - | 80 | 2       |
| J3Y        | 130 | 95 | 12 | 24 | 45 | 115 | M6X12L | - | 82 | 2       |
| J4M        | 130 | 95 | 12 | 22 | 45 | 115 | M8X12L | - | 82 | 2       |
| J4Y        | 130 | 95 | 12 | 24 | 45 | 115 | M8X12L | - | 82 | 2       |
| J5L        | 130 | 95 | 23 | 19 | 55 | 115 | M8X10L | - | 93 | 2       |
| J7Y        | 130 | 95 | 19 | 24 | 40 | 135 | M8X19L | - | 80 | 2       |
| J8Y        | 130 | 95 | 19 | 24 | 50 | 135 | M8X19L | - | 89 | 2       |

| Mount code | LC  | LB    | LE | S  | LR    | LA  | Z       | L  | B   | Drawing |
|------------|-----|-------|----|----|-------|-----|---------|----|-----|---------|
| K2L        | 130 | 110   | 10 | 19 | 40~41 | 145 | M8X20L  | 6  | 79  | 2       |
| K2M        | 130 | 110   | 10 | 22 | 40    | 145 | M8X20L  | 6  | 79  | 2       |
| K3L        | 130 | 110   | 25 | 19 | 55~58 | 145 | M8X20L  | 22 | 95  | 2       |
| K3M        | 130 | 110   | 25 | 22 | 55    | 145 | M8X20L  | 22 | 95  | 2       |
| K3Y        | 130 | 110   | 25 | 24 | 55~58 | 145 | M8X20L  | 22 | 95  | 2       |
| K6M        | 130 | 110   | 12 | 22 | 45    | 145 | M8X20L  | 9  | 82  | 2       |
| K7M        | 130 | 110   | 37 | 22 | 70    | 145 | M8X20L  | 34 | 107 | 2       |
| L1M        | 176 | 114.3 | 22 | 22 | 55    | 200 | M12X19L | -  | 92  | 2       |
| Z9Z        |     |       |    |    |       |     |         |    |     |         |

\* For dimensions in blanks, contact us.

| Stroke | A   | XA  |      |
|--------|-----|-----|------|
|        |     | MIN | MAX  |
| 100    | 309 | 400 | 500  |
| 200    | 409 | 500 | 700  |
| 300    | 509 | 600 | 900  |
| 400    | 609 | 700 | 1100 |
| 500    | 709 | 800 | 1300 |
| 600    | 809 | 900 | 1500 |

Unit: mm

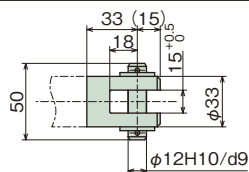
| Stroke | Mass |
|--------|------|
| 100    | 14.3 |
| 200    | 15.2 |
| 300    | 16.1 |
| 400    | 17.1 |
| 500    | 18.0 |
| 600    | 19.0 |

Unit: kg

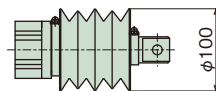
\* The above mass does not include the mass of the servomotor.

## Options

### U-type end fitting ( - U)



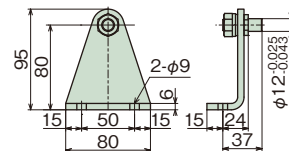
### Bellows ( - J)



When bellows are equipped, flange mount is not available.

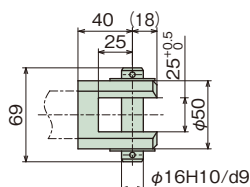
### Trunnion fitting (LPE025-T)

Mass: 0.6kg

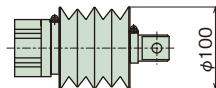


Order the trunnion fitting separately from main body model No. without entering any symbol at the end of model No.

### U-type end fitting ( - U)

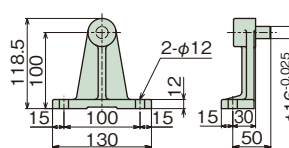


### Bellows ( - J)



### Trunnion fitting (LPE300-T)

Mass: 3.3kg



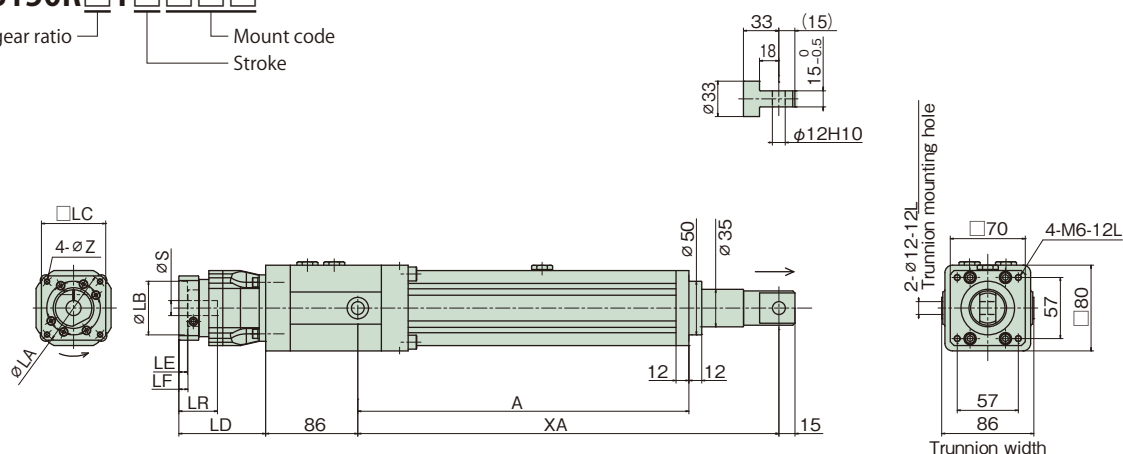
Order the trunnion fitting separately from main body model No. without entering any symbol at the end of model No.

# With precision planetary reducer

## Dimensions table (□70 frame)

### LPES150R□T□□□□

Reduction gear ratio □ Mount code □ Stroke □



With PAT-B160

| Mount code | LC | LB | LE | S  | LR | LF  | LA | Z      | LD |
|------------|----|----|----|----|----|-----|----|--------|----|
| A3D        |    |    |    |    |    |     |    |        |    |
| B3D        | 58 | 30 | 4  | 8  | 36 | 8.5 | 46 | M4X9L  | 81 |
| B4D        |    |    |    |    |    |     |    |        |    |
| E2C        |    |    |    |    |    |     |    |        |    |
| E2D        |    |    |    |    |    |     |    |        |    |
| E3D        |    |    |    |    |    |     |    |        |    |
| E3G        | 60 | 50 | 4  | 11 | 32 | 4.5 | 70 | M4X9L  | 77 |
| E3H        | 60 | 50 | 4  | 14 | 32 | 4.5 | 70 | M4X9L  | 77 |
| E4D        | 60 | 50 | 8  | 8  | 36 | 8.5 | 70 | M5X10L | 81 |
| E4E        | 60 | 50 | 8  | 9  | 36 | 8.5 | 70 | M5X10L | 81 |
| E4H        | 60 | 50 | 8  | 14 | 36 | 8.5 | 70 | M5X10L | 81 |
| E5H        |    |    |    |    |    |     |    |        |    |

| Mount code | LC | LB | LE | S  | LR | LF   | LA  | Z      | LD |
|------------|----|----|----|----|----|------|-----|--------|----|
| G1G        |    |    |    |    |    |      |     |        |    |
| G1H        |    |    |    |    |    |      |     |        |    |
| G1Z        |    |    |    |    |    |      |     |        |    |
| G5H        | 80 | 70 | 4  | 14 | 42 | 14.5 | 90  | M6X12L | 87 |
| H1F        | 92 | 80 | 9  | 10 | 42 | 14.5 | 100 | M6X12L | 87 |
| H1H        | 92 | 80 | 9  | 14 | 42 | 14.5 | 100 | M6X12L | 87 |
| H1K        | 92 | 80 | 9  | 16 | 42 | 14.5 | 100 | M6X12L | 87 |
| Z9D        |    |    |    |    |    |      |     |        |    |
| Z9H        |    |    |    |    |    |      |     |        |    |

\* For dimensions in blanks, contact us.

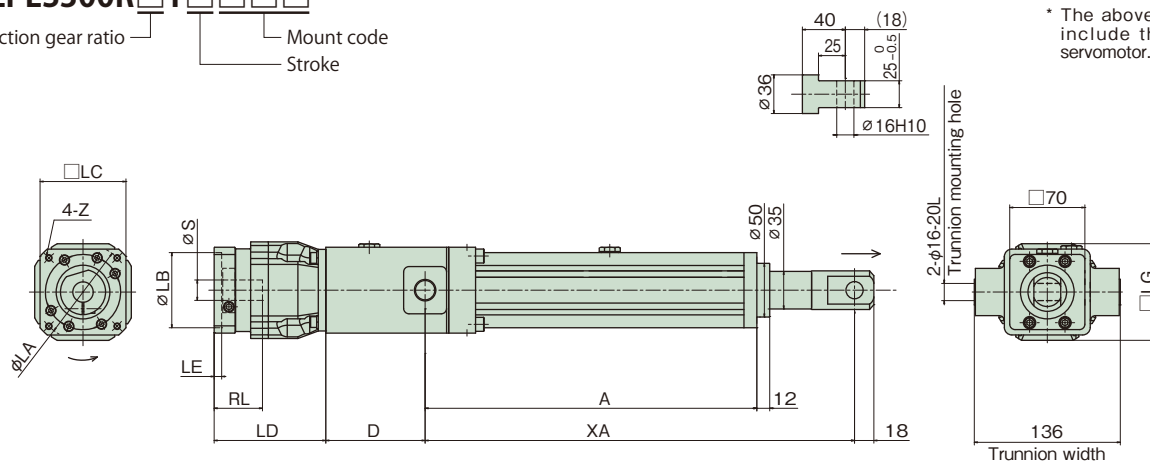
| Stroke | A   | MIN | MAX  |
|--------|-----|-----|------|
| 100    | 309 | 395 | 495  |
| 200    | 409 | 495 | 695  |
| 300    | 509 | 595 | 895  |
| 400    | 609 | 695 | 1095 |
| 500    | 709 | 795 | 1295 |
| 600    | 809 | 895 | 1495 |

| Stroke | Mass |
|--------|------|
| 100    | 10.7 |
| 200    | 11.6 |
| 300    | 12.6 |
| 400    | 13.5 |
| 500    | 14.4 |
| 600    | 15.4 |

\* The above mass does not include the mass of the servomotor.

### LPES300R□T□□□□

Reduction gear ratio □ Mount code □ Stroke □



With PAT-B160

| Mount code | LC | LB | LE | S  | LR | LF   | LA  | Z      | LD | LG | D  |
|------------|----|----|----|----|----|------|-----|--------|----|----|----|
| B3D        | 58 | 30 | 4  | 8  | 36 | 8.5  | 46  | M4X9L  | 81 | 70 | 85 |
| B4D        |    |    |    |    |    |      |     |        |    |    |    |
| E3G        | 60 | 50 | 4  | 11 | 32 | 4.5  | 70  | M4X9L  | 77 | 70 | 85 |
| E3H        | 60 | 50 | 4  | 14 | 32 | 4.5  | 70  | M4X9L  | 77 | 70 | 85 |
| E4E        | 60 | 50 | 8  | 9  | 36 | 8.5  | 70  | M5X10L | 81 | 70 | 85 |
| E4H        | 60 | 50 | 8  | 14 | 36 | 8.5  | 70  | M5X10L | 81 | 70 | 85 |
| E5H        |    |    |    |    |    |      |     |        |    |    |    |
| G1G        |    |    |    |    |    |      |     |        |    |    |    |
| G1H        |    |    |    |    |    |      |     |        |    |    |    |
| G1Z        |    |    |    |    |    |      |     |        |    |    |    |
| G4K        |    |    |    |    |    |      |     |        |    |    |    |
| G5H        | 80 | 70 | 4  | 14 | 42 | 14.5 | 90  | M6X12L | 87 | 70 | 85 |
| G5K        | 80 | 70 | 4  | 16 | 42 | 14.5 | 90  | M6X12L | 87 | 70 | 85 |
| H1F        | 92 | 80 | 9  | 10 | 42 | 14.5 | 100 | M6X12L | 87 | 70 | 85 |
| H1H        | 92 | 80 | 9  | 14 | 42 | 14.5 | 100 | M6X12L | 87 | 70 | 85 |
| H1K        | 92 | 80 | 9  | 16 | 42 | 14.5 | 100 | M6X12L | 87 | 70 | 85 |
| J2K        |    |    |    |    |    |      |     |        |    |    |    |
| K2K        |    |    |    |    |    |      |     |        |    |    |    |
| Z9H        |    |    |    |    |    |      |     |        |    |    |    |

With PAT-B220

| Mount code | LC  | LB  | LE  | S  | LR   | LF  | LA  | Z      | LD    | LG | D  |
|------------|-----|-----|-----|----|------|-----|-----|--------|-------|----|----|
| G4L        | 80  | 70  | 5.5 | 19 | 43.5 | 6.5 | 90  | M5X10L | 102.5 | 90 | 93 |
| G5L        | 80  | 70  | 7   | 19 | 45   | 8   | 90  | M6X12L | 104   | 90 | 93 |
| H1Y        | -   | -   | -   | -  | -    | -   | -   | -      | -     | 90 | 93 |
| H4L        | 90  | 80  | 8   | 19 | 57   | 20  | 100 | M6X12L | 116   | 90 | 93 |
| J3Y        | 100 | 95  | 4   | 24 | 47   | 10  | 115 | M6X12L | 106   | 90 | 93 |
| J4L        | 100 | 95  | 8   | 19 | 57   | 20  | 115 | M8X15L | 116   | 90 | 93 |
| J4M        | -   | -   | -   | -  | -    | -   | -   | -      | -     | 90 | 93 |
| J4Y        | 100 | 95  | 8   | 20 | 57   | 24  | 115 | M8X15L | 116   | 90 | 93 |
| J7Y        | 120 | 95  | 7   | 24 | 58   | 21  | 135 | M8X15L | 117   | 90 | 93 |
| K3L        | 130 | 110 | 18  | 19 | 60   | 23  | 145 | M8X15L | 119   | 90 | 93 |
| K3Y        | 130 | 110 | 18  | 24 | 60   | 23  | 145 | M8X15L | 119   | 90 | 93 |
| K5Y        | -   | -   | -   | -  | -    | -   | -   | -      | -     | 90 | 93 |
| K6M        | -   | -   | -   | -  | -    | -   | -   | -      | -     | 90 | 93 |
| K7M        | -   | -   | -   | -  | -    | -   | -   | -      | -     | 90 | 93 |
| Z9L        | -   | -   | -   | -  | -    | -   | -   | -      | -     | -  | -  |

\* For dimensions in blanks, contact us.

| Stroke | A   | MIN | MAX  |
|--------|-----|-----|------|
| 100    | 309 | 400 | 500  |
| 200    | 409 | 500 | 700  |
| 300    | 509 | 600 | 900  |
| 400    | 609 | 700 | 1100 |
| 500    | 709 | 800 | 1300 |
| 600    | 809 | 900 | 1500 |

| Stroke | Mass (with PAT-B160) | Mass (with PAT-B220) |
|--------|----------------------|----------------------|
| 100    | 14.6                 | 16.0                 |
| 200    | 15.5                 | 16.9                 |
| 300    | 16.4                 | 17.8                 |
| 400    | 17.4                 | 18.8                 |
| 500    | 18.3                 | 19.7                 |
| 600    | 19.3                 | 20.7                 |

\* The above mass does not include the mass of the servomotor.

## Dimensions table (□105 frame)

■ LPES1500FT □ □ □ □  
 Mount code  
 Stroke

Fig. 1

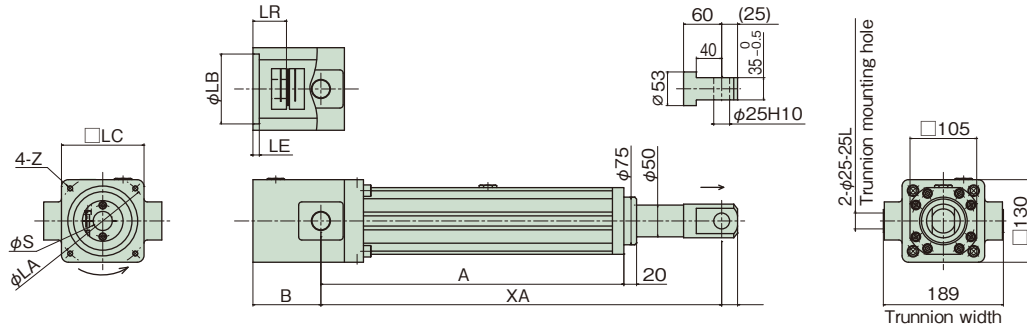
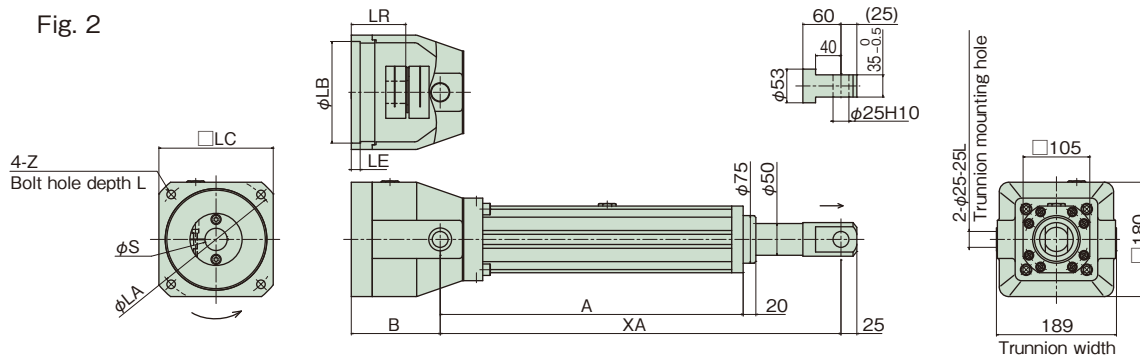


Fig. 2



| Mount code | LC  | LB    | LE | S      | LR    | LA  | Z       | L  | B   | Unit: mm |
|------------|-----|-------|----|--------|-------|-----|---------|----|-----|----------|
| H2Y        | 130 | 80    | 12 | 24     | 45    | 100 | M6X12L  | -  | 101 | Drawing  |
| J2M        | 130 | 95    | 10 | 22     | 40    | 115 | M8X16L  | -  | 96  |          |
| J3Y        | 130 | 95    | 5  | 24     | 45    | 115 | M6X12L  | -  | 101 |          |
| J4M        | 130 | 95    | 5  | 22     | 45    | 115 | M8X16L  | -  | 101 |          |
| J4Y        | 130 | 95    | 5  | 24     | 45    | 115 | M8X16L  | -  | 101 |          |
| K2M        | 130 | 110   | 9  | 22     | 40    | 145 | M8X16L  | -  | 96  |          |
| K2Z        | 130 | 110   | 9  | 26     | 40    | 145 | M8X16L  | -  | 96  |          |
| K3M        | 130 | 110   | 9  | 22     | 55~58 | 145 | M8X16L  | -  | 111 | 1        |
| K3P        | 130 | 110   | 9  | 28     | 55    | 145 | M8X16L  | -  | 111 |          |
| K3Y        | 130 | 110   | 9  | 24     | 55~58 | 145 | M8X16L  | -  | 111 |          |
| K4P        | 130 | 110   | 9  | 28     | 63    | 145 | M8X16L  | -  | 119 |          |
| K4Y        | 130 | 110   | 9  | 24     | 65    | 145 | M8X16L  | -  | 119 |          |
| K4Z        | 130 | 110   | 9  | 28(j6) | 63    | 145 | M8X16L  | -  | 119 |          |
| K6M        | 130 | 110   | 5  | 22     | 45    | 135 | M8X16L  | -  | 101 |          |
| K6P        | 130 | 110   | 5  | 28     | 55    | 135 | M8X16L  | -  | 111 |          |
| K7M        | 130 | 110   | 9  | 22     | 70    | 145 | M8X16L  | -  | 124 |          |
| L1P        | 180 | 114.3 | 11 | 28     | 55    | 200 | M12X25L | 7  | 114 |          |
| L1Q        | 180 | 114.3 | 11 | 32     | 50    | 200 | M12X25L | 7  | 109 |          |
| L1R        | 180 | 114.3 | 21 | 35     | 65~70 | 200 | M12X25L | 17 | 124 | 2        |
| L1Z        | 180 | 114.3 | 21 | 28(j6) | 65    | 200 | M12X25L | 17 | 124 |          |
| L2S        | 180 | 114.3 | 65 | 42     | 113   | 200 | M12X25L | 61 | 168 |          |
| L3R        | 180 | 114.3 | 10 | 35     | 79~80 | 200 | M12X25L | 29 | 136 |          |
| L3S        | 180 | 114.3 | 10 | 42     | 79    | 200 | M12X25L | 29 | 136 |          |
| M3P        | 180 | 130   | 17 | 28     | 60~65 | 165 | M10X25L | -  | 120 |          |
| M4P        | 180 | 130   | 17 | 28     | 70    | 165 | M10X25L | -  | 125 |          |
| N1S        | 200 | 180   | 6  | 42     | 85    | 215 | M12X25L | 33 | 140 |          |
| P2Q        | 220 | 200   | 6  | 32     | 65    | 235 | M12X29L | -  | 124 | 2        |
| P2R        | 220 | 200   | 6  | 35     | 65    | 235 | M12X29L | -  | 124 |          |
| P3R        | 220 | 200   | 6  | 35     | 70    | 235 | M12X29L | -  | 124 |          |
| Z9Z        |     |       |    |        |       |     |         |    |     |          |

\* For dimensions in blanks, contact us.

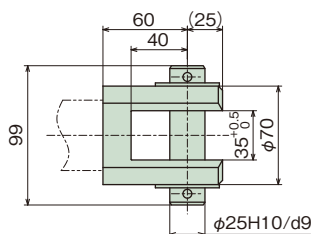
| Stroke | A    | XA   |      |
|--------|------|------|------|
|        |      | MIN  | MAX  |
| 200    | 537  | 680  | 880  |
| 300    | 637  | 790  | 1090 |
| 400    | 737  | 900  | 1300 |
| 500    | 837  | 1010 | 1510 |
| 600    | 937  | 1115 | 1715 |
| 800    | 1137 | 1335 | 2135 |
| 1000   | 1337 | 1555 | 2555 |

| Stroke | Mass |
|--------|------|
| 200    | 39.9 |
| 300    | 42.9 |
| 400    | 44.4 |
| 500    | 46.7 |
| 600    | 48.9 |
| 800    | 53.9 |
| 1000   | 57.9 |

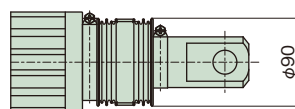
\* The above mass does not include the mass of the servomotor.

## Options

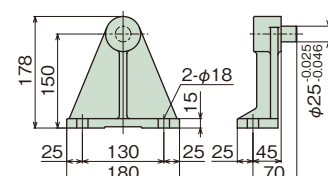
### U-type end fitting ( - U)



### Bellows ( - J)



### Trunnion fitting (LPE400-T) Mass: 7.0kg



Order the trunnion fitting separately from main body model No. without entering any symbol at the end of model No.

## With precision planetary reducer

## Dimensions table (□105 frame)

## LPES1500R□T□□□□

Reduction gear ratio

Mount code

Stroke

Fig. 1

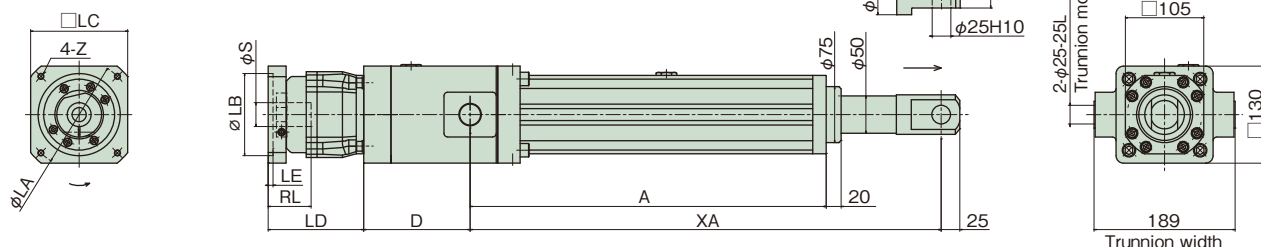
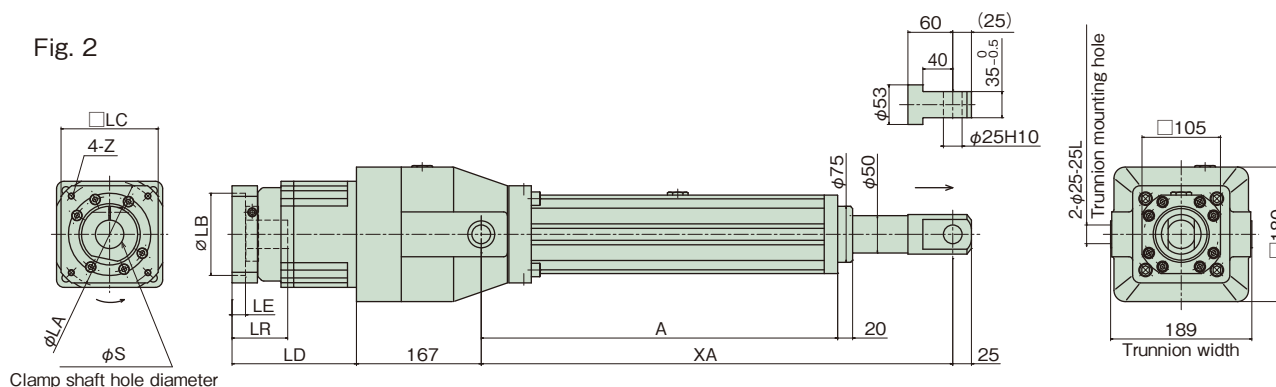


Fig. 2



## With PAT-B220

| Mount code | LC  | LB  | LE  | S  | LR   | LF  | LA  | Z      | LD    | D   | Unit: mm<br>Drawing |
|------------|-----|-----|-----|----|------|-----|-----|--------|-------|-----|---------------------|
| G4H        |     |     |     |    |      |     |     |        |       | 111 |                     |
| G4K        | 80  | 70  | 5.5 | 16 | 43.5 | 6.5 | 90  | M5X10L | 102.5 | 111 |                     |
| G4L        | 80  | 70  | 5.5 | 19 | 43.5 | 6.5 | 90  | M5X10L | 102.5 | 111 |                     |
| G5H        | 80  | 70  | 7   | 13 | 45   | 8   | 90  | M6X12L | 104   | 111 |                     |
| G5K        | 80  | 70  | 7   | 16 | 45   | 8   | 90  | M6X12L | 104   | 111 |                     |
| G5L        | 80  | 70  | 7   | 19 | 45   | 8   | 90  | M6X12L | 104   | 111 |                     |
| G7L        |     |     |     |    |      |     |     |        |       | 111 |                     |
| H1H        | 90  | 80  | 7.5 | 14 | 46   | 9   | 100 | M6X12L | 105   | 111 |                     |
| H1K        | 90  | 80  | 7.5 | 16 | 46   | 9   | 100 | M6X12L | 105   | 111 |                     |
| H1Y        |     |     |     |    |      |     |     |        |       | 111 |                     |
| H4F        | 90  | 80  | 8   | 10 | 57   | 20  | 100 | M6X12L | 116   | 111 |                     |
| H4H        |     |     |     |    |      |     |     |        |       | 111 |                     |
| H4K        | 90  | 80  | 8   | 16 | 57   | 20  | 100 | M6X12L | 116   | 111 |                     |
| H4L        | 90  | 80  | 8   | 19 | 57   | 20  | 100 | M6X12L | 116   | 111 |                     |
| J2K        | 100 | 95  | 4   | 16 | 42   | 5   | 115 | M8X15L | 101   | 111 |                     |
| J3Y        | 100 | 95  | 4   | 24 | 47   | 10  | 115 | M6X12L | 106   | 111 |                     |
| J4L        | 100 | 95  | 8   | 19 | 57   | 20  | 115 | M8X15L | 116   | 111 |                     |
| J4M        |     |     |     |    |      |     |     |        |       | 111 |                     |
| J4Y        | 100 | 95  | 8   | 20 | 57   | 20  | 115 | M8X15L | 116   | 111 |                     |
| J5L        |     |     |     |    |      |     |     |        |       | 111 |                     |
| J7Y        | 120 | 95  | 7   | 24 | 58   | 21  | 135 | M8X15L | 117   | 111 |                     |
| K3K        |     |     |     |    |      |     |     |        |       | 111 |                     |
| K3L        | 130 | 110 | 18  | 19 | 60   | 23  | 145 | M8X15L | 119   | 111 |                     |
| K3M        | 130 | 110 | 18  | 22 | 60   | 23  | 145 | M8X15L | 119   | 111 |                     |
| K3Y        | 130 | 110 | 18  | 24 | 60   | 23  | 145 | M8X15L | 119   | 111 |                     |
| K4Y        |     |     |     |    |      |     |     |        |       | 111 |                     |
| K5Y        |     |     |     |    |      |     |     |        |       | 111 |                     |
| K6M        |     |     |     |    |      |     |     |        |       | 111 |                     |
| K7M        |     |     |     |    |      |     |     |        |       | 111 |                     |
| L1M        |     |     |     |    |      |     |     |        |       | 111 |                     |
| Z9L        |     |     |     |    |      |     |     |        |       | 111 |                     |
| Z9M        |     |     |     |    |      |     |     |        |       | 111 |                     |

## With PAT-B320

|     |     |     |     |    |      |    |     |         |     |     |  |
|-----|-----|-----|-----|----|------|----|-----|---------|-----|-----|--|
| K3P | 130 | 110 | 6.5 | 28 | 57.5 | 11 | 145 | M8×15L  | 128 | 143 |  |
| K4P | 130 | 110 | 6.5 | 28 | 72.5 | 26 | 145 | M8×15L  | 143 | 143 |  |
| K6P | -   | -   | -   | -  | -    | -  | -   | -       | -   | 143 |  |
| L1P | -   | -   | -   | -  | -    | -  | -   | -       | -   | 143 |  |
| L1Q | -   | -   | -   | -  | -    | -  | -   | -       | -   | 143 |  |
| M3P | 150 | 130 | 9   | 28 | 67.5 | 21 | 165 | M10×18L | 138 | 143 |  |
| M4P | -   | -   | -   | -  | -    | -  | -   | -       | -   | 143 |  |
| P1P | 220 | 200 | 6   | 28 | 57.5 | 11 | 235 | M12×21L | 128 | 143 |  |
| Z9P |     |     |     |    |      |    |     |         |     | 143 |  |
| Z9Q |     |     |     |    |      |    |     |         |     | 143 |  |

## With PAT-B400

|     |     |       |   |    |      |      |     |        |       |  |  |
|-----|-----|-------|---|----|------|------|-----|--------|-------|--|--|
| L1R | 176 | 114.3 | 6 | 35 | 82.5 | 26.5 | 200 | M12X21 | 174.5 |  |  |
| P2R | 220 | 200   | 6 | 35 | 67.5 | 11.5 | 235 | M12X21 | 159.5 |  |  |

\* For dimensions in blanks, contact us.

| Stroke | A    | XA   |      |
|--------|------|------|------|
|        |      | MIN  | MAX  |
| 200    | 537  | 680  | 880  |
| 300    | 637  | 790  | 1090 |
| 400    | 737  | 900  | 1300 |
| 500    | 837  | 1010 | 1510 |
| 600    | 937  | 1115 | 1715 |
| 800    | 1137 | 1335 | 2135 |
| 1000   | 1337 | 1555 | 2555 |

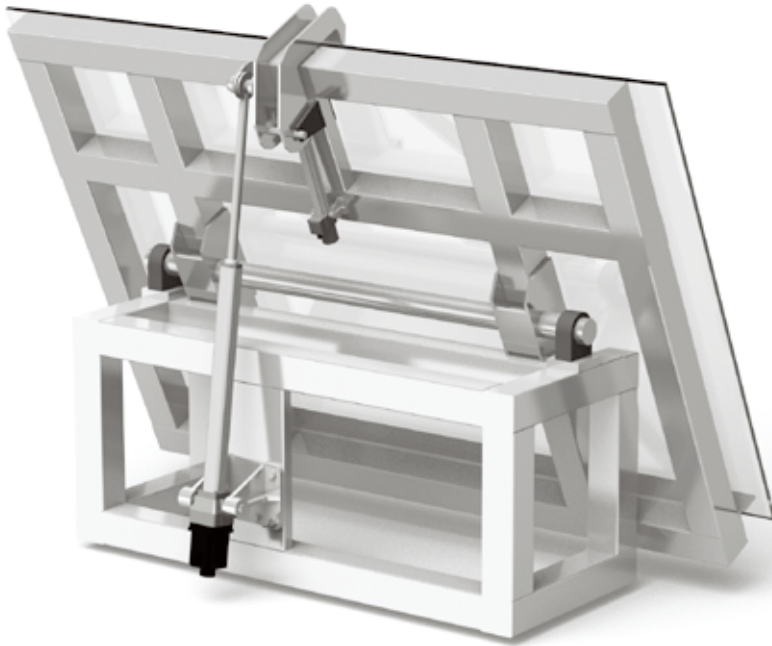
| Stroke | Mass            |                 |                 |
|--------|-----------------|-----------------|-----------------|
|        | (with PAT-B220) | (with PAT-B320) | (with PAT-B400) |
| 200    | 39.1            | 42.1            | 56.4            |
| 300    | 42.1            | 45.1            | 59.4            |
| 400    | 43.6            | 46.6            | 60.9            |
| 500    | 45.9            | 48.9            | 63.2            |
| 600    | 48.1            | 51.1            | 65.4            |
| 800    | 53.1            | 56.1            | 70.4            |
| 1000   | 57.1            | 60.1            | 74.4            |

\* The above mass does not include the mass of the servomotor.

## Application Solution

### Glass substrate tilting equipment

A large glass substrate is tilted for transfer to the next process by this equipment.



#### Points for adoption

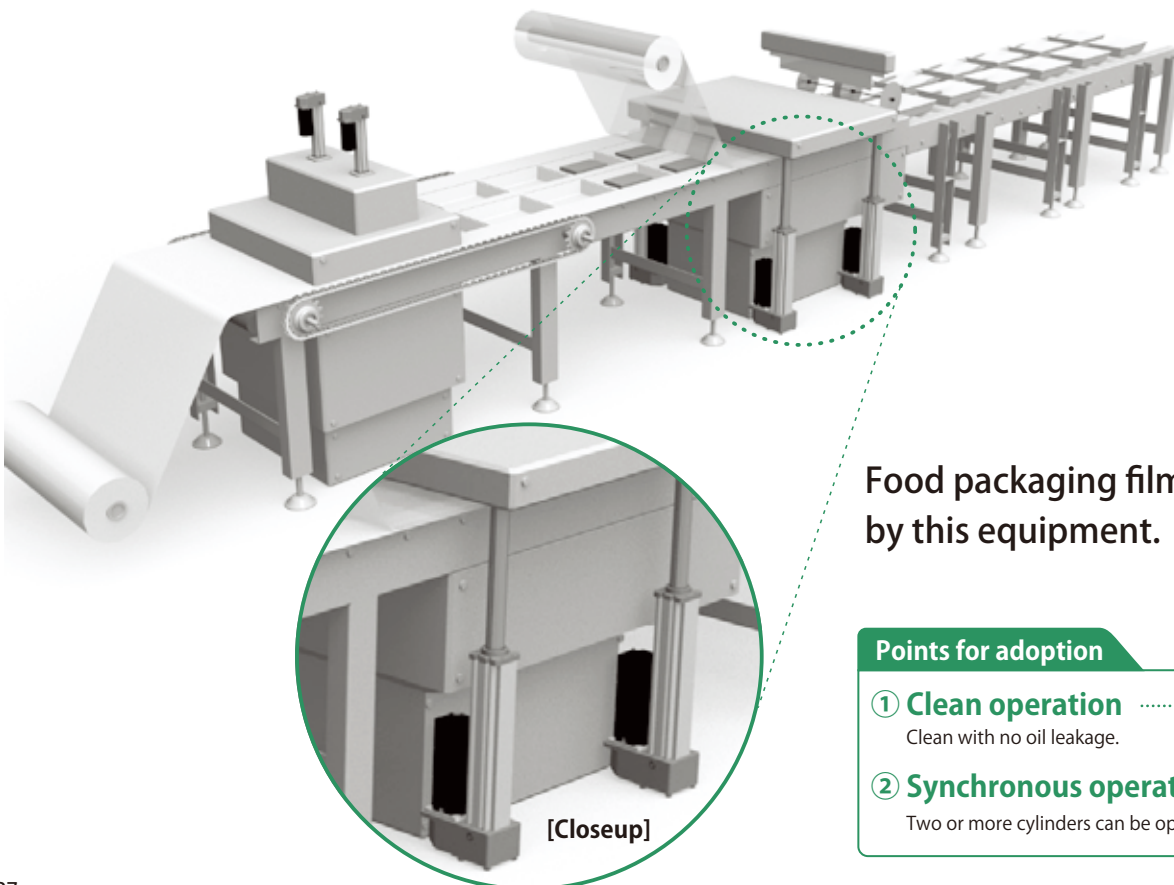
① **Swinging operation** .....

Swinging operation can be performed because the servo cylinder is pin-connected with the equipment.

② **High-frequency operation** .....

High-frequency operation with the frequency of starts 15 times/min. and a duty factor 50%ED can be performed.

### Film welding equipment



Food packaging films are welded by this equipment.

#### Points for adoption

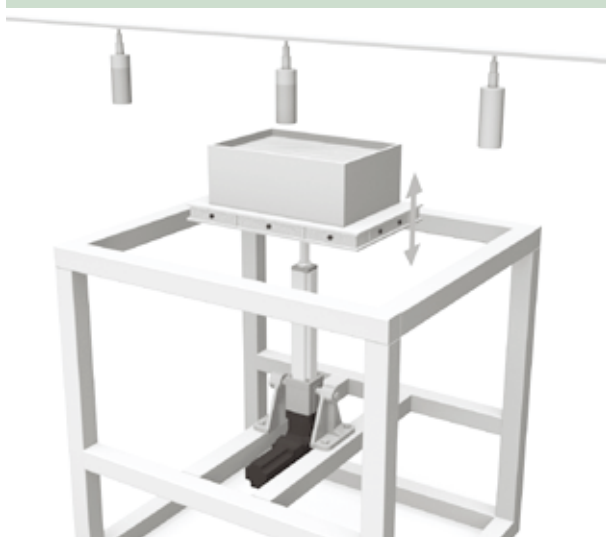
① **Clean operation** .....

Clean with no oil leakage.

② **Synchronous operation** .....

Two or more cylinders can be operated synchronously.

## Coating equipment

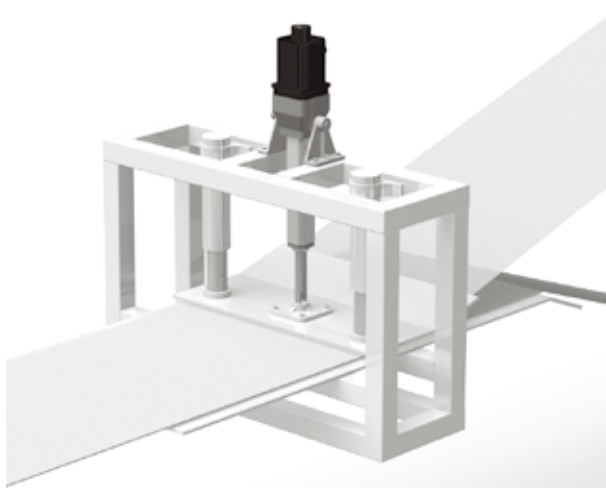


Workpieces are coated by moving up and down a tank containing a coating agent.

### Points for adoption

- ① **Accurate feeding operation** .....  
Accurate feeding operation is possible with the servo cylinder for a decrease in liquid level caused by the number of times of coating.
- ② **Shortening of overall length** .....  
In relation to the equipment, the overall length of the servo cylinder needs to be shortened, which is handled by an orthogonal type precision planetary reducer.

## Bonding equipment

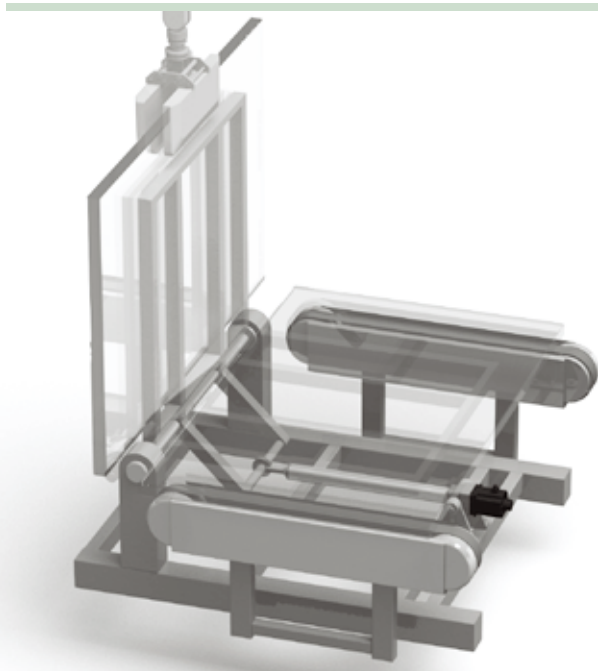


Two sheets of automotive parts are bonded by this equipment.

### Points for adoption

- ① **Accurate positioning** .....  
Fine positioning can be performed against jigs that differ in size according to sheet materials.
- ② **Torque control** .....  
Pressing force for bonding can be controlled.

## Workpiece erecting equipment



A glass substrate is erected for insertion into a cassette by this equipment.

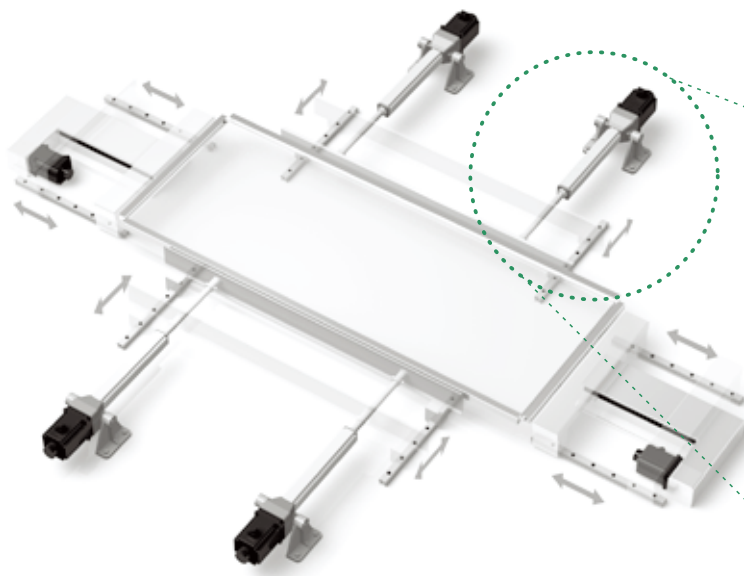
### Points for adoption

- ① **Accurate positioning** .....  
The glass substrate can be erected to an accurate position by the servo positioning function.
- ② **Selectable servomotor manufacturer** .....  
A desired servomotor manufacturer can be specified according to control compatibility with peripheral equipment.

## Application Solution

### Frame assembling equipment

Aluminum frames are accurately assembled (press-fit) to a product in four directions by this equipment.



#### Points for adoption

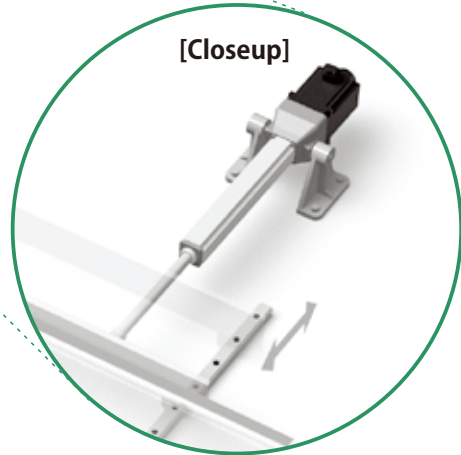
##### ① Torque control

At the time of assembly (press fitting), pressing force can be controlled as desired. (Pressing force differs according to product and shape.)

##### ② Wide-ranging speed variations

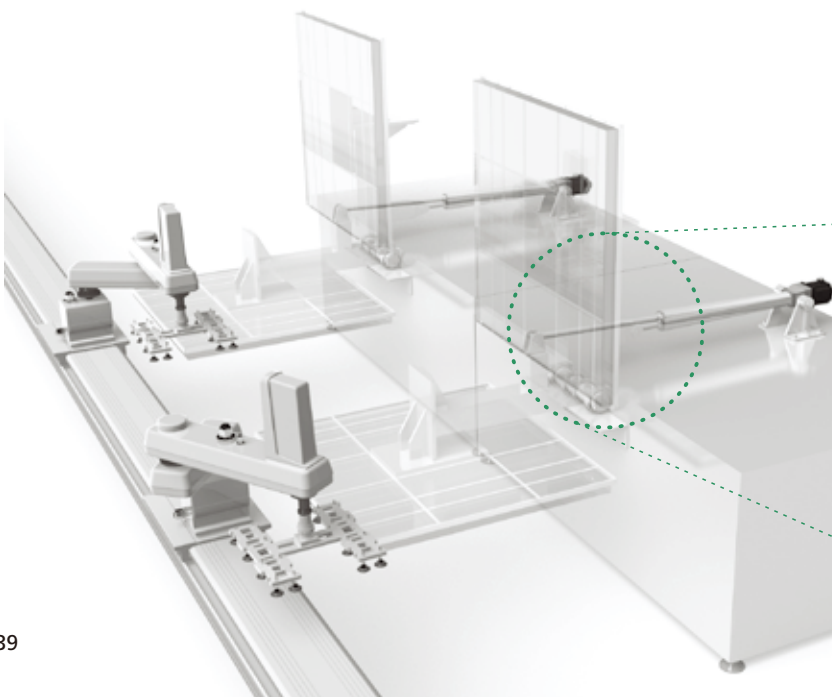
At the time of assembly (press fitting), operation is performed at low speed. At the time of return, operation can be performed at high speed, so that the cycle time can also be reduced.

[Closeup]



### Glass inspection equipment

Transferred glass is erected from 0 to 90 degrees and glass surfaces are inspected.



#### Points for adoption

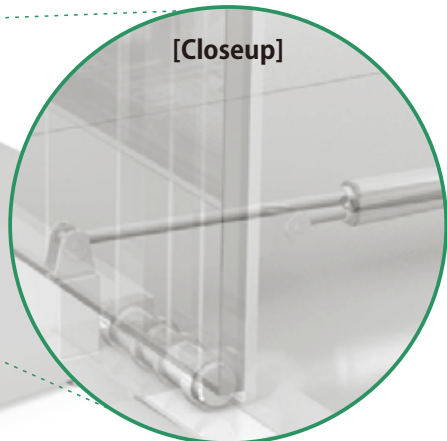
##### ① Support of large loads

Large loads of 8000N (up to 15000N) can be supported.

##### ② High-speed and high-precision positioning

Large loads can be positioned at a maximum speed of 333mm/s with high accuracy.

[Closeup]



## Press-fitting equipment (press)

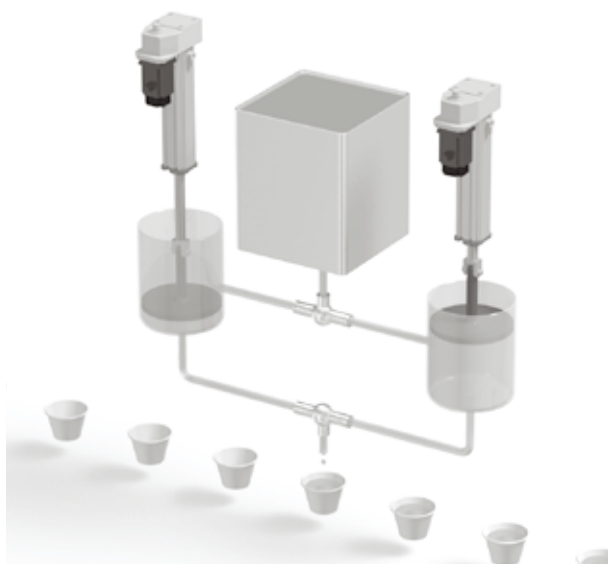


Diverse metallic parts are press-fit and assembled by this equipment.

### Points for adoption

- ① **Multiple-point positioning** .....  
Compared with air cylinders, positioning can be performed as desired.
- ② **Torque control** .....  
Pressing force is variable with workpieces and jigs.

## Injection equipment

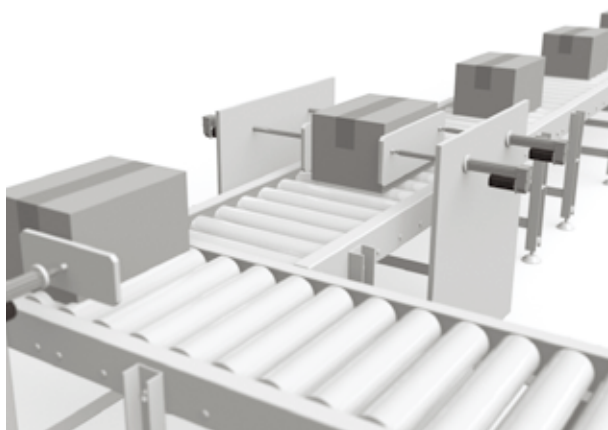


Diverse foods are quantitatively injected into special-purpose containers by this equipment.

### Points for adoption

- ① **Clean operation** .....  
Clean with no oil leakage.
- ② **Accurate speed control** .....  
Compared with conventional pump type, materials can be mixed in proportions and foods can be injected in accurately determined quantities by adjusting the speed of each piston.

## Equipment for arraying and pushing conveyed objects



Conveyed objects are arrayed on the roller conveyor as desired and ejected by this equipment.

### Points for adoption

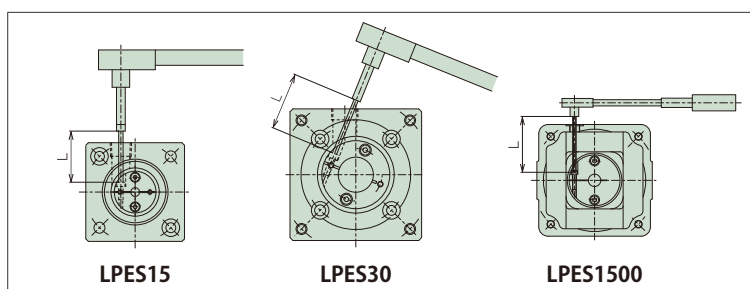
- ① **Accurate positioning** .....  
The servo positioning function allows desired arrays on the conveyor.
- ② **Torque control** .....  
Pressing force can be controlled according to the type of conveyed object.
- ③ **Flange mounting is possible depending on the installation space.**

## Servomotor mounting procedures (when installed by customer)

### Motor direct coupling

- 1 Prepare a servomotor. (An output shaft with/without keyway can be used.)
- 2 Set the servo motor with the coupling mounting hole of the motor flange facing upward. (□45 and □105 frames only)
- 3 Cleanly wipe away rust, dust, antirust oil, etc., of the motor shaft.
- 4 Loosen the clamp bolt of the coupling.
- 5 Remove the plug of the coupling case, turn the input shaft and set the clamp bolt head of the coupling to the position of the plug hole.  
⚠ For LPES30, there is a need to insert a torque wrench at an angle as shown below.
- 6 Smoothly insert the motor shaft to the coupling.  
⚠ If the motor is turned in the direction of rotation, the phase to the clamp bolt may be shifted.
- 7 Pay sufficient attention not to insert the motor shaft in a tilted manner.
- 8 After inserting the spigot facing part completely, attach it with the motor attaching bolt.
- 9 Using a torque wrench, tighten the clamp bolt of the coupling at the specified tightening torque.
- 10 Attach the removed plug to the coupling case.

\* Refer to the instruction manual for details.

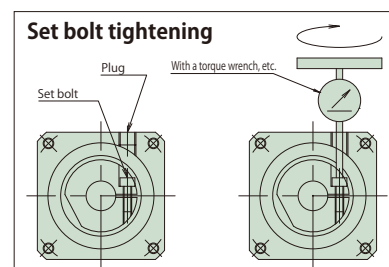


| Model number | Coupling bolt size | Tightening torque N·m (kgf·m) | L mm |
|--------------|--------------------|-------------------------------|------|
| LPES15       | M2                 | 0.5 {0.04}                    | 30   |
| LPES30       | M2.5               | 1.0 {0.10}                    | 40   |
| LPES150      | M4                 | 3.8 {0.39}                    | 60   |
| LPES300      |                    |                               | 70   |
| LPES1500     | M6                 | 12 {1.22}                     | 90   |

### With precision planetary reducer

#### 1. When the motor shaft is round

- 1 Set the reducer with the motor mounting surface upward.
- 2 Cleanly wipe rust, dust, rust inhibitor, etc., off the motor shaft.
- 3 Remove the plug from the adapter, turn the input shaft, and align the bolt head with the position of the plug hole.
- 4 Check that the set bolt has been loosened with a hexagonal spanner, etc.
- 5 Smoothly insert the motor shaft in the input shaft hole. At this time, be aware that if the motor shaft is inserted in a tilted manner, galling with the shaft hole, etc., will occur, resulting in failure to mount properly.
- 6 After complete insertion of the spigot portion, completely fix the motor to the adapter at an appropriate tightening torque.
- 7 Tighten the set bolt of the input shaft with a torque wrench or the like at the tightening torque in the following table. At this time, be aware that if it is tightened at under the specified torque, looseness of the set bolt can lead to problems, such as a slip of the motor shaft.  
Do not apply Loctite and other anti-loosening agents to the set bolt. Proper tightening torque may not be obtained, resulting in insufficient tightening.
- 8 Attach the plug. Now, the motor setting is completed.



It is assumed that the clamp fit may slide with an unexpected impact. Give consideration to a separate safety mechanism for elevation drive, etc.

#### Set bolt tightening torque table

| Reducer frame No. | Motor shaft diameter mm | Bolt size mm | Hexagonal wrench width across flats mm | Tightening torque N·m |
|-------------------|-------------------------|--------------|----------------------------------------|-----------------------|
| PAT-B120          | Single reduction        | ≤11          | M3 ×0.5P ×8L                           | 2.5                   |
|                   | Double reduction        | ≤11          | M3 ×0.5P ×8L                           | 2.1                   |
| PAT-B160          | Single reduction        | ≤14          | M4 ×0.7P ×12L                          | 3                     |
|                   | Double reduction        | ≤11          | M3 ×0.5P ×8L                           | 2.5                   |
| PAT-B220          | Single reduction        | ≤24          | M5 ×0.8P ×14L                          | 4                     |
|                   | Double reduction        | ≤14          | M4 ×0.7P ×12L                          | 3                     |
| PAT-B320          | Single reduction        | ≤32          | M6 ×1P ×16L                            | 5                     |
|                   | Double reduction        | ≤24          | M5 ×0.8P ×14L                          | 4                     |
| PAT-B400          | Single reduction        | ≤38          | M8 ×1.25P ×20L                         | 6                     |
|                   | Double reduction        | ≤32          | M6 ×1P ×16L                            | 5                     |

\* The bolt tightening torque should be in the range of the above numerical values multiplied by 1.0 – 1.2.

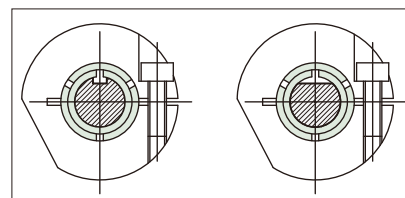
#### Motor mount bolt tightening torque table

| Bolt size mm | Hexagonal wrench width across flats mm | Tightening torque N·m |
|--------------|----------------------------------------|-----------------------|
| M3 ×0.5P     | 2.5                                    | 1.8                   |
| M4 ×0.7P     | 3                                      | 4.1                   |
| M5 ×0.8P     | 4                                      | 8.2                   |
| M6 ×1P       | 5                                      | 14                    |
| M8 ×1.25P    | 6                                      | 34                    |

#### 2. Mounting a keyed motor

A keyed motor shaft can be used in clamp type as is the case with a round shaft by removing the key.

Set the motor shaft keyway (D cut), each slit, and set bolt in position as shown in the illustration on the right-hand side. Other procedures for mounting to the reducer are the same as the round shaft's case.





# WARNING

## Cautions for selecting

- Anti-rod rotation mechanism is not provided with this cylinder. Turning force is generated to the rod owing to the thrust, make sure to perform prevention of rotation on the equipment side.  
The turning force placed on the rod at the time of the maximum thrust is as shown in the following table.

| Model number                     | LPES15          | LPES30          | LPES150        | LPES300        | LPES1500       |
|----------------------------------|-----------------|-----------------|----------------|----------------|----------------|
| Rod turning force N·m<br>{kgf·m} | 0.16<br>{0.016} | 0.32<br>{0.031} | 1.60<br>{0.16} | 3.19<br>{0.33} | 26.6<br>{2.72} |

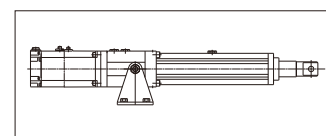
- Load holding mechanism is not provided with this cylinder in the cylinder main body. If a dangerous situation is anticipated during stoppage and when the product is broken, use a servomotor with a magnetic brake to hold the load, or provide a brake mechanism outside. It is same to use for elevating device or horizontal use and displacement is problem.
- Structurally, this power cylinder is an indoor type. Since there are problems, such as rust formation, store in a good indoor environment. Pay sufficient attention to humidity. Be aware that if it is installed in a place where the temperature changes rapidly, condensation will occur, causing failure or rust.
- Do not store or use in a corrosive atmosphere. Also, it cannot be used in a flammable atmosphere.
- Do not use in a place where there is no expectation for heat dissipation, such as in a closed container because doing so will cause failure.

## Cautions for installation

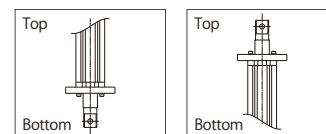
- Use a trunnion mount or a flange mount (possible only for LPES150 or smaller) to install the main body. When used with oscillation, select an I-type or a U-type end fitting. If a lateral load is applied, provide a guide so as not to receive the direct lateral load or the bending moment.
- When it is installed with a flange mount, install it in the vertical direction. (Refer to the figure at the right.)  
\* When considering use of a flange mount for a type of LPES300 or larger, please contact TEM beforehand.
- For use in a static condition without swinging the cylinder, select ① Flange mount or ② Trunnion mount + foot mount. It can be installed either horizontally or vertically. (□45 frame only)
- When it is used horizontally for a long stroke, support the bottom part of the frame end as shown in the figure below. At this point, do not fix the frame and the supporting base.



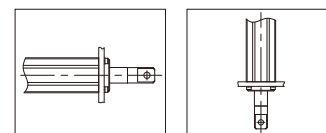
Frame end support  
(Do not fix.)



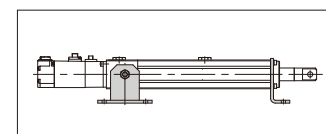
Trunnion mount



Flange mount



① Flange mount



② Trunnion mount + foot mount

## Cautions for use

- Overload protection mechanism is not provided with this cylinder in the cylinder main body, so provide protection against overvoltage, overcurrent, overload of the servo driver (servo amplifier). Additionally, manufacture the opposite side equipment of the power cylinder with a strength sufficient to withstand the maximum torque of the servomotor.
- Manual operation shaft is not provided with this cylinder for a structural reason, so adjust the cylinder position by operating the servo driver (servo amplifier) at very low speed.
- Daphne Eponex SR No.2 is applied to the screw shaft of this cylinder at the time of shipment, however, periodic lubrication is required. Refer to the table at the right for the lubrication amount of grease and the lubrication cycle.

The application amount of the grease is 10 – 15g per stroke of 100mm.

And as grease for maintenance, JWGS100G is available (sold separately) from our company.

| Frequency of operation          | Lubrication cycle         |
|---------------------------------|---------------------------|
| 1000 reciprocations/day or more | Every 1 month – 3 months  |
| 500 – 1000 reciprocations/day   | Every 3 months – 6 months |
| 100 – 500 reciprocations/day    | Every 6 months – 1 year   |
| 10 – 100 reciprocations/day     | Every 1 year – 1.5 years  |

● On the rod periphery, apply grease according to the lubrication cycle so that an oily film does not run out. Use the same grease as the one used for the screw.  
● Determine the lubrication cycle according to the situation of operation.

## Power cylinder eco series CDS type

# New type power cylinders designed exclusively for press contact stop, and just fit for motorized air cylinders.

### Self-contained

Cylinders are exclusive to press contact stop. Overcurrent is detected to stop the motor automatically.

### Simple operation

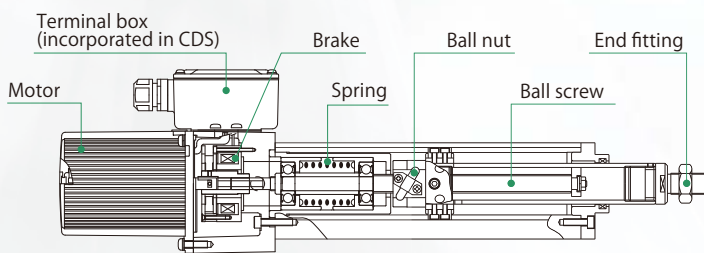
Best suited to operation between two points, like air cylinders. No intermediate stop can be made.

### Simple wiring

Operation can be performed by simply connecting the three-phase power supply. No limit switch for stroke adjustment is required.



## Structure of SpeedMech



The basic structure of this electric cylinder is a combination of a screw and motor, which is the same as conventional power cylinders.

This SpeedMech enables the cylinder to stop without a limit switch by the combination of the spring built into the actuating part and the special board (CDS) mounted in the terminal box.

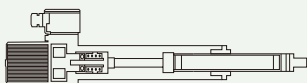
Also, compared with conventional electric cylinders, life is extended through the adoption of the first ball screw in this size and also the holding brake that is actuated after the motor is stopped.

## Operating principle of SpeedMech

1

### The cylinder extends.

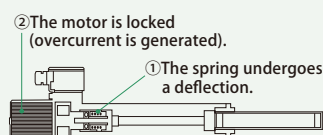
The cylinder rod extends by an extend signal. The rod stops in the middle of stroke due to the stopper, etc., of the equipment on the other side. Or, the rod stops when reaching the stroke end.



2

### The spring undergoes a deflection to lock the motor.

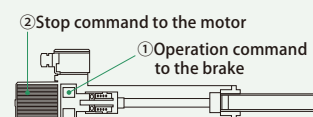
As the rod has stopped, the spring undergoes a deflection. At the same time, the motor is locked and the current value rises suddenly (overcurrent is generated).



3

### The brake is actuated to stop the motor.

The rise in current value is detected by the CDS, and an operation command is sent to the brake. Subsequently, a stop command is sent to the motor to stop the motor. At this time, a pressing force is maintained by the brake force.



## Model No. designation

① **LPE**    
 ② **100**    
 ③ **L**    
 ④ **K**    
 ⑤ **5**    
 ⑥ **MSIJ**

**① Product/series name**  
Power Cylinder  
Eco series

**② Rated thrust**  
025 : 250N {25.5kgf}  
050 : 500N {51.0kgf}  
100 : 1000N {102kgf}

**③ Rated speed**  
L and H: check the actual speed  
with reference to  
the standard model list

**④ Main body shape**  
T: straight  
K: parallel

**⑤ Stroke**  
1 : 100mm    4 : 400mm  
2 : 200mm    5 : 500mm  
3 : 300mm    6 : 600mm

**⑥ Options**  
M: anti-rod rotation specifications  
S: with magnetic sensor\*  
I: I-type end fitting (the standard end part is a screw shape.)  
U: U-type end fitting  
J: bellows

\* When a magnetic sensor is equipped, anti-rod rotation specifications are always adopted. (Code: MS)

## Standard model list

| Model number | Rated thrust<br>N {kgf} | Rated speed mm/s<br>200/200/220V<br>50/60/60Hz | Motor output                | Standard<br>stroke<br>mm |
|--------------|-------------------------|------------------------------------------------|-----------------------------|--------------------------|
| LPE025H      | 250 {25.5}              | 160/190/200                                    | 0.25N·m (50W or equivalent) | 100                      |
| LPE050L      | 500 {51.0}              | 90/100/110                                     | 0.25N·m (50W or equivalent) | 200<br>300               |
| LPE050H      | 500 {51.0}              | 160/170/190                                    | 0.50N·m (90W or equivalent) | 400                      |
| LPE100L      | 1.00k {102}             | 90/90/110                                      | 0.50N·m (90W or equivalent) | 500<br>600               |

\* Pressing force varies depending on the machine type, and is two or three times the rated thrust.

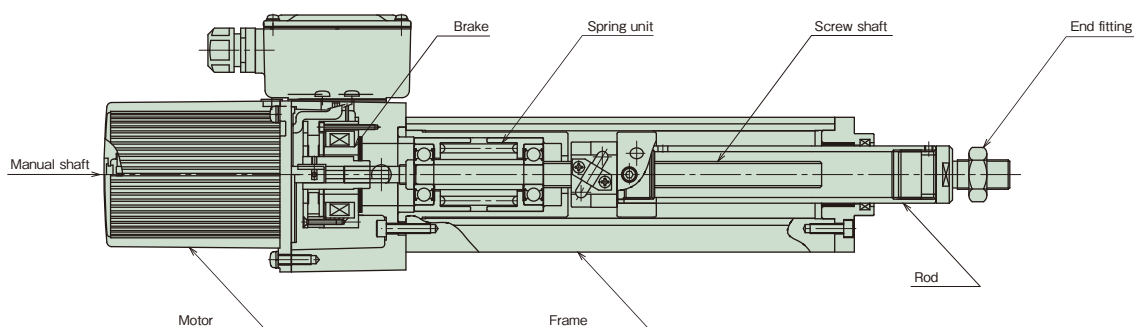
## Standard environment of use

| Model<br>Environment   | Indoor type                    |
|------------------------|--------------------------------|
| Ambient temperature    | 0~40°C                         |
| Relative humidity      | 45~85% (non-condensing)        |
| Shock resistance value | 0.5G or less                   |
| Installation altitude  | 1000m or lower above sea level |
| Ambient                | Normally indoors*              |

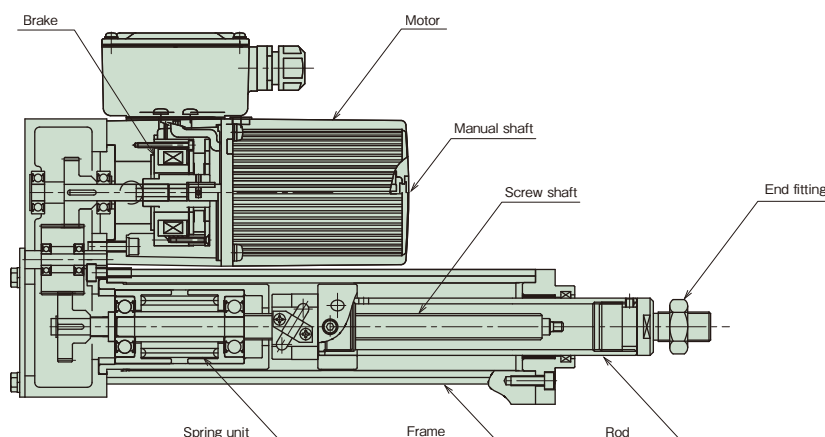
\* Normally indoors means no exposure to wind, rain and water, and dust at a level inside an ordinary factory.

## Structure

### Straight

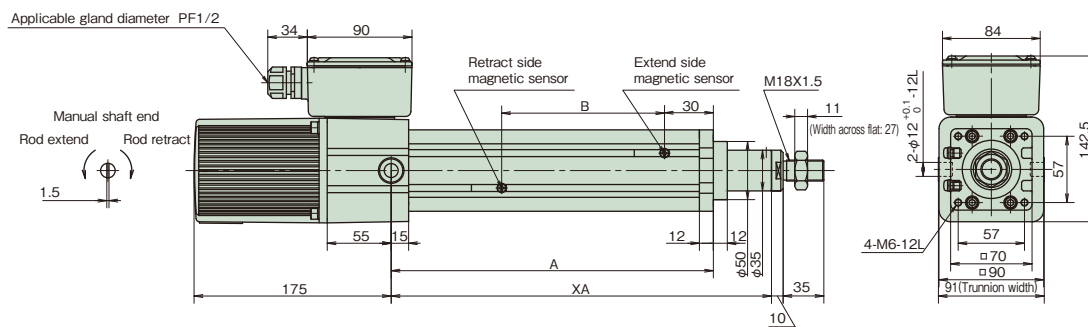


### Parallel



## Dimensions Table

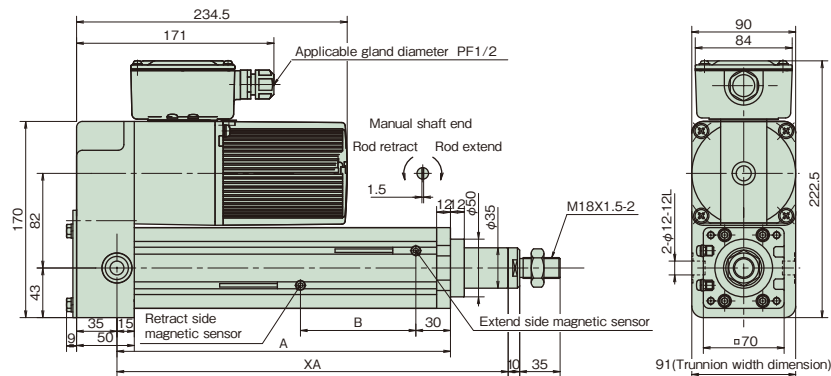
### Straight



Unit: mm

| Model                                    | Main body shape | Stroke | A   | B   | XA  |      | Approximate mass (kg) |
|------------------------------------------|-----------------|--------|-----|-----|-----|------|-----------------------|
|                                          |                 |        |     |     | MIN | MAX  |                       |
| LPE025H<br>LPE050L<br>LPE050H<br>LPE100L | T               | 100    | 289 | 100 | 339 | 439  | 9                     |
|                                          |                 | 200    | 389 | 200 | 439 | 639  | 10                    |
|                                          |                 | 300    | 489 | 300 | 539 | 839  | 11                    |
|                                          |                 | 400    | 589 | 400 | 639 | 1039 | 12                    |
|                                          |                 | 500    | 689 | 500 | 739 | 1239 | 13                    |
|                                          |                 | 600    | 789 | 600 | 839 | 1439 | 14                    |

### Parallel



Unit: mm

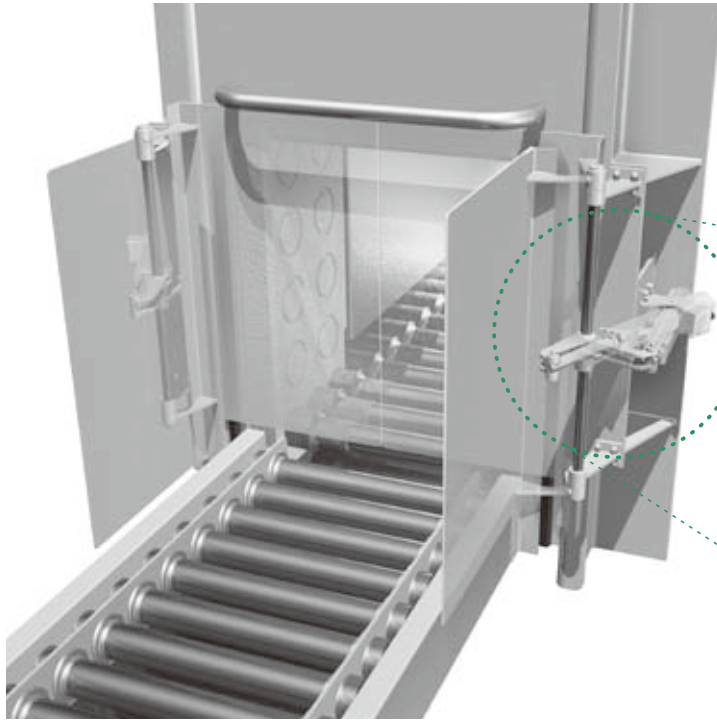
| Model                                    | Main body shape | Stroke | A   | B   | XA  |      | Approximate mass (kg) |
|------------------------------------------|-----------------|--------|-----|-----|-----|------|-----------------------|
|                                          |                 |        |     |     | MIN | MAX  |                       |
| LPE025H<br>LPE050L<br>LPE050H<br>LPE100L | K               | 100    | 289 | 100 | 339 | 439  | 14                    |
|                                          |                 | 200    | 389 | 200 | 439 | 639  | 15                    |
|                                          |                 | 300    | 489 | 300 | 539 | 839  | 16                    |
|                                          |                 | 400    | 589 | 400 | 639 | 1039 | 17                    |
|                                          |                 | 500    | 689 | 500 | 739 | 1239 | 18                    |
|                                          |                 | 600    | 789 | 600 | 839 | 1439 | 19                    |



## Application Solution

### Heat treatment furnace <for door opening and closing> [Link structure](#)

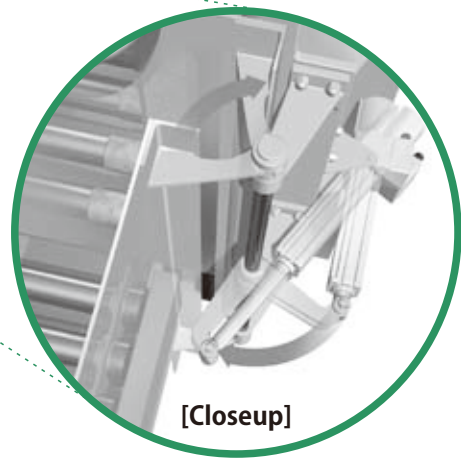
#### ● Substitution for pneumatic cylinders



#### <Door opening and closing at a transfer outlet>

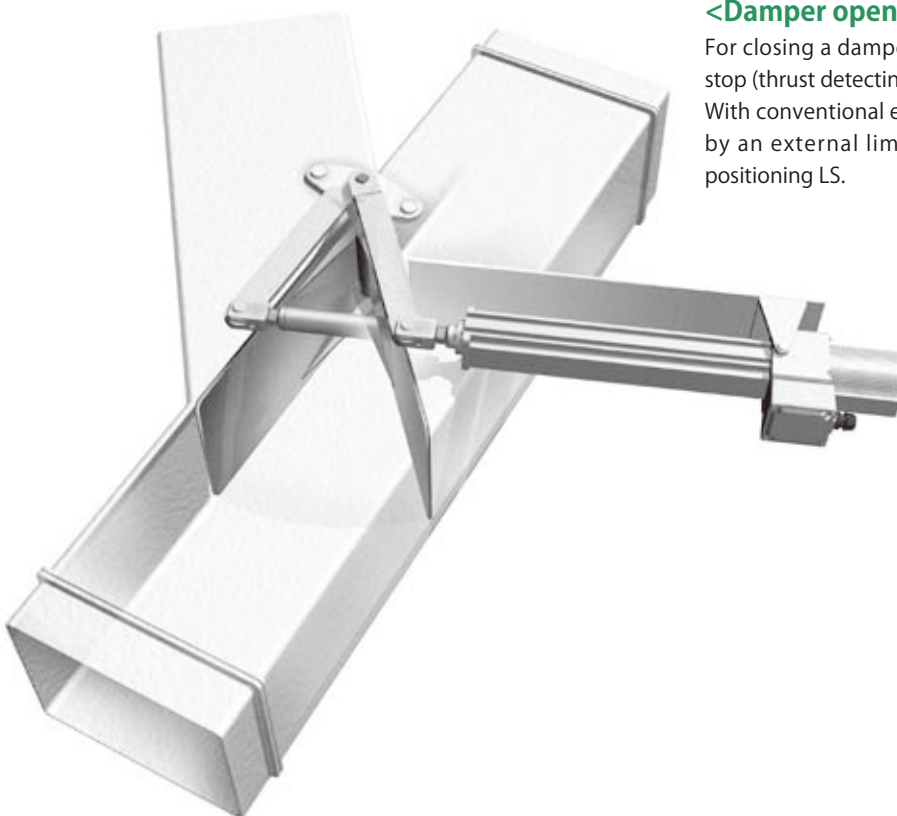
For door opening and closing at a heat treatment furnace outlet for metallic parts, the SpeedMech enabling reliable closing and holding of pressing force has been adopted because of the problem of a pneumatic cylinder, which would conventionally be used: the door-closed state cannot be maintained due to air leakage.

It is usable because the temperature around the cylinder is 40°C or less.



### Air duct <for damper opening and closing> [Link structure](#)

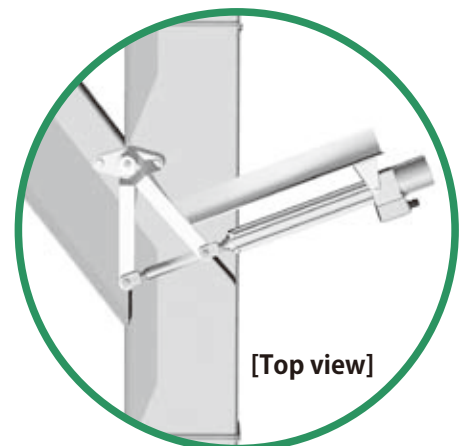
#### ● Substitution for other companies' electric cylinders



#### <Damper opening and closing>

For closing a damper reliably, the cylinder needs a press contact stop (thrust detecting mechanism).

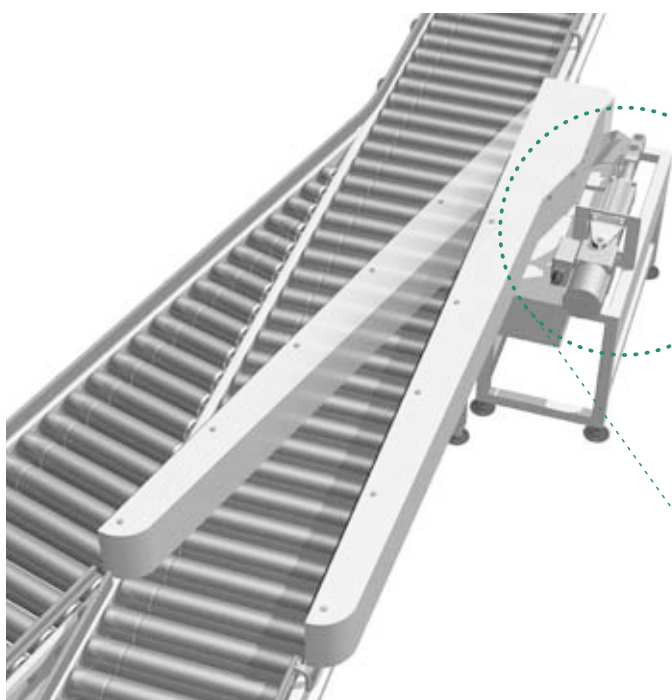
With conventional electric cylinders, stroke adjustments are made by an external limit switch, but the SpeedMech requires no positioning LS.



## Sorting <for roller conveyor>

Link structure

### ● Substitution for pneumatic cylinders

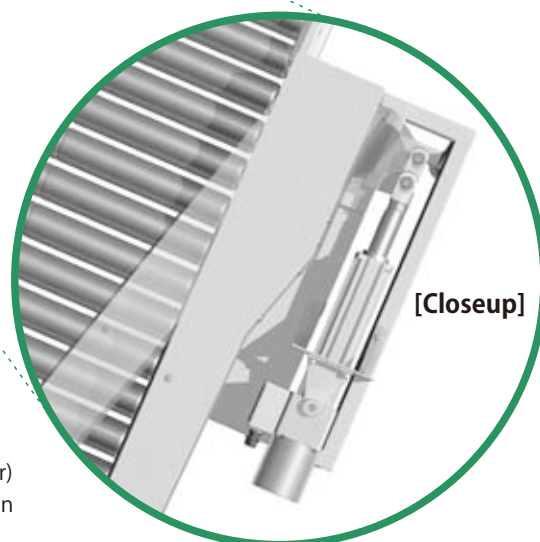


#### <Sorting (branching) of conveyed objects>

Since the destinations of conveyed objects are limited to two directions, reciprocations between two points are sufficient for the cylinder.

On the extending side, the cylinder extends to the stroke end and stops automatically. The same applies on the retracting side. Magnetic sensors are equipped because there is a need to remotely confirm the side on which the guide exists.

The SpeedMech and guide are a link mechanism.



#### <Roller conveyor>

Conveyed objects on the roller conveyor are guided by moving the guide (bar) for direction change according to their destinations. The SpeedMech has been adopted to drive this guide.

## Stopper

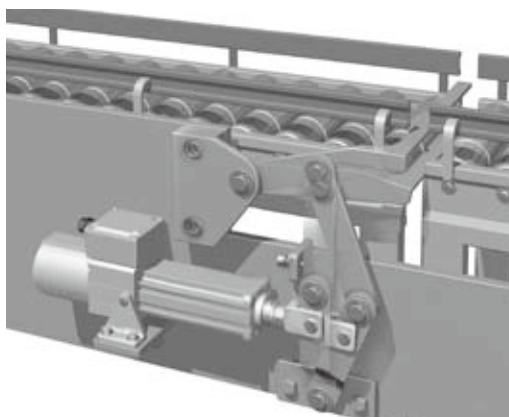
Link structure

### ● Substitution for pneumatic cylinders

A conveyed object on the conveyor is temporarily stopped by the stopper. When the cylinder rod fully extends, the stopper goes down, allowing the conveyed object to pass through. When the cylinder rod retracts to the backward limit, the stopper goes up to stop the conveyed object.

#### Points for adoption

- ① **Total cost reduction** .....  
Compared with air type, the total cost can be reduced. The running cost can also be reduced.
- ② **Environment-friendliness** .....  
Pneumatic type has adverse environmental effects caused by noise and oil mist generation.



## Pusher

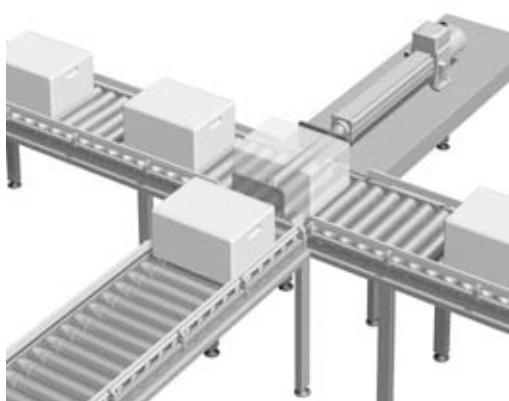
Direct-push structure

### ● Substitution for pneumatic cylinders

A specific object conveyed on the conveyor is pushed by the pusher to change the traveling direction. On the extending side, the cylinder extends to the stroke end to fully push the conveyed object with reliability. After the conveyed object is fully pushed, the cylinder rod is returned as quickly as possible.

#### Points for adoption

- ① **Simplified piping and wiring** .....  
In the case of air, piping and wiring become complicated because solenoid valves, speed controllers, etc., are required.
- ② **Cylinder speed** .....  
The speed, which is faster than that of conventional electric cylinders, cylinders virtually approaches that of pneumatic cylinders.

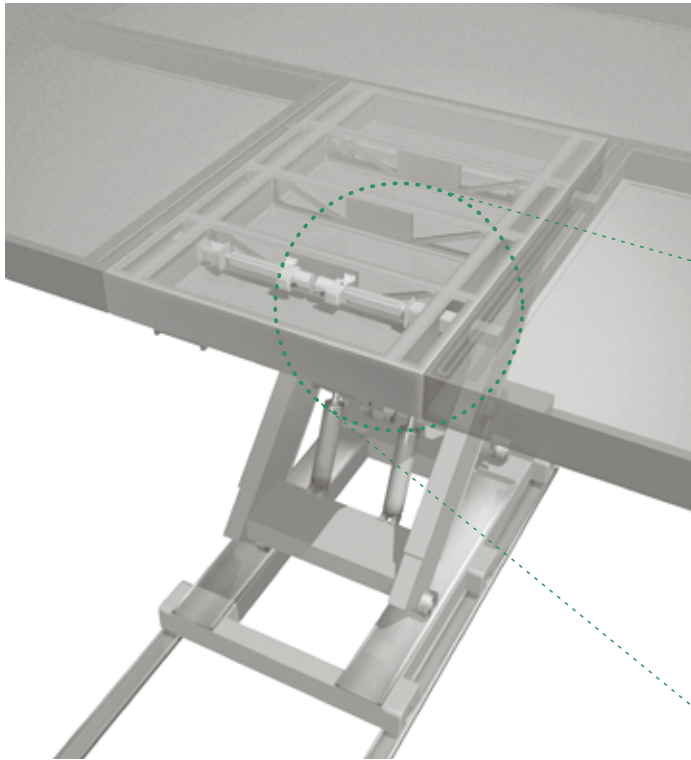


# Application Solution

## Lifter <for pin insertion to fix>

Direct-push structure

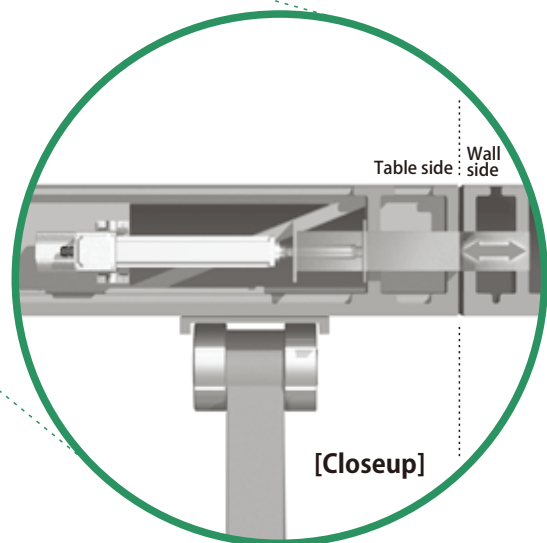
### ● Substitution for hydraulic cylinders



#### <Table fall prevention>

On the extending side, the cylinder stops automatically when hitting against the wall on the other side. On the retracting side, it stops at the stroke end.

The cylinder rod position is always checked by outputting a signal with the optional magnetic sensor. Also, since the equipment on the other side has no anti-rotation mechanism, the optional rod anti-rotation specification has been adopted.



#### <Table lifter>

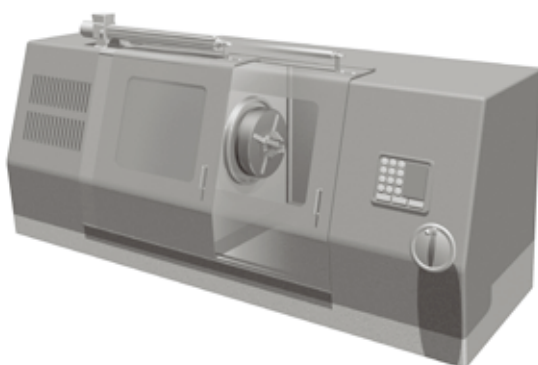
Using a hydraulic cylinder for table elevation, there is danger that the table may fall due to oil leakage from the hydraulic cylinder during an attempt to fix at the ascent position. The SpeedMech has been adopted to fix the table position.

## Door opening and closing

Direct-push structure

### ● Substitution for pneumatic cylinders

Generally, pneumatic cylinders are adopted for opening and closing the automatic doors of machines, such as lathes, but there is an increasing demand for motorization in consideration of environmental aspects. Also, wiring man-hours can be reduced compared with air piping and wiring.



#### Points for adoption

##### ① Environment-friendliness

Being free from noise and oil mist like pneumatic cylinders, the environmentally-friendly points have been well-recognized.

##### ② Simplified wiring

Compared with air piping, extra work and maintenance are not required because it can be actuated by the power line alone.

## Cutter

### Direct-push structure



#### ● Substitution for pneumatic cylinders

Bread dough in the hopper drops from the discharge spout, and the bread dough is cut by the opposing cylinders. Each cutter-equipped cylinder end stops just before the cutters collide with each other.

#### Points for adoption

##### ① Simplified piping and wiring

In the case of air, piping and wiring become complicated because solenoid valves, speed controllers, etc., are required.

##### ② Emergency stop

The cylinder brake is intended for holding, but in an emergency, it can urgently be stopped even in the middle of a stroke.

\* Cylinder end mounting flanges are not included as options.  
Also, centering is required for installation.

## Gate opening and closing

### Link structure



#### ● Substitution for hydraulic cylinders

When pouring fresh concrete into formwork, the gate (lid) is opened and closed.

The gate is closed by the cylinder in the pulling direction. If the fresh concrete has a high water content, there is a need to close the gate reliably in order to prevent leakage from the hopper.

Conventionally, a hydraulic cylinder would be adopted.

#### Points for adoption

##### ① High speed

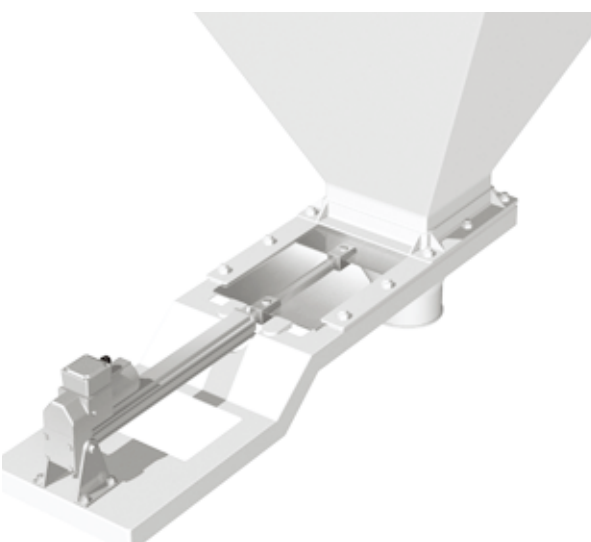
There is a need to close the gate quickly in order to secure a specified amount of pouring.

##### ② Reduction of piping and maintenance work

The hydraulic method requires time and effort, and cost for piping, and also maintenance should be performed.

## Shutter opening and closing

### Direct-push structure



#### ● Substitution for pneumatic cylinders

In the process of conveying grains, a fixed amount of raw materials in the tank is dropped down and weighed. At that time, when the shutter is opened and closed, it should quickly be performed because the material drops at a high speed. Also, there is a need to close the shutter reliably and hold the pressing force.

#### Points for adoption

##### ① High speed

The shutter is closed quickly to prevent more than a fixed amount of raw materials from dropping.

##### ② Holding of pressing force

After the shutter is closed, the state needs to be held. (Press contact stop)

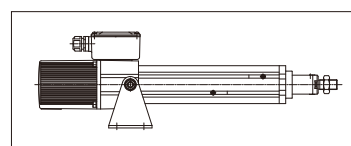
# **WARNING**

## **Cautions for selecting**

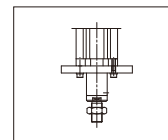
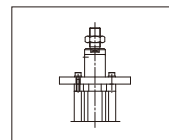
- No anti-rod rotation mechanism is attached to a cylinder with standard specifications. To use the end part freely, select the anti-rod rotation specifications (option).  
And when a magnetic sensor (option) is equipped, anti-rod rotation specifications are required.
- Refer to the allowable number table on page 46 to check that the number of the starts of selected cylinder is within the allowable range.
- If this cylinder is used for press or pull contact stopping, the strength of the equipment side must be 300% or more of the rated thrust.
- Structurally, this power cylinder is an indoor type. Since there are problems, such as rust formation, store in a good indoor environment. Pay sufficient attention to humidity. Be aware that if it is installed in a place where the temperature changes rapidly, condensation will occur, causing failure or rust.
- Do not store or use in a corrosive atmosphere. Also, it cannot be used in a flammable atmosphere.
- Do not use in a place where there is no expectation for heat dissipation, such as in a closed container because doing so will cause failure.

## **Cautions for installation**

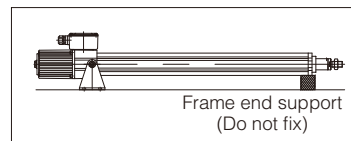
- Install the main body using a trunnion or a flange mount.  
When it is used with oscillation using a trunnion mount, select an I-type or an U-type end fitting.
- If lateral load is applied, provide a guide so as not to receive lateral load or bending moment directly.
- When it is installed with a flange mount, install it in the vertical direction. (Refer to the figure at the right.)
- When it is used horizontally for a long stroke, support the bottom part of the frame end as shown in the figure below. Do not fix the frame and the supporting base.



Trunnion mount



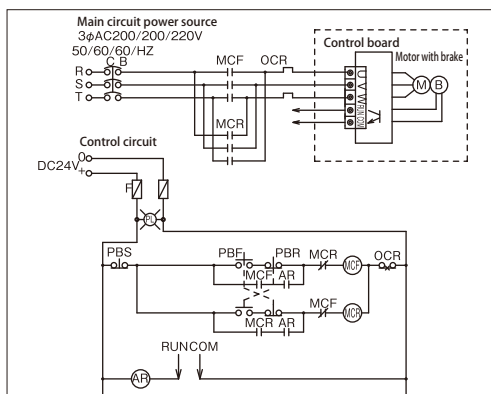
Flange mount



Frame end support  
(Do not fix)

## **Cautions for use**

- The motor stops when press or pull contact stops, however, on-the terminal block electricity is still being conducted. Never fail to cut off the main power source before working with the terminal box open.
- When adjusting the stroke manually, remove the cap bolt of the opposite load side of the motor, and turn the manual shaft with a flat-blade screwdriver or the like. However, use this only as an emergency since it is an operation with the brake working. And when operating manually, make sure to remove the load.
- Never use an inverter. This cylinder controls the press contact force by detecting overcurrent with the built-in CDS inside the terminal block and stopping the motor. If an inverter is used, the CDS circuit may be broken.
- Megger testing is prohibited for this cylinder. It may break the built in CDS. Remove all the terminals in the terminal block for megger testing of external circuits.
- Ensure the change over between extend and retract are at an interval of 0.2 seconds or more.
- The temperature around the motor may rapidly increase during operation and immediately after stopping. Do not touch around the motor part.
- Refer to the diagram below for connection and reference circuitry.



### **NOTE:**

- ① This is a single acting circuit diagram. The cylinder extends with the PBF and automatically stops with the press contact force at the stroke end or when hitting a wall in the middle of a stroke, etc. For retract, the cylinder retracts with the PBR and stops in the same manner as the extend side. Provide a circuit for allowing MCF and MCR to be turned OFF every time the cylinder stops.
- ② RUN and COM terminals can take out the output signal of the cylinder action.  
Open collector output: 50mA maximum 30V DC  
Coil current of the relay AR must be 50mA DC or less.
- ③ Use an electromagnetic contactor with a contact capacity of SC-0 made of a Fuji Electric or equivalent.

## Power Cylinder

# F series

### Thrust : 100N to 6.00kN {10.2kgf to 612kgf}

Small thrust type Power Cylinder, driven by DC (Battery) power source.

AC power source is also available with AC adaptor (Option).

Optimum for outdoor use, such as agricultural machine, multistory car parking.

#### ● Light weight, small type

Compact design where the operating part and the motor part are right angle.

#### ● Effective utilization of installation space

The hole of the clevis fitting is made in 2 directions at right angles to each other, the installation method can be selected from 4 directions so that it does not interfere with machine, etc.

#### ● Versatile power source

The DC power source type (12V DC, 24V DC) is standard. By using the AC adapter (sold separately), it can also be used with an AC power source. (LPF010, 020, 040 types)

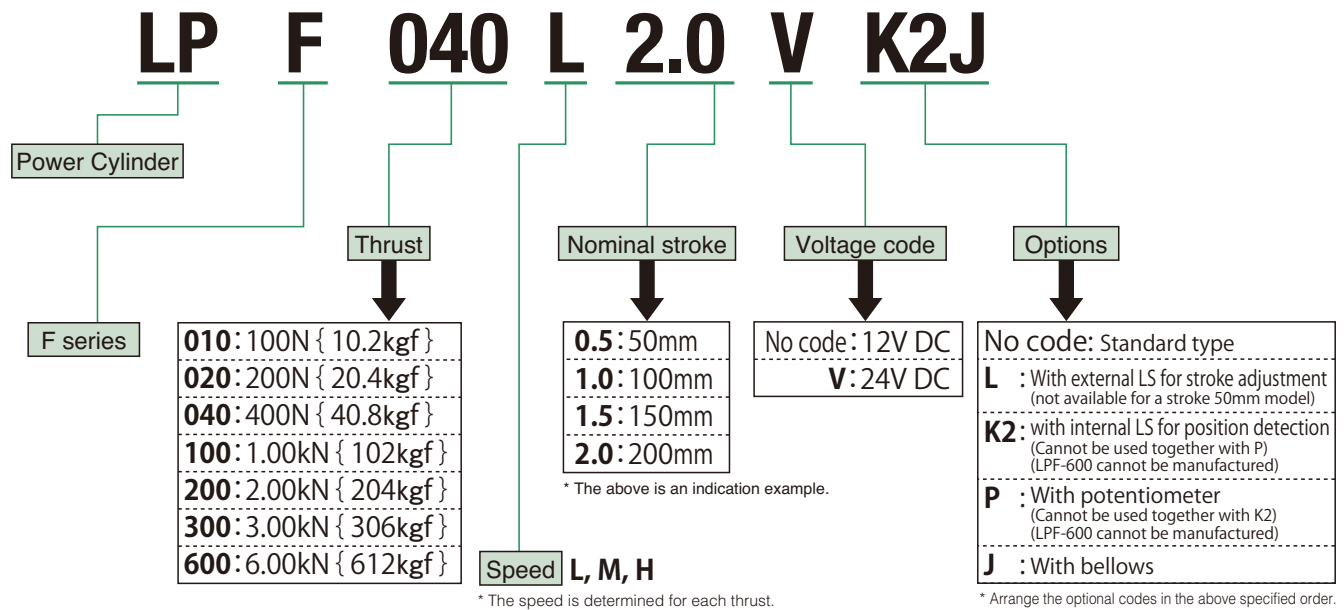
#### ● Wide variety of options

Various options are available in comparison to the conventional type.

- Stroke adjustment external limit switch
- Bellows
- Position detection unit (internal limit switch, potentiometer)
- Overload detection unit



## Model No. designation



## Standard model list

| Model number |     |         |       | Rated thrust |       | Stroke | Rated speed | Power source         | Rated load current | Locked rotor current |
|--------------|-----|---------|-------|--------------|-------|--------|-------------|----------------------|--------------------|----------------------|
|              |     |         |       | N            | {kgf} | mm     | mm/s        | V                    | A                  | A                    |
| LPF010H      | 0.5 | LPF010H | 0.5 V | 100          | 10.2  | 50     | 54          | 12 DC<br>or<br>24 DC | 3.2<br>(1.6)       | 16.7<br>(7.5)        |
|              | 1.0 |         | 100   |              |       |        |             |                      |                    |                      |
|              | 1.5 |         | 150   |              |       |        |             |                      |                    |                      |
|              | 2.0 |         | 200   |              |       |        |             |                      |                    |                      |
|              | 3.0 |         | 300   |              |       |        |             |                      |                    |                      |
| LPF020M      | 0.5 | LPF020M | 0.5 V | 200          | 20.4  | 50     | 24          |                      | 3.2<br>(1.6)       | 16.7<br>(7.5)        |
|              | 1.0 |         | 100   |              |       |        |             |                      |                    |                      |
|              | 1.5 |         | 150   |              |       |        |             |                      |                    |                      |
|              | 2.0 |         | 200   |              |       |        |             |                      |                    |                      |
|              | 3.0 |         | 300   |              |       |        |             |                      |                    |                      |
| LPF040L      | 0.5 | LPF040L | 0.5 V | 400          | 40.8  | 50     | 15          |                      | 3.7<br>(1.8)       | 16.7<br>(7.5)        |
|              | 1.0 |         | 100   |              |       |        |             |                      |                    |                      |
|              | 1.5 |         | 150   |              |       |        |             |                      |                    |                      |
|              | 2.0 |         | 200   |              |       |        |             |                      |                    |                      |
|              | 3.0 |         | 300   |              |       |        |             |                      |                    |                      |
| LPF100H      | 0.5 | LPF100H | 0.5 V | 1.00k        | 102   | 50     | 30          |                      | 18<br>(10)         | 63<br>(52)           |
|              | 1.0 |         | 100   |              |       |        |             |                      |                    |                      |
|              | 1.5 |         | 150   |              |       |        |             |                      |                    |                      |
|              | 2.0 |         | 200   |              |       |        |             |                      |                    |                      |
|              | 3.0 |         | 300   |              |       |        |             |                      |                    |                      |
| LPF200M      | 0.5 | LPF200M | 0.5 V | 2.00k        | 204   | 50     | 18          |                      | 22<br>(11)         | 63<br>(52)           |
|              | 1.0 |         | 100   |              |       |        |             |                      |                    |                      |
|              | 1.5 |         | 150   |              |       |        |             |                      |                    |                      |
|              | 2.0 |         | 200   |              |       |        |             |                      |                    |                      |
|              | 3.0 |         | 300   |              |       |        |             |                      |                    |                      |
| LPF300L      | 0.5 | LPF300L | 0.5 V | 3.00k        | 306   | 50     | 9           |                      | 22<br>(11)         | 63<br>(52)           |
|              | 1.0 |         | 100   |              |       |        |             |                      |                    |                      |
|              | 1.5 |         | 150   |              |       |        |             |                      |                    |                      |
|              | 2.0 |         | 200   |              |       |        |             |                      |                    |                      |
|              | 3.0 |         | 300   |              |       |        |             |                      |                    |                      |
| LPF600L      | 1.0 | LPF600L | 1.0 V | 6.00k        | 612   | 100    | 8           |                      | 20<br>(10)         | 63<br>(52)           |
|              | 2.0 |         | 200   |              |       |        |             |                      |                    |                      |
|              | 3.0 |         | 300   |              |       |        |             |                      |                    |                      |
|              | 4.0 |         | 400   |              |       |        |             |                      |                    |                      |
|              | 5.0 |         | 500   |              |       |        |             |                      |                    |                      |
|              | 6.0 |         | 600   |              |       |        |             |                      |                    |                      |

Note) 1. In the case of 24V DC, V is attached at the end of the model number.

2. The numerical value in parentheses is an electric current value at the time of 24V DC.

3. Use a power source with a sufficient capacity in consideration of the locked rotor current.

## Motor specifications

| Model      | Item | Voltage<br>V | Output<br>W | Rated time |
|------------|------|--------------|-------------|------------|
| LPF010 H   |      | 12           | 29          | 5 minutes  |
| LPF010 H V |      | 24           |             |            |
| LPF020 M   |      | 12           |             |            |
| LPF020 M V |      | 24           |             |            |
| LPF040 L   |      | 12           |             |            |
| LPF040 L V |      | 24           | 160         | 5 minutes  |
| LPF100 H   |      | 12           |             |            |
| LPF100 H V |      | 24           |             |            |
| LPF200 M   |      | 12           |             |            |
| LPF200 M V |      | 24           |             |            |
| LPF300 L   |      | 12           |             |            |
| LPF300 L V |      | 24           |             |            |
| LPF600 L   |      | 12           |             |            |
| LPF600 L V |      | 24           |             |            |

## Standard use environment

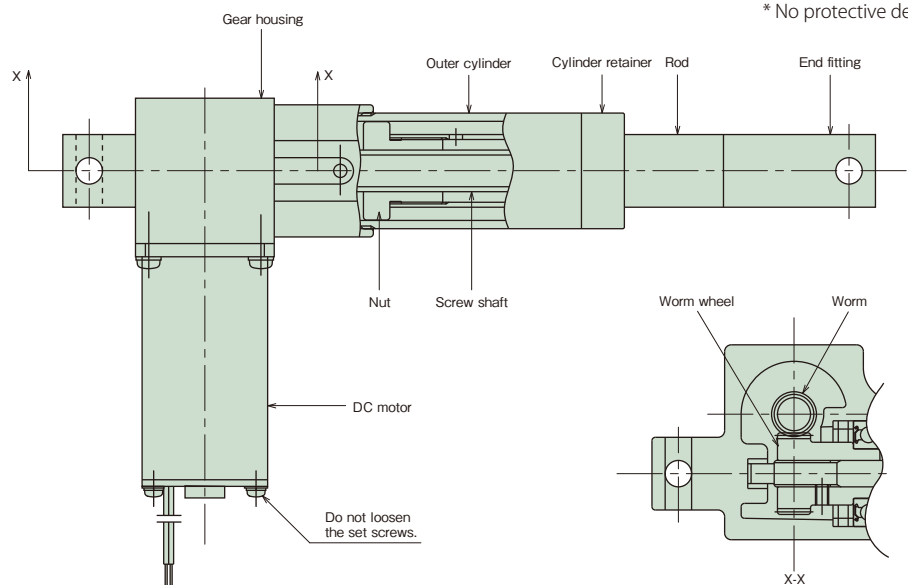
| Environment            | Model | Outdoor type                      |
|------------------------|-------|-----------------------------------|
| Ambient temperature    |       | -5°C~40°C                         |
| Relative humidity      |       | 85% or less (no dew condensation) |
| Shock resistance value |       | 1G or less                        |
| Installation altitude  |       | 1000m or lower above sea level    |
| Atmosphere             |       | Normally outdoors                 |

- 1) If used below the freezing point, the characteristics of the cylinder (current value, speed) may change from the influence of grease.
- 2) Cylinders with bellows are recommended in an excessively dusty location.
- 3) All models are totally enclosed structures so that they can be used normally outdoors, however, when exposed to constant adverse conditions such as water, steam and snow accumulation, an appropriate cover is required. When using at 40°C or higher, always protect with a heat insulating cover, etc. Never use in a flammable atmosphere. Otherwise it may cause an explosion and fire. In addition, avoid using in a location where vibration or shock exceeding 1G is applied.
- 4) For use in a misty atmosphere, contact us.

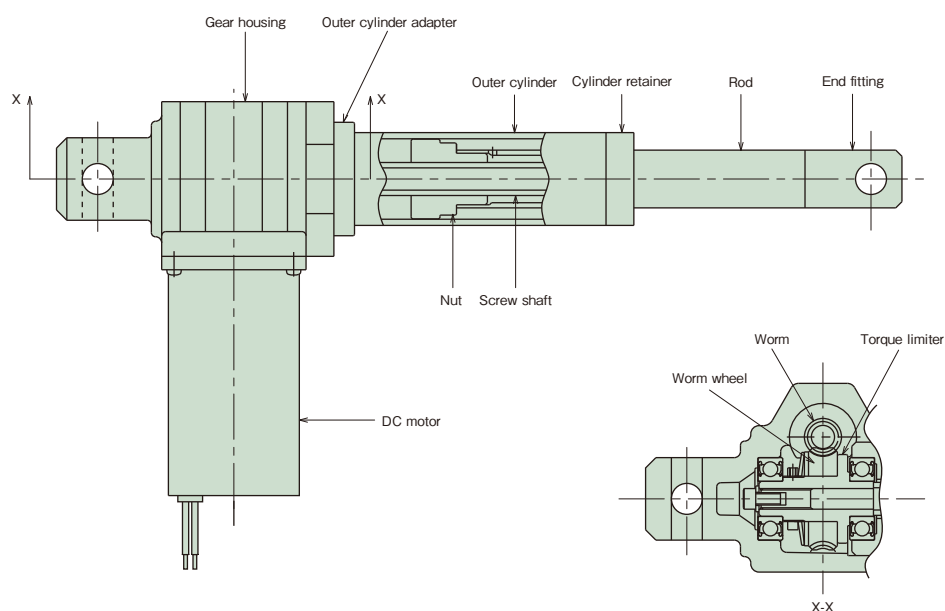
## Structure

## LPF010~LPF040

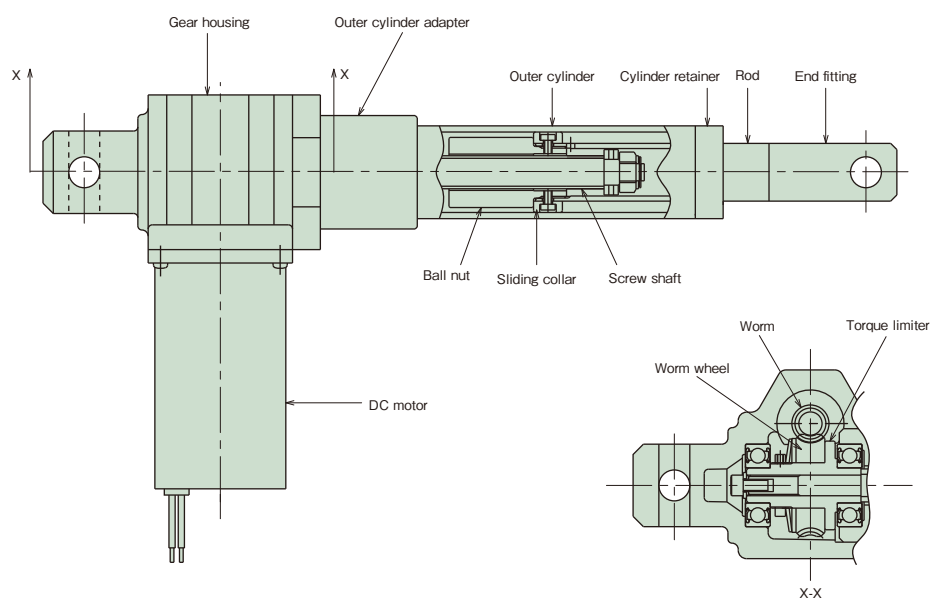
\* No protective device is equipped.



## LPF100~LPF300



## LPF600



## Selection

### Operating conditions required for selection

- |                                 |               |                                                 |
|---------------------------------|---------------|-------------------------------------------------|
| 1. Used machine and application | 3. Stroke mm  | 5. Frequency of operation, number of start/min. |
| 2. Thrust or load N { kgf }     | 4. Speed mm/s | 6. Power voltage, frequency                     |

### Selecting procedures

1. Select a suitable model number based on the thrust or load N { kgf }, stroke mm, speed mm/s.
2. Use the cylinder at an allowable operating frequency 2 times/min., allowable duty factor: 25%ED (5 minute basis), as for the frequency of operation.

The Working time rate is a ratio of the operating time per 5 minutes on a 5-minute basis.

$$\text{Working time rate (\%ED)} = \frac{\text{Operating time of 1 cycle}}{\text{Operating time of 1 cycle} + \text{dwell time}} \times 100\%$$

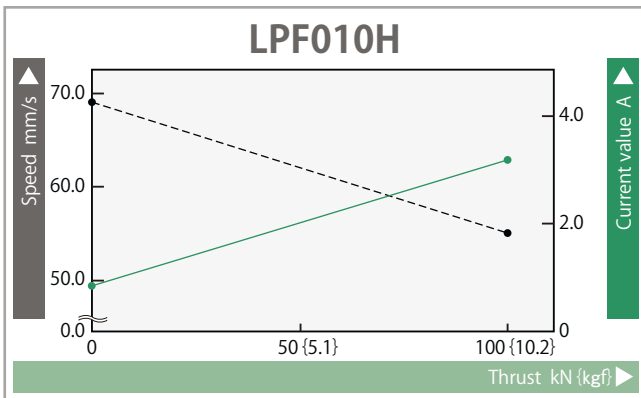
### Duration of life as a guide

Duration of life is 15,000 reciprocations, as a guide.

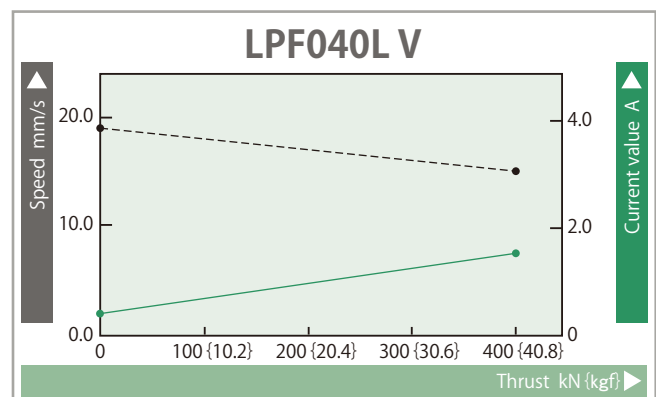
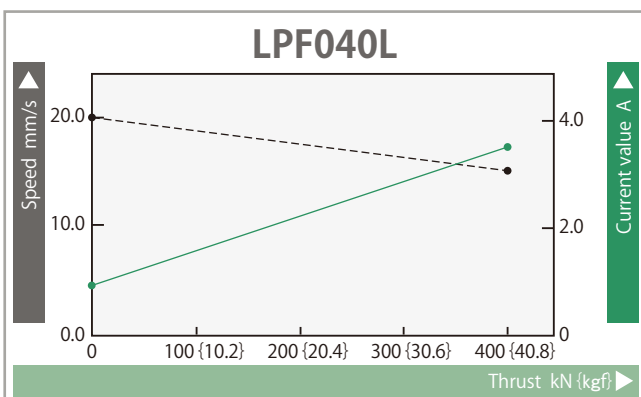
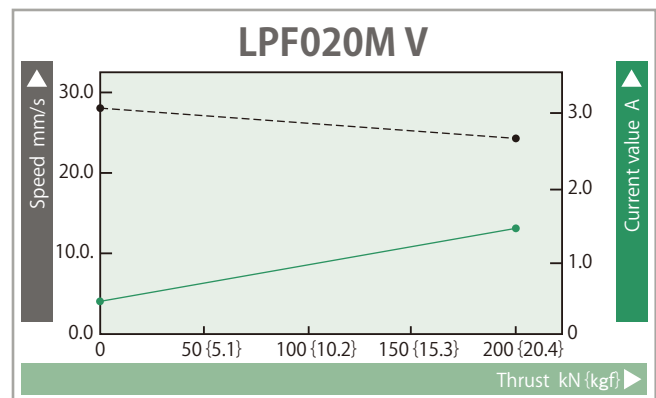
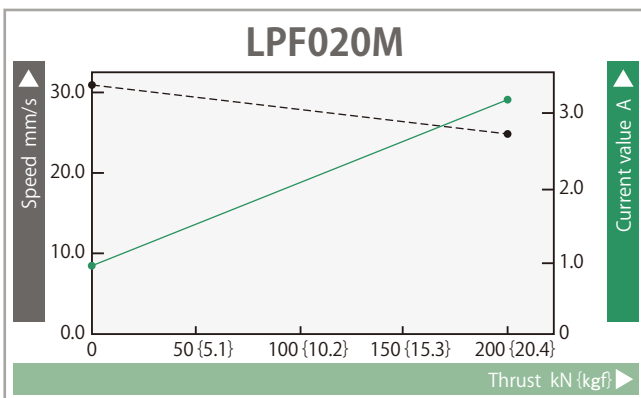
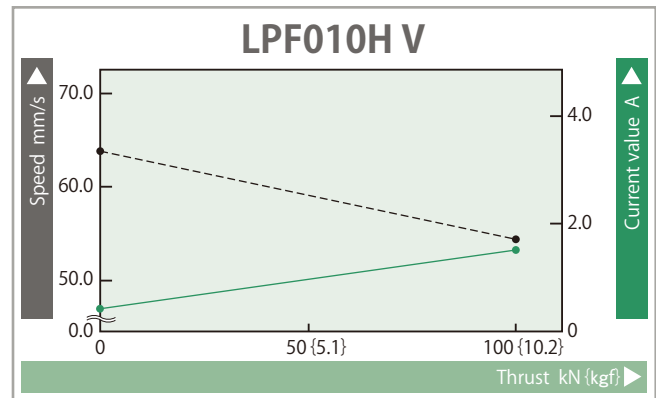
\* Select a power cylinder of a sufficient thrust, allowing for a safety factor so that the loads used (static and dynamic) do not exceed the rated thrust.

## Characteristics graph

### 12V DC power source

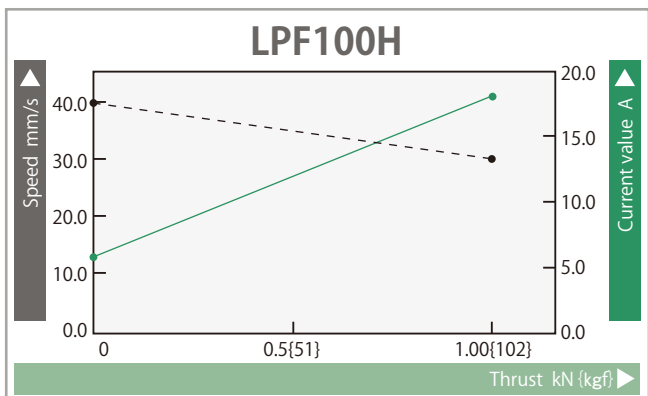


### 24V DC power source

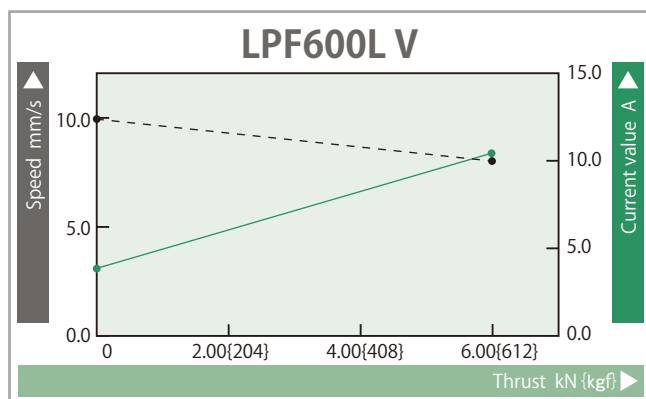
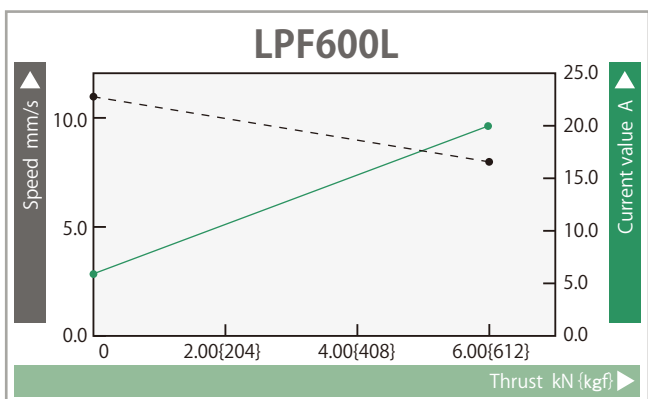
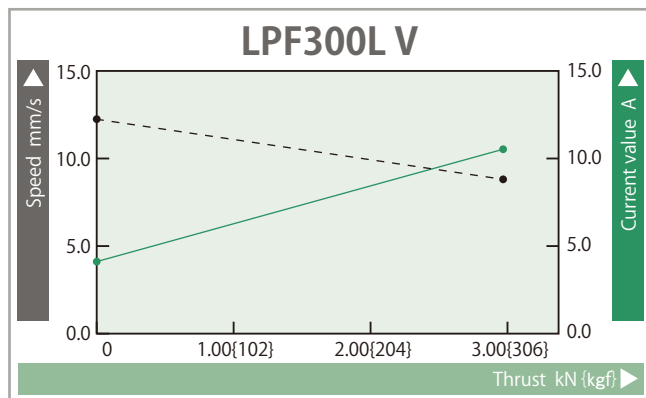
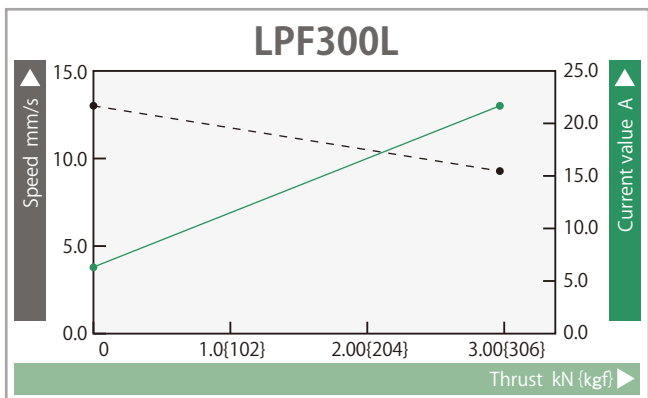
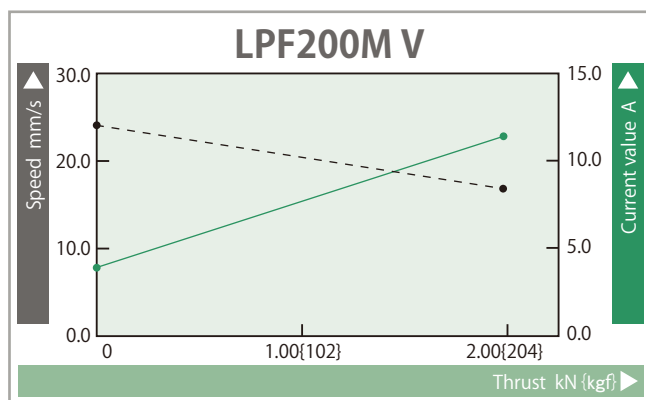
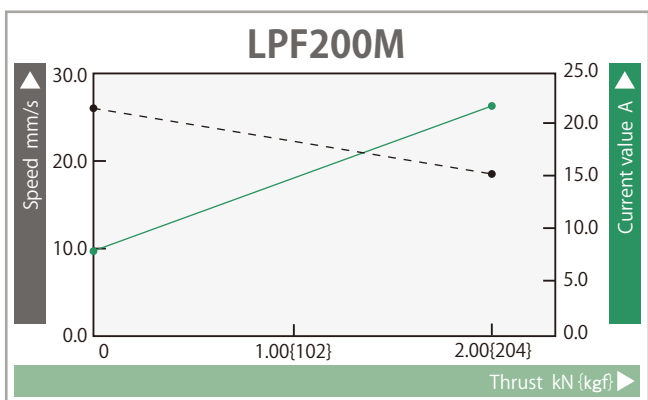
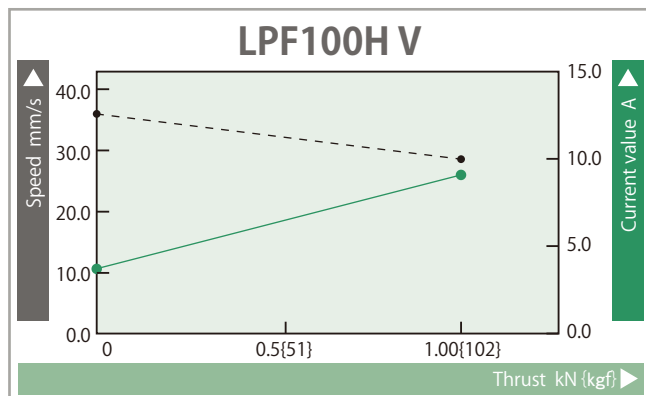


(Note) The graphs show standard values (12V/24V DC power source, ambient temperature 20°C). The speed and the current value vary depending on conditions of power source and ambient temperatures, etc.

## 12V DC power source



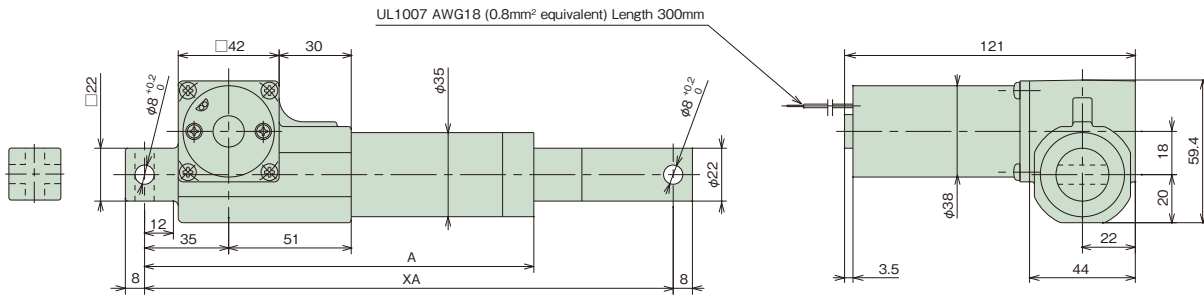
## 24V DC power source



(Note) The graphs show standard values (12V/24V DC power source, ambient temperature 20°C). The speed and the current value vary depending on conditions of power source and ambient temperatures, etc.

## Dimensions Table

### LPF010~LPF040: Basic type



| Model number                    |                                           | Rated thrust |      | Stroke | Rated speed | Dimensions mm |      |     | Approximate mass |
|---------------------------------|-------------------------------------------|--------------|------|--------|-------------|---------------|------|-----|------------------|
|                                 |                                           |              |      |        |             | A             | XA   |     |                  |
| N                               | {kgf}                                     | mm           | mm/s |        | MIN.        |               | MAX. | kg  |                  |
| 0.5<br>1.0<br>1.5<br>2.0<br>3.0 | 0.5 V<br>1.0 V<br>1.5 V<br>2.0 V<br>3.0 V | 100          | 10.2 | 50     | 54          | 162           | 220  | 270 | 1.0              |
|                                 |                                           |              |      | 100    |             | 212           | 270  | 370 | 1.2              |
|                                 |                                           |              |      | 150    |             | 262           | 320  | 470 | 1.4              |
|                                 |                                           |              |      | 200    |             | 312           | 370  | 570 | 1.6              |
|                                 |                                           |              |      | 300    |             | 412           | 480  | 780 | 2.0              |
| 0.5<br>1.0<br>1.5<br>2.0<br>3.0 | 0.5 V<br>1.0 V<br>1.5 V<br>2.0 V<br>3.0 V | 200          | 20.4 | 50     | 24          | 162           | 220  | 270 | 1.0              |
|                                 |                                           |              |      | 100    |             | 212           | 270  | 370 | 1.2              |
|                                 |                                           |              |      | 150    |             | 262           | 320  | 470 | 1.4              |
|                                 |                                           |              |      | 200    |             | 312           | 370  | 570 | 1.6              |
|                                 |                                           |              |      | 300    |             | 412           | 480  | 780 | 2.0              |
| 0.5<br>1.0<br>1.5<br>2.0<br>3.0 | 0.5 V<br>1.0 V<br>1.5 V<br>2.0 V<br>3.0 V | 400          | 40.8 | 50     | 15          | 162           | 220  | 270 | 1.0              |
|                                 |                                           |              |      | 100    |             | 212           | 270  | 370 | 1.2              |
|                                 |                                           |              |      | 150    |             | 262           | 320  | 470 | 1.4              |
|                                 |                                           |              |      | 200    |             | 312           | 370  | 570 | 1.6              |
|                                 |                                           |              |      | 300    |             | 412           | 480  | 780 | 2.0              |

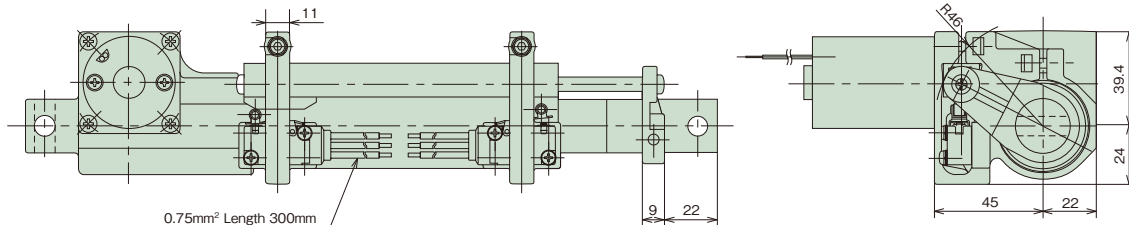
Note) V is attached at the end of the model number for 24V DC.

## Options

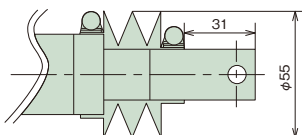
### ■ With external limit switch for stroke adjustment

Note) No limit switch for stroke adjustment is attached to the model of 50 mm stroke.

The above-mentioned XA dimensions will not change even after attaching an external limit switch for stroke adjustment and bellows. The mechanical stroke preset value is 60mm or more. However, note that it does not include the coasting distance.



### ■ With bellows

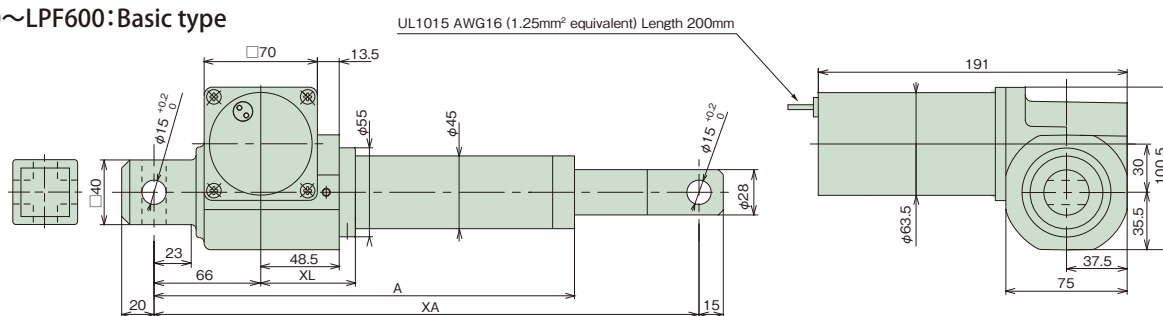


### ■ LS specification (common for LPF010H – LPF600L)

|                       |                                                                     |  |
|-----------------------|---------------------------------------------------------------------|--|
| Model                 | D2VW-5L2A-1M equivalent OMRON                                       |  |
| Circuit configuration | <div> <div>Red</div> <div>Blue</div> </div> <div>Black</div>        |  |
| Power rating          | 250V AC 4A (cos $\phi=0.7$ ), 30V DC 4A (time constant 7ms or less) |  |
| Connection            | 0.75mm <sup>2</sup> × 3C Length 300m, discrete lead wire            |  |

## Dimensions Table

### LPF100~LPF600: Basic type



| Model number |       | Rated thrust |       | Stroke | Rated speed | Dimensions mm |     |     |      | Approximate mass |
|--------------|-------|--------------|-------|--------|-------------|---------------|-----|-----|------|------------------|
|              |       | kN           | {kgf} | mm     | mm/s        | XL            | A   | XA  |      |                  |
|              |       |              |       |        |             |               |     |     |      | MIN.             |
| LPF100H      | 0.5 V | 1.00         | 102   | 50     | 30          | 58.5          | 210 | 275 | 325  | 5.0              |
|              | 1.0 V |              |       | 100    |             |               | 260 | 325 | 425  | 5.3              |
|              | 1.5 V |              |       | 150    |             |               | 310 | 395 | 545  | 5.6              |
|              | 2.0 V |              |       | 200    |             |               | 360 | 445 | 645  | 5.9              |
|              | 3.0 V |              |       | 300    |             |               | 460 | 545 | 845  | 6.5              |
| LPF200M      | 0.5 V | 2.00         | 204   | 50     | 18          |               | 210 | 275 | 325  | 5.0              |
|              | 1.0 V |              |       | 100    |             |               | 260 | 325 | 425  | 5.3              |
|              | 1.5 V |              |       | 150    |             |               | 310 | 395 | 545  | 5.6              |
|              | 2.0 V |              |       | 200    |             |               | 360 | 445 | 645  | 5.9              |
|              | 3.0 V |              |       | 300    |             |               | 460 | 545 | 845  | 6.5              |
| LPF300L      | 0.5 V | 3.00         | 306   | 50     | 9           |               | 210 | 275 | 325  | 5.0              |
|              | 1.0 V |              |       | 100    |             |               | 260 | 325 | 425  | 5.3              |
|              | 1.5 V |              |       | 150    |             |               | 310 | 395 | 545  | 5.6              |
|              | 2.0 V |              |       | 200    |             |               | 360 | 445 | 645  | 5.9              |
|              | 3.0 V |              |       | 300    |             |               | 460 | 545 | 845  | 6.5              |
| LPF600L      | 1.0 V | 6.00         | 612   | 100    | 8           | 95.5          | 297 | 360 | 460  | 5.9              |
|              | 2.0 V |              |       | 200    |             |               | 397 | 480 | 680  | 6.5              |
|              | 3.0 V |              |       | 300    |             |               | 497 | 580 | 880  | 7.1              |
|              | 4.0 V |              |       | 400    |             |               | 597 | 705 | 1105 | 7.8              |
|              | 5.0 V |              |       | 500    |             |               | 697 | 805 | 1305 | 8.4              |
|              | 6.0 V |              |       | 600    |             |               | 797 | 920 | 1520 | 9.0              |
|              |       |              |       |        |             |               |     |     |      |                  |

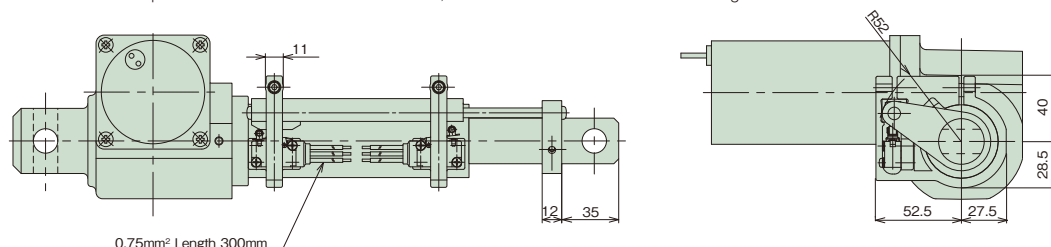
Note) V is attached at the end of the model number for 24V DC.

## Options

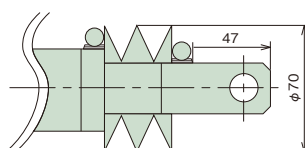
### ■ With external limit switch for stroke adjustment

Note) No limit switch for stroke adjustment is attached to the model of 50 mm stroke.

The above-mentioned XA dimensions will not change even after attaching an external limit switch for stroke adjustment and bellows. The mechanical stroke preset value is 60mm or more. However, note that it does not include the coasting distance.

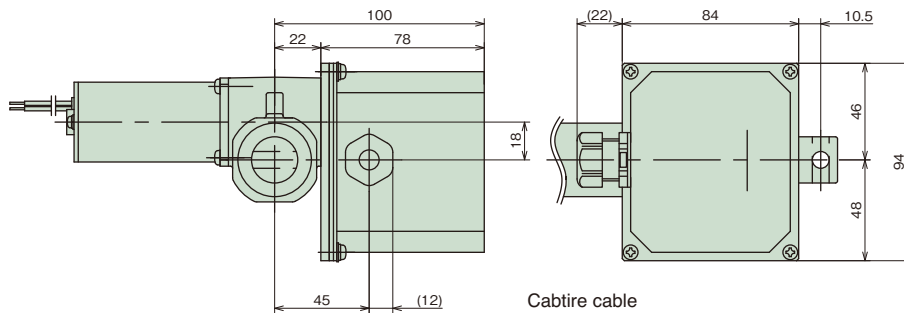


### ■ With bellows



## Position Detection unit

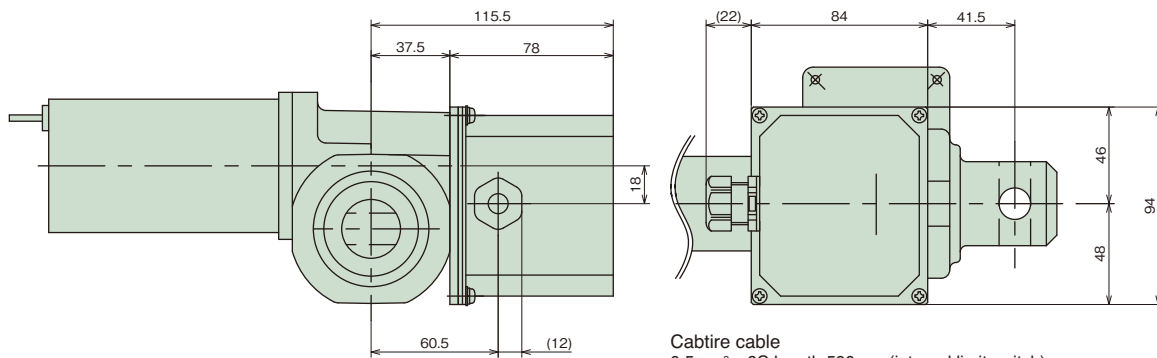
### ① LPF010~LPF040



Cable cable  
0.5mm<sup>2</sup> x 6C length 500mm (internal limit switch)  
0.5mm<sup>2</sup> x 3C length 500mm (potentiometer)

For connection, see the position detecting device specifications on page 60.

### ② LPF100~LPF300



Cable cable  
0.5mm<sup>2</sup> x 6C length 500mm (internal limit switch)  
0.5mm<sup>2</sup> x 3C length 500mm (potentiometer)

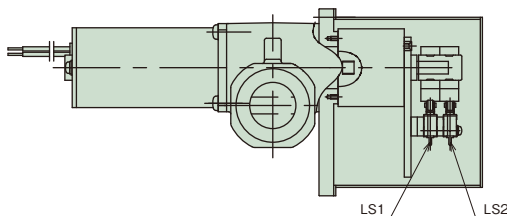
For connection, see the position detecting device specifications on page 60.

Note) Note that a position detecting unit cannot be manufactured for LPF600.

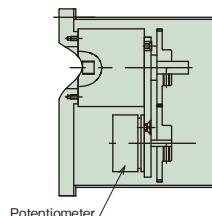
## Internal structure

For the position detecting unit, the following 2 types of position detecting devices can be built in as requested.

### ① Internal limit switch for position detection



### ② Potentiometer



Note) An internal limit switch for position detection and a potentiometer cannot be used together.

## Position detecting device specifications

### Internal limit switch for position detection

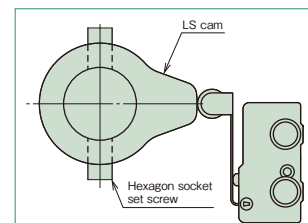
Use this LS when an external limit switch cannot be attached for reasons of installation space, or when the atmosphere is an adverse environment (with litter, dust, corrosion, etc.). When attaching 2 positions: Option code K2

Note) Up to 2 internal limit switches can be built in. (A position detecting device with 4 internal LS cannot be manufactured)

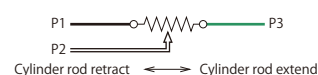
### Setting of limit switch

1. Operate the power cylinder individually before installing to the machine and check the rotation direction of the LS cam.
2. Install the power cylinder to the machine, and move the rod to a desired position to stop or to a position to detect the position.
3. Rotate the LS cam and tighten the hexagon socket set screw and fix it at the position where the microswitch acts. At this point, based on the previously checked rotating direction, set the LS at the front side considering the cylinder coasting amount.

|                       |                                                             |
|-----------------------|-------------------------------------------------------------|
| Model                 | SS-5GL2 equivalent OMRON                                    |
| Circuit configuration | LS 1 for extend<br>Black White<br>Red Green<br>Yellow Brown |
| Electrical rating     | 250V AC 2A (cos $\phi$ =0.4)                                |
| Connection            | 0.5mm <sup>2</sup> ×6C Length 500 mm<br>Cable cable         |



|                            |                                                     |
|----------------------------|-----------------------------------------------------|
| Model                      | CP-30 equivalent<br>Sakae Tsushin Kogyo             |
| Total resistance           | 1k $\Omega$                                         |
| Power rating               | 0.75W                                               |
| Dielectric strength        | 1000V AC 1min.                                      |
| Effective electrical angle | 35 $^{\circ}$ $\pm$ 5 $^{\circ}$                    |
| Effective mechanical angle | 360 $^{\circ}$ Endless                              |
| Connection                 | 0.5mm <sup>2</sup> ×3C Length 500 mm<br>Cable cable |



### Potentiometer

This is a variable resistor to output electrical signals according to the stroke amount of the cylinder.

Use it together with a print board and a stroke indication meter.

The resistance value according to the model is already adjusted at the time of shipment.

The potentiometer is set to work within the effective angle.

Note that if the rod is rotated before installation, a phase with stroke will shift.

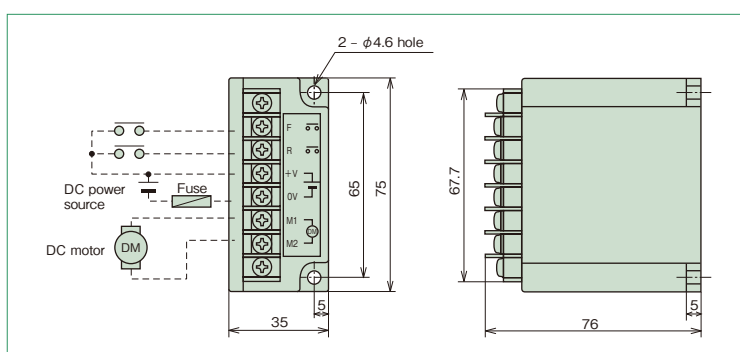
### <Cautions>

- \* Note that LPF600 type with a position detecting unit is not available.
- \* When an internal limit switch for position detection and a potentiometer are attached, the torque limiter mechanism is removed to prevent deviation in the preset values. Do not apply any load of the rated thrust or more to the cylinder during installation and operation of the cylinder. It may cause burnout of the motor. And do not hit the cylinder on the stroke end. It may cause the rod to get caught or burnout the motor.

## Control optional

**Overload detection unit** Necessary for protection against instantaneous overload and for press contact stop.

Applicable for LPF010, LPF020, LPF040 \* For LPF100 through 600, the overload detection unit is a special type.

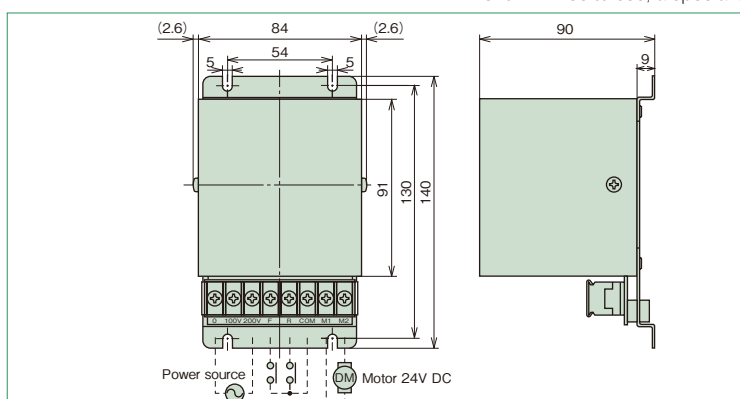


| Model number                 | LPF-K12                                                                                                                                 | LPF-K24              |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Power source                 | 10 ~ 14V DC                                                                                                                             | 20 ~ 28V DC          |
| Rated current                | 3.7A DC                                                                                                                                 | 1.8A DC              |
| Overload protection function | Load current                                                                                                                            | 7.0A DC (fixed)      |
|                              | Start time                                                                                                                              | 0.3s (fixed)         |
|                              | Shock time                                                                                                                              | 0.1s or less (fixed) |
| Operation specifications     | Rod extend at ON between F and +V<br>Rod retract at ON between R and +V<br>Rod stops with ON both between F and +V and between R and +V |                      |
| Ambient temperature          | -15 ~ 40 $^{\circ}$ C                                                                                                                   |                      |
| Ambient humidity             | 45 ~ 85%RH (no dew condensation)                                                                                                        |                      |
| Structure                    | Panel inside storing type Case: ABS                                                                                                     |                      |
| Mass                         | 0.2kg                                                                                                                                   |                      |

\* No signal is output at time of overload.

### AC adapter

Applicable for LPF010, LPF020, LPF040 \* AC adaptor for LPF100 to 600 is not available.  
\* As for LPF100 to 600, a special type with an AC motor is manufactured.



Note) Check the cautions on page 62 when using an AC adapter.

|                              |              |                                                                                                                                             |  |
|------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------|--|
| Model number                 |              | LPF—A24                                                                                                                                     |  |
| Applicable motor             |              | 24V DC 29W                                                                                                                                  |  |
| Power source                 |              | Commercial power source 100V AC 50/60Hz<br>200/220V AC 50/60Hz                                                                              |  |
| Rated current                |              | 1.8A DC                                                                                                                                     |  |
| Overload protection function | Load current | 4.0A DC (fixed)                                                                                                                             |  |
|                              | Start time   | 0.3s (fixed)                                                                                                                                |  |
|                              | Shock time   | 0.1s or less (fixed)                                                                                                                        |  |
| Operation specifications     |              | Rod extend at ON between F and COM<br>Rod retract at ON between R and COM<br>Rod stops with ON both between F and COM and between R and COM |  |
| Ambient temperature          |              | —15~40℃                                                                                                                                     |  |
| Ambient humidity             |              | 45~85%RH (no dew condensation)                                                                                                              |  |
| Structure                    |              | Panel inside storing type Case: SPCC                                                                                                        |  |
| Mass                         |              | 2.5kg                                                                                                                                       |  |

\* The overload protection function is built in the AC adapter.

## Control option (for potentiometer)

### Stroke indication meter

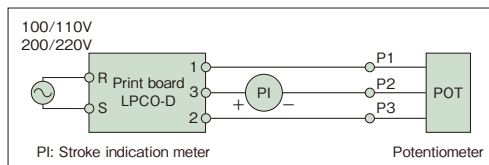


Stroke is indicated by % according to the signal from the print board.

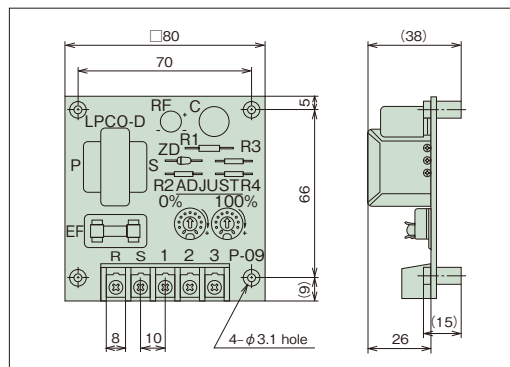
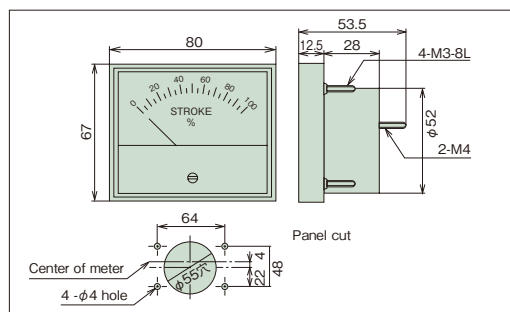
|                      |                                   |
|----------------------|-----------------------------------|
| Model number         | RM80B (100 $\mu$ A DC) equivalent |
| Class                | JIS C 1102 2.5 class              |
| Appearance           | Frame • Black                     |
| Scale specifications | Full stroke indicated by 100%     |

**Print board** Model number **LPCO-D1** (Operation power: 100/110V 50/60Hz)  
**LPCO-D2** (Operation power: 200/220V 50/60Hz)

The voltage signal from the potentiometer of the position detecting unit of the Power Cylinder F series is converted to a current value.



Adjust the meter with the adjustment dial on the print board. Do not make a mistake with the stroke indication meter (+) and (-). Replace the terminals 1 and 2 on the print board to make the indication meter 100% when the stroke is minimum.



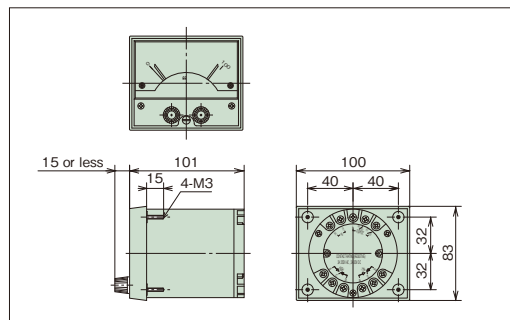
### Meter relay (the print board is the same as the print board of the stroke indication meter.)



Used for simple adjustment of stroke on the operation panel.

( Iron panel is standard.  
Contact TEM when installing an aluminum panel.)

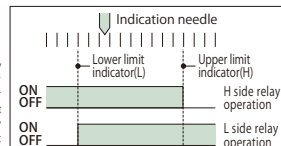
|                          |                                                                |
|--------------------------|----------------------------------------------------------------|
| Model number             | NRC-100HL (TSURUGA) equivalent                                 |
| Class                    | JIS C 1102 2.5 class                                           |
| Appearance               | Frame: Black                                                   |
| Scale                    | Full stroke indicated by 100%                                  |
| Power source             | 100/100V AC, 200/220V AC 50/60Hz                               |
| Input                    | 100 $\mu$ A DC maximum                                         |
| Output contact structure | 1C for both HIGH, LOW sides (Refer to the figure at the right) |
| Contact capacity         | 250V AC 3A ( $\cos \phi = 1$ )                                 |



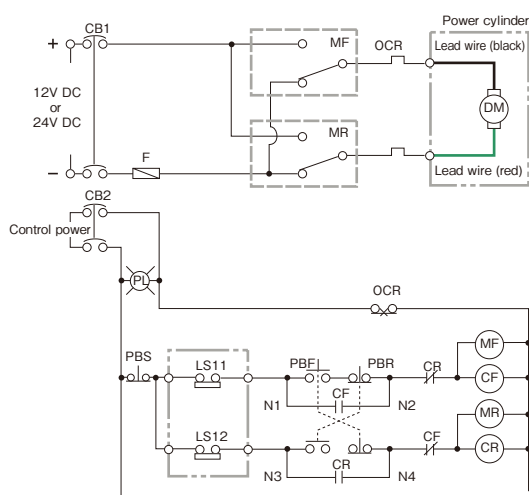
#### <Relay operation>

(In the case of b contact)

Wiring is the same as the stroke indication meter, however, power supply is separately required for the meter relay. Supply from the operation power source, etc. As for the output contact, it is easy to connect the b contact serially to the b contact of the stroke adjustment LS, etc.



## Wire connection diagram



### LS11: Extend stroke adjustment external LS

### LS12: Retract stroke adjustment external LS

#### NOTE :

- (1) This diagram shows a single-acting circuit. When using in an inching circuit, remove the wire connections between N1 and N2, N3 and N4, and short-circuit the PBS.
- (2) A [ ] portion indicate a supply range of the power cylinder. Provide others than the [ ] portion on your side. (Stroke adjustment external LS is our option.)
- (3) Recommended breakers for LPF100H through LPF600L  
For 12V DC: NF32-SW 30A 250V DC (Mitsubishi Electric) or equivalent  
For 24V DC: NF32-SW 15A 250V DC (Mitsubishi Electric) or equivalent
- (4) Thermal relays for LPF100H through LPF600L  
For 12V DC: TH-N20 (Mitsubishi Electric) or equivalent  
For 24V DC: TH-N12 (Mitsubishi Electric) or equivalent

Use drive relays (MF, MR) with the following capacities.

| Model                                    | 12V DC Spec.            | 24V DC Spec.            |
|------------------------------------------|-------------------------|-------------------------|
| LPF010H<br>LPF020M<br>LPF040L            | 30A or more<br>(14V DC) | 30A or more<br>(28V DC) |
| LPF100H<br>LPF200M<br>LPF300L<br>LPF600L | 70A or more<br>(12V DC) | 60A or more<br>(24V DC) |

\* Drive relays for LPF100H through 600L are also available from us. Contact us.

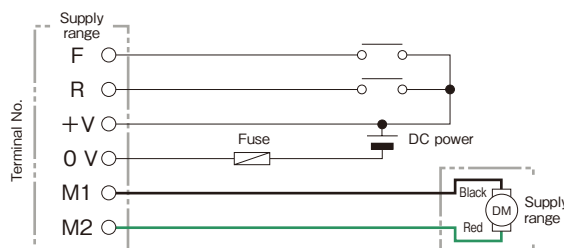
Use fuses with the following capacities as a guide.

| Model                                    | 12V DC Spec. | 24V DC Spec. |
|------------------------------------------|--------------|--------------|
| LPF010H<br>LPF020M<br>LPF040L            | 10A          | 5A           |
| LPF100H<br>LPF200M<br>LPF300L<br>LPF600L | 20A          | 10A          |

#### \* CAUTION

Be careful of the wire length (between motor and DC power source) and wire diameter in order to prevent voltage drop. Voltage drop may reduce the predetermined performance.

## Overload detection unit (used for LPF010 through LPF040)

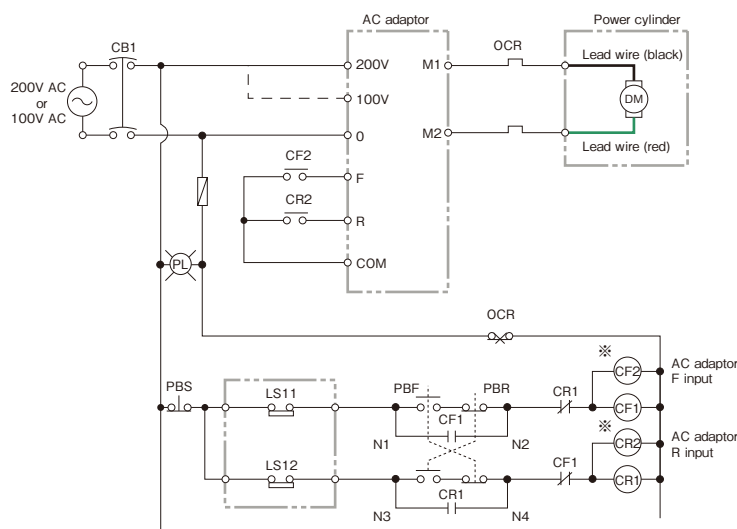


#### \* CAUTION

When the overload detection has tripped, it is necessary to turn OFF the operation signal F or R once. If it is not turned OFF (not reset), a state that voltage is not output to the motor will be held. (Common to AC adaptor)

(In the case of jogging operation, it is reset as the contact is opened when the push button is released (F or R is turned OFF).)

## AC adaptor wire connection diagram (used for LPF010 through LPF040)



### LS11: Extend stroke adjustment external LS

### LS12: Retract stroke adjustment external LS

#### NOTE :

- (1) This diagram shows a single-acting circuit. When using in an inching circuit, remove wire connections between N1, N2, N3 and N4.
- (2) A [ ] portion indicate a supply range of the power cylinder and AC adaptor. Provide others than the [ ] portion on your side. (Stroke adjustment external LS is our option.)
- (3) For relays of CF1, CF2, CR1 and CR2, OMRON relay MY or equivalent is recommended.
- (4) If the power source is 100V AC, connect the power to the dotted line part (100V terminal).

#### \* CAUTION

1. Securely separate contacts of the relays CF2, CR2 connected to the operation signals F, R on the AC adaptor from the AC circuit (200V class, 400V class) for use. If the AC circuit is built in the same relay, arc is generated between contacts due to surge, and the AC adaptor may be broken.
2. If a surge intrudes from the power line, connect a surge killer to the power terminal as a surge countermeasure. Surge killers which we recommend are 100V terminal – ENC221D\*, 200V terminal – ENC471D\* (Fuji Electric). For details on surge countermeasures, contact TEM.

# **WARNING**

## **■ Cautions for installation**

- Use pins to connect the power cylinder with the equipment. Align phases of pins (clevis fitting pin and end fitting pin).
- Apply grease into the clevis fitting holes and end fitting holes, and pins before installation.
- Pay attention so as not to apply a lateral load on the power cylinder when installing.
- All models are totally enclosed structures so that they can be used normally outdoors, however, under adverse conditions exposed to constant water and steam etc., and snow accumulation, although they are an outdoors type, an appropriate cover is required. The power cylinder can generally be used in a range of -5°C to 40°C, although it varies depending on the use conditions. When using at 40°C or higher, always protect with a heat insulating cover, etc. Never use in a flammable atmosphere, otherwise it may cause an explosion and fire. In addition, avoid using it in a location where vibration or shock exceeding 1G is applied.
- The main body is of outdoor specifications however, carry out proper waterproofing treatment on the motor lead wire terminal with waterproofing connectors etc.

## **■ Cautions for use**

- Speed and current value change with an increase/decrease in load. For details, refer to the characteristics diagram. Linkage operation cannot be performed due to characteristics of the motor.
- When rectifying alternating current to use without using battery power, make sure to smoothen the current and provide a DC power supply with a capacity so that the voltage does not drop. It greatly affects performance of the power cylinder and the duration of the life of the brush. (As an option, an AC adaptor for an output voltage of 24V is available. This adaptor supports LPF010 to 040 only. For LPF 100 or larger, contact us separately. When using with other than commercial power supply, check that power voltage variation is within a range of  $\pm 10\%$  and the power supply is an alternating current power supply without strain.)
- When using an AC adaptor, use a power cylinder of 24V DC specifications.
- 12V DC specifications are within a voltage range from 10 to 14V, and 24V DC specifications are within a voltage range from 20 to 28V. Note that the speed varies if the voltage varies due to the characteristics of the DC motor.
- No overload detection mechanism is built in the LPF series. When detecting an overload, commonly use the overload detection unit as an option. For LPF010 to 040, combine with the overload detection unit to allow for press stopping. (For LPF100 to 600, an overload detection unit of special model can be manufactured, however, press stopping cannot be performed.)  
When press stopping is performed, allow the equipment to have a sufficient strength (rated thrust x 300%)  
When not using the overload detection unit, never perform press stopping, and use within the stroke range otherwise the power cylinder may be damaged.
- A model of stroke 50mm cannot be equipped with a stroke adjustment external LS. The mechanical stroke adjusting range of the stroke adjustment external LS is 60mm or more. However, note that it does not include a coasting distance.
- If coasting becomes a problem, provide a dynamic brake circuit separately.
- Our overload detection unit and AC adapter are provided with a dynamic brake circuit.
- Anti-rotation is required because the rod of the power cylinder generates a rotating force with thrust. The rotating force of the rod is as follows.

| Model              |         | LPF010H | LPF020M | LPF040L | LPF100H | LPF200M | LPF300L | LPF600L |
|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Rod rotating force | N·m     | 0.14    | 0.28    | 0.55    | 1.75    | 3.50    | 5.25    | 5.81    |
|                    | {kgf·m} | 0.014   | 0.029   | 0.056   | 0.179   | 0.357   | 0.536   | 0.593   |

## **■ Cautions for maintenance and inspection**

- The operating portion and reduction portion are filled with grease, therefore, it is not necessary for them to be greased.
- The duration of life is 15000 reciprocations as a guide.
- Structurally, repairs and parts supply are not available.  
If the above reference life is exceeded, replace the main body with a new one.

F series plus  $\alpha$ Plus  $\alpha$  Ver.1 with AC motor

## Model designation

LPF

LPF series

100

Thrust

H

Speed

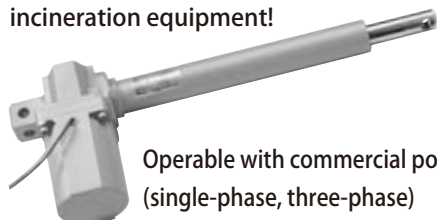
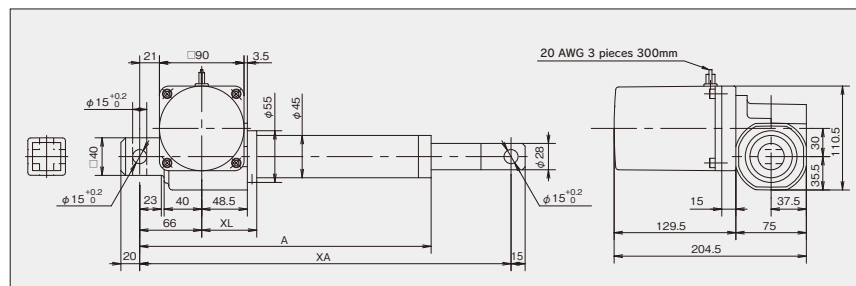
1.0

Stroke

X - TK

With special motor

Special model

\* Specify single-phase or three-phase power voltage.  
(Power cylinder with brake is also available.)Optimum for food machines,  
air conditioning equipment and  
incineration equipment!Operable with commercial power  
(single-phase, three-phase)

## ■ Dimensions Table

| Model                         | Stroke<br>mm | Dimensions mm |     |     |      |
|-------------------------------|--------------|---------------|-----|-----|------|
|                               |              | XL            | A   | MIN | MAX  |
| LPF100H<br>LPF200M<br>LPF300L | 50           | 58.5          | 210 | 275 | 325  |
|                               | 100          |               | 260 | 325 | 425  |
|                               | 150          |               | 310 | 395 | 545  |
|                               | 200          |               | 360 | 445 | 645  |
|                               | 300          |               | 460 | 545 | 845  |
| LPF600L                       | 100          | 95.5          | 297 | 360 | 460  |
|                               | 200          |               | 397 | 480 | 680  |
|                               | 300          |               | 497 | 580 | 880  |
|                               | 400          |               | 597 | 705 | 1105 |
|                               | 500          |               | 697 | 805 | 1305 |
|                               | 600          |               | 797 | 920 | 1520 |

## ■ Motor specification

| Model                 | Single-phase          |                        | Three-phase        |
|-----------------------|-----------------------|------------------------|--------------------|
|                       | Capacitor run         | Capacitor run          | Induction motor    |
| Output                | 90W                   | 90W                    | 90W                |
| Number of poles       | Four-pole             | Four-pole              | Four-pole          |
| Power                 | Voltage               | 100/100V               | 200/200V           |
|                       | Frequency             | 50/60Hz                | 50/60Hz            |
| Heat resistance class | E                     | E                      | E                  |
| Capacitor capacity    | 30 $\mu$ F (Attached) | 7.5 $\mu$ F (Attached) |                    |
| Time rating           | S2 15min              | S2 15min               | S2 15min           |
| Protection class      | (Indoor type) IP42    | (Indoor type) IP42     | (Indoor type) IP42 |

## ■ Standard use environment

| Model       | Indoor type                                                                                                                                                                                                                       |                                |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
|             | Ambient temperature                                                                                                                                                                                                               | 5 ~ 40°C                       |
| Environment | Relative humidity                                                                                                                                                                                                                 | 85% or less                    |
|             | Impact resistance value                                                                                                                                                                                                           | 1G or less                     |
|             | Installation altitude                                                                                                                                                                                                             | 1000m or lower above sea level |
| Atmosphere  | <ul style="list-style-type: none"> <li>Indoor location which is not directly exposed to rain, wind, lightning or sunlight.</li> <li>Extent of sand and dust which exist in general factory (5mg/m<sup>3</sup> or less)</li> </ul> |                                |

- 1) Characteristic current value and speed of the cylinder may change due to influence of grease when it is used at low temperatures.
- 2) Cylinders with bellows are recommended in an excessively dusty location.

## ■ Nominal speed list

| Type    | Single-phase        |                     | Three-phase                |
|---------|---------------------|---------------------|----------------------------|
|         | 100/100V<br>50/60Hz | 200/200V<br>50/60Hz | 200/200/220V<br>50/60/60Hz |
| LPF100H | 9.0 / 11            | 9.0 / 11 / 11       |                            |
| LPF200M | 6.0 / 7.0           | 6.0 / 7.0 / 8.0     |                            |
| LPF300L | 3.0 / 4.0           | 3.0 / 4.0 / 4.0     |                            |
| LPF600L | 2.5 / 3.0           | 2.5 / 3.0 / 3.0     |                            |

Plus  $\alpha$  Ver.2 with ball clutch type overload protection device

## Model designation

LPF

LPF series

100

Thrust

H

Speed

1.0

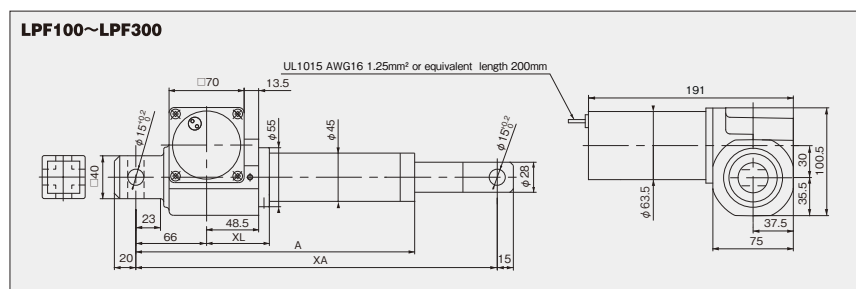
Stroke

- TK

Special model

\* Designate as "with ball clutch type overload protection device."

Optimum for agricultural machines!

Clicking sound informs  
of overload!

## ■ Dimensions Table

| Model   |       | Rated thrust<br>kN (kgf) | Stroke<br>mm | Rated speed<br>mm/s | Dimensions (mm) |     |     |     | Approx. Mass<br>kg |
|---------|-------|--------------------------|--------------|---------------------|-----------------|-----|-----|-----|--------------------|
|         |       |                          |              |                     | XL              | A   | MIN | MAX |                    |
| LPF100H | 0.5 V | 1.00                     | 102          | 30                  | 58.5            | 210 | 275 | 325 | 5.0                |
|         | 1.0 V |                          | 100          |                     |                 | 260 | 325 | 425 | 5.3                |
|         | 1.5 V |                          | 150          |                     |                 | 310 | 395 | 545 | 5.6                |
|         | 2.0 V |                          | 200          |                     |                 | 360 | 445 | 645 | 5.9                |
|         | 3.0 V |                          | 300          |                     |                 | 460 | 545 | 845 | 6.5                |
| LPF200M | 0.5 V | 2.00                     | 204          | 18                  |                 | 210 | 275 | 325 | 5.0                |
|         | 1.0 V |                          | 100          |                     |                 | 260 | 325 | 425 | 5.3                |
|         | 1.5 V |                          | 150          |                     |                 | 310 | 395 | 545 | 5.6                |
|         | 2.0 V |                          | 200          |                     |                 | 360 | 445 | 645 | 5.9                |
|         | 3.0 V |                          | 300          |                     |                 | 460 | 545 | 845 | 6.5                |
| LPF300L | 0.5 V | 3.00                     | 306          | 9                   |                 | 210 | 275 | 325 | 5.0                |
|         | 1.0 V |                          | 100          |                     |                 | 260 | 325 | 425 | 5.3                |
|         | 1.5 V |                          | 150          |                     |                 | 310 | 395 | 545 | 5.6                |
|         | 2.0 V |                          | 200          |                     |                 | 360 | 445 | 645 | 5.9                |
|         | 3.0 V |                          | 300          |                     |                 | 460 | 545 | 845 | 6.5                |

## ■ Motor specifications

| Model     | Item | Voltage | Output | Rated time |
|-----------|------|---------|--------|------------|
| LPF100H   |      | 12      | 160    | 5 minutes  |
| LPF100H V |      | 24      |        |            |
| LPF200M   |      | 12      |        |            |
| LPF200M V |      | 24      |        |            |
| LPF300L   |      | 12      |        |            |
| LPF300L V |      | 24      |        |            |

## ■ Standard use environment

| Model       | Outdoor type            |                                |
|-------------|-------------------------|--------------------------------|
|             | Ambient temperature     | -5 ~ 40°C                      |
| Environment | Relative humidity       | 85% or less                    |
|             | Impact resistance value | 1G or less                     |
|             | Installation altitude   | 1000m or lower above sea level |
| Atmosphere  | Normal outdoors         |                                |

- 1) If used below the freezing point, the characteristics of the cylinder (current value, speed) may change from the influence of grease.
- 2) Cylinders with bellows are recommended in an excessively dusty location.
- 3) All models are totally enclosed structures so that they can be used normally outdoors, however, when exposed to constant adverse conditions such as water, steam and snow accumulation, an appropriate cover is required. When using at 40°C or higher, always protect with a heat insulating cover, etc. Never use in a flammable atmosphere, otherwise it may cause an explosion and fire. In addition, avoid using it in a location where vibration or shock exceeding 1G is applied.

## F series Plus $\alpha$

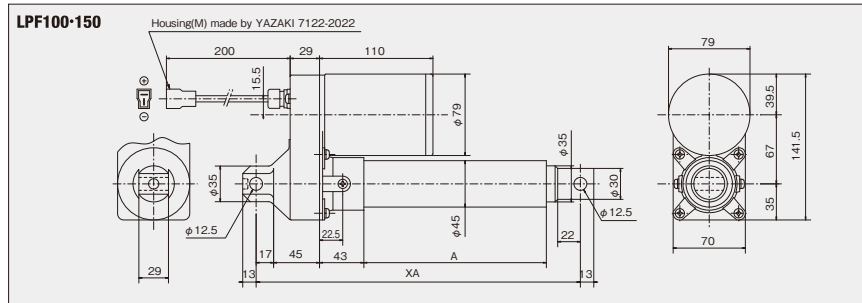
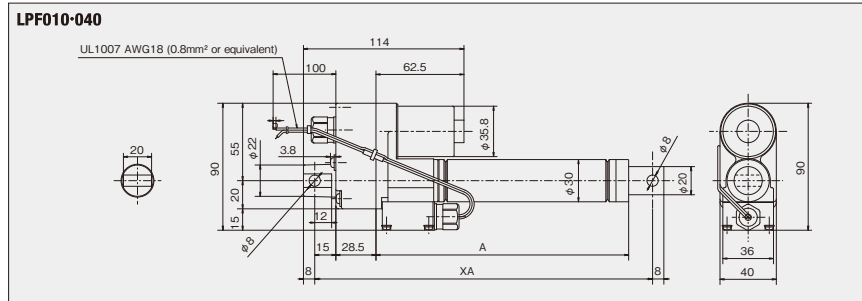
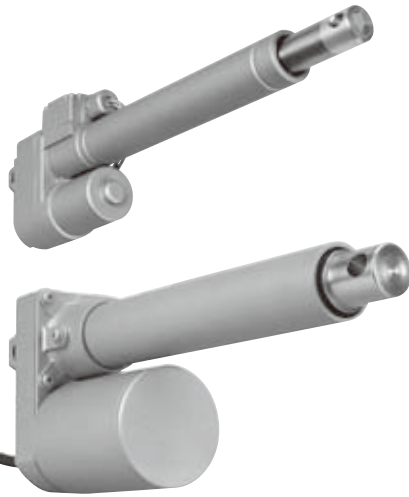
Plus  $\alpha$  Ver.3A Parallel (folded type)

### Model designation

**LPF 100 M K 1.0 - TK**

LPF series    Thrust    Speed    Parallel    Stroke    Special model

Optimum for outdoor use such as agricultural machines!



\*Provide a YAZAKI housing (F) 7123-2024 (1 piece), terminal (F) 7116-2090 (2 pieces) for counterpart of the connector. Waterproof connectors are also available.

### ■ Dimensions Table

#### LPF010-040

| Model           | Stroke<br>mm | Dimension mm |     |     | Approx.<br>mass<br>kg |
|-----------------|--------------|--------------|-----|-----|-----------------------|
|                 |              | A            | MIN | MAX |                       |
| LPF010MK 0.5(V) | 50           | 129.5        | 190 | 240 | 0.8                   |
| LPF040LK 0.5(V) | 100          | 179.5        | 240 | 340 | 0.9                   |
| LPF010MK 1.0(V) | 150          | 229.5        | 290 | 440 | 1.0                   |
| LPF040LK 1.0(V) | 200          | 279.5        | 340 | 540 | 1.1                   |

#### LPF100-150

| Model           | Stroke<br>mm | Dimension mm |     |     | Approx.<br>mass<br>kg |
|-----------------|--------------|--------------|-----|-----|-----------------------|
|                 |              | A            | MIN | MAX |                       |
| LPF100MK 0.5(V) | 50           | 77           | 205 | 255 | 3.6                   |
| LPF150LK 0.5(V) | 100          | 127          | 255 | 355 | 3.9                   |
| LPF100MK 1.0(V) | 150          | 177          | 305 | 455 | 4.2                   |
| LPF150LK 1.0(V) | 200          | 227          | 355 | 555 | 4.5                   |

### ■ Standard model

| Model    | Rated thrust |       | Thrust detecting load                                                                                                                                          |       | Stroke<br>mm | Rated<br>speed<br>mm/s | Power<br>V         | Rated<br>load<br>current<br>A | Locked<br>rotor<br>current<br>A |
|----------|--------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------|------------------------|--------------------|-------------------------------|---------------------------------|
|          | N            | {kgf} | N                                                                                                                                                              | {kgf} |              |                        |                    |                               |                                 |
| LPF010MK | 100          | 10.2  | 157                                                                                                                                                            | 16    | 50           | 50                     | 12V DC<br>(24V DC) | 3.4<br>(1.7)                  | 9.0<br>(4.2)                    |
|          |              |       |                                                                                                                                                                |       | 100          |                        |                    |                               |                                 |
|          |              |       |                                                                                                                                                                |       | 150          |                        |                    |                               |                                 |
|          |              |       |                                                                                                                                                                |       | 200          |                        |                    |                               |                                 |
|          |              |       |                                                                                                                                                                |       | 250          |                        |                    |                               |                                 |
| LPF040LK | 400          | 40.8  | 490                                                                                                                                                            | 50    | 50           | 15                     | 12V DC<br>(24V DC) | 3.0<br>(1.5)                  | 9.0<br>(4.2)                    |
|          |              |       |                                                                                                                                                                |       | 100          |                        |                    |                               |                                 |
|          |              |       |                                                                                                                                                                |       | 150          |                        |                    |                               |                                 |
|          |              |       |                                                                                                                                                                |       | 200          |                        |                    |                               |                                 |
|          |              |       |                                                                                                                                                                |       | 250          |                        |                    |                               |                                 |
| LPF100MK | 1.00k        | 102   | Without thrust<br>detecting<br>mechanism<br>* A ball clutch is built<br>in for overload<br>protection.<br>However, it cannot<br>be used for press<br>stopping. |       | 50           | 27                     | 12V DC<br>(24V DC) | 13<br>(6.5)                   | 58<br>(34)                      |
|          |              |       |                                                                                                                                                                |       | 100          |                        |                    |                               |                                 |
|          |              |       |                                                                                                                                                                |       | 150          |                        |                    |                               |                                 |
|          |              |       |                                                                                                                                                                |       | 200          |                        |                    |                               |                                 |
|          |              |       |                                                                                                                                                                |       | 250          |                        |                    |                               |                                 |
| LPF150LK | 1.50k        | 153   |                                                                                                                                                                |       | 50           | 17                     | 12V DC<br>(24V DC) | 13<br>(6.5)                   | 58<br>(34)                      |
|          |              |       |                                                                                                                                                                |       | 100          |                        |                    |                               |                                 |
|          |              |       |                                                                                                                                                                |       | 150          |                        |                    |                               |                                 |
|          |              |       |                                                                                                                                                                |       | 200          |                        |                    |                               |                                 |
|          |              |       |                                                                                                                                                                |       | 250          |                        |                    |                               |                                 |

### ■ Standard use environment

| Model       |                         | Outdoor type                   |
|-------------|-------------------------|--------------------------------|
| Environment | Ambient temperature     | -5 ~ 40°C                      |
|             | Relative humidity       | 85% or less                    |
|             | Impact resistance value | 1G or less                     |
|             | Installation altitude   | 1000m or lower above sea level |
|             | Atmosphere              | Normal outdoors                |

## Precautions for use

### 1. About voltage

The voltage shall be 12V DC  $\pm 10\%$  or 24V DC  $\pm 10\%$ . If the voltage is low, the cylinder will slow down, due to which the overload detection LS may not operate.

Be aware that if the voltage is high, it may be caught at the stroke end.

(LPF100 and LPF150 should also be used within the above voltage range).

### 2. Pressing force

In the case of press contact stopping, maximum pressing forces of 245N {25kgf} and 784N {80kgf} are exerted on LPF010MK and LPF040LK, respectively. Be aware that LPF100 and LPF150 cannot be used for press contact stopping.

### 3. Outdoor use

All models have a totally enclosed structure so that they can be used normally outdoors. Even so, however, an appropriate cover is required in a severe environment that is splashed with water or vapor or in such a location where snow accumulates.

For lead wire connection, use a waterproof connector.

### 4. Other

With use below freezing, the characteristics (current value and speed) of the cylinder may vary according to the effect of grease.

For use at 40° C or higher, always protect with a heat-insulating cover, etc.

Never use in a flammable atmosphere. Doing so may cause an explosion or fire.

In addition, avoid using in a location subjected to vibration or impact exceeding 1G.

## Power Cylinder

# G series

### Thrust : 700N to 3.00kN {71.4kgf to 306kgf}

Power cylinder in intermediate thrust zone which can be used with AC power supply.

This can be used across a wide range of applications such as steel, food and multistory car parking for general industry.

#### ● Wide variation

Basic 630 models and approximately 9000 models including option are standardized.

LPGA: Simple and basic economical type

LPGB: Built-in slip overload protection mechanism type

LPGC: Built-in thrust detection, press stop mechanism type

#### ● Screw type selectable according to use

Trapezoidal screw excellent in cost performance

Best-suited for low-speed, low-frequency use

High-efficiency, long-life ball screw

Best-suited for high-speed, high-frequency use

#### ● Quick delivery of special motor (For details, refer to page 120.)

Heat resistance class F and class H are supported.

Different voltage specifications (Overseas voltages are supported.)

Inverter specifications

Global specifications (CE-compliant, UL-compliant and CCC-compliant)

Explosion-proof specifications

#### ● Quiet operation

Noise at the start and stop has been greatly reduced by drive of the motor with a quiet DC brake.

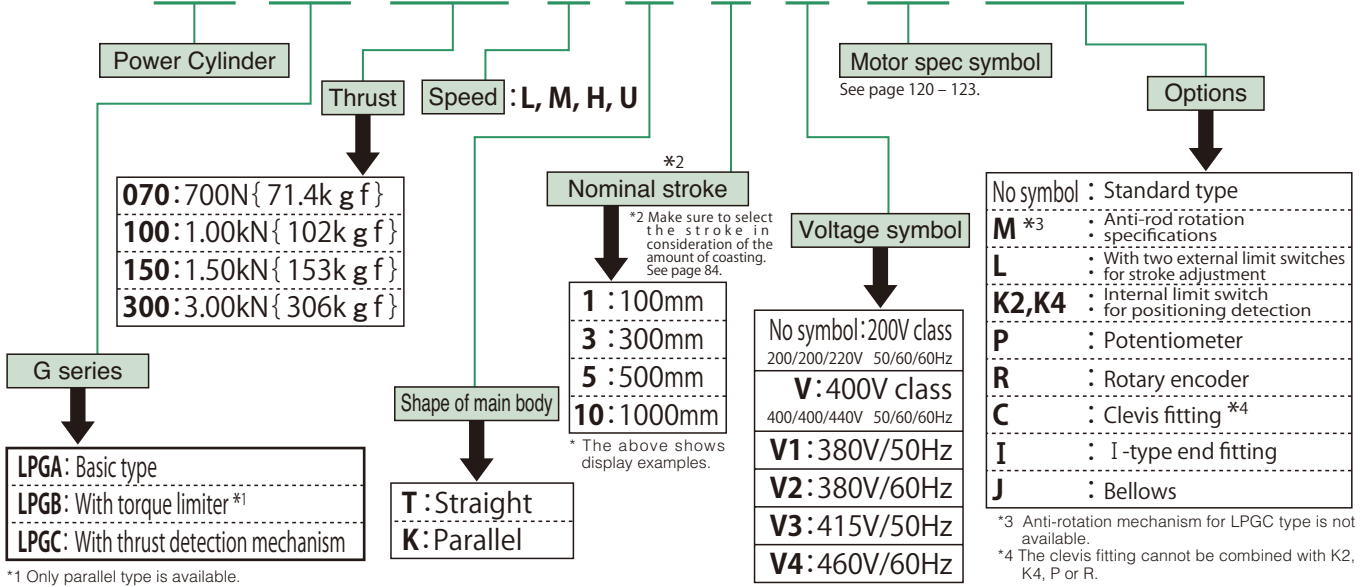
#### ● Excellent speed stability

This power cylinder is basically structured so that the screw shaft is rotated by the induction motor and the nut (rod) is extend and retract, allowing for a stable speed run which is hardly affected by load variation.



## Model No. designation

**LP GC 300 L T 5 V T1 K2PIJ**



## Trapezoidal screw type standard model list

| Model   | Speed symbol | Rated thrust<br>N<br>{ kgf } | Nominal speed<br>mm/s<br>50/60Hz | Motor capacity<br>kW | Rod movement<br>per turn of<br>manual shaft<br>mm | Rod rotating force |           | Nominal stroke<br>mm | Main body shape |          | Type  |                     | Option                          |         |             |                         |                    |                |                         |  |  |  |
|---------|--------------|------------------------------|----------------------------------|----------------------|---------------------------------------------------|--------------------|-----------|----------------------|-----------------|----------|-------|---------------------|---------------------------------|---------|-------------|-------------------------|--------------------|----------------|-------------------------|--|--|--|
|         |              |                              |                                  |                      |                                                   | N•m                | { kgf•m } |                      | Straight        | Parallel | Basic | With torque limiter | With thrust detection mechanism | Bellows | External LS | Position detection unit | L-type end fitting | Clevis fitting | Anti-rotation mechanism |  |  |  |
| LPGA070 | L            | 700<br>{ 71.4 }              | 25/30                            | 0.1                  | 1                                                 | 1.54               | 0.16      | 100                  | ○               | ○        | ○     | *1                  | ○                               | ○       | ○           | ○                       | *1                 | ○              | ○                       |  |  |  |
| LPGB070 | M            |                              | 75/90                            | 0.2                  | 3                                                 | 2.31               | 0.24      |                      |                 |          |       |                     |                                 |         |             |                         |                    |                |                         |  |  |  |
| LPGC070 | H            |                              | 100/120                          | 0.4                  | 4                                                 | 1.54               | 0.16      |                      |                 |          |       |                     |                                 |         |             |                         |                    |                |                         |  |  |  |
| LPGA100 | L            | 1.00k<br>{ 102 }             | 25/30                            | 0.1                  | 1                                                 | 2.20               | 0.22      | 300                  | ○               | ○        | ○     | *1                  | ○                               | ○       | ○           | ○                       | *1                 | ○              | ○                       |  |  |  |
| LPGB100 | M            |                              | 75/90                            | 0.2                  | 3                                                 | 3.29               | 0.34      |                      |                 |          |       |                     |                                 |         |             |                         |                    |                |                         |  |  |  |
| LPGC100 | H            |                              | 100/120                          | 0.4                  | 4                                                 | 2.20               | 0.22      |                      |                 |          |       |                     |                                 |         |             |                         |                    |                |                         |  |  |  |
| LPGA150 | L            | 1.50k<br>{ 153 }             | 25/30                            | 0.2                  | 1                                                 | 3.29               | 0.34      | 500                  | ○               | ○        | ○     | *1                  | ○                               | ○       | ○           | ○                       | *1                 | ○              | ○                       |  |  |  |
| LPGB150 | M            |                              | 75/90                            | 0.4                  | 3                                                 | 4.94               | 0.50      |                      |                 |          |       |                     |                                 |         |             |                         |                    |                |                         |  |  |  |
| LPGC150 | H            |                              | 100/120                          | 0.4                  | 4                                                 | 4.94               | 0.50      |                      |                 |          |       |                     |                                 |         |             |                         |                    |                |                         |  |  |  |
| LPGA300 | L            | 3.00k<br>{ 306 }             | 25/30                            | 0.4                  | 1                                                 | 6.59               | 0.67      | 1000                 | ○               | ○        | ○     | *1                  | ○                               | ○       | ○           | ○                       | *1                 | ○              | *2                      |  |  |  |
| LPGB300 |              |                              |                                  |                      |                                                   |                    |           | 1200                 |                 |          |       |                     |                                 |         |             |                         |                    |                |                         |  |  |  |
| LPGC300 |              |                              |                                  |                      |                                                   |                    |           |                      |                 |          |       |                     |                                 |         |             |                         |                    |                |                         |  |  |  |

\*2. LPGC type is not available.

## Ball screw type standard model list

| Model                         | Speed symbol | Rated thrust<br>N<br>{ kgf } | Nominal speed<br>mm/s<br>50/60Hz | Motor capacity<br>kW | Rod movement<br>per turn of<br>manual shaft<br>mm | Rod rotating force |           | Nominal stroke<br>mm | Main body shape |          | Type  |                     |                                 | Option  |             |                         |                    |                |                         |
|-------------------------------|--------------|------------------------------|----------------------------------|----------------------|---------------------------------------------------|--------------------|-----------|----------------------|-----------------|----------|-------|---------------------|---------------------------------|---------|-------------|-------------------------|--------------------|----------------|-------------------------|
|                               |              |                              |                                  |                      |                                                   | N•m                | { kgf•m } |                      | Straight        | Parallel | Basic | With torque limiter | With thrust detection mechanism | Bellows | External LS | Position detection unit | L-type end fitting | Clevis fitting | Anti-rotation mechanism |
| LPGA070<br>LPGB070<br>LPGC070 | U            | 700<br>{ 71.4 }              | 200/240                          | 0.4                  | 8                                                 | 0.99               | 0.10      | 100<br>200<br>300    | ○               | ○        | ○     | *1                  | *3                              | ○       | ○           | *1                      | ○                  | *1             | *2                      |
| LPGA100<br>LPGB100<br>LPGC100 | U            | 1.00k<br>{ 102 }             | 200/240                          | 0.4                  | 8                                                 | 1.41               | 0.14      | 400<br>500<br>600    | ○               | ○        | ○     | *1                  | *3                              | ○       | ○           | *1                      | ○                  | *1             | *2                      |
| LPGA300<br>LPGB300<br>LPGC300 | M            | 3.00k                        | 50/60                            | 0.2                  | 2                                                 | 4.24               | 0.43      | 800                  | ○               | ○        | ○     | *1                  | ○                               | ○       | ○           | *1                      | ○                  | *1             | *2                      |
|                               | H            | { 306 }                      | 67/80                            | 0.4                  | 2.67                                              | 4.24               | 0.43      | 1000<br>1200         |                 |          |       |                     |                                 |         |             |                         |                    |                |                         |

\*3. Cannot be used for press contact stopping at the U speed.

## Motor specifications

|                       |                                               |                         |
|-----------------------|-----------------------------------------------|-------------------------|
| Type                  | Totally enclosed self cooling type with brake |                         |
| Output                | Standard model list                           |                         |
| Number of poles       | 4 poles                                       |                         |
| Power supply          | Voltage                                       | 3 $\phi$ 200V/200V/220V |
|                       | Frequency                                     | 50Hz/60Hz/60Hz          |
| Heat resistance class | B                                             |                         |
| Time rating           | S2 30min.                                     |                         |
| Protection class      | Totally enclosed outdoor type (IP55)          |                         |

1) Different voltage specifications other than the above, 400/440V are also available.

2) For motor current value and brake current value, refer to page 79.

## Painting color

TSUBAKI olive gray (Munsell 5GY6/0.5 or approximate color)

## Standards use environment

| Model<br>Environment | Ambient<br>temperature | Relative<br>humidity<br>(non-condensing) | Impact<br>resistance<br>value | Installation<br>altitude                | Atmosphere         |
|----------------------|------------------------|------------------------------------------|-------------------------------|-----------------------------------------|--------------------|
| Outdoor<br>type      | -15°C<br>to<br>40°C    | 85% or less                              | 1G or less                    | 1000m<br>or<br>lower above<br>sea level | Normal<br>outdoors |

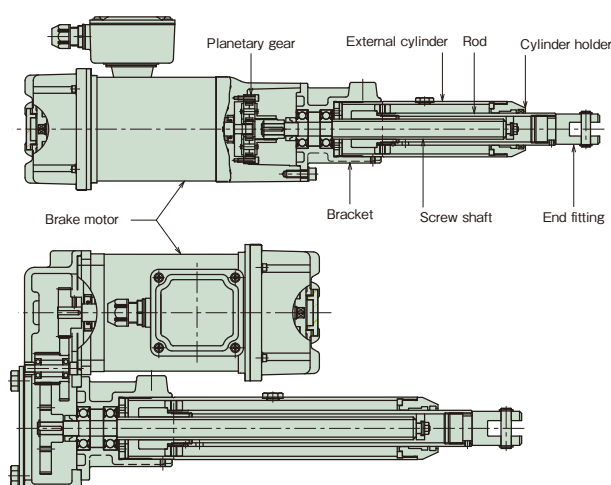
- 1) With use below freezing, the characteristics (current value and speed) of the cylinder may vary according to the effect of grease.
- 2) Cylinders with bellows are recommended in an excessively dusty location.
- 3) All models have a totally enclosed structure so that they can be used normally outdoors. Even so, however, an appropriate cover is required in such a hostile environment that is splashed with water or vapor or in such a location where snow accumulates. For use at 40°C or higher, always protect with a heat-insulating cover, etc. Never use in a flammable atmosphere. Doing so may cause an explosion or fire. In addition, avoid using in a location subjected to vibration or impact exceeding 1G.
- 4) For use in a misty atmosphere, contact us.

## Structure

### LPGA: Basic type

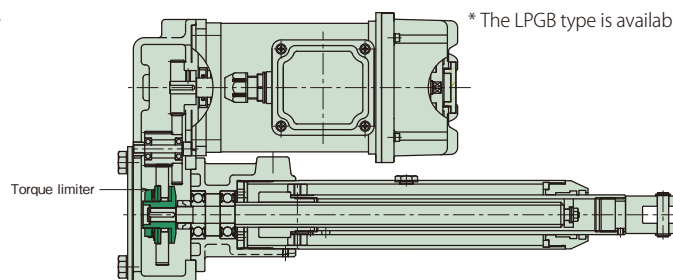
●Straight

●Parallel



### LPGB: With torque limiter

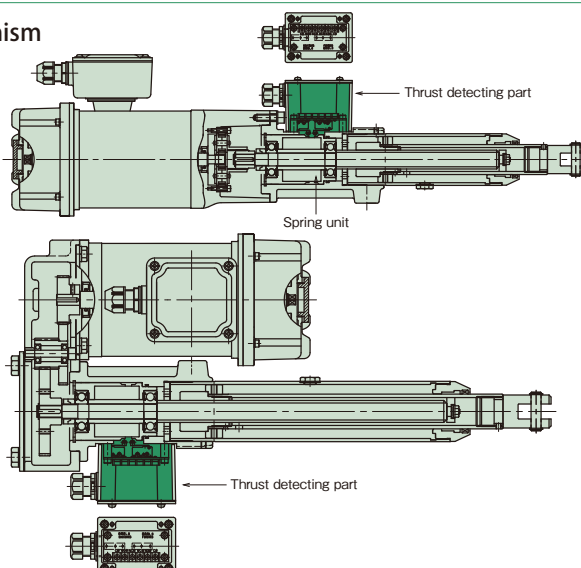
●Parallel



### LPGC: With thrust detection mechanism

●Straight

●Parallel



## Classification of usage according to type (protection device)

The power cylinder G series includes the following three types. Each of these can be selected so that optimum functions can be fully exerted depending on application. The three types of power cylinders have the same performances (thrust, speed, stroke).

**LPGA (basic model)** — This type has a stop function with a brake only. Note that use exceeding the nominal stroke may result in breakage. When using this type, sensor for stroke regulation must be installed or optional external limit switch for stroke adjustment must be used. (The other two types similarly require a sensor for stroke adjustment.) When detecting abnormalities, combination with an electric protection device is recommended. A shock relay and shock monitor are available as electric protection devices.

**LPGB (with torque limiter)** — When any overload phenomena occurs and the set thrust is exceeded, the built-in torque limiter slips to exert the protecting function. However, long time slip generates heat on the motor, resulting in burnout, or reduces the transmissible torque, resulting in malfunction of the cylinder. Therefore, usage in combination with our shock relay is recommended.  
\* Only parallel type is available.

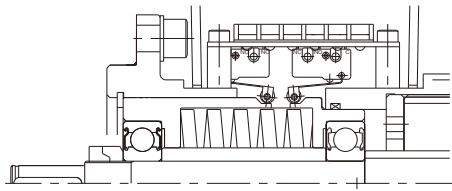
**LPGC (with thrust detecting mechanism)** — A type with a thrust detecting mechanism in combination with a pre-loaded spring and a limit switch. This mechanism exerts an effect in the following cases.

- ① When press (pull) and stop are performed.
- ② When an electric signal is required at overload.
- ③ When an overload is possibly applied from the load side during stoppage.

The built-in spring absorbs deflection impact load for impact within the rating.  
\* Cannot be used for press contact stopping at the mechanical stroke end.

### [Thrust detecting mechanism]

#### At normal condition



#### When extending

- When the cylinder is overloaded while extending
- When the cylinder stops within the XA dimension at the time of extending
- When a pressing force is attempted to be maintained even after stop

#### When retracting

- When the cylinder is overloaded during retracting
- When the cylinder stops within the XA dimension at the time of retracting
- When a pressing force is attempted to be maintained even after stop

## Preset load for protection device

Preset loads for protection devices of the GB type and GC type are as follows.

The protection device does not work at the start for opening/closing of the damper or the hopper gate, normal reverse, inclination and elevation, however, when load inertia is large due to horizontal movement of the carriage, the protection device works to impair smooth operation at the start. When load inertia exceeds values shown in the table below, take countermeasures such as slow start operation by the inverter, etc.

### <Operation preset load for protection device>

GB (with a torque limiter): 150% to 200% of rated thrust

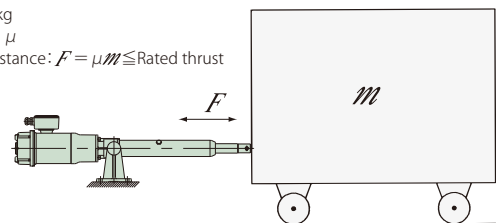
GC (with a thrust detecting mechanism): 140% to 200% of rated thrust

\* Use the above values as a guide.

### <Allowable mass in consideration of inertia at the time of horizontal drive> Unit: kg

| Model | LPGA070 | LPGA100 | LPGA150 | LPGA300 |
|-------|---------|---------|---------|---------|
|       | LPGB070 | LPGB100 | LPGB150 | LPGB300 |
| Speed | LPGC070 | LPGC100 | LPGC150 | LPGC300 |
| L     | 1150    | 2085    | 1220    | 2060    |
| M     | 170     | 280     | 310     | 1560    |
| H     | 130     | 240     | 270     | 790     |
| U     | 71      | 102     | —       | —       |

Mass of carriage:  $M$  kg  
Coefficient of friction:  $\mu$   
Carriage traveling resistance:  $F = \mu M \leq \text{Rated thrust}$



## Cautions for use

### ① When installing rotary encoder or potentiometer

For the LPGC type, a spring mechanism is built in the operating part. The spring slightly deflects at press (pull) and stop, or when an overload occurs, the signal amount deviates by the deflection. For LPGB type, even if the safety device is tripped, the signal amount does not deviate. However, the LPGC type can be used at normal stroke operation.

### ② When there is a problem with movement of the rod even if overload is applied from the load side during stop

For the LPGC type, a spring mechanism is built in the operating part, therefore, when a large load is applied, the spring deflects and the rod moves by the deflection. When the load is eliminated, the rod returns to the original position.

### ③ When using with press (pull) and stop, strength of the mating device shall be 250% of the rated thrust or more.

### ④ When the LPGC type is used, the time lag should be 0.03s or less.

## Selection 1

### Conditions of use required for selection

- |                                       |                                                  |                                                       |
|---------------------------------------|--------------------------------------------------|-------------------------------------------------------|
| 1. Machine to be used and application | 4. Speed mm/s                                    | 7. Type of load of machine used                       |
| 2. Thrust or load N { kgf }           | 5. Frequency of operation, number of starts/min. | 8. Environment of use                                 |
| 3. Stroke mm                          | 6. Power source voltage, frequency               | 9. Hours of operation a day and annual operating days |

### Selection procedures

1. Select the suitable model number from the standard model list (page 67) based on thrust, load N { kgf }, speed (mm/s), and stroke (mm).
2. Determine the shape (straight or parallel) of the main body suitable for the installing condition, necessity of protection device and option from the machine used and use conditions.
3. Check that the frequency of operation and the working time rate are within the allowable values of the cylinder.

#### Frequency of operation and the working time rate

|                             |                        |
|-----------------------------|------------------------|
| Allowable start cycle       | 10 cycles/min. or less |
| Allowable duty factor (%ED) | 25                     |

$$\text{Working time rate (\%ED)} = \frac{\text{operating time of 1 cycle}}{\text{Operating time of 1 cycle} + \text{dwell time}} \times 100\%$$

The working time rate is a ratio of the operating time per 10 minutes on a 10-minute basis.

### Guide for life

#### <Expected traveling distance of trapezoidal screw type>

25km in cylinder (nut) traveling distance

#### <Expected traveling distance of ball screw type>

The life of a ball screw is determined by flaking of the rolling surface caused by its fatigue. Check the rough life with this chart of expected traveling distance. However, in the case of great impact or in the case where lubrication or maintenance is not performed properly, the expected traveling distance becomes substantially short.

**Expected traveling distance (km) = actual load stroke (m) × frequency of use (times/day) × number of operating days × 10<sup>-3</sup> × expected number of years**

The chart on the right-hand side is based on L10 life. L10 life expresses in traveling distance a life that can be reached by 90% or more of all ball screws. If you select a power cylinder based on the life, select model No. from this chart.

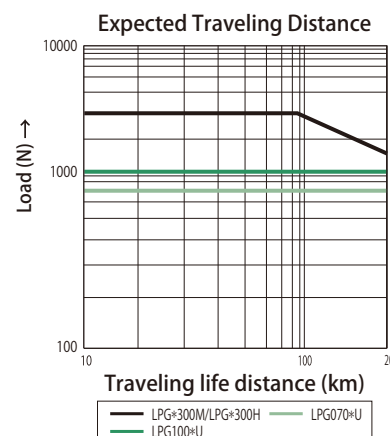
If the load greatly fluctuates in the middle of stroke, calculate the equivalent load ( $P_M$ ) by the equation on the right-hand side.

$$P_M = \frac{P_{MIN} + 2 \times P_{MAX}}{3}$$

$P_M$  : Equivalent load N { kgf }

$P_{MIN}$  : Minimum load N { kgf }

$P_{MAX}$  : Maximum load N { kgf }



### Brake holding force

A load holding force while the power cylinder stops is exerted more than the rated thrust, therefore, it can be used for holding a load of the rated thrust. This holding force is generated by braking operation of the brake motor. The brake is of a spring braking type that always performs braking operation by a spring force during stop, and the brake torque has a holding force of 150% or more of the motor rated torque. The expected life of the brake is 2,000,000 times. However, gap adjustment is required.

\* When selecting the H, U speed, refer to the cautions for selecting on page 84.

\* Select a power cylinder of a sufficient thrust, allowing for a safety rate so that the loads used (static and dynamic) do not exceed the rated thrust.

## Selection 2

Refer to the following cylinder characteristics data to check that the cylinder is suitable for the application.

#### <Coasting distance and stop accuracy>

Coasting amount and stop accuracy vary depending on the operation speed and load. When you attempt to correctly position, cylinders with low operation speed are recommended. Set the limit switch in consideration of the coasting distance. Refer to the cautions for selecting on page 84.

Reference values of the coasting distance and stop accuracy are shown in the following table.

#### Coasting distance and stop accuracy (Reference values) (When relay time lag is assumed to be 0.03 seconds)

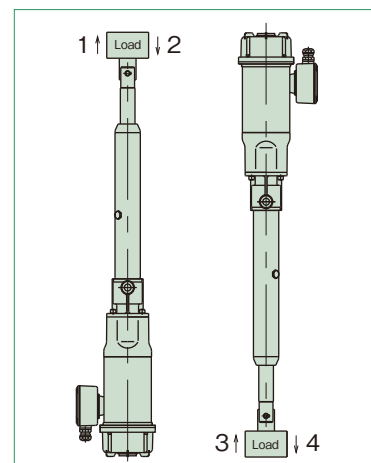
| Coasting distance and stop accuracy (reference values) (when relay time lag is assumed to be 0.05 seconds) |   |                                      |               |                   |               |                                        |               |                   |               | Unit: mm |
|------------------------------------------------------------------------------------------------------------|---|--------------------------------------|---------------|-------------------|---------------|----------------------------------------|---------------|-------------------|---------------|----------|
| Usage<br><br>Model                                                                                         |   | Lifting load (In the case of 1 or 3) |               |                   |               | Suspended load (In the case of 2 or 4) |               |                   |               |          |
|                                                                                                            |   | 50Hz                                 |               | 60Hz              |               | 50Hz                                   |               | 60Hz              |               |          |
|                                                                                                            |   | Coasting distance                    | Stop accuracy | Coasting distance | Stop accuracy | Coasting distance                      | Stop accuracy | Coasting distance | Stop accuracy |          |
| LPGA070<br>LPGB070<br>LPGC070                                                                              | L | 6.9                                  | ±0.4          | 10.0              | ±0.5          | 10.6                                   | ±0.4          | 14.9              | ±0.5          |          |
|                                                                                                            | M | 15.0                                 | ±1.1          | 21.5              | ±1.3          | 21.8                                   | ±1.2          | 30.1              | ±1.4          |          |
|                                                                                                            | H | 15.4                                 | ±1.4          | 21.7              | ±1.7          | 23.7                                   | ±1.5          | 32.7              | ±1.8          |          |
|                                                                                                            | U | 34.2                                 | ±2.8          | 47.9              | ±3.4          | 60.6                                   | ±3.1          | 81.2              | ±3.8          |          |
| LPGA100<br>LPGB100<br>LPGC100                                                                              | L | 6.1                                  | ±0.4          | 9.0               | ±0.5          | 10.6                                   | ±0.4          | 14.9              | ±0.5          |          |
|                                                                                                            | M | 13.8                                 | ±1.1          | 19.8              | ±1.3          | 22.1                                   | ±1.2          | 30.5              | ±1.4          |          |
|                                                                                                            | H | 14.1                                 | ±1.4          | 19.8              | ±1.7          | 23.8                                   | ±1.5          | 32.7              | ±1.8          |          |
|                                                                                                            | U | 32.0                                 | ±2.8          | 45.0              | ±3.4          | 66.9                                   | ±3.1          | 88.2              | ±3.8          |          |
| LPGA150<br>LPGB150<br>LPGC150                                                                              | L | 4.6                                  | ±0.4          | 6.6               | ±0.5          | 7.1                                    | ±0.4          | 9.8               | ±0.5          |          |
|                                                                                                            | M | 10.6                                 | ±1.1          | 14.7              | ±1.3          | 15.6                                   | ±1.2          | 21.3              | ±1.4          |          |
|                                                                                                            | H | 13.7                                 | ±1.4          | 19.0              | ±1.7          | 21.8                                   | ±1.6          | 30.0              | ±1.9          |          |
| LPGA300<br>LPGB300<br>LPGC300                                                                              | L | 3.3                                  | ±0.4          | 4.6               | ±0.5          | 5.1                                    | ±0.4          | 6.9               | ±0.5          |          |
|                                                                                                            | M | 8.6                                  | ±0.8          | 12.4              | ±0.9          | 23.2                                   | ±0.8          | 29.4              | ±1.0          |          |
|                                                                                                            | H | 9.4                                  | ±1.0          | 13.1              | ±1.2          | 19.0                                   | ±1.1          | 25.0              | ±1.3          |          |

\* The values in the above table slightly vary depending on the models.

\* Coasting distance: This indicates a distance from a time when the limit switch or the stop button is operated until the cylinder stops. This coasting distance varies depending on how a load is applied and the operation circuit.

\* Stop accuracy: This indicates a variation in the stop position when stop is repeated.

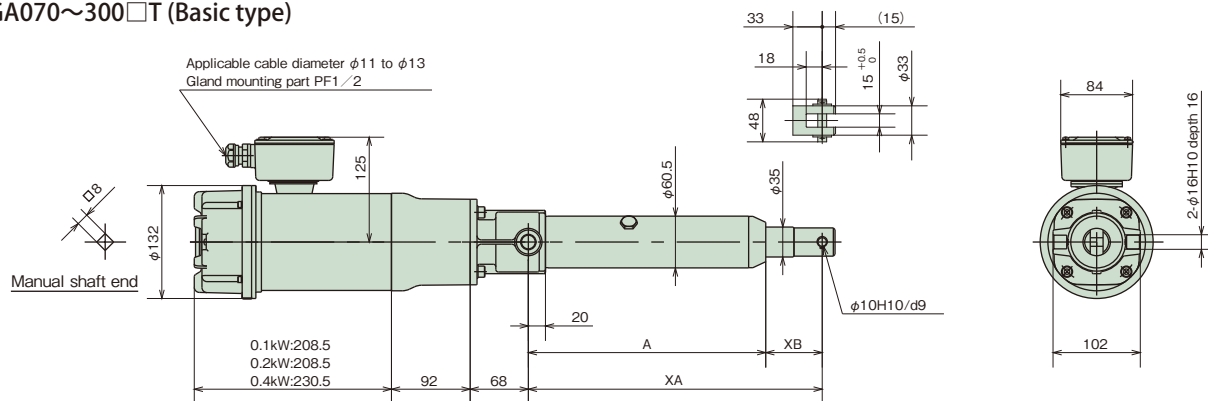
The above table takes ±25% of time lag of the relay and the brake into consideration.



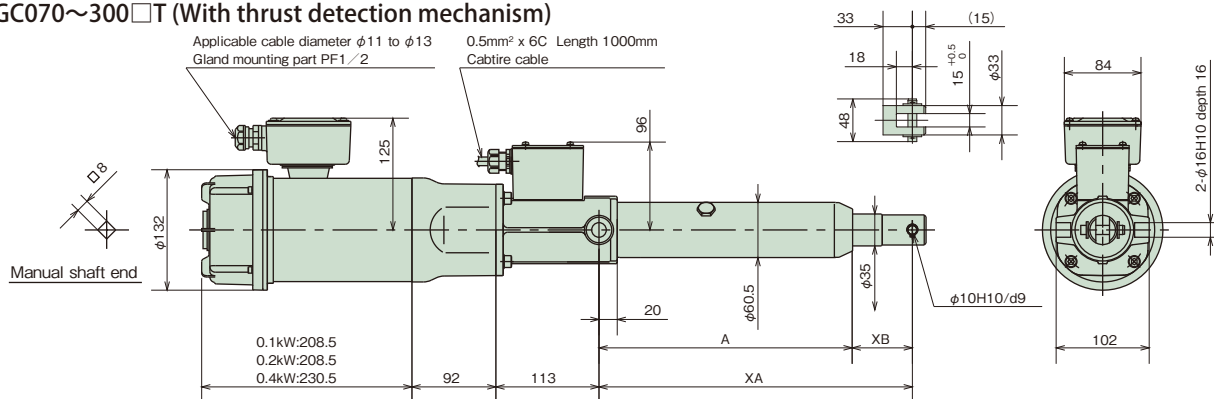
\* An anti-rod rotation mechanism is required.

## Dimensions Table Straight type

### LPGA070~300□T (Basic type)



### LPGC070~300□T (With thrust detection mechanism)



Unit: mm

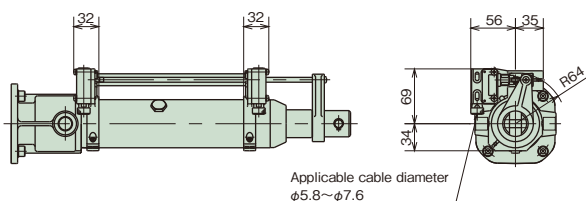
| Model        |                          | Speed<br>symbol  | Shape of<br>main body | Nominal<br>stroke | A    | XA   |      | XB  |      | Approx. mass (kg) |      |
|--------------|--------------------------|------------------|-----------------------|-------------------|------|------|------|-----|------|-------------------|------|
|              |                          |                  |                       |                   |      | MIN  | MAX  | MIN | MAX  | LPGA              | LPGC |
| LPGA<br>LPGC | 070<br>100<br>150<br>300 | L<br>M<br>H<br>U | T                     | 100               | 178  | 243  | 343  | 65  | 165  | 14                | 18   |
|              |                          |                  |                       | 200               | 278  | 343  | 543  | 65  | 265  | 15                | 19   |
|              |                          |                  |                       | 300               | 378  | 443  | 743  | 65  | 365  | 16                | 21   |
|              |                          |                  |                       | 400               | 478  | 543  | 943  | 65  | 465  | 18                | 22   |
|              |                          |                  |                       | 500               | 578  | 643  | 1143 | 65  | 565  | 19                | 23   |
|              |                          |                  |                       | 600               | 678  | 743  | 1343 | 65  | 665  | 20                | 24   |
|              |                          |                  |                       | 800               | 878  | 963  | 1763 | 85  | 885  | 22                | 26   |
|              |                          |                  |                       | 1000              | 1078 | 1183 | 2183 | 105 | 1105 | 24                | 28   |
|              |                          |                  |                       | 1200              | 1278 | 1403 | 2603 | 125 | 1325 | 27                | 31   |

Note) 1. The mechanical stroke includes a margin of 3 to 8 mm of the nominal stroke on both sides.

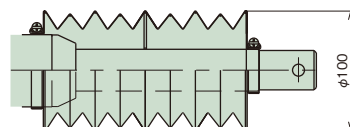
2. For U speed, only 070 and 100 are applied.

## Options

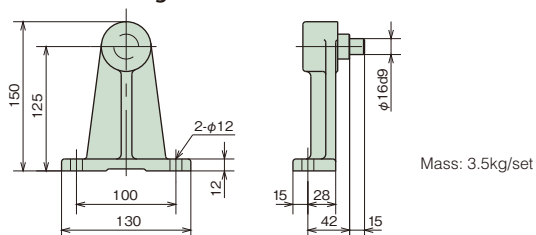
### External LS ( - L)



### Bellows ( - J)

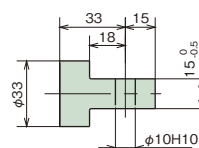


### Trunnion fitting (LPGA300-T)



Note) Apply grease to the trunnion pin and into the trunnion hole for installation.

### I-type end fitting ( - I)



Note) Shipped as attached to the main body.  
The XA dimensions are the same as the standard U-type end fitting.

\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions. When designing the machine, take margins into consideration.

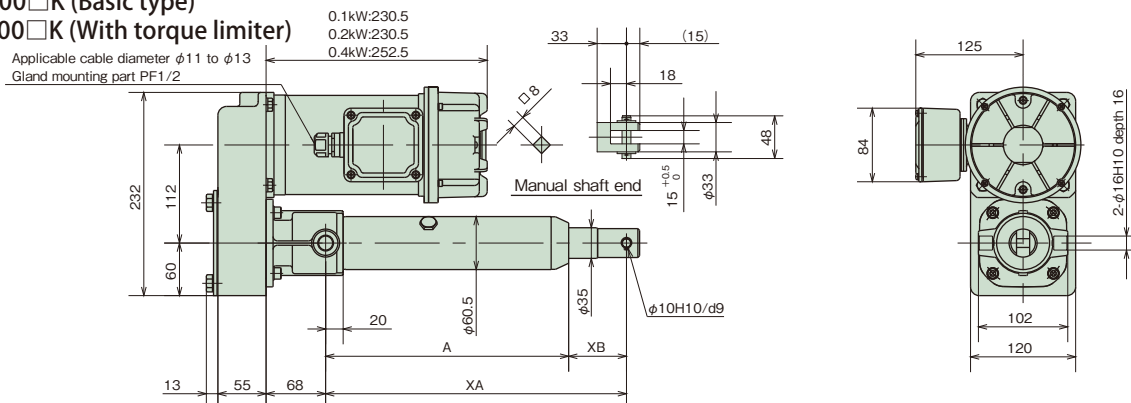
MEMO

Handwriting practice area with horizontal dashed lines.

## Dimensions Table Parallel type

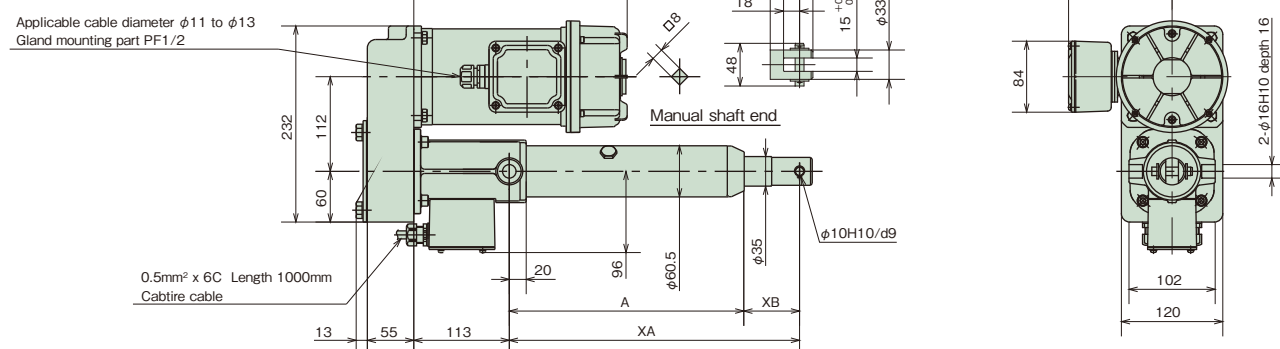
### LPGA070~300□K (Basic type)

### LPGB070~300□K (With torque limiter)



### LPGC070~300□K

### (With thrust detection mechanism)



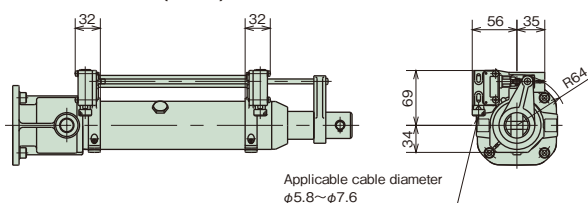
Unit: mm

| Model                |                          | Speed<br>symbol  | Shape of<br>main body | Nominal<br>stroke | A    | XA   |      | XB  |      | Approx. mass (kg) |      |      |
|----------------------|--------------------------|------------------|-----------------------|-------------------|------|------|------|-----|------|-------------------|------|------|
|                      |                          |                  |                       |                   |      | MIN  | MAX  | MIN | MAX  | LPGA              | LPGB | LPGC |
| LPGA<br>LPGB<br>LPGC | 070<br>100<br>150<br>300 | L<br>M<br>H<br>U | K                     | 100               | 178  | 243  | 343  | 65  | 165  | 18                | 18   | 23   |
|                      |                          |                  |                       | 200               | 278  | 343  | 543  | 65  | 265  | 19                | 19   | 24   |
|                      |                          |                  |                       | 300               | 378  | 443  | 743  | 65  | 365  | 21                | 21   | 25   |
|                      |                          |                  |                       | 400               | 478  | 543  | 943  | 65  | 465  | 22                | 22   | 26   |
|                      |                          |                  |                       | 500               | 578  | 643  | 1143 | 65  | 565  | 23                | 23   | 27   |
|                      |                          |                  |                       | 600               | 678  | 743  | 1343 | 65  | 665  | 24                | 24   | 28   |
|                      |                          |                  |                       | 800               | 878  | 963  | 1763 | 85  | 885  | 26                | 26   | 31   |
|                      |                          |                  |                       | 1000              | 1078 | 1183 | 2183 | 105 | 1105 | 28                | 28   | 33   |
|                      |                          |                  |                       | 1200              | 1278 | 1403 | 2603 | 125 | 1325 | 31                | 31   | 35   |

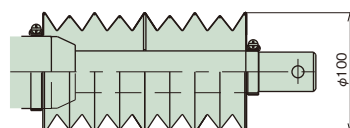
Note) 1. The mechanical stroke includes a margin of 3 to 8 mm of the nominal stroke on both sides.  
2. For U speed, only 070 and 100 are applied.

## Options

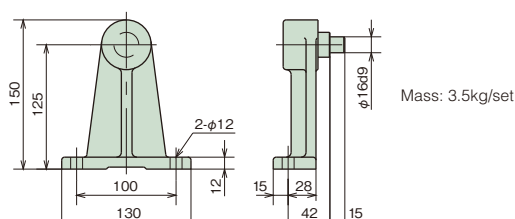
### External LS ( - L)



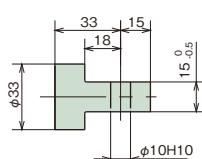
### Bellows ( - J)



### Trunnion fitting (LPGA300-T)

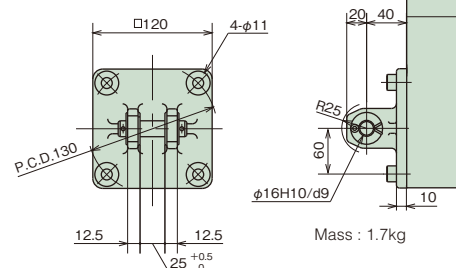


### I-type end fitting ( - I)



Note) Shipped as attached to the main body.  
The XA dimensions are the same as the standard U-type end fitting.

### Clevis fitting ( - C)



\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions. When designing the machine, take margins into consideration.

MEMO

Handwriting practice area with horizontal dashed lines.

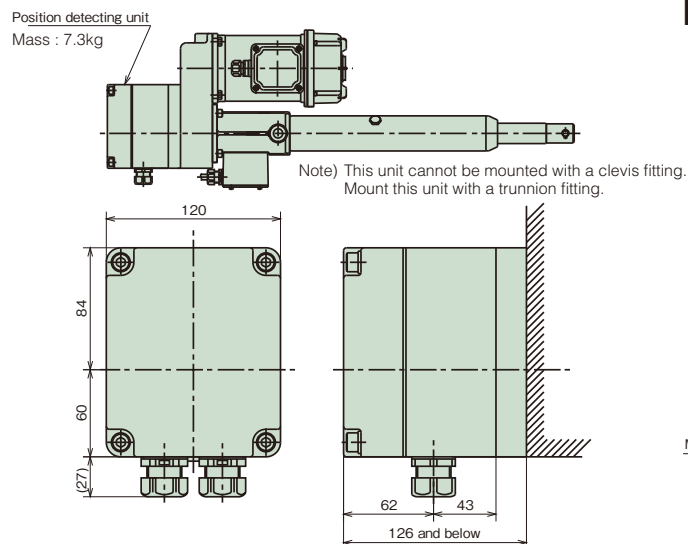
## Position detecting unit

The following three types of the position detecting device can be built in the position detecting unit at your request.

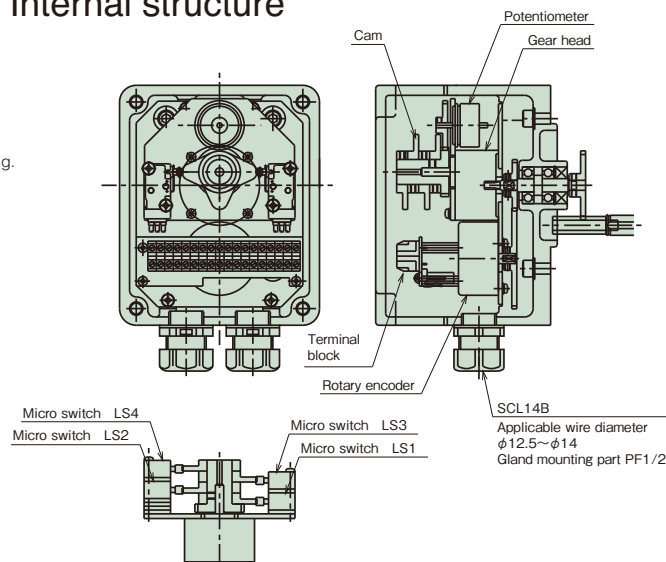
### 1. Position detecting internal LS (with two or four pieces)

### 2. Potentiometer

### 3. Rotary encoder



## Internal structure



#### Wire connection into position detecting unit

Use terminals provided in the unit to connect to the internal limit switch, potentiometer and rotary encoder. COM for the internal limit switch is common. (internally wire-connected)  
Use shield wire for wire-connection to the rotary encoder.

Terminals for power cylinder wiring

Terminals for device wiring

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|

Terminal No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

| Option       | Internal limit switch (K2, K4) |    |     |   |     |    |     |   |        | Potentiometer |   |   | Rotary encoder |    |    |        |    |      |
|--------------|--------------------------------|----|-----|---|-----|----|-----|---|--------|---------------|---|---|----------------|----|----|--------|----|------|
| Symbol       | LS1                            |    | LS2 |   | LS3 |    | LS4 |   | Common | P             |   |   | R              |    |    |        |    |      |
| Contact      | a                              | b  | a   | b | a   | b  | a   | b | c      | 1             | 2 | 3 | 1              | 2  | Z  | 5V~24V | 0V | Case |
| Terminal No. | 18                             | 17 | 5   | 6 | 16  | 15 | 7   | 8 | 4      | 1             | 2 | 3 | 9              | 10 | 11 | 12     | 13 | 14   |

### 1. Position detecting internal LS (with two or four pieces)

Use this LS when the external LS cannot be installed due to the installation space or when performing operation in combination with the potentiometer or the rotary encoder.

With two pieces: Optional symbol K2 Arrangement of LS1 and LS2 in the above figure.

With four pieces: Optional symbol K4 Arrangement of all of LS1 through 4 in the above figure.

#### <Setting of LS>

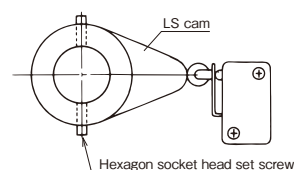
First, before installing a power cylinder to the equipment, operate the cylinder in a single unit to check the rotating direction of the LS cam.

Intall the equipment to the power cylinder, stop the power cylinder, or, move it to a position where you would like to have it be detected.

Then, rotate the LS cam, and tighten the hexagon socket head set screw to fix at a position where the micro switch operates.

At this time, estimate a coasting amount of the power cylinder depending on the pre-checked rotating direction.

| Micro switch specification |                                                                                                                         |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Model                      | OMRON<br>D2VW-5L2A-1M or equivalent                                                                                     |
| Circuit configuration      | NC (Red)  COM (Black)<br>NO (Blue) |
| Electric rating            | 250V AC 4A ( $\cos\phi 0.7$ )                                                                                           |
| Connection                 | Terminal block connection in position detecting unit                                                                    |



## Position detecting unit

### 2. Potentiometer

This is a variable resistor to output electric signals depending on the stroke amount of the power cylinder. Use this unit in combination with TSUBAKI TC unit, or print board and stroke indication meter. Resistance values according to the model have been adjusted before shipment.

Separately request preset values according to the model as they are described in the position detecting unit specification drawing. Pay strict attention to handling because correspondence between the stroke position and the resistance value will deviate by rotating the rod of the power cylinder.

| Potentiometer specifications |                                                        |
|------------------------------|--------------------------------------------------------|
| Model                        | CP-30 or equivalent                                    |
| Manufacturer                 | SAKAE TSUSHIN KOGYO CO., LTD.                          |
| Total resistance             | 1k $\Omega$                                            |
| Rated power                  | 0.75W                                                  |
| Dielectric strength          | 1000V AC 1min.                                         |
| Effective electric angle     | 355° $\pm$ 5°                                          |
| Effective mechanical angle   | 360°endless                                            |
| Connection                   | Connected to terminal block in position detecting unit |

Cylinder rod retract  $\longleftrightarrow$  Cylinder rod extend

### 3. Rotary encoder

| Rotary encoder specifications |                                                                   |
|-------------------------------|-------------------------------------------------------------------|
| Model                         | TS5305N251                                                        |
| Manufacturer                  | Tamagawa Seiki Co., Ltd.                                          |
| Output pulse number           | 600P/R                                                            |
| Output waveform               | 90° phase difference two-phase square wave + home position output |
| Output voltage                | H — Note 1)                                                       |
|                               | L 1V or less Note 1)                                              |
| Power supply                  | 5~24V DC                                                          |

The output signal of the standard specification is of an incremental type, however, an absolute type is also available.

The output type in standard specifications is an open collector.

If voltage output type is required, see (Note 1) below.

If the specification of line driver output is required, contact us.

Note 1) Due to the open collector output, output signals are obtained when the pull-up resistor is connected.

Signal 1 and signal 2 are output voltages of H "(power supply voltage – 1)V or more" and L "1V or less."

For the Z-phase, negative logic applies.

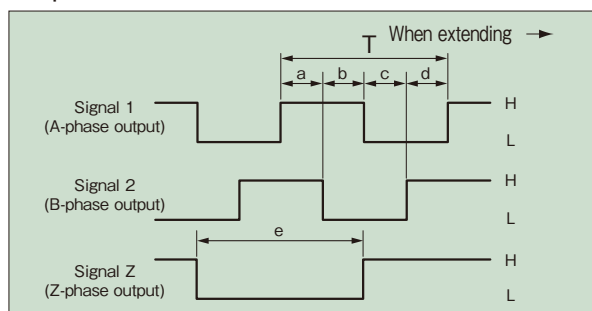
<Reference resistance values> 5V: 220 $\Omega$ , 12V: 470 $\Omega$ , 24V: 1k $\Omega$

#### Output connection

| Signal 1 | Signal 2 | Signal Z | +5V to 24V | 0V   | Case |
|----------|----------|----------|------------|------|------|
| (9)      | (10)     | (11)     | (12)       | (13) | (14) |

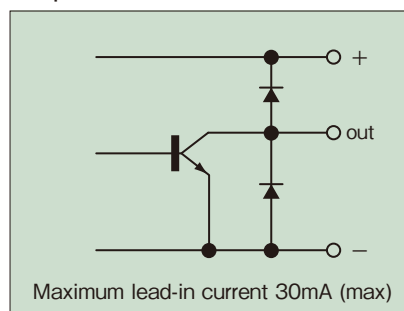
Figures in parentheses indicate terminal No.

#### Output waveform



a. b. c. d =  $T/4 \pm T/8$   $T/2 \leq e \leq 3T/2$

#### Output circuit



\* Best suited to controlling the stroke by a sequencer or programmable controller, etc.

More accurate positioning control is possible in combination with motor speed control by an inverter, etc.

- ① The standard products incorporate an incremental type encoder.
- ② The rotary encoder has been set to output 20 pulses per stroke of 1mm.
- ③ It is possible to set an accurate home position of the machine in combination with a limit switch because home position output is read out every 600 pulses.
- ④ Do not apply vibration or impact to the rotary encoder because it is precision equipment.
- ⑤ Use shield wire for wiring to the rotary encoder.
- ⑥ As a guide for the distance between the rotary encoder and control panel, a collector current of 20mA should be able to be transmitted approximately 50m (12V pull-up).

For distances other than the above, consult with us.

## Control option

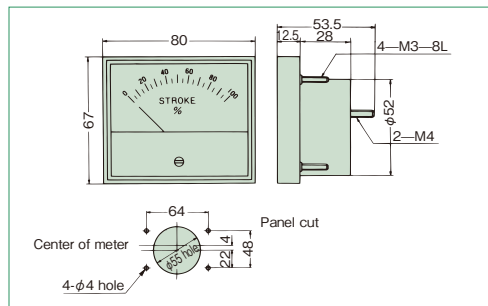
### For potentiometer

#### ■ Stroke indication meter

This meter indicates a stroke in % by a signal from the print board.

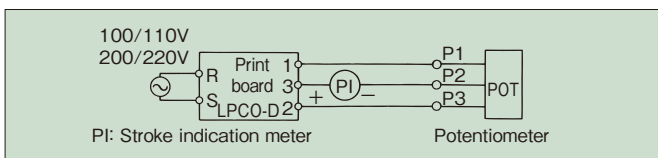
|                     |                                      |
|---------------------|--------------------------------------|
| Model               | RM-80B(100 $\mu$ A DC) or equivalent |
| Grade               | JIS C 1102 2.5 class                 |
| Appearance          | Frame • black                        |
| Scale specification | Entire stroke is indicated in 100%   |

\* A separate printed board is also required.



#### ■ Printed board

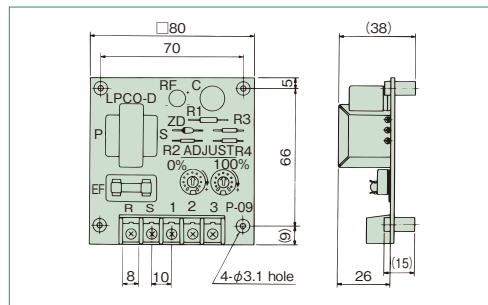
This printed board converts voltage signals from the potentiometer in the position detecting unit of the power cylinder G series into current signals.



Adjust the meter with an ADJUST volume on the print board. Do not make a mistake with the stroke indication meter + and -. Replace the terminals 1 and 2 on the print board to set the indication meter to 100% when the stroke is MIN.

Model LPCO-D1 (Operation power 100/110V 50/60Hz)

LPCO-D2 (Operation power 200/220V 50/60Hz)

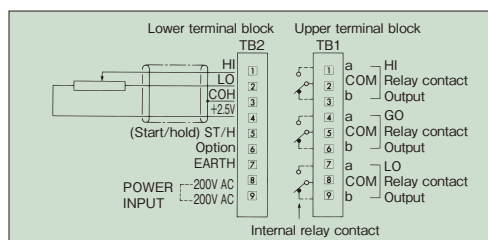
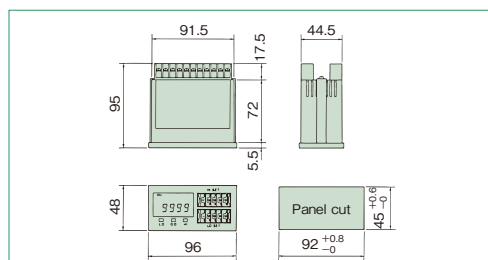


#### ■ R controller

This controller converts voltage signals from the potentiometer in the position detecting unit of the power cylinder G series into digital signals, and performs indication and stroke control. This controller incorporates a scaling function, and can indicate real strokes or extension (%).

This R controller can be directly connected to the potentiometer.

|                                               |                                     |
|-----------------------------------------------|-------------------------------------|
| Model                                         | RX-5455-NBAS (BURRUF) or equivalent |
| Total resistance value of input potentiometer | 0.8k $\Omega$ ~12k $\Omega$         |
| Indication                                    | 4 digits 7 segment LED              |
| Appearance                                    | Black                               |
| Comparison output                             | HI,LO,GO (Relay output)             |
| Comparison preset value                       | 0— $\pm$ 9999                       |
| Comparison output contact capacity            | 30V DC/1A 250V AC/0.2A              |
| Output contact configuration                  | 1C (for all of HI, GO, LO sides)    |
| Power supply                                  | 200V AC $\pm$ 10% 50/60Hz           |



#### ■ Meter relay

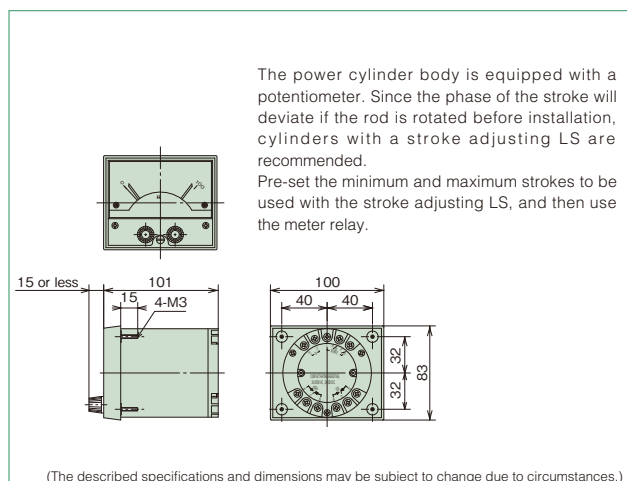
Used for simple adjustment of stroke on the operation panel.

- ( Iron panel attachment is standard.
- ( Contact us separately when installing an aluminum panel. )

Note) For using 4—20mA output, designate as "for 4—20mA output."

| Meter relay specification    |                                                        |
|------------------------------|--------------------------------------------------------|
| Model                        | NRC-100HL (TSURUGA) or equivalent                      |
| Grade                        | JIS C 1102 2.5 class                                   |
| Appearance                   | Frame • black                                          |
| Scale                        | Entire stroke is indicated in 100%                     |
| Power supply                 | 100/100V AC, 200/220V AC 50/60Hz                       |
| Input                        | Max. 100 $\mu$ A DC                                    |
| Output contact configuration | For both of HIGH, LOW sides<br>1C (See the right Fig.) |
| Contact capacity             | 250V AC 3A (cos $\phi$ =1)                             |

\* A separate printed board is also required.

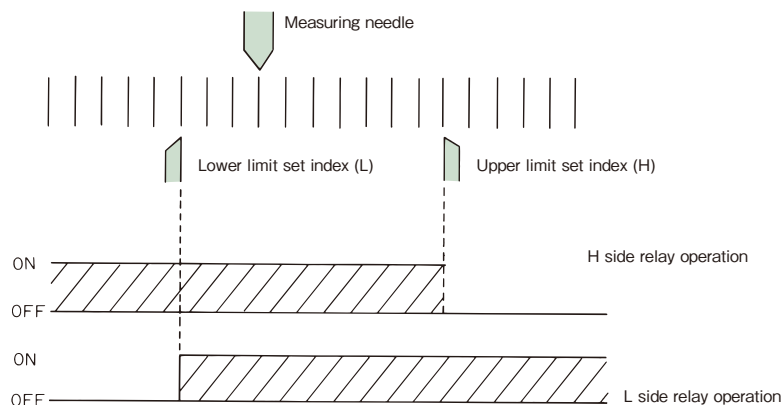


## Control option

### <Printed board>

This is the same as the printed board for the stroke indication meter.

### <Relay operation> (In the case of b contact)



Wire connection is the same as that for the stroke indication meter, however, it is necessary to separately feed power to the meter relay. It is easy to connect the b contact as an output contact to the b contact for the stroke adjusting LS in series.

## Shock relay

Our highly reliable shock relay is recommended as an electric safety device for the GB type power cylinder. For details, refer to the "TSUBAKI E&M SAFCON overload protection devices and control devices catalogue."



Shock relay TBSA series  
(Economy, automatic reset type)



Shock relay TSBSS series  
(Economy, self-holding type)



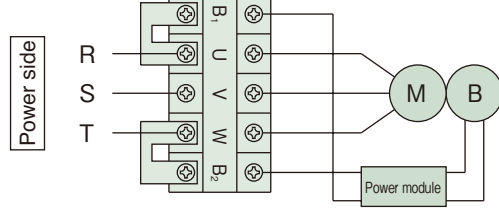
Shock relay TSBED series  
(Digital indication, self-holding/automatic reset type)

## Wire connection

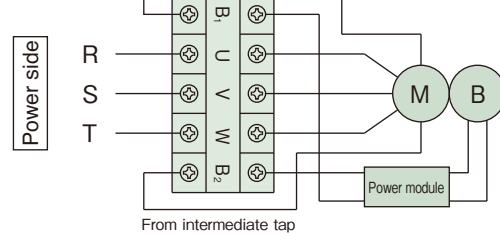
### Wire connection for brake motor (motor with DC brake)

#### Brake internal wiring

##### 200V class

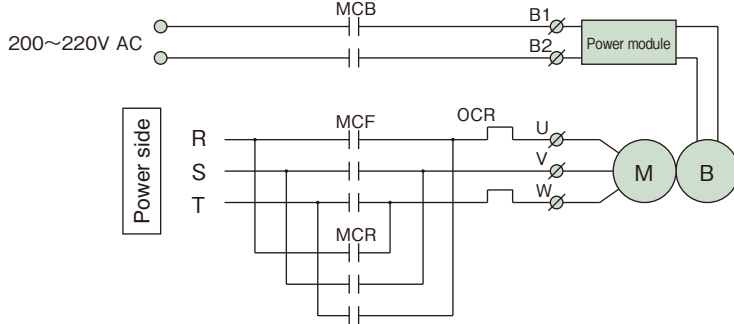


##### 400V class

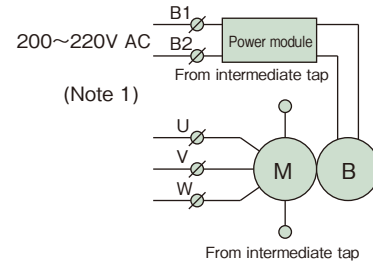


#### Brake external wiring

##### 200V class



##### 400V class



Note) 1. When AC external wiring in the three-phase 400V class motor, make sure to insulate the wire from the intermediate tap. In this case, input power supply to the power module requires 200 to 220V. If no power of 200 to 220V is supplied, decrease the voltage to 200 to 220V by a transformer.

If a voltage of 230V or more is directly input to the power module, the brake and the power module may burn out.

The capacity of the transformer shall be 90VA or more (0.1 to 0.4kW), and check that there is no voltage drop.

Use an MCB with a contact capacity of 250V AC, 7A or more.

The power module includes a surge absorbing protection element. Add a protection element for the contact in each part if necessary.

2. Do not put a relay contact on the output side of the standard power module (between the power module and brake coil). (Do not perform DC external wiring.)

3. By the above connection, the rod retracts in a straight type, and the rod extends in a parallel type.

\* Crimp contact bolt: M4

\* For the other details, refer to the Operation Manual.

## Limit switch specification

|                       | Stroke adjusting external LS                          | Thrust detecting LS                                                |
|-----------------------|-------------------------------------------------------|--------------------------------------------------------------------|
| Model                 | OMRON<br>D4E-1B20N or equivalent                      | OMRON<br>SS-5GL2D or equivalent                                    |
| Circuit configuration | NC ———— COM<br>NO ————                                | For extend Red<br>Black White<br>For retract Green<br>Yellow Brown |
| Electric rating       | 250V AC 3A (cosφ0.4)                                  | 250V AC 2A (cosφ=0.4)                                              |
| Connection            | M3 screw x3<br>Applicable cable diameter φ5.8 to φ7.6 | 0.5E x 6C Length 1000A<br>Cable cable draw-out                     |

## Motor current value, Brake current value

| Output,<br>frame No. | Motor current value (A) |                |                |                |                |                | Brake<br>model | Brake current value (A) |              |              |              |              |              |
|----------------------|-------------------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------------|--------------|--------------|--------------|--------------|--------------|
|                      | 200V<br>50Hz            | 200V<br>60Hz   | 220V<br>60Hz   | 400V<br>50Hz   | 400V<br>60Hz   | 440V<br>60Hz   |                | 200V<br>50Hz            | 200V<br>60Hz | 220V<br>60Hz | 400V<br>50Hz | 400V<br>60Hz | 440V<br>60Hz |
| 4P - 0.1kW           | 0.72<br>(2.76)          | 0.62<br>(2.60) | 0.65<br>(2.84) | 0.36<br>(1.38) | 0.31<br>(1.27) | 0.32<br>(1.41) | SBH01LP        | 0.18<br>0.27            | 0.18<br>0.27 | 0.19<br>0.29 | 0.18<br>0.27 | 0.18<br>0.27 | 0.19<br>0.29 |
| 4P - 0.2 kW          | 1.3<br>(4.91)           | 1.1<br>(4.68)  | 1.1<br>(5.14)  | 0.63<br>(2.40) | 0.55<br>(2.22) | 0.56<br>(2.41) | SBH02LP        | 0.18<br>0.27            | 0.18<br>0.27 | 0.19<br>0.29 | 0.18<br>0.27 | 0.18<br>0.27 | 0.19<br>0.29 |
| 4P - 0.4 kW          | 2.4<br>(11.6)           | 2.1<br>(10.2)  | 2.1<br>(11.0)  | 1.2<br>(5.14)  | 1.1<br>(4.88)  | 1.1<br>(5.39)  | SBH04LP        | 0.18<br>0.27            | 0.18<br>0.27 | 0.19<br>0.29 | 0.18<br>0.27 | 0.18<br>0.27 | 0.19<br>0.29 |

Note) 1. The above values are rated current values of the motor and brake. The numerical value in parentheses is a start current value of the motor.

2. The rated current values and start current values do not include brake current values.

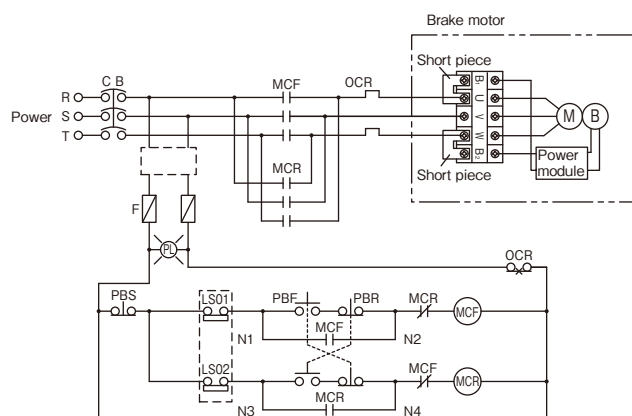
3. A DC brake is used as a brake. The upper stage of the brake current value indicates a value on the primary side of the power module, and the lower stage indicates a value on the secondary side.

4. The above values are references because the rated current values for the power cylinder vary depending on the operating conditions.

5. For AC internal wiring of the 400V class, the voltage is converted to 200V through the motor intermediate tap to be input. For AC external wiring, decrease the voltage to 200 to 220V by a transformer. The capacity of the transformer shall be 90VA or more.

## Reference circuit

## 200V Class GA type brake internal wiring reference circuit



LS01: Extend stroke adjusting external limit switch

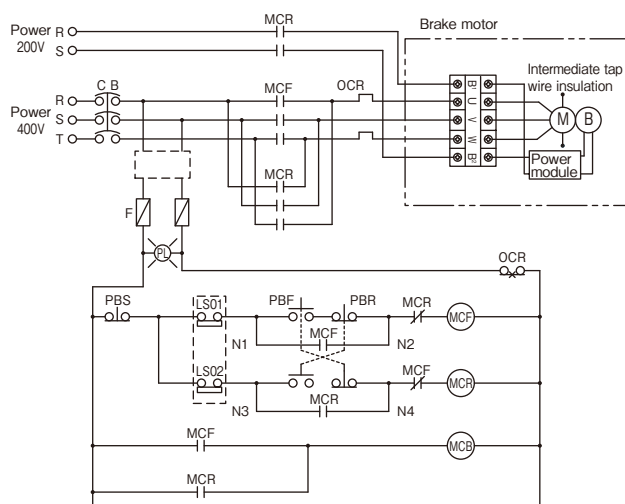
LS02: Retract stroke adjusting external limit switch

**NOTE :**

- (1) This diagram shows a single-acting circuit. When using in an inching circuit, remove the wire connection between N1 and N2, N3 and N4, and short-circuit the PBS.
- (2) If the power voltage for the motor is different from the control voltage, put a transformer into a [ ] portion in the diagram.
- (3) When AC external wiring the brake, remove the short piece on the terminal block and apply a normal power voltage (200 to 220V) to B1 and B2 from the outside.

\* For wire connection when an inverter is used, refer to page 114.

## 400V Class GA type brake internal wiring reference circuit



LS01: Extend stroke adjusting external limit switch

LS02: Retract stroke adjusting external limit switch

**NOTE :**

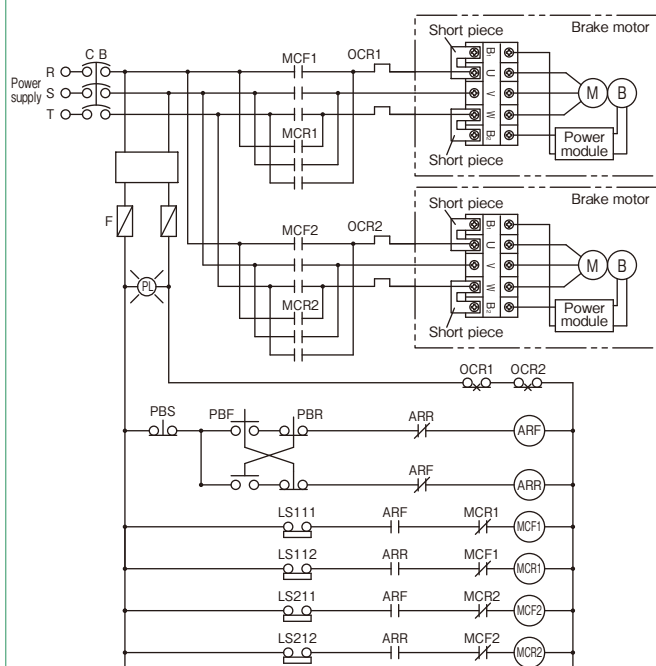
- (1) This diagram shows a single-acting circuit. When using in an inching circuit, remove the wire connection between N1 and N2, N3 and N4, and short-circuit the PBS.
- (2) If the power voltage for the motor is different from the control voltage, put a transformer into a [ ] portion in the diagram.
- (3) When AC external wiring the brake, remove the wire connected to the terminal block from the motor intermediate tap and insulate it. Apply a normal power voltage (200 to 220V) to B1 and B2 (primary side of the module). If there is no power of 200V, decrease the voltage to 200V by a transformer.

The capacity of the transformer shall be 90VA or more (0.1 to 0.4KW), and check that there is no voltage drop.

Use a contact capacity of 250V AC, 7A or more.

\* For wire connection when an inverter is used, refer to page 114.

## 0.1 – 0.4kW GA type brake internal wiring reference circuit for linkage of two



LS111: LP No. 1 extend stroke adjusting external limit switch LS1

LS112: LP No. 1 retract stroke adjusting external limit switch LS1

LS211: LP No. 2 extend stroke adjusting external limit switch LS2

LS212: LP No. 2 retract stroke adjusting external limit switch LS2

**NOTE :**

- (1) This diagram shows an example of 0.1 – 0.4kW brake internal wiring circuit for linkage of two in inching motion.
- (2) If the power supply voltage for the motor is different from the control voltage, put a transformer in the [ ] section in the diagram.
- (3) Lead wires B1 and B2 for the brakes are connected to U and W on the motor terminal block by using short pieces.
- (4) For using the brakes by external wiring, remove the short pieces, and externally apply not inverter output but normal power supply voltage to B1 and B2.

## Installation

### Installation direction

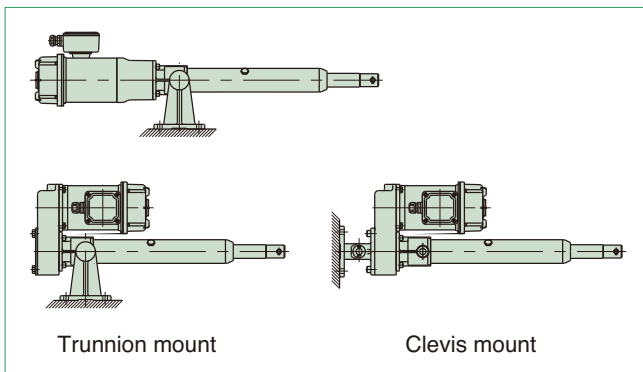
Either horizontal, vertical and inclined directions are allowed.

### Installation method

For installation of the main body, use a trunnion mount or clevis mount (parallel only).

Apply grease to the trunnion pins and bracket holes for mounting.

Install the end part with a U-type or I-type end fitting.



### Manual operation

When manually adjusting the stroke, rotate the manual shaft on the motor opposite load side with the manual handle after releasing the brake. For how to release the brake, refer to the Operation Manual. The manual handle is attached to the product.

#### ⚠ WARNING

When a load is applied to the rod, remove the load before releasing the brake.

For the amount of movement of the rod per one turn of the manual shaft, refer to the standard model list (page 67).

### Anti-rod rotation

1. Anti-rod rotation is required because a rotating force is generated on the rod with thrust. Generally, rotation can be mainly prevented by installing the rod end to a driven machine.
2. When operating with the end set free or installing pulleys to pull a rope, use a rod anti-rotation specification (option symbol M).

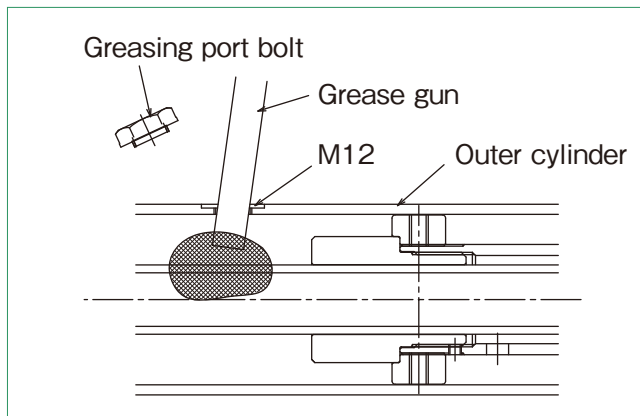
### Setting of stroke adjusting external LS

1. Take the coasting amount (page 70) into consideration to set adjustment of the limit switch.
2. When using the cylinder at the nominal stroke, set the limit switch so that the cylinder stops within the XA dimension in the Dimensions Table.
3. When synchronized operating two or more power cylinders, install a limit switch at the extend limit and retract limit on each cylinder to stop each cylinder. Avoid controlling all power cylinders with one limit switch because accumulated errors in stroke will occur. For the control circuit, see the example of circuit for linkage on page 80.

## Maintenance

### Greasing on screw

Use the screw as it is because it has been applied with greased in advance. Refill grease with reference to Table 1-2 as a guide. To apply grease to the screw, remove the greasing port bolt on the outer cylinder and advance the rod in the full stroke and apply grease to the outer circumference of the screw with a grease gun, and then reciprocate the rod within the stroke to be used. Repeat this operation a few times.



#### ⚠ WARNING

Never insert your finger into the greasing port.

If the cylinder operates with your finger inserted, your finger may be injured.

Table 1 Recommended grease

| Use classification | Company name         | Grease name                |
|--------------------|----------------------|----------------------------|
| Screw shaft        | TSUBAKI E&M          | JWGS100G                   |
|                    | IDEMITSU KOSAN       | *DAPHNE EPONEX SRNo.2      |
|                    | NIPPON GREASE        | NIGULUBE EP-2K             |
|                    | EXXON MOBILE         | MOBILUX EPNo.2             |
|                    | COSMO OIL LUBRICANTS | COSMO GREASE DINAMX EPNo.2 |
|                    | SHOWA SHELL          | SHELL ALBANIA EP grease 2  |

\* The above greases are filled before shipment.

Note) JWGS100G is separately sold in a container of 100g. (See page 262.)

Table 2 Lubrication cycle

| Lubrication cycle   |                       |                        |
|---------------------|-----------------------|------------------------|
| Traveling distance  | Every 5km             |                        |
| Operating frequency | 100 times or more/day | One to three months    |
|                     | 10 to 100 times/day   | Three to six months    |
|                     | Up to 10 times/day    | Six months to one year |

Note) The above values are for longer use, and do not indicate life.

### Greasing on Reduction part

Grease has been applied on the tooth surfaces in advance, therefore, use the decelerating part as it is.

Initial tooth surface application grease

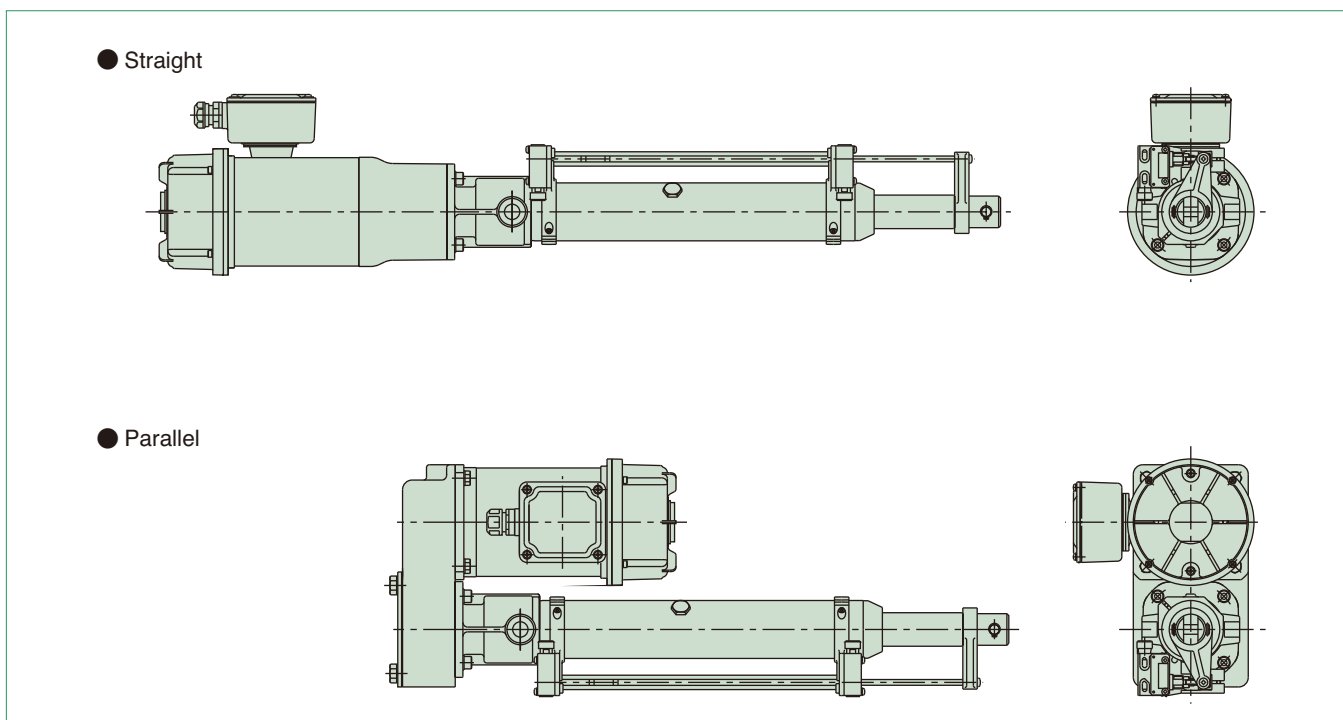
Planetary gear (straight type): Moly gear grease No. 1 (SUMICO LUBRICANT CO., LTD.)

Helical gear (parallel type): Moly gear grease No. 1 (SUMICO LUBRICANT CO., LTD.)

\* Apply grease to the helical gear part (parallel type) approximately once one year.

## Adjustment of external limit switch and variation of mounting

### 1. Standard Mounting Form

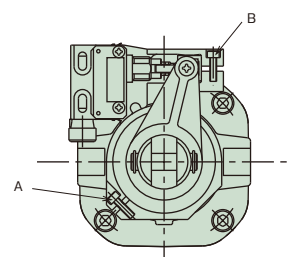


### 2. Adjustment method

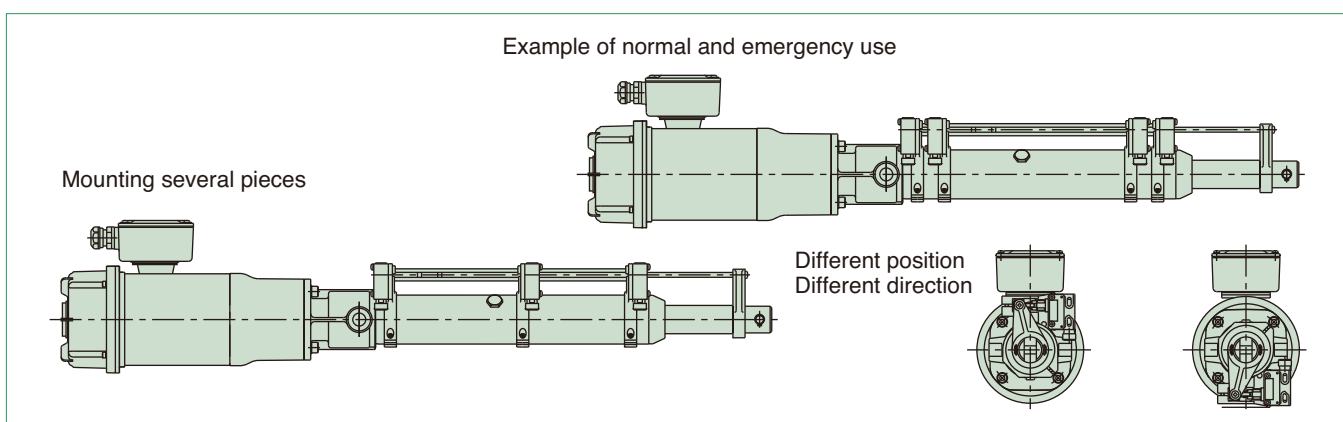
The power cylinder G series has a margin of approximately 3 to 8mm of the nominal stroke on both sides which allows for mechanical stroke. The stroke to be used is within the nominal stroke, therefore, adjust the limit switch so that operation is made in this range. If the nominal stroke is exceeded, the striker protrudes from the LS guide rail. When adjusting the limit switches, adjust and fix the limit switches one by one so that the relative position between the LS guide rail and the cylinder body is not deviated.

#### <Adjustment method>

1. Loosen the LS flange tightening bolt (A) and the guide rail tightening bolt (B).
2. Slide the flange to a position where you want it set.
3. Tighten the guide rail tightening bolt (B) beforehand.
4. Check that the guide rail and the LS rod are not twisted, and tighten the LS flange tightening bolt (A).



### 3. Mounting variations



### 4. Change in mounting work

- For change in orientation and quantity, a separate Instruction Manual is available. Contact us.
- Either mounting direction is allowed, however, take the direction into consideration so that accumulation of dust or dirt the guide rail does not impair operation of the striker.

## Variation in direction and position of terminal box

### 1. "Direction" of motor terminal box

The motor terminal box can be fixed in four directions shown in the following diagram.

This direction can be easily changed by the customer.

Be aware that if the lead wires are pulled or bent forcefully, the wires will be broken.

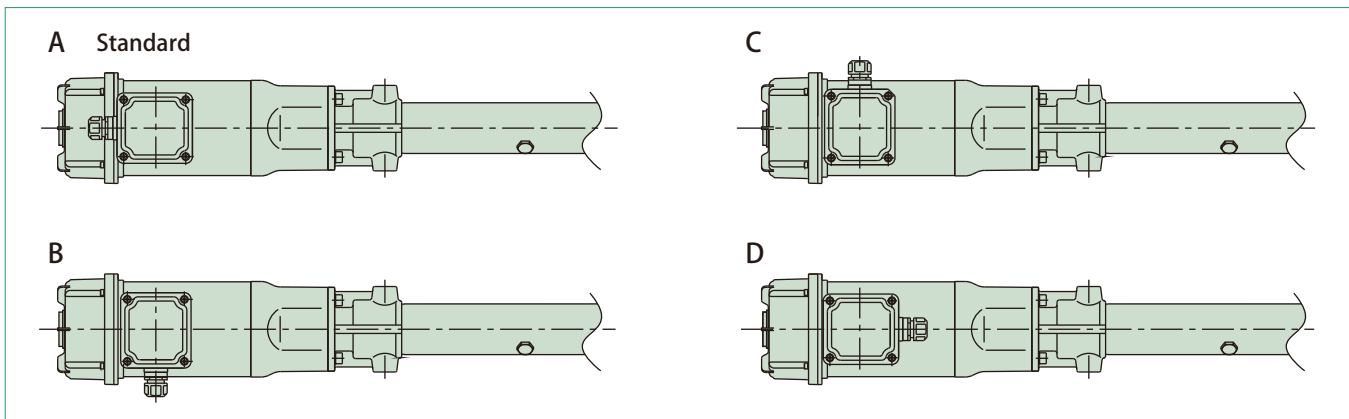
Procedures to change are as follows.

1. Remove the lid of the terminal box.
2. Remove the two screws fixed to the terminal block.
3. Bring up the terminal block without removing the wire connection for the motor and the brake, and remove the four screws fixed to the terminal box.
4. Rotate the terminal box in the desired direction and re-fix it to the main body.
5. Install the terminal block again.

Be aware that if the lead wires are trapped under the terminal block, the wires will be broken or an insulation failure will occur.

6. After connecting the power cable, install the lid, then the procedures are completed.

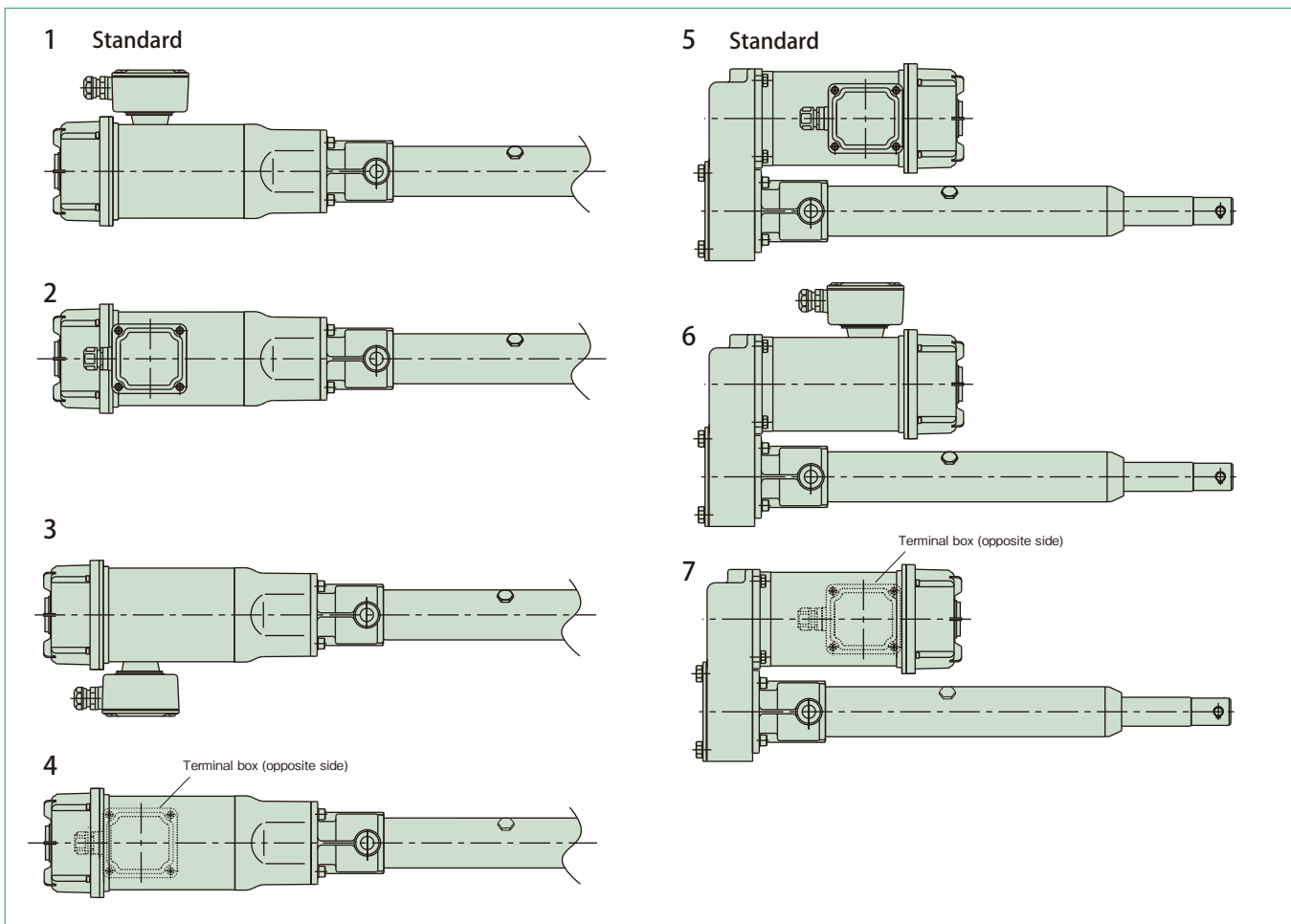
When fixing the terminal box to the main body, check that the rubber packing is correctly sandwiched, then firmly tighten the four screws.



### 2. "Position" of motor terminal box

The position of the motor terminal box can be rotated by every 90 degrees around the motor shaft as shown in the following diagram.

However, this change must not be carried out by the customer. Specify the position when ordering the power cylinder.





# WARNING

## ■ Cautions for selecting

- Anti-rod rotation is required because a rotating force is exerted on the rod with thrust. Rod rotating forces at the rated thrust are described in the model list. When operating with the end unconnected or when installing pulleys to pull rope, use an optional rod anti-rotation specification.
- When the cylinder operating stroke is short, a high speed type cylinder cannot be used because the operating time per one stroke becomes shorter and cannot be controlled. The following table shows the minimum necessary strokes when motor energization time is 0.5s. Refer to this table to determine the speed.

| Speed symbol                                     | H             | U               |
|--------------------------------------------------|---------------|-----------------|
| Nominal speed mm/s 50/60Hz                       | 100/120       | 200/240         |
| 0.5s operation moving amount mm                  | 50/60         | 100/120         |
| Predicted maximum coasting amount mm (Reference) | 24/33         | 67/89           |
| Minimum necessary stroke mm                      | 74/93 or more | 167/209 or more |

## ■ Cautions for installation

- Apply grease to the trunnion pin and the trunnion hole for trunnion mounting.
- Also, apply grease to the connecting pin of the end fitting and the connecting pin for clevis mounting.
- When the main body greatly swings by operation of the cylinder, consider using a sliding bearing or a rolling bearing for the connecting part. Cylinders whose trunnion hole is provided with sliding bearing are available as MTO.
- When the trunnion pin or connecting pin for the clevis or the end fitting is directed in the vertical direction (when the cylinder is laid horizontally), and the main body swings, take countermeasures for wear such as inserting a bearing member into the trunnion hole, the clevis fitting, or the side part of the end fitting.
- All models are totally enclosed structures so that they can be used normally outdoors, however, under adverse conditions exposed to constant water and steam etc., and snow accumulation, although they are an outdoors type, an appropriate cover is required. The power cylinder can generally be used in a range of -15°C to 40°C, although it varies depending on the use conditions. When using at 40°C or higher, always protect with a heat insulating cover, etc. Never use in a flammable atmosphere, otherwise it may cause an explosion and fire. In addition, avoid using it in a location where vibration or shock exceeding 1G is applied. For use in a misty atmosphere, consult with us.
- When using a cylinder of the cabtire cable lead wire specification outdoors, carry out waterproofing treatment sufficiently.

## ■ Cautions for use

- Regulate both ends of the stroke by the limit switch. Select a type of option which allows the limit switch to be mounted on the power cylinder body.
- Use within the stroke range. If the stroke is exceeded, breakage may occur.
- As a high-speed type (U, H speed) of the power cylinder G series has a long coasting distance, the striker may override the limit switch. (The striker for the U-speed power cylinder overrides the limit switch at the rated lifted load.) For this reason, make sure to allow a limit signal to be self-held on the control circuit.
- Megger testing is prohibited for this cylinder. It may break the built-in power module. Remove the brake wiring for the terminal block when conducting megger testing of the external circuits.
- Adjustment of the limit switch for thrust detection of the GC type must not be carried out by the customer. The preset value for thrust detection may greatly change.

## Easy wiring specifications

This is a specification in which limit switches for thrust detection and external adjustment are wired by us before shipment. For details, request a leaflet.



## Power cylinder G series have become easier to use.

Slim  
&  
Simple

Cost-  
effective

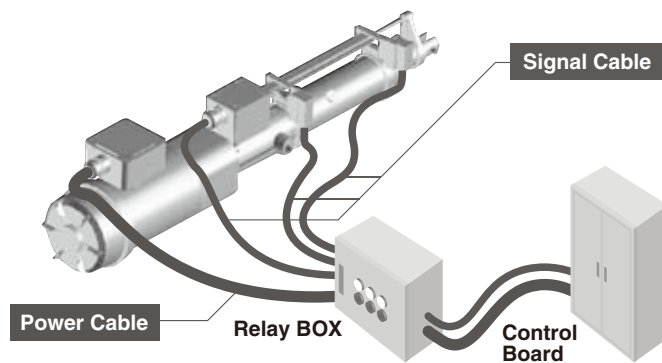
Safe

To respond to voices of the “**power cylinder is troublesome when it comes to wiring!**” from customers, [simple wiring specifications] have been added to LPG series. (Option)

The power cylinder can be selected from two of “Automatic detecting type” and “Centralized terminal box type” with the keywords of simple, neat, reduction in wiring man-hours, and safety (automatic detecting type).

### In standard specifications

- ▶ Large number of wires and its complexity require wiring man-hours and cost at the relay box.
- ▶ Equipment may be damaged due to omission of wiring for the external limit switch for thrust detection and stroke adjustment.



## Needs simplicity!

### By adoption of easy wiring specifications

#### Advantages

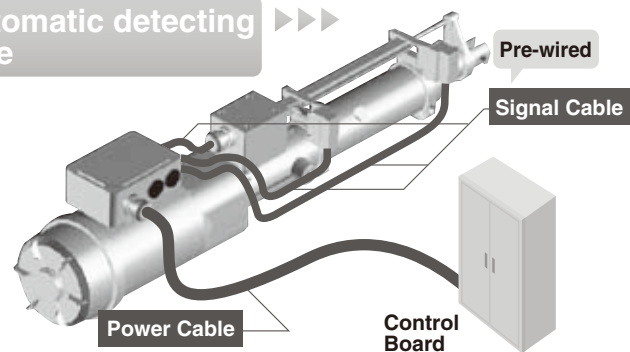
Slim and simple in appearance

Cost reduction by pre-wired relay boxes

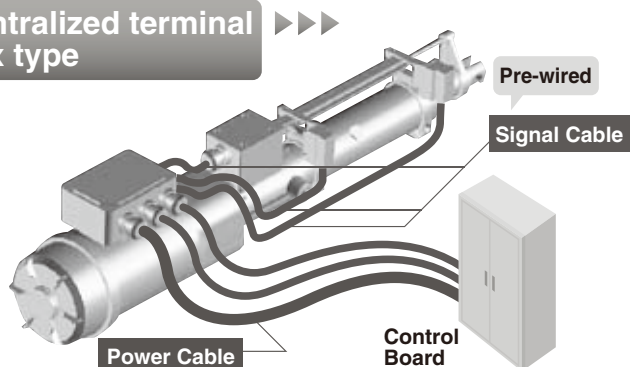
Operates just by connecting the power cable to the terminal box

Prevents damage from excessive torque and stroke caused by incomplete relay box wiring

#### Automatic detecting type



#### Centralized terminal box type



## Power Cylinder

# T series

### Thrust : 2.45kN to 313kN {250kgf to 32000kgf}

This is a power cylinder of a large thrust type which can be used with AC (alternating current).

Power cylinder T series can be used across a wide range of applications such as steel, injection molding machines, liquid crystal and semiconductor device.

This power cylinder can be used outdoors. (IP55)

#### ● Two easy-to-select types

T series have two types which are different in safety mechanisms from each other. The TB type incorporates a wet slip clutch. TC type is equipped with a thrust detecting limit switch.

#### ● Wide variation

A wide range of models are available as standard according to application, thrust and speed.

Thrust can be selected in a range from 2.45kN{250kgf} to 313kN{32000kgf}, and speed can be selected in a range from 10mm/s to 120mm/s.

For details, refer to the standard model list.

#### ● Reliable operation

All models adopt a highly efficient ball screw, quiet reduction part, and highly reliable brake motor.

All series incorporate a highly reliable safety device which works effectively against overload.

#### ● Abundance of options

The stroke adjusting limit switch includes two types of the external type and internal type, and the stroke sensor includes two types of the potentiometer method and rotary encoder method. Control by a sequencer becomes simpler. For a stroke sensor with potentiometer, an option not only indicating stroke but also allowing for control by a meter relay is also available.

#### ● Quick delivery of special motor (For details, refer to page 120.)

Heat resistance class F and class H are supported.

Different voltage specifications (Overseas voltages are supported.)

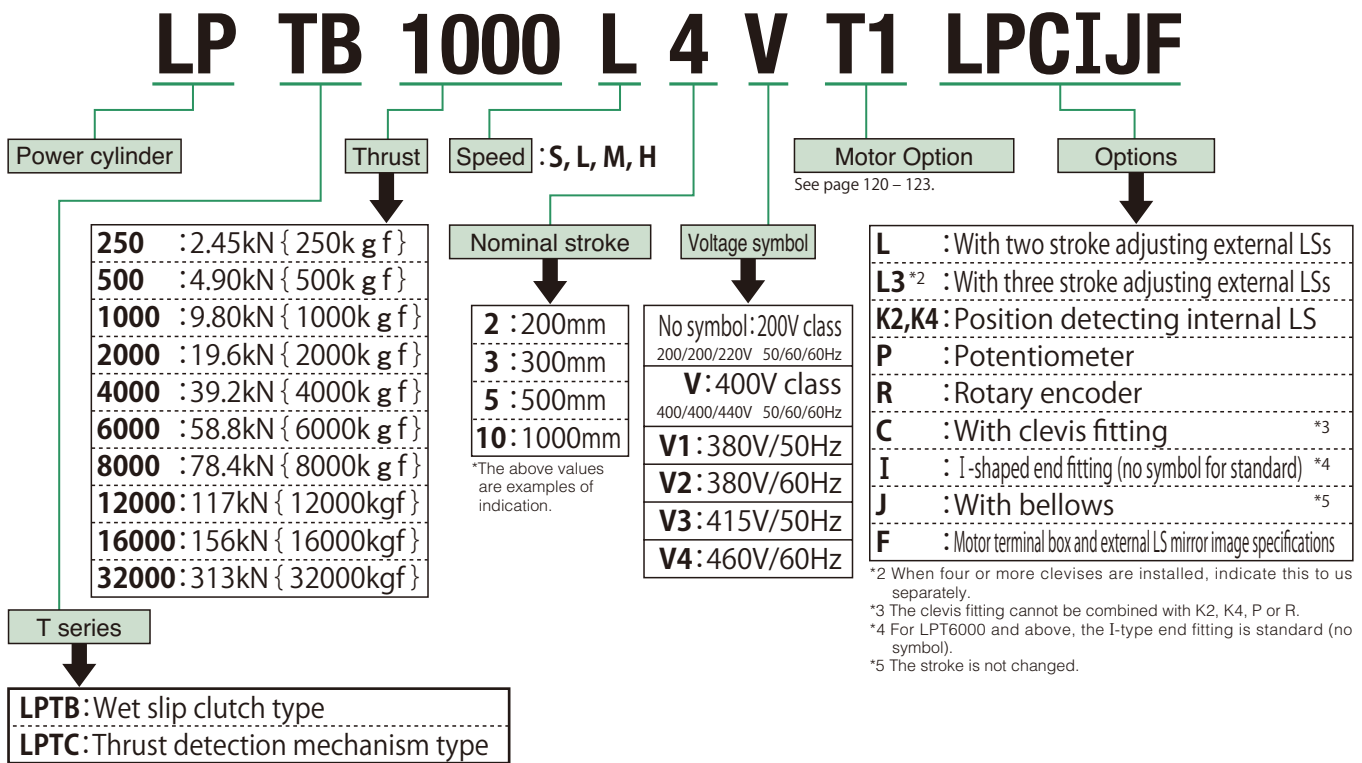
Inverter specifications

Global specifications (CE-compliant, UL-compliant and CCC-compliant)

Explosion-proof specifications



## Model No. designation



\* The Trunnion fitting is not included in the body model number. Please separately specify a Trunnion model number.  
 \* Manual operating handles are also available.

## Standard model list

| Power cylinder model |       | Rated thrust |         | Nominal speed<br>50/60Hz<br>mm/s | Motor output<br>kW | Rod movement per<br>one turn of manual<br>shaft mm | Rod rotating force |         | Nominal stroke<br>mm            | Brake specifications                               |
|----------------------|-------|--------------|---------|----------------------------------|--------------------|----------------------------------------------------|--------------------|---------|---------------------------------|----------------------------------------------------|
|                      |       | N            | {kgf}   |                                  |                    |                                                    | N·m                | {kgf·m} |                                 |                                                    |
| LPTB                 | 250   | S            | 2.45k   | 250                              | 0.1                | 2.0                                                | 2.60               | 0.27    | 200, 300, 400                   | ● DC brake<br>● Brake external wiring is available |
| LPTC                 |       | L            |         |                                  | 0.1                | 1.0                                                |                    |         | 500, 600                        |                                                    |
|                      |       | M            |         |                                  | 0.2                | 2.0                                                |                    |         |                                 |                                                    |
|                      |       | H            |         |                                  | 0.4                | 4.0                                                |                    |         |                                 |                                                    |
| LPTB                 | 500   | S            | 4.90k   | 500                              | 0.1                | 2.0                                                | 5.20               | 0.53    | 200, 300, 400                   |                                                    |
| LPTC                 |       | L            |         |                                  | 0.2                | 1.0                                                |                    |         | 500, 600, 800                   |                                                    |
|                      |       | M            |         |                                  | 0.4                | 2.0                                                |                    |         |                                 |                                                    |
|                      |       | H            |         |                                  | 0.75               | 3.9                                                |                    |         |                                 |                                                    |
| LPTB                 | 1000  | S            | 9.80k   | 1000                             | 0.2                | 2.0                                                | 13.8               | 1.41    | 200, 300, 400                   |                                                    |
| LPTC                 |       | L            | (7.84k) | (800)                            | 0.4                | 1.0                                                |                    |         | 500, 600, 800                   |                                                    |
|                      |       | M            |         |                                  | 0.75               | 2.0                                                |                    |         | ※ 1000 (Rated thrust is 7.84kN) |                                                    |
|                      |       | H            |         |                                  | 1.5                | 4.0                                                |                    |         |                                 |                                                    |
| LPTB                 | 2000  | S            | 19.6k   | 2000                             | 0.4                | 2.0                                                | 34.7               | 3.54    | 200, 300, 400                   |                                                    |
| LPTC                 |       | L            | (15.6k) | (1600)                           | 0.75               | 1.0                                                |                    |         | 500, 600, 800                   |                                                    |
|                      |       | M            | (12.2k) | (1250)                           | 1.5                | 2.0                                                |                    |         | ※ 1000 (Rated thrust is 15.7kN) |                                                    |
|                      |       | H            |         |                                  | 2.2                | 3.0                                                |                    |         | ※ 1200 (Rated thrust is 12.2kN) |                                                    |
| LPTB                 | 4000  | S            | 39.2k   | 4000                             | 0.75               | 1.4                                                | 83.2               | 8.49    | 200, 300, 400                   |                                                    |
| LPTC                 |       | L            | (33.3k) | (3400)                           | 1.5                | 1.0                                                |                    |         | 500, 600, 800                   |                                                    |
|                      |       | M            |         |                                  | 2.2                | 1.4                                                |                    |         | 1000, 1200                      |                                                    |
|                      |       | H            |         |                                  | 3.7                | 2.4                                                |                    |         | ※ 1500 (Rated thrust is 33.3kN) |                                                    |
| LPTB                 | 6000  | S            | 58.8k   | 6000                             | 0.75               | 1.0                                                | 124                | 12.7    | 500                             |                                                    |
| LPTC                 |       | L            |         |                                  | 1.5                | 0.7                                                |                    |         | 1000                            |                                                    |
|                      |       | M            |         |                                  | 2.2                | 1.0                                                |                    |         | 1500                            |                                                    |
|                      |       | H            |         |                                  | 3.7                | 1.7                                                |                    |         |                                 |                                                    |
| LPTB                 | 8000  | S            | 78.4k   | 8000                             | 1.5                | 1.2                                                | 222                | 22.6    | 500                             |                                                    |
| LPTC                 |       | L            |         |                                  | 2.2                | 0.8                                                |                    |         | 1000                            |                                                    |
|                      |       | M            |         |                                  | 3.7                | 1.2                                                |                    |         | 1500                            |                                                    |
|                      |       | H            |         |                                  | 5.5                | 1.7                                                |                    |         |                                 |                                                    |
| LPTB                 | 12000 | L            | 117k    | 12000                            | 2.2                | 1.2                                                | 333                | 34.0    | 500                             |                                                    |
| LPTC                 |       | M            |         |                                  | 3.7                | 2.2                                                |                    |         | 1000                            |                                                    |
|                      |       | H            |         |                                  | 5.5                | 1.2                                                |                    |         | 1500                            |                                                    |
|                      |       |              |         |                                  |                    |                                                    |                    |         | 2000                            |                                                    |
| LPTB                 | 16000 | L            | 156k    | 16000                            | 3.7                | 2.9                                                | 666                | 67.9    | 500                             |                                                    |
| LPTC                 |       | M            |         |                                  | 5.5                | 3.2                                                |                    |         | 1000                            |                                                    |
|                      |       | H            |         |                                  | 7.5                | 3.7                                                |                    |         | 1500                            |                                                    |
|                      |       |              |         |                                  |                    |                                                    |                    |         | 2000                            |                                                    |
| LPTB                 | 32000 | L            | 313k    | 32000                            | 5.5                | 0.4                                                | 1330               | 136     | 500                             |                                                    |
| LPTC                 |       | M            |         |                                  | 7.5                | 0.6                                                |                    |         | 1000                            |                                                    |
|                      |       | H            |         |                                  | 11                 | 0.8                                                |                    |         | 1500                            |                                                    |
|                      |       |              |         |                                  |                    |                                                    |                    |         | 2000                            |                                                    |

Note) The numerical value in parentheses on rated thrust is for the long stroke type.

1) The rated thrust is limited for the stroke marked with an\*.  
 2) The speeds indicate a value at the motor synchronized rotating speed.

## Motor specifications

|                       |                                               |
|-----------------------|-----------------------------------------------|
| Model                 | Totally enclosed self cooling type with brake |
| Output                | Refer to Standard model dimensions list       |
| Number of poles       | 4 poles                                       |
| Voltage               | 3 $\phi$ 200V/200V/220V                       |
| Frequency             | 50Hz/60Hz/60Hz                                |
| Heat resistance class | E (B for 1.5kW or less)                       |
| Time rating           | S2 30min.                                     |
| Protection method     | Totally enclosed outdoor type (IP55)          |

1) 400/440V, different voltage specifications other than the above voltages are also available.  
2) For motor current value and brake current value, refer to page 115.

## Painting color

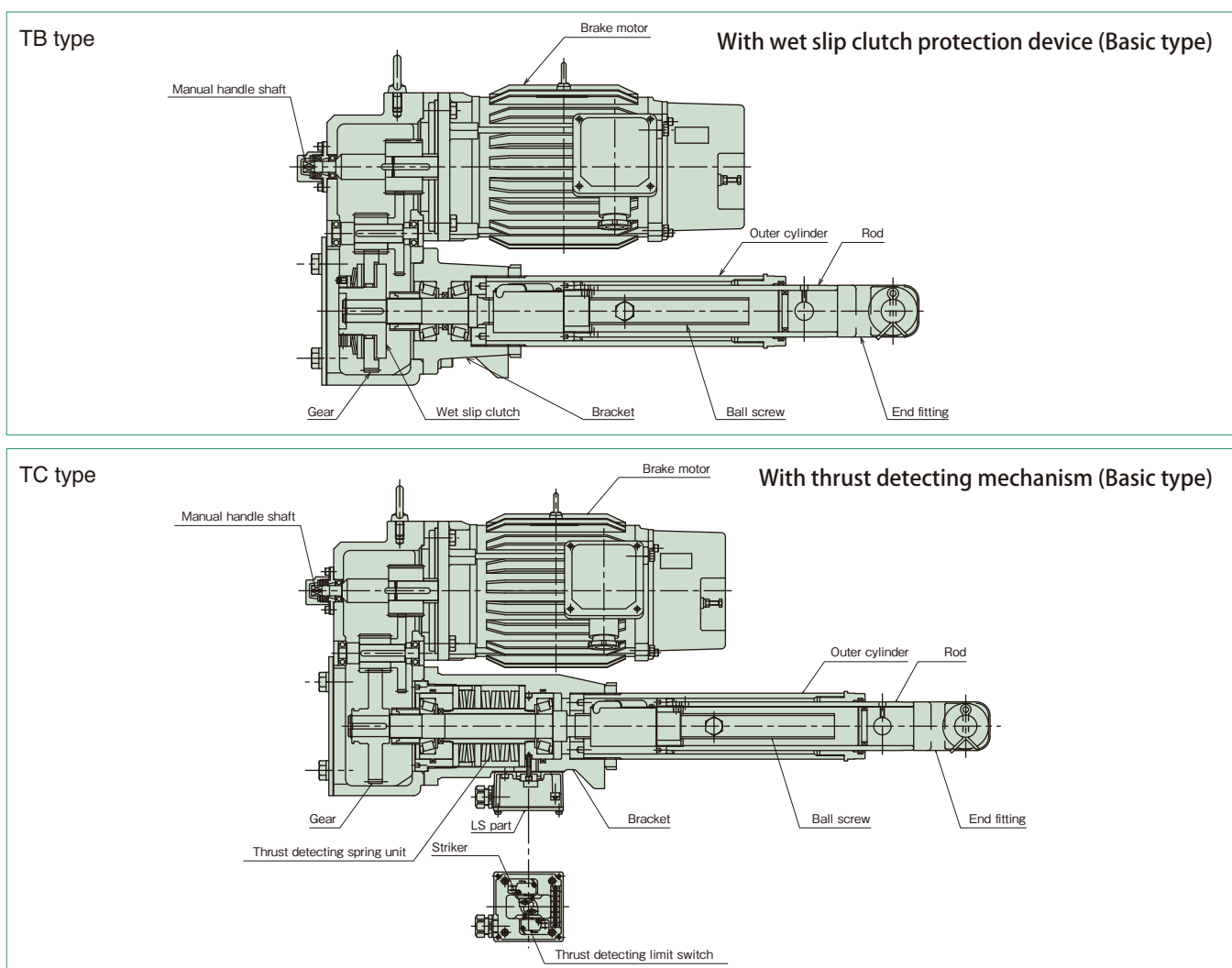
TSUBAKI olive gray (Munsell 5GY6/0.5 or approximate color)

## Standard use environment

| Environment<br>Model | Ambient<br>temperature | Relative<br>humidity                    | Impact resistance<br>value | Installation<br>altitude             | Atmosphere           |
|----------------------|------------------------|-----------------------------------------|----------------------------|--------------------------------------|----------------------|
| Outdoor<br>type      | -15℃<br>~<br>40℃       | 85%<br>or less<br>(no dew condensation) | 1G<br>or less              | 1000m<br>or lower above<br>sea level | Normally<br>outdoors |

- 1) Cylinders with bellows are recommended in an excessively dusty location.
- 2) Special painting is available for locations exposed to sea breezes and salt. Consult us.
- 3) All models are totally enclosed structures so that they can be used normally outdoors, however, under adverse conditions exposed to constant water and steam etc., and snow accumulation, although they are an outdoors type, an appropriate cover is required. When using at 40℃ or higher, always protect with a heat insulating cover, etc. Never use in a flammable atmosphere, otherwise it may cause an explosion and fire. In addition, avoid using it in a location where vibration or shock exceeding 1G is applied.
- 4) For use in a misty atmosphere, contact us.

## Structure



\* The structure slightly varies depending on the model.

**Brake motor** — This motor adopts a deenergization operation type (spring close type), and the brake is applied while the cylinder stops. This brake action holds load while the power cylinder stops and reduces coasting during stoppage, and serves the purpose of increasing stop accuracy. All of the brake motors adopt outdoor types.

**Reduction part** — The reduction part adopts a combination of a helical gear on the high speed side and a spur gear on the low speed side. The lubrication method is grease bath type, and has a quiet operating specification. Furthermore, a manual handle shaft is provided, and the structure of the speed reducer facilitates operation at power failure and adjustment for installation. As options, various position detecting devices can be installed.

**Actuation part** — The actuation part is provided with a ball screw and nut which converts a rotating force into linear motion. Further, external limit switches for stroke adjustment can be mounted. A high precision ball screw and nut have advantages such as high transmission efficiency, less wear, long life and easy lubrication. The external limit switches for stroke adjustment are structured to freely adjust the stroke and endure outdoor use. The bellows are excellent in weatherproofing, and the stroke does not change even if the bellows are mounted. The seal for the rod also endures outdoor use.

## Classification of usage for LPTB and LPTC types

Both types of the power cylinders have the same basic functions (thrust, speed, stroke), however, each has its feature as regards the mechanism. Read the following to select the optimum type.

### TB type

#### ● Wet slip clutch type (simple type)

##### [Wet slip clutch]

The screw shaft end of the reduction part incorporates a slip clutch which operates stably in grease as a safety device.

Adoption of special lining exerts a protective function even at the time of overload or stroke overextension.

\* When overload is electrically detected, use in combination with our shock relay is recommended.

### TC type

#### ● Thrust detecting mechanism type

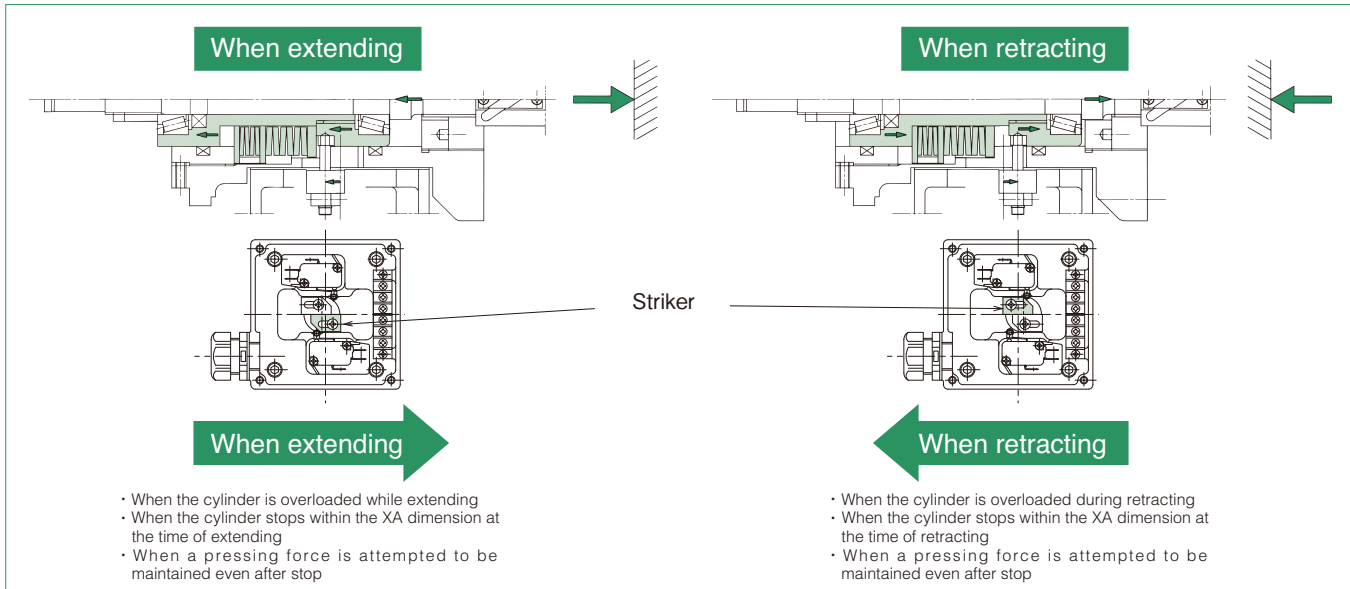
This type exerts its effect in the following cases.

- ① When performing press (pull) stop
- ② When requiring an electric signal at the time of overload
- ③ When an overload is possibly applied from the load side during stop

When an overload is impulsively applied, the incorporated spring absorbs the impact load.

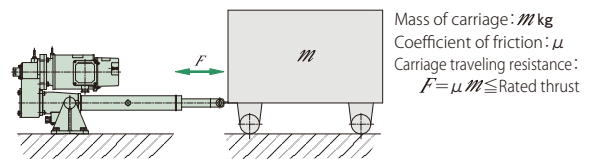
##### [Thrust detecting mechanism]

This is a thrust detecting mechanism which combines two types of pre-loaded disc springs whose spring constants are different from each other and limit switches. The combined effect of these disc springs also allows for press and stop of the high speed type. (There is only one type for the 6000 type and larger.)



### Preset thrust for safety device

For both of the TB type and TC type, the thrust for the safety device has been set to approximately 150% to 200% of the rated thrust. The safety device does not work at the start for opening/closing of the damper or the hopper gate, normal reverse, inclination and elevation, however, when a load inertia is large due to horizontal movement of carriage, the safety device may work to impair smooth operation at the start. For the allowable mass  $M$  of each model, see Table 4 on page 92.



## Cautions for use

#### ● When pressing (pulling) and stopping at high frequency

When using the power cylinder at a frequency of ten or more times a day, refer to the total stop times for every model in the following table.

| Type                                                 | LPTC250~LPTC4000 |    |   | LPTC6000~LPTC32000 |   |   |
|------------------------------------------------------|------------------|----|---|--------------------|---|---|
| Speed                                                | S,L              | M  | H | S,L                | M | H |
| Reference total stop times<br>( $\times 10^4$ times) | 30               | 10 | 5 | 10                 | 3 | 1 |

Note) When the power cylinder is used for press (pull) contact stopping, external wiring is recommended for the wire connection of the brake.

Note) When the power cylinder is used exceeding the values on the above table, it is recommended to stop with the stroke adjusting LS.

Note) When the power cylinder is used with press (pull) stop, strength of the mating equipment shall be 250% or more of the rated thrust.

#### ● When multiple operation or stroke position control is performed

##### ① When installing rotary encoder or potentiometer

For the TC type, a spring mechanism is built in the operating part. The spring slightly deflects at press (pull) and stop, or when overload occurs, the signal amount deviates by the deflection. For the TB type, even if the safety device is tripped, signal amount does not deviate. However, the TC type can be used at normal stroke operation.

##### ② When there is a problem with movement of the rod even if overload is applied from load side during stop

For the TC type, a spring mechanism is built in the operating part, therefore, when a large load is applied from the load side, the spring deflects and the rod moves by the deflection.

When the load is eliminated, the rod returns to the original position.

## Selection 1

### Conditions of use required for selection

- Machine to be used and application
- Thrust or load N { kgf }
- Stroke mm
- Speed mm/s
- Frequency of operation, cycles/min.
- Hours of operation and annual number of operating days
- Type of load of machine used
- Environment of use
- Power voltage, frequency

### Selection procedures

#### Determination of model STEP 1

Determine the type (TB or TC) according to the use environment and method of operation.

#### Determination of model No. STEP 2

- Obtain annual traveling distance from the stroke, frequency of operation and hours of operation.

$$\text{Annual traveling distance km} = \text{Actual stroke m} \times \text{Frequency of use/day} \times \text{number of operating days} \times 10^{-3}$$

- Obtain the operation factor from the characteristics of load and the machine used, referring to Table 1.

- Multiply thrust or load by operation factor to obtain a corrected thrust.
- Determine the frame No. from the "Expected Traveling Distance" shown below on this page according to the corrected thrust and annual traveling distance, and select an applicable model No. from the standard model list (page 87) based on the stroke, speed, power supply voltage and frequency.

#### Characteristics check STEP 3

- Use the power cylinder at a frequency of operation below the allowable frequency of operation (Table 2).
- Check the load time ratio.
- Positioning accuracy varies depending on the stopping method. Refer to the stopping method (page 91).

Table 1 Operation factor

| Characteristics of load                                    | Example of machine used                                                                                       | Operation factor |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|------------------|
| Smooth operation without impact<br>Small inertia           | Damper, opening/closing of valve, conveyor changeover device                                                  | 1.0~1.3          |
| Operation with light impact<br>Intermediate inertia        | Opening/closing of hopper gate, various transfer equipment, various lifter elevation                          | 1.3~1.5          |
| Operation with large impact and vibration<br>Large inertia | Heavy object conveyance by carriage, buffer for belt conveyor, inversion opening/closing device for large lid | 1.5~3.0          |

Note) The above operation factor table shows general guidelines. Therefore, make a determination in consideration of operating conditions.

Table 2 Allowable frequency of operation

| Type                                              | LPTB•LPTC            | LPTB•LPTC             | LPTB•LPTC                      | LPTB•LPTC                                | LPTB•LPTC                                 | LPTB•LPTC                                  | LPTB•LPTC                                   | LPTB•LPTC                           | LPTB•LPTC        | LPTB•LPTC |
|---------------------------------------------------|----------------------|-----------------------|--------------------------------|------------------------------------------|-------------------------------------------|--------------------------------------------|---------------------------------------------|-------------------------------------|------------------|-----------|
| Power cylinder model                              | 250S<br>250L<br>500S | 250M<br>500L<br>1000S | 250H<br>500M<br>1000L<br>2000S | 500H<br>1000M<br>2000L<br>4000S<br>6000S | 1000H<br>2000M<br>4000L<br>6000L<br>8000S | 2000H<br>4000M<br>6000M<br>8000L<br>12000L | 4000H<br>6000H<br>8000M<br>12000M<br>16000L | 8000H<br>12000H<br>16000M<br>32000L | 16000H<br>32000M | 32000H    |
| Number of starting times<br>(Number of times/min) | 5                    | 5                     | 5                              | 4                                        | 4                                         | 4                                          | 4                                           | 3                                   | 3                | 2         |
| Load time ratio(%ED)                              | 25%ED                |                       |                                |                                          |                                           |                                            |                                             |                                     |                  |           |

Note) The above frequencies of operation are values determined by heat generation of the motor. They are not values taking life of the cylinder body into consideration.

Allowable frequency of operation for the power cylinder T series is within a range which satisfies the number of starting times and load time ratio in the above table. The load time ratio is expressed by the following equation.

$$\text{Load time ratio (\%ED)} = \frac{\text{Operation time of one cycle}}{(\text{Operation time of one cycle} + \text{dwell time})} \times 100\%$$

### Guide for life

Use the number of operation times of the brake and the traveling distance of the cylinder (nut) as a guide for product life of the power cylinder T series to select the cylinder (nut).

#### 1. Number of operation times of brake

Expected life 2 million times

#### 2. Traveling distance of cylinder (nut)

The life of a ball screw is determined by flaking of the rolling surface caused by its fatigue. Check the rough life with this chart of expected traveling distance. However, in the case of great impact or in the case where lubrication or maintenance is not performed properly, the expected traveling distance becomes substantially short.

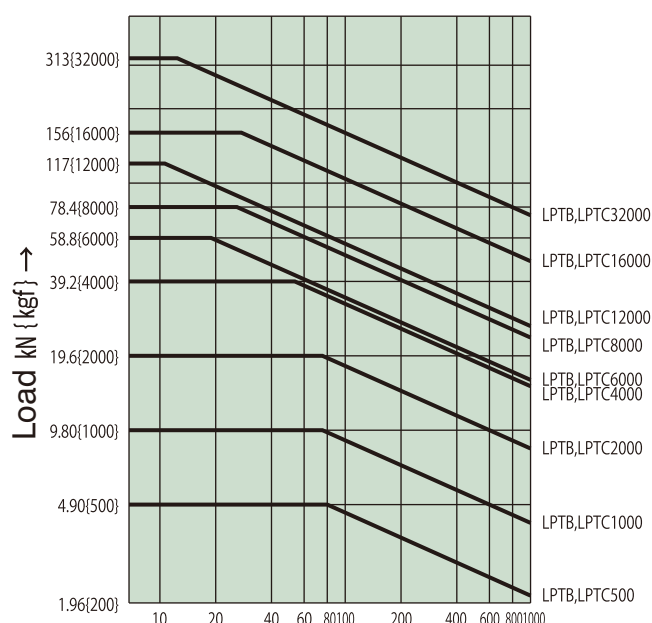
$$\text{Expected traveling distance (km)} = \text{actual load stroke (m)} \times \text{frequency of use (times/day)} \times \text{number of operating days} \times 10^{-3} \times \text{expected number of years}$$

The chart on the right-hand side is based on L10 life. L10 life expresses in traveling distance a life that can be reached by 90% or more of all ball screws. If you select a power cylinder based on the life, select model No. from this chart. If the load greatly fluctuates in the middle of stroke, calculate the equivalent load ( $P_M$ ) by the following equation.

$$P_M = \frac{P_{\min} + 2 \times P_{\max}}{3}$$

$P_M$  : Equivalent load N { kgf }  
 $P_{\min}$  : Minimum load N { kgf }  
 $P_{\max}$  : Maximum load N { kgf }

### Expected Traveling Distance



Expected Traveling Distance (km)

Table 3 Coasting distance and stop accuracy (Reference value)

Unit: mm

| Usage      |            | Brake internal connection         |                              |                                    |                              | Brake external connection         |                              |                                    |                              |
|------------|------------|-----------------------------------|------------------------------|------------------------------------|------------------------------|-----------------------------------|------------------------------|------------------------------------|------------------------------|
|            |            | Lifting load                      |                              | Suspended load                     |                              | Lifting load                      |                              | Suspended load                     |                              |
|            |            | Coasting distance                 | Stop accuracy                | Coasting distance                  | Stop accuracy                | Coasting distance                 | Stop accuracy                | Coasting distance                  | Stop accuracy                |
| Model      | LPTB 250   | S 2.2<br>L 4.3<br>M 6.9<br>H 13.7 | ±0.4<br>±0.8<br>±1.4<br>±2.7 | S 3.0<br>L 8.5<br>M 12.4<br>H 27.3 | ±0.6<br>±2.1<br>±3.2<br>±7.3 | S 1.9<br>L 3.7<br>M 6.0<br>H 12.5 | ±0.3<br>±0.6<br>±1.1<br>±2.4 | S 2.7<br>L 7.8<br>M 11.4<br>H 26.1 | ±0.5<br>±1.9<br>±2.9<br>±6.9 |
|            | LPTB 500   | S 2.1<br>L 3.6<br>M 6.5<br>H 12.7 | ±0.4<br>±0.7<br>±1.3<br>±2.7 | S 3.7<br>L 6.1<br>M 11.4<br>H 22.3 | ±0.9<br>±1.6<br>±2.9<br>±5.9 | S 1.8<br>L 3.1<br>M 5.9<br>H 10.2 | ±0.3<br>±0.6<br>±1.2<br>±2.0 | S 3.3<br>L 5.6<br>M 10.8<br>H 19.6 | ±0.8<br>±1.4<br>±2.7<br>±5.2 |
|            | LPTB 1000  | S 1.7<br>L 3.2<br>M 6.3<br>H 15.6 | ±0.4<br>±0.7<br>±1.4<br>±3.3 | S 2.8<br>L 5.4<br>M 10.2<br>H 27.6 | ±0.7<br>±1.4<br>±2.6<br>±7.7 | S 1.5<br>L 2.9<br>M 5.0<br>H 10.4 | ±0.3<br>±0.6<br>±1.0<br>±2.0 | S 2.5<br>L 5.1<br>M 8.8<br>H 22.1  | ±0.6<br>±1.2<br>±2.2<br>±6.3 |
| LPTB 2000  | LPTC       | S 1.7<br>L 3.2<br>M 7.7<br>H 13.3 | ±0.4<br>±0.7<br>±1.7<br>±2.9 | S 2.7<br>L 5.0<br>M 12.7<br>H 22.8 | ±0.7<br>±1.3<br>±3.4<br>±6.4 | S 1.5<br>L 2.5<br>M 5.2<br>H 8.0  | ±0.3<br>±0.5<br>±1.0<br>±1.6 | S 2.5<br>L 4.2<br>M 10.0<br>H 17.1 | ±0.6<br>±1.0<br>±2.7<br>±4.9 |
|            | LPTB 4000  | S 1.2<br>L 3.8<br>M 6.4<br>H 10.9 | ±0.3<br>±0.8<br>±1.4<br>±2.4 | S 1.6<br>L 5.9<br>M 9.9<br>H 16.9  | ±0.4<br>±1.5<br>±2.6<br>±4.4 | S 0.9<br>L 2.5<br>M 3.8<br>H 6.6  | ±0.2<br>±0.5<br>±0.8<br>±1.3 | S 1.3<br>L 4.5<br>M 7.2<br>H 12.3  | ±0.3<br>±1.1<br>±1.9<br>±3.2 |
|            | LPTB 6000  | S 0.6<br>L 2.7<br>M 4.5<br>H 7.6  | ±0.2<br>±0.6<br>±1.0<br>±1.7 | S 0.8<br>L 4.4<br>M 7.4<br>H 12.2  | ±0.2<br>±1.2<br>±2.0<br>±3.2 | S 0.5<br>L 1.8<br>M 2.7<br>H 4.6  | ±0.1<br>±0.4<br>±0.5<br>±0.9 | S 0.6<br>L 3.4<br>M 5.5<br>H 9.0   | ±0.1<br>±0.9<br>±1.5<br>±2.4 |
| LPTB 8000  | LPTC       | S 1.9<br>L 3.6<br>M 5.6<br>H —    | ±0.4<br>±0.8<br>±1.2<br>—    | S 2.9<br>L 5.8<br>M 8.4<br>H —     | ±0.7<br>±1.6<br>±2.1<br>—    | S 1.3<br>L 2.2<br>M 3.4<br>H 5.4  | ±0.2<br>±0.4<br>±0.7<br>±1.0 | S 2.2<br>L 4.3<br>M 6.1<br>H 8.7   | ±0.5<br>±1.1<br>±1.5<br>±2.0 |
|            | LPTB 12000 | S 2.1<br>L 3.5<br>M —<br>H —      | ±0.5<br>±0.8<br>—<br>—       | S 3.0<br>L 5.1<br>M —<br>H —       | ±0.8<br>±1.3<br>—<br>—       | S 1.3<br>L 2.1<br>M 3.6<br>H —    | ±0.2<br>±0.4<br>±0.7<br>—    | S 2.2<br>L 3.6<br>M 5.9<br>H —     | ±0.5<br>±0.9<br>±1.4<br>—    |
|            | LPTB 16000 | S 2.8<br>L —<br>M —<br>H —        | ±0.6<br>—<br>—<br>—          | S 4.0<br>L —<br>M —<br>H —         | ±1.0<br>—<br>—<br>—          | S 1.7<br>L 2.6<br>M 3.9<br>H —    | ±0.3<br>±0.5<br>±0.7<br>—    | S 2.8<br>L 4.0<br>M 8.6<br>H —     | ±0.7<br>±0.9<br>±2.4<br>—    |
| LPTB 32000 | LPTC       | S —<br>L —<br>M —<br>H —          | —<br>—<br>—<br>—             | S —<br>L —<br>M —<br>H —           | —<br>—<br>—<br>—             | S 1.3<br>L 2.0<br>M 2.7<br>H —    | ±0.3<br>±0.4<br>±0.5<br>—    | S 2.0<br>L 4.2<br>M 4.4<br>H —     | ±0.4<br>±1.1<br>±1.0<br>—    |

## Brake holding force

Load holding force while the power cylinder stops is generated more than the rated thrust, therefore, it can be used for holding load of the rated thrust.

This holding force is generated by the braking operation of the brake motor. The brake is of a spring braking type that always performs braking operation by spring force during stoppage, and brake torque has a holding force of 150% or more of the motor rated torque.

Coasting distance: This indicates a distance from a time when the limit switch or the stop button is operated until the cylinder stops.

This coasting distance varies depending on how the load is applied and the operation circuit.

Stop accuracy: This indicates variation of the stop position when stop is repeated.

\* When selecting the H speed, refer to the cautions for selecting on page 118.

\* Select a power cylinder of a sufficient thrust, allowing for a safety rate so that the loads used (static and dynamic) do not exceed the rated thrust.

## Example of selection

1. Operation method : Opening degree adjustment type damper open/close (Stop at middle two points, press and stop at extend limit and retract limit)

2. Required thrust : 12.7kN {1300kgf}

3. Stroke : 600mm

4. Speed : 600mm/s for approximately 20 seconds

5. Frequency of operation : One reciprocation/10 minutes (6 reciprocations/hour)

6. Operating time : 10 hours/day, 250 days operation/year, durable years approximately 5 years

7. Characteristics of load : Operation with light impact, loaded when extend and retract

8. Use environment : Outdoor installation, much dust, temperature 0°C~35°C

9. Power source : 220V 60Hz

<Determination of type>: With press and stop, internal stop → Select TC type

<Determination of model No.>: 1. Operation factor : 1.3

2. Corrected thrust : 12.7kN {1300kgf} × 1.3 = 16.5kN {1680kgf}

3. Model No. : LPTC 2000L6

Stop at two middle points  $\frac{K2}{J}$  With bellows (much dust)

<Characteristics check>: 1. Number of starting times

● Number of starting : 2 times/10min < 4 times/min

● Load time ratio :  $\frac{600}{30} \times 2 = 40$   
 $\frac{40}{10 \times 60} \times 100 = 6.7\% < 25\%$

2. Number of total press (pull) stop times : 2 times/1 reciprocation, durable years: 5 years (250 days/year)

$2 \times 6 \times 10 \times 250 \times 5 = 15 \times 10^4$  times <  $30 \times 10^4$  times

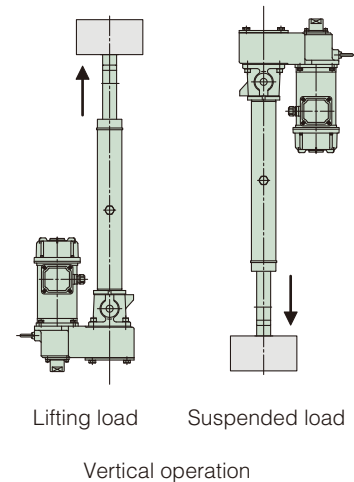
<Life check>: 1. Annual traveling distance :  $0.6 \times 2 \times 6$  times/hour × 10 hours/day × 250 days/year ×  $10^{-3}$  = 18km

2. Expected traveling life : 18km × 5 years = 90km

3. Equivalent load :  $P_M = \frac{16.5 + 16.5 \times 2}{3} = 16.5\text{kN}$  {1680kgf}

This calculated value satisfies the expected traveling life of LPTC 2000 according to the load-life diagram on page 90.

Fig. 1 Type of load



Note) Anti-rod rotation is required for actual operation.

## Selection 2

Table 4 Allowable mass in consideration of inertia at time of horizontal drive

Unit: kg

| Power cylinder model | LPTB : 250<br>LPTC : 250 |      |     | LPTB : 500<br>LPTC : 500 |      |     | LPTB : 1000<br>LPTC : 1000 |      |      | LPTB : 2000<br>LPTC : 2000 |      |      | LPTB : 4000<br>LPTC : 4000 |       |       |
|----------------------|--------------------------|------|-----|--------------------------|------|-----|----------------------------|------|------|----------------------------|------|------|----------------------------|-------|-------|
|                      | L                        | M    | H   | L                        | M    | H   | L                          | M    | H    | L                          | M    | H    | L                          | M     | H     |
| Allowable mass $m$   | 4300                     | 1500 | 850 | 5500                     | 2650 | 950 | 10000                      | 3200 | 2200 | 12300                      | 8400 | 7100 | 31800                      | 26000 | 16800 |

| Power cylinder model | LPTB : 6000<br>LPTC : 6000 |       |       | LPTB : 8000<br>LPTC : 8000 |       |       | LPTB : 12000<br>LPTC : 12000 |        |        | LPTB : 16000<br>LPTC : 16000 |        |        | LPTB : 32000<br>LPTC : 32000 |        |        |
|----------------------|----------------------------|-------|-------|----------------------------|-------|-------|------------------------------|--------|--------|------------------------------|--------|--------|------------------------------|--------|--------|
|                      | L                          | M     | H     | L                          | M     | H     | L                            | M      | H      | L                            | M      | H      | L                            | M      | H      |
| Allowable mass $m$   | 73000                      | 60000 | 39000 | 106000                     | 69000 | 86000 | 271000                       | 158000 | 200000 | 274000                       | 344000 | 189000 | 1368000                      | 761000 | 860000 |

Note) There is no problem with low speed S.

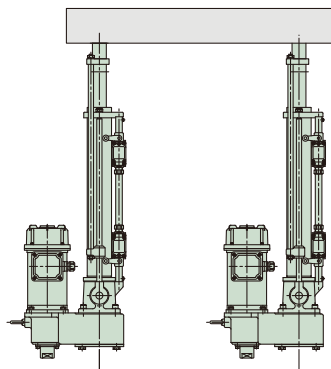
## Selection 3

### Multiple operation method

As shown in Fig. 2, transfer or elevation can be carried out by sharing load on some power cylinders.

This is because there is less speed fluctuation due to variation in load. For selection, pay attention to the items at the right.

Fig. 2 Linkage operation by some power cylinders



### Control method

To start, turn on the power for all of the cylinders, and stop them with the limit switches installed on each power cylinder. When all of the cylinders are controlled with one limit switch, stroke error is accumulated, therefore, avoid controlling with one limit switch.

For an example of the control circuit, refer to example of the multiple circuit (page 116).

### Multiple accuracy

Variation in speed of each power cylinder during operation is generated due to variation in load, and is generally approximately 5%. For variation at stop, refer to the stop accuracy in Table 4. When synchronizing power cylinders, use the multi-series. (Page 124)

$$\text{Thrust per one cylinder} = \frac{\text{Required thrust } N \text{ (kgf)}}{\text{Number of power cylinders to be used} \times \text{Multiple factor}}$$

Table 5 Multiple factor

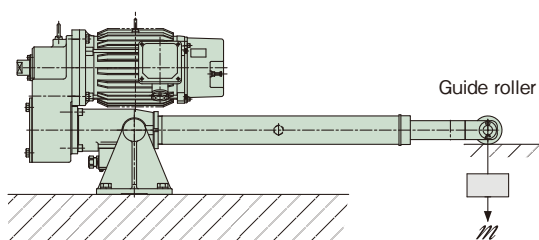
| Number of power cylinders used | 2 cylinders | 3 cylinders | 4 cylinders | 5 cylinders | 6 cylinders |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|
| Multiple factor                | 0.8         | 0.7         | 0.6         | 0.55        | 0.5         |

### Cautions for layout

When the load is in the right angle direction (lateral load) or load of which direction is biased (biased load) is applied on the rod, take the following countermeasures.

① Lateral load Install guide roller etc., on the rod part. (Fig. 3)

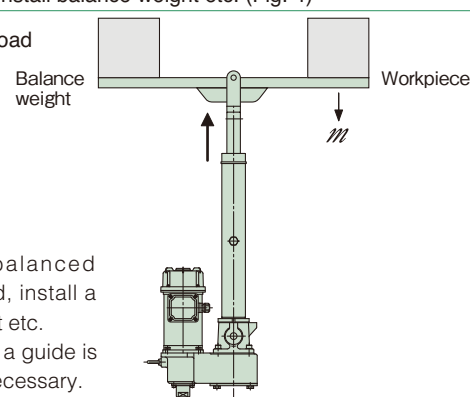
Fig. 3 Lateral load



Avoid directly applying a lateral load and install a guide roller.

② Biased load Install balance weight etc. (Fig. 4)

Fig. 4 Biased load



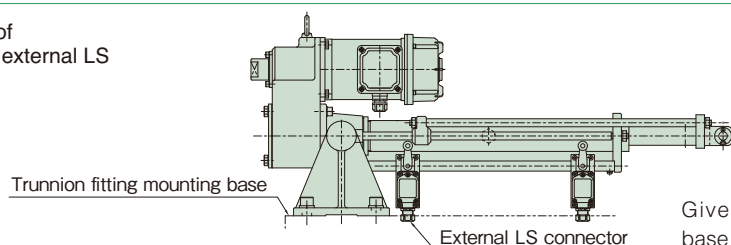
When an unbalanced load is applied, install a balance weight etc.

\* In this layout, a guide is separately necessary.

③ Anti-rod rotation --- A rotating force is generated on the rod with thrust (page 87), therefore, prevent rotation on the equipment side.

④ Vertical installation of stroke adjusting external LS (stroke 300mm or less) --- The connector portion of the external LS appears below the trunnion mounting base surface. (Fig. 5)

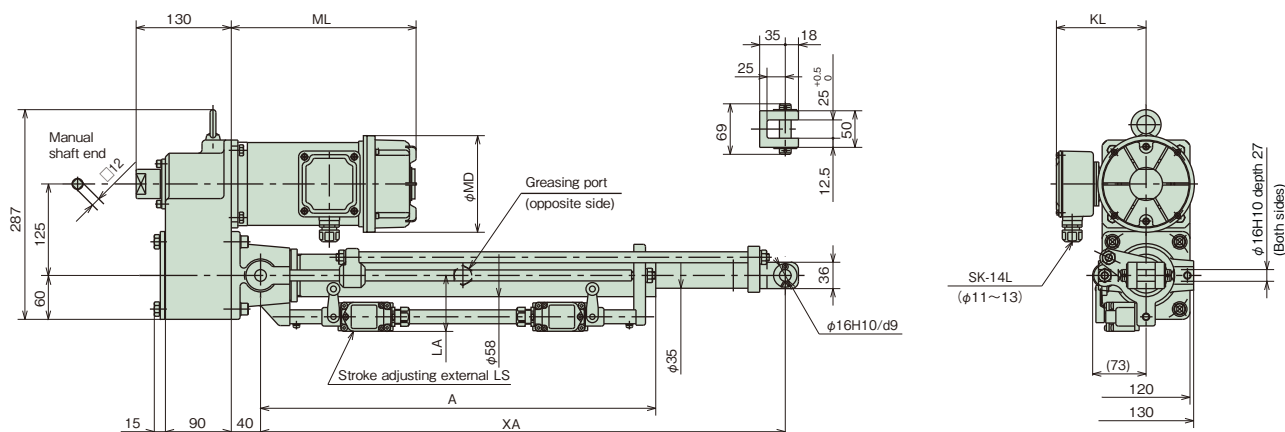
Fig. 5 Vertical installation of the stroke adjusting external LS



Give consideration to the mounting base because cabling is required.

## Dimensions Table T Series 250

### LPTB250



Unit: mm

| Model    | Nominal speed<br>mm/s<br>50/60Hz | Motor<br>kW | MD  | ML  | KL  |
|----------|----------------------------------|-------------|-----|-----|-----|
| LPTB250S | 12.5/15                          | 0.1         | 132 | 296 | 125 |
| LPTB250L | 25/30                            | 0.1         | 132 | 231 | 125 |
| LPTB250M | 50/60                            | 0.2         | 132 | 231 | 125 |
| LPTB250H | 100/120                          | 0.4         | 132 | 253 | 125 |

Approximate mass of main body

Unit: kg

| Nominal stroke | 200 | 300 | 400 | 500 | 600 |
|----------------|-----|-----|-----|-----|-----|
| Model          |     |     |     |     |     |
| LPTB250S       | 35  | 36  | 37  | 38  | 39  |
| LPTB250L       | 32  | 33  | 34  | 35  | 36  |
| LPTB250M       | 32  | 33  | 34  | 35  | 36  |
| LPTB250H       | 34  | 35  | 36  | 37  | 38  |

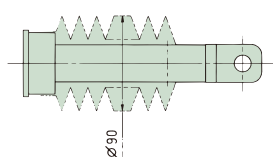
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger. (See ④ in Cautions for layout on page 92.)
3. Mechanical stroke has a margin of approximately 10mm on both sides for the nominal stroke.
4. For the cylinder with bellows, the stroke will also not change.
5. For connector part dimensions of the motor terminal box, refer to page 115.

Unit: mm

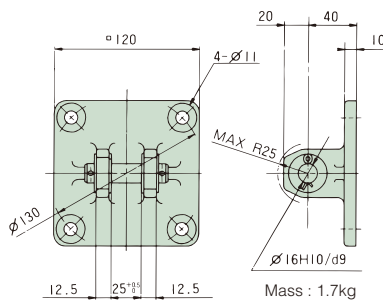
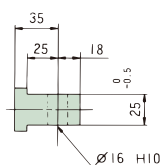
| Nominal stroke | Thrust |         | A   | XA  |      | LA  |
|----------------|--------|---------|-----|-----|------|-----|
|                | kN     | { kgf } |     | MIN | MAX  |     |
| 200            | 2.45   | 250     | 340 | 435 | 635  | 161 |
| 300            |        |         | 440 | 545 | 845  |     |
| 400            |        |         | 540 | 655 | 1055 |     |
| 500            |        |         | 640 | 765 | 1265 |     |
| 600            |        |         | 740 | 870 | 1470 |     |

## Options

### ■ Bellows ( - J )



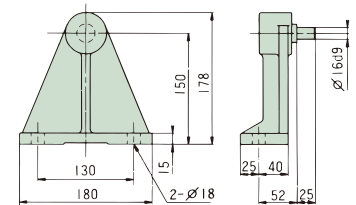
### ■ I-type end fitting ( - I ) ■ Clevis fitting ( - C )



Note) Shipped as attached to the main body.  
The XA dimensions are the same as the standard U-type end fitting.

Note) Shipped attached to the main body.  
If it needs to be shipped individually, consult us.

### ■ Trunnion fitting (LPTB500-T)

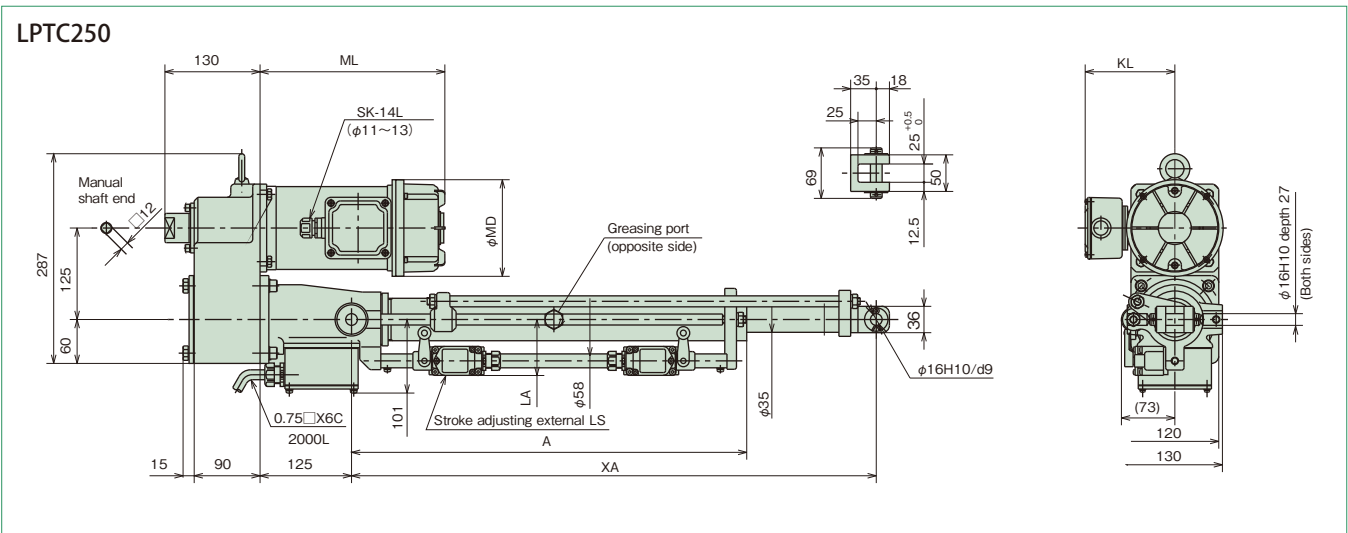


Mass: 7.0kg/set

Note) Apply grease to the trunnion pin and trunnion hole before mounting.

\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions.  
When designing the machine, take the margin into consideration.

# Dimensions Table T Series 250



Unit: mm

| Model    | Nominal speed<br>mm/s<br>50/60Hz | Motor<br>kW | MD  | ML  | KL  |
|----------|----------------------------------|-------------|-----|-----|-----|
| LPTC250S | 12.5/15                          | 0.1         | 132 | 296 | 125 |
| LPTC250L | 25/30                            |             |     | 231 |     |
| LPTC250M | 50/60                            | 0.2         |     | 253 |     |
| LPTC250H | 100/120                          | 0.4         |     | 253 |     |

Unit: mm

| Nominal<br>stroke | Thrust |         | A   | XA  |      | LA  |
|-------------------|--------|---------|-----|-----|------|-----|
|                   | kN     | { kgf } |     | MIN | MAX  |     |
| 200               | 2.45   | 250     | 340 | 435 | 635  | 161 |
| 300               |        |         | 440 | 545 | 845  |     |
| 400               |        |         | 540 | 655 | 1055 |     |
| 500               |        |         | 640 | 765 | 1265 |     |
| 600               |        |         | 740 | 870 | 1470 |     |

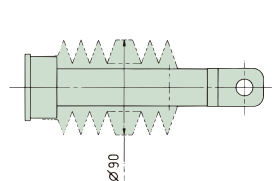
Approximate mass of main body Unit: kg

| Nominal<br>stroke | 200 | 300 | 400 | 500 | 600 |
|-------------------|-----|-----|-----|-----|-----|
| LPTC250S          | 39  | 40  | 41  | 42  | 43  |
| LPTC250L          | 36  | 37  | 38  | 39  | 40  |
| LPTC250M          | 36  | 37  | 38  | 39  | 40  |
| LPTC250H          | 38  | 39  | 40  | 41  | 42  |

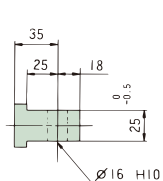
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger. (See ④ in Cautions for layout on page 92.)
3. Mechanical stroke has a margin of approximately 10mm on both sides for the nominal stroke.
4. For the cylinder with bellows, the stroke will also not change.
5. Use TC type model in brake individual turnoff.
6. For connector part dimensions of the motor terminal box, refer to page 115.

## Options

### ■ Bellows ( - J )

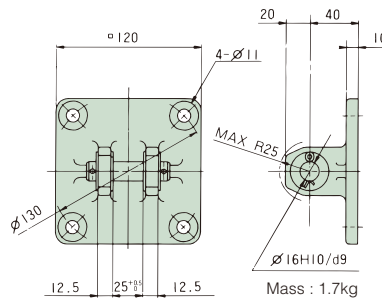


### ■ I-type end fitting ( - I )



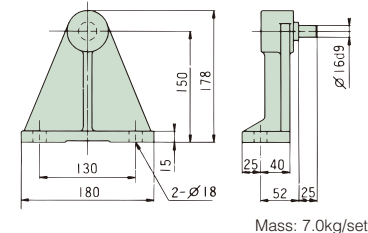
Note) Shipped as attached to the main body.  
The XA dimensions are the same as the standard U-type end fitting.

### ■ Clevis fitting ( - C )



Note) Shipped attached to the main body.  
If it needs to be shipped individually, consult us.

### ■ Trunnion fitting (LPTB500-T)

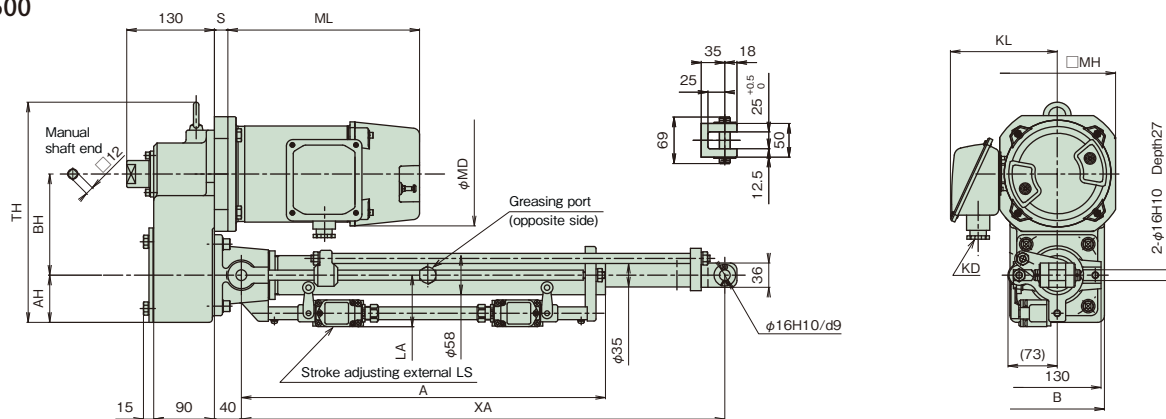


Note) Apply grease to the trunnion pin and trunnion hole before mounting.

\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions. When designing the machine, take the margin into consideration.

## Dimensions Table T Series 500

### LPTB500



Unit: mm

| Model    | Nominal speed<br>mm/s<br>50/60Hz | Motor<br>kW | MD  | ML  | KL  | KD     | MH  | AH | BH  | TH  | S  | B   | C    | E  | F  | G  | H  | J   | K  | L  |
|----------|----------------------------------|-------------|-----|-----|-----|--------|-----|----|-----|-----|----|-----|------|----|----|----|----|-----|----|----|
| LPTB500S | 12.5/15                          | 0.1         | 132 | 231 | 125 | SK-14L | 120 | 60 | 125 | 287 | 65 | 120 | 12.5 | 25 | 20 | 40 | 10 | 130 | 25 | 16 |
| LPTB500L | 25/30                            | 0.2         |     | 253 |     |        |     |    |     |     | —  |     |      |    |    |    |    |     |    |    |
| LPTB500M | 50/60                            | 0.4         |     | 253 |     |        |     |    |     |     | —  |     |      |    |    |    |    |     |    |    |
| LPTB500H | 100/120                          | 0.75        | 180 | 289 | 166 | A20C   | 170 | 70 | 150 | 327 | 20 | 140 | 15   | 30 | 25 |    | 12 | 140 | 31 | 20 |

Unit: mm

| Nominal<br>stroke | Thrust |         | A   | XA   |      | LA   |
|-------------------|--------|---------|-----|------|------|------|
|                   | kN     | { kgf } |     | MIN  | MAX  |      |
| 200               | 4.90   | 500     | 340 | 435  | 635  | 161  |
| 300               |        |         | 440 | 545  | 845  |      |
| 400               |        |         | 540 | 655  | 1055 |      |
| 500               |        |         | 640 | 765  | 1265 | 76.5 |
| 600               |        |         | 740 | 870  | 1470 |      |
| 800               |        |         | 940 | 1090 | 1890 |      |

Approximate mass of main body

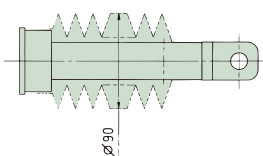
Unit: kg

| Nominal<br>stroke | 200 | 300 | 400 | 500 | 600 | 800 |
|-------------------|-----|-----|-----|-----|-----|-----|
| LPTB500S          | 35  | 36  | 37  | 38  | 39  | 41  |
| LPTB500L          | 32  | 33  | 34  | 35  | 36  | 38  |
| LPTB500M          | 34  | 35  | 36  | 37  | 38  | 40  |
| LPTB500H          | 43  | 44  | 45  | 46  | 47  | 49  |

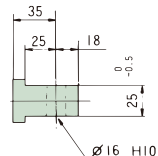
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger. (See ④ in Cautions for layout on page 92.)
3. Mechanical stroke has a margin of approximately 10mm on both sides for the nominal stroke.
4. For the cylinder with bellows, the stroke will also not change.
5. For connector part dimensions of the motor terminal box, refer to page 115.

## Options

### ■ Bellows ( - J )

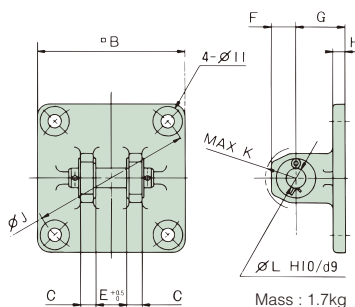


### ■ I-type end fitting ( - I )



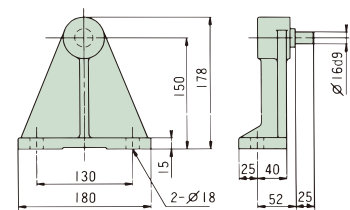
Note) Shipped as attached to the main body.  
The XA dimensions are the same as the standard U-type end fitting.

### ■ Clevis fitting ( - C )



Note) Shipped attached to the main body.  
If it needs to be shipped individually, consult us.

### ■ Trunnion fitting (LPTB500-T)

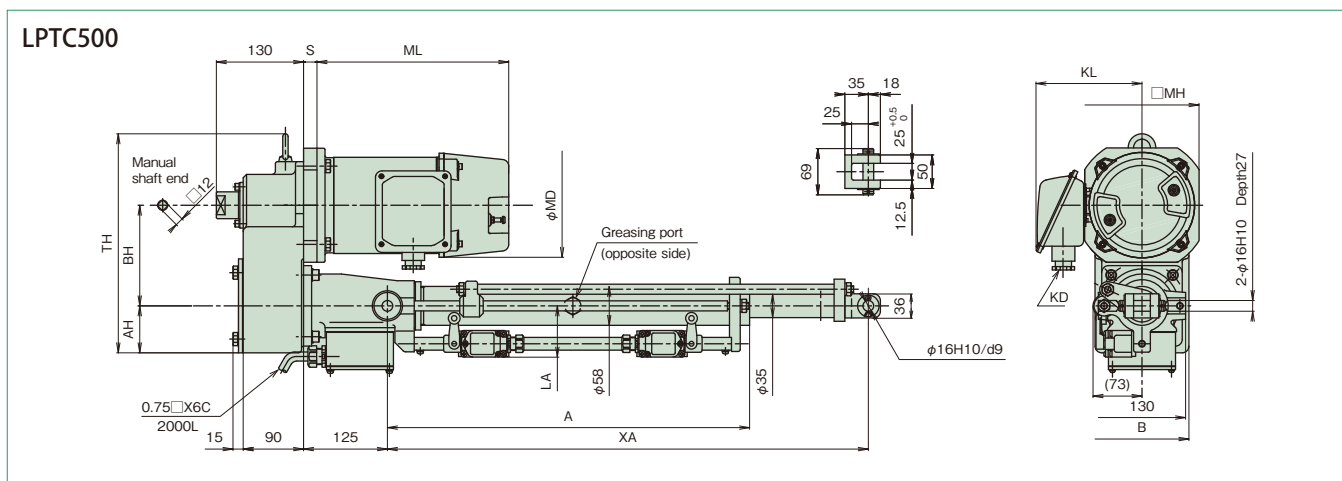


Mass: 7.0kg/set

Note) Apply grease to the trunnion pin and trunnion hole before mounting.

\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions.  
When designing the machine, take the margin into consideration.

## Dimensions Table T Series 500



Unit: mm

| Model    | Nominal speed<br>mm/s<br>50/60Hz | Motor<br>kW | MD  | ML  | KL  | KD     | MH  | AH | BH  | TH  | S  | B   | C    | E  | F  | G  | H  | J   | K  | L  |
|----------|----------------------------------|-------------|-----|-----|-----|--------|-----|----|-----|-----|----|-----|------|----|----|----|----|-----|----|----|
| LPTC500S | 12.5/15                          | 0.1         | 132 | 231 | 125 | SK-14L | 120 | 60 | 125 | 287 | 65 | 120 | 12.5 | 25 | 20 | 40 | 10 | 130 | 25 | 16 |
| LPTC500L | 25/30                            | 0.2         |     | 253 |     |        |     |    |     |     | —  |     |      |    |    |    |    |     |    |    |
| LPTC500M | 50/60                            | 0.4         |     | 253 |     |        |     |    |     |     | —  |     |      |    |    |    |    |     |    |    |
| LPTC500H | 100/120                          | 0.75        | 180 | 289 | 166 | A20C   | 170 | 70 | 150 | 327 | 20 | 140 | 15   | 30 | 25 |    | 12 | 140 | 31 | 20 |

Unit: mm

| Nominal stroke | Thrust<br>kN {kgf} | A   | XA<br>MIN MAX | LA   |
|----------------|--------------------|-----|---------------|------|
| 200            | 4.90 500           | 340 | 435 635       | 161  |
| 300            |                    | 440 | 545 845       |      |
| 400            |                    | 540 | 655 1055      |      |
| 500            |                    | 640 | 765 1265      | 76.5 |
| 600            |                    | 740 | 870 1470      |      |
| 800            |                    | 940 | 1090 1890     |      |

Approximate mass of main body

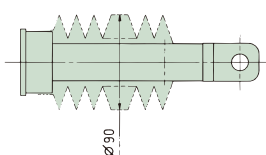
Unit: kg

| Nominal stroke | 200 | 300 | 400 | 500 | 600 | 800 |
|----------------|-----|-----|-----|-----|-----|-----|
| LPTC500S       | 39  | 40  | 41  | 42  | 43  | 45  |
| LPTC500L       | 36  | 37  | 38  | 39  | 40  | 42  |
| LPTC500M       | 38  | 39  | 40  | 41  | 42  | 44  |
| LPTC500H       | 47  | 48  | 49  | 50  | 51  | 53  |

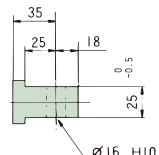
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger. (See ④ in Cautions for layout on page 92.)
3. Mechanical stroke has a margin of approximately 10mm on both sides for the nominal stroke.
4. For the cylinder with bellows, the stroke will also not change.
5. Use TC type model in brake individual turnoff.
6. For connector part dimensions of the motor terminal box, refer to page 115.
7. The terminal box lead-out direction in this diagram is for the H speed.  
For the S, L, and M speeds, the direction is the same as the LPTC250 type.

## Options

### ■ Bellows ( - J)

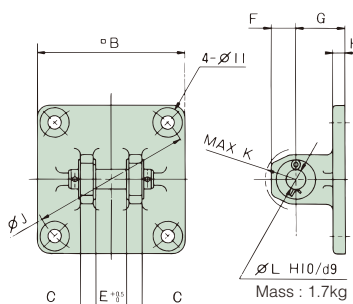


### ■ I-type end fitting ( - I)



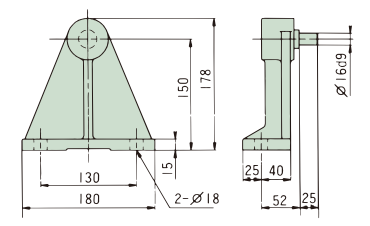
Note) Shipped as attached to the main body.  
The XA dimensions are the same as the standard U-type end fitting.

### ■ Clevis fitting ( - C)



Note) Shipped attached to the main body.  
If it needs to be shipped individually, consult us.

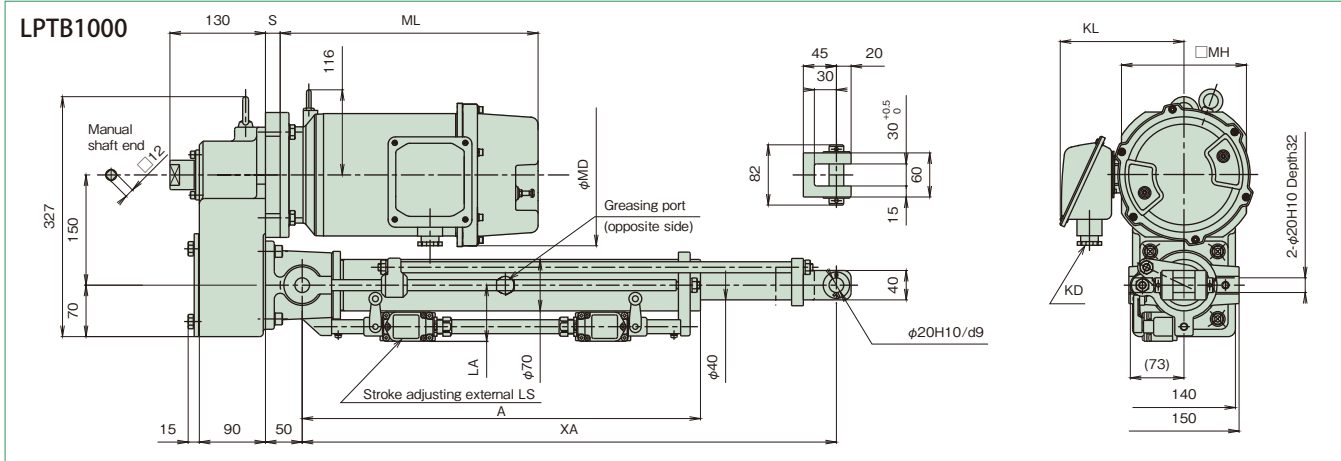
### ■ Trunnion fitting (LPTB500-T)



Note) Apply grease to the trunnion pin and trunnion hole before mounting.

\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions. When designing the machine, take the margin into consideration.

## Dimensions Table T Series 1000



Unit: mm

| Model     | Nominal speed<br>mm/s<br>50/60Hz | Motor<br>kW | MD  | ML  | KL  | KD     | MH  | S  |
|-----------|----------------------------------|-------------|-----|-----|-----|--------|-----|----|
| LPTB1000S | 12.5/15                          | 0.2         | 132 | 231 | 125 | SK-14L | 120 | 65 |
| LPTB1000L | 25/30                            | 0.4         |     | 253 |     |        |     | —  |
| LPTB1000M | 50/60                            | 0.75        | 180 | 289 | 166 | A20C   | 170 | 20 |
| LPTB1000H | 100/120                          | 1.5         | 194 | 351 | 178 |        |     |    |

Approximate mass of main body

Unit: kg

| Model     | 200 | 300 | 400 | 500 | 600 | 800 | 1000 |
|-----------|-----|-----|-----|-----|-----|-----|------|
| LPTB1000S | 42  | 44  | 45  | 47  | 48  | 51  | 54   |
| LPTB1000L | 40  | 42  | 43  | 45  | 46  | 49  | 52   |
| LPTB1000M | 46  | 48  | 49  | 51  | 52  | 55  | 58   |
| LPTB1000H | 50  | 52  | 53  | 55  | 56  | 59  | 62   |

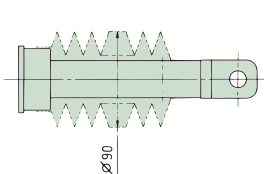
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger. (See ④ in Cautions for layout on page 92.)
3. Mechanical stroke has a margin of approximately 10mm on both sides for the nominal stroke.
4. For the cylinder with bellows, the stroke will also not change.
5. For connector part dimensions of the motor terminal box, refer to page 115.

Unit: mm

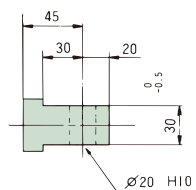
| Nominal stroke | Thrust |         | A    | XA   |      | LA   |
|----------------|--------|---------|------|------|------|------|
|                | kN     | { kgf } |      | MIN  | MAX  |      |
| 200            | 9.80   | 1000    | 360  | 465  | 665  | 161  |
| 300            |        |         | 460  | 575  | 875  |      |
| 400            |        |         | 560  | 685  | 1085 |      |
| 500            |        |         | 660  | 795  | 1295 |      |
| 600            |        |         | 760  | 900  | 1500 |      |
| 800            | 7.84   | 800     | 960  | 1120 | 1920 | 76.5 |
| 1000           |        |         | 1160 | 1340 | 2340 |      |

## Options

### ■ Bellows ( - J )

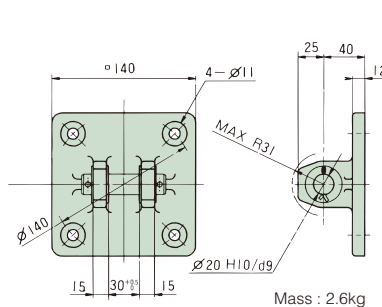


### ■ I-type end fitting ( - I )



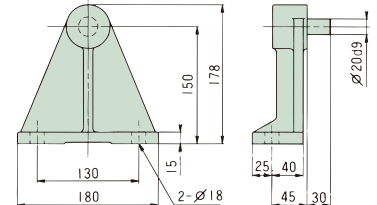
Note) Shipped as attached to the main body.  
The XA dimensions are the same as the standard U-type end fitting.

### ■ Clevis fitting ( - C )



Note) Shipped attached to the main body.  
If it needs to be shipped individually, consult us.

### ■ Trunnion fitting (LPTB1000-T)

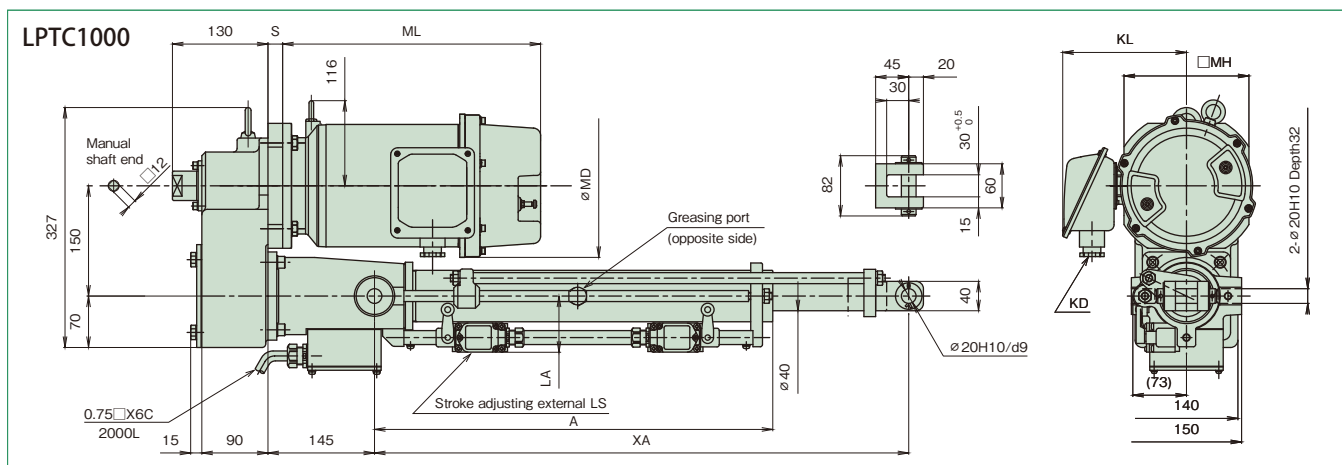


Mass: 7.0kg/set

Note) Apply grease to the trunnion pin and trunnion hole before mounting.

\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions.  
When designing the machine, take the margin into consideration.

## Dimensions Table T Series 1000



Unit: mm

| Model     | Nominal speed<br>mm/s<br>50/60Hz | Motor<br>kW | MD  | ML  | KL  | KD     | MH  | S  |
|-----------|----------------------------------|-------------|-----|-----|-----|--------|-----|----|
| LPTC1000S | 12.5/15                          | 0.2         | 132 | 231 | 125 | SK-14L | 120 | 65 |
| LPTC1000L | 25/30                            | 0.4         |     | 253 |     |        |     | —  |
| LPTC1000M | 50/60                            | 0.75        | 180 | 289 | 166 | A20C   | 170 | 20 |
| LPTC1000H | 100/120                          | 1.5         | 194 | 351 | 178 |        |     |    |

Unit: mm

| Nominal stroke | Thrust |         | A    | XA   |      | LA   |
|----------------|--------|---------|------|------|------|------|
|                | kN     | { kgf } |      | MIN  | MAX  |      |
| 200            | 9.80   | 1000    | 360  | 465  | 665  | 161  |
| 300            |        |         | 460  | 575  | 875  |      |
| 400            |        |         | 560  | 685  | 1085 |      |
| 500            |        |         | 660  | 795  | 1295 |      |
| 600            |        |         | 760  | 900  | 1500 |      |
| 800            | 7.84   | 800     | 960  | 1120 | 1920 | 76.5 |
| 1000           |        |         | 1160 | 1340 | 2340 |      |

Approximate mass of main body

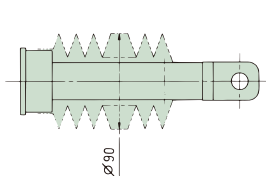
Unit: kg

| Model     | 200 | 300 | 400 | 500 | 600 | 800 | 1000 |
|-----------|-----|-----|-----|-----|-----|-----|------|
| LPTC1000S | 48  | 50  | 51  | 53  | 54  | 57  | 60   |
| LPTC1000L | 46  | 48  | 49  | 51  | 52  | 55  | 58   |
| LPTC1000M | 52  | 54  | 55  | 57  | 58  | 61  | 64   |
| LPTC1000H | 56  | 58  | 59  | 61  | 62  | 65  | 68   |

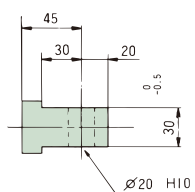
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger. (See ④ in Cautions for layout on page 92.)
3. Mechanical stroke has a margin of approximately 10mm on both sides for the nominal stroke.
4. For the cylinder with bellows, the stroke will also not change.
5. Use TC type model in brake individual turnoff.
6. When the model of the TC type nominal stroke 1000mm is used, press and stop cannot be carried out near the maximum stroke in terms of buckling strength.
7. For connector part dimensions of the motor terminal box, refer to page 115.

## Options

### ■ Bellows ( - J )

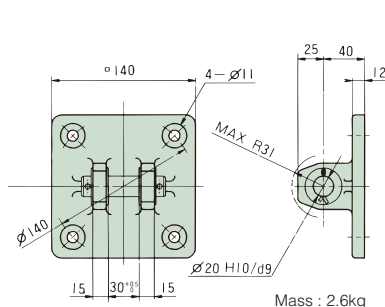


### ■ I-type end fitting ( - I )



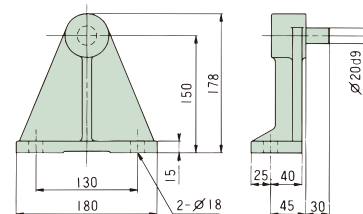
Note) Shipped as attached to the main body.  
The XA dimensions are the same as the standard U-type end fitting.

### ■ Clevis fitting ( - C )



Note) Shipped attached to the main body.  
If it needs to be shipped individually, consult us.

### ■ Trunnion fitting (LPTB1000-T)

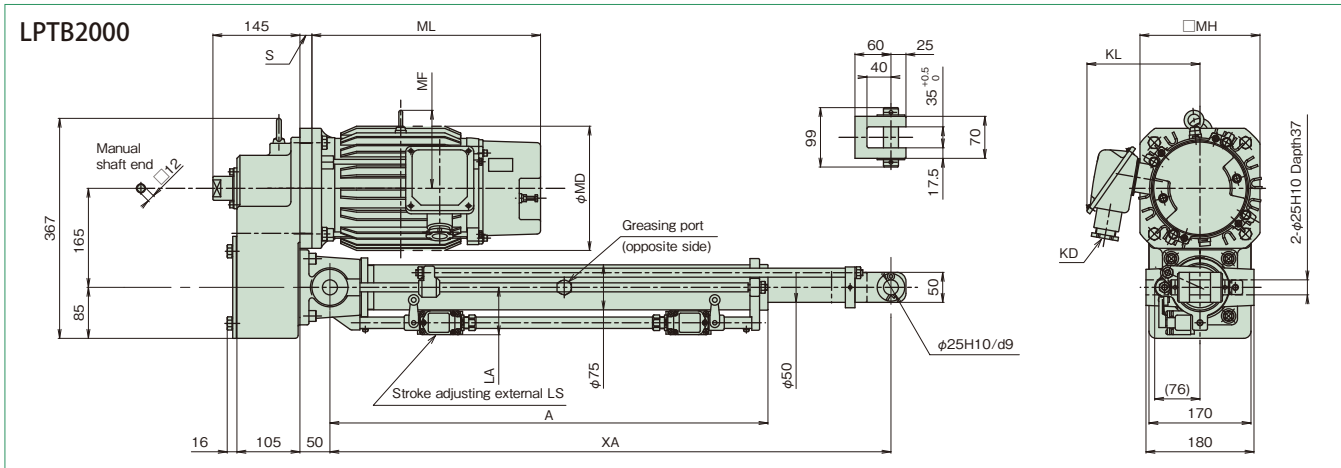


Mass: 7.0kg/set

Note) Apply grease to the trunnion pin and trunnion hole before mounting.

\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions. When designing the machine, take the margin into consideration.

## Dimensions Table T Series 2000



Unit: mm

| Model     | Nominal speed<br>mm/s<br>50/60Hz | Motor<br>kW | MD  | ML  | MF  | KL  | KD     | MH  | S  |
|-----------|----------------------------------|-------------|-----|-----|-----|-----|--------|-----|----|
| LPTB2000S | 12.5/15                          | 0.4         | 132 | 253 |     | 125 | SK-14L | 120 | 70 |
| LPTB2000L | 25/30                            | 0.75        | 180 | 289 | —   | 166 | A20C   | 170 | —  |
| LPTB2000M | 50/60                            | 1.5         | 194 | 351 |     | 178 |        |     |    |
| LPTB2000H | 75/90                            | 2.2         | 207 | 381 | 130 | 190 | A25C   | 200 | 20 |

Unit: mm

| Nominal stroke | Thrust |       | A    | XA   |      | LA  |
|----------------|--------|-------|------|------|------|-----|
|                | kN     | {kgf} |      | MIN  | MAX  |     |
| 200            | 19.6   | 2000  | 400  | 520  | 720  | 164 |
| 300            |        |       | 500  | 630  | 930  |     |
| 400            |        |       | 600  | 740  | 1140 |     |
| 500            |        |       | 700  | 850  | 1350 |     |
| 600            |        |       | 800  | 955  | 1555 |     |
| 800            | 15.6   | 1600  | 1000 | 1175 | 1975 | 79  |
| 1000           |        |       | 1200 | 1395 | 2395 |     |
| 1200           |        |       | 1400 | 1615 | 2815 |     |

Approximate mass of main body

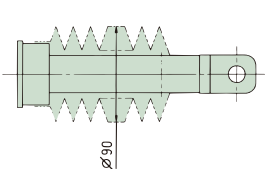
Unit: kg

| Model     | 200 | 300 | 400 | 500 | 600 | 800 | 1000 | 1200 |
|-----------|-----|-----|-----|-----|-----|-----|------|------|
| LPTB2000S | 56  | 58  | 60  | 62  | 64  | 68  | 72   | 76   |
| LPTB2000L | 55  | 57  | 59  | 61  | 63  | 67  | 71   | 75   |
| LPTB2000M | 59  | 61  | 63  | 65  | 67  | 71  | 75   | 79   |
| LPTB2000H | 70  | 72  | 74  | 76  | 78  | 82  | 86   | 90   |

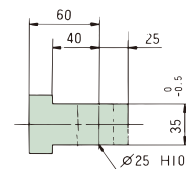
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger. (See ④ in Cautions for layout on page 92.)
3. Mechanical stroke has a margin of approximately 10mm on both sides for the nominal stroke.
4. For the cylinder with bellows, the stroke will also not change.
5. For connector part dimensions of the motor terminal box, refer to page 115.

## Options

### ■ Bellows ( - J)

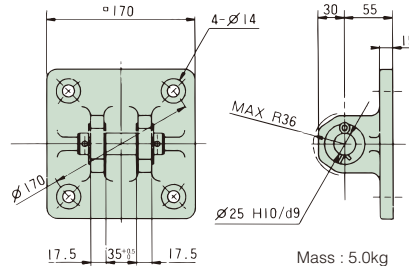


### ■ I-type end fitting ( - I)



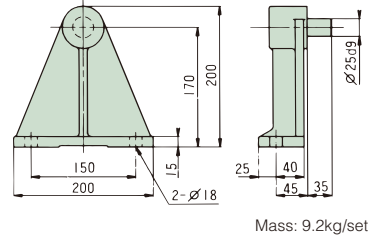
Note) Shipped as attached to the main body.  
The XA dimensions are the same as the standard U-type end fitting.

### ■ Clevis fitting ( - C)



Note) Shipped attached to the main body.  
If it needs to be shipped individually, consult us.

### ■ Trunnion fitting (LPTB2000-T)

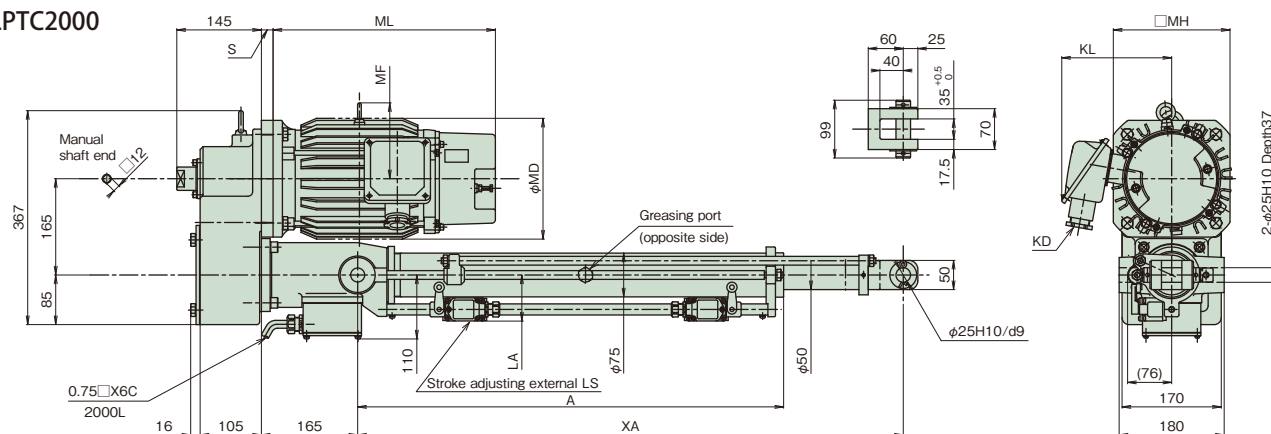


Note) Apply grease to the trunnion pin and trunnion hole before mounting.

\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions.  
When designing the machine, take the margin into consideration.

## Dimensions Table T Series 2000

## LPTC2000



Unit: mm

| Model     | Nominal speed<br>mm/s<br>50/60Hz | Motor<br>kW | MD  | ML  | MF  | KL  | KD     | MH  | S  |
|-----------|----------------------------------|-------------|-----|-----|-----|-----|--------|-----|----|
| LPTC2000S | 12.5/15                          | 0.4         | 132 | 253 | —   | 125 | SK-14L | 120 | 70 |
| LPTC2000L | 25/30                            | 0.75        | 180 | 289 |     | 166 | A20C   | 170 | —  |
| LPTC2000M | 50/60                            | 1.5         | 194 | 351 |     | 178 |        |     |    |
| LPTC2000H | 75/90                            | 2.2         | 207 | 381 | 130 | 190 | A25C   | 200 | 20 |

Unit: mm

| Nominal<br>stroke | Thrust |         | A    | XA   |      | LA  |
|-------------------|--------|---------|------|------|------|-----|
|                   | kN     | { kgf } |      | MIN  | MAX  |     |
| 200               | 19.6   | 2000    | 400  | 520  | 720  | 164 |
| 300               |        |         | 500  | 630  | 930  |     |
| 400               |        |         | 600  | 740  | 1140 |     |
| 500               |        |         | 700  | 850  | 1350 | 79  |
| 600               |        |         | 800  | 955  | 1555 |     |
| 800               |        |         | 1000 | 1175 | 1975 |     |
| 1000              | 15.6   | 1600    | 1200 | 1395 | 2395 |     |
| 1200              | 12.2   | 1250    | 1400 | 1615 | 2815 |     |

## Approximate mass of main body

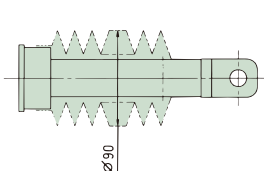
Unit: kg

| Model     | 200 | 300 | 400 | 500 | 600 | 800 | 1000 | 1200 |
|-----------|-----|-----|-----|-----|-----|-----|------|------|
| LPTC2000S | 64  | 66  | 68  | 70  | 72  | 76  | 80   | 84   |
| LPTC2000L | 63  | 65  | 67  | 69  | 71  | 75  | 79   | 83   |
| LPTC2000M | 67  | 69  | 71  | 73  | 75  | 79  | 83   | 87   |
| LPTC2000H | 78  | 80  | 82  | 84  | 86  | 90  | 94   | 98   |

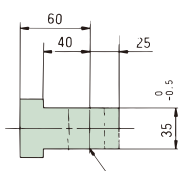
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger. (See ④ in Cautions for layout on page 92.)
3. Mechanical stroke has a margin of approximately 10mm on both sides for the nominal stroke.
4. For the cylinder with bellows, the stroke will also not change.
5. Use TC type model in brake individual turnoff.
6. When the model of the TC type nominal stroke 1000 or 1200mm is used, press and stop cannot be carried out near the maximum stroke in terms of buckling strength.
7. For connector part dimensions of the motor terminal box, refer to page 115.

## Options

■ Bellows ( - J)

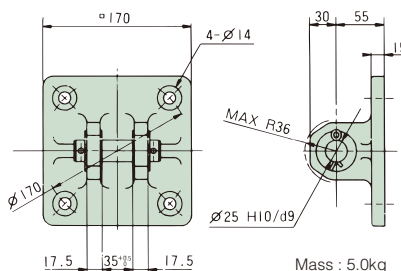


■ I-type end fitting ( - I) ■ Clevis fitting ( - C)



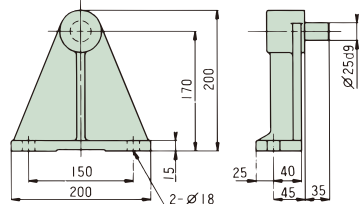
Note) Shipped as attached to the main body.  
The XA dimensions are the same as the standard U-type end fitting.

■ Clevis fitting ( - C)



Note) Shipped attached to the main body.  
If it needs to be shipped individually,  
consult us.

■ Trunnion fitting (LPTB2000-T)



Mass: 9.2kg/set

Note) Apply grease to the trunnion pin and trunnion hole before mounting.

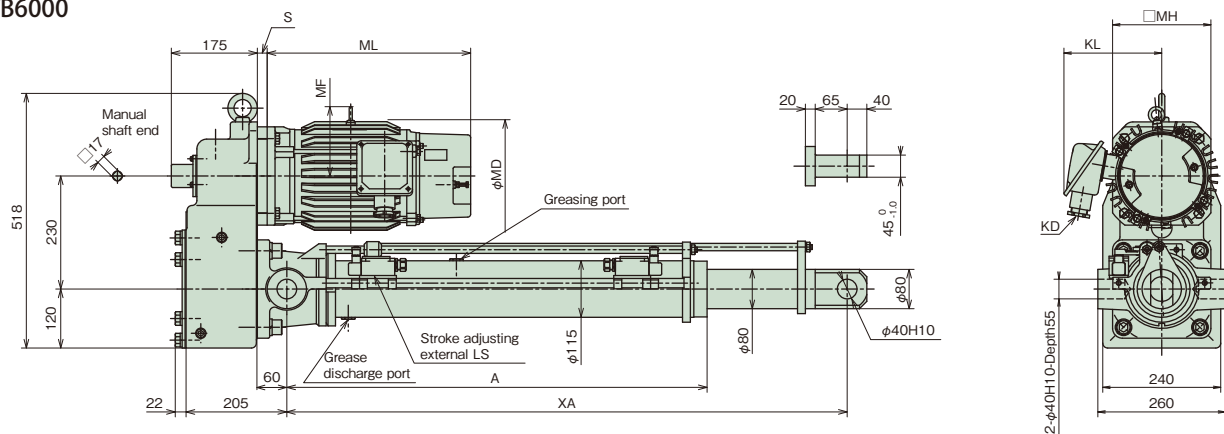
\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions.  
When designing the machine, take the margin into consideration.



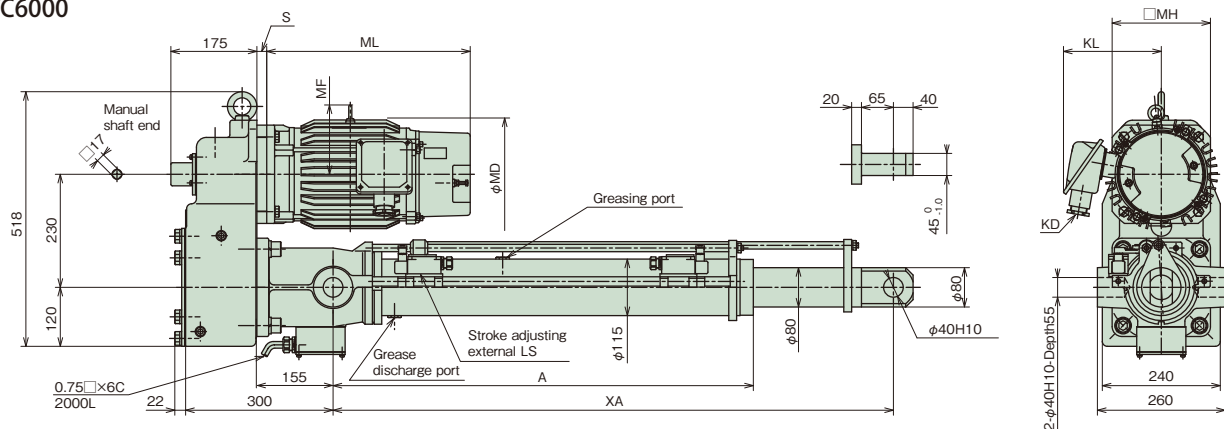


## Dimensions Table T Series 6000

### LPTB6000



### LPTC6000



Unit: mm

| Model     | Nominal speed<br>mm/s<br>50/60Hz | Motor<br>kW | MD  | ML  | MF  | KL  | KD   | MH  | S  |
|-----------|----------------------------------|-------------|-----|-----|-----|-----|------|-----|----|
| LPTB6000S | 6.3/7.6                          | 0.75        | 180 | 289 | —   | 166 | A20C | 170 | 90 |
| LPTC6000S | 17.5/21                          | 1.5         | 194 | 351 | —   | 178 |      | —   | —  |
| LPTB6000L | 25/30                            | 2.2         | 207 | 381 | 130 | 190 | A25C | 200 | 20 |
| LPTC6000L | 42/50                            | 3.7         | 229 | 414 | 141 | 201 |      | —   | —  |

Unit: mm

| Nominal<br>stroke | Thrust |       | A    | XA   |      |
|-------------------|--------|-------|------|------|------|
|                   | kN     | {kgf} |      | MIN  | MAX  |
| 500               | 58.8   | 6000  | 855  | 1010 | 1510 |
| 1000              |        |       | 1355 | 1560 | 2560 |
| 1500              |        |       | 1955 | 2210 | 3710 |

Approximate mass of main body

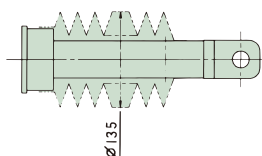
Unit: kg

| Model     | Nominal<br>stroke | 500 | 1000 | 1500 |
|-----------|-------------------|-----|------|------|
| LPTB6000S |                   | 143 | 168  | 193  |
| LPTC6000S |                   | 165 | 190  | 215  |
| LPTB6000L |                   | 151 | 176  | 201  |
| LPTC6000L |                   | 173 | 198  | 223  |
| LPTB6000M |                   | 157 | 182  | 207  |
| LPTC6000M |                   | 179 | 204  | 229  |
| LPTB6000H |                   | 172 | 197  | 222  |
| LPTC6000H |                   | 194 | 219  | 244  |

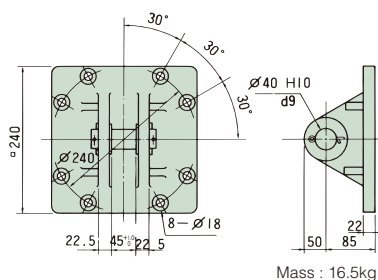
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. Mechanical stroke has a margin of approximately 10mm on both sides for the nominal stroke.
3. For the cylinder with bellows, the stroke will also not change.
4. Use TC type model in brake individual turnoff.
5. When the model of the TC type nominal stroke 1500mm is used, press and stop cannot be carried out near the maximum stroke in terms of buckling strength.
6. For connector part dimensions of the motor terminal box, refer to page 115.

## Options

### ■ Bellows ( - J)

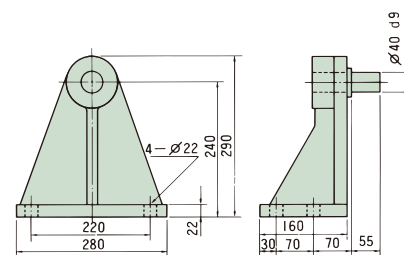


### ■ Clevis fitting ( - C)



Note) Shipped attached to the main body.  
If it needs to be shipped individually, consult us.

### ■ Trunnion fitting (LPTB6000-T)

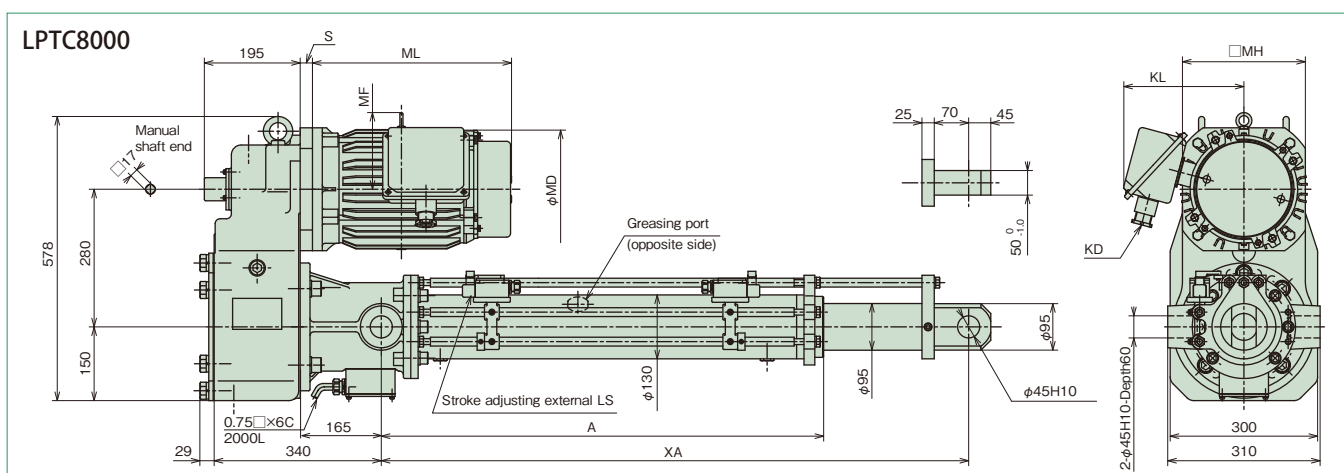
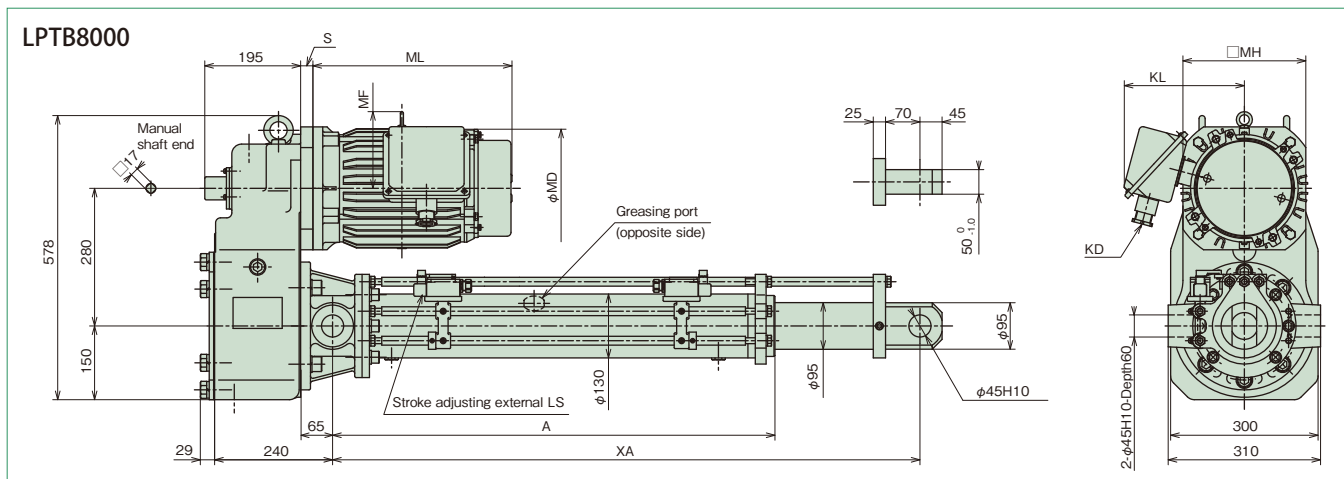


Mass: 39.0kg/set

Note) Apply grease to the trunnion pin and trunnion hole before mounting.

\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions.  
When designing the machine, take the margin into consideration.

# Dimensions Table T Series 8000



Unit: mm

| Model                  | Nominal speed<br>mm/s<br>50/60Hz | Motor<br>kW | MD  | ML  | MF  | KL  | KD   | MH  | S   |
|------------------------|----------------------------------|-------------|-----|-----|-----|-----|------|-----|-----|
| LPTB8000S<br>LPTC8000S | 10/12                            | 1.5         | 194 | 351 | —   | 178 | A20C | 170 | 137 |
| LPTB8000L<br>LPTC8000L | 20/24                            | 2.2         | 207 | 381 | 130 | 190 | A25C | 200 | —   |
| LPTB8000M<br>LPTC8000M | 30/36                            | 3.7         | 229 | 414 | 141 | 201 |      | —   | —   |
| LPTB8000H<br>LPTC8000H | 43/52                            | 5.5         | 265 | 403 | 156 | 245 |      | 250 | 25  |

Unit: mm

| Nominal<br>stroke | Thrust |         | A    | XA   |      |
|-------------------|--------|---------|------|------|------|
|                   | kN     | { kgf } |      | MIN  | MAX  |
| 500               | 78.4   | 8000    | 900  | 1065 | 1565 |
| 1000              |        |         | 1400 | 1615 | 2615 |
| 1500              |        |         | 1900 | 2165 | 3665 |

Approximate mass of main body

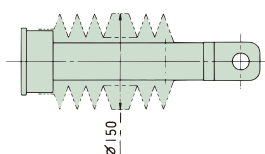
Unit: kg

| Model     | Nominal<br>stroke | 500 | 1000 | 1500 |
|-----------|-------------------|-----|------|------|
| LPTB8000S |                   | 224 | 254  | 284  |
| LPTC8000S |                   | 254 | 284  | 314  |
| LPTB8000L |                   | 212 | 242  | 272  |
| LPTC8000L |                   | 242 | 272  | 302  |
| LPTB8000M |                   | 230 | 260  | 290  |
| LPTC8000M |                   | 260 | 290  | 320  |
| LPTB8000H |                   | 241 | 271  | 301  |
| LPTC8000H |                   | 271 | 301  | 331  |

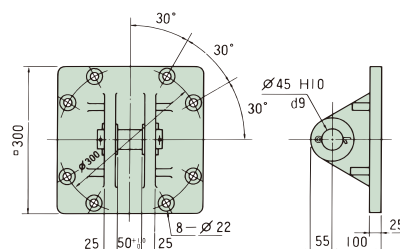
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. Mechanical stroke has a margin of approximately 10mm on both sides for the nominal stroke.
3. For the cylinder with bellows, the stroke will also not change.
4. Use TC type model in brake individual turnoff.
5. When the model of the TC type nominal stroke 1500mm is used, press and stop cannot be carried out near the maximum stroke in terms of buckling strength.
6. For connector part dimensions of the motor terminal box, refer to page 115.

## Options

### ■ Bellows ( - J )



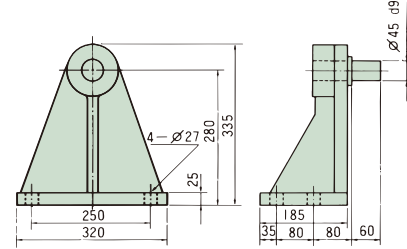
### ■ Clevis fitting ( - C )



Mass : 27.0kg

Note) Shipped attached to the main body.  
If it needs to be shipped individually, consult us.

### ■ Trunnion fitting (LPTB8000-T)



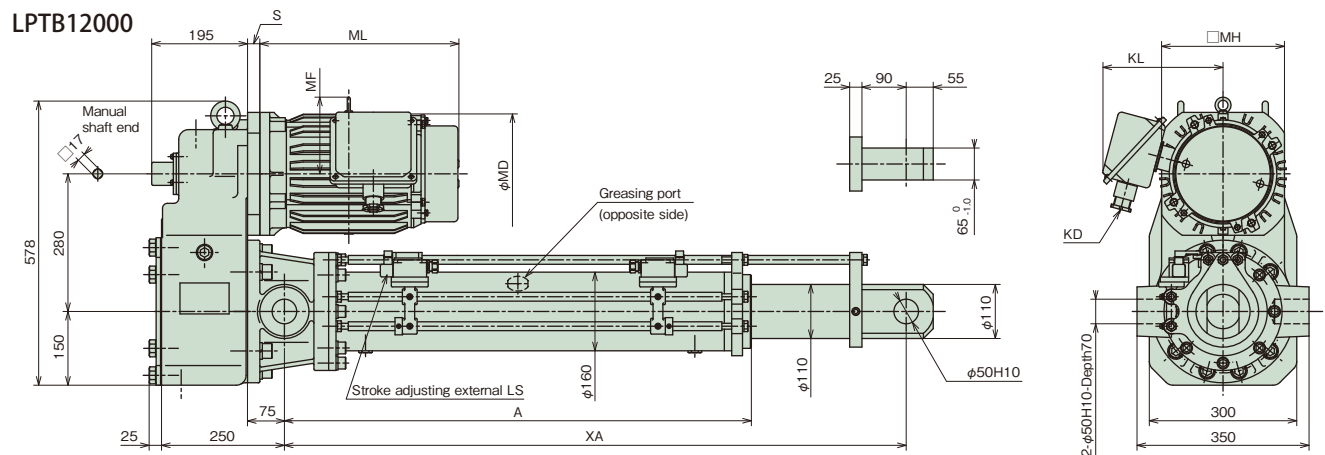
Mass: 70.6kg/set

Note) Apply grease to the trunnion pin and trunnion hole before mounting.

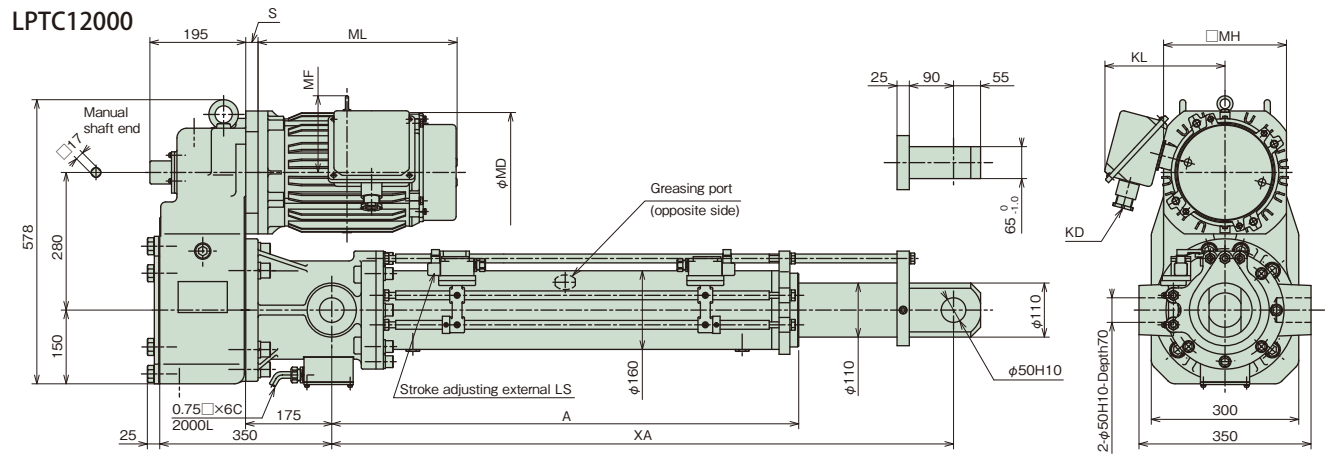
\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions.  
When designing the machine, take the margin into consideration.

## Dimensions Table T Series 12000

### LPTB12000



### LPTC12000



Unit: mm

| Model                    | Nominal speed<br>mm/s<br>50/60Hz | Motor<br>kW | MD  | ML  | MF  | KL  | KD   | MH  | S   |
|--------------------------|----------------------------------|-------------|-----|-----|-----|-----|------|-----|-----|
| LPTB12000L<br>LPTC12000L | 10/12                            | 2.2         | 207 | 381 | 130 | 190 |      | 200 | 145 |
| LPTB12000M<br>LPTC12000M | 18/22                            | 3.7         | 229 | 414 | 141 | 201 | A25C | 250 | 145 |
| LPTB12000H<br>LPTC12000H | 30/36                            | 5.5         | 265 | 403 | 156 | 245 |      | 250 | 25  |

Unit: mm

| Nominal<br>stroke | Thrust |         | A    | XA   |      |
|-------------------|--------|---------|------|------|------|
|                   | kN     | { kgf } |      | MIN  | MAX  |
| 500               | 117    | 12000   | 950  | 1135 | 1635 |
| 1000              |        |         | 1450 | 1685 | 2685 |
| 1500              |        |         | 1950 | 2235 | 3735 |
| 2000              |        |         | 2450 | 2785 | 4785 |

Approximate mass of main body

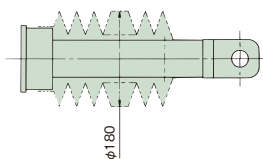
Unit: kg

| Model      | Nominal<br>stroke | 500 | 1000 | 1500 | 2000 |
|------------|-------------------|-----|------|------|------|
| LPTB12000L |                   | 270 | 312  | 354  | 396  |
| LPTC12000L |                   | 309 | 351  | 393  | 435  |
| LPTB12000M |                   | 285 | 327  | 369  | 411  |
| LPTC12000M |                   | 324 | 366  | 408  | 450  |
| LPTB12000H |                   | 295 | 337  | 379  | 421  |
| LPTC12000H |                   | 334 | 376  | 418  | 460  |

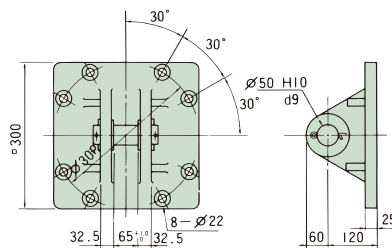
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. Mechanical stroke has a margin of approximately 10mm on both sides for the nominal stroke.
3. For the cylinder with bellows, the stroke will also not change.
4. Use TC type model in brake individual turnover.
5. When the model of the TC type nominal stroke 2000mm is used, press and stop cannot be carried out near the maximum stroke in terms of buckling strength.
6. For connector part dimensions of the motor terminal box, refer to page 115.

## Options

### ■ Bellows ( - J)



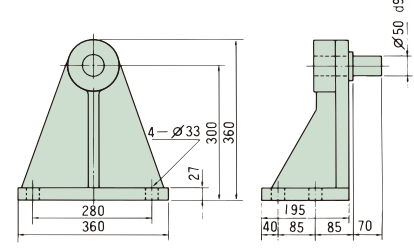
### ■ Clevis fitting ( - C)



Mass : 33.0kg

Note) Shipped attached to the main body.  
If it needs to be shipped individually, consult us.

### ■ Trunnion fitting (LPTB12000-T)



Mass: 84.4kg/set

Note) Apply grease to the trunnion pin and trunnion hole before mounting.

\* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions.  
When designing the machine, take the margin into consideration.





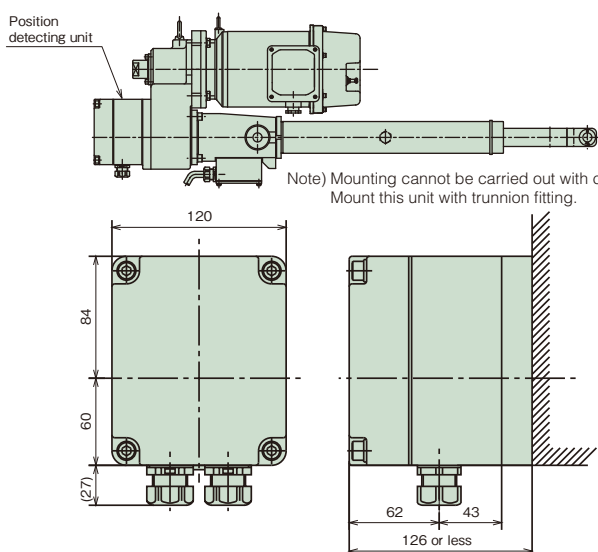
## Position detecting unit

The following three types of position detecting devices can be built in as your requested.

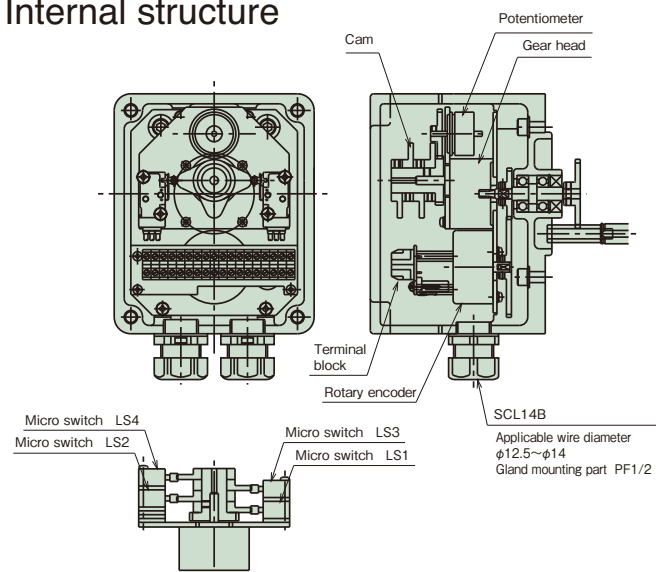
### 1. Position detecting internal limit switch (with two or four switches)

### 2. Potentiometer

### 3. Rotary encoder



### Internal structure



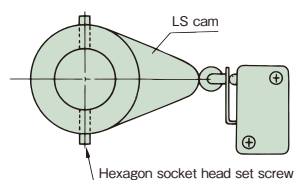
Mass of positional detecting unit Unit: kg

| Frame no. | Mass |
|-----------|------|
| T500      | 7.3  |
| T1000     | 7.6  |
| T2000     | 8.0  |
| T4000     | 9.0  |
| T6000     | 12.2 |
| T8000     | 13.3 |
| T12000    | 13.3 |
| T16000    | 14.5 |

### 1. Position detecting internal limit switch (with two or four switches)

- With two switches (symbol K2) ..... Layout of micro switches LS<sub>1</sub> and LS<sub>2</sub> in the previous diagram
- With four switches (symbol K4) ..... Layout of micro switches LS<sub>1</sub>, LS<sub>2</sub>, LS<sub>3</sub> and LS<sub>4</sub> in the previous diagram

|                                | Option symbol | Application example |                                                                                                                                                                                                                                                     | Micro switch specification        |                                                                                                                                                                                                            |
|--------------------------------|---------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Position detecting internal LS | K2            |                     | Extend:<br>External press stop, position detecting<br>Retract:<br>Determined position stop<br><br>Both ends determined position stop<br><br>Both ends external press stop, position detection                                                       | Model<br>Electric configuration   | D2VW-5L2A-1M (OMRON) Equivalent<br>250V AC 4A (cos=0.7)                                                                                                                                                    |
|                                |               |                     |                                                                                                                                                                                                                                                     | Contact configuration             | 1C<br>                                                                                                                                                                                                     |
| Position detecting internal LS | K4            |                     | Extend:<br>Middle determined position stop<br>External press stop, position detection<br>Retract:<br>Two-determined position stop<br><br>For both extend and retract:<br>External press stop, position detection<br>Middle determined position stop | Note)<br>In the table at the left | <br>Stops with operation of the micro switch for thrust detection.<br>Stops with operation of the micro switch for position detection.<br>Detects position with operation of the micro switch for position |



#### <Setting of LS>

For adjustment of the operating position, operate the power cylinder to adjust the LS cam. Loosen the hexagon socket head set screws (2 pieces) on the LS cam with a hexagon bar wrench (nominal 1.5).

## Position detecting unit

### 2. Potentiometer

This is a variable resistor to output electric signals depending on the stroke amount of the cylinder. Use this unit in combination with a printed board and a stroke indication meter. Resistance values according to the model have been adjusted before shipment.

Separately request preset values according to the model as they are described in the position detecting unit specification drawing. Pay strict attention to handling because correspondence between the stroke position and the resistance value will deviate by rotating the rod of the power cylinder.

| Potentiometer specifications |                                                        |
|------------------------------|--------------------------------------------------------|
| Model                        | CP-30 or equivalent                                    |
| Manufacturer                 | SAKAE TSUSHIN KOGYO CO., LTD.                          |
| Total resistance value       | 1kΩ                                                    |
| Rated power                  | 0.75W                                                  |
| Dielectric strength          | 1000V AC 1min.                                         |
| Effective electric degree    | 355° ± 5°                                              |
| Effective mechanical degree  | 360° endless                                           |
| Connection                   | Connected to terminal block in position detecting unit |

### 3. Rotary encoder

| Rotary encoder specifications |                                                                   |
|-------------------------------|-------------------------------------------------------------------|
| Model                         | TS5305N251                                                        |
| Manufacturer                  | Tamagawa Seiki Co., Ltd.                                          |
| Output pulse number           | 600P/R                                                            |
| Output waveform               | 90° phase difference two-phase square wave + home position output |
| Output voltage                | H ————— Note 1)                                                   |
|                               | L ————— Note 1)                                                   |
| Power supply                  | 5~24V DC                                                          |

The output signal of the standard specification is of an incremental type, however, an absolute type is also available.

The output type in standard specifications is open collector.

If voltage output type is required, see (Note 1) below.

If the specification of line driver output is required, contact us.

Note 1) Due to the open collector output, output signals are obtained when the pull-up resistor is connected.

Signal 1 and signal 2 are output voltages of H "(power supply voltage – 1)V or more" and L "1V or less."

For the Z-phase, negative logic applies.

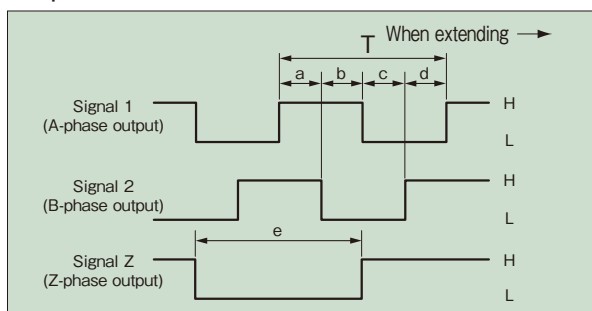
<Reference resistance values> 5V: 220Ω, 12V: 470Ω, 24V: 1kΩ

#### Output connection

| Signal 1 | Signal 2 | Signal Z | +5V to 24V | 0V   | Case |
|----------|----------|----------|------------|------|------|
| (9)      | (10)     | (11)     | (12)       | (13) | (14) |

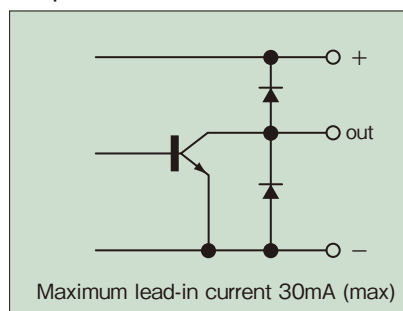
Figures in parentheses indicate terminal No.

#### Output waveform



a. b. c. d =  $T/4 \pm T/8$   $T/2 \leq e \leq 3T/2$

#### Output circuit



\* Best suited to controlling the stroke by a sequencer or programmable controller, etc.

More accurate positioning control is possible in combination with motor speed control by an inverter, etc.

① The standard products incorporate an incremental type encoder.

② The rotary encoder has been set to output 10 pulse per stroke of 1mm.

③ It is possible to set an accurate home position of the machine in combination with a limit switch because home position output is read out every 600 pulses.

④ Do not apply vibration or impact to the rotary encoder because it is precision equipment.

⑤ Use shield wire for wiring to the rotary encoder.

⑥ As a guide for the distance between the rotary encoder and control panel, a collector current of 20mA should be able to be transmitted approximately 50m (12V pull-up).

For distances other than the above, consult with us.

## Position detecting unit

### Wire connection in position detecting unit

Use terminals provided in the unit for wire connection to the position detecting internal limit switch, potentiometer and rotary encoder.

COM on the internal LS means common use. (internally wire-connected)

Use shield wire for wiring to the rotary encoder.

|                                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|--------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Power cylinder wiring terminal |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Equipment wiring terminal      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Terminal No.                   | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                 | 5                                                                                 | 6                                                                                 | 7                                                                                 | 8                                                                                 | 9                                                                                 | 10                                                                                | 11                                                                                | 12                                                                                | 13                                                                                | 14                                                                                | 15                                                                                | 16                                                                                | 17                                                                                  | 18                                                                                  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

| Option       | Internal LS (K2, K4) |    |     |   |     |    |     |   | Potentiometer |   |   | Rotary encoder |   |    |    |         |    |      |
|--------------|----------------------|----|-----|---|-----|----|-----|---|---------------|---|---|----------------|---|----|----|---------|----|------|
| Symbol       | LS1                  |    | LS2 |   | LS3 |    | LS4 |   | Common use    | P |   |                | R |    |    |         |    |      |
| Contact      | a                    | b  | a   | b | a   | b  | a   | b | c             | 1 | 2 | 3              | 1 | 2  | Z  | +5V~24V | 0V | Case |
| Terminal No. | 18                   | 17 | 5   | 6 | 16  | 15 | 7   | 8 | 4             | 1 | 2 | 3              | 9 | 10 | 11 | 12      | 13 | 14   |

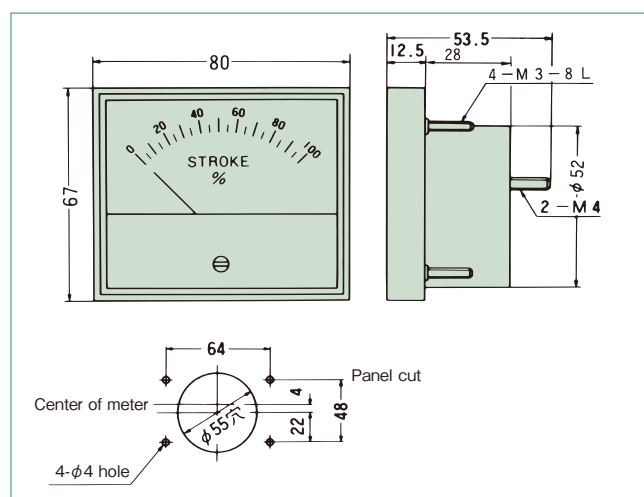
## Control option

### Stroke indication meter

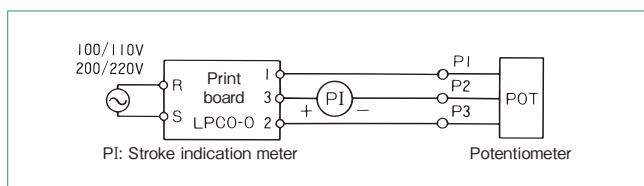
|                      |                                |
|----------------------|--------------------------------|
| Model                | RM-80B(100μA DC) or equivalent |
| Grade                | JIS C 1102 2.5 class           |
| Appearance           | Frame・black                    |
| Scale specifications | Full stroke indicated by 100%  |

1. Special scale and wide angle gauge are also available at your request.
2. When you want to express scale in other than percentage, indicate this to us.

\* A separate printed board is also required.

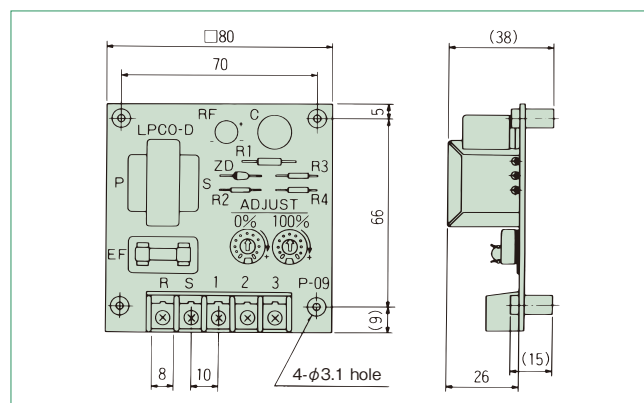


## Printed board



Adjust the meter with an ADJUST volume on the printed board. Do not make a mistake with the stroke indication meter +, - . Replace the terminals 1 and 2 on the print board to set the indication meter to 100% when the stroke is MIN.

Model LPCO-D1 (Operation power source 100/110V 50/60Hz)  
LPCO-D2 (Operation power source 200/220V 50/60Hz)



## Control option

### Meter relay

Used for simple adjustment of stroke on the operation panel.

( Iron panel installation is standard. Separately indicate to us when installing an aluminum panel. )

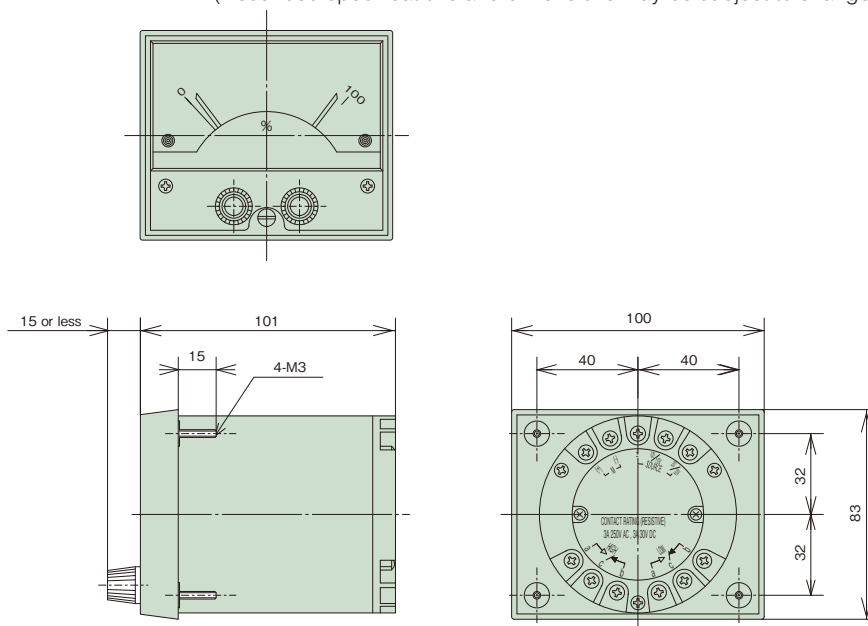
Note) For using 4 – 20mA output, designate as “for 4 – 20mA output.”

\* A separate printed board is also required.

#### Meter relay specifications

|                              |                                                           |
|------------------------------|-----------------------------------------------------------|
| Model number                 | NRC-100HL (TSURUGA) or equivalent product                 |
| Class                        | JIS C 1102 2.5 class                                      |
| Appearance                   | Frame•Black                                               |
| Scale                        | Full stroke indicated by 100%                             |
| Power source                 | 100/100V AC, 200/220V AC 50/60Hz                          |
| Input                        | 100 $\mu$ A DC maximum                                    |
| Output contact configuration | 1C for both HIGH, LOW sides (refer to the following Fig.) |
| Contact capacity             | 250V AC 3A ( $\cos \phi = 1$ )                            |

(Described specifications and dimensions may be subject to change due to circumstances.)



The main body of the power cylinder is provided with a potentiometer.

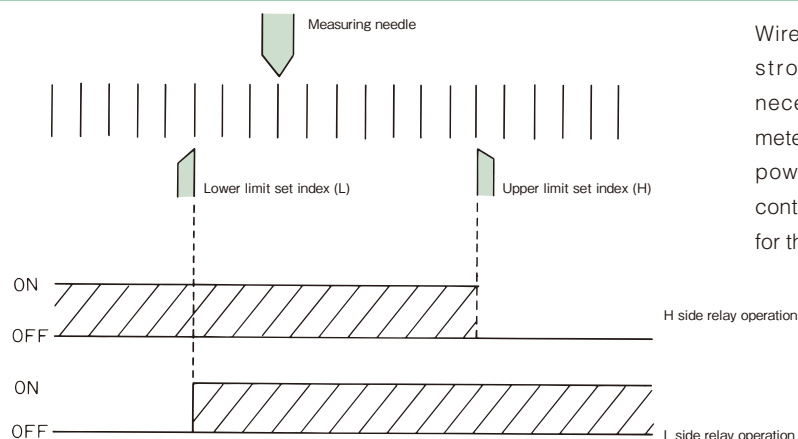
The phase of a stroke deviates if the rod is rotated before installation. Therefore, cylinders with a stroke adjusting limit switch are recommended.

Pre-set minimum and maximum strokes to be used with the stroke adjusting limit switch, then use the meter relay.

#### <Print board>

This is the same as the print board for the stroke indication meter.

#### <Relay operation> (In the case of b contact)



Wire connection is the same as that for the stroke indication meter, however, it is necessary to separately feed power to the meter relay. Supply power from the operating power supply. It is easy to connect the b contact as an output contact to the b contact for the stroke adjusting LS in series.

## Shock relay

Our highly reliable shock relay is recommended as an electric safety device for the power cylinder of the TB type.

For details, refer to the “TSUBAKI E&M electric overload protection devices shock monitor shock relay catalogue.”

## Stroke control for power cylinder

There are various methods of positioning control for the power cylinder. Positioning accuracy greatly varies depending on the speed of the power cylinder, the size of the load, the size of a load inertia, the operating direction (vertical, horizontal) and the wire connection method for the brake. Control methods may be limited depending on the operating condition. As such, what methods there are will be conceptually described here.

### Limit switch method

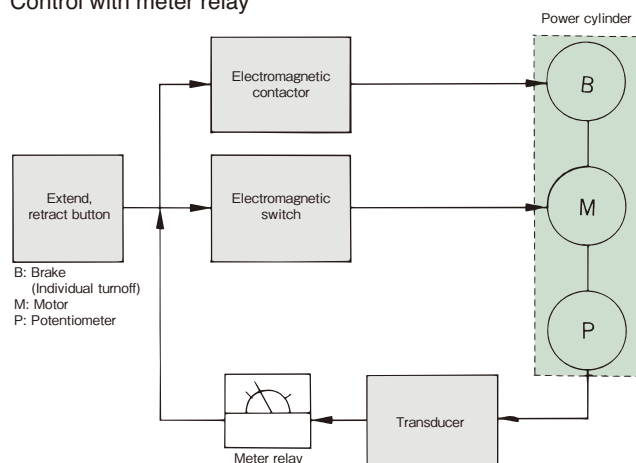
- ① With stroke adjusting limit switch ..... Positioning of stroke upper and lower limit
- ② With position detecting limit switch ..... Intermediate positioning  
Accuracy generally increases with lower cylinder speed.
- ③ Press (pull) stop (Thrust detecting limit switch for T series TC type is used.)

This is a method that stoppers are mechanically provided on both ends of a stroke used for equipment driven by the power cylinder, and press, pull stop are carried out, and then a thrust detecting limit switch for the power cylinder is used. The stroke is mechanically regulated by the stoppers, therefore, accurate positioning is possible.

### Method with potentiometer

This method is convenient when you want to change the stroke of the power cylinder on the control side. Accuracy generally increases as the cylinder speed decreases. For the power cylinder body, the method with a stroke adjusting limit switch is recommended to prevent stroke over.

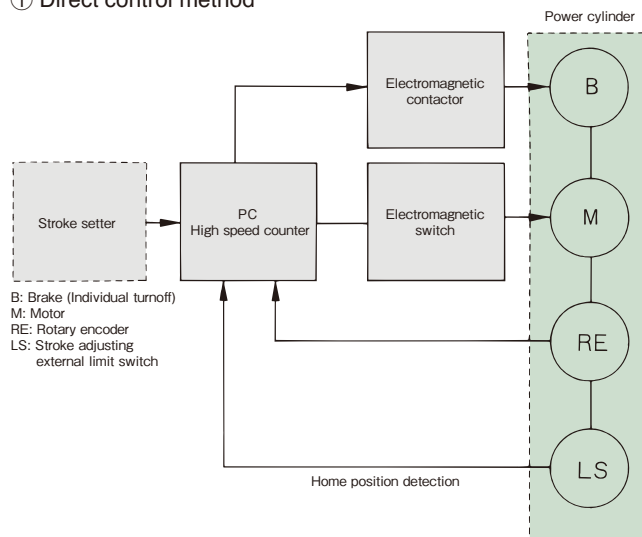
### Control with meter relay



### Method with rotary encoder (RE)

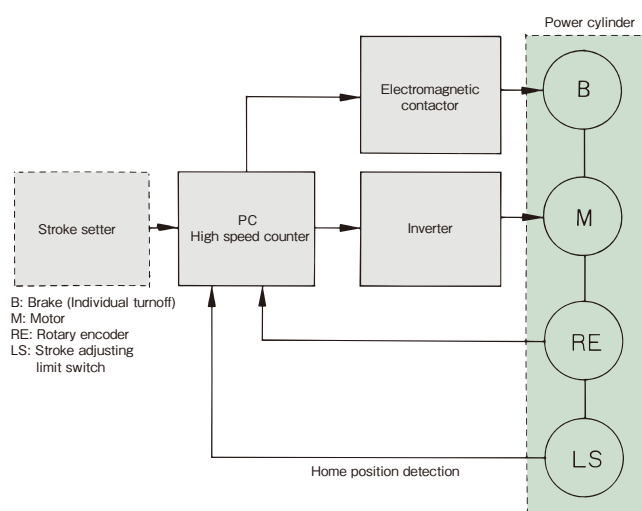
This method controls stroke by a programmable controller (PC). Use the PC with a counter. Use a limit switch to detect home position. (For the power cylinder body, the method with a stroke adjusting limit switch is recommended.)

#### ① Direct control method



With this method, when OFF signals for the motor and the brake are not simultaneously outputted from the PC, and OFF signal for the motor is outputted earlier, the cylinder coasts while decelerating. Highly accurate positioning is possible because the power cylinder operates at a low speed such as output of an operation signal for the brake just before the stop position.

#### ② Motor speed control method



Note that, when a heavy object is moved up or down, or a load with a large inertia is operated, it may not be sufficiently slowed down by any method.

## Wire connection

### Wire connection for brake motor (Motor with DC brake)

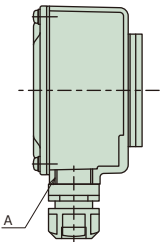
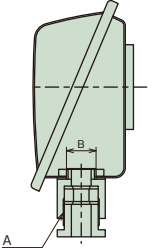
| In the case of brake internal wiring                                                   |                                            |                                                            |
|----------------------------------------------------------------------------------------|--------------------------------------------|------------------------------------------------------------|
| 0.1~0.4kW                                                                              | <p>200V class</p>                          | <p>400V class</p>                                          |
|                                                                                        | <p>Common to 200/400V</p>                  | <p>For 5.5kW or higher,<br/>use brake external wiring.</p> |
| In the case of brake external wiring                                                   |                                            |                                                            |
| 0.1~0.4kW                                                                              | <p>200V class</p> <p>200~220V AC</p>       | <p>400V class</p> <p>200~220V AC</p>                       |
|                                                                                        | <p>200V class</p> <p>200~230V AC</p>       | <p>400V class</p> <p>380~460V AC</p>                       |
| 0.75~3.7kW                                                                             | <p>200V class</p> <p>200~230V AC</p>       | <p>400V class</p> <p>380~460V AC</p>                       |
|                                                                                        | <p>Common to 200/400V</p>                  |                                                            |
| 5.5kW or more                                                                          | <p>Common to 200/400V</p>                  |                                                            |
| Rod operating direction<br><small>(In the case of connection on upper surface)</small> | LPTB <sub>250</sub> ~LPTC <sub>16000</sub> | LPTB <sub>32000</sub> ~LPTC <sub>16000</sub>               |
|                                                                                        | Rod extend                                 | Rod retract                                                |

\* Crimp contact bolt: M4



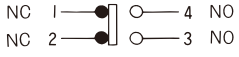
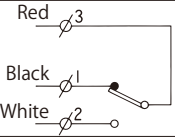
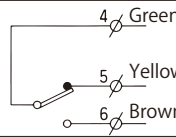
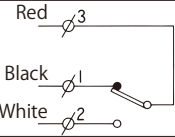
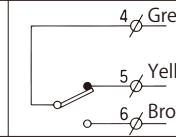
## Wire connection

Dimensions of motor terminal, connector part

| Shape of terminal box                                                                                 | Motor capacity | Shape of connector | Applicable cable outer diameter | Connector part mounting dimension A | Terminal box seat hole dimension B |
|-------------------------------------------------------------------------------------------------------|----------------|--------------------|---------------------------------|-------------------------------------|------------------------------------|
| <br>(0.4kW or less)  | 0.1kW~0.4kW    | SK-14L             | $\phi 11 \sim \phi 13$          | PF 1/2                              | —                                  |
| <br>(0.75kW or more) | 0.75kW~1.5kW   | A20C               | $\phi 14 \sim \phi 15$          | PF 3/4                              | $\phi 28$                          |
|                                                                                                       | 2.2kW~7.5kW    | A25C               | $\phi 19 \sim \phi 20$          | PF 1                                | $\phi 35$                          |
|                                                                                                       | 11kW           | A30B               | $\phi 23 \sim \phi 24$          | PF 1 1/4                            | $\phi 42$                          |

Note) A rubber plug or plate has been inserted into the connector to prevent water etc., from intruding before shipment.  
Make sure to remove it when using.

## Limit switch specifications

|                                                | Stroke adjusting external LS                                                                 | Thrust detecting LS (LPT16000 or smaller)                                           |                                                                                      | Thrust detecting LS                                                                   |                                                                                       |
|------------------------------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Limit switch type                              | WLCA2(OMRON) or equivalent                                                                   | V-165-1AR5(OMRON) or equivalent                                                     |                                                                                      | Z-15GW22-B(OMRON) or equivalent                                                       |                                                                                       |
| Electric capacity                              | 250V AC 10A ( $\cos\phi=0.4$ )                                                               | 250V AC 10A ( $\cos\phi=0.4$ )                                                      |                                                                                      | 250V AC 10A ( $\cos\phi=0.4$ )                                                        |                                                                                       |
| Contact configuration                          | 1a 1b<br> | For advancing                                                                       | For retreating                                                                       | For advancing                                                                         | For retreating                                                                        |
|                                                |                                                                                              |  |  |  |  |
| Connector<br>(Applicable cable outer diameter) | SCS-10B ( $\phi 8.5 \sim \phi 10.5$ ) PF1/2                                                  | SCL-14A ( $\phi 10.5 \sim \phi 12.5$ ) PF1/2                                        |                                                                                      | SCS-14A ( $\phi 10.5 \sim \phi 12.5$ ) PF1/2                                          |                                                                                       |

## Motor current value • brake current value

| Output frame No. | Motor current value (A) |                |                |                |                |                | Brake model No. | Brake current value (A) |              |              |              |              |              |
|------------------|-------------------------|----------------|----------------|----------------|----------------|----------------|-----------------|-------------------------|--------------|--------------|--------------|--------------|--------------|
|                  | 200V 50Hz               | 200V 60Hz      | 220V 60Hz      | 400V 50Hz      | 400V 60Hz      | 440V 60Hz      |                 | 200V 50Hz               | 200V 60Hz    | 220V 60Hz    | 400V 50Hz    | 400V 60Hz    | 440V 60Hz    |
| 4P - 0.1kW       | 0.72<br>(2.76)          | 0.62<br>(2.60) | 0.65<br>(2.84) | 0.36<br>(1.38) | 0.31<br>(1.27) | 0.32<br>(1.41) | SBH01LP         | 0.18<br>0.27            | 0.18<br>0.27 | 0.19<br>0.29 | 0.18<br>0.27 | 0.18<br>0.27 | 0.19<br>0.29 |
| 4P - 0.2 kW      | 1.3<br>(4.91)           | 1.1<br>(4.68)  | 1.1<br>(5.14)  | 0.63<br>(2.40) | 0.55<br>(2.22) | 0.56<br>(2.41) | SBH02LP         | 0.18<br>0.27            | 0.18<br>0.27 | 0.19<br>0.29 | 0.18<br>0.27 | 0.18<br>0.27 | 0.19<br>0.29 |
| 4P - 0.4 kW      | 2.4<br>(11.6)           | 2.1<br>(10.2)  | 2.1<br>(11.0)  | 1.2<br>(5.14)  | 1.1<br>(4.88)  | 1.1<br>(5.39)  | SBH04LP         | 0.18<br>0.27            | 0.18<br>0.27 | 0.19<br>0.29 | 0.18<br>0.27 | 0.18<br>0.27 | 0.19<br>0.29 |
| 4P - 0.75 kW     | 3.9<br>(24.0)           | 3.5<br>(22.0)  | 3.4<br>(24.0)  | 1.9<br>(12.0)  | 1.7<br>(11.0)  | 1.7<br>(12.0)  | SLB07LP         | 0.18<br>0.27            | 0.18<br>0.27 | 0.20<br>0.30 | 0.09<br>0.15 | 0.09<br>0.15 | 0.10<br>0.16 |
| 4P - 1.5 kW      | 6.5<br>(49.0)           | 6.1<br>(45.0)  | 5.8<br>(50.0)  | 3.2<br>(24.5)  | 3.1<br>(22.5)  | 2.9<br>(25.0)  | SLB15LP         | 0.18<br>0.29            | 0.18<br>0.29 | 0.20<br>0.32 | 0.09<br>0.15 | 0.09<br>0.15 | 0.11<br>0.16 |
| 4P - 2.2 kW      | 9.6<br>(67.0)           | 9.0<br>(59.0)  | 8.6<br>(64.9)  | 4.8<br>(33.5)  | 4.5<br>(29.5)  | 4.3<br>(32.5)  | TB-A2.2         | 0.25<br>0.34            | 0.25<br>0.34 | 0.25<br>0.34 | 0.13<br>0.17 | 0.13<br>0.17 | 0.13<br>0.17 |
| 4P - 3.7 kW      | 15.2<br>(122)           | 14.4<br>(104)  | 13.6<br>(114)  | 7.6<br>(61.0)  | 7.2<br>(51.8)  | 6.8<br>(57.0)  | TB-A3.7         | 0.34<br>0.44            | 0.34<br>0.44 | 0.34<br>0.44 | 0.17<br>0.22 | 0.17<br>0.22 | 0.17<br>0.22 |
| 4P - 5.5 kW      | 22.4<br>(146)           | 21.0<br>(125)  | 19.8<br>(138)  | 11.2<br>(73.0) | 10.5<br>(62.5) | 9.9<br>(68.8)  | TB-A7.5         | 1.5<br>2.0              | 1.5<br>2.0   | 1.5<br>2.0   | 3.0<br>4.0   | 3.0<br>4.0   | 3.0<br>4.0   |
| 4P - 7.5 kW      | 29.6<br>(215)           | 28.2<br>(185)  | 26.4<br>(204)  | 14.8<br>(108)  | 14.1<br>(92.5) | 13.2<br>(102)  | TB-A7.5         | 1.5<br>2.0              | 1.5<br>2.0   | 1.5<br>2.0   | 3.0<br>4.0   | 3.0<br>4.0   | 3.0<br>4.0   |
| 4P - 11 kW       | 42.5<br>(290)           | 41.0<br>(249)  | 38.0<br>(274)  | 21.5<br>(145)  | 20.5<br>(124)  | 19.0<br>(137)  | TB-A15          | 1.3<br>1.7              | 1.3<br>1.7   | 1.3<br>1.7   | 2.6<br>3.4   | 2.6<br>3.4   | 2.6<br>3.4   |

Note) 1. The above values are rated current values of the motor and brake. A numerical value in parentheses is a start current value of the motor.

2. The rated current values and start current values do not include a brake current value.

3. A DC brake is used as a brake. The upper stage of the brake current value indicates a value on the primary side of the power module, and the lower stage indicates a value on the secondary side.

4. The above values are references because the rated current values for the power cylinder vary depending on operating conditions.

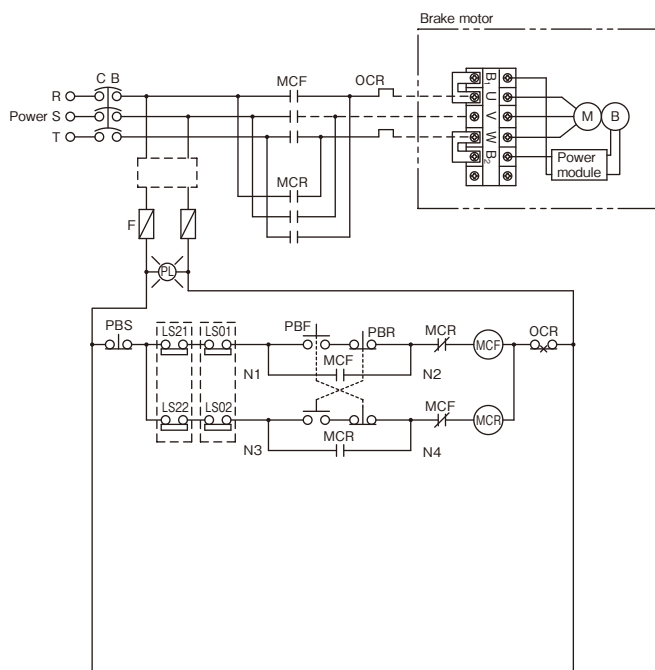
5. For simultaneous turnoff of 0.1kW to 0.4kW, 400V class, the voltage is converted to 200V through the motor intermediate tap to be input. For individual turnoff, decrease the voltage to 200 to 220V by a transformer. The capacity of the transformer capacity shall be 90VA or more.

6. For individual turnoff of 0.75kW or more, 400V class, the DC module is applicable for 400V class, therefore, it is unnecessary to decrease the voltage.

7. For 0.75kW and 1.5kW of 400V class, the brake model Nos. are "SLB07LPV" and "SLB15LPV," respectively.

## Reference circuit

### 0.75 to 3.7kW TC type reference circuit diagram



LS01: Stroke adjusting external limit switch for extending

LS21: Thrust detecting limit switch for extending

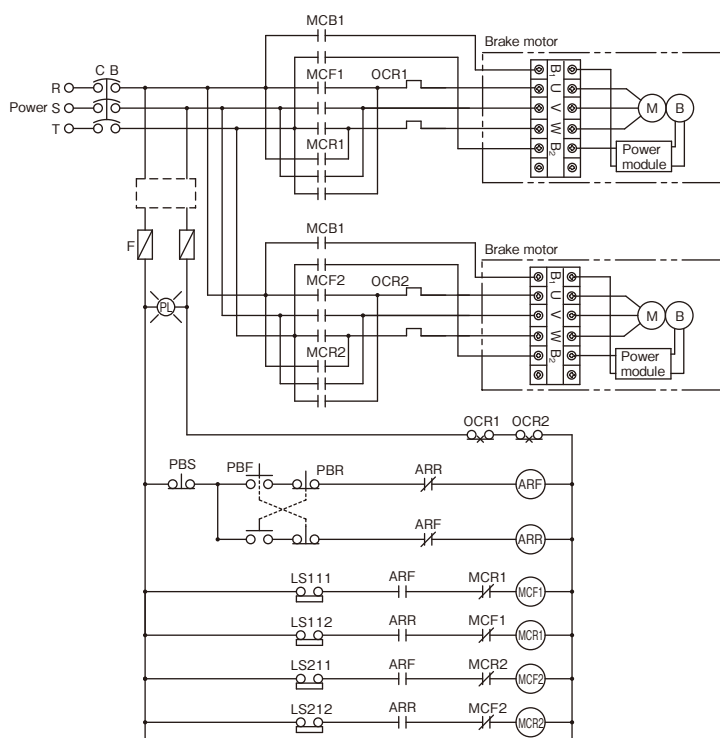
LS02: Stroke adjusting external limit switch for retracting

LS22: Thrust detecting limit switch for retracting

#### NOTE :

- (1) This diagram is an example when the thrust detecting limit switch is used for overload protection.
- (2) This diagram shows a single-acting circuit. When using in an inching circuit, remove wire connection between N1 and N2, N3 and N4 and short-circuit the PBS.
- (3) If the power source voltage for the motor is different from the control voltage, place a transformer into a [ ] portion in the diagram.
- (4) The lead wires B1 and B2 for the brake are connected to the motor terminal blocks U and W using short pieces.
- (5) When individually turning off the brake, remove the short piece and apply a normal power source voltage other than inverter output to B1 and B2 from the outside.

### 0.75 to 3.7kW Brake individual turnoff two units multiple reference circuit diagram



LS111: LPNo.1 Stroke adjusting external limit switch for extending LS1

LS112: LPNo.1 Stroke adjusting external limit switch for retracting LS1

LS211: LPNo.2 Stroke adjusting external limit switch for extending LS2

LS212: LPNo.2 Stroke adjusting external limit switch for retracting LS2

#### NOTE :

- (1) This diagram is an example of 0.75kW or more brake individual turnoff two units inching multiple circuit.
- (2) If the power source voltage for the motor is different from the control voltage, place a transformer into a [ ] portion in the diagram.
- (3) As the brake terminal blocks B1 and B2 are connected to the motor terminal blocks U and W using short pieces, remove the short pieces before use.
- (4) Apply a normal power source voltage other than inverter output to B1 and B2 from the outside.

\* For reference circuit for the type of 0.4kW or less, refer to page 80.

## Installation

### Installation direction

Any of horizontal, vertical and inclined direction is allowed.

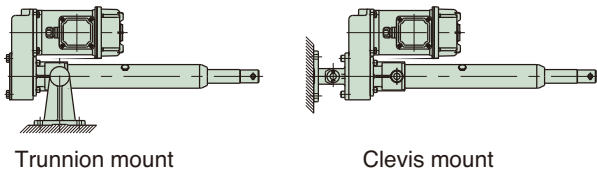
### Installation method

For installation of the main body, use a trunnion mount or clevis mount (parallel only).

Apply grease to the trunnion pin and the bracket hole before mounting.

Install the end part with a U-type or I -type end fitting.

Fig. 1 Installation method



\* For the mount fitting, refer to the item of options.

### Manual operation

When manually adjusting the stroke, rotate the manual handle shaft on the reducer part with a monkey wrench or a socket wrench after releasing the brake for the brake motor.



#### WARNING

When load is applied to the rod, remove the load before releasing the brake.

For the amount of movement of the rod per one turn of the manual shaft, refer to the standard model list (page 87).

### Anti-rod rotation

1. Anti-rod rotation is required because a rotating force is generated on the rod with thrust (refer to page 87). Generally, rotation can be mostly prevented by installing the rod end to a driven machine.
2. When operating with the end set free or in the case of application to install pulleys to pull a rope, a rod anti-rotation is normally required.

### Lateral load on rod

Install the power cylinder so as to prevent bending load (lateral load) from acting on the rod.

### Setting of stroke adjusting external LS

- Take a coasting amount into consideration for adjustment of the limit switch.
- When using the cylinder at the nominal stroke 100%, set the limit switch so that the cylinder stops within the XA dimension in the Dimensions Table.
- When simultaneously operating two or more power cylinders, install a limit switch at the upper limit and lower limit on each cylinder.

## Maintenance

### Lubrication on ball screw

Use the ball screw as it is because it has been lubricated with grease in advance. Refill grease with reference to Table 1-2 as a guide. To apply grease to the ball screw, remove the greasing port bolt on the outer cylinder and advance the rod in the full stroke and apply grease to the outer circumference of the screw with a grease gun, and then reciprocate the rod within the stroke to be used. Repeat this operation a few times.



#### WARNING

Never insert your finger into the greasing port.

If the cylinder operates with your finger inserted, your finger may be injured.

Table 1 Recommended grease

| Use classification | Company name         | Grease name                |
|--------------------|----------------------|----------------------------|
| Screw shaft        | TSUBAKI E&M          | JWGS100G                   |
|                    | IDEMITSU KOSAN       | *DAPHNE EPONEX SRNo.2      |
|                    | NIPPON GREASE        | NIGULUBE EP-2K             |
|                    | EXXON MOBILE         | MOBILUX EPNo.2             |
|                    | COSMO OIL LUBRICANTS | COSMO GREASE DINAMX EPNo.2 |
|                    | SHOWA SHELL          | SHELL ALBANIA EP grease 2  |

\* The above greases are filled before shipment.

Note) JWGS100G is separately sold in a container of 100g.

Table 2 Lubrication cycle

| Operating frequency   | Lubrication cycle        |
|-----------------------|--------------------------|
| 500 to 1000 times/day | Three to six months      |
| 100 to 500 times/day  | Six months to one year   |
| 10 to 100 times/day   | One to one and half year |

Note) The above values are for longer use, and do not indicate the life.

### Greasing on Reduction part

For the gear and the bearing in the reducer part, the gear case is filled with grease. Accordingly, it is not necessary to grease because they normally endure use for one year or longer. However, operation for a long time or use after long storage impairs the lubrication effect due to deterioration of grease. Therefore, inspect and grease.

Reducer part initial filled grease

Gear case: DAPHNE EPONEX SRNo.1 IDEMITSU KOSAN

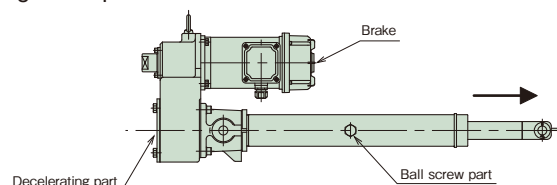
Planetary gear (straight type): Moly gear grease No. 1 SUMICO LUBRICANT CO., LTD.

### Gap adjustment of brake

Although the electromagnet stroke (gap) of the brake has been adjusted to approximately 1.2 through 1.3mm (limit gap 1.5mm) for 0.4kW or less or to approximately 0.2mm (limit gap 0.5mm) for 0.75kW or more, re-adjust it before it exceeds the limit gap value.

For details, refer to the Operation Manual.

Fig. 2 Inspection location





## WARNING

### ■ Cautions for selecting

- Anti-rod rotation is required because a rotating force is exerted on the rod with thrust. Rod rotating forces at the rated thrust are described in the model list. When operating with the end disconnected or when installing pulleys to pull rope, use an optional rod anti-rotation specification.
- When the cylinder operating stroke is short, a high speed type cylinder cannot be used because the operating time per one stroke becomes shorter and cannot be actually controlled. The following table shows minimum necessary strokes when motor energization time is 0.5s. Refer to this table to determine the speed.

| Speed symbol                                     | H             |
|--------------------------------------------------|---------------|
| Nominal speed mm/s 50/60Hz                       | 100/120       |
| 0.5s operation moving amount mm                  | 50/60         |
| Predicted maximum coasting amount mm (Reference) | 24/33         |
| Minimum necessary stroke mm                      | 74/93 or more |

### ■ Cautions for installation

- Apply grease to the trunnion pin and the trunnion hole for trunnion mounting.
- Also, apply grease to the connecting pin of the end fitting and the connecting pin for clevis mounting.
- When the main body greatly swings by operation of the cylinder, consider using a sliding bearing or a rolling bearing for the connecting part. Cylinders whose trunnion hole is provided with sliding bearing are available as MTO.
- When the trunnion pin or connecting pin for the clevis or the end fitting is directed in the vertical direction (when the cylinder is laid horizontally), and the main body swings, take countermeasures for wear such as inserting a bearing member into the trunnion hole, the clevis fitting, or the side part of the end fitting.
- All models are totally enclosed structures so that they can be used normally outdoors, however, under adverse conditions exposed to constant water and steam etc., and snow accumulation, although they are an outdoors type, an appropriate cover is required. The power cylinder can generally be used in a range of -15°C to 40°C, although it varies depending on the use conditions. When using at 40°C or higher, always protect with a heat insulating cover, etc. Never use in a flammable atmosphere, otherwise it may cause an explosion and fire. In addition, avoid using it in a location where vibration or shock exceeding 1G is applied.
- When using a cylinder of the cabtire cable lead wire specification outdoors, carry out waterproofing treatment sufficiently.

### ■ Cautions for use

- Regulate the both ends of the stroke by the limit switch. Select a type of option which allows the limit switch to be mounted on the power cylinder body.
- Use within the stroke range. If the stroke is exceeded, breakage may occur.
- As a high-speed type (H speed) of the power cylinder T series has a long coasting distance, the striker may override the limit switch. For this reason, make sure to allow a limit signal to be self-held on the control circuit.
- Megger testing is prohibited for this cylinder. It may break the built-in power module. Remove the brake wiring for the terminal block when conducting megger testing of the external circuits.
- Adjustment of the limit switch for thrust detection of the TC type must not be carried out by the customer. The preset value for thrust detection may greatly change.

## Power Cylinder Scum Skimmer Specifications



### 6 features

- 1 Easy maintenance**  
In comparison with a hydraulic and pneumatic type, troublesome oil replacement and drain check are not necessary, and maintenance is easy.
- 2 Simple structure of equipment and low cost**  
Neither hydraulic unit, compressor nor piping are necessary, allowing for cost reductions throughout the whole facility.
- 3 Environmentally friendly**  
Totally closed outdoor type brake motor and many stainless parts are used, and coating suitable for water treatment facility is applied.
- 4 Wide variety of options**  
A wide variety of options such as potentiometer, bellows and opening meter are available.
- 5 An abundance of results**  
Nationwide in Japan more than one hundred water treatment plants have adopted this power cylinder.
- 6 Energy savings**  
Adoption of highly efficient ball screw allows the motor capacity to be smaller in comparison with trapezoidal screw specifications.

### Four points for more user-friendliness

#### 1. Workability increased by making position detecting unit large.

Workability has remarkably increased by sizing up the position detecting unit by 2.5 times in volume ratio in comparison with the conventional one, and structuring the unit so that there is no obstacle around the LS cam and the terminal block when the cover is removed.

#### 2. Centralizing terminals for all control systems on one terminal block

Wiring work is facilitated by centralizing terminals for the optional potentiometer in addition to the internal limit switch, thrust detecting limit switch and manual interlock limit switch on one terminal block in the position detecting unit.

#### 3. Wiring with PLICA tube

The position detecting part and thrust detecting part can be respectively equipped with a waterproof union box connector (SANKEI MANUFACTURING Co., Ltd: WBG-24, WBG-17) for PLICA tube. PLICA tube and waterproof union box connector should be provided by the customer. However, the motor terminal box is equipped with the WBG-17 as standard.

#### 4. Others

- Adherence of rust decreased by press-fitting a bushing into the trunnion hole of the bracket. (When installing, apply grease to the trunnion pin and in the trunnion hole.)
- The greasing port bolt and manual interlock cap are connected to the main body with a stainless steel ball chain, preventing them from falling.

## Power cylinder G series, T series Right Angle Specifications



### What right angle specification is

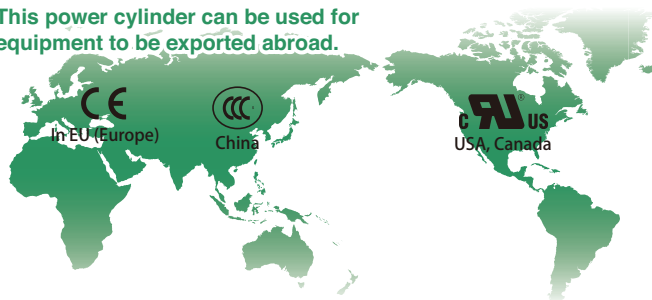
This is a form so that the motor part is right-angled (perpendicular) to the actuating part of the power cylinder.

This specification responds to a wide range of needs by adopting our small size gear motor (worm gear) on the motor part.



## Right Angle Specification 6 Features

- 1 Low speed**  
Applicable to lower speeds even lower than the standard speed of the power cylinder G series and T series.  
**Motor capacity can be smaller.**
- 2 Low noise**  
Noise level can be reduced by approximately 25dB in comparison with conventional products. (compared with our ordinary products)  
Noise reference value (Our measured value) 45dB (at 1m in A scale)  
**This can be used in applications such as concert halls and medical facilities which require low noise.**
- 3 Fall-preventing mechanism**  
Three fall-preventing mechanisms can be simultaneously made applicable by providing a self-lock system of the trapezoidal screw and the worm gear and providing a brake on the motor part.  
**This mechanism can be used in applications such as medical equipment for which falling may be problematic.**
- 4 Wide variety of options**  
A wide variety of options such as an inverter motor and one touch manual release, including without brake and with brake are available.  
**This can be used across a wide range of applications.**
- 5 Space savings**  
Longitudinal dimensions are shortened by up to approximately 180mm in comparison with conventional products. (LPG series)  
The motor part can be rotated every 90 degrees to the operating part.  
**This can be used in applications such as compactly designed equipment.**
- 6 Global measures**  
Power cylinders conforming to worldwide directives, standards and organizations (such as CCC, CE, UL) are available.  
**This power cylinder can be used for equipment to be exported abroad.**



## Power cylinder brake motor upgrades



### Further evolution in the strength of "TSUBAKI" motors!

The available range of special brake motors for power cylinders has been expanded to 1.5kW.

Our lineup has been strengthened!!

## Six specifications of brake motor upgrades



### Heat resistance specification: T

Compared with conventional products, substantial reductions in delivery time and price reduction have been realized. Also, heat resistance class "H", which would conventionally be unavailable, can be met.

- <Common specifications>
- Adaptable models: G series and T series of power cylinders
  - Adaptable motor capacity: 0.1kW – 1.5kW
  - Totally outdoor type (IP55) with brake (The heat resistance class of the brake is B.)

#### Heat resistance class "F" supported

Reference delivery time 30 days

##### 40°C

- Model No.: T1 (200V class), VT1 (400V class), V1T1 (380V, 50Hz), V2T1 (380V, 60Hz), V3T1 (415V, 50Hz), V4T1 (460V, 60Hz)
- Usable temperature range: 0 – 40°C (non-condensing)
- Duty factor: 25%ED
- Rating: S2 30min.
- Brake power supply module: Built into the terminal box

##### 60°C

- Model No.: T2 (200V class), VT2 (400V class), V1T2 (380V, 50Hz), V2T2 (380V, 60Hz), V3T2 (415V, 50Hz), V4T2 (460V, 60Hz)
  - Usable temperature range: 0 – 60°C (non-condensing)
  - Duty factor: 15%ED
  - Rating: S2 15min.
  - Brake power supply module: Separate placement (standard DC module)
- \* Install in a 40°C or lower environment.  
\* If being built into the terminal box is desired, contact us.

##### 80°C

- Model No.: T3 (200V class), VT3 (400V class), V1T3 (380V, 50Hz), V2T3 (380V, 60Hz), V3T3 (415V, 50Hz), V4T3 (460V, 60Hz)
  - Usable temperature range: 0 – 80°C (non-condensing)
  - Duty factor: 5%ED
  - Rating: S2 5min.
  - Brake power supply module: Separate placement (standard DC module)
- \* Install in a 40°C or lower environment.  
\* If being built into the terminal box is desired, contact us.

#### Heat resistance class "H" supported

Reference delivery time 60 days

- Model No.: T4 (200V class), VT4 (400V class), V1T4 (380V, 50Hz), V2T4 (380V, 60Hz), V3T4 (415V, 50Hz), V4T4 (460V, 60Hz)
  - Usable temperature range: 0 – 80°C (non-condensing) \* We will confirm the duty factor and rating in each case.
  - Duty factor: 15%ED
  - Rating: S2 15min.
  - Brake power supply module: Separate placement (special DC module)
- \* Install in a 40°C or lower environment.  
\* The motor terminal is a lug type.

## 2 Different voltage specification: V

We will deliver conventionally-available different voltage motors in a short period of time. Also, an estimation request and arrangements can be made smoothly through model-numbering of each voltage.

- <Common specifications>
- Adaptable models: G series and T series of power cylinders
  - Adaptable motor capacity: 0.1kW – 1.5kW
  - Totally outdoor type (IP55) with brake
  - Heat resistance class B

### Different voltage supported Reference delivery time + one week

- Model No.: V1 (380V, 50Hz), V2 (380V, 60Hz), V3 (415V, 50Hz), V4 (460V, 60Hz)  
 Usable temperature range: -15 – 40°C (non-condensing)  
 Duty factor: 25%ED  
 Rating: S2 30min.  
 Brake power supply module: Built into the terminal box
- Note
- For using the brakes by external wiring, contact us.

## 3 Inverter specification: Z

Compared with conventional products, substantial reduction in delivery time and price reduction have been realized. The controllability of power cylinders has been improved as speed control including acceleration and deceleration and speed variations can be performed easily. Also, outdoor type with brake is standard.

- <Common specifications>
- Adaptable models: G series and T series of power cylinders
  - Adaptable motor capacity: 0.1kW – 1.5kW
  - Totally outdoor type (IP55) with brake (The heat resistance class of the brake is B.)
  - Heat resistance class F
  - Constant torque operation can be performed in the range of 6 – 60Hz.

### Inverter drive supported Reference delivery time 30 days

- Model No.: Z (200V class), ZV (400V class)  
 Usable temperature range: 0 – 40°C (non-condensing)  
 Duty factor: 25%ED  
 Rating: S2 30min.  
 Brake power supply module: Built into the terminal box
- \* Apply not inverter output but normal power supply voltage to the brake power supply module.  
 Applicable power supply voltage is 200 – 220V for 200V class and 400 – 440V for 400V class.

## 4 Global specification: N

Power cylinders conforming to worldwide directives, standards and systems (CE, UL and CCC) are available. They can be used for equipment to be exported abroad.

- <Common specifications>
- Adaptable models: G series and T series of power cylinders
  - Adaptable motor capacity: 0.1kW – 0.4kW
  - Usable temperature range: -15 – 40°C (non-condensing)
  - Totally indoor type with brake
- Note
- Only brake motors are compliant with the standards.  
 If limit switches, etc., are required, contact us.

### CE-compliant Reference delivery time 60 days

- Model No.: Z (200V class), VN (400V class)  
 ■ Specifications (both N and VN)  
 Protection class: IP20  
 Heat resistance class: B
- 
- Target directive and standard  
 Target directive: Low Voltage Directive 73/23/EEC  
 Target standard: EN60034-1 (general motor regulations)

Products to be exported to the European market must be CE-marked to prove conformity with safety requirements provided by EC Directives. (Being “CE-compliant” is to affix a “CE mark” to products to prove conformity with EC Directives.)

### UL-compliant Reference delivery time 60 days

- Model No.: N2 (230/240V, 60/60Hz), VN2 (460V, 60Hz)  
 ■ Specifications (both N2 and VN2)  
 Protection class: IP20  
 Heat resistance class: A
- 
- Target standard and file No.  
 Target standard: UL1004  
 UL file No.: E225995

UL is an abbreviation for “Underwriters Laboratories” which represents safety standards for testing in the U.S. (Being “UL-compliant” is to affix a “UL mark” to products to prove UL standard certification with use of UL-standard-accredited motors.) Our certification in C-UR model conforms with both UL and CSA standards.

### CCC-compliant Reference delivery time 60 days

- Model No.: N3 (200/220/200/220V, 50/50 60/60Hz)  
 \* Only 200/220V, 50/60Hz for 0.4kW.  
 VN3 (380V/50Hz)  
 ■ Specifications (both N3 and VN3)  
 Protection class: IP23  
 Heat resistance class: E
- 
- National standard: GB12350

CCC is the China Compulsory Certification system, and for exporting 1.1kW or smaller motors to China, it is necessary to indicate a “CCC mark” to prove compulsory certification. We have received certification from the CQC (China Quality Certification Center).

5

**Explosion-proof specification: D**

Power cylinders adaptable to explosion-proof structures, which can be used in class 1 and class 2 hazardous locations, can be delivered in a short period of time. A vessel having an explosion-proof structure withstands the pressure of an explosion of explosive gas, if caused inside the vessel, and poses no danger of catching fire with external explosive gas.

**<Common specifications>**

- Adaptable models: G series and T series of power cylinders
- Adaptable motor capacity: 0.2kW – 1.5kW
- Totally outdoor type (IP44) with brake
- Heat resistance class B

**■Note**

- Inverters cannot be used.
- Stroke adjusting external limit switches are available. Contact us.
- LPTC (thrust detection mechanism type) and the position detecting unit part cannot be explosion-proof.
- Brakes cannot be used by external wiring.

**d2G4-compliant****Reference delivery time 30 days****■Model No.:** D (200V class), VD (400V class)

Usable temperature range: -10 – 40°C (non-condensing)

Duty factor: 25%ED

Rating: S3 40%.

Brake power supply module: None (AC brake)

6

**Adapter specification: A**

To be prepared for customer-desired manufacturer, IEC, NEMA, overseas standards, and other special flange motors, adapters are available from us to facilitate installation. Also, they are available for other special flange sizes and motor shaft diameters. Contact us.

**<Common specifications>** • Adaptable models: T series of power cylinders

- Adaptable motor capacity: 0.1kW – 7.5kW

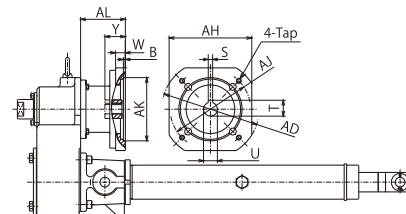
**Adapter supported****■Model No.:** A (adaptable to all brake motors)**■Standards use environment of power cylinder**

Usable temperature range: -15 to 40°C (non-condensing) \*40°C or higher is also supported.

Duty factor: Within 25%ED

**■Note**

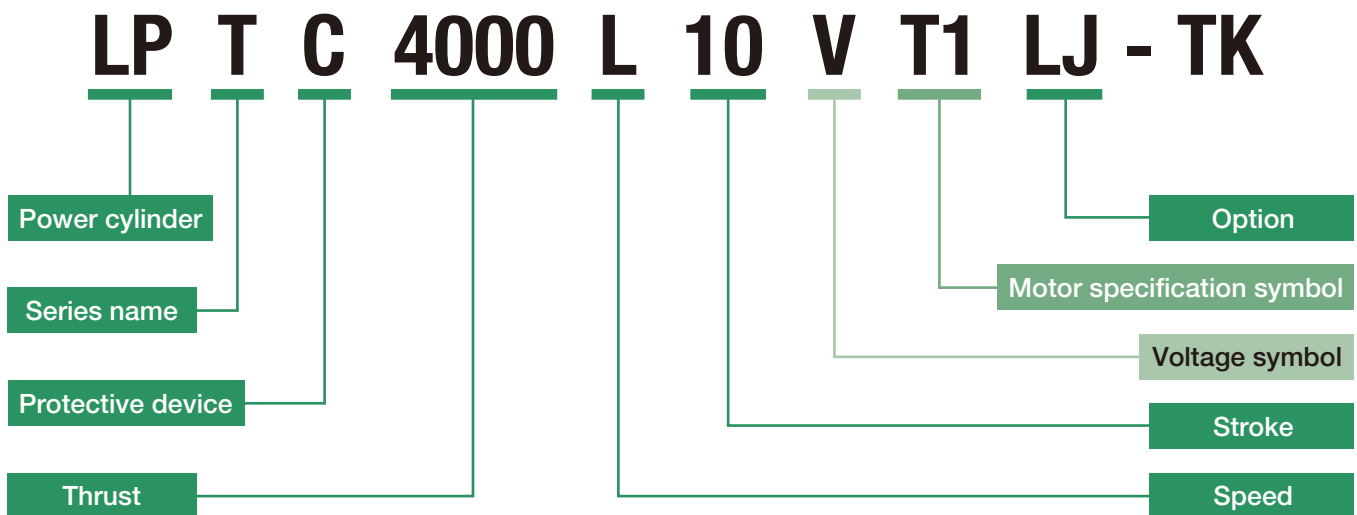
- The brake motor starting torque should be 200% or more of the rated torque.
- Make sure to prepare power cylinders with brakes because they are highly efficient.
- The brake torque should be 150% or more of the rated torque.

**T series adapter interconnection dimensions list (IEC standard motor)**

Unit: mm

| Model No.    | Speed | Motor capacity | Frame No. | AL   | AD   | AH   | AK     | B   | AJ   | S     | T     | U     | W  | Y     | Tap dia. |
|--------------|-------|----------------|-----------|------|------|------|--------|-----|------|-------|-------|-------|----|-------|----------|
| LPTB<br>LPTC | 250   | S              | 0.1       | 80   | φ160 | —    | φ110G7 | 4   | φ130 | 4Js9  | 12.8  | φ11F7 | 15 | 25    | 4-M8     |
|              |       | L              | 0.1       | 63   |      | —    |        | 5   |      | 5Js9  | 16.3  | φ14F7 | 14 | 32    |          |
|              |       | M              | 0.2       | 71   |      | —    |        | 4   |      | 4Js9  | 12.8  | φ11F7 | 15 | 25    |          |
|              |       | H              | 0.4       | 71   |      | —    |        | 5   |      | 5Js9  | 16.3  | φ14F7 | 14 | 32    |          |
| LPTB<br>LPTC | 500   | S              | 0.1       | 80   | φ160 | —    | φ110G7 | 4   | φ130 | 4Js9  | 12.8  | φ11F7 | 15 | 25    | 4-M8     |
|              |       | L              | 0.2       | 63   |      | —    |        | 5   |      | 5Js9  | 16.3  | φ14F7 | 14 | 32    |          |
|              |       | M              | 0.4       | 71   |      | —    |        | 4   |      | 6Js9  | 21.8  | φ19F7 | 20 | 42    |          |
|              |       | H              | 0.75      | 80   |      | □170 |        | 5   |      | 4Js9  | 12.8  | φ11F7 | 15 | 25    |          |
| LPTB<br>LPTC | 1000  | S              | 0.2       | 63   | φ160 | —    | φ110G7 | 4   | φ130 | 5Js9  | 16.3  | φ14F7 | 14 | 32    | 4-M10    |
|              |       | L              | 0.4       | 71   |      | —    |        | 5   |      | 6Js9  | 21.8  | φ19F7 | 20 | 42    |          |
|              |       | M              | 0.75      | 80   |      | □170 |        | 4   |      | 8Js9  | 27.3  | φ24F7 | 16 | 52    |          |
|              |       | H              | 1.5       | 90L  |      | —    |        | 5   |      | 31.3  | φ28F7 | 20    | 62 | 4-M12 |          |
| LPTB<br>LPTC | 2000  | S              | 0.4       | 71   | φ160 | —    | φ110G7 | 4   | φ130 | 5Js9  | 16.3  | φ14F7 | 15 | 32    | 4-M8     |
|              |       | L              | 0.75      | 80   |      | —    |        | 5   |      | 6Js9  | 21.8  | φ19F7 | 16 | 42    |          |
|              |       | M              | 1.5       | 90L  |      | —    |        | 4   |      | 8Js9  | 27.3  | φ24F7 | 16 | 52    |          |
|              |       | H              | 2.2       | 100L |      | □200 |        | 4.5 |      | 31.3  | φ28F7 | 20    | 62 | 4-M12 |          |
| LPTB<br>LPTC | 4000  | S              | 0.75      | 80   | φ200 | —    | φ130G7 | 4   | φ165 | 6Js9  | 21.8  | φ19F7 | 20 | 42    | 4-M10    |
|              |       | L              | 1.5       | 90L  |      | —    |        | 5   |      | 8Js9  | 27.3  | φ24F7 | 16 | 52    |          |
|              |       | M              | 2.2       | 100L |      | □200 |        | 4.5 |      | 31.3  | φ28F7 | 20    | 62 | 4-M12 |          |
|              |       | H              | 3.7       | 112M |      | —    |        | 5   |      | 27.3  | φ24F7 | 16    | 52 | 4-M10 |          |
| LPTB<br>LPTC | 6000  | S              | 0.75      | 80   | φ200 | —    | φ130G7 | 4   | φ165 | 6Js9  | 21.8  | φ19F7 | 20 | 42    | 4-M10    |
|              |       | L              | 1.5       | 90L  |      | —    |        | 5   |      | 8Js9  | 27.3  | φ24F7 | 16 | 52    |          |
|              |       | M              | 2.2       | 100L |      | □200 |        | 4.5 |      | 31.3  | φ28F7 | 20    | 62 | 4-M12 |          |
|              |       | H              | 3.7       | 112M |      | —    |        | 5   |      | 27.3  | φ24F7 | 12    | 52 | 4-M10 |          |
| LPTB<br>LPTC | 8000  | S              | 1.5       | 90L  | φ200 | —    | φ130G7 | 4   | φ165 | 8Js9  | 31.3  | φ28F7 | 20 | 62    | 4-M12    |
|              |       | L              | 2.2       | 100L |      | —    |        | 5   |      | 10Js9 | 41.3  | φ38F7 | 45 | 82    |          |
|              |       | M              | 3.7       | 112M |      | □200 |        | 5   |      | 27.3  | φ24F7 | 12    | 52 | 4-M10 |          |
|              |       | H              | 5.5       | 132S |      | □250 |        | 5   |      | 31.3  | φ28F7 | 20    | 62 | 4-M12 |          |
| LPTB<br>LPTC | 12000 | L              | 2.2       | 100L | φ250 | □200 | φ180G7 | 5   | φ215 | 8Js9  | 31.3  | φ28F7 | 20 | 62    | 4-M12    |
|              |       | M              | 3.7       | 112M |      | □250 |        |     |      | 10Js9 | 41.3  | φ38F7 | 45 | 82    |          |
|              |       | H              | 5.5       | 132S |      | □250 |        |     |      | 31.3  | φ28F7 | 20    | 62 | 4-M12 |          |
| LPTB<br>LPTC | 16000 | L              | 3.7       | 112M | φ250 | □200 | φ180G7 | 5   | φ215 | 8Js9  | 31.3  | φ28F7 | 20 | 62    | 4-M12    |
|              |       | M              | 5.5       | 132S |      | □250 |        |     |      | 10Js9 | 41.3  | φ38F7 | 45 | 82    |          |
|              |       | H              | 7.5       | 132M |      | □250 |        |     |      | 31.3  | φ28F7 | 20    | 62 | 4-M12 |          |

## Model No. designation



|                                 | Voltage symbol | Motor specification symbol | Model No. specification                   |
|---------------------------------|----------------|----------------------------|-------------------------------------------|
| Standard specification          | No symbol      |                            | 200V class                                |
|                                 | V              |                            | 400V class                                |
| Different voltage specification | V1             |                            | 380V, 50Hz                                |
|                                 | V2             |                            | 380V, 60Hz                                |
|                                 | V3             |                            | 415V, 50Hz                                |
|                                 | V4             |                            | 460V, 60Hz                                |
| Heat resistance specification   |                | T1                         | 200V class, heat resistance class F, 40°C |
|                                 |                | T2                         | 200V class, heat resistance class F, 60°C |
|                                 |                | T3                         | 200V class, heat resistance class F, 80°C |
|                                 |                | T4                         | 200V class, heat resistance class H, 80°C |
|                                 | V              | T1                         | 400V class, heat resistance class F, 40°C |
|                                 |                | T2                         | 400V class, heat resistance class F, 60°C |
|                                 |                | T3                         | 400V class, heat resistance class F, 80°C |
|                                 |                | T4                         | 400V class, heat resistance class H, 80°C |

|                                                                 | Voltage symbol | Motor specification symbol | Model No. specification                  |
|-----------------------------------------------------------------|----------------|----------------------------|------------------------------------------|
| Different voltage specification + heat resistance specification | V1             | T1                         | 380V 50Hz, heat resistance class F, 40°C |
|                                                                 |                | T2                         | 380V 50Hz, heat resistance class F, 60°C |
|                                                                 |                | T3                         | 380V 50Hz, heat resistance class F, 80°C |
|                                                                 |                | T4                         | 380V 50Hz, heat resistance class H, 80°C |
|                                                                 | V2             | T1                         | 380V 60Hz, heat resistance class F, 40°C |
|                                                                 |                | T2                         | 380V 60Hz, heat resistance class F, 60°C |
|                                                                 |                | T3                         | 380V 60Hz, heat resistance class F, 80°C |
|                                                                 |                | T4                         | 380V 60Hz, heat resistance class H, 80°C |
|                                                                 | V3             | T1                         | 415V 50Hz, heat resistance class F, 40°C |
|                                                                 |                | T2                         | 415V 50Hz, heat resistance class F, 60°C |
|                                                                 |                | T3                         | 415V 50Hz, heat resistance class F, 80°C |
|                                                                 |                | T4                         | 415V 50Hz, heat resistance class H, 80°C |
|                                                                 | V4             | T1                         | 460V 60Hz, heat resistance class F, 40°C |
|                                                                 |                | T2                         | 460V 60Hz, heat resistance class F, 60°C |
|                                                                 |                | T3                         | 460V 60Hz, heat resistance class F, 80°C |
|                                                                 |                | T4                         | 460V 60Hz, heat resistance class H, 80°C |

|                               | Voltage symbol | Motor specification symbol | Model No. specification                               |
|-------------------------------|----------------|----------------------------|-------------------------------------------------------|
| Inverter specification        |                | Z                          | 200V class inverter drive supported                   |
|                               |                | ZV                         | 400V class inverter drive supported <sup>Note 1</sup> |
| Global specification          |                | N                          | 200V class CE-compliant                               |
|                               |                | N2                         | 200V class UL-compliant                               |
|                               |                | N3                         | 200V class CCC-compliant                              |
|                               | V              | N                          | 400V class CE-compliant                               |
|                               |                | N2                         | 400V class UL-compliant                               |
|                               |                | N3                         | 400V class CCC-compliant                              |
| Explosion-proof specification |                | D                          | 200V class d2G4-compliant                             |
|                               | V              | D                          | 400V class d2G4-compliant                             |
| Adapter specification         |                | A                          | Adapter supported                                     |

Note 1) ZV only for double voltage with inverter drive supported.

\* All special specifications of brake motors other than the above shall be expressed as "X."

Contact us for reference delivery time of a lot of 5 units or more (3 units or more in the case of explosion-proof specification).

## Power Cylinder

# Multi series

### Thrust : 4.94kN to 314kN {500kgf to 32000kgf}

This is a power cylinder that allows multiple use of cylinders to completely synchronize by one motor. Compact economy type (LPTB) and thrust detecting type with a safety device (LPTC) are available. Select a type according to the application.

- **Tough configuration**

Operating part to carry a load is separated from the reduce part. There is no change in gear tooth contact due to fluctuation load.

- **multiple use of some units is allowed**

multiple use of some units is allowed by use of an input shaft with sufficient strength.

- **Long life**

Long life is realized by adopting a ball screw with a large load capacity.

- **Swinging operation is allowed**

Since the input shaft and trunnion part have the same shaft center, swing is allowed while linkage operation is performed.

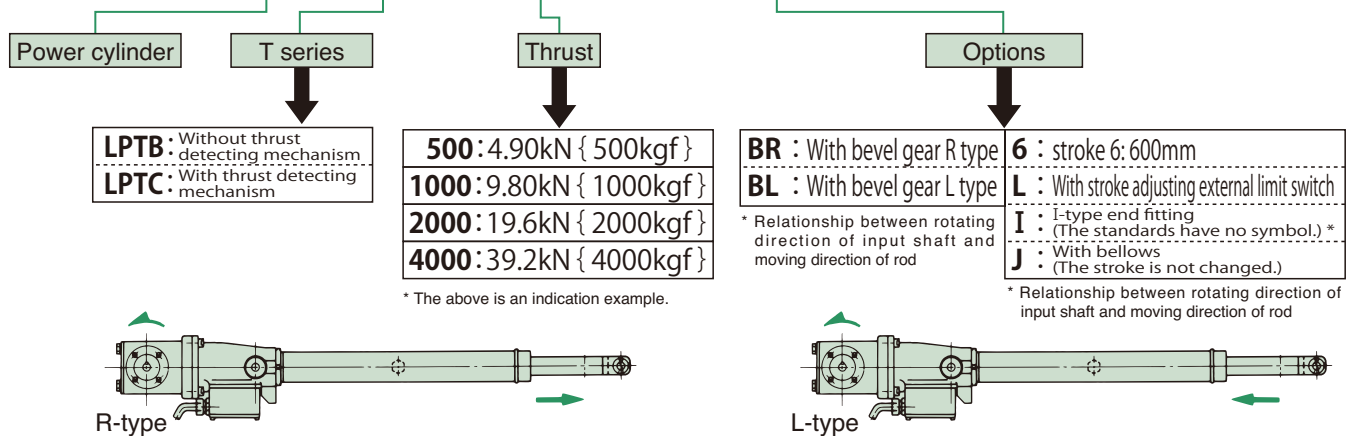
- **Safety**

Thrust detecting mechanism to detect overload and protect can be built in. (LPTC)



## Model No. designation

# LP TB 1000 BR6LIJ



## Standard model list

| Power cylinder model                             |             | LPT500B                          | LPT1000B                         | LPT2000B                         | LPT4000B                                       | LPT6000B            | LPT8000B            | LPT12000B                   | LPT16000B                   | LPT32000B                   |
|--------------------------------------------------|-------------|----------------------------------|----------------------------------|----------------------------------|------------------------------------------------|---------------------|---------------------|-----------------------------|-----------------------------|-----------------------------|
| Rated thrust                                     | kN          | 4.90                             | 9.80                             | 19.6                             | 39.2                                           | 58.8                | 78.4                | 117                         | 156                         | 313                         |
|                                                  | { kgf }     | 500                              | 1000                             | 2000                             | 4000                                           | 6000                | 8000                | 12000                       | 16000                       | 32000                       |
| Screw lead                                       | mm          | 6                                | 8                                | 10                               | 12                                             | 12                  | 16                  | 16                          | 24                          | 24                          |
| Gear ratio                                       |             | 2                                | 2                                | 2                                | 2                                              | 2                   | 2                   | 2                           | 2                           | 2                           |
| Total efficiency                                 | %           | 85.5                             | 85.5                             | 85.5                             | 85.5                                           | 85.5                | 85.5                | 85.5                        | 85.5                        | 85.5                        |
| No-load idling torque                            | N•cm        | 0.74                             | 2.06                             | 5.19                             | 14.7                                           | 23.5                | 108                 | 160                         | 331                         | 624                         |
|                                                  | { kgf •cm } | 0.075                            | 0.21                             | 0.53                             | 1.5                                            | 2.4                 | 11                  | 16.3                        | 33.8                        | 63.7                        |
| Holding torque                                   | N•m         | 1.78                             | 4.74                             | 11.9                             | 28.4                                           | 42.7                | 75.9                | 114                         | 228                         | 455                         |
|                                                  | { kgf •m }  | 0.18                             | 0.48                             | 1.21                             | 2.90                                           | 4.35                | 7.74                | 11.6                        | 23.2                        | 46.4                        |
| Allowable input torque<br>Note 1)                | N•m         | 11.0                             | 29.3                             | 73.2                             | 176                                            | 264                 | 471                 | 353                         | 707                         | 1413                        |
|                                                  | { kgf •m }  | 1.12                             | 2.99                             | 7.47                             | 17.9                                           | 26.9                | 48.1                | 36.1                        | 72.2                        | 144.2                       |
| Required input torque<br>to rated thrust Note 2) | N•m         | 2.74                             | 7.32                             | 18.3                             | 43.9                                           | 65.9                | 118                 | 177                         | 354                         | 707                         |
|                                                  | { kgf •m }  | 0.28                             | 0.75                             | 1.87                             | 4.48                                           | 6.73                | 12.0                | 18.0                        | 36.1                        | 72.1                        |
| Rod movement in<br>one turn of input shaft       | mm          | 3                                | 4                                | 5                                | 6                                              | 6                   | 8                   | 8                           | 12                          | 12                          |
| Maximum input rotation<br>speed Note 3) r/min    | L P T B     | 2400                             | 1800                             | 1080                             | 720                                            | 500                 | 382.5               | 255                         | 180                         | 120                         |
|                                                  | L P T C     | 1200                             | 900                              | 720                              | 420                                            | 300                 | 270                 | 165                         | 120                         | 90                          |
| Rod rotation force<br>at rated thrust            | N•m         | 5.20                             | 13.8                             | 34.7                             | 83.2                                           | 124                 | 222                 | 333                         | 666                         | 1330                        |
|                                                  | { kgf •m }  | 0.53                             | 1.41                             | 3.54                             | 8.49                                           | 12.7                | 22.6                | 34.0                        | 67.9                        | 136                         |
| Stroke                                           | mm          | 200, 300<br>400, 500<br>600, 800 | 200, 300<br>400, 500<br>600, 800 | 200, 300<br>400, 500<br>600, 800 | 200, 300<br>400, 500<br>600, 800<br>1000, 1200 | 500<br>1000<br>1500 | 500<br>1000<br>1500 | 500<br>1000<br>1500<br>2000 | 500<br>1000<br>1500<br>2000 | 500<br>1000<br>1500<br>2000 |
|                                                  |             |                                  |                                  |                                  |                                                |                     |                     |                             |                             |                             |
| Approximate weight                               | kg          | 21~25                            | 25~35                            | 39~51                            | 102~137                                        | 122~174             | 187~256             | 206~318                     | 337~502                     | 1130~1490                   |

Note 1) Allowable torque for only input shaft. (Check this torque before multiple operation.)

Note 2) Values including no-load idling torque.

Note 3) When intending to use exceeding the maximum input rotation speed, consult us beforehand.

Note 4) When using at half of the rated thrust or lower, consult TEM because of different idle torque at no load.

## Standard use environment

| Environment  | Ambient temperature | Impact resistance value |
|--------------|---------------------|-------------------------|
| Outdoor type | -20°C to 80°C       | 3 G or less             |

1) This use environment shows values for the power cylinder body only. For a driving part other than this standard, consider separately.

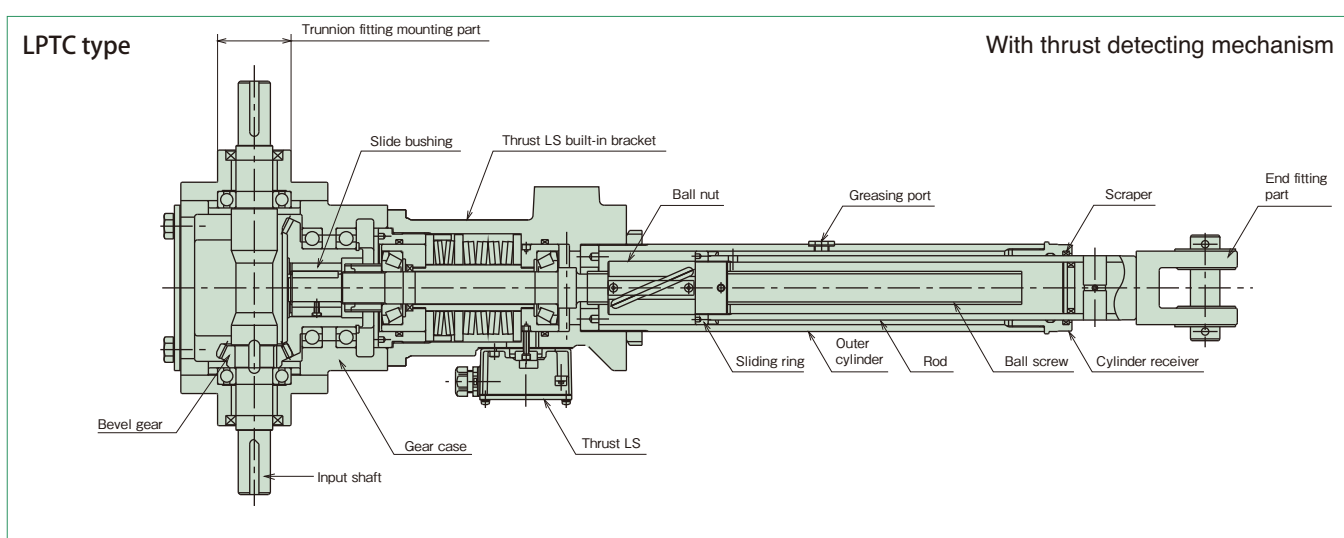
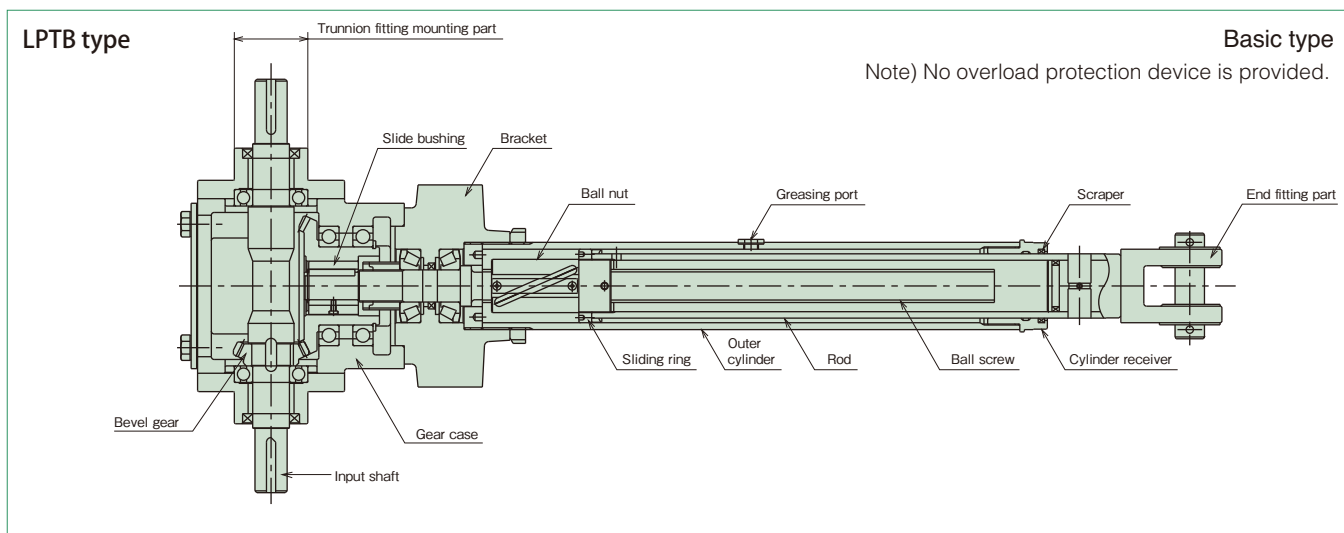
2) Power cylinders with bellows are recommended in an excessively dusty location.

3) For locations exposed to sea breezes and salt, it is possible for some specifications such as painting specifications, structure of adjusting limit switch to be changed.

## Painting color

TSUBAKI olive gray (Munsell 5GY6/0.5 Approximate color)

## Structure



\* Structure slightly varies depending on model.

**Operating part** — The operating part uses a ball screw to convert rotating force into linear motion. And this part is equipped with an external limit switch for stroke adjustment. Adopts a ball screw of high transmission efficiency and high load capacity, and has features of long life and easy maintenance. The stroke can be freely adjusted by the external limit switch. Additionally, the bellows are extremely weather resistant and the stroke does not change, even when fitted.

**Reducer part** — The reducer part adopts a spiral bevel gear, and has high transmission capacity due to special heat treatment. The spiral gear is supported by a dedicated bearing so there is no thrust force effect. Therefore the tooth contact does not change even with load variation. Transmission capacity is also ensured. Since the input shaft and trunnion fitting have the same shaft center, swing motion is allowed. Lubrication for the reducer part is a grease bath type.

## Classification of usage for LPTB and LPTC types

Both types of the power cylinders have the same basic functions (thrust, speed, stroke), however, the features of each mechanism will differ. Read the following to select the optimum type.

### TB type

#### ● Basic type (without overload protection device)

\* For mechanical protection and for electric overload detection on the input side, combination with our shock relay is recommended.

### TC type

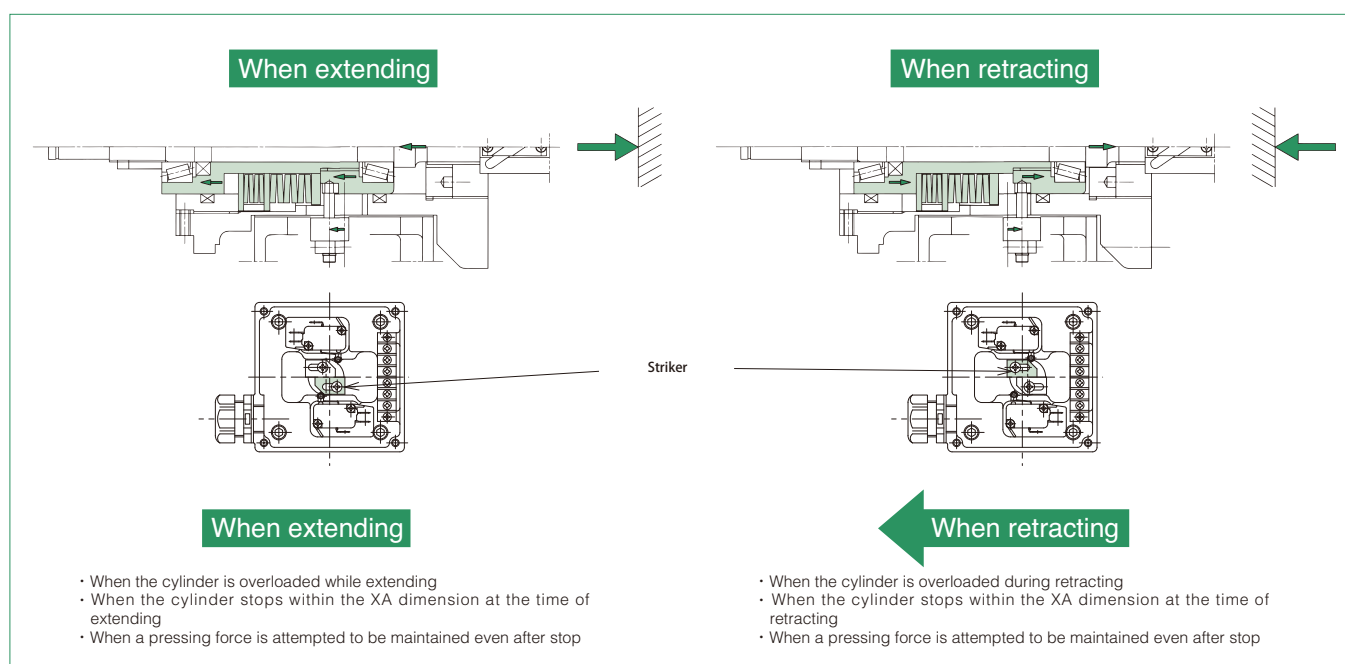
#### ● Thrust detecting mechanism type

This type exerts its effect in the following cases.

- ① When performing press (pull) stop
  - ② When requiring electric signal at overload
  - ③ When overload is possibly applied from load side during stoppage
- When overload is impulsively applied, the incorporated spring deflects to absorb an impact load.

#### [Thrust detecting mechanism]

This is a thrust detecting mechanism which combines two types of pre-loaded disc springs whose spring constants are different from each other and limit switches. The combination effect of these disc springs also allows for press and stop of high speed type. (There is only one type for the 6000 type or larger.)



## Cautions for use

#### ● When pressing (pulling) and stopping at high frequency

When using the power cylinder at a frequency of ten or more times a day, refer to the reference total stop times for each model in the table below.

| Type                                                 | LPTC250~LPTC4000 |    |   | LPTC6000~LPTC32000 |   |   |
|------------------------------------------------------|------------------|----|---|--------------------|---|---|
|                                                      | S,L              | M  | H | S,L                | M | H |
| Reference total stop times (x 10 <sup>4</sup> times) | 30               | 10 | 5 | 10                 | 3 | 1 |

Note) When the power cylinder is used with press (pull) stop and with internal stop, the wire connection for the brake is recommended to be external wiring.

Note) When the power cylinder is used exceeding the value in the above table, it is recommended to stop with the stroke adjusting LS, however, when press (pull) stop, or internal stop is required due to circumstances of the equipment, consult us.

Note) When the power cylinder is used with press (pull) stop, strength of the mating equipment shall be 250% or more of the rated thrust.

#### ● When multiple operation run or stroke position control is performed

When there is a problem with movement of the rod even if overload is applied from load side during stop

For the TC type, a spring mechanism is built in the operating part, therefore, when a large load is applied from the load side, the spring deflects and the rod moves by the degree of deflection.

When the load is eliminated, the rod returns to the original position.

## Selection of cylinder

### Conditions of use required for selection

1. Machine to be used and application
2. Thrust or load N { kgf }
3. Stroke mm
4. Speed mm/s
5. Frequency of operation, number of cycles/min.
6. Hours of operation and annual number of operating days
7. Type of load of machine used
8. Environment of use

### Selection procedures

1. Select either one of LPTB or LPTC according to the application.
2. Determine an operation factor from characteristics of load, and machine to be used.
3. Determine annual traveling distance from the stroke, frequency of operation and hours of operation.

$$\text{Annual traveling distance (km)} = \text{Actual stroke (m)} \times \text{Frequency of use/day} \times \text{number of operating days} \times 10^{-3}$$

4. If load greatly varies in the middle of the stroke, calculate the equivalent load by the following equation.

$$P_M = \frac{P_{\min} + 2 \times P_{\max}}{3}$$

$P_M$  : Equivalent load N { kgf }  
 $P_{\min}$  : Minimum load N { kgf }  
 $P_{\max}$  : Maximum load N { kgf }

5. Multiply equipment maximum load by operation factor, and for multiple operation, divide by multiple factor and number of multiple units to obtain corrected thrust.

$$\text{Corrected thrust} = \frac{\text{Equipment maximum load} \times \text{operation factor}}{\text{number of multiple units} \times \text{multiple factor}}$$

#### ● Operation factor

| Characteristics of load                                    | Example of machine used                                                                                          | Operation factor |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------|
| Smooth operation without impact<br>Small inertia           | Damper, opening/closing of valve, conveyor switching device                                                      | 1.0~1.3          |
| Operation with light impact<br>Intermediate inertia        | Opening/closing of hopper gate, various transfer equipment, various lifter elevation                             | 1.3~1.5          |
| Operation with large impact and vibration<br>Large inertia | Heavy object conveyance by carriage, buffer for belt conveyor, inversion opening/closing equipment for large lid | 1.5~3.0          |

Note) The above operation factor table shows general guidelines. As such, determine in consideration of operating conditions.

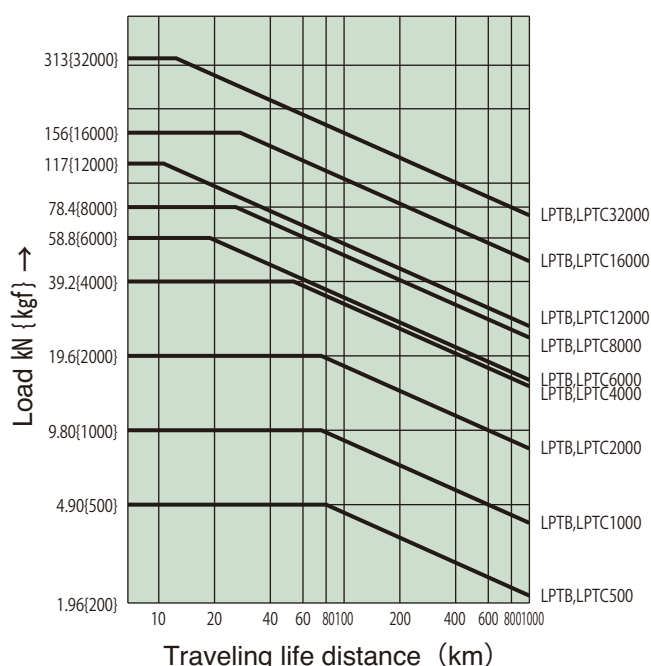
#### ● Multiple factor

| Number of multiple (units) | 2   | 3   | 4   | 5   | 6    |
|----------------------------|-----|-----|-----|-----|------|
| multiple factor            | 1.0 | 1.0 | 1.0 | 0.8 | 0.67 |

Note ) Number of multiple units is up to six units.

6. Select model No. to be used from the standard models based on the corrected thrust and stroke.
7. Calculate life from the load – life chart and compare it with the annual traveling distance to check the life.

Load-Life chart



The life distance has been calculated from  $B_{10}^*$  life.

\*  $B_{10}$  life is a life which 90% or more of a group of the same ball screws which are operated under the same condition expire without flaking.

## Selection of driving source

As a driving motor, motors with a speed reducer, DC motors, servomotors or ball change motors are available. The motor to be used rotates in reverse by load because the power cylinder is highly efficient. Make sure to use a motor with a brake. Use a brake of a spring close type and with brake torque 150% or more.

- Select a driving motor according to the following equation.

Calculate necessary input torque and use a motor which satisfies the calculated torque value.

For specifications of the power cylinder, refer to page 125.

$$T = \frac{W \times \ell}{2 \times \pi \times R \times \eta \times 1000} + \frac{T_0}{100}$$

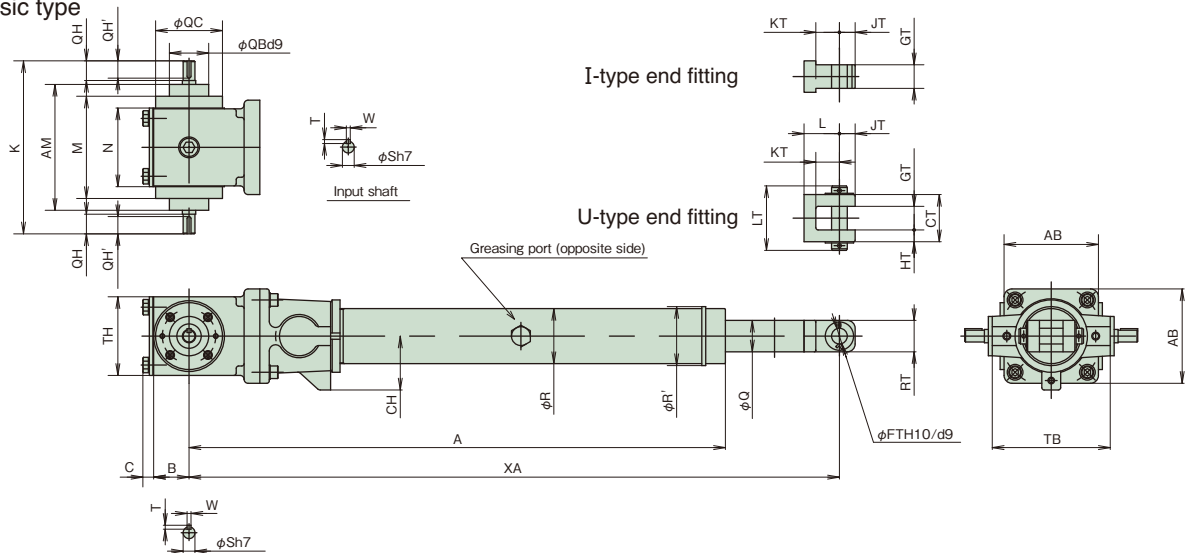
$T$  : Necessary input torque N · m { kgf · m }  
 $W$  : Load N { kgf }  
 $\ell$  : Screw lead mm  
 $R$  : Gear speed ratio=2  
 $\eta$  : Total efficiency=0.855  
 $T_0$  : No-load idling torque N · cm { kgf · cm }

Note) Note that, if any motor of a larger capacity than necessary is used, when it is locked in the course of the stroke, impact load acts on the power cylinder due to rotation energy of the motor, resulting in breakage.

Wire connection should be carried out according to brake individual turnoff.

## Dimensions Table

LPTB basic type



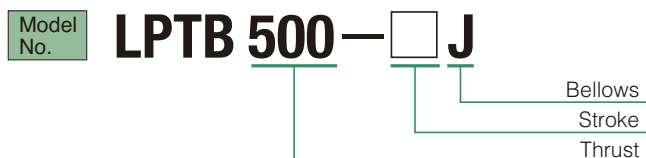
Unit: mm

| Model       | Stroke | Length |          | Input shaft |    |   |    |     |     | Input shaft bracket |     |     |     | Gear case |     |    |    | Bracket inner/outer cylinder |      |     |    |     |     | End fitting |    |    |      |     |    |    |    |    |  |  |  |
|-------------|--------|--------|----------|-------------|----|---|----|-----|-----|---------------------|-----|-----|-----|-----------|-----|----|----|------------------------------|------|-----|----|-----|-----|-------------|----|----|------|-----|----|----|----|----|--|--|--|
|             |        | A      | X<br>MIN | S           | W  | T | QH | QH' | K   | QB                  | QC  | AM  | M   | AB        | TH  | B  | C  | N                            | CH   | TB  | Q  | R   | R'  | RT          | CT | GT | HT   | LT  | KT | L  | JT | FT |  |  |  |
| LPTB<br>500 | 200    | 470    | 565      |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 300    | 570    | 675      |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 400    | 670    | 785      |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 500    | 770    | 895      | 15          | 5  | 5 | 25 | 22  | 220 | 50                  | 85  | 160 | 130 | 120       | 100 | 45 | 14 | 100                          | 68.5 | 130 | 35 | 58  | 63  | 36          | 50 | 25 | 12.5 | 69  | 25 | 35 | 18 | 16 |  |  |  |
|             | 600    | 870    | 1000     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 800    | 1070   | 1220     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
| 1000        | 200    | 500    | 605      |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 300    | 600    | 715      |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 400    | 700    | 825      | 15          | 5  | 5 | 25 | 22  | 220 | 50                  | 85  | 160 | 130 | 120       | 100 | 45 | 14 | 100                          | 48   | 150 | 40 | 70  | 75  | 40          | 60 | 30 | 15   | 82  | 30 | 45 | 20 | 20 |  |  |  |
|             | 500    | 800    | 935      |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 600    | 900    | 1040     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 800    | 1100   | 1260     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
| 2000        | 200    | 560    | 680      |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 300    | 660    | 790      |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 400    | 760    | 900      | 20          | 6  | 6 | 30 | 25  | 270 | 60                  | 110 | 200 | 160 | 130       | 130 | 55 | 17 | 130                          | 71   | 180 | 50 | 76  | 81  | 50          | 70 | 35 | 17.5 | 99  | 40 | 60 | 25 | 25 |  |  |  |
|             | 500    | 860    | 1010     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 600    | 960    | 1115     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 800    | 1160   | 1335     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
| 4000        | 200    | 645    | 780      |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 300    | 745    | 890      |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 400    | 845    | 1000     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 500    | 945    | 1105     | 35          | 10 | 8 | 70 | 60  | 450 | 80                  | 160 | 300 | 230 | 190       | 190 | 80 | 19 | 190                          | 90   | 220 | 70 | 95  | 100 | 70          | 80 | 40 | 20   | 115 | 50 | 75 | 35 | 32 |  |  |  |
|             | 600    | 1045   | 1215     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 800    | 1245   | 1430     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
| 6000        | 1000   | 1445   | 1645     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 1200   | 1645   | 1865     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 1500   | 2175   | 2430     | 35          | 10 | 8 | 70 | 60  | 480 | 80                  | 160 | 330 | 260 | 220       | 220 | 80 | 26 | 220                          | —    | 260 | 80 | 115 | —   | 80          | —  | 45 | —    | —   | 65 | —  | 40 | 40 |  |  |  |
|             | 2000   | 2705   | 3040     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 2500   | 3235   | 3680     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 3000   | 3765   | 4210     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
| 8000        | 500    | 1145   | 1310     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 1000   | 1645   | 1860     | 40          | 12 | 8 | 80 | 70  | 550 | 90                  | 180 | 380 | 300 | 260       | 240 | 90 | 29 | 240                          | —    | 310 | 95 | 130 | —   | 95          | —  | 50 | —    | —   | 70 | —  | 45 | 45 |  |  |  |
|             | 1500   | 2145   | 2410     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 2000   | 2645   | 2910     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
| 12000       | 500    | 1205   | 1390     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |
|             | 1000   | 1705   | 1940     |             |    |   |    |     |     |                     |     |     |     |           |     |    |    |                              |      |     |    |     |     |             |    |    |      |     |    |    |    |    |  |  |  |

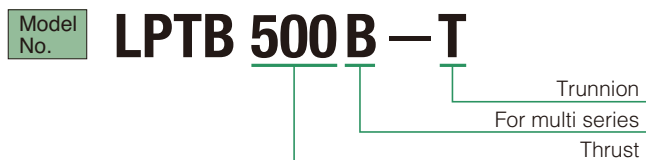


## Options

### Bellows



### Trunnion



### ● Dimensions of bellows

Unit: mm

| LPTB<br>LPTC | 500 | 1000 | 2000 | 4000 | 6000 | 8000 | 12000 | 16000 | 32000 |
|--------------|-----|------|------|------|------|------|-------|-------|-------|
| D            | 90  | 90   | 90   | 120  | 135  | 150  | 180   | 210   | 250   |

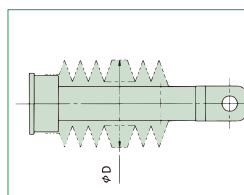


Fig. 1

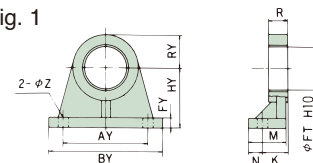
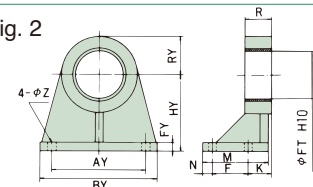


Fig. 2



### ● Multi series trunnion fitting

Unit: mm

| Model        |             | Applicable body model No. | AY  | BY | FY  | HY  | RY  | FT  | F   | K   | M  | N  | R  | Z      | Form   | Mass (kg) |      |
|--------------|-------------|---------------------------|-----|----|-----|-----|-----|-----|-----|-----|----|----|----|--------|--------|-----------|------|
| LPTB500B-T   | LPTB 500B   | 130                       | 180 | 15 | 150 | 40  | 50  | —   | 45  | 65  | 25 | 15 | 18 | Fig. 1 |        | 5.7       |      |
|              | LPTC 1000B  |                           |     |    |     |     |     |     |     |     |    |    |    |        |        |           |      |
| LPTB2000B-T  | LPTB 2000B  | 150                       | 200 | 15 | 170 | 50  | 60  | —   | 45  | 65  | 25 | 20 | 18 |        |        | 9.4       |      |
| LPTB4000B-T  | LPTB 4000B  | 180                       | 240 | 20 | 170 | 70  | 80  | —   | 55  | 80  | 30 | 35 | 22 |        | Fig. 2 |           | 22.8 |
|              | LPTC 6000B  |                           |     |    |     |     |     |     |     |     |    |    |    |        |        |           |      |
| LPTB8000B-T  | LPTB 8000B  | 250                       | 320 | 25 | 280 | 80  | 90  | 80  | 80  | 185 | 35 | 40 | 27 |        |        |           | 60.5 |
|              | LPTC 12000B |                           |     |    |     |     |     |     |     |     |    |    |    |        |        |           |      |
| LPTB16000B-T | LPTB 16000B | 320                       | 400 | 30 | 320 | 100 | 120 | 90  | 90  | 210 | 40 | 50 | 33 |        |        | 95.7      |      |
| LPTB32000B-T | LPTB 32000B | 400                       | 500 | 35 | 380 | 160 | 200 | 120 | 120 | 275 | 50 | 80 | 45 |        |        | 220.0     |      |

\* Note that there are some models which may interfere with the bracket in an installation method in which the trunnion fitting installation face is on the cylinder end.

## Limit switch specifications

|                                   | Stroke adjusting external LS   | Thrust detecting LS (LPT16000 or less) |                                            | Thrust detecting LS (LPT32000)       |                                            |
|-----------------------------------|--------------------------------|----------------------------------------|--------------------------------------------|--------------------------------------|--------------------------------------------|
| Limit switch type                 | WLCA2(OMRON) or equivalent     | V-165-1AR5(OMRON) or equivalent        |                                            | Z-15GW22-B(OMRON) or equivalent      |                                            |
| Electric capacity                 | 250V AC 10A (cosφ=0.4)         | 250V AC 10A (cosφ=0.4)                 |                                            | 250V AC 10A (cosφ=0.4)               |                                            |
| Contact configuration             | NC 1 —●— 4 NO<br>NC 2 —●— 3 NO | Retracting side                        | Extending side                             | Retracting side                      | Extending side                             |
|                                   |                                | Red —φ3—<br>Black —φ1—<br>White —φ2—   | 4 —φ— Green<br>5 —φ— Yellow<br>6 —φ— Brown | Red —φ3—<br>Black —φ1—<br>White —φ2— | 4 —φ— Green<br>5 —φ— Yellow<br>6 —φ— Brown |
| (Applicable cable outer diameter) | SCS-10B (φ8.5~φ10.5) PF1/2     | SCL-14A (φ10.5~φ12.5) PF1/2            |                                            | SCS-14A (φ10.5~φ12.5) PF1/2          |                                            |

## Electric wiring

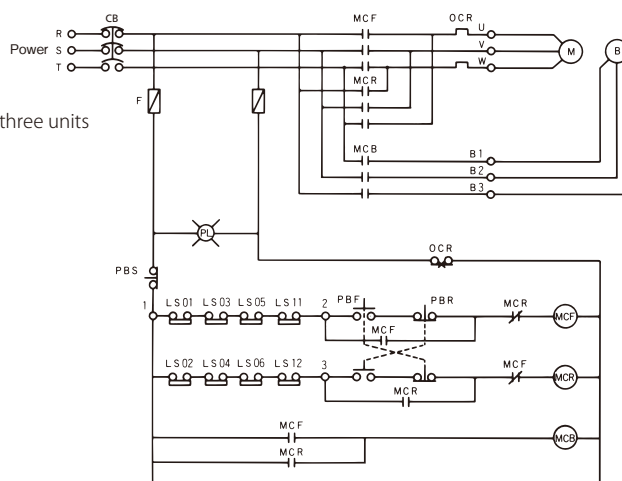
An electric wiring diagram is shown on the right.

Carry out sequence as a guide.

LS01, LS03, LS05 Extending side thrust detecting limit switch  
 LS02, LS04, LS06 Retracting side thrust detecting limit switch  
 LS11, LS12 Stroke adjusting limit switch

Linkage of three units

### ● Power cylinder reference circuit



## Maintenance and inspection

### Greasing on ball screw

Use the ball screw as it is because it has been lubricated with grease in advance. Refill grease with reference to the Table below as a guide. To apply grease to the ball screw, remove the greasing port bolt on the outer cylinder and advance the rod in the full stroke and apply grease to the outer circumference of the screw with a grease gun.

#### ● Lubrication cycle

| Operating frequency   | Lubrication cycle        |
|-----------------------|--------------------------|
| 500 to 1000 times/day | Three to six months      |
| 100 to 500 times/day  | Six months to one year   |
| 10 to 100 times/day   | One to one and half year |

Note) The above values are for longer use, and do not indicate the life.

#### ● Recommended grease

| Use classification | Company name         | Grease name                  |
|--------------------|----------------------|------------------------------|
| Ball screw         | TSUBAKI E&M          | JWGS100G                     |
|                    | IDEMITSU KOSAN       | *DAPHNE EPONEX SRNo.2        |
|                    | NIPPON GREASE        | NIGULUBE EP-2K               |
|                    | EXXON MOBILE         | MOBILUX EPNNo.2              |
|                    | COSMO OIL LUBRICANTS | COSMO GREASE DINAMAX EPNNo.2 |
|                    | SHOWA SHELL          | SHELL ALBANIA EP grease 2    |

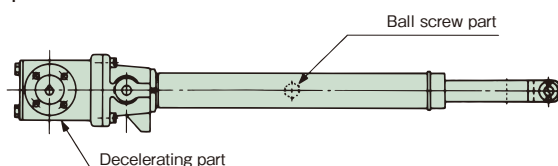
\* The above greases are filled before shipment.

Note) JWGS100G is separately sold in a container of 100g.

### Greasing on Reduction part

For the gear and the bearing in the reducer part, the gear case is filled with grease. Accordingly, it is not necessary to grease because they normally endure use for one year or longer. However, operation for a long time or use after long storage impairs lubrication effect due to deterioration of grease. As such, inspect and fill the grease.

#### Inspection location



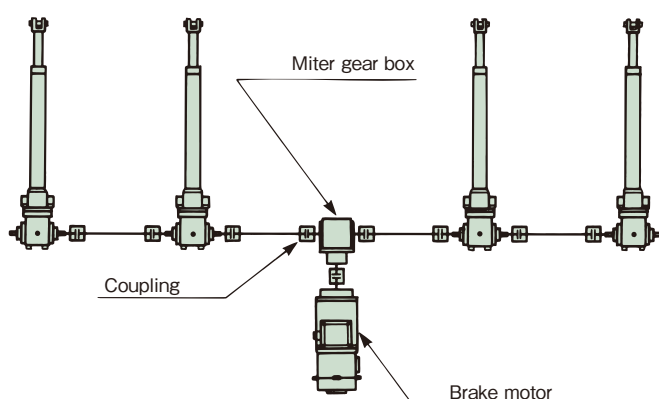
#### ⚠ WARNING

Never insert your finger into the greasing port.  
If the cylinder operates with your finger inserted, your finger may be injured.

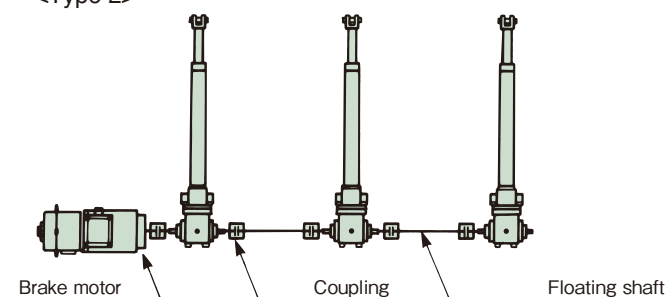
### Synchronizing operation

Multi series has a feature to ensure synchronization of multiple power cylinders. Refer to the layout shown below to plan synchronizing operation.

#### <Type 1>



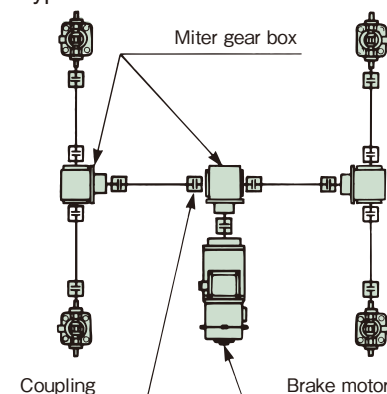
#### <Type 2>



#### Image



#### <Type 3>



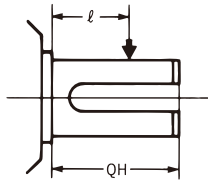
# **WARNING**

## **■ Cautions for selecting**

- The LPTB type of the multi series is not equipped with an overload protecting function. If an overload protecting function is required on the cylinder main body, select the LTPC type.
- If this cylinder is used for press contact or pull contact stopping, the strength of the mating equipment side must be 300% or more of the rated thrust.
- When installing a sprocket, a gear or a pulley on the input or output shaft, check that an overhang load acting on the shaft is less than the allowable overhang load.

$$\text{Allowable O. H. L.} \geq \frac{T \cdot f \cdot L f}{R}$$

O.H.L. : O. H. L: Overhang load (N { kgf })  
 T : Load torque (N·m { kgf·m })  
 f : Transmission element factor  
 Lf : Factor by load acting position  
 R : Pitch circle radius of sprocket, gear, V pulley (m)



QH : Length of shaft  
 l : Load acting position

### ● Transmission element factor (f)

|           |      |
|-----------|------|
| Sprocket  | 1.00 |
| Gear      | 1.25 |
| V belt    | 1.50 |
| Flat belt | 2.50 |

### ● Factor by load acting position (Lf)

| l/QH | 0.25 | 0.38 | 0.5 | 0.75 | 1 |
|------|------|------|-----|------|---|
| Lf   | 0.8  | 0.9  | 1   | 1.5  | 2 |

● Table 1

| Power cylinder model    |         | LPTB,TC<br>500 | LPTB,TC<br>1000 | LPTB,TC<br>2000 | LPTB,TC<br>4000 | LPTB,TC<br>6000 | LPTB,TC<br>8000 | LPTB,TC<br>12000 | LPTB,TC<br>16000 | LPTB,TC<br>32000 |
|-------------------------|---------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|
| Allowable overhang load | N       | 549            | 1.06k           | 1.95k           | 3.49k           | 4.60k           | 6.75k           | 8.85k            | 14.0k            | 22.3k            |
|                         | { kgf } | { 56 }         | { 108 }         | { 199 }         | { 356 }         | { 469 }         | { 689 }         | { 903 }          | { 1430 }         | { 2280 }         |

## **■ Cautions for installation**

- Securely carry out centering between the center of the trunnion fitting and the center of the end fitting mount part. Prevent lateral load from acting on the cylinder due to swing particularly when the cylinder operates.
- Coupling is recommended to couple the input shaft and the driving shaft. Use a type of coupling including chain coupling, gear coupling and disk coupling which can absorb misalignment.
- Note that, if the floating shaft of the coupling to couple the driving part and cylinders is long, vibration may be generated by its rotation. Consider together with rigidity of the floating shaft and backlash of the coupling.
- Apply grease to the connecting pin on the end fitting.
- All models are totally enclosed structures so that they can be used normally outdoors, however, under adverse conditions exposed to constant water and steam etc., and snow accumulation, although they are an outdoors type, an appropriate cover is required. The power cylinder can generally be used in a range of -20°C to 40°C, although it varies depending on the conditions of use. When using at 40°C or higher, always protect with a heat insulating cover, etc. Never use in a flammable atmosphere, otherwise it may cause an explosion and fire. In addition, avoid using it in a location where vibration or shock exceeding 1G is applied.
- For use in a misty atmosphere, contact us.

## **■ Cautions for use**

- Regulate both ends of the stroke by the limit switch. Select a type of option which allows the limit switch to be mounted on the power cylinder body.
- Use within the stroke range. If the stroke is exceeded, breakage may occur.
- If the power cylinder multi series is used at high speed, since the coasting distance is long, the striker may override the limit switch. For this reason, make sure to allow the limit signal to be self-held on the control circuit.
- Anti-rod rotation is required because a rotating force is generated on the rod with thrust. The rod rotating force at the rated thrust is described in the model list. When operating with the end unconnected or when installing pulleys to pull a rope, contact us since a rod anti-rotation specification is also available.
- Adjustment of the limit switch for thrust detection of TC type must not be carried out by the customer. The preset value for thrust detection may greatly change.

## Power Cylinder

# Mini series

**Thrust : 98.0N to 392N {10kgf to 40kgf}**

This series is suitable for automation with small force near by for the packaging machine and transfer machine, etc.

- **With single-phase power source is available**

This can be readily used only with a single-phase power source and ancillary equipment is also unnecessary.

(Power cylinder with three-phase motor or brake motor is also available.)

Power cylinders with a potentiometer are optimum for remote operation.

- **Long life design**

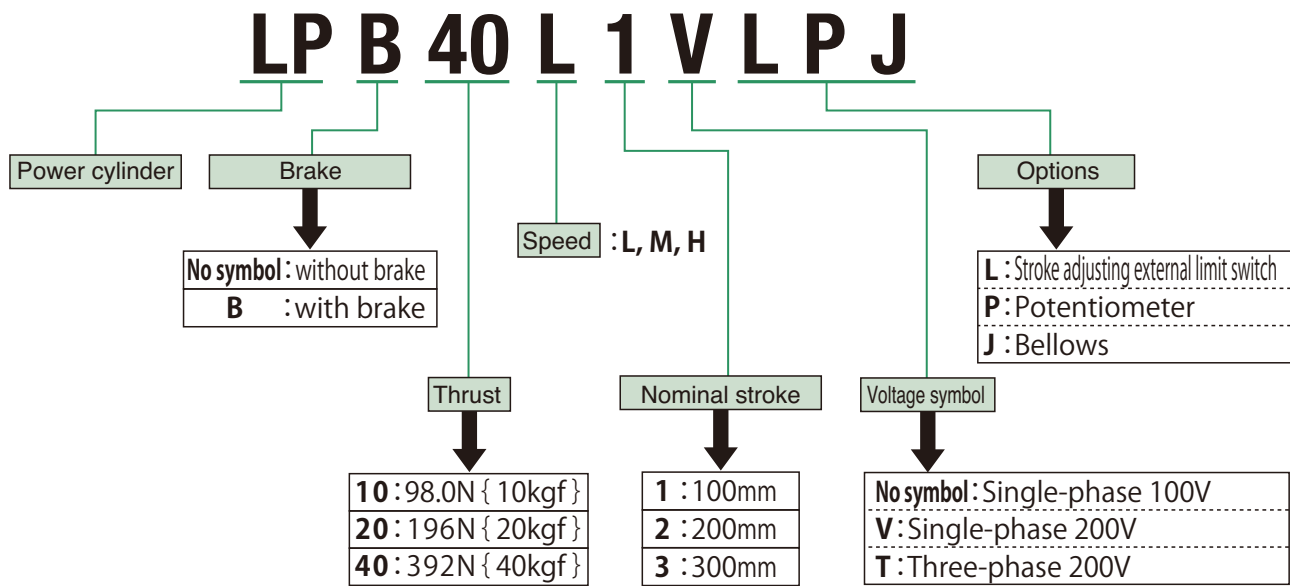
Long life design with a die cast structure, grease hermetically sealed type and large screw diameter.

- **Wide variety of options**

Wide variety of options such as adjusting limit switches, potentiometers, bellows and trunnion fitting are also available.



## Model No. designation



\* Specify LP040-T as a trunnion fitting.

\* Power cylinders with a three-phase motor and with a brake motor are also available. (Refer to page 139 through 140.)

\* Be careful not to make mistakes in motor specifications (power supply, voltage and presence or absence of brake).

## Standard model list

| Model No.  |                                                |                    |                                                                      | Rated thrust |         | Rated speed<br>mm/s<br>50/60Hz | Stroke<br>mm* |
|------------|------------------------------------------------|--------------------|----------------------------------------------------------------------|--------------|---------|--------------------------------|---------------|
| Basic type | With stroke adjusting<br>external limit switch | With potentiometer | With stroke adjusting<br>external limit switch<br>With potentiometer | N            | { kgf } |                                |               |
| LP 10H1    | LP 10H1L                                       | LP 10H1P           | LP 10H1LP                                                            | 98.0         | 10      | 34/42                          | 100           |
| LP 10H2    | LP 10H2L                                       | LP 10H2P           | LP 10H2LP                                                            |              |         |                                | 200           |
| LP 10H3    | LP 10H3L                                       | LP 10H3P           | LP 10H3LP                                                            |              |         |                                | 300           |
| LP 20M1    | LP 20M1L                                       | LP 20M1P           | LP 20M1LP                                                            | 196          | 20      | 17/21                          | 100           |
| LP 20M2    | LP 20M2L                                       | LP 20M2P           | LP 20M2LP                                                            |              |         |                                | 200           |
| LP 20M3    | LP 20M3L                                       | LP 20M3P           | LP 20M3LP                                                            |              |         |                                | 300           |
| LP 40L1    | LP 40L1L                                       | LP 40L1P           | LP 40L1LP                                                            | 392          | 40      | 9/11                           | 100           |
| LP 40L2    | LP 40L2L                                       | LP 40L2P           | LP 40L2LP                                                            |              |         |                                | 200           |
| LP 40L3    | LP 40L3L                                       | LP 40L3P           | LP 40L3LP                                                            |              |         |                                | 300           |

\* Mini-series does not take stroke margin into consideration.

## Motor specifications

|                         |                                                                                                            |       |                                                                                                             |       |
|-------------------------|------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------|-------|
| Model                   | Condenser run type reversible motor                                                                        |       |                                                                                                             |       |
| Number of poles, output | 4P 20W (30 min Heat resistance class E)                                                                    |       |                                                                                                             |       |
| Voltage                 | single-phase 100V                                                                                          |       | single-phase 200V                                                                                           |       |
| Frequency               | 50Hz                                                                                                       | 60Hz  | 50Hz                                                                                                        | 60Hz  |
| Current value           | 0.64A                                                                                                      | 0.55A | 0.32A                                                                                                       | 0.28A |
| Condenser capacity      | $10\mu\text{F}$ $\left(\begin{smallmatrix}\text{Withstand voltage} \\ 200\text{V}\end{smallmatrix}\right)$ |       | $2.5\mu\text{F}$ $\left(\begin{smallmatrix}\text{Withstand voltage} \\ 400\text{V}\end{smallmatrix}\right)$ |       |
| Protecting structure    | Totally enclosed type (Indoor type)                                                                        |       |                                                                                                             |       |

## Painting color

TSUBAKI olive gray (Munsell 5GY6/0.5 or approximate color)

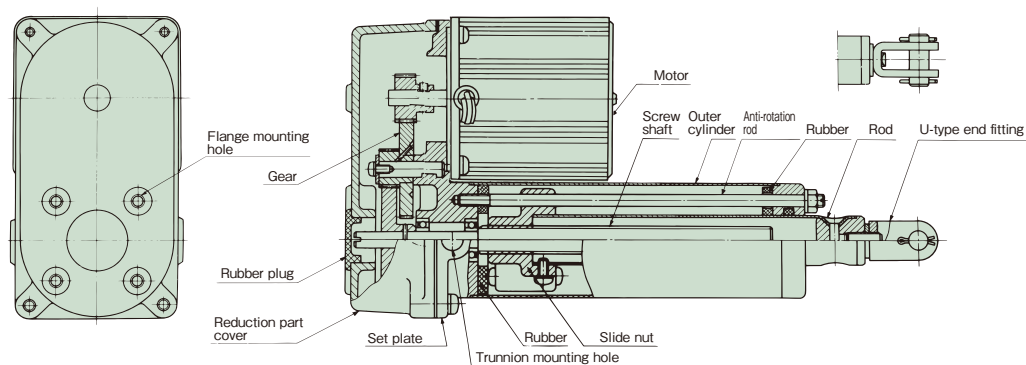
## Standard use environment

| Environment             | Model | Indoor type                                                                                                                                                             |
|-------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature     |       | −15°C to 40°C                                                                                                                                                           |
| Relative humidity       |       | 85% or less (No dew condensation)                                                                                                                                       |
| Impact resistance value |       | 1G or less                                                                                                                                                              |
| Installation altitude   |       | 1000m or lower above sea level                                                                                                                                          |
| Atmosphere              |       | Indoor location which is not directly exposed to rain, wind, lightning or sunlight. Extent of sand and dust which exist in general factory (5mg/m <sup>3</sup> or less) |
| Remark                  |       | Power cylinders with bellows are recommended in an excessively dusty location.                                                                                          |

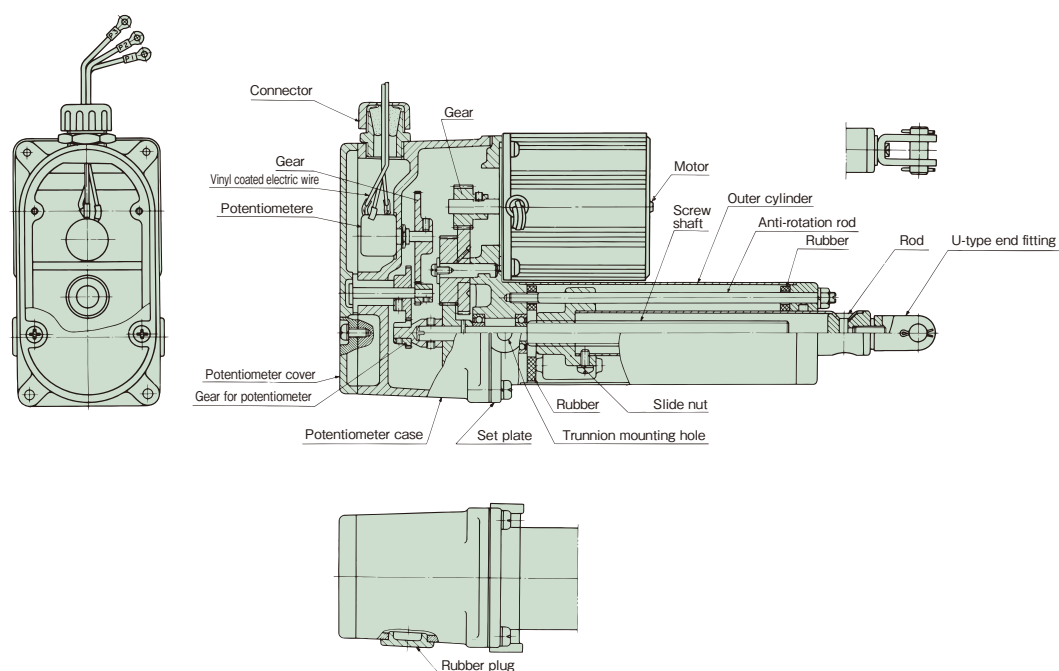
Note) This cylinder cannot be used outdoors.

## Structure

### Basic type



### With potentiometer



**Feature** ————— Power cylinder in a small thrust zone operable with a single-phase power source. Various motors including not only single-phase motors but also three-phase motors or brake motors can be selected.

Since the cylinder body incorporates an anti-rotation function, the cylinder can be used as it is even if used with the end set free.

The model with a potentiometer basically built-in a potentiometer. As the potentiometer is rotated via small gear by rotation of the screw shaft, potentiometer output proportional to the stroke can be obtained.

## Selection

### Conditions of use required for selection

1. Machine to use and application
2. Thrust or load N { kgf }
3. Stroke mm
4. Speed mm/s
5. Frequency of operation, number of cycles/min.
6. Power source voltage, frequency

### Selection procedure

#### Model selection

Determine a model (basic type, with stroke adjusting external limit switch, with potentiometer) according to the application.

#### Selecting model No.

Select an applicable model No. from the standard model list (Page 135) based on the thrust or load (N{kgf}), stroke (mm), and speed (mm/s).

#### Characteristics check

Use the power cylinder at an operating frequency below the allowable operating frequency (Table 1).

Table 1 Allowable operating frequency (Number of cycles/min)

| 10H1 | 10H2 | 10H3 | 20M1 | 20M2 | 20M3 | 40L1 | 40L2 | 40L3 |
|------|------|------|------|------|------|------|------|------|
| 6    | 3    | 2    | 3    | 1.5  | 1    | 1.5  | 1    | 0.5  |

## Installation

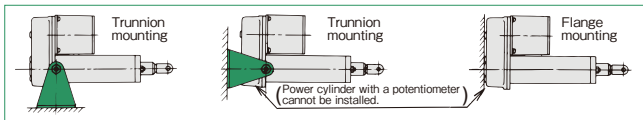
### Installation direction

Either horizontal, vertical and inclined direction is allowed.

### Installation method

For installation of the main body, use trunnion fitting (separately sold attachment). (page 139)

Apply grease to the trunnion pin and bracket hole before mounting. Use tap holes (4-M6) on the reducer part cover to install flange, and use U-shape end fitting or tap hole (M8) for installation of the end.



### Installation of external limit switch

1. For power cylinders without a limit switch, separately install a limit switch to regulate the stroke.
2. Check the coasting amount before determination of the mounting position. The coasting amount is approximately 3 to 6mm.
3. Set the limit switch so that the cylinder stops within L dimension in the dimensions table when using in the full nominal stroke.
4. Minimum preset value of the stroke is 60mm.

### Vibration insulation treatment

Load is retained by a self-lock system of the trapezoidal screw. However, since secure retention may be difficult in a vibration conveying location, carry out vibration proofing treatment or select a power cylinder with a brake.

### Manual operation

Remove the rubber plug on the reducer part and turn the shaft with a screwdriver. When it is turned clockwise, the rod retracts to move by 3mm per one turn. The power cylinder with a potentiometer cannot be manually operated.

### Lateral load on rod

Install the power cylinder so as to prevent a bending load (lateral load) from acting on the rod.

## Lubrication

This is of a grease lubrication type. As the power cylinder is applied with grease before shipment, use as it is.

Refill grease with reference to Table 2-3 as a guide when temperature rises or noise increases.

For greasing it is necessary to disassemble the main body since there is no greasing port. For disassembling method, contact us separately.

Table 2 Recommended grease

| Company name              | Grease name         |
|---------------------------|---------------------|
| SUMICO LUBRICANT CO., LTD | Moly gear grease    |
| DOW CORNING               | Moly coat EP grease |

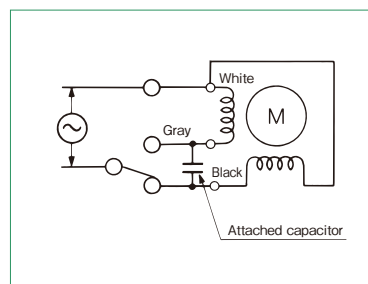
Note) Use the same grease for the screw and the reducer part.

Table 3 Lubrication cycle

| Operating frequency   | Lubrication cycle           |
|-----------------------|-----------------------------|
| 500 to 1000 times/day | Three to six months         |
| 100 to 500 times/day  | Six months to one year      |
| 10 to 100 times/day   | One to one and a half years |

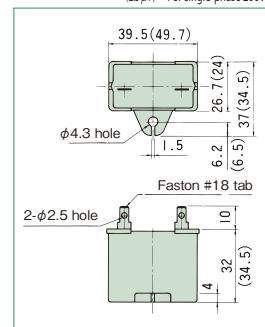
Note) The above values are for longer use, and do not indicate the life.

## Wire connection



For retracting, turn the switch in reverse.

Attached capacitor 10  $\mu$ F.....For single-phase 100V  
(25  $\mu$ F)---For single-phase 200V



## Limit switch

|                            |                                      |
|----------------------------|--------------------------------------|
| Model                      | D2VW-5L2A-1M (OMRON) or equivalent   |
| Electric rating            | 250V AC 5A (cos $\phi$ 0.7)          |
| Contact configuration (1C) | (Red) NC<br>(Blue) NO<br>(Black) COM |

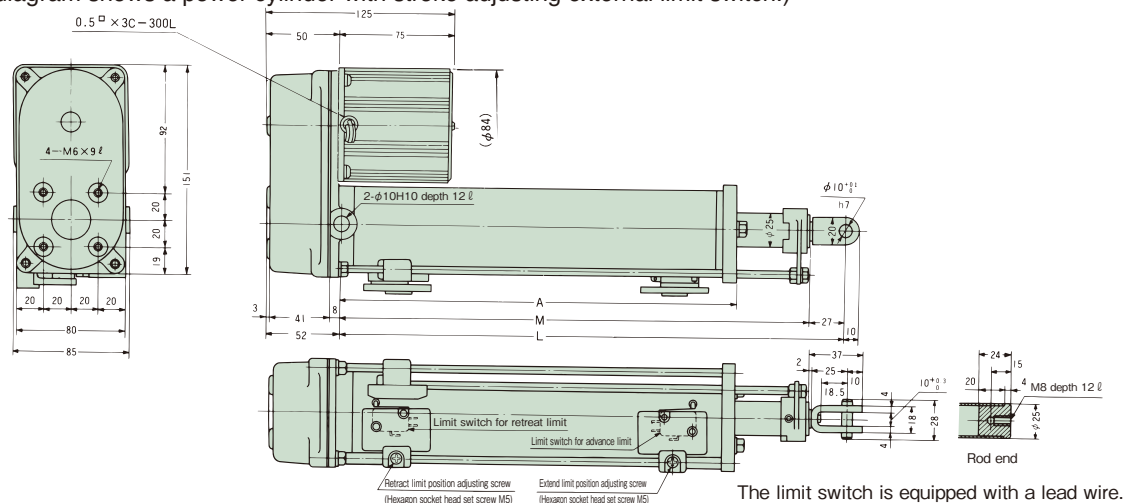
## Potentiometer

|                          |                                                       |
|--------------------------|-------------------------------------------------------|
| Model                    | 22-HHP-10N (SAKAE TSUSHIN KOGYO CO., LTD.) equivalent |
| Resistance value         | 1k $\Omega$                                           |
| Effective electric angle | 3600°                                                 |
| Rated power              | 2W                                                    |
| Withstand voltage        | 1000V AC (1 minute)                                   |

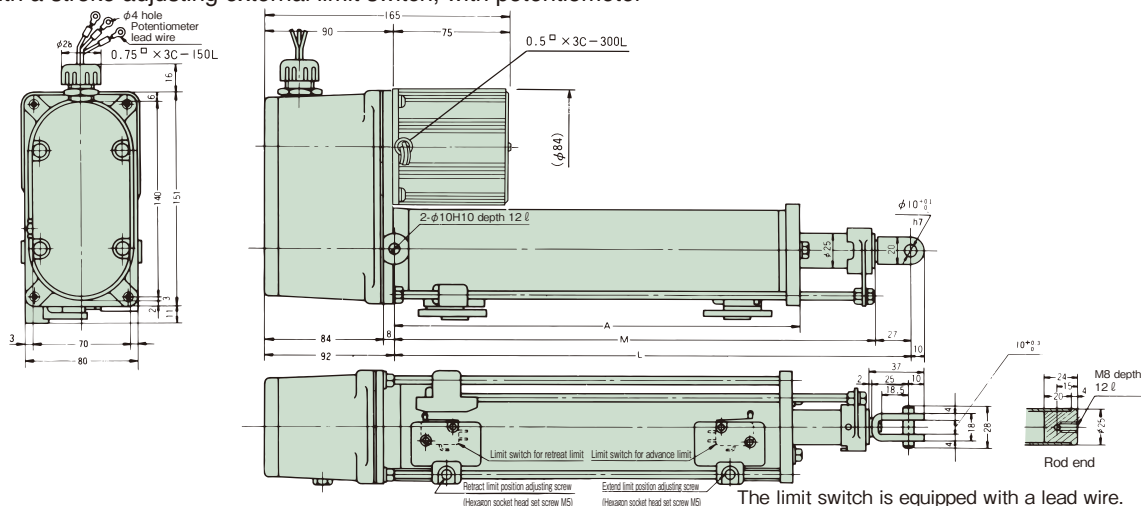
To indicate stroke, use stroke indication meter and print board on page 110.

## Dimensions Table

Basic type (This diagram shows a power cylinder with stroke adjusting external limit switch.)



Power cylinder with a stroke adjusting external limit switch, with potentiometer



Unit: mm

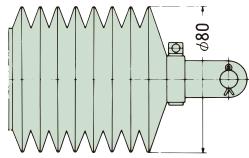
| Stroke | A          |                                                   | M       |              |              | L               |              |         | Approximate mass kg |         |                       |                           |
|--------|------------|---------------------------------------------------|---------|--------------|--------------|-----------------|--------------|---------|---------------------|---------|-----------------------|---------------------------|
|        | Basic type | With stroke<br>adjusting external<br>limit switch | Minimum | With bellows |              | Minimum         |              | maximum | Basic type          | With LS | With<br>potentiometer | With LS,<br>potentiometer |
|        |            |                                                   |         | Minimum      | Stroke       | Without bellows | With bellows |         |                     |         |                       |                           |
| 100    | 176        | 179                                               | 205     | 205<br>(230) | 100<br>(75)  | 232             | 232<br>(257) | 332     | 4.0                 | 4.6     | 5.1                   | 5.6                       |
| 200    | 276        | 279                                               | 305     | 319<br>(348) | 186<br>(157) | 332             | 346<br>(375) | 532     | 4.5                 | 5.1     | 5.6                   | 6.1                       |
| 300    | 376        | 379                                               | 405     | 433<br>(469) | 272<br>(236) | 432             | 460<br>(496) | 732     | 5.0                 | 5.6     | 6.1                   | 6.6                       |

Note) Dimensions in the parentheses indicate a value for power cylinders with a limit switch.

## Options

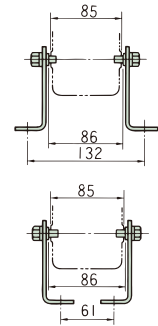
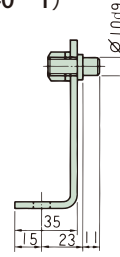
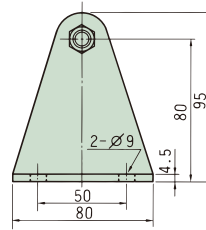
### ■ Bellows ( —J)

Use bellows when equipment is installed in a location exposed to dust or water.



This shows dimension for a cylinder without a limit switch.  
This dimension is  $\phi 65$  for the cylinder with a limit switch.

### ■ Trunnion fitting (LP040—T)



Apply grease to the trunnion pin and trunnion hole before mounting.

## Application

With three-phase motor

### 1. Outline

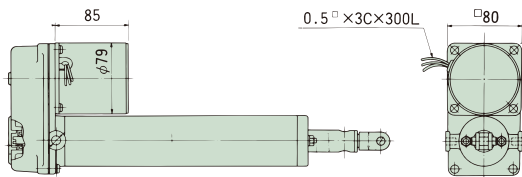
This is a model which can be used with a three-phase power source.

As this motor is of an induction type, the coasting amount slightly increases. Use this model in an application of relatively low frequency.

### 2. Specifications

Same as those of the standard models except for specifications and dimensions of the motor.

<Outside dimension>



### <Specifications of motor>

|                 |                                            |
|-----------------|--------------------------------------------|
| Power           | Three-phase 200V 50/60Hz                   |
| Motor model     | Induction motor                            |
| Time rating     | Continuous                                 |
| Output          | 25W                                        |
| Rated current   | 0.25A                                      |
| Wire connection | <div> </div> <p>Replace any two wires.</p> |

### 3. Model No. designation

**LP40L1T**

Three-phase 200V 50/60Hz

## Application

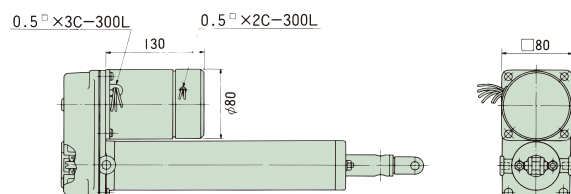
### With brake motor

#### 1. Outline

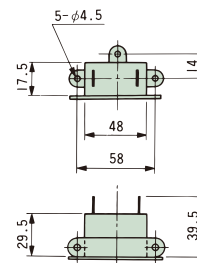
When you want to increase cylinder stop accuracy or reduce the coasting amount, power cylinders with a brake motor are optimum. Load can be securely retained in a vibration conveying location. All brakes retain a load even at power failure because they are of a deenergization type.

#### 2. Specifications

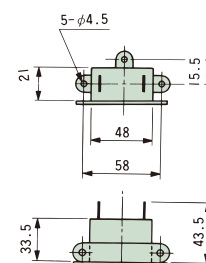
Same as those of the standard models except for specifications and dimensions of the motor.



Outside dimensions of capacitors for single-phase 100V and 200V



For single-phase 100V (10μF)

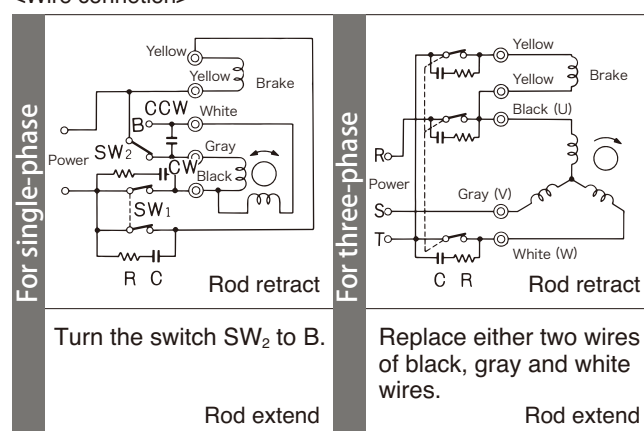


For single-phase 200V (2.5μF)

#### <Specifications of brake motor>

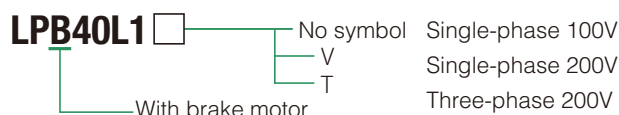
|                         | Single-phase                   |                                | Three-phase       |
|-------------------------|--------------------------------|--------------------------------|-------------------|
|                         | 100V 50/60Hz                   | 200V 50/60Hz                   | 200V 50/60Hz      |
| Power source            | 100V 50/60Hz                   | 200V 50/60Hz                   | 200V 50/60Hz      |
| Motor model             | Condenser run reversible motor | Condenser run reversible motor | Induction motor   |
| Time rating             | 30 minutes                     | 30 minutes                     | Continuous        |
| Output                  | 25W                            | 25W                            | 25W               |
| Rated current           | 0.8A                           | 0.4A                           | 0.25A             |
| Specifications of brake | Power source                   | Single-phase 100V              | Single-phase 200V |
|                         | Input current                  | 12W 0.15A                      | 12W 0.1A          |
|                         | Static friction torque         | 1kgf·cm                        | 1kgf·cm           |

#### <Wire connection>



In the connecting diagram, C.R is a contact protecting CR circuit. Make sure to insert a contact protecting CR as shown in the diagram because the contacts to open/close the brake generate spark when the contacts open/close. C=0.1~0.2μF (400V) R=5~200Ω (1/4 W or less)  
Protecting CR is not attached.

#### 3. Model No. designation





# WARNING

## ■ Cautions for selecting

- Cylinders with bellows are available as an option for dust proofing. Note that the effective stroke is shorter in the case of a cylinder with bellows. For effective strokes, refer to the Dimensions Table.
- This cylinder is not provided with an overload protecting function.
- Even a type without brake calculatory has a self-lock system and retains a load, however, the self-lock system may not work due to vibration or impact. If vibration or impact is given, select a type with a brake.
- For operating frequency, refer to the following table.

Operating frequency: Number of cycles/min

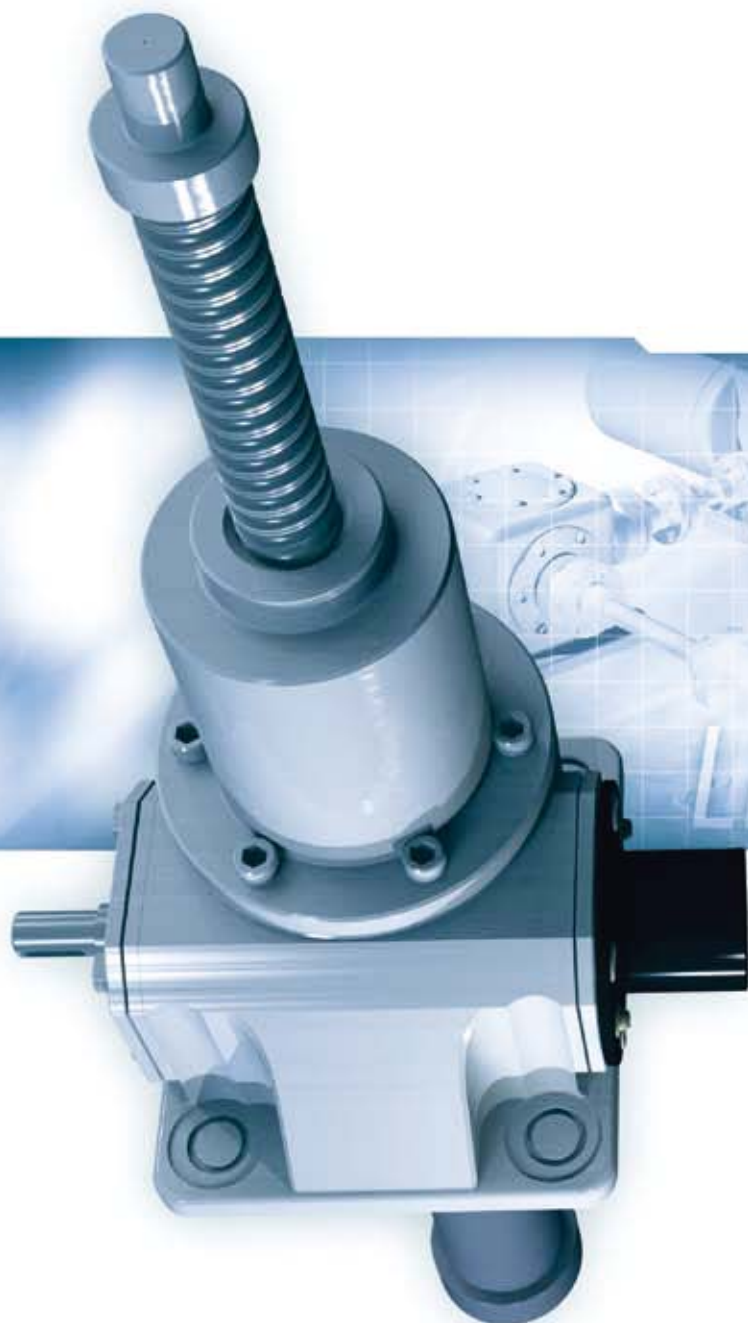
| Model            | LP (B) 10H |     |     | LP (B) 20M |     |     | LP (B) 40L |     |     |
|------------------|------------|-----|-----|------------|-----|-----|------------|-----|-----|
| Stroke           | 100        | 200 | 300 | 100        | 200 | 300 | 100        | 200 | 300 |
| Number of cycles | 6          | 3   | 2   | 3          | 1.5 | 1   | 1.5        | 1   | 0.5 |

## ■ Cautions for installation

- Securely carry out centering between the center of the trunnion fitting and the center of the end fitting mount part. Prevent a lateral load from acting on the cylinder due to swing particularly when the cylinder operates.
- Apply grease to the trunnion pin and the trunnion hole for trunnion mounting.
- Also, apply grease to the connecting pin of the end fitting.
- All models are of ordinary outdoor specification, and it can be used in a location not exposed to water and steam, etc., where dust is in the extent in an ordinary factory. The power cylinder can generally be used in a range of -15°C to 40°C, although it varies depending on the use conditions. When using at 40°C or higher, always protect with a heat insulating cover, etc. Never use in a flammable atmosphere, otherwise it may cause an explosion and fire. In addition, avoid using it in a location where vibration or shock exceeding 1G is applied.

## ■ Cautions for use

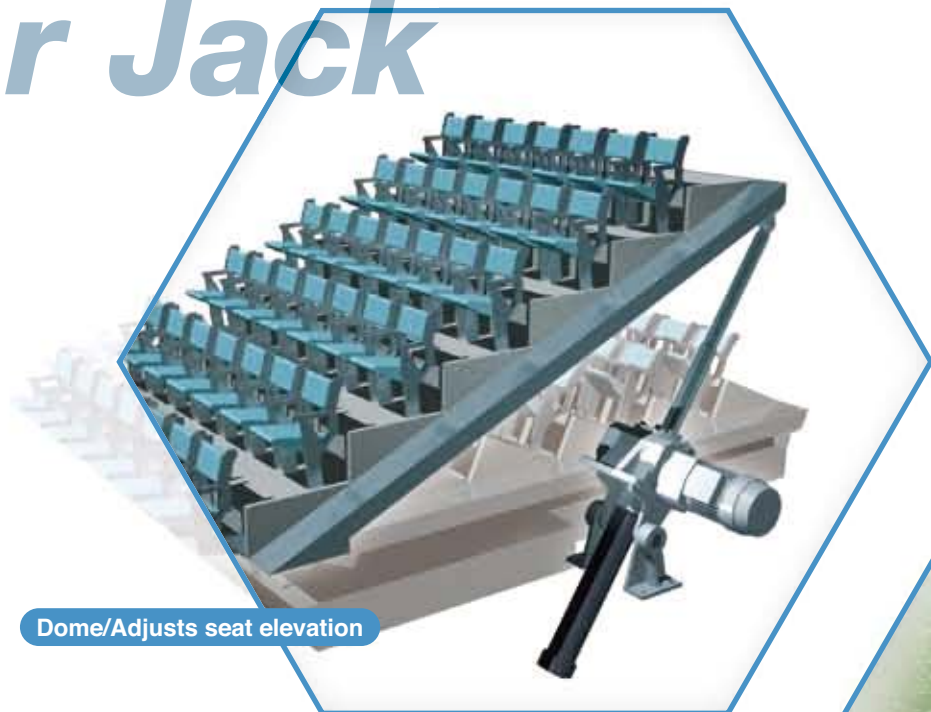
- Do not allow a force (traverse load) bending the rod to act.
- For position adjustment by manual operation, remove the rubber plug (opposite side of the cylinder) on the gear case and turn the end of the screw shaft with a screw driver. When it is turned counterclockwise, the cylinder extends. Make sure to turn OFF the power for manual operation. The power cylinder with potentiometer cannot be manually operated.
- When pressing to an external stopper and stopping the cylinder, place a cushion (such as rubber plate) between them. Operate the limit switch so as not to restrain the motor before pressing against the stopper.



# Linipower Jack

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# Linipower Jack

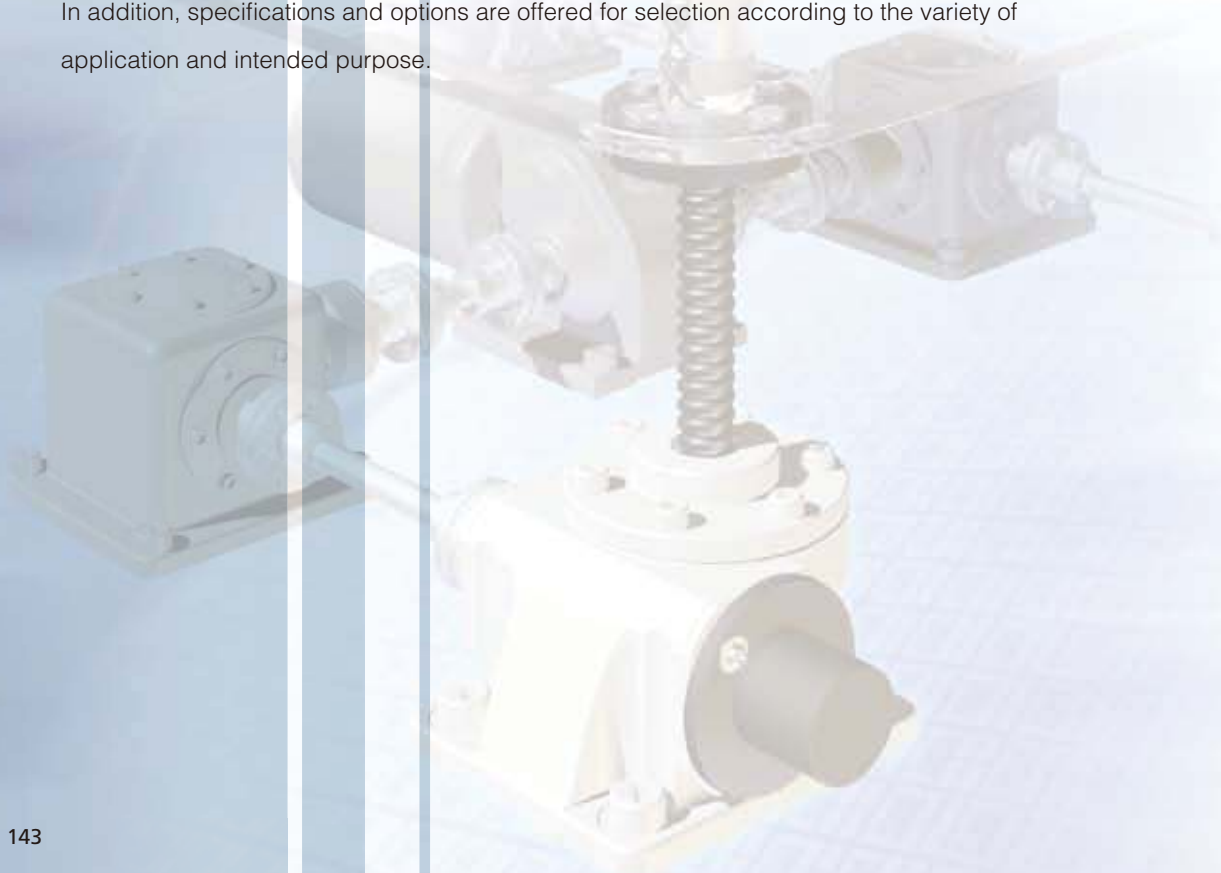


## APPLICATION SOLUTION

TSUBAKI E&M Linipower Jack is our latest jack realized through a combination of technology cultivated over years of experience as a top manufacturer of power cylinders and product manufacturing in consideration of thorough quality controls and environmental consciousness.

Linipower Jacks play an active role across various fields including iron and steel, stage setting, medical equipment, and liquid crystal /PDP devices.

In addition, specifications and options are offered for selection according to the variety of application and intended purpose.





Dome/Adjusts mound elevation



Parabolic Antenna/Adjusts antenna angles



Aircraft/Lifts and lowers part

# Linipower Jack

## Linipower Jack Basic specifications list

| JWM                                                                               |                          |                                                                                    |                        |                                                                                     |                        |                                                                                     |                        |
|-----------------------------------------------------------------------------------|--------------------------|------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------|------------------------|
| U S                                                                               |                          | D S                                                                                |                        | U R                                                                                 |                        | D R                                                                                 |                        |
| (Standard Model for Lifting)                                                      |                          | (Standard Model for Suspending)                                                    |                        | (Travel Nut Type for Lifting)                                                       |                        | (Travel Nut Type for Suspending)                                                    |                        |
|  |                          |  |                        |  |                        |  |                        |
| Standard                                                                          | Frame No.                | 002~200                                                                            | 300~1000               | 002~200                                                                             | 300~1000               | 002~200                                                                             |                        |
|                                                                                   | *1 Basic Capacity*       | kN<br>{tf}                                                                         | 1.96~196<br>{0.2}~{20} | 294~980<br>{30}~{100}                                                               | 1.96~196<br>{0.2}~{20} | 294~980<br>{30}~{100}                                                               | 1.96~196<br>{0.2}~{20} |
|                                                                                   | Screw Outer Diameter     | mm                                                                                 | 12~65                  | 85~150                                                                              | 12~65                  | 85~150                                                                              | 12~65                  |
|                                                                                   | Gear Ratio               | H/L Speed                                                                          |                        |                                                                                     |                        |                                                                                     |                        |
|                                                                                   | Stroke                   | See Table Below                                                                    |                        |                                                                                     |                        |                                                                                     |                        |
|                                                                                   | Lubrication              | Shaft: Grease Reducer Unit: Grease Bath                                            |                        |                                                                                     |                        |                                                                                     |                        |
|                                                                                   | Color                    | Tsubaki Olive Grey (Munsell 5GY6/0.5)                                              |                        |                                                                                     |                        |                                                                                     |                        |
|                                                                                   | Environment              | Indoor                                                                             |                        |                                                                                     |                        |                                                                                     |                        |
|                                                                                   | *2 Rotation Prevention   | ○                                                                                  | △                      | ○                                                                                   | △                      | ×                                                                                   | ×                      |
|                                                                                   |                          |                                                                                    |                        |                                                                                     |                        |                                                                                     |                        |
| Output                                                                            | Bellows                  | ○                                                                                  | ○                      | ○                                                                                   | ○                      | △                                                                                   | △                      |
|                                                                                   | Rod Type End Fitting     | ○                                                                                  | ○                      | ○                                                                                   | ○                      | ×                                                                                   | ×                      |
|                                                                                   | I Type End Fitting       | ○                                                                                  | ○                      | ○                                                                                   | ○                      | ×                                                                                   | ×                      |
|                                                                                   | Table Type End Fitting   | ○                                                                                  | ○                      | ○                                                                                   | ○                      | ×                                                                                   | ×                      |
| Sensor                                                                            | LS Counter               | ○                                                                                  | ○                      | ○                                                                                   | ○                      | ○                                                                                   | ○                      |
|                                                                                   | Internal LS x2           | ○                                                                                  | ○                      | ○                                                                                   | ○                      | ○                                                                                   | ○                      |
|                                                                                   | Internal LS x4           | ○                                                                                  | ○                      | ○                                                                                   | ○                      | ○                                                                                   | ○                      |
|                                                                                   | Potentiometer            | ○                                                                                  | ○                      | ○                                                                                   | ○                      | ○                                                                                   | ○                      |
|                                                                                   | Rotary Encoder           | ○                                                                                  | ○                      | ○                                                                                   | ○                      | ○                                                                                   | ○                      |
| Input                                                                             | 3 Phase Motor            | △                                                                                  | △                      | △                                                                                   | △                      | △                                                                                   | △                      |
|                                                                                   | Gearmotor                | ○                                                                                  | △                      | ○                                                                                   | △                      | ○                                                                                   | ○                      |
|                                                                                   | Hand Wheel               | ○                                                                                  | △                      | ○                                                                                   | △                      | ○                                                                                   | ○                      |
| Accessories                                                                       | Clevis Fitting Adapter   | ○                                                                                  | △                      | △                                                                                   | △                      | △                                                                                   | △                      |
|                                                                                   | Trunnion Fitting Adapter | ○                                                                                  | △                      | △                                                                                   | △                      | △                                                                                   | △                      |

\*1 Basic capacity means a maximum load which the jack can support (retain).

\*2 Rotating force is generated on the screw shaft of the jack. Select anti-rotation specification if the screw shaft is free or there is no guide, etc., on the equipment side.

| Frame No.      |      | 002        | 005           | 010           | 025         | 050           | 100         | 150          | 200        | 300         | 500         | 750         | 1000        |
|----------------|------|------------|---------------|---------------|-------------|---------------|-------------|--------------|------------|-------------|-------------|-------------|-------------|
| Basic Capacity |      | kN<br>{tf} | 1.96<br>{0.2} | 4.90<br>{0.5} | 9.80<br>{1} | 24.5<br>{2.5} | 49.0<br>{5} | 98.0<br>{10} | 47<br>{15} | 196<br>{20} | 294<br>{30} | 490<br>{50} | 980<br>{75} |
| Stroke         | 100  | ○          | ○             | ○             | ○           | ○             | ○           | ○            | ○          | △           | △           | △           | △           |
|                | 200  | ○          | ○             | ○             | ○           | ○             | ○           | ○            | ○          | △           | △           | △           | △           |
|                | 300  | ○          | ○             | ○             | ○           | ○             | ○           | ○            | ○          | △           | △           | △           | △           |
|                | 400  | ○          | ○             | ○             | ○           | ○             | ○           | ○            | ○          | △           | △           | △           | △           |
|                | 500  | △          | ○             | ○             | ○           | ○             | ○           | ○            | ○          | △           | △           | △           | △           |
|                | 600  | △          | ○             | ○             | ○           | ○             | ○           | ○            | ○          | △           | △           | △           | △           |
|                | 800  | —          | ○             | ○             | ○           | ○             | ○           | ○            | ○          | △           | △           | △           | △           |
|                | 1000 | —          | △             | ○             | ○           | ○             | ○           | ○            | ○          | △           | △           | △           | △           |
|                | 1200 | —          | —             | △             | ○           | ○             | ○           | ○            | ○          | △           | △           | △           | △           |
|                | 1500 | —          | —             | —             | △           | ○             | ○           | ○            | ○          | △           | △           | △           | △           |
|                | 2000 | —          | —             | —             | —           | △             | △           | △            | ○          | △           | △           | △           | △           |

Traveling nut specification is also available for JW300 and above.

○: Standard △: Produced by order —: Produced depending on the conditions of use. Consult with us. ×: Not producible

| JWB                                                                               |              |                                                                                   |              |                                                                                   |                                                                                   | JWH                                                                               |   |                                                                                    |                                                                                     |                                                                                     |
|-----------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| U S                                                                               |              | D S                                                                               |              | U R                                                                               | D R                                                                               | U S                                                                               |   | D S                                                                                | U R                                                                                 | D R                                                                                 |
| (Standard Model for Lifting)                                                      |              | (Standard Model for Suspending)                                                   |              | (Travel Nut Type for Lifting)                                                     | (Travel Nut Type for Suspending)                                                  | (Standard Model for Lifting)                                                      |   | (Standard Model for Suspending)                                                    | (Travel Nut Type for Lifting)                                                       | (Travel Nut Type for Suspending)                                                    |
|  |              |  |              |  |  |  |   |  |  |  |
| 005~200                                                                           | 300~1000     | 005~200                                                                           | 300~1000     | 005~200                                                                           |                                                                                   | 010~200                                                                           |   | 010~200                                                                            |                                                                                     |                                                                                     |
| 4.90~196                                                                          | 294~980      | 4.90~196                                                                          | 294~980      | 4.90~196                                                                          |                                                                                   | 9.80~196                                                                          |   | 9.80~196                                                                           |                                                                                     |                                                                                     |
| {0.5} ~ {20}                                                                      | {30} ~ {100} | {0.5} ~ {20}                                                                      | {30} ~ {100} | {0.5} ~ {20}                                                                      |                                                                                   | {1} ~ {20}                                                                        |   | {1} ~ {20}                                                                         |                                                                                     |                                                                                     |
| 16~63                                                                             | 85~140       | 16~63                                                                             | 85~140       | 16~63                                                                             |                                                                                   | 20~63                                                                             |   | 20~63                                                                              |                                                                                     |                                                                                     |
| H/L Speed                                                                         |              |                                                                                   |              |                                                                                   |                                                                                   | H Speed                                                                           |   |                                                                                    |                                                                                     |                                                                                     |
| See Table Below                                                                   |              |                                                                                   |              |                                                                                   |                                                                                   | See Table Below                                                                   |   |                                                                                    |                                                                                     |                                                                                     |
| Shaft: Grease   Reducer Unit: Grease Bath                                         |              |                                                                                   |              |                                                                                   |                                                                                   | Shaft: Grease   Reducer Unit: Grease Bath                                         |   |                                                                                    |                                                                                     |                                                                                     |
| Tsubaki Olive Grey (Munsell 5GY6/0.5)                                             |              |                                                                                   |              |                                                                                   |                                                                                   | Tsubaki Olive Grey (Munsell 5GY6/0.5)                                             |   |                                                                                    |                                                                                     |                                                                                     |
| Indoor                                                                            |              |                                                                                   |              |                                                                                   |                                                                                   | Indoor                                                                            |   |                                                                                    |                                                                                     |                                                                                     |
| ○                                                                                 | △            | ○                                                                                 | △            | ×                                                                                 | ×                                                                                 | △                                                                                 | △ | ×                                                                                  | ×                                                                                   |                                                                                     |
| ○                                                                                 | ○            | ○                                                                                 | ○            | △                                                                                 | △                                                                                 | ○                                                                                 | ○ | △                                                                                  | △                                                                                   |                                                                                     |
| ○                                                                                 | ○            | ○                                                                                 | ○            | ×                                                                                 | ×                                                                                 | ○                                                                                 | ○ | ×                                                                                  | ×                                                                                   |                                                                                     |
| ○                                                                                 | ○            | ○                                                                                 | ○            | ×                                                                                 | ×                                                                                 | ○                                                                                 | ○ | ×                                                                                  | ×                                                                                   |                                                                                     |
| ○                                                                                 | ○            | ○                                                                                 | ○            | ×                                                                                 | ×                                                                                 | ○                                                                                 | ○ | ×                                                                                  | ×                                                                                   |                                                                                     |
| ○                                                                                 | ○            | ○                                                                                 | ○            | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○ | ○                                                                                  | ○                                                                                   |                                                                                     |
| ○                                                                                 | ○            | ○                                                                                 | ○            | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○ | ○                                                                                  | ○                                                                                   |                                                                                     |
| ○                                                                                 | ○            | ○                                                                                 | ○            | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○ | ○                                                                                  | ○                                                                                   |                                                                                     |
| ○                                                                                 | ○            | ○                                                                                 | ○            | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○ | ○                                                                                  | ○                                                                                   |                                                                                     |
| ○                                                                                 | ○            | ○                                                                                 | ○            | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○ | ○                                                                                  | ○                                                                                   |                                                                                     |
| ○                                                                                 | △            | ○                                                                                 | △            | ○                                                                                 | ○                                                                                 | △                                                                                 | △ | △                                                                                  | △                                                                                   |                                                                                     |
| ○                                                                                 | △            | ○                                                                                 | △            | ○                                                                                 | ○                                                                                 | △                                                                                 | △ | △                                                                                  | △                                                                                   |                                                                                     |
| △                                                                                 | △            | △                                                                                 | △            | △                                                                                 | △                                                                                 | △                                                                                 | △ | △                                                                                  | △                                                                                   |                                                                                     |
| ○                                                                                 | △            | △                                                                                 | △            | △                                                                                 | △                                                                                 | ○                                                                                 | △ | △                                                                                  | △                                                                                   |                                                                                     |
| ○                                                                                 | △            | △                                                                                 | △            | △                                                                                 | △                                                                                 | ○                                                                                 | △ | △                                                                                  | △                                                                                   |                                                                                     |

| 005   | 010  | 025   | 050  | 100  | 150  | 200  | 300  | 500  | 750  | 1000  | 010  | 025   | 050  | 100  | 150  | 200  |
|-------|------|-------|------|------|------|------|------|------|------|-------|------|-------|------|------|------|------|
| 4.90  | 9.80 | 24.5  | 49.0 | 98.0 | 147  | 196  | 294  | 490  | 735  | 980   | 9.80 | 24.5  | 49.0 | 98.0 | 147  | 196  |
| {0.5} | {1}  | {2.5} | {5}  | {10} | {15} | {20} | {30} | {50} | {75} | {100} | {1}  | {2.5} | {5}  | {10} | {15} | {20} |
| ○     | ○    | ○     | ○    | ○    | ○    | ○    | △    | △    | △    | △     | ○    | ○     | ○    | ○    | ○    | ○    |
| ○     | ○    | ○     | ○    | ○    | ○    | ○    | △    | △    | △    | △     | ○    | ○     | ○    | ○    | ○    | ○    |
| ○     | ○    | ○     | ○    | ○    | ○    | ○    | △    | △    | △    | △     | ○    | ○     | ○    | ○    | ○    | ○    |
| ○     | ○    | ○     | ○    | ○    | ○    | ○    | △    | △    | △    | △     | ○    | ○     | ○    | ○    | ○    | ○    |
| ○     | ○    | ○     | ○    | ○    | ○    | ○    | △    | △    | △    | △     | ○    | ○     | ○    | ○    | ○    | ○    |
| ○     | ○    | ○     | ○    | ○    | ○    | ○    | △    | △    | △    | △     | ○    | ○     | ○    | ○    | ○    | ○    |
| △     | ○    | ○     | ○    | ○    | ○    | ○    | △    | △    | △    | △     | ○    | ○     | ○    | ○    | ○    | ○    |
| —     | △    | ○     | ○    | ○    | ○    | ○    | △    | △    | △    | △     | △    | ○     | ○    | ○    | ○    | ○    |
| —     | —    | △     | ○    | ○    | ○    | ○    | △    | △    | △    | △     | —    | △     | ○    | ○    | ○    | ○    |
| —     | —    | —     | △    | △    | △    | ○    | △    | △    | △    | △     | —    | —     | △    | △    | △    | ○    |

# Linipower Jack

## Model Features

### JWM [Machine Screw Type]

#### Low Speed, Low Frequency

JWM (Machine Screw Type) is a standard model, suitable for low speed, low frequency operations. Major components include trapezoidal screw and high precision worm gear.

**1. Economical**

Simple, compact and affordable.

**2. Low Speed, Low Frequency**

The unique sliding motion of trapezoidal screw provides smooth and consistent low speed, suitable for low frequency operations.

**3. Load**

Machine screw has a self-lock feature based on calculation, and can maintain loads.

\* Self-lock may not be effective where vibration or shock is present. In this case, install a brake unit.



### JWB [Ball Screw Type]

#### High Speed, High Frequency

JWB (Ball Screw Type) is a highly efficient jack for high speed, high frequency operations. Major components include accurate ball screw and high precision worm gear.

**1. High Efficiency**

JWB's ball screw generates high efficiency and its compact drive unit produces high power.

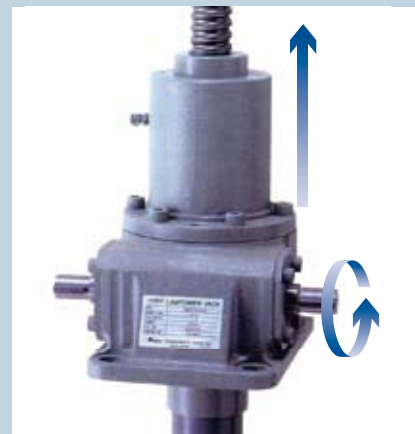
**2. High Speed**

Compared to the JWM, its high efficiency allows easier high speed drive.

**3. Extended Life**

Long and predictable ball screw life.

\*Self-lock is not provided. Must install a brake unit.



### JWH [High Lead Ball Screw Type]

#### Super High Speed, High Frequency

Depending on the high lead ball screw used, the screw shaft speed can exceed that of a JWB by up to 4 times at the same input shaft rpm. Major components include high lead ball screw and high precision worm gear.

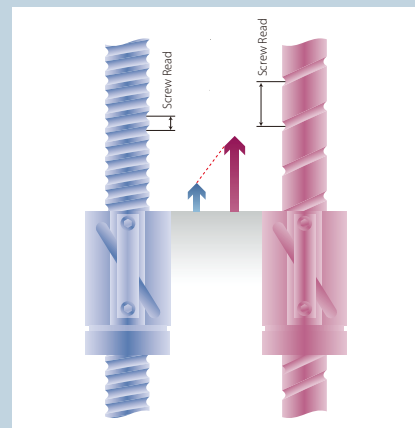
**1. Super High Speed**

Effective high lead screw allows maximum screw shaft speed of 7.5m/min.

**2. Quiet Operation**

JWH (High Lead Ball Screw Type) requires less input rpm at its drive and reducer units to run at the same speed of JWB (Ball Screw Type), resulting in considerably quiet operation.

\*Self-lock is not provided. Must install a brake unit.



## Linipower Jack

# Selecting Your Linipower Jack · Technical Notes

### Selecting Your Linipower Jack

Selecting Process ..... P149•150

Example ..... P151•152

### Technical Notes

Screw Shaft Speed and Allowable Load ..... P153~157

Allowable Buckling Load ..... P158~160

Allowable Side Load ..... P161

Expected Travel Distance and Wear Life ..... P162

Technical Data ..... P163

(Allowable OHL and Allowable Screw Shaft rpm)

# Selecting Your Linipower Jack

## Selecting Process

- 1) **Equipment** ..... Table or theatre lifter, conveyer line selector etc.
- 2) **Layout** ..... Patterns of multiple jack systems (4, 6 or more units), driving, coupling etc.
- 3) **Maximum Load (W)** ..... Load or work weight N {kgf}.
- 4) **Screw Shaft Speed (V)** ..... Required speed for jack, m/min.
- 5) **Stroke** ..... Actual stroke used, mm.
- 6) **Screw Types** ..... Machine Screw Type (JWM), Ball Screw Type (JWB), High Lead Ball Screw Type (JWH).
- 7) **Installation Configuration** ... Basic specifications (lift or suspend, with or without rotation prevention).  
Travel nut type (lift or suspend).
- 8) **Installation Conditions** ..... Fixed base, shaft end, clevis etc. For compression loads, consider buckling.
- 9) **Life Expectancy** ..... Years jack will withstand wear (for JWB, JWH only).

## STEP1 Selecting Your Linipower Jack

### 1. Adjusted Load Ws

Calculate the "Adjusted Load" Ws, by determining the correct safety coefficient rate (Table 1) for specific load conditions.

$$\text{Adjusted Load } W_s = \text{Maximum Load } W \times \text{Coefficient } S_f$$

N {kgf}                      N {kgf}

Table 1. Coefficient S<sub>f</sub>

| Load Conditions                             | Example Purposes                                                                      | Coefficient Range |
|---------------------------------------------|---------------------------------------------------------------------------------------|-------------------|
| Smooth movement with no shock<br>Light load | Opening and closing a valve<br>Adjusting a conveyor                                   | 1.0 ~ 1.3         |
| Light shock<br>Medium load                  | Use with various kinds of<br>transporting equipment and lifters                       | 1.3 ~ 1.5         |
| Severe shock and/or vibration<br>Heavy load | Use with large transporting<br>carriages<br>Holding the position of<br>a press roller | 1.5 ~ 3.0         |

Note) The above table is for general reference only. Consider particular operating conditions under which you operate before selecting a coefficient.

### 2. Load per jack

Calculate load W per jack, by using the adjusted load Ws obtained above.

For a synchronous drive, use a synchronous drive coefficient (Table 2).

$$\text{Load / jack } W = \frac{\text{Adjusted Load } W_s \text{ N\{kgf\}}}{\text{No. of jacks} \times \text{synchro. drive coefficient } f_d}$$

N {kgf}

Table 2. Synchronous Drive Coefficient f<sub>d</sub>

| No. of units | 2    | 3   | 4    | 5 ~ 8 |
|--------------|------|-----|------|-------|
| Coefficient  | 0.95 | 0.9 | 0.85 | 0.8   |

### 3. Jack Selection

Follow these steps to make a preliminary jack selection.

#### Points of preliminary jack selection

- ① Select (temporary) worm speed ratio by adjusting the screw shaft rpm. If difficult to select, inspect by H speed.
- ② Consider traveling space when selecting stroke.
- ③ Select options based on your needs.

### 4. Verifying Buckling and Screw Shaft rpm

#### ① Allowable Buckling Load

For a compressive load, verify that it does not exceed the allowable buckling load (See pages 158~160). If it does, increase jack size and recalculate.

#### ② Allowable Screw Shaft rpm

If using a travel nut, verify that it does not exceed the allowable shaft rpm (See page 163). If it does, increase jack size and recalculate.

### 5. Confirming Required Input rpm

Determine the required input rpm, using the required screw shaft speed.

$$N = \frac{V}{\ell} \times R$$

N : Input rpm                      r/min  
V : Screw Shaft Speed          m/min  
ℓ : Screw Lead                      m  
R : Gear Ratio

### 6. Verifying Required Input Torque

Calculate required input torque.

$$T = \frac{W \times \ell}{2 \times \pi \times R \times \eta} + T_o$$

T : Required Input Torque N · m {kgf · m}  
W : Lifting Load N {kgf}  
ℓ : Screw Lead m  
π : Circular Constant 3.14  
R : Gear Ratio  
η : Overall Efficiency  
T<sub>o</sub> : Tare Drag Torque N · m {kgf · m}

\* For screw lead, gear ratio, overall efficiency and tare drag torque, see pages 169, 195 and 219. Take caution in selecting screw units. (8mm→0.008m)

### 7. Verifying Input Capacity

$$\text{SI Unit } P = \frac{T \times N}{9550}$$

$$\text{Gravitational Unit } P = \frac{T \times N}{974}$$

T : Required Input Torque N · m {kgf · m}  
P : Required Input Load kW  
N : Input rpm                      r/min

## 8. Allowable Overhang Load

If attaching a sprocket, gear, or belt to the input shaft, verify that the total weight is within the allowable overhang load. (See page 163) If not, increase jack size and recalculate.

## 9. Verifying Wear Life (JWB/JWH only)

Check if wear life is sufficient. (See page 162)

When increasing travel distance, increase jack size and recalculate.

\* Life cannot be calculated for JWM (Machine Screw Type).

## 10. Selecting Your Options

Select options that best suit your needs.

- |                     |                        |                   |
|---------------------|------------------------|-------------------|
| 1. Output Option    | 2. Installation Option | } (See page 228~) |
| 3. Sensor Option    | 4. Input Option        |                   |
| 5. Accessory Option |                        |                   |

## 11. Jack Number

Determine the actual Linipower Jack number that meets the above conditions.

## STEP2 Parts Options

### Motor

### Determine the required drive unit capacity for synchronous drive Pt.

1. Add the torque required for each jack  $T_{1\sim4}$  on the drive unit side to determine the overall Torque  $T_t$ .

<Required Torque per Jack>

$$T_{1\sim4} = \frac{T}{(\text{Gearbox efficiency})^{\text{No. of gear box}}}$$

<Required Torque for the Drive Unit>

$$T_t = T_1 + T_2 + T_3 + T_4$$

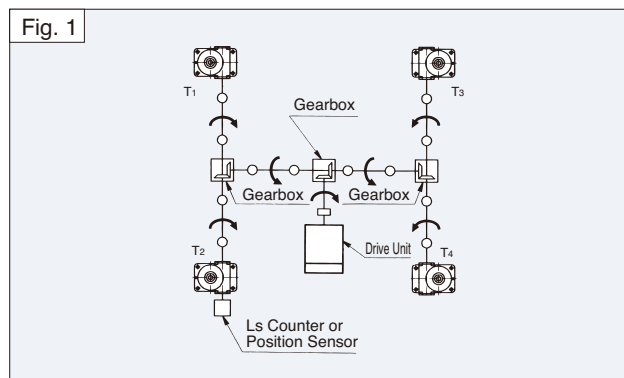
$T_{1\sim4}$  : Required torque for each jack on the drive unit side  $N \cdot m \{kgf \cdot m\}$

$T$  : Required input torque per jack  $N \cdot m \{kgf \cdot m\}$

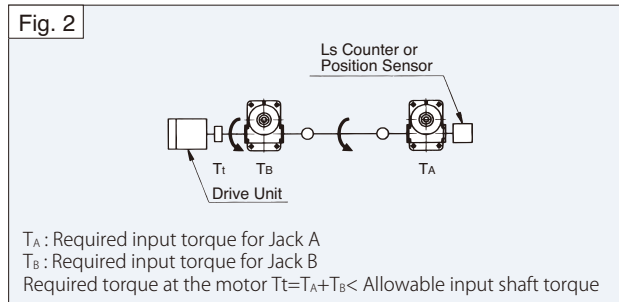
Gear box efficiency: Assume 0.9

$T_t$  : Required torque for the drive-unit  $N \cdot m \{kgf \cdot m\}$

For a four unit system (Fig. 1),  $T_{1\sim4} = \frac{T}{0.9^2}$



2. Be certain that the required input torque calculated is within the allowable input shaft torque.  
(e.g.) If jacks are arranged in a linear structure as shown in Fig. 2, the drive unit input shaft consumes the total input torque required for both jacks. This doubled torque should not exceed the allowable input torque.



3. Next, determine the required drive unit capacity  $P_t$  with input rpm  $N$  and overall Torque  $T_t$  determined in 1.

SI Unit  $P_t = \frac{T_t \times N}{9550}$

Gravitational Unit  $P_t = \frac{T_t \times N}{974}$

$P_t$  : Total required torque at the drive unit kW

$T_t$  : Total required torque at the drive unit  $N \cdot m \{kgf \cdot m\}$

$N$  : Input rpm for the jack r/min

### Other Parts Options

1. Gear box....Select based on input rpm and required torque.  
See TSUBAKI E&M Miter Gear Box Catalog.  
(Bulletin No.04001)
2. Coupling....Select based on allowable torque and maximum shaft diameter.  
See TSUBAKI E&M Coupling Catalog.  
(Bulletin No.06009)

## Example

### Jack Selection Example 1

**Example :** Four jack synchronous drive for lifting with 3-phase 220v/60Hz motor (see layout below), operating at room temperature under low dust conditions.

Guide installed on the equipment to prevent side load.

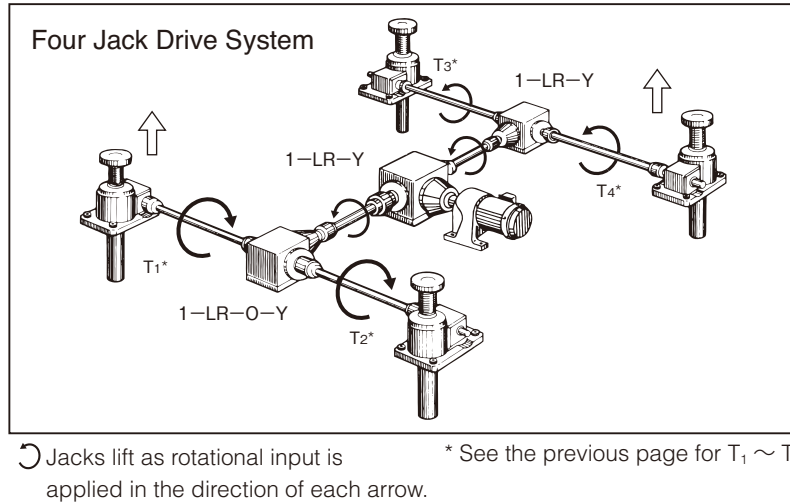
Fixed base-Guided shaft end/Fixed shaft end.

Operation cycle : (2 times/hour) X (8 hours/day) X (300 days/year) X (3 years usage)

① Maximum load : 88.2 kN {9 tf} / 4 Units

② Required speed : 10 mm/s (600 mm/min)

③ Operating stroke : 260 mm



#### SI Unit

1. Adjusted load  $W_s$  is (coefficient  $S_f=1.3$ )

$$W_s = 88200 \times 1.3 = 114660 \text{ N}$$

2. Load  $W$  per jack is

$$W = \frac{114660}{4 \times 0.85} = 33724 \text{ N}$$

3. Considering speed, efficiency and drive unit, JWB050USH is preliminarily selected.

4. For 260mm operating stroke, use 300 mm stroke for the jack.

Considering its possible dust generation and shaft end stability (see layout above), the appropriate jack would be JWB050USH3JM.

5. Since this load is compressive, calculate the operated buckling load based on the formula used on pages 159~160. (Assume safety level  $S_f=4$ .) See page 160 for details on calculations.

$$P_{CR} = 20 \times 10^4 \times \left( \frac{31.3^2}{637} \right)^2$$

\*Refer to dimensions on page 203.

$$= 473073 \text{ N}$$

$$S_f = \frac{473073}{33724} > 4 \cdots \text{OK}$$

6. This is not a travel nut type so there is no need to confirm allowable screw shaft rpm. (Inspect the allowable screw shaft rpm if using a travel nut.)

#### { Gravitational Unit }

1. Adjusted load  $W_s$  is (coefficient  $S_f=1.3$ )

$$W_s = 9000 \times 1.3 = 11700 \text{ kgf}$$

2. Load  $W$  per jack is

$$W = \frac{11700}{4 \times 0.85} = 3442 \text{ kgf}$$

3. Considering speed, efficiency and drive unit, JWB050USH is preliminarily selected.

4. For 260mm operating stroke, use 300 mm stroke for the jack. Considering its possible dust generation and shaft end stability (see layout above), the appropriate jack would be JWB050USH3JM.

5. Since this load is compressive, calculate the operated buckling load based on the formula used on pages 159~160. (Assume safety level  $S_f=4$ .) See page 160 for details on calculations.

$$P_{CR} = 20 \times 10^3 \times \left( \frac{31.3^2}{637} \right)^2$$

\*Refer to dimensions on page 203.

$$= 47307 \text{ kgf}$$

$$S_f = \frac{47307}{3442} > 4 \cdots \text{OK}$$

6. This is not a travel nut type so there is no need to confirm allowable screw shaft rpm. (Inspect the allowable screw shaft rpm if using a travel nut.)

**SI Unit**

## 7. Required Input Capacity

$$\textcircled{1} N = \frac{0.60}{0.010} \times 6 = 360 \text{ r/min}$$

$$\textcircled{2} T = \frac{33724 \times 0.010}{2 \times 3.14 \times 6 \times 0.64} + 1.37 = 15.4 \text{ N} \cdot \text{m}$$

$$\text{From } \textcircled{1}\textcircled{2} \quad P = \frac{15.4 \times 360}{9550} = 0.58 \text{ kW}$$

Rated input capacity for JWB050USH3 is 0.58 kW < 2.2 kW.  
(If not suitable, increase the frame number or reduce the screw shaft rpm and recalculate.)

## 8. Overhang load dose not apply so inspection is not required. Inspect as appropriate.

## 9. Verifying Wear Life for JWB

Calculate the expected travel distance from usage frequency. (See page 162)

Expected driving distance =  $0.26 \times 2 \times 8 \times 300 \times 10^{-3} \times 3 = 3.74 \text{ km}$

We then find that the suitable jack number is JWB050.

.....OK

## 10. Jack Options

Possible dust  $\longrightarrow$  Use with bellow

Shaft end  $\longrightarrow$  Table shaft end

Finally, we conclude by selecting **JWB050USH3JM**.

**{ Gravitational Unit }**

## 7. Required Input Capacity

$$\textcircled{1} N = \frac{0.60}{0.010} \times 6 = 360 \text{ r/min}$$

$$\textcircled{2} T = \frac{3442 \times 0.010}{2 \times 3.14 \times 6 \times 0.64} + 0.14 = 1.57 \text{ kgf} \cdot \text{m}$$

$$\text{From } \textcircled{1}\textcircled{2} \quad P = \frac{1.57 \times 360}{974} = 0.58 \text{ kW}$$

Rated input capacity for JWB050USH3 is 0.58 kW < 2.2 kW.  
(If not suitable, increase the frame number or reduce the screw shaft rpm and recalculate.)

## 8. Overhang load dose not apply so inspection is not required. Inspect as appropriate.

## 9. Verifying Wear Life for JWB

Calculate the expected travel distance from usage frequency. (See page 162)

Expected driving distance =  $0.26 \times 2 \times 8 \times 300 \times 10^{-3} \times 3 = 3.74 \text{ km}$

We then find that the suitable jack number is JWB050.

.....OK

## 10. Jack Options

Possible dust  $\longrightarrow$  Use with bellow

Shaft end  $\longrightarrow$  Table shaft end

Finally, we conclude by selecting **JWB050USH3JM**.

**Selecting Parts (Parts Options)**

## A. Selecting a Drive Unit

1. Calculate the required torque  $T_1$  (2.3.4) for each jack on the drive unit side.

$$\text{SI Unit} \quad T_1 = \frac{15.4}{0.9^2} = 19.0 \text{ N} \cdot \text{m}$$

$$\left\{ \begin{array}{l} \text{Gravitational} \\ \text{Unit} \end{array} \right. T_1 = \frac{1.57}{0.9^2} = 1.94 \text{ kgf} \cdot \text{m}$$

Since 4 jacks follow the same route

$$\text{SI Unit} \quad T_t = T_1 \times 4 = 76.0 \text{ N} \cdot \text{m}$$

$$\left\{ \begin{array}{l} \text{Gravitational Unit} \end{array} \right. T_t = T_1 \times 4 = 7.76 \text{ kgf} \cdot \text{m}$$

## 2. Inspecting the Rated Input Torque

In this case, inspection is not necessary because 2 or more jacks are not arranged in a linear structure.

3. Required Capacity for the Drive Unit  $P_t$ 

$$\text{SI Unit} \quad P_t = \frac{76.0 \times 360}{9550} = 2.87 \text{ kW}$$

$$\left\{ \begin{array}{l} \text{Gravitational} \\ \text{Unit} \end{array} \right. P_t = \frac{7.76 \times 360}{974} = 2.87 \text{ kW}$$

from the input rpm 360r/min we find

$$\frac{1800}{360} = 5$$

Based on this data we select GMTA370-50L5B, TSUBAKI E&M 3.7kW gearmotor with a brake unit.

For details, see TSUBAKI E&M Compact Gearmotor Catalog (Bulletin No.07003).

## B.1. Select a gear box based on the required input torque of 15.4N · m {1.57kgf · m}, and input rpm of 360r/min.

## 1.1. Gear box on each side of the jack must tolerate the combined torque of 2 jacks. Thus we selected gear box ED4M.

$$\frac{15.4 \times 2}{0.9} = 34.3 \text{ N} \cdot \text{m} \quad \left\{ \frac{1.57 \times 2}{0.9} = 3.49 \text{ kgf} \cdot \text{m} \right\}$$

(Caution: Make sure the direction of the gear box shaft rotation is correct.)

## 1-2. Gear box by the gearmotor requires torque for 4 jacks

$$\frac{15.4 \times 4}{0.9^2} = 76.1 \text{ N} \cdot \text{m} \quad \left\{ \frac{1.57 \times 4}{0.9^2} = 7.76 \text{ kgf} \cdot \text{m} \right\}$$

From this, we find that the gear box ED6M is most suitable.

Gear box by the jack Left  $\longrightarrow$  ED4M 1-LR-O-Y

Right  $\longrightarrow$  ED4M 1-LR-Y

Gear box by the gearmotor  $\longrightarrow$  ED6M 1-LR-Y

(For details see TSUBAKI E&M Miter Gear Box Catalog).

## B.2. Select couplings based on your requirements.

(See TSUBAKI E&M Coupling Catalog for details.)

The following is an example process for selecting the right couplings.

2-1. Select couplings used between each jack and their adjacent gear box based on the required input torque per jack, 15.4N · m {1.57kgf · m}, input shaft diameter ( $\phi 20$  for JWB050USH), and the gear box shaft diameter ( $\phi 19$  for ED4M).

Required number is  $2 \times 2 = 4$ .

## 2-2. Select couplings used between the gear boxes based on the required torque for the nearest pair of jacks,

$$\frac{15.4 \times 2}{0.9} = 34.3 \text{ N} \cdot \text{m} \quad \left\{ \frac{1.57 \times 2}{0.9} = 3.49 \text{ kgf} \cdot \text{m} \right\}$$

and the diameter of each gear box shaft: one by the jack ( $\phi 19$  for ED4M), and the other by the gearmotor ( $\phi 25$  ED6M). Required number is  $2 \times 2 = 4$ .

## 2-3. Select couplings used between each gear box and the gearmotor based on the total required torque for the four jacks,

$$\frac{15.4 \times 4}{0.9^2} = 76.1 \text{ N} \cdot \text{m} \quad \left\{ \frac{1.57 \times 4}{0.9^2} = 7.76 \text{ kgf} \cdot \text{m} \right\}$$

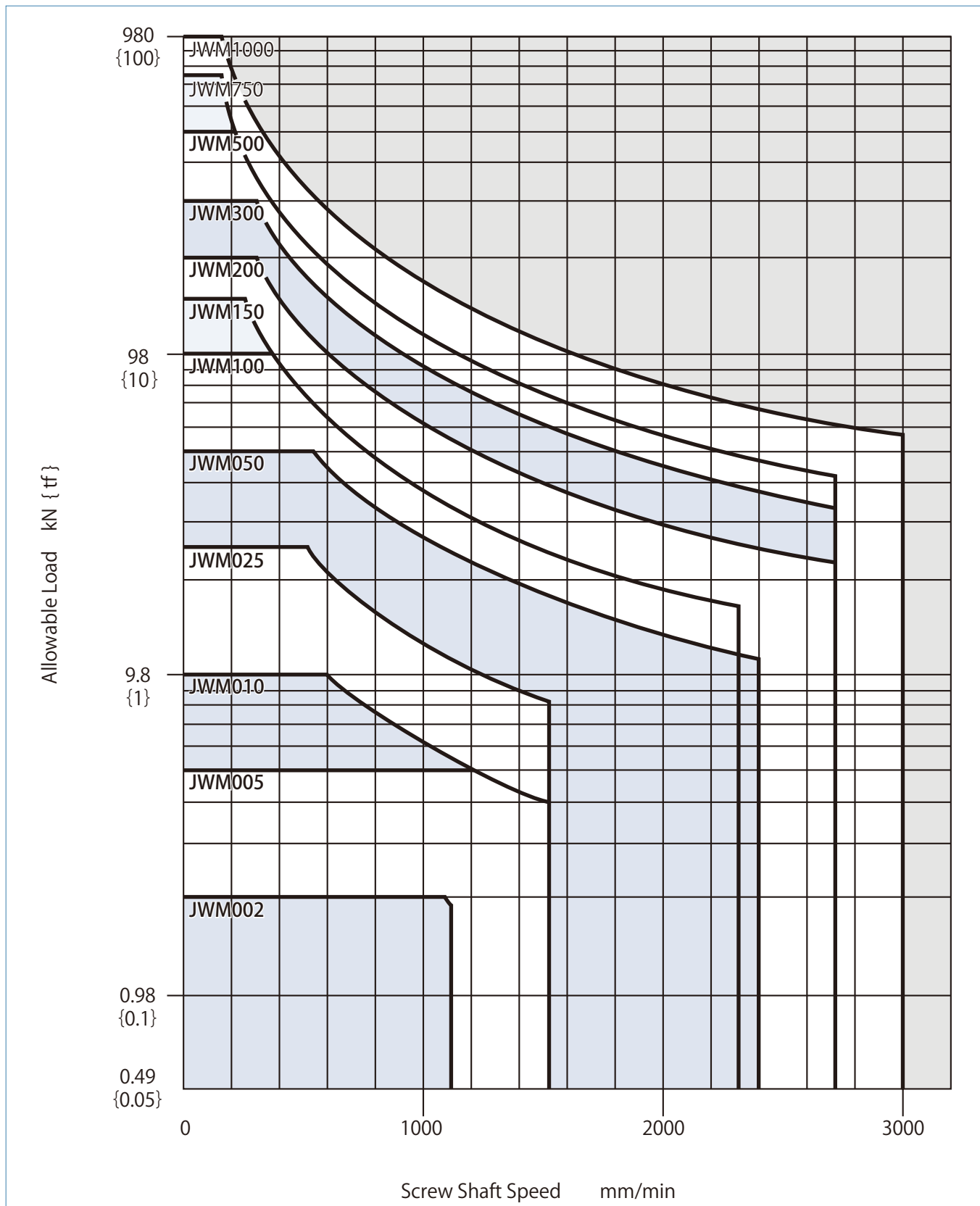
and the diameters of the gear box ( $\phi 25$  for ED6M) and the output shafts ( $\phi 50$  for GMTA370-50L5B).

## Screw Shaft Speed (Lifting) and Allowable Load for JWM (Machine Screw Type)

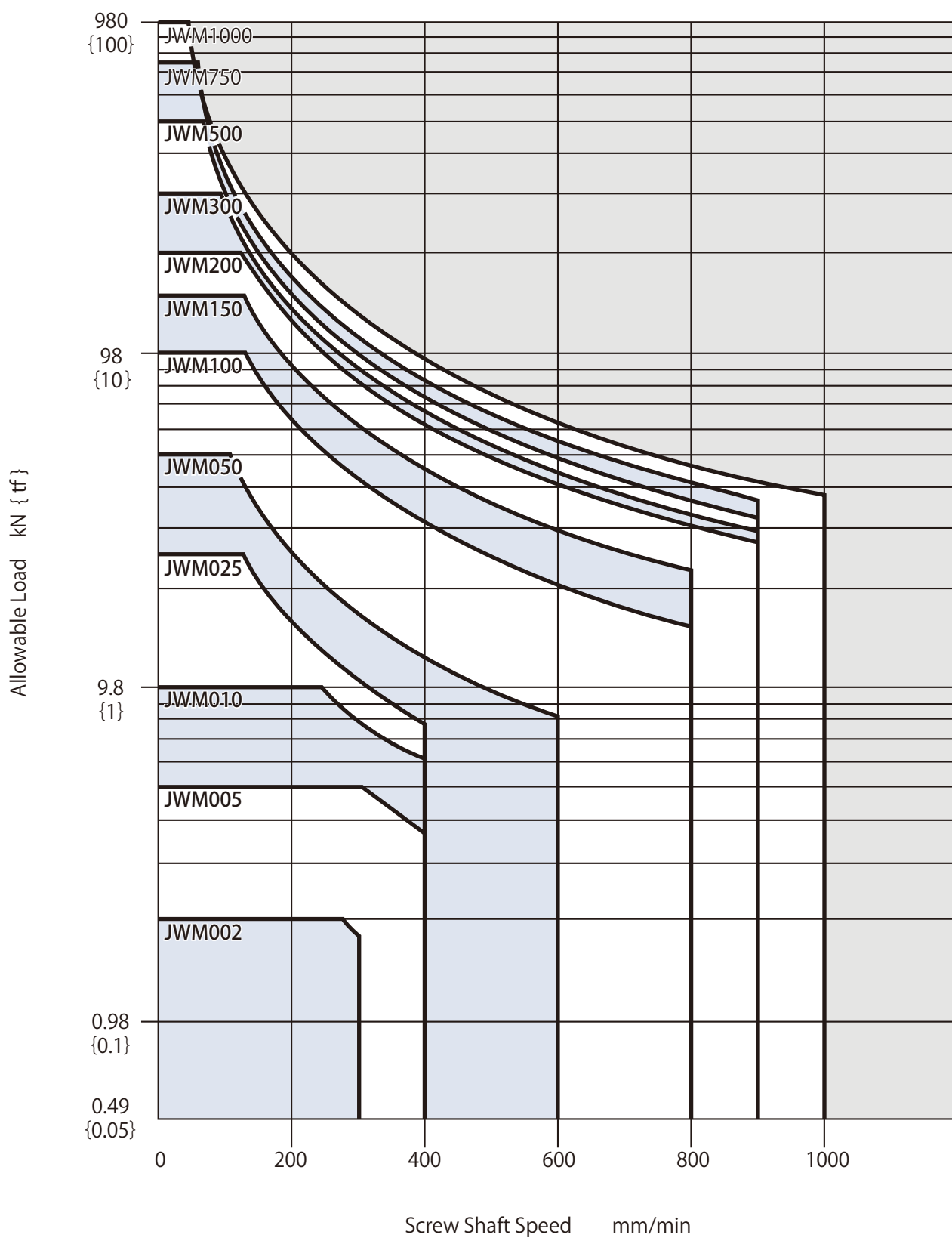
This graph illustrates the relationship between screw shaft speed and allowable load for each frame number. Use this graph to select the correct frame number for specific requirements.

If inspection is required, see page 149 for calculation details.

### ■ H Speed



■ L Speed

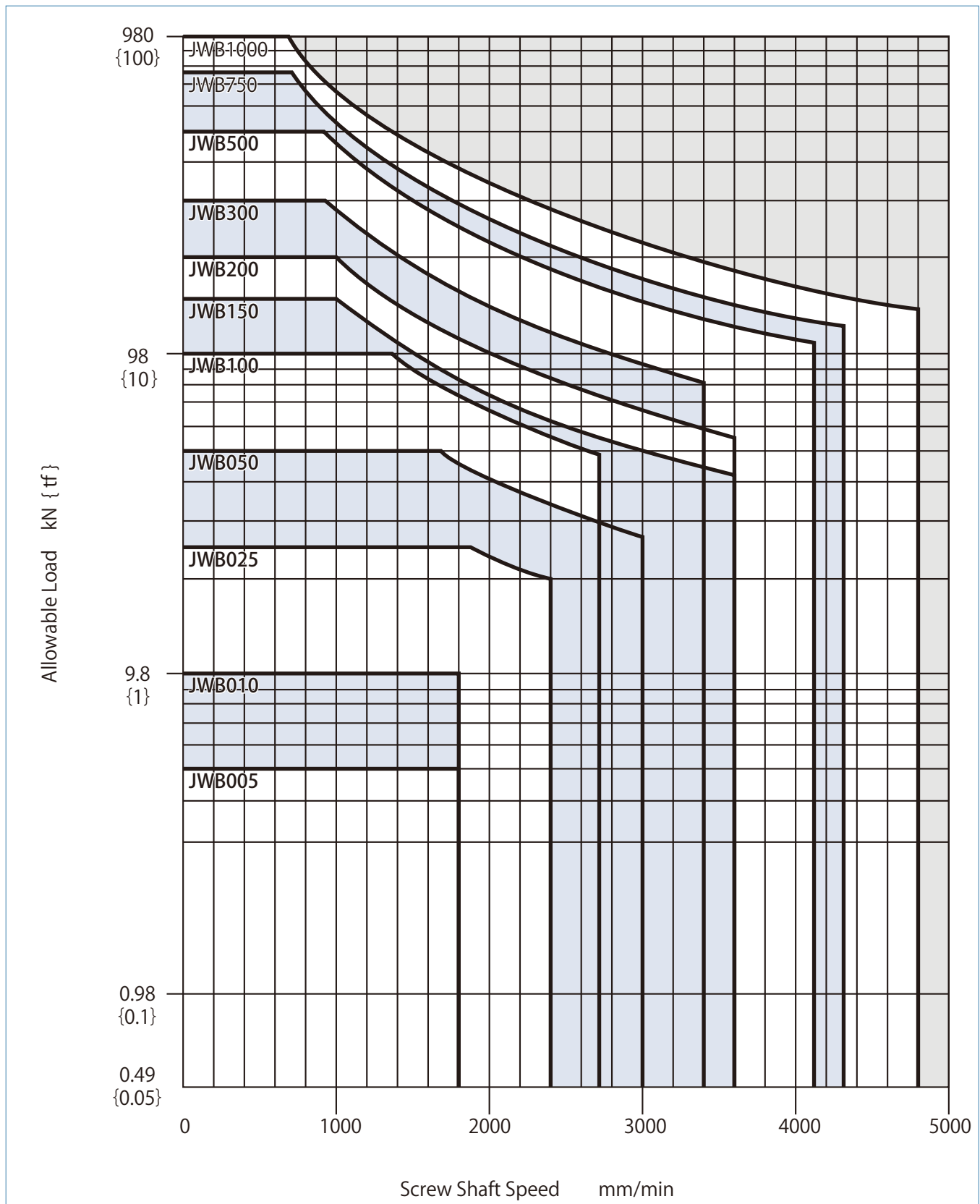


## Screw Shaft Speed (Lifting) and Allowable Load for JWB (Ball Screw Type)

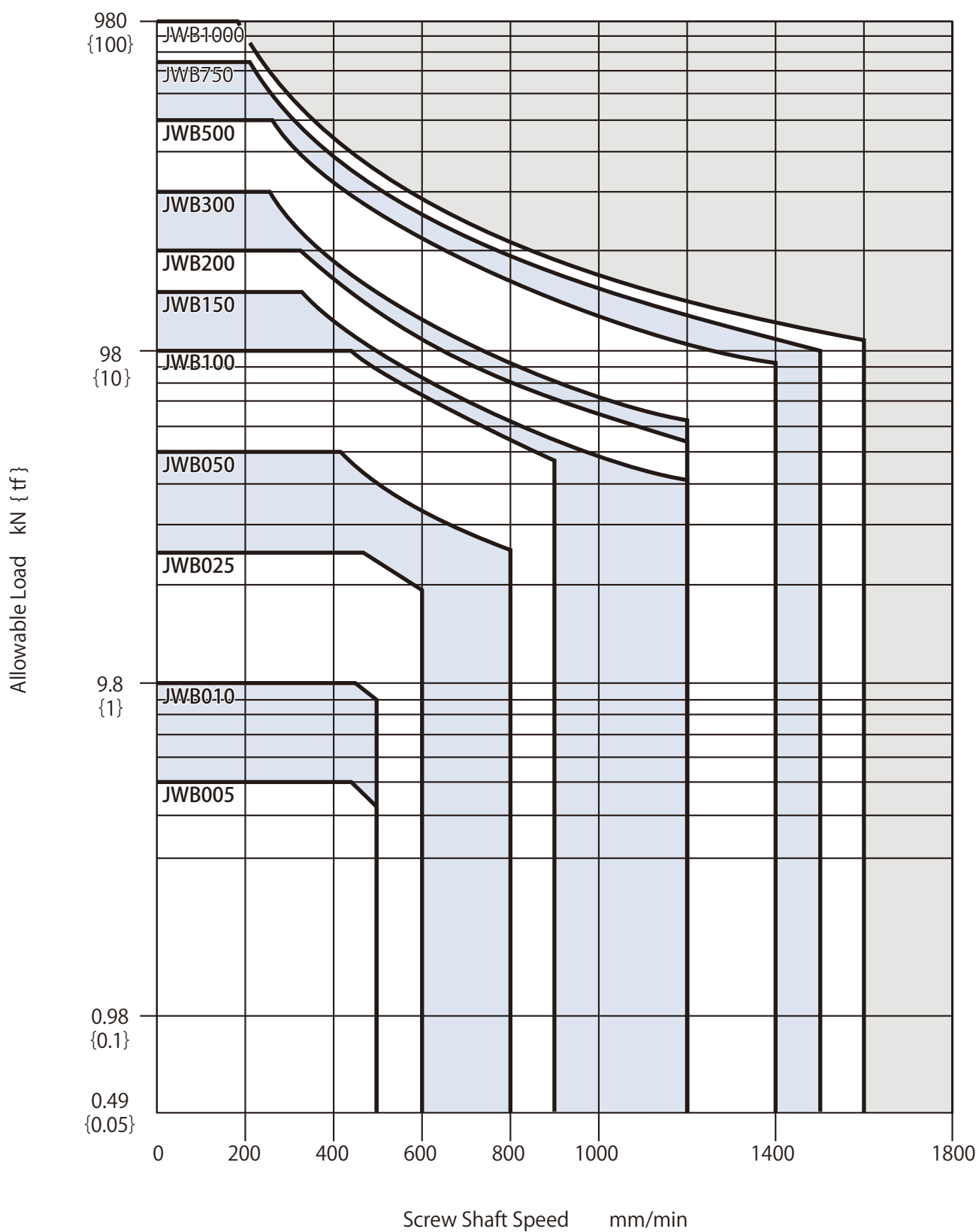
This graph illustrates the relationship between screw shaft speed and allowable load for each frame number. Use this graph to select the correct frame number for specific requirements.

If inspection is required, see page 149 for calculation details.

### ■ H Speed



■ L Speed

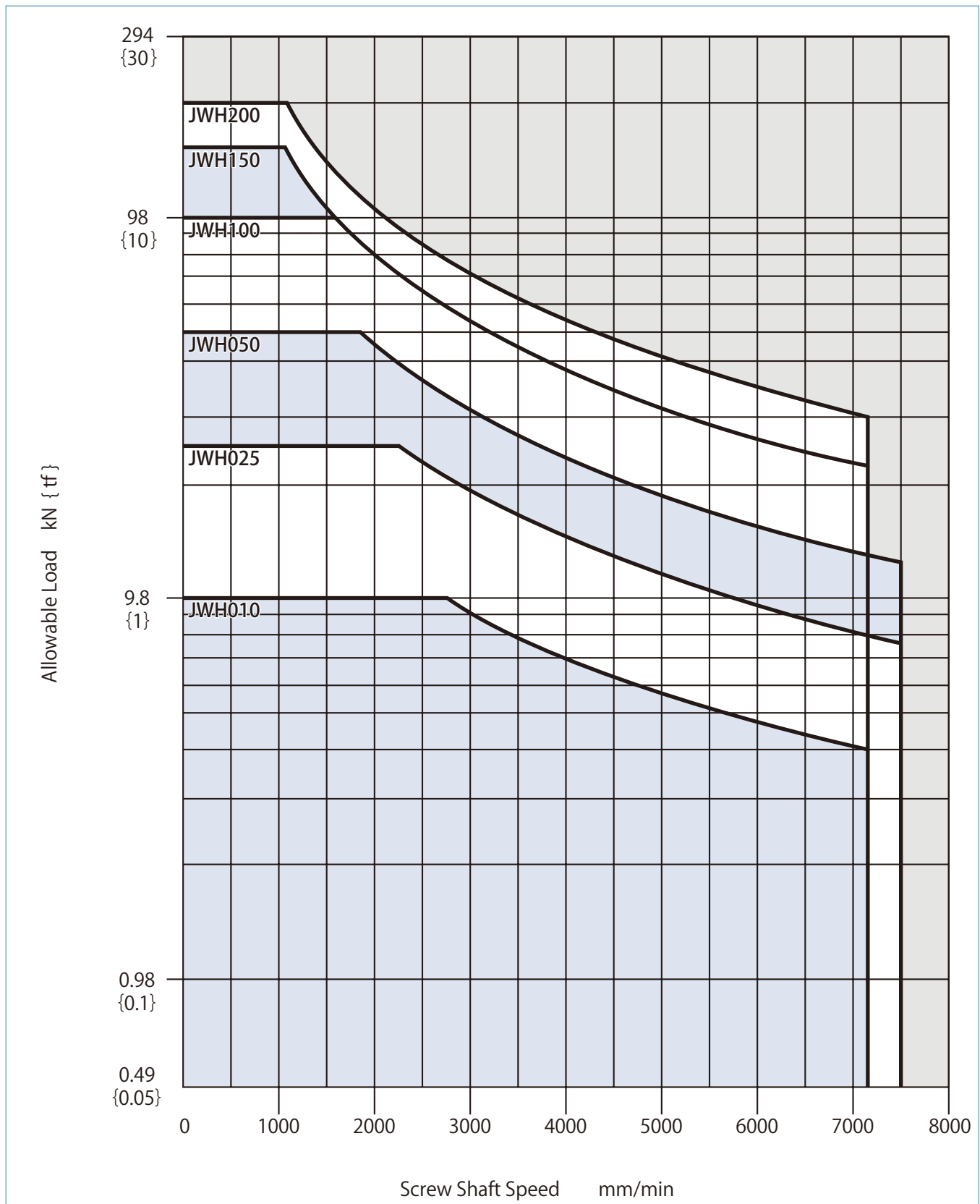


## Screw Shaft Speed (Lifting) and Allowable Load for JWH (High Lead Ball Screw Type)

This graph illustrates the relationship between screw shaft speed and allowable load for each frame number. Use this graph to select the correct frame number for specific requirements.

If inspection is required, see page 149 for calculation details.

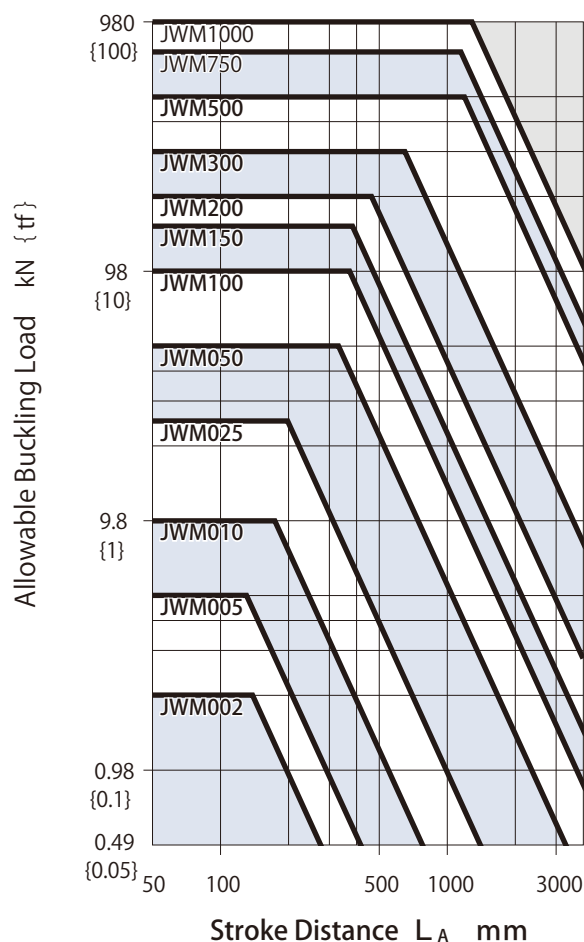
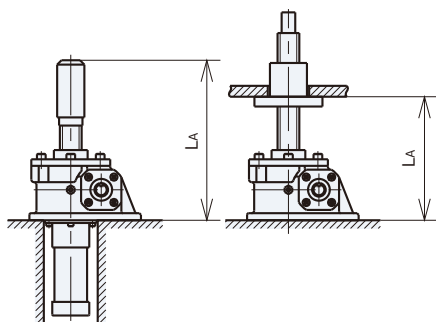
### ■ H Speed



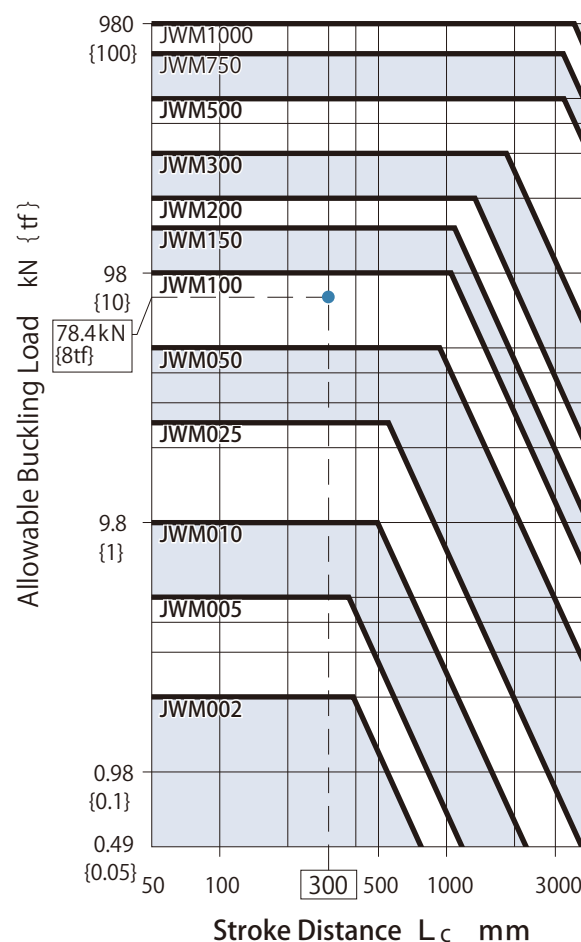
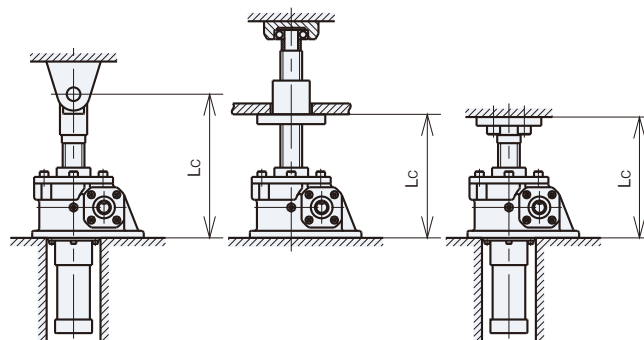
## Allowable Buckling Load for JWM (Machine Screw Type)

- Use this graph to select the correct frame number based on a specific buckling load, for compression loads.  
The graph for Allowable Buckling Load assumes a load safety rate of  $S_f = 4$ .
- ① From the installation conditions shown in A and C below, determine the correct distance for  $L_A$  and  $L_C$ .  
(For other installation conditions, see page 160)
- ② The graphs allow you to select the correct frame number based on a specific load  $W$  (vertical axis) and stroke distance  $L_A$  (horizontal axis).
- Make sure side load does not apply. The graph below assumes no side load.
- If the shaft is loaded in tension buckling can be avoided, and hence be highly economical.

### A Fixed base - Shaft end free



### C Fixed base - Guided shaft end/Fixed shaft end



Notes) 1. The dotted line on the graph represents an example based on  $W78.4\text{kN} \{8\text{tf}\}$  load (buckling safety rate of  $S_f = 4$ ) and installation condition C with a distance of 300mm. From this graph, JWM100 is selected as the suitable frame number for these conditions.

2. If full inspection is required, see page 160 for calculation details.

## Allowable Buckling Load for JWB (Ball Screw Type)

● Use this graph to select the correct frame number based on a specific buckling load, for compression loads.

The graph for Allowable Buckling Load assumes a buckling load safety rate of  $S_f = 4$ .

① From the installation conditions shown in A and C below, determine the correct distance for  $L_A$  and  $L_C$ .

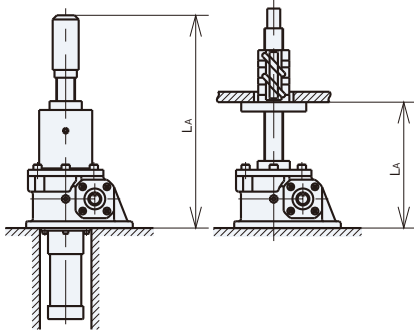
(For other installation conditions, see page 160)

② The graphs allow you to select the correct frame number based on a specific load  $W$  (vertical axis) and stroke distance  $L_A$  (horizontal axis).

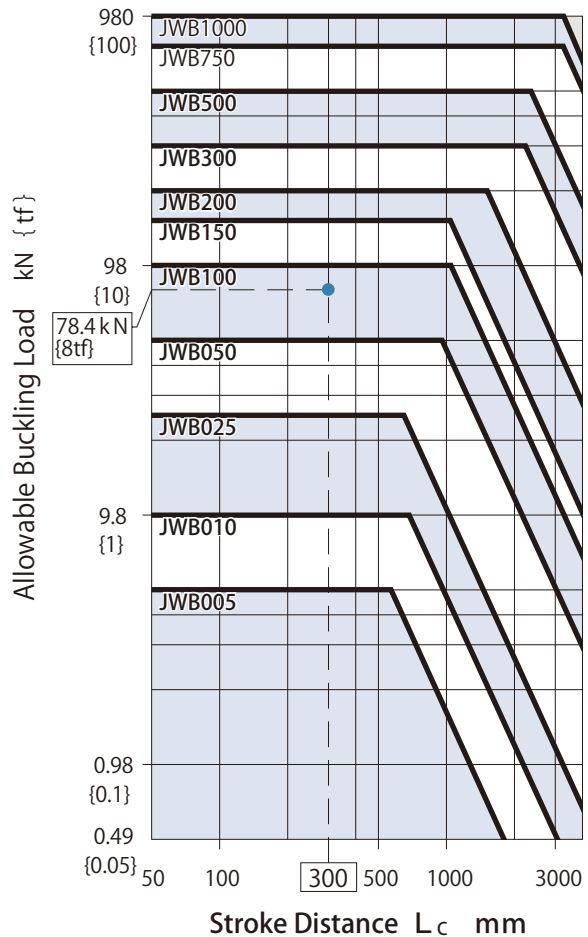
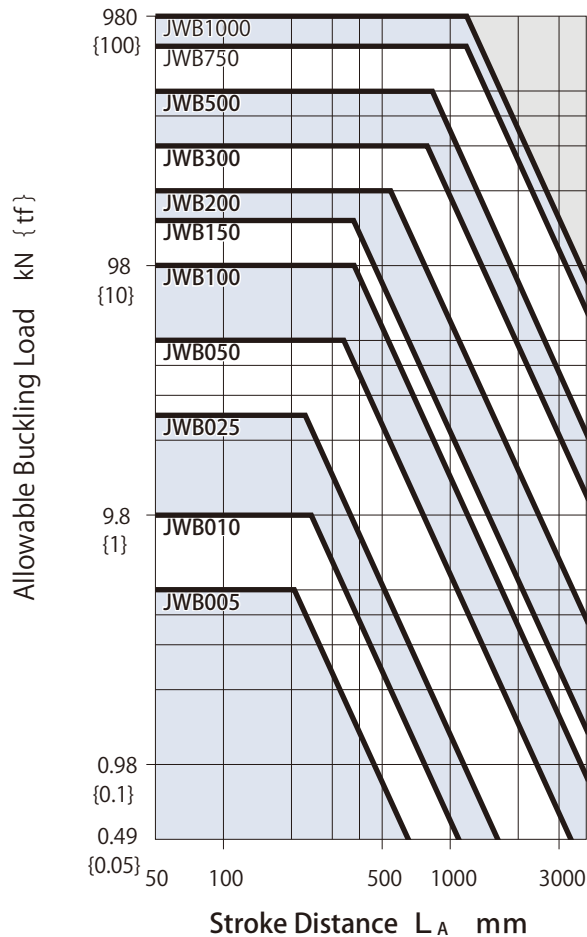
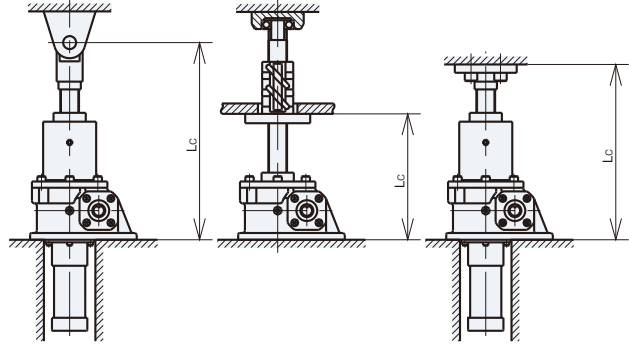
● Make sure side load does not apply. The graph below assumes no side load.

● If the shaft is loaded in tension buckling can be avoided, and hence be highly economical.

### A Fixed base - Shaft end free



### C Fixed base - Guided shaft end/Fixed shaft end



Notes) 1. The dotted line on the graph represents an example based on  $W=78.4\text{kN}$  {8tf} load (buckling safety rate of  $S_f = 4$ ) and installation condition C with a distance of 300mm. From this graph, JWB100 is selected as the suitable frame number for these conditions.

2. If full inspection is required, see page 160 for calculation details.

## Allowable Buckling Load for JWH (High Lead Ball Screw Type)

- Use this graph to select the correct frame number based on a specific buckling load for compression loads.

The graph for Allowable Buckling Load assumes a buckling load safety rate of  $S_f = 4$ .

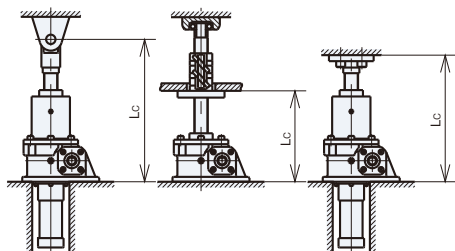
① From the installation condition shown in C below, determine the correct distance for  $L_c$ . (For other installation conditions, see technical data).

② The graph allows you to select the correct frame number based on a specific load  $W$  (vertical axis) and stroke distance  $L_c$  (horizontal axis).

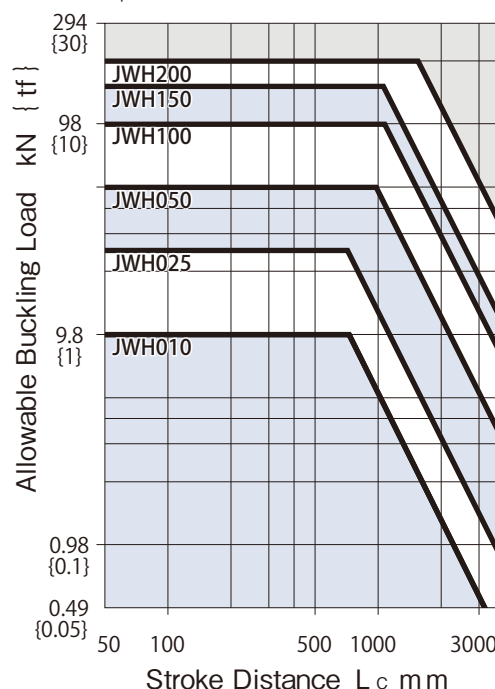
- Make sure side load does not apply. The graph below assumes no side load.

- If the shaft is loaded in tension buckling can be avoided, and hence be highly economical.

### C Fixed base - Guided shaft end/Fixed shaft end



Note) If a detailed study is required, check by the following formula.



## Formula used to calculate Allowable Buckling Load

Formula used to calculate allowable buckling load.

$$P_{CR} = m \times \left( \frac{d^2}{L} \right)^2$$

Make sure  $P_{CR} > W \times S_f$

$P_{CR}$  : Allowable buckling load N { kgf }

$d$  : Screw shaft root diameter mm (Refer to pages 169 • 170 for JWM, pages 195 • 196 for JWB and pages 219 • 220 for JWH)

$m$  : Support coefficient

(Select installation condition from the figures below)

$L$  : Screw shaft projection distance mm

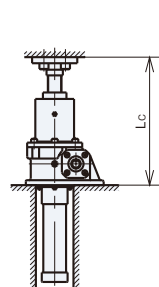
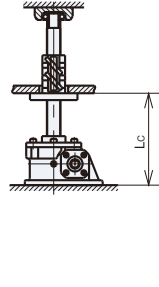
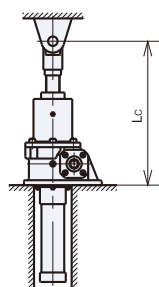
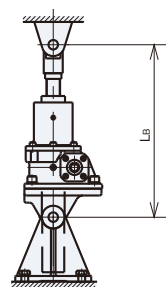
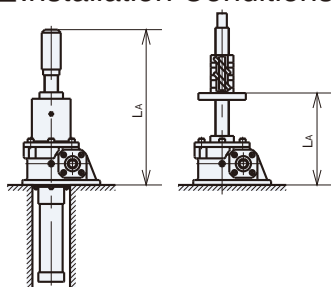
(maximum dimension in the dimensions table of each frame No.:

If an end fitting is required, see the dimension of the end fitting.)

$W$  : Load per jack N { kgf }

$S_f$  : Buckling safety rate (Assume 4)

### Installation Conditions



### A Fixed base-Shaft end free

|                    | m                 |
|--------------------|-------------------|
| SI Unit            | $2.5 \times 10^4$ |
| Gravitational Unit | $2.5 \times 10^3$ |

### B Base and shaft end with clevis

|                    | m                |
|--------------------|------------------|
| SI Unit            | $10 \times 10^4$ |
| Gravitational Unit | $10 \times 10^3$ |

### C Fixed base-Guided shaft end/Fixed shaft end

|                    | m                |
|--------------------|------------------|
| SI Unit            | $20 \times 10^4$ |
| Gravitational Unit | $20 \times 10^3$ |

### SI Unit

We calculate the  $P_{CR}$  of JWM100USH5JI, based on 49000N load and installation condition C (Fixed base and guided shaft end/Fixed shaft end.)

$$P_{CR} = 20 \times 10^4 \times \left( \frac{38.4^2}{791^*} \right)^2$$

$$= 695027 \text{ N}$$

$$W \times S_f = 49000 \times 4 \text{ (assuming } S_f = 4)$$

$$= 196000 \text{ N}$$

$$P_{CR} > W \times S_f$$

$$695027 > 196000 \dots \text{OK}$$

\*  $L = 711 + 80$  (I-type end fitting) = 791  
from the dimensions table on page 181.

### { Gravitational Unit }

We calculate the  $P_{CR}$  of JWM100USH5JI, based on 5000kgf load and installation condition C (Fixed base and guided shaft end/Fixed shaft end.)

$$P_{CR} = 20 \times 10^3 \times \left( \frac{38.4^2}{791^*} \right)^2$$

$$= 69502 \text{ kgf}$$

$$W \times S_f = 5000 \times 4 \text{ (assuming } S_f = 4)$$

$$= 20000 \text{ kgf}$$

$$P_{CR} > W \times S_f$$

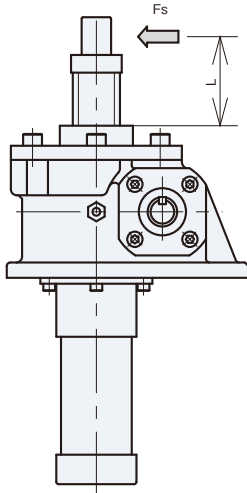
$$69502 > 20000 \dots \text{OK}$$

\*  $L = 711 + 80$  (I-type end fitting) = 791  
from the dimensions table on page 181.

## Allowable Side Load for JWM (Machine Screw Type)

Guides are typically used for Machine Screw Types as shown in the diagram below. However, if the shaft projection distance (L) beyond the housing surface is relatively short, a certain amount of side load is acceptable.

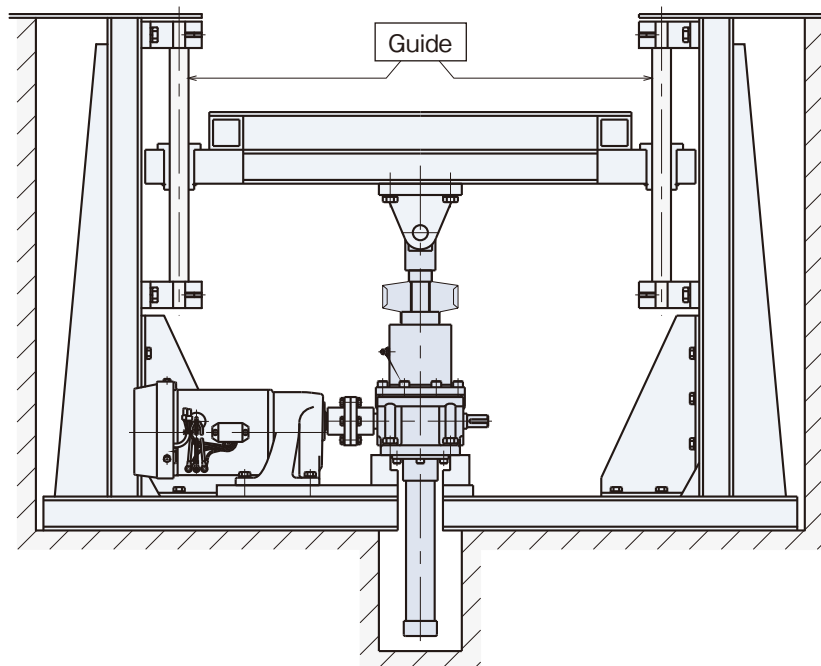
Note) L represents the distance of screw shaft projection that affects side load. It does not refer to stroke distance.



| Frame Number<br>Screw Shaft<br>Projection<br>Distance L, mm | Allowable Side Load |             |             |             |                |                |                |                |                   |                   |                   | N<br>{ kgf }        |
|-------------------------------------------------------------|---------------------|-------------|-------------|-------------|----------------|----------------|----------------|----------------|-------------------|-------------------|-------------------|---------------------|
|                                                             | 002                 | 005         | 010         | 025         | 050            | 100            | 150            | 200            | 300               | 500               | 750               | 1000                |
| 100                                                         | 83<br>{9}           | 128<br>{13} | 318<br>{32} | 570<br>{59} | 2,500<br>{255} | 4,010<br>{409} | 4,610<br>{470} | 8,210<br>{838} | 21,700<br>{2,210} | 85,300<br>{8,700} | 73,500<br>{7,500} | 159,700<br>{16,300} |
| 200                                                         | 42<br>{4}           | 64<br>{7}   | 159<br>{16} | 290<br>{29} | 1,250<br>{128} | 2,010<br>{205} | 2,300<br>{235} | 4,110<br>{419} | 10,800<br>{1,110} | 50,400<br>{5,150} | 56,700<br>{5,780} | 79,900<br>{8,150}   |
| 300                                                         | 28<br>{3}           | 43<br>{4}   | 106<br>{11} | 190<br>{20} | 830<br>{85}    | 1,340<br>{136} | 1,540<br>{157} | 2,740<br>{279} | 7,200<br>{740}    | 33,600<br>{3,430} | 37,800<br>{3,860} | 53,200<br>{5,430}   |
| 400                                                         | 21<br>{2}           | 32<br>{3}   | 79<br>{8}   | 140<br>{15} | 620<br>{64}    | 1,000<br>{102} | 1,150<br>{118} | 2,050<br>{210} | 5,400<br>{550}    | 25,200<br>{2,570} | 28,300<br>{2,890} | 39,900<br>{4,080}   |
| 500                                                         | —<br>—              | 27<br>{3}   | 64<br>{6}   | 110<br>{12} | 500<br>{51}    | 800<br>{82}    | 920<br>{94}    | 1,640<br>{168} | 4,300<br>{440}    | 20,200<br>{2,060} | 22,700<br>{2,310} | 31,900<br>{3,260}   |
| 600                                                         | —<br>—              | 25<br>{3}   | 53<br>{5}   | 100<br>{10} | 420<br>{43}    | 670<br>{68}    | 770<br>{78}    | 1,370<br>{140} | 3,600<br>{370}    | 16,800<br>{1,720} | 18,900<br>{1,930} | 26,600<br>{2,720}   |
| 700                                                         | —<br>—              | 23<br>{2}   | 51<br>{5}   | 90<br>{9}   | 360<br>{36}    | 570<br>{58}    | 660<br>{67}    | 1,170<br>{120} | 3,100<br>{320}    | 14,400<br>{1,470} | 16,200<br>{1,650} | 22,800<br>{2,330}   |
| 800                                                         | —<br>—              | 21<br>{2}   | 48<br>{5}   | 90<br>{9}   | 310<br>{32}    | 500<br>{51}    | 580<br>{59}    | 1,030<br>{105} | 2,700<br>{280}    | 12,600<br>{1,290} | 14,200<br>{1,450} | 20,000<br>{2,040}   |
| 900                                                         | —<br>—              | —<br>—      | 45<br>{5}   | 90<br>{9}   | 280<br>{28}    | 450<br>{45}    | 510<br>{52}    | 910<br>{93}    | 2,400<br>{250}    | 11,200<br>{1,140} | 12,600<br>{1,290} | 17,700<br>{1,810}   |
| 1000                                                        | —<br>—              | —<br>—      | 42<br>{4}   | 90<br>{9}   | 250<br>{26}    | 400<br>{41}    | 460<br>{47}    | 820<br>{84}    | 2,200<br>{220}    | 10,100<br>{1,030} | 11,300<br>{1,160} | 16,000<br>{1,630}   |

## Allowable Side Load for JWB and JWH (Ball Screw and High Lead Ball Screw Types)

If side load applies, make consideration so that it does not directly apply the jack by installing a guide as shown below.



## Expected Travel Distance for JWB and JWH (Ball Screw and High Lead Ball Screw Types)

Ball screw life is determined by the flaking of the rolling surface due to fatigue.

Verify ball screw life expectancy using the graphs shown. However, note that conditions such as severe shock and failure to conduct regular maintenance can largely affect the life of a ball screw.

Expected travel distance (km) = Actual load stroke (m)  
x Usage frequency (times/day) x No. of operating days/yr.  
x  $10^{-3}$  x Expected no. of years

The graph on the right is based on life expectancy of B10. B10 represents distance traveled by 90% of the entire unit.

If selecting a jack based on life, use the following graph and determine the frame number first.

Each graph shows the equivalent Pm or 39.2kN {4tf} for the required expected travel distance, 5km. The coordinates of horizontal and vertical axes suggest suitable frame numbers. In this case, jacks JWB050, JWH050 or above are recommended.

If the load largely fluctuates in the middle of a stroke, use the following formula to calculate equivalent load.

$$P_M = \frac{P_{MIN} + 2 \times P_{MAX}}{3}$$

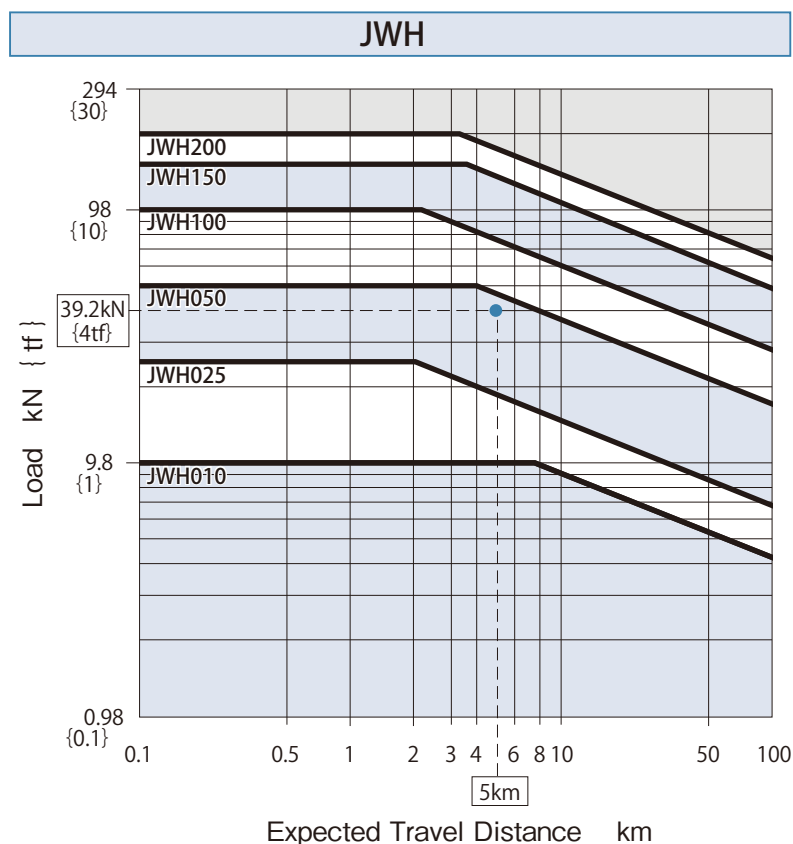
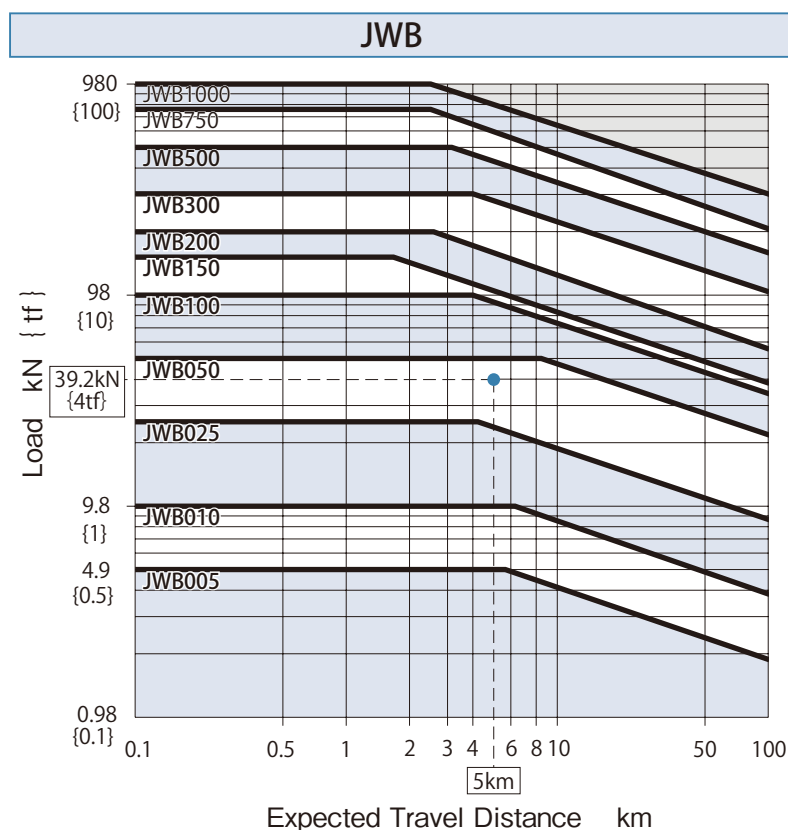
$P_M$  : Equivalent load kN { kgf }

$P_{MIN}$  : Minimum load kN { kgf }

$P_{MAX}$  : Maximum load kN { kgf }

<JWM (Machine Screw Type) Expected Travel Distance>  
Machine screw life cannot be determined by the formula used to calculate a ball screw wear life. Use the information below as a reference.

JWM050 and below---5km (Average expected life)  
JWM100 and above---1km (Average expected life)



## Technical Data

### 1. Allowable Overhang Load

When installing a sprocket, gear, or belt, use the following formula to verify that any overhang load applied to the shaft falls within the allowable OHL (Table 1).

$$\text{Allowable O. H. L.} \geq \frac{T \times f \times L_f}{R}$$

O.H.L. : Overhang load N {kgf}  
 T : Input torque N · m {kgf · m}  
 f : Coefficient - power transmission element  
 L<sub>f</sub> : Coefficient-Load position  
 R : Sprocket, Gear, V pulley or Pitch diameter m

Table 2. Coefficient- Power Transmission Element ( f )

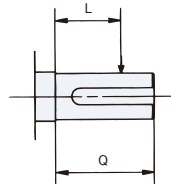
|           |      |
|-----------|------|
| Chain     | 1.00 |
| Gear      | 1.25 |
| V Belt    | 1.50 |
| Flat Belt | 2.50 |

Table 3. Coefficient (L<sub>f</sub>) - Load Position

| L/Q            | Below 0.5 | 0.75 | 1 |
|----------------|-----------|------|---|
| L <sub>f</sub> | 1         | 1.5  | 2 |

Table 1. Allowable O.H.L.

| Frame No.                       |         | 002  | 005  | 010  | 025   | 050   | 100   | 150   | 200   | 300   | 500    | 750    | 1000   |
|---------------------------------|---------|------|------|------|-------|-------|-------|-------|-------|-------|--------|--------|--------|
| JWM (Machine Screw Type)        | N       | 99   | 200  | 380  | 710   | 1500  | 2270  | 3160  | 4320  | 6110  | 10100  | 13900  | 18000  |
| H Speed                         | { kgf } | {10} | {21} | {39} | {73}  | {153} | {232} | {323} | {441} | {624} | {1030} | {1420} | {1840} |
| JWM (Machine Screw Type)        | N       | 63   | 120  | 220  | 420   | 820   | 1430  | 1950  | 2800  | 4400  | 6650   | 9390   | 13200  |
| L Speed                         | { kgf } | {6}  | {13} | {23} | {44}  | {85}  | {146} | {200} | {286} | {449} | {678}  | {958}  | {1350} |
| JWB (Ball Screw Type)           | N       | —    | 130  | 220  | 480   | 870   | 1290  | 2030  | 2490  | 3450  | 5240   | 7200   | 9790   |
| H Speed                         | { kgf } | —    | {14} | {23} | {50}  | {89}  | {132} | {208} | {255} | {352} | {535}  | {735}  | {998}  |
| JWB (Ball Screw Type)           | N       | —    | 82   | 140  | 290   | 500   | 840   | 1300  | 1610  | 2400  | 3560   | 4940   | 6970   |
| L Speed                         | { kgf } | —    | {8}  | {15} | {31}  | {52}  | {86}  | {133} | {165} | {245} | {363}  | {504}  | {711}  |
| JWH (High Lead Ball Screw Type) | N       | —    | —    | 530  | 980   | 1510  | 2390  | 3130  | 3840  | —     | —      | —      | —      |
| H Speed                         | { kgf } | —    | —    | {54} | {100} | {154} | {244} | {320} | {392} | —     | —      | —      | —      |



Q : Shaft Length  
 L : Loaded Position

### 2. Screw Shaft rpm

When using a travel nut with screw shaft rotation, make sure the screw shaft rpm is within the rated value determined by the following formula. In cases where it exceeds the allowable rate, increase the frame number and recalculate.

(Verify the allowable screw shaft rpm if the input rpm is 900 r/min or over with H speed standard stroke, or if the stroke used exceeds the standard value.)

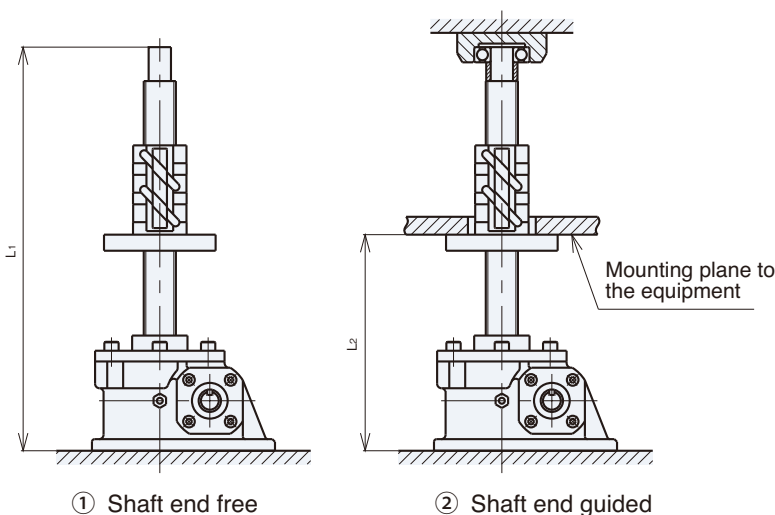
$$NC = \frac{96 \times n \times d \times 10^6}{L^2}$$

NC : Allowable screw shaft rpm r/min  
 d : Screw shaft root diameter mm  
 (See pages 169 · 170 for JWM, pages 195 · 196 for JWB and pages 219 · 220 for JWH.)  
 n : Shaft end support coefficient  
 ① Shaft end free: n=0.36  
 ② Fixed shaft end: n=1.56  
 L : Support space distance mm (See graph for each frame no.)

$$NS = \frac{N}{R}$$

NS : Screw shaft rpm r/min  
 N : Input rpm r/min  
 R : Worm speed ratio

### MAKE SURE NC > NS



(Calculation Example)

Assume JWM200URH20D with input rpm of 1200r/min with fixed shaft end.

Screw shaft rpm N<sub>s</sub> is:

$$NS = \frac{1200}{8} = 150\text{r/min}$$

\* See dimensions on page 186

$$NC = \frac{96 \times 1.56 \times 51.3 \times 10^6}{2237^2}$$

$$= 1535\text{r/min}$$

$$NC = 1535\text{r/min} > NS = 150\text{r/min} \cdots \text{OK}$$

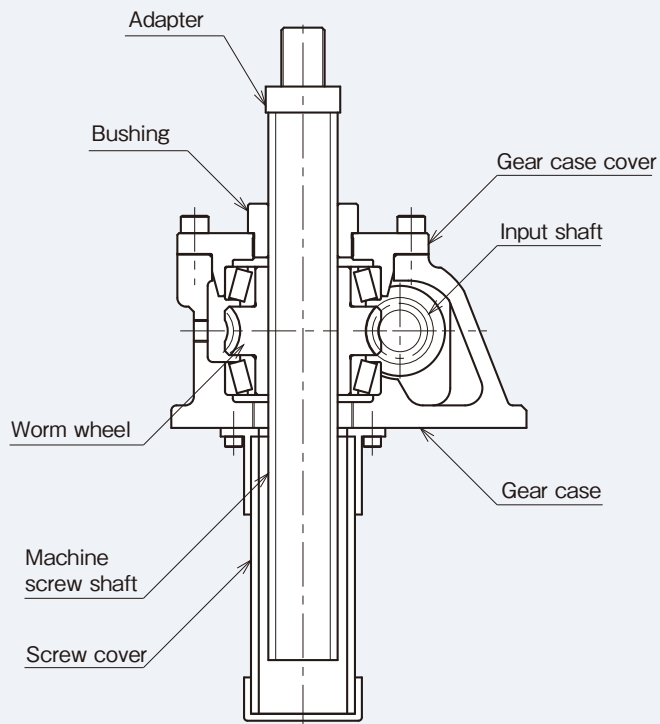
# Linipower Jack

## JWM (Machine Screw Type)

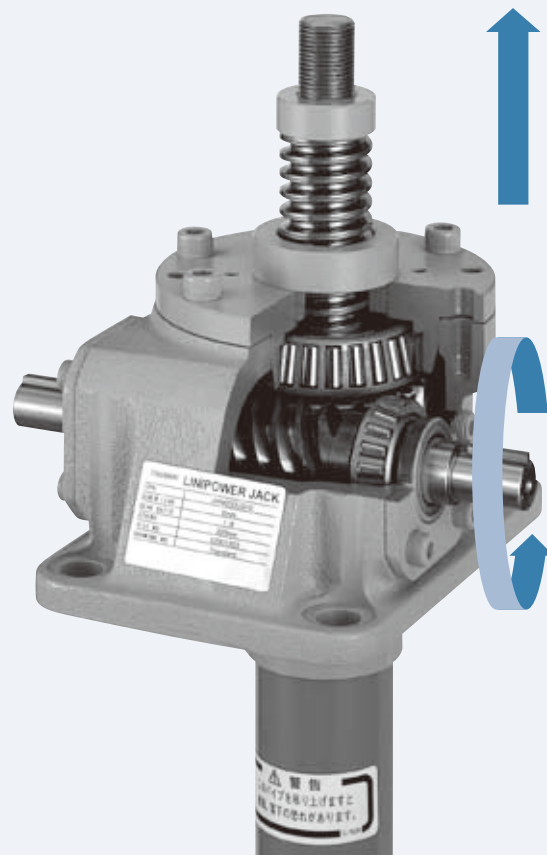
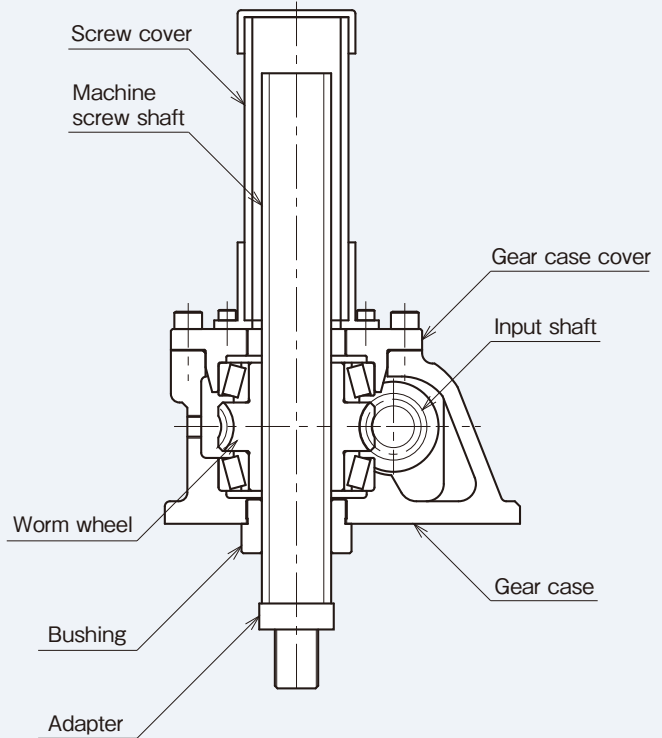


|                                  |          |
|----------------------------------|----------|
| Drawings                         | P165•166 |
| JWM Reference Number System      | P167•168 |
| Reference Table for Standard Use | P169•170 |
| Dimensions                       | P171~188 |
| Precautions                      | P189     |

JWM Standard Model for Lifting



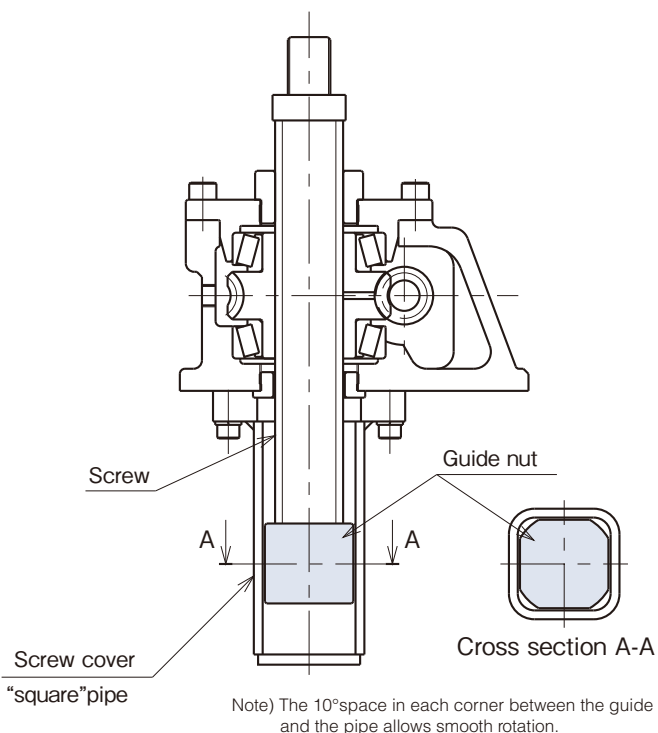
JWM Standard Model for Suspending



## JWM (Machine Screw Type) Rotation Prevention Type

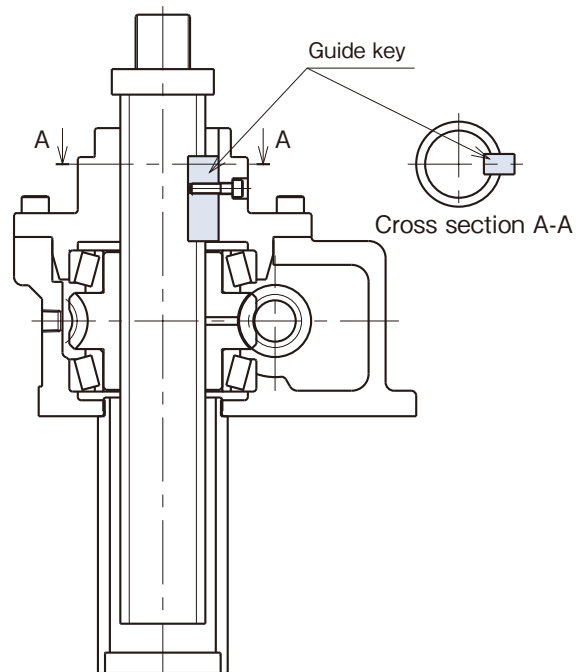
### JWM002~050

〈Rotation Prevention Type with Guide Nut〉

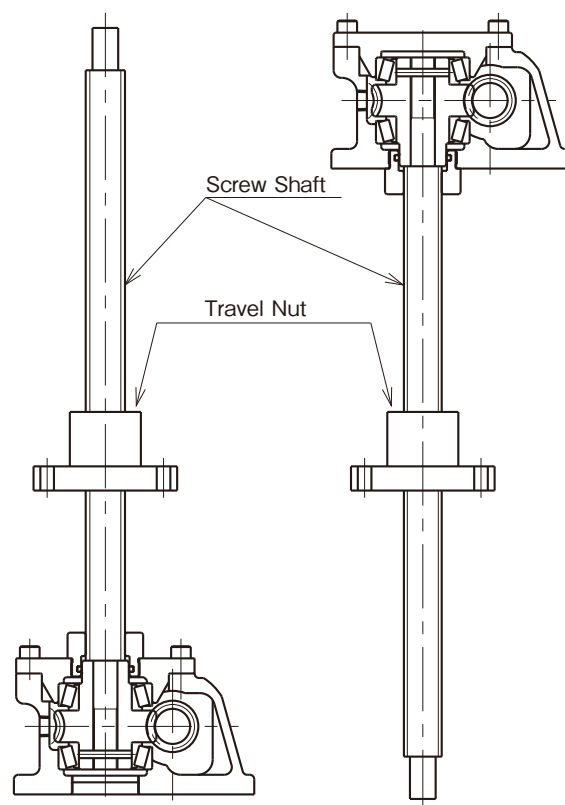
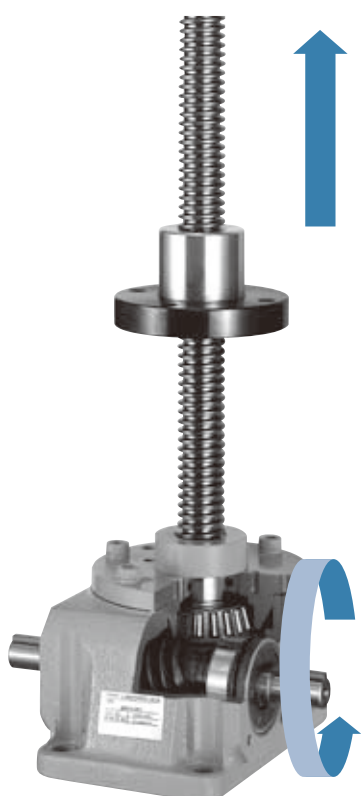


### JWM100•150•200

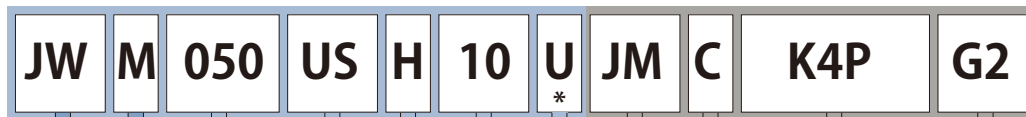
〈Rotation Prevention Type with Guide Key〉



## JWM (Machine Screw Type) Travel Nut Type



# JWM (Machine Screw Type)



Linipower Jack

Jack Type  
M : Machine screw

## Basic Capacity

| Frame No. | kN   | {tf}  |
|-----------|------|-------|
| 002       | 1.96 | {0.2} |
| 005       | 4.90 | {0.5} |
| 010       | 9.80 | {1}   |
| 025       | 24.5 | {2.5} |
| 050       | 49.0 | {5}   |
| 100       | 98.0 | {10}  |
| 150       | 147  | {15}  |
| 200       | 196  | {20}  |
| 300       | 294  | {30}  |
| 500       | 490  | {50}  |
| 750       | 735  | {75}  |
| 1000      | 980  | {100} |

\*Compact type is available for JWM300 and 500. See page 257.

\*JWM750 and 1000 are manufactured upon inspecting specific needs.

## Installation Type

|    |                                                                               |
|----|-------------------------------------------------------------------------------|
| US | Standard Use - Lifting<br>                                                    |
| DS | Standard Use - Suspending<br>                                                 |
| UM | Screw shaft anti-rotation specification for lifting<br><br>(See page 166.)    |
| DM | Screw shaft anti-rotation specification for Suspending<br><br>(See page 166.) |

## Stroke mm

|    |      |
|----|------|
| 1  | 100  |
| 3  | 300  |
| 6  | 600  |
| 10 | 1000 |

\*The above values are examples. For actual stroke used, refer to the Model comparison Table for JWM on page 145.

## Gear Ratio

| Symbol Frame No. | H                              | L  |
|------------------|--------------------------------|----|
| 002              | 5                              | 20 |
| 005              | 5                              | 20 |
| 010              | 5                              | 20 |
| 025              | 6                              | 24 |
| 050              | 6                              | 24 |
| 100              | 8                              | 24 |
| 150              | 8                              | 24 |
| 200              | 8                              | 24 |
| 300              | 10 <sup>2</sup> / <sub>3</sub> | 32 |
| 500              | 10 <sup>2</sup> / <sub>3</sub> | 32 |
| 750              | 10 <sup>2</sup> / <sub>3</sub> | 32 |
| 1000             | 12                             | 36 |

## Flange Installation

|   |  |
|---|--|
| U |  |
| D |  |

|    |                             |
|----|-----------------------------|
| UR | Travel Nut - Lifting<br>    |
| DR | Travel Nut - Suspending<br> |

\*Be sure to use the flange installation method U or D with travel nuts.

\*Above are only necessary with travel nuts.

## Examples)

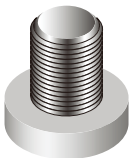
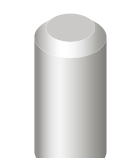
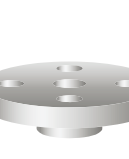
### JWM100UMH3

- Machine Screw Type • 98.0kN {10tf} • Rotation prevention (for lifting) • Gear ratio H (1/8) • Stroke 300mm

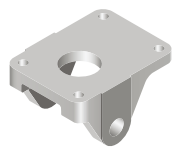
### JWM050USH10JMK4PG2

- Machine Screw Type • 49.0kN {5tf} • Standard use (for lifting) • Gear ratio H (1/6) • Stroke 1000mm
- Bellows / Table Type End Fitting • 4 Internal LS • Potentiometer
- 3 Phase motor with brake and gear; reducer ratio of 1/10

## Output Option

|           |                                                                                                                  |
|-----------|------------------------------------------------------------------------------------------------------------------|
| No symbol | Screw Shaft End (standard)<br> |
| J         | Bellows<br>                   |
| B         | Rod Type End Fitting<br>      |
| I         | I Type End Fitting<br>        |
| M         | Table Type End Fitting<br>    |

## Installation Option

|   |                                                                                                               |
|---|---------------------------------------------------------------------------------------------------------------|
| C | Clevis Mounting Adapter<br> |
|---|---------------------------------------------------------------------------------------------------------------|

Note) For standard lifting only.

## Sensor Option

|    |                                                                                                                                                                                               |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Y  | LS Counter<br>                                                                                              |
| K2 | Position Sensor<br>K2...2 Internal LS<br>K4...4 Internal LS<br>P...Potentiometer<br>R...Rotary Encoder<br> |

(See page 239)

(See page 241)

Note) To request the above parts, provide their letter symbols in the order given.

## Input Option

|    |                                                                                                                                                                                                                                     |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E  | 3 phase brake and motor<br>E...200V 50Hz<br>200/220V 60Hz<br>EV...400 50Hz<br>400/440V 60Hz<br>                                                 |
| G1 | 3 phase brake and gear-motor<br>G1...Gear ratio 1/5<br>200V 50Hz<br>200/220V 60Hz<br>G2...Reducer ratio 1/10<br>200V 50Hz<br>200/220V 60Hz<br> |

(See page 229~)

(See page 229~)

## Accessories

### Hand Wheel



(See page 246)

### Control Options

Stroke Meter and PCB



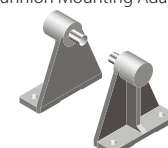
Meter Relay and PCB



(See page 242~)

### Others

Trunnion Mounting Adapter



\* Use as a set with clevis mounting adapter.

(See page 245)

Note) To request the above parts, provide their letter symbols in the order given. When travel nuts are used, B, I and M are not required.

Note) Travel nut type with bellows is estimated for each order. Enter necessary information in the inquiry form on page 249 to contact TSUBAKI E&M.

## Reference Table for Standard Use JWM (Machine Screw Type)

| Frame No.                                           |                              | JWM002                                  | JWM005                                                                                            | JWM010 | JWM025  | JWM050 |
|-----------------------------------------------------|------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------|--------|---------|--------|
| Basic Capacity                                      | kN                           | 1.96                                    | 4.90                                                                                              | 9.80   | 24.5    | 49.0   |
|                                                     | {tf}                         | {0.2}                                   | {0.5}                                                                                             | {1}    | {2.5}   | {5}    |
| Outer Screw Diameter                                | mm                           | 12                                      | 16                                                                                                | 20     | 26      | 40     |
| Minor Screw Diameter                                | mm                           | 8.8                                     | 10.8                                                                                              | 14.8   | 19.7    | 30.5   |
| Screw Lead                                          | mm                           | 3                                       | 4                                                                                                 | 4      | 5       | 8      |
| Gear Ratio                                          | H Speed                      | 5                                       | 5                                                                                                 | 5      | 6       | 6      |
|                                                     | L Speed                      | 20                                      | 20                                                                                                | 20     | 24      | 24     |
| Overall Efficiency                                  | %                            |                                         |                                                                                                   |        |         |        |
|                                                     | H Speed                      | 26                                      | 26                                                                                                | 21     | 21      | 22     |
|                                                     | L Speed                      | 15                                      | 15                                                                                                | 12     | 12      | 14     |
| Max. Allowable Input Capacity                       | kW                           |                                         |                                                                                                   |        |         |        |
|                                                     | H Speed                      | 0.16                                    | 0.39                                                                                              | 0.49   | 1.0     | 2.0    |
|                                                     | L Speed                      | 0.08                                    | 0.18                                                                                              | 0.36   | 0.46    | 0.63   |
| Tare Drag Torque                                    | N • m                        | 0.11                                    | 0.11                                                                                              | 0.29   | 0.62    | 1.4    |
|                                                     | {kgf • m}                    | {0.011}                                 | {0.011}                                                                                           | {0.03} | {0.063} | {0.14} |
| Allowable Input Torque *Note 1                      | N • m                        | 9.8                                     | 9.8                                                                                               | 19.6   | 49.0    | 153.9  |
|                                                     | {kgf • m}                    | {1}                                     | {1}                                                                                               | {2}    | {5}     | {15.7} |
| Required Input Torque *Note 2<br>for Basic Capacity | N • m                        |                                         |                                                                                                   |        |         |        |
|                                                     | {kgf • m}                    |                                         |                                                                                                   |        |         |        |
|                                                     | H Speed                      | 0.83                                    | 2.5                                                                                               | 6.2    | 16.1    | 48.7   |
|                                                     | L Speed                      | 0.42                                    | 1.1                                                                                               | 2.9    | 7.4     | 20.0   |
| Screw Movement/<br>per Revolution of Input Shaft    | mm                           |                                         |                                                                                                   |        |         |        |
|                                                     | H Speed                      | 0.6                                     | 0.8                                                                                               | 0.8    | 0.83    | 1.33   |
|                                                     | L Speed                      | 0.15                                    | 0.2                                                                                               | 0.2    | 0.21    | 0.33   |
| Max. Input rpm                                      | r/min                        |                                         |                                                                                                   |        |         |        |
|                                                     | H Speed                      | 1800                                    | 1800                                                                                              | 1800   | 1800    | 1800   |
|                                                     | L Speed                      | 1800                                    | 1800                                                                                              | 1800   | 1800    | 1800   |
| Max. Input rpm<br>for Basic Capacity                | r/min                        |                                         |                                                                                                   |        |         |        |
|                                                     | H Speed                      | 1800                                    | 1500                                                                                              | 750    | 600     | 400    |
|                                                     | L Speed                      | 1800                                    | 1500                                                                                              | 1200   | 600     | 300    |
| Screw Shaft Rotational<br>Torque for Basic Capacity | N • m                        | 2.6                                     | 8.6                                                                                               | 20.1   | 65.1    | 201.5  |
|                                                     | {kgf • m}                    | {0.26}                                  | {0.87}                                                                                            | {2.1}  | {6.6}   | {20.5} |
| Screw Cover Material *Note 3                        |                              | Hard Vinyl Chloride                     |                                                                                                   |        |         |        |
| Lubrication                                         |                              | Shaft: Grease Reducer Unit: Grease Bath |                                                                                                   |        |         |        |
| Color                                               |                              | Tsubaki Olive Grey (Munsell 5GY6/0.5)   |                                                                                                   |        |         |        |
| Environment                                         | Operating Temperature Range  |                                         | — 15 to 80°C (Precautions #2)                                                                     |        |         |        |
|                                                     | Relative Humidity            |                                         | 85% or less (no dew condensation)                                                                 |        |         |        |
|                                                     | Operating ambient atmosphere |                                         | Indoor Environment (Indoor room where rain and water cannot enter. Dust volume should be normal.) |        |         |        |
| Duty Cycle *Note 4                                  |                              | Within 20% ED                           |                                                                                                   |        |         |        |

Note 1) The allowable torque is for jack input shaft only. (Reconfirm if synchronous drive.)

Note 2) Includes tare drag torque.

Note 3) Rotation prevention types for frames 002~050 are steel square pipes.

Note 4) Standard percentage duty cycle is 30 minutes. Thus, driving time is based on 30 minute intervals.

### Precautions

1. All loads (static, dynamic or shock) should be within the rated capacity of the jack at sufficient safety levels.
2. Operating Temperature Range refers to the surface temperature of the jack during operation. To check, measure the surface temperature of the input shaft unit or travel nut (if used). Be sure all the rotating parts have completely stopped before proceeding to measure.
3. Be sure to operate within the allowable input rpm of 1800/min.
4. Number of synchronizing jacks which can be connected on the same line is limited by shaft strength. Refer to the allowable input shaft torque on the above table.
5. Activating torque for the drive unit should be maintained at 200% above the required torque.
6. If operating in freezing temperatures, a change in viscosity may reduce the efficiency of the grease. Set the drive unit so as to accommodate this change.

| JWM100                                                                                            | JWM150 | JWM200  | JWM300  | JWM500  | JWM750  | JWM1000  |
|---------------------------------------------------------------------------------------------------|--------|---------|---------|---------|---------|----------|
| 98.0                                                                                              | 147    | 196     | 294     | 490     | 735     | 980      |
| {10}                                                                                              | {15}   | {20}    | {30}    | {50}    | {75}    | {100}    |
| 50                                                                                                | 55     | 65      | 85      | 120     | 130     | 150      |
| 38.4                                                                                              | 43.4   | 51.3    | 67      | 102     | 112     | 127      |
| 10                                                                                                | 10     | 12      | 16      | 16      | 16      | 20       |
| 8                                                                                                 | 8      | 8       | 10 2/3  | 10 2/3  | 10 2/3  | 12       |
| 24                                                                                                | 24     | 24      | 32      | 32      | 32      | 36       |
| 22                                                                                                | 20     | 20      | 19      | 15      | 13      | 13       |
| 15                                                                                                | 14     | 13      | 11      | 10      | 8       | 8        |
| 2.8                                                                                               | 3.1    | 5.0     | 8.4     | 13.4    | 14.4    | 21.4     |
| 1.4                                                                                               | 2.2    | 3.2     | 4.6     | 5.7     | 7.2     | 9.4      |
| 2.0                                                                                               | 2.6    | 3.9     | 9.8     | 19.6    | 29.4    | 39.2     |
| {0.2}                                                                                             | {0.27} | {0.4}   | {1}     | {2}     | {3}     | {4}      |
| 292                                                                                               | 292.0  | 292.0   | 735.0   | 1372.0  | 1764.0  | 2450.0   |
| {29.8}                                                                                            | {29.8} | {29.8}  | {75}    | {140}   | {180}   | {250}    |
| 90.7                                                                                              | 149    | 238.1   | 400.1   | 856.0   | 1380.5  | 2040.9   |
| {9.2}                                                                                             | {15.2} | {24.3}  | {40.8}  | {87.3}  | {140.7} | {208.0}  |
| 45.3                                                                                              | 72.3   | 124.0   | 244.0   | 453.3   | 761.3   | 1278.3   |
| {4.6}                                                                                             | {7.4}  | {12.6}  | {24.9}  | {46.2}  | {77.6}  | {130.3}  |
| 1.25                                                                                              | 1.25   | 1.50    | 1.50    | 1.50    | 1.50    | 1.67     |
| 0.42                                                                                              | 0.42   | 0.50    | 0.50    | 0.50    | 0.50    | 0.56     |
| 1800                                                                                              | 1800   | 1800    | 1800    | 1800    | 1800    | 1800     |
| 1800                                                                                              | 1800   | 1800    | 1800    | 1800    | 1800    | 1800     |
| 300                                                                                               | 200    | 200     | 200     | 150     | 100     | 100      |
| 300                                                                                               | 290    | 250     | 180     | 120     | 90      | 70       |
| 503.6                                                                                             | 813.2  | 1287.7  | 2531.9  | 5551.3  | 8921.8  | 13878.3  |
| {51.3}                                                                                            | {82.9} | {131.3} | {258.1} | {565.9} | {909.5} | {1414.7} |
| Steel Pipe                                                                                        |        |         |         |         |         |          |
| Screw: Grease Reducer Unit: Grease Bath                                                           |        |         |         |         |         |          |
| Tsubaki Olive Grey (Munsell 5GY6/0.5)                                                             |        |         |         |         |         |          |
| - 15 to 80°C (Precautions #2)                                                                     |        |         |         |         |         |          |
| 85% or less (no dew condensation)                                                                 |        |         |         |         |         |          |
| Indoor Environment (Indoor room where rain and water cannot enter. Dust volume should be normal.) |        |         |         |         |         |          |
| Within 20% ED                                                                                     |        |         |         |         |         |          |

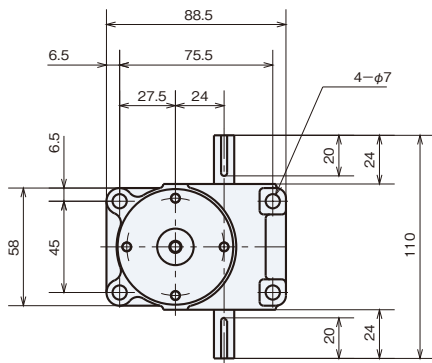
7. Although JWM (Machine Screw Type) comes with a self-locking device, it may not be effective with vibration or shock. Use a brake under such conditions.

⚠8. Be certain that the jack rating exceeds the maximum stroke. Over travel can cause the lift shaft to disengage from the worm wheel. JWM (Machine screw type) is not equipped with a fall stop, therefore, if the stroke range is exceeded, the screw shaft falls.

⚠9. Do not use mechanical stops under any circumstances. This will cause major internal damage.

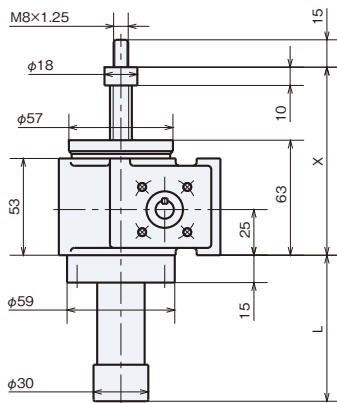
10. Input shaft key is provided with each unit.  
(The input shaft key complies with JIS B 1301-1996 (normal grade).)

## JWM002 Dimensions - Standard Model

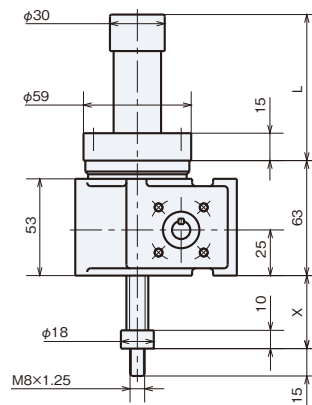


| Stroke | US Standard Model for Lifting |     |              |     |     | DS Standard Model for Suspending |     |              |     |     | Weight kg |
|--------|-------------------------------|-----|--------------|-----|-----|----------------------------------|-----|--------------|-----|-----|-----------|
|        | X                             |     | X            |     | L   | X                                |     | X            |     | L   |           |
|        | Without Bellows               |     | With Bellows |     |     | Without Bellows                  |     | With Bellows |     |     |           |
|        | MIN                           | MAX | MIN          | MAX | MIN | MAX                              | MIN | MAX          |     |     |           |
| 100    | 73                            | 173 | 127          | 227 | 184 | 20                               | 120 | 65           | 165 | 184 | 2.3       |
| 200    | 73                            | 273 | 127          | 327 | 284 | 20                               | 220 | 65           | 265 | 284 | 2.4       |
| 300    | 73                            | 373 | 167          | 467 | 424 | 20                               | 320 | 105          | 405 | 424 | 2.6       |
| 400    | 73                            | 473 | 167          | 567 | 524 | 20                               | 420 | 105          | 505 | 524 | 2.7       |

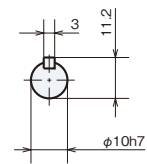
Lift (JWM002US)



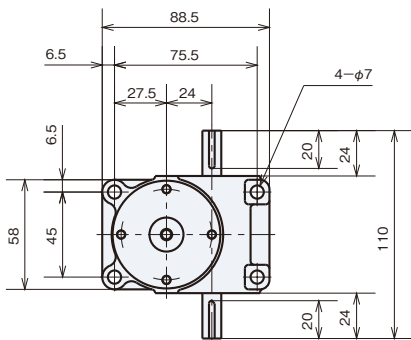
Suspend (JWM002DS)



●Input Shaft

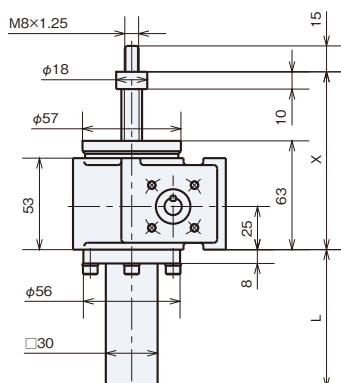


## JWM002 Dimensions - Rotation Prevention Type

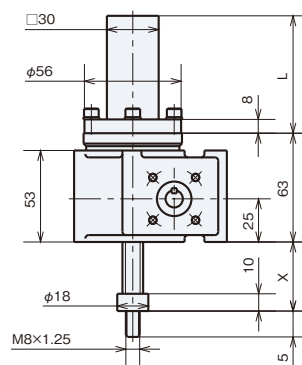


| Stroke | UM Rotation Prevention Type for Lifting |     |              |     |     | DM Rotation Prevention Type for Suspending |     |              |     |     | Weight kg |
|--------|-----------------------------------------|-----|--------------|-----|-----|--------------------------------------------|-----|--------------|-----|-----|-----------|
|        | X                                       |     | X            |     | L   | X                                          |     | X            |     | L   |           |
|        | Without Bellows                         |     | With Bellows |     |     | Without Bellows                            |     | With Bellows |     |     |           |
|        | MIN                                     | MAX | MIN          | MAX |     | MIN                                        | MAX | MIN          | MAX |     |           |
| 100    | 73                                      | 173 | 127          | 227 | 202 | 20                                         | 120 | 65           | 165 | 202 | 3.0       |
| 200    | 73                                      | 273 | 127          | 327 | 302 | 20                                         | 220 | 65           | 265 | 302 | 3.4       |
| 300    | 73                                      | 373 | 167          | 467 | 442 | 20                                         | 320 | 105          | 405 | 442 | 3.9       |
| 400    | 73                                      | 473 | 167          | 567 | 542 | 20                                         | 420 | 105          | 505 | 542 | 4.3       |

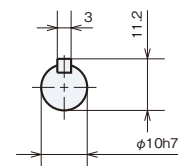
Lift (JWM002UM)



Suspend (JWM002DM)

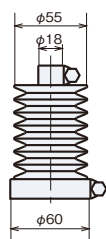


●Input Shaft

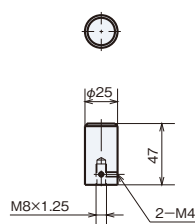


## Output Options

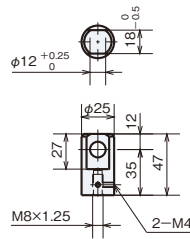
■ Bellows ( - J)



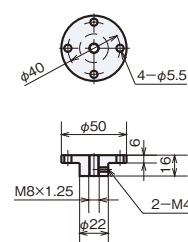
■ Rod Type End Fitting ( - B)



■ I Type End Fitting ( - I)

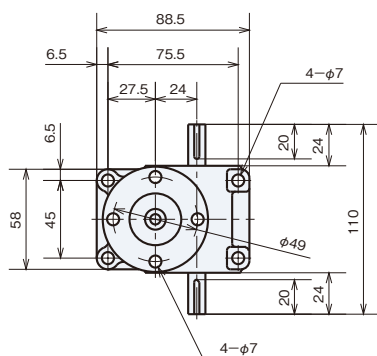


■ Table Type End Fitting ( - M)



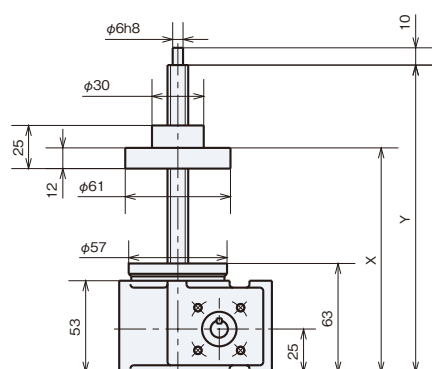
Note) For detailed measurements on units with bellows, see page 248.

## JWM002 Dimensions - Travel Nut Type

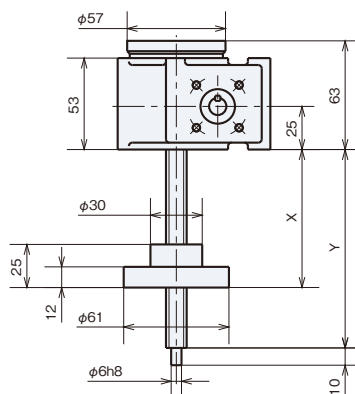


| Stroke | UR Travel Nut Type for Lifting |     |     | DR Travel Nut Type for Suspending |     |     | Weight kg |
|--------|--------------------------------|-----|-----|-----------------------------------|-----|-----|-----------|
|        | X                              |     | Y   | X                                 |     | Y   |           |
|        | MIN                            | MAX |     | MIN                               | MAX |     |           |
| 100    | 84                             | 184 | 207 | 35                                | 135 | 145 | 2.6       |
| 200    | 84                             | 284 | 307 | 35                                | 235 | 245 | 2.6       |
| 300    | 84                             | 384 | 407 | 35                                | 335 | 345 | 2.7       |
| 400    | 84                             | 484 | 507 | 35                                | 435 | 445 | 2.8       |

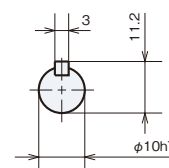
Lift (JWM002UR)



Suspend (JWM002DR)

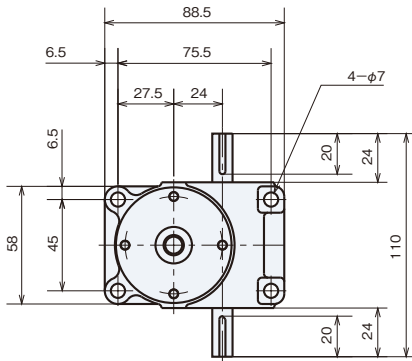


● Input Shaft



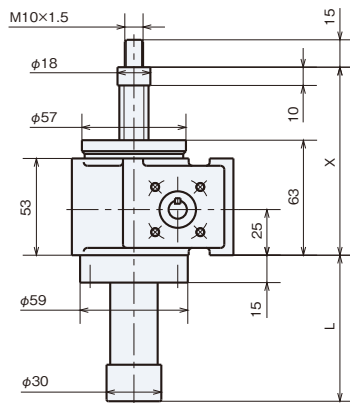
Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

## JWM005 Dimensions - Standard Model

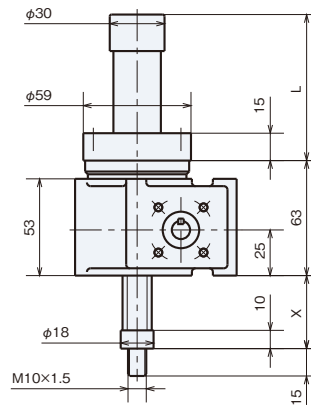


| Stroke | US Standard Model for Lifting |     |              |      |     | DS Standard Model for Suspending |     |              |     |     | Weight kg |
|--------|-------------------------------|-----|--------------|------|-----|----------------------------------|-----|--------------|-----|-----|-----------|
|        | X                             |     | X            |      | L   | X                                |     | X            |     | L   |           |
|        | Without Bellows               |     | With Bellows |      |     | Without Bellows                  |     | With Bellows |     |     |           |
|        | MIN                           | MAX | MIN          | MAX  | MIN | MAX                              | MIN | MAX          |     |     |           |
| 100    | 73                            | 173 | 127          | 227  | 188 | 20                               | 120 | 65           | 165 | 188 | 2.5       |
| 200    | 73                            | 273 | 127          | 327  | 288 | 20                               | 220 | 65           | 265 | 288 | 2.6       |
| 300    | 73                            | 373 | 167          | 467  | 428 | 20                               | 320 | 105          | 405 | 428 | 2.8       |
| 400    | 73                            | 473 | 167          | 567  | 528 | 20                               | 420 | 105          | 505 | 528 | 3.0       |
| 500    | 73                            | 573 | 202          | 702  | 663 | 20                               | 520 | 140          | 640 | 663 | 3.2       |
| 600    | 73                            | 673 | 202          | 802  | 763 | 20                               | 620 | 140          | 740 | 763 | 3.3       |
| 800    | 73                            | 873 | 237          | 1037 | 998 | 20                               | 820 | 175          | 975 | 998 | 3.7       |

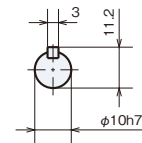
Lift (JWM005US)



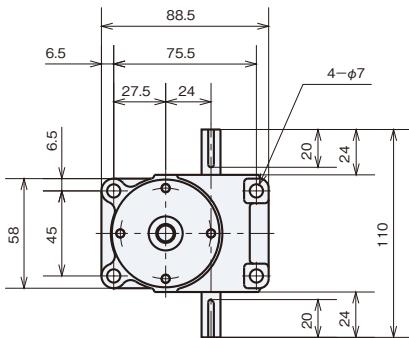
Suspend (JWM005DS)



● Input Shaft

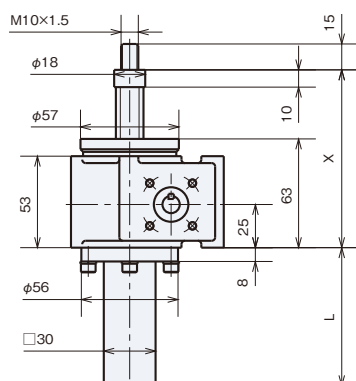


## JWM005 Dimensions - Rotation Prevention Type

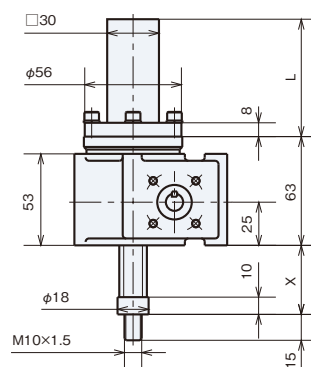


| Stroke | UM Rotation Prevention Type for Lifting |              |                 |              |      | DM Rotation Prevention Type for Suspending |     |     |     |      | Weight kg |
|--------|-----------------------------------------|--------------|-----------------|--------------|------|--------------------------------------------|-----|-----|-----|------|-----------|
|        | X                                       |              | X               |              | L    | X                                          |     | X   |     | L    |           |
|        | Without Bellows                         | With Bellows | Without Bellows | With Bellows |      |                                            |     |     |     |      |           |
|        | MIN                                     | MAX          | MIN             | MAX          |      | MIN                                        | MAX | MIN | MAX |      |           |
| 100    | 73                                      | 173          | 127             | 227          | 202  | 20                                         | 120 | 65  | 165 | 202  | 3.1       |
| 200    | 73                                      | 273          | 127             | 327          | 302  | 20                                         | 220 | 65  | 265 | 302  | 3.5       |
| 300    | 73                                      | 373          | 167             | 467          | 442  | 20                                         | 320 | 105 | 405 | 442  | 4.1       |
| 400    | 73                                      | 473          | 167             | 567          | 542  | 20                                         | 420 | 105 | 505 | 542  | 4.6       |
| 500    | 73                                      | 573          | 202             | 702          | 677  | 20                                         | 520 | 140 | 640 | 677  | 5.1       |
| 600    | 73                                      | 673          | 202             | 802          | 777  | 20                                         | 620 | 140 | 740 | 777  | 5.5       |
| 800    | 73                                      | 873          | 237             | 1037         | 1012 | 20                                         | 820 | 175 | 975 | 1012 | 6.5       |

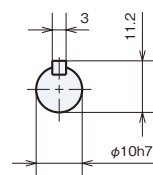
Lift (JWM005UM)



Suspend (JWM005DM)

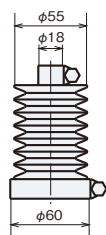


● Input Shaft

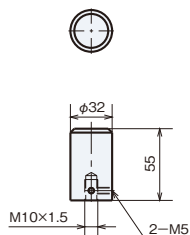


## Output Options

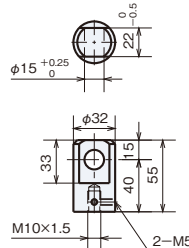
■ Bellows ( - J)



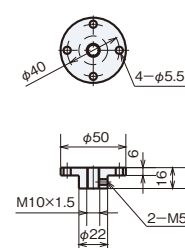
■ Rod Type End Fitting ( - B)



■ I Type End Fitting ( - I)

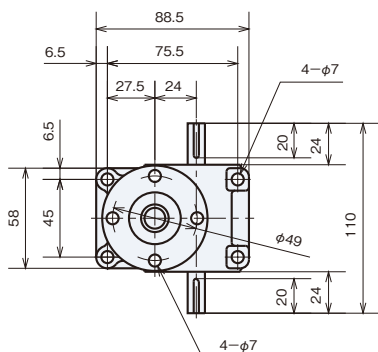


■ Table Type End Fitting ( - M)



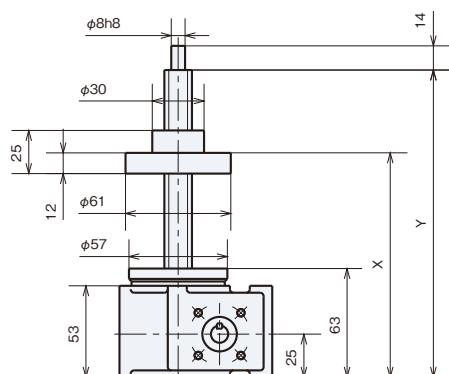
Note) For detailed measurements on units with bellows, see page 248.

## JWM005 Dimensions - Travel Nut Type

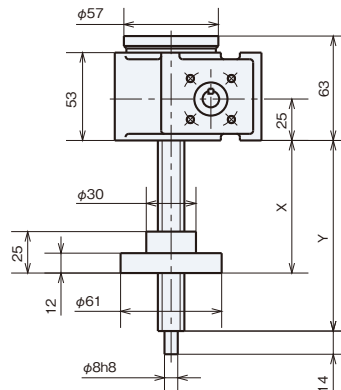


| Stroke | UR Travel Nut Type for Lifting |     |     | DR Travel Nut Type for Suspending |     |     | Weight kg |
|--------|--------------------------------|-----|-----|-----------------------------------|-----|-----|-----------|
|        | X                              |     | Y   | X                                 |     | Y   |           |
|        | MIN                            | MAX |     | MIN                               | MAX |     |           |
| 100    | 84                             | 184 | 207 | 35                                | 135 | 145 | 2.6       |
| 200    | 84                             | 284 | 307 | 35                                | 235 | 245 | 2.8       |
| 300    | 84                             | 384 | 407 | 35                                | 335 | 345 | 2.9       |
| 400    | 84                             | 484 | 507 | 35                                | 435 | 445 | 3.0       |
| 500    | 84                             | 584 | 607 | 35                                | 535 | 545 | 3.1       |
| 600    | 84                             | 684 | 707 | 35                                | 635 | 645 | 3.2       |
| 800    | 84                             | 884 | 907 | 35                                | 835 | 845 | 3.5       |

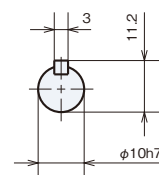
Lift (JWM005UR)



Suspend (JWM005DR)

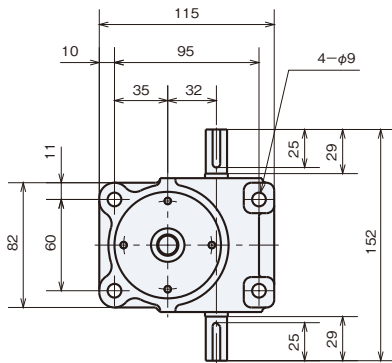


● Input Shaft



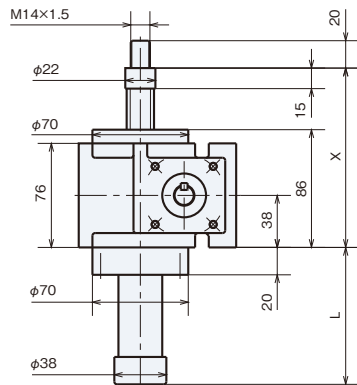
Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

## JWM010 Dimensions - Standard Model

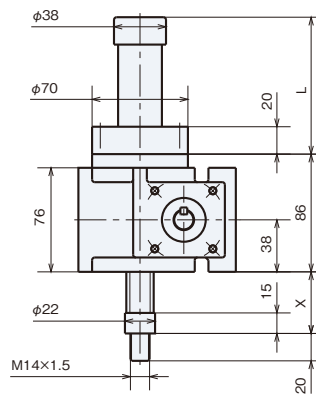


| Stroke | US Standard Model for Lifting |      |              |      |      | DS Standard Model for Suspending |      |              |      |      | Weight kg |
|--------|-------------------------------|------|--------------|------|------|----------------------------------|------|--------------|------|------|-----------|
|        | X                             |      | X            |      | L    | X                                |      | X            |      | L    |           |
|        | Without Bellows               |      | With Bellows |      |      | Without Bellows                  |      | With Bellows |      |      |           |
|        | MIN                           | MAX  | MIN          | MAX  |      | MIN                              | MAX  | MIN          | MAX  |      |           |
| 100    | 101                           | 201  | 161          | 261  | 194  | 25                               | 125  | 75           | 175  | 194  | 5.5       |
| 200    | 101                           | 301  | 161          | 361  | 294  | 25                               | 225  | 75           | 275  | 294  | 5.7       |
| 300    | 101                           | 401  | 201          | 501  | 434  | 25                               | 325  | 115          | 415  | 434  | 6.1       |
| 400    | 101                           | 501  | 201          | 601  | 534  | 25                               | 425  | 115          | 515  | 534  | 6.3       |
| 500    | 101                           | 601  | 236          | 736  | 669  | 25                               | 525  | 150          | 650  | 669  | 6.6       |
| 600    | 101                           | 701  | 236          | 836  | 769  | 25                               | 625  | 150          | 750  | 769  | 6.9       |
| 800    | 101                           | 901  | 271          | 1071 | 1004 | 25                               | 825  | 185          | 985  | 1004 | 7.5       |
| 1000   | 101                           | 1101 | 301          | 1301 | 1234 | 25                               | 1025 | 215          | 1215 | 1234 | 8.0       |

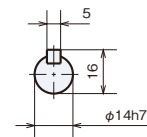
Lift (JWM010US)



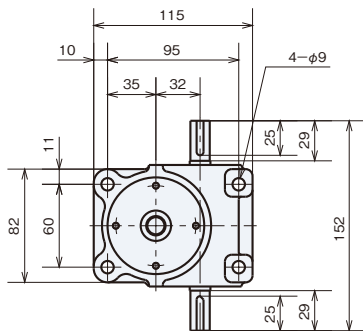
Suspend (JWM010DS)



●Input Shaft

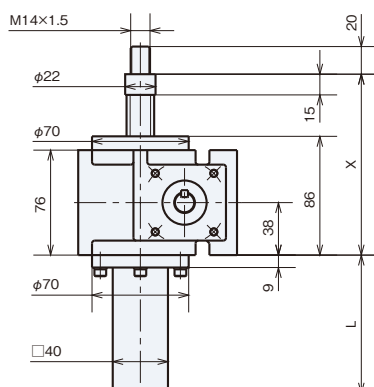


## JWM010 Dimensions - Rotation Prevention Type

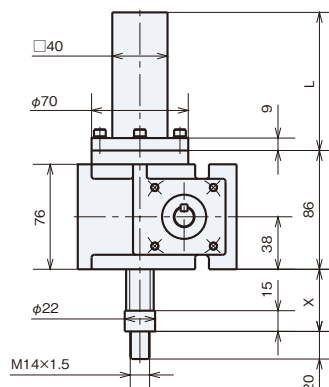


| Stroke | UM Rotation Prevention Type for Lifting |      |              |      |      | DM Rotation Prevention Type for Suspending |      |              |      |      | Weight kg |
|--------|-----------------------------------------|------|--------------|------|------|--------------------------------------------|------|--------------|------|------|-----------|
|        | X                                       |      | X            |      | L    | X                                          |      | X            |      | L    |           |
|        | Without Bellows                         |      | With Bellows |      |      | Without Bellows                            |      | With Bellows |      |      |           |
|        | MIN                                     | MAX  | MIN          | MAX  |      | MIN                                        | MAX  | MIN          | MAX  |      |           |
| 100    | 101                                     | 201  | 161          | 261  | 213  | 25                                         | 125  | 75           | 175  | 213  | 6.6       |
| 200    | 101                                     | 301  | 161          | 361  | 313  | 25                                         | 225  | 75           | 275  | 313  | 7.2       |
| 300    | 101                                     | 401  | 201          | 501  | 453  | 25                                         | 325  | 115          | 415  | 453  | 8.1       |
| 400    | 101                                     | 501  | 201          | 601  | 553  | 25                                         | 425  | 115          | 515  | 553  | 8.8       |
| 500    | 101                                     | 601  | 236          | 736  | 688  | 25                                         | 525  | 150          | 650  | 688  | 9.6       |
| 600    | 101                                     | 701  | 236          | 836  | 788  | 25                                         | 625  | 150          | 750  | 788  | 11        |
| 800    | 101                                     | 901  | 271          | 1071 | 1023 | 25                                         | 825  | 185          | 985  | 1023 | 12        |
| 1000   | 101                                     | 1101 | 301          | 1301 | 1253 | 25                                         | 1025 | 215          | 1215 | 1253 | 14        |

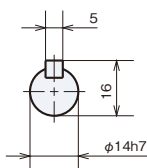
Lift (JWM010UM)



Suspend (JWM010DM)

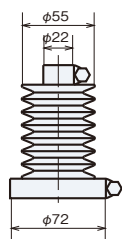


●Input Shaft

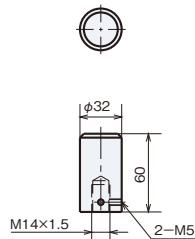


## Output Options

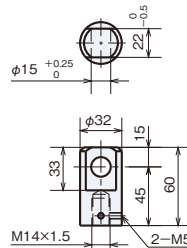
■ Bellows ( - J)



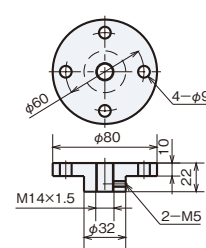
■ Rod Type End Fitting ( - B)



■ I Type End Fitting ( - I)

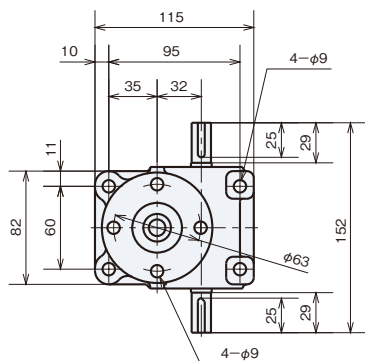


■ Table Type End Fitting ( - M)



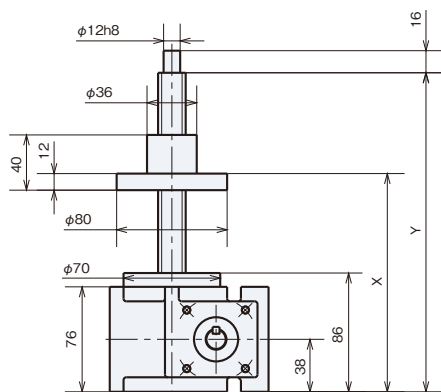
Note) For detailed measurements on units with bellows, see page 248.

## JWM010 Dimensions - Travel Nut Type

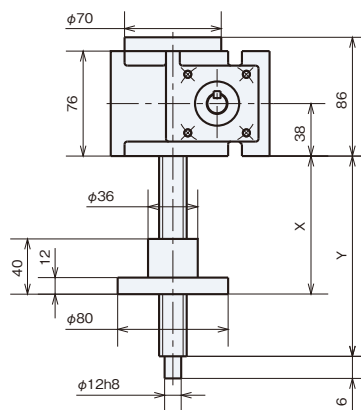


| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 108                            | 208  | 246  | 50                                | 150  | 160  | 5.9       |
| 200    | 108                            | 308  | 346  | 50                                | 250  | 260  | 6.1       |
| 300    | 108                            | 408  | 446  | 50                                | 350  | 360  | 6.2       |
| 400    | 108                            | 508  | 546  | 50                                | 450  | 460  | 6.4       |
| 500    | 108                            | 608  | 646  | 50                                | 550  | 560  | 6.6       |
| 600    | 108                            | 708  | 746  | 50                                | 650  | 660  | 6.8       |
| 800    | 108                            | 908  | 946  | 50                                | 850  | 860  | 7.2       |
| 1000   | 108                            | 1108 | 1146 | 50                                | 1050 | 1060 | 7.6       |

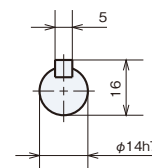
Lift (JWM010UR)



Suspend (JWM010DR)

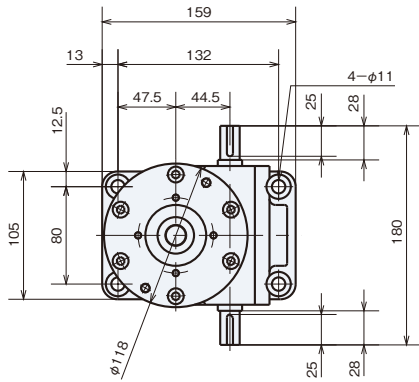


● Input Shaft

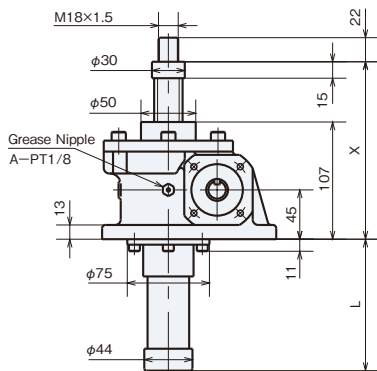


Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

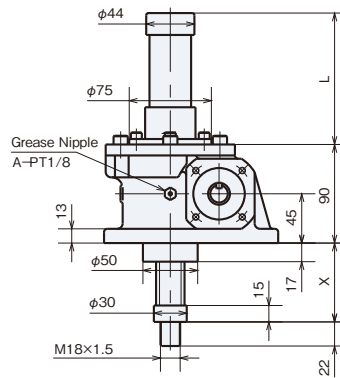
## JWM025 Dimensions - Standard Model



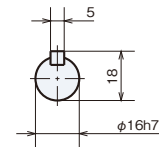
Lift (JWM025US)



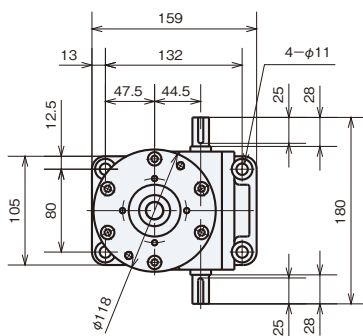
Suspend (JWM025DS)



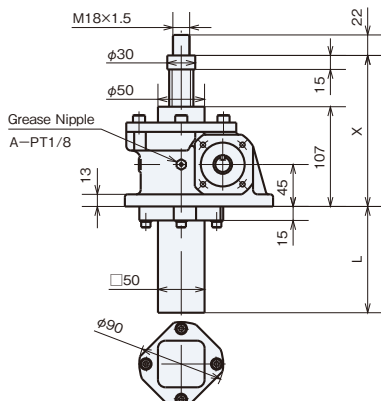
●Input Shaft



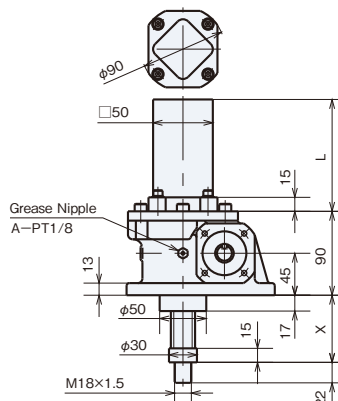
## JWM025 Dimensions - Rotation Prevention Type



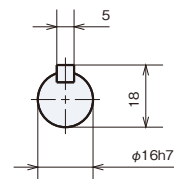
Lift (JWM025UM)



Suspend (JWM025DM)



●Input Shaft

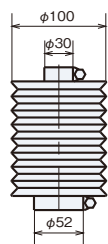


| Stroke | US Standard Model for Lifting |      |              |      |      | DS Standard Model for Suspending |      |              |      |      | Weight kg |
|--------|-------------------------------|------|--------------|------|------|----------------------------------|------|--------------|------|------|-----------|
|        | X                             |      | X            |      | L    | X                                |      | X            |      | L    |           |
|        | Without Bellows               |      | With Bellows |      |      | Without Bellows                  |      | With Bellows |      |      |           |
|        | MIN                           | MAX  | MIN          | MAX  |      | MIN                              | MAX  | MIN          | MAX  |      |           |
| 100    | 132                           | 232  | 147          | 247  | 149  | 42                               | 142  | 57           | 157  | 149  | 7.7       |
| 200    | 132                           | 332  | 147          | 347  | 249  | 42                               | 242  | 57           | 257  | 249  | 8.1       |
| 300    | 132                           | 432  | 167          | 467  | 369  | 42                               | 342  | 77           | 377  | 369  | 8.5       |
| 400    | 132                           | 532  | 167          | 567  | 469  | 42                               | 442  | 77           | 477  | 469  | 8.9       |
| 500    | 132                           | 632  | 187          | 687  | 589  | 42                               | 542  | 97           | 597  | 589  | 9.4       |
| 600    | 132                           | 732  | 187          | 787  | 689  | 42                               | 642  | 97           | 697  | 689  | 9.8       |
| 800    | 132                           | 932  | 207          | 1007 | 909  | 42                               | 842  | 117          | 917  | 909  | 11        |
| 1000   | 132                           | 1132 | 227          | 1227 | 1129 | 42                               | 1042 | 137          | 1137 | 1129 | 12        |
| 1200   | 132                           | 1332 | 242          | 1442 | 1344 | 42                               | 1242 | 152          | 1352 | 1344 | 13        |

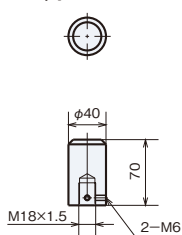
| Stroke | UM Rotation Prevention Type for Lifting |      |              |      |      | DM Rotation Prevention Type for Suspending |      |              |      |      | Weight kg |
|--------|-----------------------------------------|------|--------------|------|------|--------------------------------------------|------|--------------|------|------|-----------|
|        | X                                       |      | X            |      | L    | X                                          |      | X            |      | L    |           |
|        | Without Bellows                         |      | With Bellows |      |      | Without Bellows                            |      | With Bellows |      |      |           |
|        | MIN                                     | MAX  | MIN          | MAX  | MIN  | MAX                                        | MIN  | MAX          |      |      |           |
| 100    | 132                                     | 232  | 147          | 247  | 181  | 42                                         | 142  | 57           | 157  | 181  | 10        |
| 200    | 132                                     | 332  | 147          | 347  | 281  | 42                                         | 242  | 57           | 257  | 281  | 12        |
| 300    | 132                                     | 432  | 167          | 467  | 401  | 42                                         | 342  | 77           | 377  | 401  | 13        |
| 400    | 132                                     | 532  | 167          | 567  | 501  | 42                                         | 442  | 77           | 477  | 501  | 14        |
| 500    | 132                                     | 632  | 187          | 687  | 621  | 42                                         | 542  | 97           | 597  | 621  | 15        |
| 600    | 132                                     | 732  | 187          | 787  | 721  | 42                                         | 642  | 97           | 697  | 721  | 17        |
| 800    | 132                                     | 932  | 207          | 1007 | 941  | 42                                         | 842  | 117          | 917  | 941  | 19        |
| 1000   | 132                                     | 1132 | 227          | 1227 | 1161 | 42                                         | 1042 | 137          | 1137 | 1161 | 21        |
| 1200   | 132                                     | 1332 | 242          | 1442 | 1376 | 42                                         | 1242 | 152          | 1352 | 1376 | 24        |

## Output Options

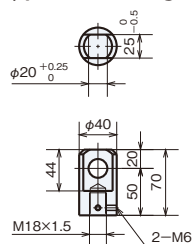
### ■ Bellows ( - J)



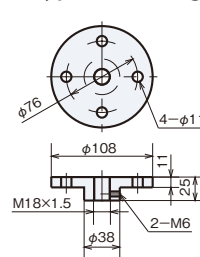
### ■ Rod Type End Fitting ( - B)



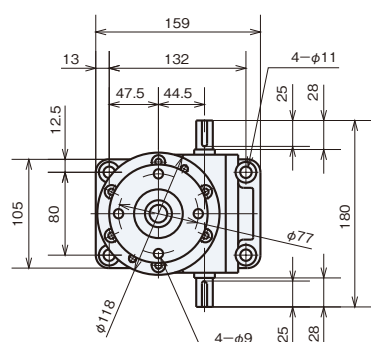
### ■ I Type End Fitting ( - I)



### ■ Table Type End Fitting ( - M)

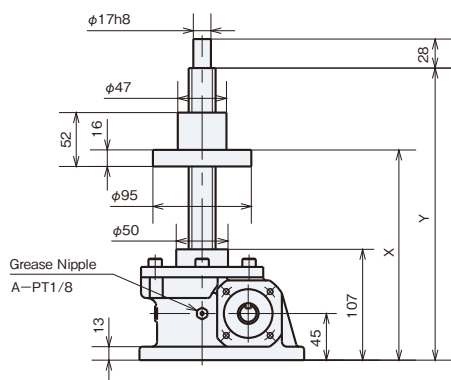


## JWM025 Dimensions - Travel Nut Type

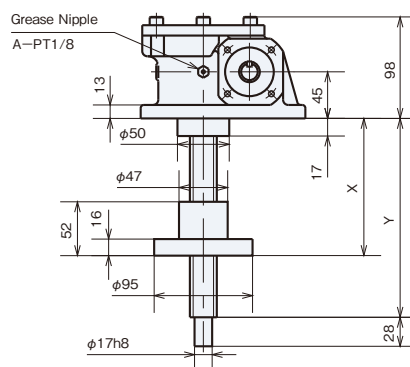


| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 133                            | 233  | 279  | 79                                | 179  | 189  | 9.2       |
| 200    | 133                            | 333  | 379  | 79                                | 279  | 289  | 9.5       |
| 300    | 133                            | 433  | 479  | 79                                | 379  | 389  | 9.9       |
| 400    | 133                            | 533  | 579  | 79                                | 479  | 489  | 11        |
| 500    | 133                            | 633  | 679  | 79                                | 579  | 589  | 11        |
| 600    | 133                            | 733  | 779  | 79                                | 679  | 689  | 11        |
| 800    | 133                            | 933  | 979  | 79                                | 879  | 889  | 12        |
| 1000   | 133                            | 1133 | 1179 | 79                                | 1079 | 1089 | 13        |
| 1200   | 133                            | 1333 | 1379 | 79                                | 1279 | 1289 | 13        |

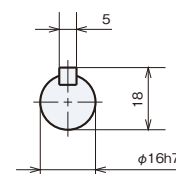
### Lift (JWM025UR)



### Suspend (JWM025DR)

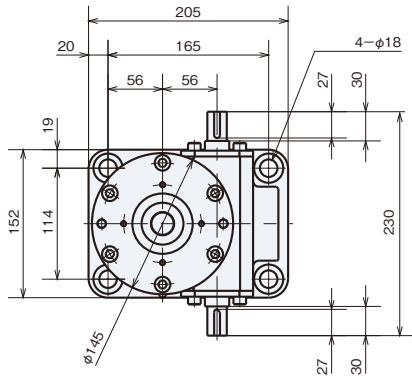


### ● Input Shaft



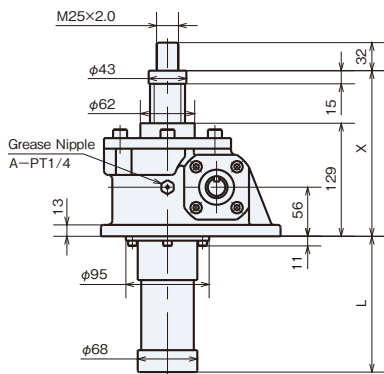
Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

## JWM050 Dimensions - Standard Model

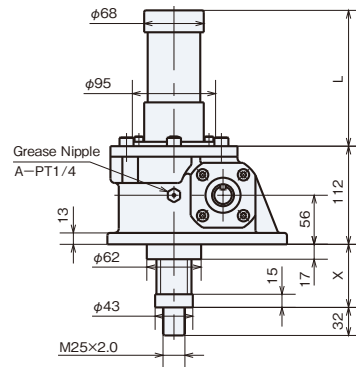


| Stroke | US Standard Model for Lifting |              |                 |              |      | DS Standard Model for Suspending |      |     |      |      | Weight kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|------|-----|------|------|-----------|
|        | X                             |              | X               |              | L    | X                                |      | X   |      | L    |           |
|        | Without Bellows               | With Bellows | Without Bellows | With Bellows |      |                                  |      |     |      |      |           |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX  | MIN | MAX  |      |           |
| 100    | 154                           | 254          | 169             | 269          | 147  | 42                               | 142  | 57  | 157  | 147  | 18        |
| 200    | 154                           | 354          | 169             | 369          | 247  | 42                               | 242  | 57  | 257  | 247  | 19        |
| 300    | 154                           | 454          | 189             | 489          | 367  | 42                               | 342  | 77  | 377  | 367  | 20        |
| 400    | 154                           | 554          | 189             | 589          | 467  | 42                               | 442  | 77  | 477  | 467  | 21        |
| 500    | 154                           | 654          | 209             | 709          | 587  | 42                               | 542  | 97  | 597  | 587  | 22        |
| 600    | 154                           | 754          | 209             | 809          | 687  | 42                               | 642  | 97  | 697  | 687  | 23        |
| 800    | 154                           | 954          | 229             | 1029         | 907  | 42                               | 842  | 117 | 917  | 907  | 25        |
| 1000   | 154                           | 1154         | 249             | 1249         | 1127 | 42                               | 1042 | 137 | 1137 | 1127 | 27        |
| 1200   | 154                           | 1354         | 264             | 1464         | 1342 | 42                               | 1242 | 152 | 1352 | 1342 | 29        |
| 1500   | 154                           | 1654         | 289             | 1789         | 1667 | 42                               | 1542 | 177 | 1677 | 1667 | 32        |

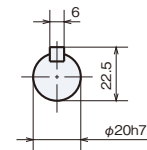
Lift (JWM050US)



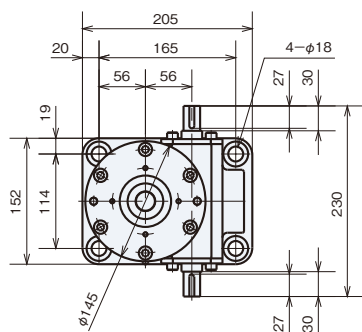
Suspend (JWM050DS)



●Input Shaft

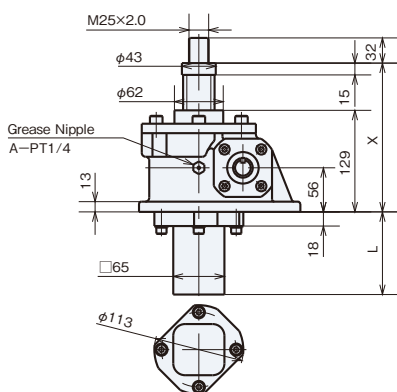


## JWM050 Dimensions - Rotation Prevention Type

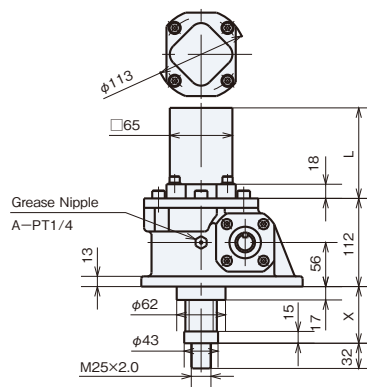


| Stroke | UM Rotation Prevention Type for Lifting |      |              |      |      | DM Rotation Prevention Type for Suspending |      |              |      |      | Weight kg |
|--------|-----------------------------------------|------|--------------|------|------|--------------------------------------------|------|--------------|------|------|-----------|
|        | X                                       |      | X            |      | L    | X                                          |      | X            |      | L    |           |
|        | Without Bellows                         |      | With Bellows |      |      | Without Bellows                            |      | With Bellows |      |      |           |
|        | MIN                                     | MAX  | MIN          | MAX  |      | MIN                                        | MAX  | MIN          | MAX  |      |           |
| 100    | 154                                     | 254  | 169          | 269  | 196  | 42                                         | 142  | 57           | 157  | 196  | 22        |
| 200    | 154                                     | 354  | 169          | 369  | 296  | 42                                         | 242  | 57           | 257  | 296  | 24        |
| 300    | 154                                     | 454  | 189          | 489  | 416  | 42                                         | 342  | 77           | 377  | 416  | 26        |
| 400    | 154                                     | 554  | 189          | 589  | 516  | 42                                         | 442  | 77           | 477  | 516  | 28        |
| 500    | 154                                     | 654  | 209          | 709  | 636  | 42                                         | 542  | 97           | 597  | 636  | 30        |
| 600    | 154                                     | 754  | 209          | 809  | 736  | 42                                         | 642  | 97           | 697  | 736  | 32        |
| 800    | 154                                     | 954  | 229          | 1029 | 956  | 42                                         | 842  | 117          | 917  | 956  | 36        |
| 1000   | 154                                     | 1154 | 249          | 1249 | 1176 | 42                                         | 1042 | 137          | 1137 | 1176 | 40        |
| 1200   | 154                                     | 1354 | 264          | 1464 | 1391 | 42                                         | 1242 | 152          | 1352 | 1391 | 44        |
| 1500   | 154                                     | 1654 | 289          | 1789 | 1716 | 42                                         | 1542 | 177          | 1677 | 1716 | 50        |

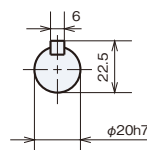
Lift (JWM050UM)



Suspend (JWM050DM)

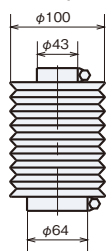


●Input Shaft

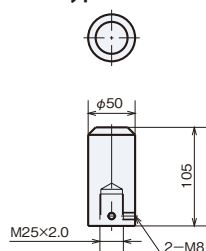


## Output Options

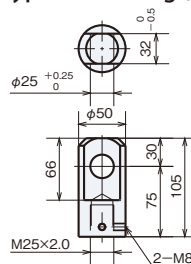
### ■ Bellows ( - J)



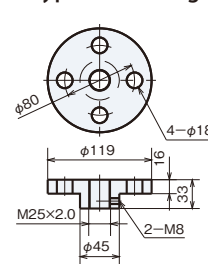
### ■ Rod Type End Fitting ( - B)



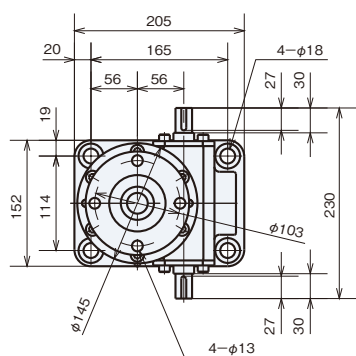
### ■ I Type End Fitting ( - I)



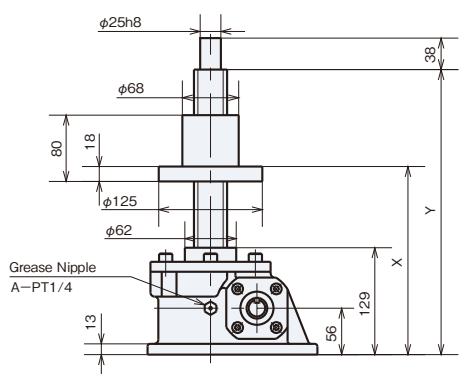
### ■ Table Type End Fitting ( - M)



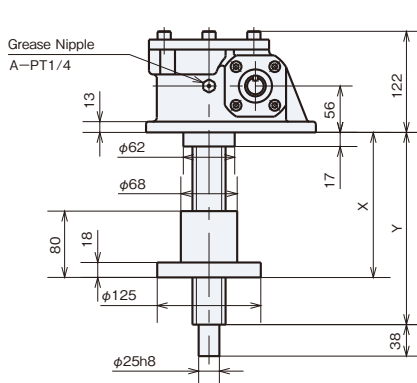
## JWM050 Dimensions - Travel Nut Type



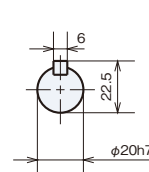
### Lift (JWM050UR)



### Suspend (JWM050DR)



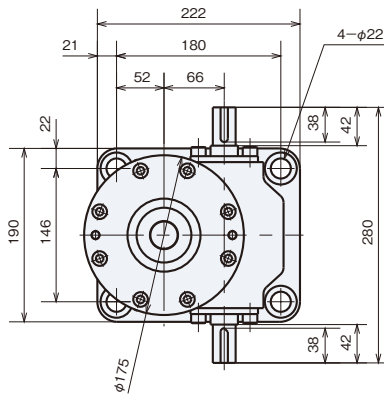
### ● Input Shaft



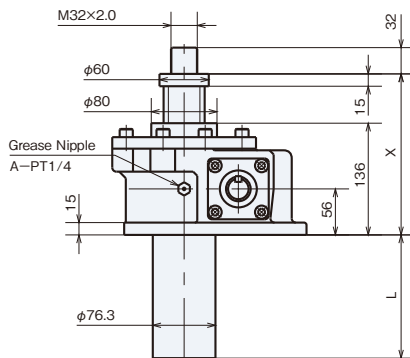
| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 157                            | 257  | 330  | 107                               | 207  | 218  | 22        |
| 200    | 157                            | 357  | 430  | 107                               | 307  | 318  | 22        |
| 300    | 157                            | 457  | 530  | 107                               | 407  | 418  | 23        |
| 400    | 157                            | 557  | 630  | 107                               | 507  | 518  | 24        |
| 500    | 157                            | 657  | 730  | 107                               | 607  | 618  | 25        |
| 600    | 157                            | 757  | 830  | 107                               | 707  | 718  | 26        |
| 800    | 157                            | 957  | 1030 | 107                               | 907  | 918  | 27        |
| 1000   | 157                            | 1157 | 1230 | 107                               | 1107 | 1118 | 29        |
| 1200   | 157                            | 1357 | 1430 | 107                               | 1307 | 1318 | 30        |
| 1500   | 157                            | 1657 | 1730 | 107                               | 1607 | 1618 | 33        |

Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

## JWM100 Dimensions - Standard Model

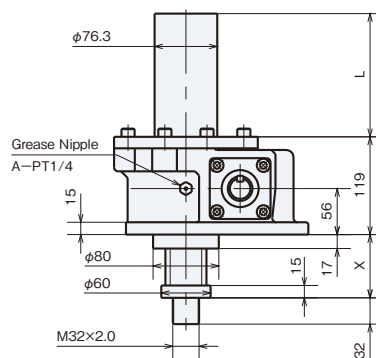


Lift (JWM100US)

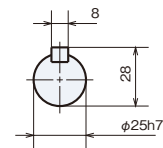


| Stroke | US Standard Model for Lifting |              |                 |              |      | DS Standard Model for Suspending |      |     |      |      | Weight kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|------|-----|------|------|-----------|
|        | X                             |              | X               |              | L    | X                                |      | X   |      | L    |           |
|        | Without Bellows               | With Bellows | Without Bellows | With Bellows |      |                                  |      |     |      |      |           |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX  | MIN | MAX  |      |           |
| 100    | 161                           | 261          | 171             | 271          | 151  | 42                               | 142  | 52  | 152  | 151  | 27        |
| 200    | 161                           | 361          | 171             | 371          | 252  | 42                               | 242  | 52  | 252  | 252  | 29        |
| 300    | 161                           | 461          | 186             | 486          | 366  | 42                               | 342  | 67  | 367  | 366  | 32        |
| 400    | 161                           | 561          | 186             | 586          | 466  | 42                               | 442  | 67  | 467  | 466  | 34        |
| 500    | 161                           | 661          | 211             | 711          | 591  | 42                               | 542  | 92  | 592  | 591  | 37        |
| 600    | 161                           | 761          | 211             | 811          | 691  | 42                               | 642  | 92  | 692  | 691  | 40        |
| 800    | 161                           | 961          | 226             | 1026         | 906  | 42                               | 842  | 107 | 907  | 906  | 45        |
| 1000   | 161                           | 1161         | 236             | 1236         | 1116 | 42                               | 1042 | 117 | 1117 | 1116 | 50        |
| 1200   | 161                           | 1361         | 261             | 1461         | 1341 | 42                               | 1242 | 142 | 1342 | 1341 | 56        |
| 1500   | 161                           | 1661         | 286             | 1786         | 1666 | 42                               | 1542 | 167 | 1667 | 1666 | 63        |

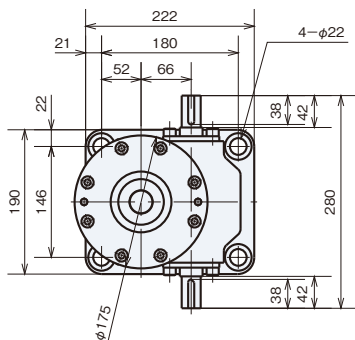
Suspend (JWM100DS)



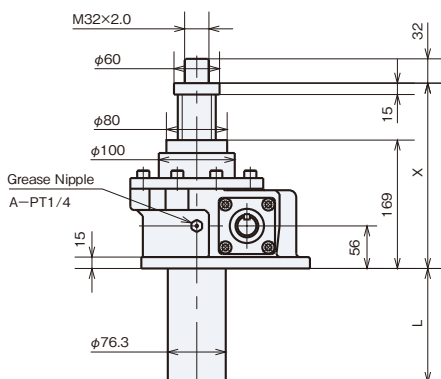
●Input Shaft



## JWM100 Dimensions - Rotation Prevention Type

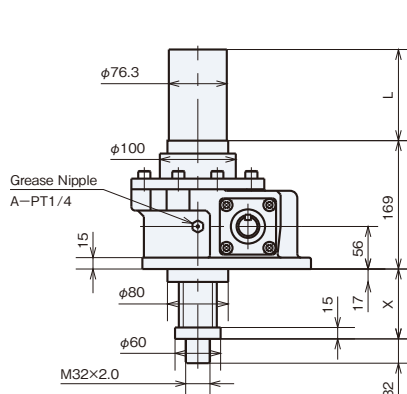


Lift (JWM100UM)

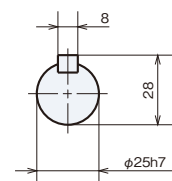


| Stroke | UM Rotation Prevention Type for Lifting |      |              |      |      | DM Rotation Prevention Type for Suspending |      |              |      |      | Weight kg |
|--------|-----------------------------------------|------|--------------|------|------|--------------------------------------------|------|--------------|------|------|-----------|
|        | X                                       |      | X            |      | L    | X                                          |      | X            |      | L    |           |
|        | Without Bellows                         |      | With Bellows |      |      | Without Bellows                            |      | With Bellows |      |      |           |
|        | MIN                                     | MAX  | MIN          | MAX  |      | MIN                                        | MAX  | MIN          | MAX  |      |           |
| 100    | 194                                     | 294  | 204          | 304  | 151  | 42                                         | 142  | 52           | 152  | 151  | 30        |
| 200    | 194                                     | 394  | 204          | 404  | 252  | 42                                         | 242  | 52           | 252  | 252  | 32        |
| 300    | 194                                     | 494  | 219          | 519  | 366  | 42                                         | 342  | 67           | 367  | 366  | 35        |
| 400    | 194                                     | 594  | 219          | 619  | 466  | 42                                         | 442  | 67           | 467  | 466  | 37        |
| 500    | 194                                     | 694  | 244          | 744  | 591  | 42                                         | 542  | 92           | 592  | 591  | 40        |
| 600    | 194                                     | 794  | 244          | 844  | 691  | 42                                         | 642  | 92           | 692  | 691  | 43        |
| 800    | 194                                     | 994  | 259          | 1059 | 906  | 42                                         | 842  | 107          | 907  | 906  | 48        |
| 1000   | 194                                     | 1194 | 269          | 1269 | 1116 | 42                                         | 1042 | 117          | 1117 | 1116 | 53        |
| 1200   | 194                                     | 1394 | 294          | 1494 | 1341 | 42                                         | 1242 | 142          | 1342 | 1341 | 58        |
| 1500   | 194                                     | 1694 | 319          | 1819 | 1666 | 42                                         | 1542 | 167          | 1667 | 1666 | 66        |

Suspend (JWM100DM)

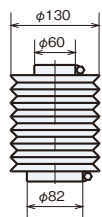


●Input Shaft

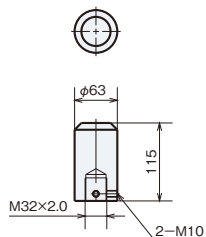


## Output Options

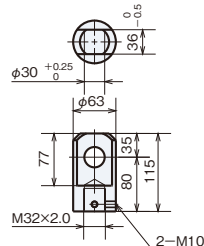
■ Bellows ( - J)



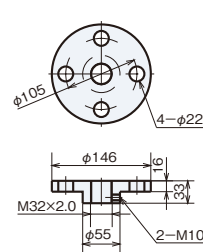
■ Rod Type End Fitting ( - B)



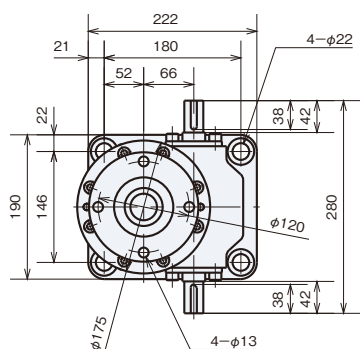
■ I Type End Fitting ( - I)



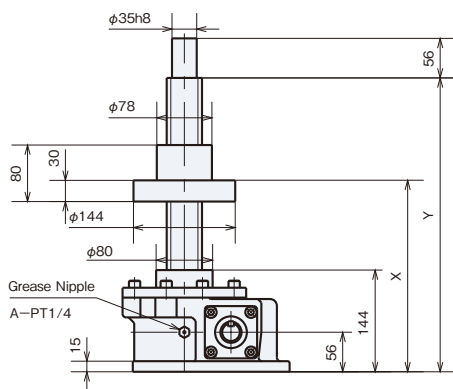
■ Table Type End Fitting ( - M)



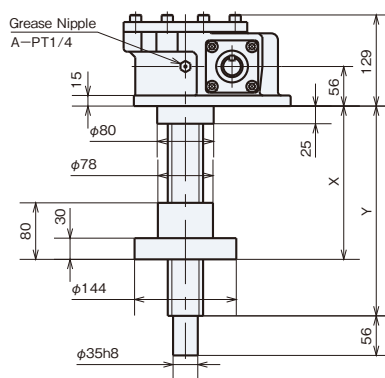
## JWM100 Dimensions - Travel Nut Type



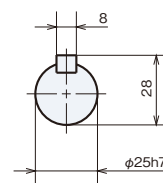
Lift (JWM100UR)



Suspend (JWM100DR)



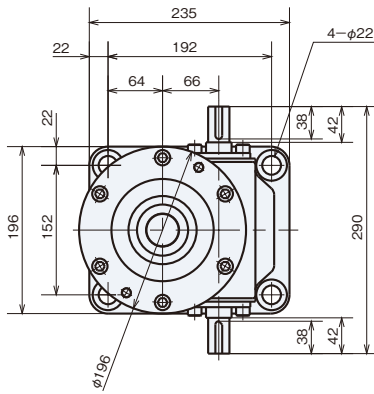
● Input Shaft



| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 184                            | 284  | 344  | 115                               | 215  | 225  | 32        |
| 200    | 184                            | 384  | 444  | 115                               | 315  | 325  | 33        |
| 300    | 184                            | 484  | 544  | 115                               | 415  | 425  | 34        |
| 400    | 184                            | 584  | 644  | 115                               | 515  | 525  | 36        |
| 500    | 184                            | 684  | 744  | 115                               | 615  | 625  | 37        |
| 600    | 184                            | 784  | 844  | 115                               | 715  | 725  | 38        |
| 800    | 184                            | 984  | 1044 | 115                               | 915  | 925  | 41        |
| 1000   | 184                            | 1184 | 1244 | 115                               | 1115 | 1125 | 43        |
| 1200   | 184                            | 1384 | 1444 | 115                               | 1315 | 1325 | 45        |
| 1500   | 184                            | 1684 | 1744 | 115                               | 1615 | 1625 | 49        |

Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

## JWM150 Dimensions - Standard Model

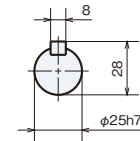
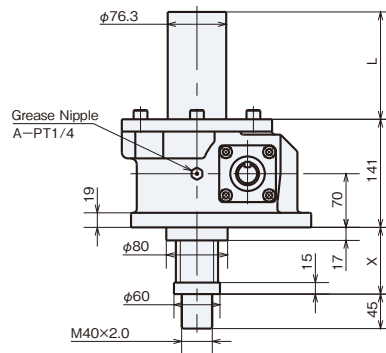
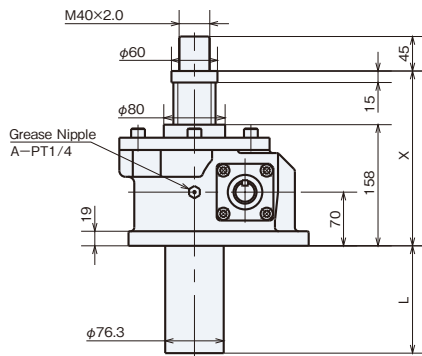


Lift (JWM150US)

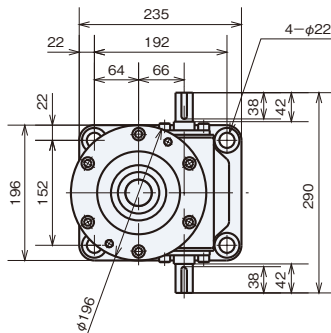
| Stroke | US Standard Model for Lifting |      |              |      |      | DS Standard Model for Suspending |      |              |      |      | Weight kg |
|--------|-------------------------------|------|--------------|------|------|----------------------------------|------|--------------|------|------|-----------|
|        | X                             |      | X            |      | L    | X                                |      | X            |      | L    |           |
|        | Without Bellows               |      | With Bellows |      |      | Without Bellows                  |      | With Bellows |      |      |           |
|        | MIN                           | MAX  | MIN          | MAX  | MIN  | MAX                              | MIN  | MAX          |      |      |           |
| 100    | 183                           | 283  | 193          | 293  | 151  | 42                               | 142  | 52           | 152  | 151  | 33        |
| 200    | 183                           | 383  | 193          | 393  | 252  | 42                               | 242  | 52           | 252  | 252  | 35        |
| 300    | 183                           | 483  | 208          | 508  | 366  | 42                               | 342  | 67           | 367  | 366  | 38        |
| 400    | 183                           | 583  | 208          | 608  | 466  | 42                               | 442  | 67           | 467  | 466  | 41        |
| 500    | 183                           | 683  | 233          | 733  | 591  | 42                               | 542  | 92           | 592  | 591  | 45        |
| 600    | 183                           | 783  | 233          | 833  | 691  | 42                               | 642  | 92           | 692  | 691  | 47        |
| 800    | 183                           | 983  | 248          | 1048 | 906  | 42                               | 842  | 107          | 907  | 906  | 53        |
| 1000   | 183                           | 1183 | 258          | 1258 | 1116 | 42                               | 1042 | 117          | 1117 | 1116 | 59        |
| 1200   | 183                           | 1383 | 283          | 1483 | 1341 | 42                               | 1242 | 142          | 1342 | 1341 | 65        |
| 1500   | 183                           | 1683 | 308          | 1808 | 1666 | 42                               | 1542 | 167          | 1667 | 1666 | 74        |

Suspend (JWM150DS)

● Input Shaft

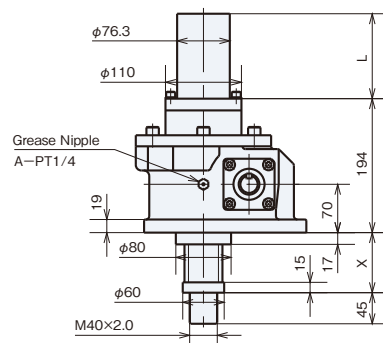
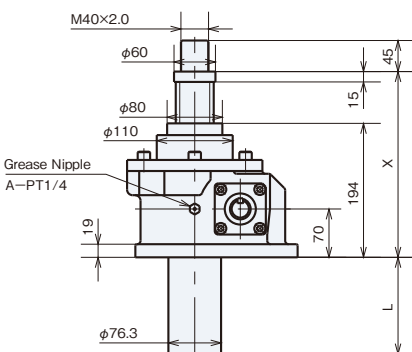


## JWM150 Dimensions - Rotation Prevention Type

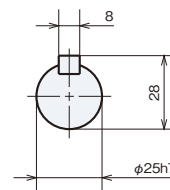


Lift (JWM150UM)

| Stroke | UM Rotation Prevention Type for Lifting |      |              |      |      | DM Rotation Prevention Type for Suspending |      |              |      |      | Weight kg |
|--------|-----------------------------------------|------|--------------|------|------|--------------------------------------------|------|--------------|------|------|-----------|
|        | X                                       |      | X            |      | L    | X                                          |      | X            |      | L    |           |
|        | Without Bellows                         |      | With Bellows |      |      | Without Bellows                            |      | With Bellows |      |      |           |
|        | MIN                                     | MAX  | MIN          | MAX  |      | MIN                                        | MAX  | MIN          | MAX  |      |           |
| 100    | 219                                     | 319  | 229          | 329  | 151  | 42                                         | 142  | 52           | 152  | 151  | 37        |
| 200    | 219                                     | 419  | 229          | 429  | 252  | 42                                         | 242  | 52           | 252  | 252  | 40        |
| 300    | 219                                     | 519  | 244          | 544  | 366  | 42                                         | 342  | 67           | 367  | 366  | 43        |
| 400    | 219                                     | 619  | 244          | 644  | 466  | 42                                         | 442  | 67           | 467  | 466  | 46        |
| 500    | 219                                     | 719  | 269          | 769  | 591  | 42                                         | 542  | 92           | 592  | 591  | 49        |
| 600    | 219                                     | 819  | 269          | 869  | 691  | 42                                         | 642  | 92           | 692  | 691  | 52        |
| 800    | 219                                     | 1019 | 284          | 1084 | 906  | 42                                         | 842  | 107          | 907  | 906  | 58        |
| 1000   | 219                                     | 1219 | 294          | 1294 | 1116 | 42                                         | 1042 | 117          | 1117 | 1116 | 64        |
| 1200   | 219                                     | 1419 | 319          | 1519 | 1341 | 42                                         | 1242 | 142          | 1342 | 1341 | 69        |
| 1500   | 219                                     | 1719 | 344          | 1844 | 1666 | 42                                         | 1542 | 167          | 1667 | 1666 | 78        |



● Input Shaft

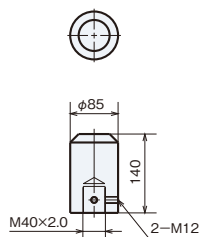


## Output Options

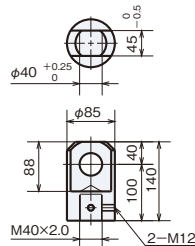
■ Bellows ( - J)



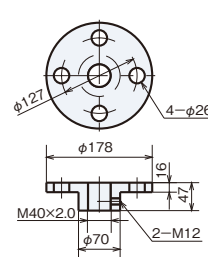
■ Rod Type End Fitting ( - B)



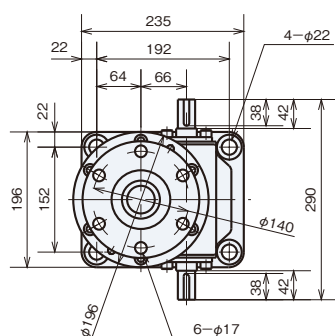
■ I Type End Fitting ( - I)



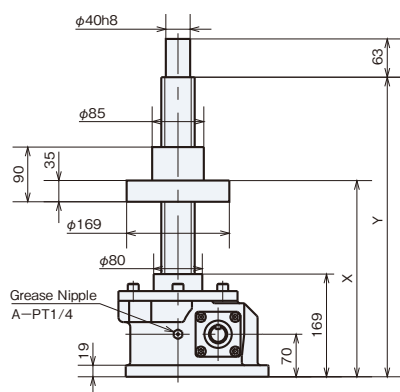
■ Table Type End Fitting ( - M)



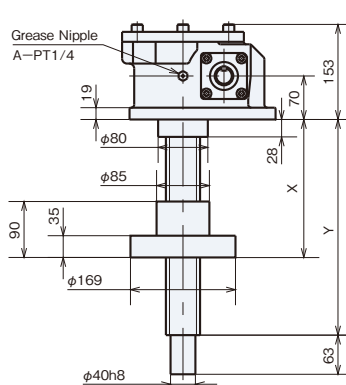
## JWM150 Dimensions - Travel Nut Type



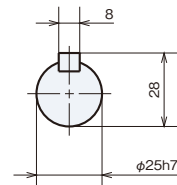
Lift (JWM150UR)



Suspend (JWM150DR)



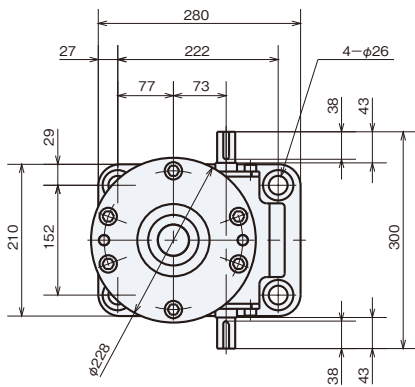
● Input Shaft



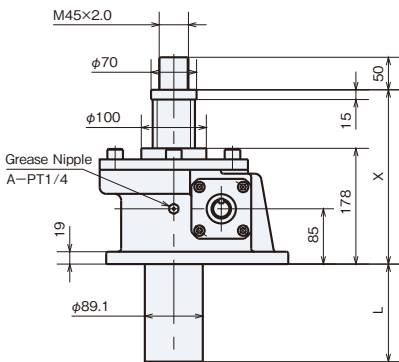
| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 214                            | 314  | 379  | 128                               | 228  | 239  | 40        |
| 200    | 214                            | 414  | 479  | 128                               | 328  | 339  | 42        |
| 300    | 214                            | 514  | 579  | 128                               | 428  | 439  | 43        |
| 400    | 214                            | 614  | 679  | 128                               | 528  | 539  | 45        |
| 500    | 214                            | 714  | 779  | 128                               | 628  | 639  | 46        |
| 600    | 214                            | 814  | 879  | 128                               | 728  | 739  | 48        |
| 800    | 214                            | 1014 | 1079 | 128                               | 928  | 939  | 51        |
| 1000   | 214                            | 1214 | 1279 | 128                               | 1128 | 1139 | 54        |
| 1200   | 214                            | 1414 | 1479 | 128                               | 1328 | 1339 | 57        |
| 1500   | 214                            | 1714 | 1779 | 128                               | 1628 | 1639 | 61        |

Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

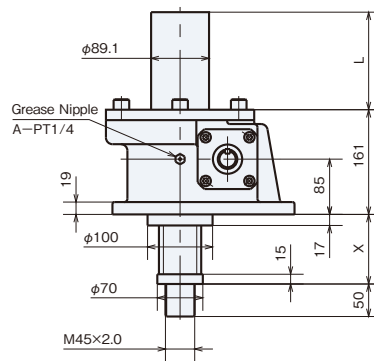
## JWM200 Dimensions - Standard Model



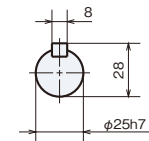
Lift (JWM200US)



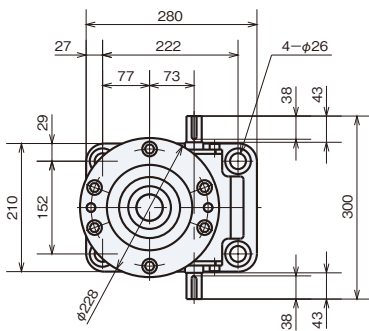
Suspend (JWM200DS)



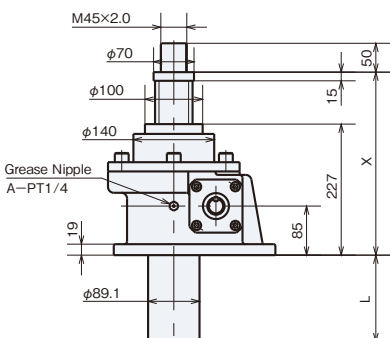
● Input Shaft



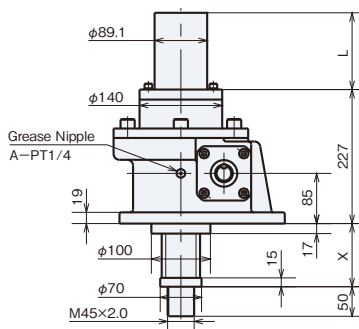
## JWM200 Dimensions - Rotation Prevention Type



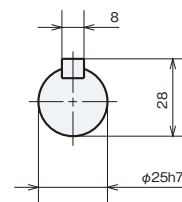
Lift (JWM200UM)



Suspend (JWM200DM)



● Input Shaft

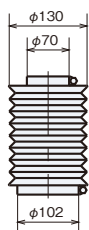


| Stroke | US Standard Model for Lifting |      |              |      |      | DS Standard Model for Suspending |      |              |      |      | Weight kg |
|--------|-------------------------------|------|--------------|------|------|----------------------------------|------|--------------|------|------|-----------|
|        | X                             |      | X            |      | L    | X                                |      | X            |      | L    |           |
|        | Without Bellows               |      | With Bellows |      |      | Without Bellows                  |      | With Bellows |      |      |           |
|        | MIN                           | MAX  | MIN          | MAX  |      | MIN                              | MAX  | MIN          | MAX  |      |           |
| 100    | 203                           | 303  | 213          | 313  | 136  | 42                               | 142  | 52           | 152  | 136  | 42        |
| 200    | 203                           | 403  | 213          | 413  | 236  | 42                               | 242  | 52           | 252  | 236  | 45        |
| 300    | 203                           | 503  | 228          | 528  | 351  | 42                               | 342  | 67           | 367  | 351  | 49        |
| 400    | 203                           | 603  | 228          | 628  | 451  | 42                               | 442  | 67           | 467  | 451  | 53        |
| 500    | 203                           | 703  | 253          | 753  | 576  | 42                               | 542  | 92           | 592  | 576  | 57        |
| 600    | 203                           | 803  | 253          | 853  | 676  | 42                               | 642  | 92           | 692  | 676  | 60        |
| 800    | 203                           | 1003 | 268          | 1068 | 891  | 42                               | 842  | 107          | 907  | 891  | 67        |
| 1000   | 203                           | 1203 | 278          | 1278 | 1101 | 42                               | 1042 | 117          | 1117 | 1101 | 74        |
| 1200   | 203                           | 1403 | 303          | 1503 | 1326 | 42                               | 1242 | 142          | 1342 | 1326 | 81        |
| 1500   | 203                           | 1703 | 328          | 1828 | 1651 | 42                               | 1542 | 167          | 1667 | 1651 | 92        |
| 2000   | 203                           | 2203 | 373          | 2373 | 2196 | 42                               | 2042 | 212          | 2212 | 2196 | 109       |

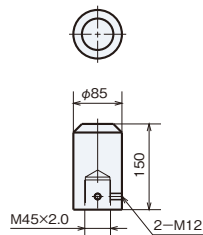
| Stroke | UM Rotation Prevention Type for Lifting |      |              |      |      | DM Rotation Prevention Type for Suspending |      |              |      |      | Weight kg |
|--------|-----------------------------------------|------|--------------|------|------|--------------------------------------------|------|--------------|------|------|-----------|
|        | X                                       |      | X            |      | L    | X                                          |      | X            |      | L    |           |
|        | Without Bellows                         |      | With Bellows |      |      | Without Bellows                            |      | With Bellows |      |      |           |
|        | MIN                                     | MAX  | MIN          | MAX  |      | MIN                                        | MAX  | MIN          | MAX  |      |           |
| 100    | 252                                     | 352  | 262          | 362  | 136  | 42                                         | 142  | 52           | 152  | 136  | 51        |
| 200    | 252                                     | 452  | 262          | 462  | 236  | 42                                         | 242  | 52           | 252  | 236  | 55        |
| 300    | 252                                     | 552  | 277          | 577  | 351  | 42                                         | 342  | 67           | 367  | 351  | 58        |
| 400    | 252                                     | 652  | 277          | 677  | 451  | 42                                         | 442  | 67           | 467  | 451  | 62        |
| 500    | 252                                     | 752  | 302          | 802  | 576  | 42                                         | 542  | 92           | 592  | 576  | 66        |
| 600    | 252                                     | 852  | 302          | 902  | 676  | 42                                         | 642  | 92           | 692  | 676  | 69        |
| 800    | 252                                     | 1052 | 317          | 1117 | 891  | 42                                         | 842  | 107          | 907  | 891  | 76        |
| 1000   | 252                                     | 1252 | 327          | 1327 | 1101 | 42                                         | 1042 | 117          | 1117 | 1101 | 83        |
| 1200   | 252                                     | 1452 | 352          | 1552 | 1326 | 42                                         | 1242 | 142          | 1342 | 1326 | 90        |
| 1500   | 252                                     | 1752 | 377          | 1877 | 1651 | 42                                         | 1542 | 167          | 1667 | 1651 | 100       |
| 2000   | 252                                     | 2252 | 422          | 2422 | 2196 | 42                                         | 2042 | 212          | 2212 | 2196 | 118       |

## Output Options

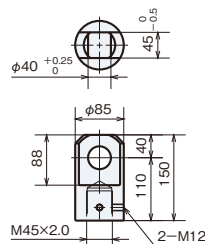
### ■ Bellows ( - J)



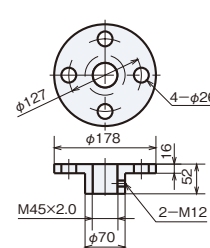
### ■ Rod Type End Fitting ( - B)



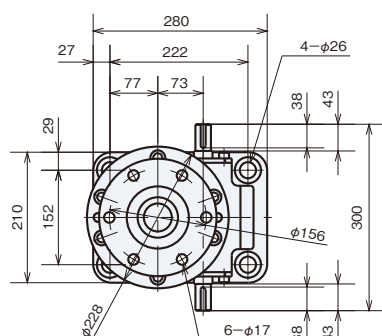
### ■ I Type End Fitting ( - I)



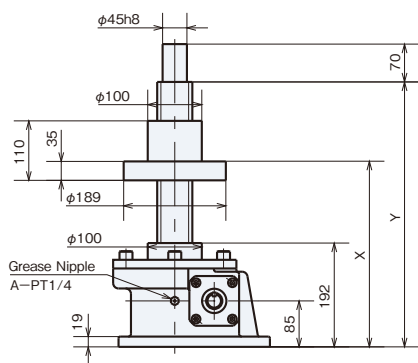
### ■ Table Type End Fitting ( - M)



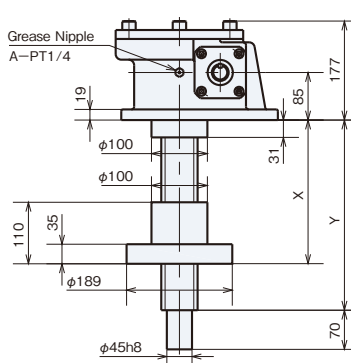
## JWM200 Dimensions - Travel Nut Type



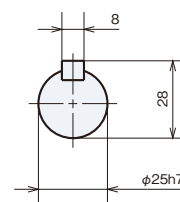
Lift (JWM200UR)



Suspend (JWM200DR)



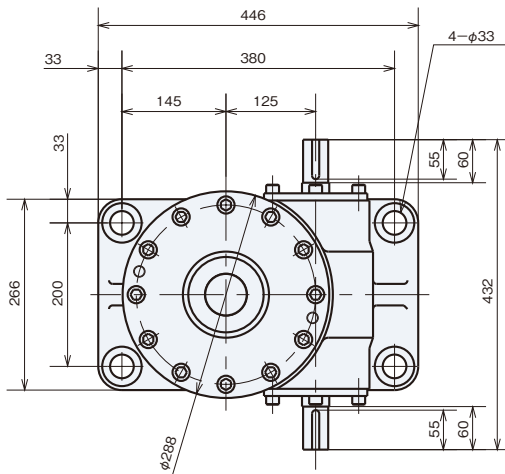
● Input Shaft



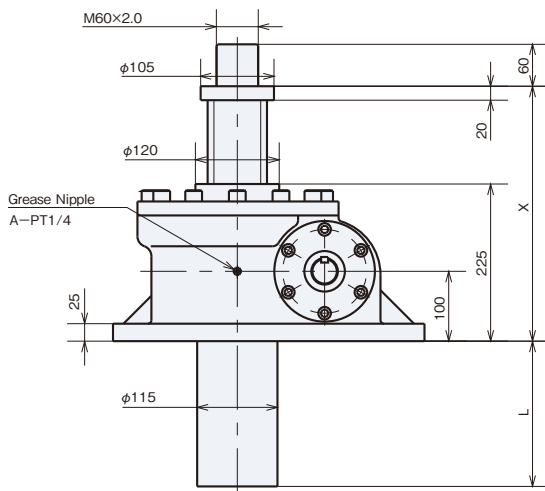
| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 237                            | 337  | 422  | 151                               | 251  | 261  | 56        |
| 200    | 237                            | 437  | 522  | 151                               | 351  | 361  | 58        |
| 300    | 237                            | 537  | 622  | 151                               | 451  | 461  | 60        |
| 400    | 237                            | 637  | 722  | 151                               | 551  | 561  | 62        |
| 500    | 237                            | 737  | 822  | 151                               | 651  | 661  | 64        |
| 600    | 237                            | 837  | 922  | 151                               | 751  | 761  | 66        |
| 800    | 237                            | 1037 | 1122 | 151                               | 951  | 961  | 71        |
| 1000   | 237                            | 1237 | 1322 | 151                               | 1151 | 1161 | 75        |
| 1200   | 237                            | 1437 | 1522 | 151                               | 1351 | 1361 | 79        |
| 1500   | 237                            | 1737 | 1822 | 151                               | 1651 | 1661 | 85        |
| 2000   | 237                            | 2237 | 2322 | 151                               | 2151 | 2161 | 96        |

Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

## JWM300 Dimensions - Standard Model

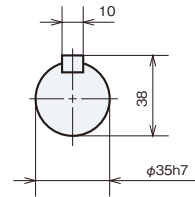


Lift (JWM300US)

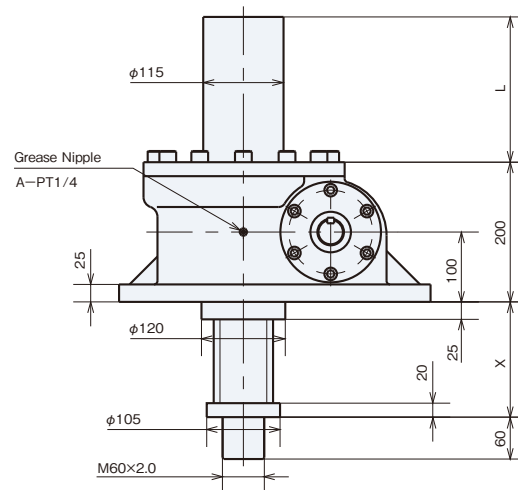


| Stroke | US Standard Model for Lifting |      |              |      |      | DS Standard Model for Suspending |      |              |      |      | Weight kg |
|--------|-------------------------------|------|--------------|------|------|----------------------------------|------|--------------|------|------|-----------|
|        | X                             |      | X            |      | L    | X                                |      | X            |      | L    |           |
|        | Without Bellows               |      | With Bellows |      |      | Without Bellows                  |      | With Bellows |      |      |           |
|        | MIN                           | MAX  | MIN          | MAX  |      | MIN                              | MAX  | MIN          | MAX  |      |           |
| 100    | 255                           | 355  | 265          | 365  | 135  | 55                               | 155  | 65           | 165  | 135  | 118       |
| 200    | 255                           | 455  | 265          | 465  | 235  | 55                               | 255  | 65           | 265  | 235  | 123       |
| 300    | 255                           | 555  | 280          | 580  | 350  | 55                               | 355  | 80           | 380  | 350  | 128       |
| 400    | 255                           | 655  | 280          | 680  | 450  | 55                               | 455  | 80           | 480  | 450  | 134       |
| 500    | 255                           | 755  | 295          | 795  | 565  | 55                               | 555  | 95           | 595  | 565  | 139       |
| 600    | 255                           | 855  | 295          | 895  | 665  | 55                               | 655  | 95           | 695  | 665  | 145       |
| 800    | 255                           | 1055 | 310          | 1110 | 880  | 55                               | 855  | 110          | 910  | 880  | 155       |
| 1000   | 255                           | 1255 | 330          | 1330 | 1100 | 55                               | 1055 | 130          | 1130 | 1100 | 167       |
| 1200   | 255                           | 1455 | 340          | 1540 | 1310 | 55                               | 1255 | 140          | 1340 | 1310 | 177       |
| 1500   | 255                           | 1755 | 365          | 1865 | 1635 | 55                               | 1555 | 165          | 1665 | 1635 | 194       |
| 2000   | 255                           | 2255 | 400          | 2400 | 2170 | 55                               | 2055 | 200          | 2200 | 2170 | 221       |

● Input Shaft



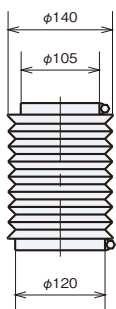
Suspend (JWM300DS)



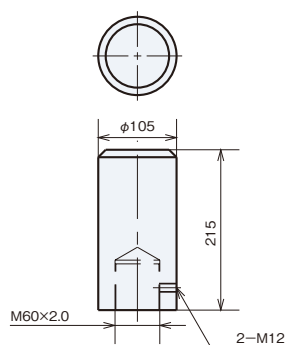
For JWM300 (compact type), see page 257 - 260.

## Output Options

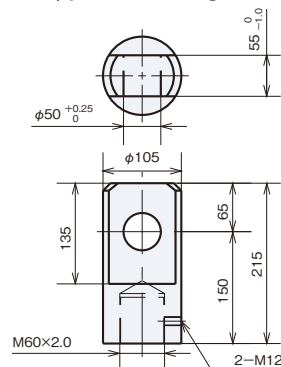
### ■ Bellows ( - J )



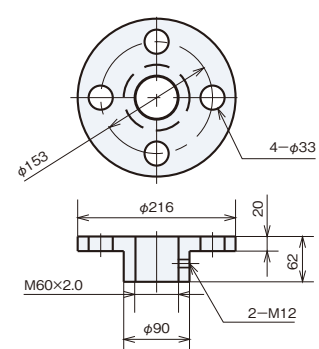
### ■ Rod Type End Fitting ( - B )



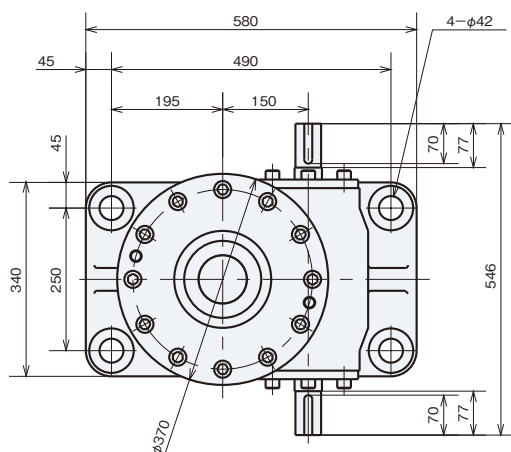
### ■ I Type End Fitting ( - I )



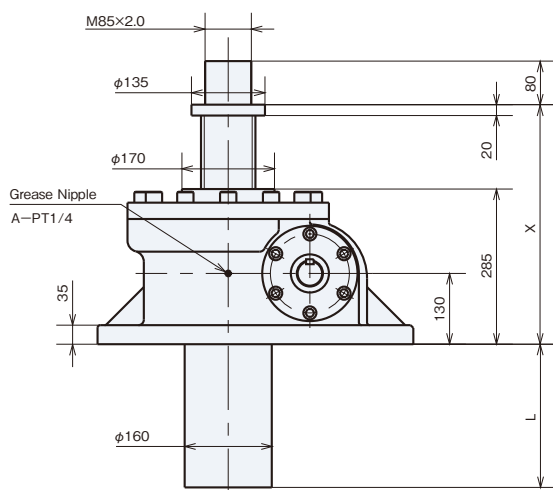
### ■ Table Type End Fitting ( - M )



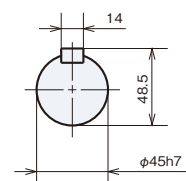
## JWM500 Dimensions - Standard Model



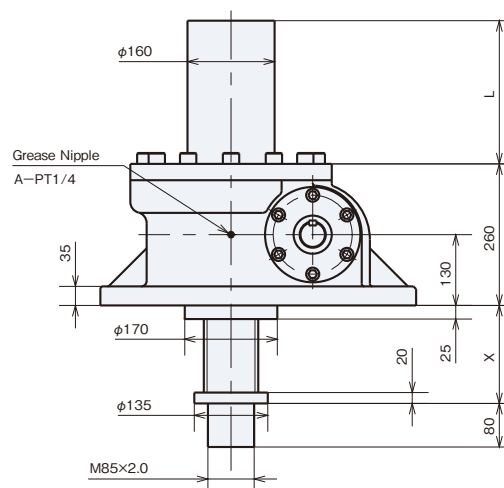
Lift (JWM500US)



● Input Shaft



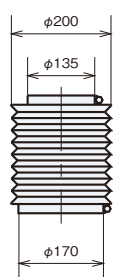
Suspend (JWM500DS)



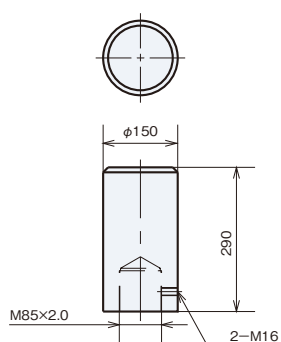
For JWM500 (compact type), see page 257 - 260.

## Output Options

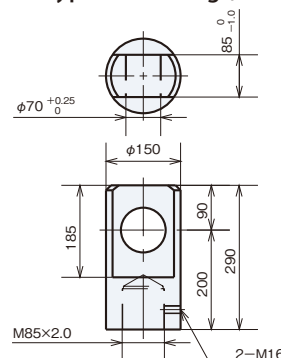
### ■ Bellows ( - J )



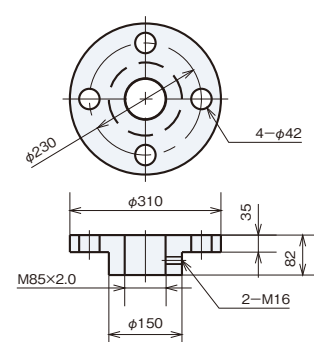
### ■ Rod Type End Fitting ( - B )



### ■ I Type End Fitting ( - I )



### ■ Table Type End Fitting ( - M )





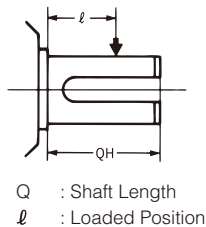
# Warning

## Cautions for selecting

- Duty cycle of JWM (Machine screw type) is within 20% ED. Duty cycle is a ratio of operating time per 30 min on the basis of 30 min interval.
- Although JWM (Machine screw type) comes with a self-locking device based on calculation, it may not be effective due to vibration or shock. Separately a brake mechanism is required under such conditions.
- Activating torque for the drive unit should be maintained at 200% above the required torque.
- Allowable input rotation speed of linear power jack is 1800 r/min, however, when inputting a speed exceeding the maximum input rotation speed at the basic capacity, check the screw shaft speed (elevation speed) and allowable load related graphs on page 153.
- Select a stroke for the jack with an extra margin with respect to the used stroke.
- Rotating force is generated on the screw shaft (travel nut in the case of travel nut type) with thrust, therefore, rotation prevention is required. Screw rotation torque at the basic capacity is described in the standard specification list. When operating with the end unconnected, and pulling the rope with a sheave installed, use the rotation prevention type. However, the rotation prevention type cannot be manufactured for the travel nut type, therefore, provide a rotation prevention mechanism on the device.
- When installing a sprocket, gear, or belt to the input or output shaft, confirm that any overhang load applied to the shaft decreases to the allowable OHL or less.

$$\text{Allowable O. H. L.} \geq \frac{T \times f \times L_f}{R}$$

O.H.L. : Overhang load N {kgf}  
 T : Input torque N · m {kgf · m}  
 f : Coefficient - power transmission element  
 L<sub>f</sub> : Coefficient - Load operating position  
 R : Sprocket, Gear, V pulley or Pitch diameter m



Q : Shaft Length  
 l : Loaded Position

### ● Coefficient – Power Transmission Element (f)

|           |      |
|-----------|------|
| Sprocket  | 1.00 |
| Gear      | 1.25 |
| V-belt    | 1.50 |
| Flat belt | 2.50 |

### ● Coefficient (L<sub>f</sub>) – Load Position

| l / QH         | 0.25 | 0.38 | 0.5 | 0.75 | 1 |
|----------------|------|------|-----|------|---|
| L <sub>f</sub> | 0.8  | 0.9  | 1   | 1.5  | 2 |

### ● Allowable O.H.L

| Frame No.                |         | 002  | 005  | 010  | 025  | 050   | 100   | 150   | 200   | 300   | 500    | 750    | 1000   |
|--------------------------|---------|------|------|------|------|-------|-------|-------|-------|-------|--------|--------|--------|
| JWM (Machine Screw Type) | N       | 99   | 200  | 380  | 710  | 1500  | 2270  | 3160  | 4320  | 6110  | 10100  | 13900  | 18000  |
| H Speed                  | { kgf } | {10} | {21} | {39} | {73} | {153} | {232} | {323} | {441} | {624} | {1030} | {1420} | {1840} |
| JWM (Machine Screw Type) | N       | 63   | 120  | 220  | 420  | 820   | 1430  | 1950  | 2800  | 4400  | 6650   | 9390   | 13200  |
| L Speed                  | { kgf } | {6}  | {13} | {23} | {44} | {85}  | {146} | {200} | {286} | {449} | {678}  | {958}  | {1350} |

## Precautions for installation

- Jacks that range under the basic capacity of 49.0 kN {5tf} or less are provided with screw covers made of hard vinyl chloride pipe. Never suspend or carry a jack by use of the screw cover, which is dangerous.
- JWM (Machine screw type) is not equipped with a fall stop, therefore, if the stroke range is exceeded, the screw shaft falls.
- Take jack coasting amount into consideration to set the stroke adjusting limit switch.

## Precautions for use

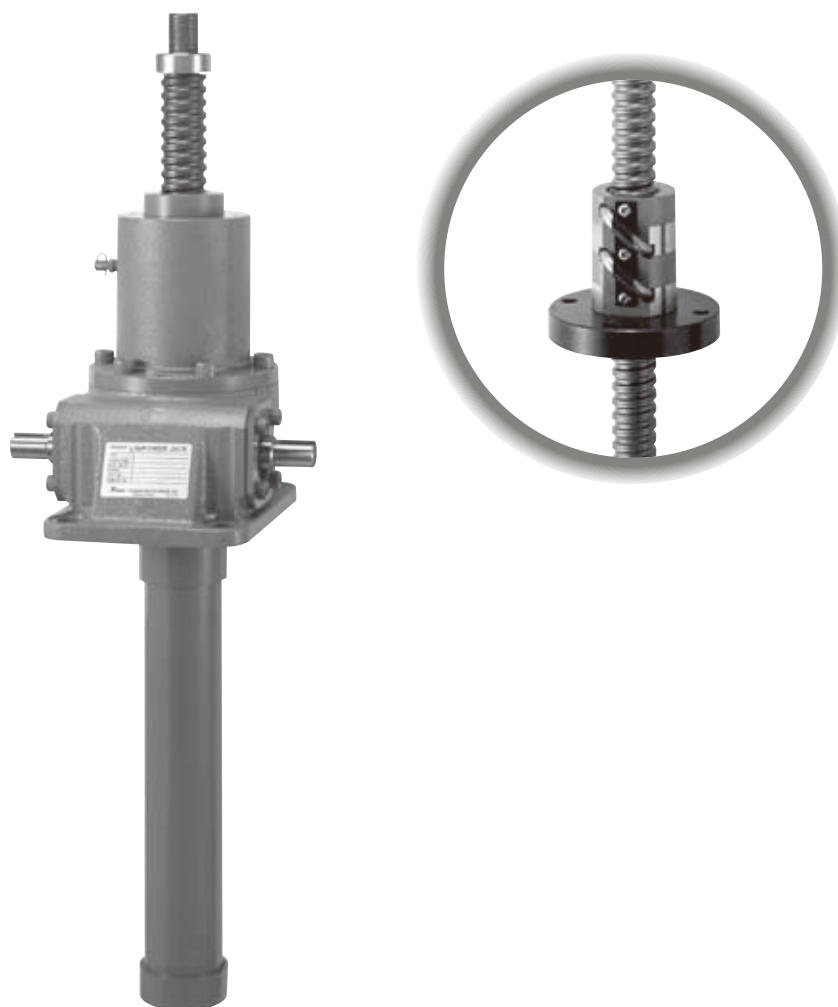
- Do not use mechanical stops under any circumstances.
- Operating Environment for jack is as follows.

|                             |                                                           |
|-----------------------------|-----------------------------------------------------------|
| Operating place             | Indoor room which cannot be splashed with rain or water.  |
| Ambient atmosphere          | Dust volume comparable to general factories.              |
| Operating temperature range | – 15 to 80°C (Refer to section 3 in general precautions.) |
| Relative humidity           | 85% or less (no dew condensation)                         |

- Operating part and reducer unit are factory greased. Therefore, use jack as delivered.
- For lubrication grease, lubrication cycle and lubrication amount to the screw shaft and reducer unit, refer to page 253.
- Inspect regularly for general backlash and screw unit condition. Jack life and replacement timing are determined by the following:  
 Backlash in the direction of screw shaft and nut reaches 1/4 of the screw pitch.  
 Replace gear when its input shaft exceeds 30 rpm with backlash (rattle between input shaft and worm wheel) at H speed, or exceeds 60 rpm at L speed.  
 In either case, if it is used at the replacement timing, this may cause rotation failure of screw shaft and input shaft, and further sudden drop of travel nut.

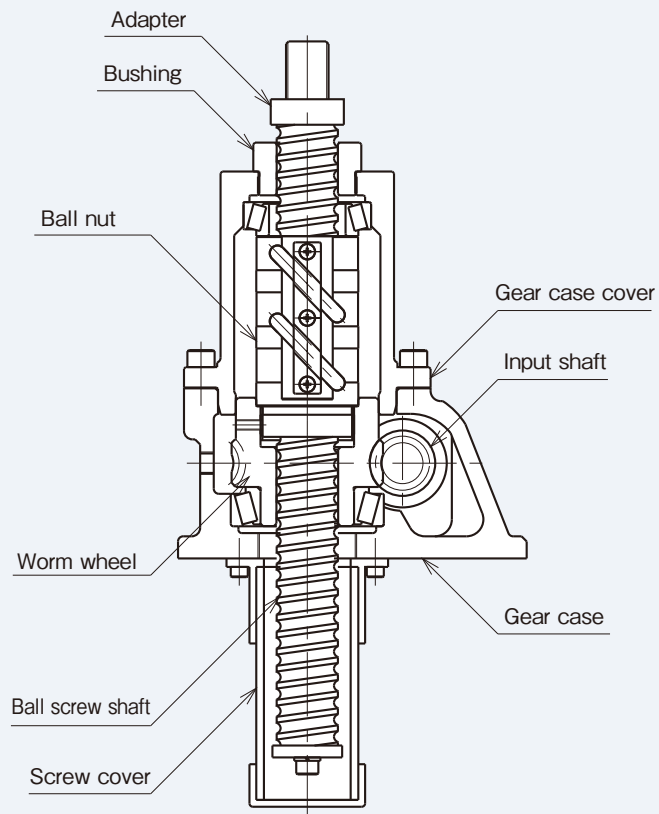
## Linipower Jack

# JWB (Ball Screw Type)

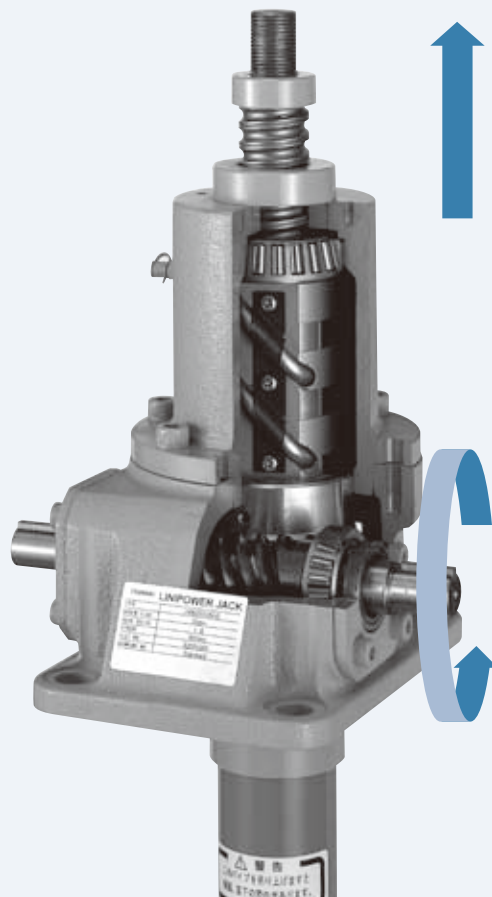
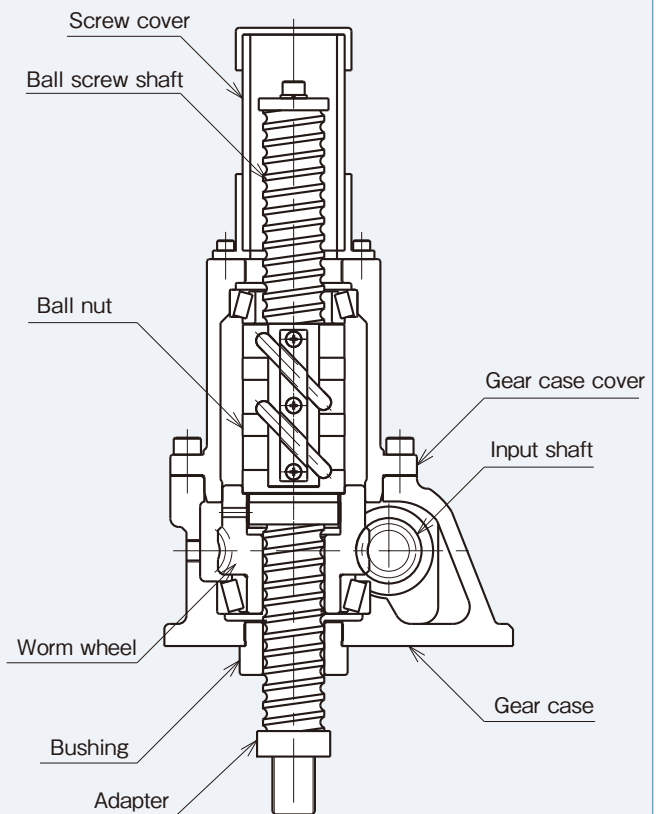


|                                  |          |
|----------------------------------|----------|
| Drawings                         | P191•192 |
| JWB Reference Number System      | P193•194 |
| Reference Table for Standard Use | P195•196 |
| Dimensions                       | P197~212 |
| Precautions                      | P213     |

Standard Use for Lifting



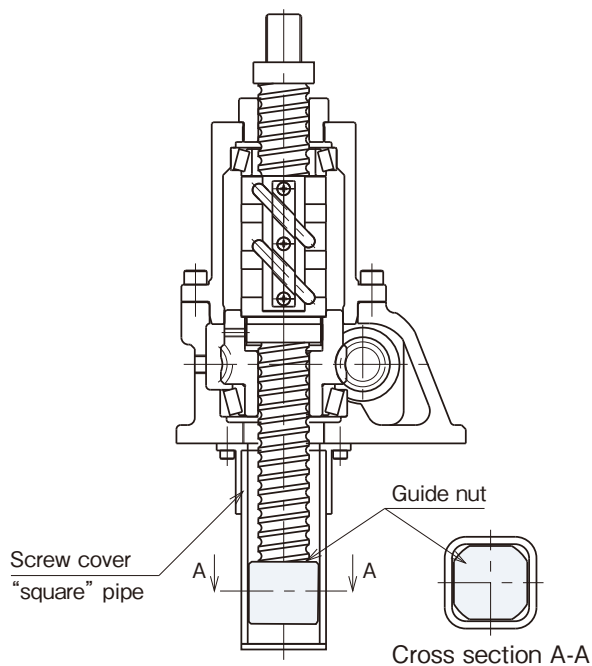
Standard Use for Suspending



## JWB (Ball Screw Type) Rotation Prevention Type

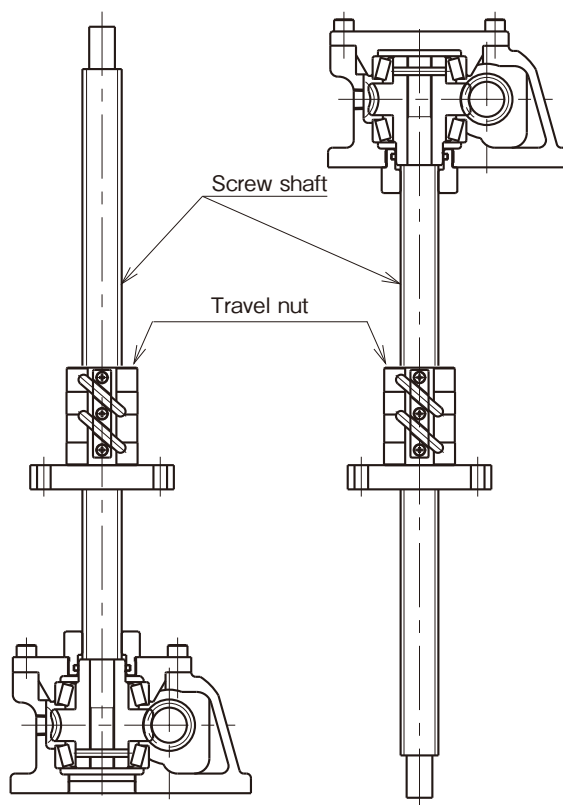
JWB005~200

〈Rotation Prevention Type with Guide Nut〉

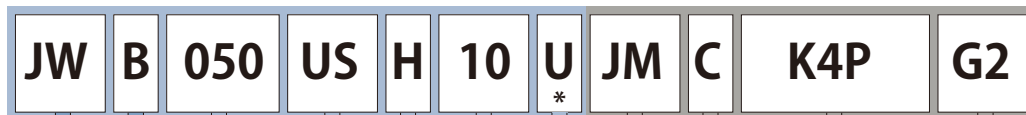


Note) The 10° space in each corner between the guide and the pipe allows smooth rotation.

## JWB (Ball Screw Type) Travel Nut Type



# JWB (Ball Screw Type)



Linipower Jack

Jack Type  
B : Ball screw

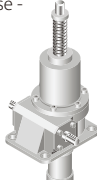
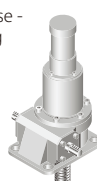
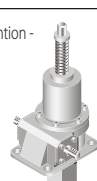
Basic Capacity

| Frame No. | kN   | {tf}  |
|-----------|------|-------|
| 005       | 4.90 | {0.5} |
| 010       | 9.80 | {1}   |
| 025       | 24.5 | {2.5} |
| 050       | 49.0 | {5}   |
| 100       | 98.0 | {10}  |
| 150       | 147  | {15}  |
| 200       | 196  | {20}  |
| 300       | 294  | {30}  |
| 500       | 490  | {50}  |
| 750       | 735  | {75}  |
| 1000      | 980  | {100} |

\*Compact type is available for JWM300 and 500. See page 257.

\*JWM750 and 1000 are manufactured upon inspecting specific needs.

Installation Type

|    |                                  |                                                                                                       |
|----|----------------------------------|-------------------------------------------------------------------------------------------------------|
| US | Standard Use - Lifting           |                      |
| DS | Standard Use - Suspending        |                     |
| UM | Rotation Prevention - Lifting    | <br>(See page 192) |
| DM | Rotation Prevention - Suspending | <br>(See page 192) |

Stroke mm

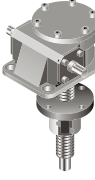
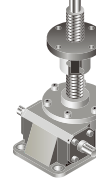
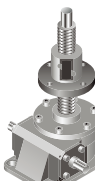
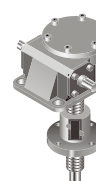
|    |      |
|----|------|
| 1  | 100  |
| 3  | 300  |
| 6  | 600  |
| 10 | 1000 |

\*The above values are examples. For actual stroke used, refer to the Model comparison Table for JWB on page 145.

Gear Ratio

| Symbol<br>Frame No. | H                              | L  |
|---------------------|--------------------------------|----|
| 005                 | 5                              | 20 |
| 010                 | 5                              | 20 |
| 025                 | 6                              | 24 |
| 050                 | 6                              | 24 |
| 100                 | 8                              | 24 |
| 150                 | 8                              | 24 |
| 200                 | 8                              | 24 |
| 300                 | 10 <sup>2</sup> / <sub>3</sub> | 32 |
| 500                 | 10 <sup>2</sup> / <sub>3</sub> | 32 |
| 750                 | 10 <sup>2</sup> / <sub>3</sub> | 32 |
| 1000                | 12                             | 36 |

Flange Installation

|   |                                                                                       |                                                                                       |
|---|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| U |  |  |
| D |  |  |

\*Be sure to use the flange installation method U or D with travel nuts.

\*Above are only necessary with travel nuts.

## Examples)

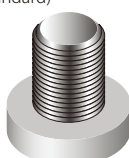
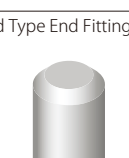
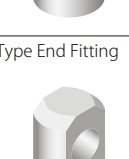
### JWB100UMH3

- Machine Screw Type
- 98.0kN {10tf}
- Rotation prevention (for lifting)
- Gear ratio H (1/8)
- Stroke 300mm

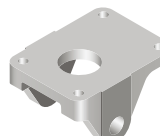
### JWB050USH10JMK4PG2

- Machine Screw Type
- 49.0kN {5tf}
- Standard use (for lifting)
- Gear ratio H (1/6)
- Stroke 1000mm
- Bellows
- Table Type End Fitting
- 4 Internal LS
- Potentiometer
- 3 Phase motor with brake and gear; reducer ratio of 1/10

## Output Option

|           |                                                                                                                  |
|-----------|------------------------------------------------------------------------------------------------------------------|
| No symbol | Screw Shaft End (standard)<br> |
| J         | Bellows<br>                   |
| B         | Rod Type End Fitting<br>      |
| I         | I Type End Fitting<br>        |
| M         | Table Type End Fitting<br>    |

## Installation Option

|   |                                                                                                                                 |
|---|---------------------------------------------------------------------------------------------------------------------------------|
| C | Clevis Mounting Adapter<br><br>(See page 245) |
|---|---------------------------------------------------------------------------------------------------------------------------------|

Note) For standard lifting only.

## Sensor Option

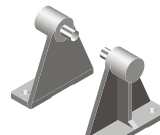
|                    |                                                                                                                                                                                                                 |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Y                  | LS Counter<br><br>(See page 239)                                                                                              |
| K2<br>K4<br>P<br>R | Position Sensor<br>K2...2 Internal LS<br>K4...4 Internal LS<br>P...Potentiometer<br>R...Rotary Encoder<br><br>(See page 241) |

Note) To request the above parts, provide their letter symbols in the order given.

## Input Option

|          |                                                                                                                                                                                                                                                        |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E<br>EV  | 3 phase brake and motor<br>E...200V 50Hz<br>200/220V 60Hz<br>EV...400 50Hz<br>400/440V 60Hz<br><br>(See page 229~)                                                 |
| G1<br>G2 | 3 phase brake and gear-motor<br>G1...Gear ratio 1/5<br>200V 50Hz<br>200/220V 60Hz<br>G2...Reducer ratio 1/10<br>200V 50Hz<br>200/220V 60Hz<br><br>(See page 229~) |

## Accessories

|                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Control Options</b>                                                                                                                                                               |
| Stroke Meter and PCB<br>                                                                         |
| Meter Relay and PCB<br><br>(See page 242~)                                                      |
| <b>Others</b>                                                                                                                                                                        |
| Trunnion Mounting Adapter<br><br>* Use as a set with clevis mounting adapter.<br>(See page 245) |

Note) To request the above parts, provide their letter symbols in the order given. When travel nuts are used, B, I and M are not required.

Note) Travel nut type with bellows is estimated for each order. Enter necessary information in the inquiry form on page 249 to contact TSUBAKI E&M.

## Reference Table for Standard Use JWB (Ball Screw Type)

| Frame No.                                        |                              | JWB005                                                                                            | JWB010 | JWB025  | JWB050 | JWB100     |
|--------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------------------|--------|---------|--------|------------|
| Basic Capacity                                   | kN                           | 4.90                                                                                              | 9.80   | 24.5    | 49.0   | 98.0       |
|                                                  | {tf}                         | {0.5}                                                                                             | {1}    | {2.5}   | {5}    | {10}       |
| Outer Screw Diameter                             | mm                           | 16                                                                                                | 20     | 25      | 36     | 45         |
| Minor Screw Diameter                             | mm                           | 13.5                                                                                              | 17.5   | 21.4    | 31.3   | 39.1       |
| Screw Lead                                       | mm                           | 5                                                                                                 | 5      | 8       | 10     | 12         |
| Gear Ratio                                       | H Speed                      | 5                                                                                                 | 5      | 6       | 6      | 8          |
|                                                  | L Speed                      | 20                                                                                                | 20     | 24      | 24     | 24         |
| Overall Efficiency                               | H Speed                      | 63                                                                                                | 61     | 62      | 64     | 63         |
|                                                  | L Speed                      | 37                                                                                                | 34     | 35      | 39     | 43         |
| Max. Allowable Input Capacity                    | H Speed                      | 0.25                                                                                              | 0.54   | 1.3     | 2.2    | 3.6        |
|                                                  | L Speed                      | 0.12                                                                                              | 0.27   | 0.63    | 1.0    | 1.9        |
| Tare Drag Torque                                 | N·m                          | 0.11                                                                                              | 0.29   | 0.62    | 1.37   | 1.96       |
|                                                  | {kg·m}                       | {0.011}                                                                                           | {0.03} | {0.063} | {0.14} | {0.2}      |
| Holding Torque                                   | H Speed                      | 0.69                                                                                              | 1.27   | 4.31    | 10.78  | 19.6       |
|                                                  | L Speed                      | 0.14                                                                                              | 0.26   | 0.91    | 2.4    | 5.8        |
| Allowable Input Torque *Note 1                   | N·m                          | 9.8                                                                                               | 19.6   | 49.0    | 153.9  | 292.0      |
|                                                  | {kg·m}                       | {1}                                                                                               | {2}    | {5}     | {15.7} | {29.8}     |
| Required Input Torque for Basic Capacity *Note 2 | H Speed                      | 1.3                                                                                               | 2.8    | 9.0     | 21.5   | 39.1       |
|                                                  | L Speed                      | 0.62                                                                                              | 1.4    | 4.3     | 9.6    | 20.4       |
| Screw Movement/ per Revolution of Input Shaft    | H Speed                      | 1                                                                                                 | 1      | 1.33    | 1.67   | 1.5        |
|                                                  | L Speed                      | 0.25                                                                                              | 0.25   | 0.33    | 0.42   | 0.50       |
| Max. Input rpm                                   | H Speed                      | 1800                                                                                              | 1800   | 1800    | 1800   | 1800       |
|                                                  | L Speed                      | 1800                                                                                              | 1800   | 1800    | 1800   | 1800       |
| Max. Input rpm for Basic Capacity                | H Speed                      | 1800                                                                                              | 1800   | 1400    | 1000   | 890        |
|                                                  | L Speed                      | 1800                                                                                              | 1800   | 1400    | 1000   | 890        |
| Screw Shaft Rotational Torque for Basic Capacity | N·m                          | 4.3                                                                                               | 8.7    | 34.7    | 86.7   | 208.2      |
|                                                  | {kgf·m}                      | {0.44}                                                                                            | {0.88} | {3.5}   | {8.8}  | {21.2}     |
| Screw Cover Material *Note 3                     |                              | Hard Vinyl Chloride                                                                               |        |         |        | Steel Pipe |
| Lubrication                                      |                              | Shaft: Grease Reducer Unit: Grease Bath                                                           |        |         |        |            |
| Color                                            |                              | Tsubaki Olive Grey (Munsell 5GY6/0.5)                                                             |        |         |        |            |
| Environment                                      | Operating Temperature Range  | - 15 to 80°C (Precautions #2)                                                                     |        |         |        |            |
|                                                  | Relative Humidity            | 85% or less (no dew condensation)                                                                 |        |         |        |            |
|                                                  | Operating ambient atmosphere | Indoor Environment (Indoor room where rain and water cannot enter. Dust volume should be normal.) |        |         |        |            |
| Duty Cycle *Note 4                               |                              | Within 30% ED                                                                                     |        |         |        |            |

Note 1) The allowable torque is for jack input shaft only. (Reconfirm if synchronous drive.)

Note 2) Includes tare drag torque.

Note 3) Rotation prevention types for frames 005~050 are steel square pipes.

Note 4) Standard percentage duty cycle is 30 minutes. Thus, driving time is based on 30minute intervals.

### Precautions

- 1.All loads (static, dynamic or shock) should be within the rated capacity of the jack at sufficient safety levels.
- 2.Operating Temperature Range refers to the surface temperature of the jack during operation. To check, measure the surface temperature of the input shaft unit or travel nut (if used). Be sure all the rotating parts have completely stopped before proceeding to measure.
- 3.Be sure to operate within the allowable input rpm of 1800/min.
- 4.Number of synchronizing jacks which can be connected on the same line is limited by shaft strength. Refer to the allowable input shaft torque on the above table.
- 5.Activating torque for the drive unit should be maintained at 200% above the required torque.
- 6.If operating in freezing temperatures, a change in viscosity may reduce the efficiency of the grease. Set the drive unit so as to accommodate this change.

| JWB150                                                                                            | JWB200 | JWB300  | JWB500  | JWB750  | JWB1000 |
|---------------------------------------------------------------------------------------------------|--------|---------|---------|---------|---------|
| 147                                                                                               | 196    | 294     | 490     | 735     | 980     |
| {15}                                                                                              | {20}   | {30}    | {50}    | {75}    | {100}   |
| 50                                                                                                | 63     | 85      | 100     | 125     | 140     |
| 43.1                                                                                              | 55.7   | 74.8    | 87      | 112     | 122     |
| 16                                                                                                | 16     | 20      | 24      | 25      | 32      |
| 8                                                                                                 | 8      | 10 2/3  | 10 2/3  | 10 2/3  | 12      |
| 24                                                                                                | 24     | 32      | 32      | 32      | 36      |
| 63                                                                                                | 62     | 56      | 60      | 57      | 54      |
| 43                                                                                                | 41     | 34      | 38      | 36      | 32      |
| 4.0                                                                                               | 5.5    | 8.9     | 13.3    | 16.1    | 21.2    |
| 2.1                                                                                               | 2.8    | 4.1     | 6.5     | 8.2     | 10.2    |
| 2.65                                                                                              | 3.92   | 9.81    | 19.6    | 29.4    | 39.2    |
| {0.27}                                                                                            | {0.4}  | {1}     | {2}     | {3}     | {4}     |
| 39.2                                                                                              | 51.0   | 68.6    | 140.1   | 210.7   | 362.6   |
| {4.0}                                                                                             | {5.2}  | {7.0}   | {14.3}  | {21.5}  | {37}    |
| 11.8                                                                                              | 15.0   | 19.5    | 41.2    | 59.8    | 99.0    |
| {1.2}                                                                                             | {1.53} | {1.99}  | {4.2}   | {6.1}   | {10.1}  |
| 292.0                                                                                             | 292.0  | 735.0   | 1372.0  | 1764.0  | 2450.0  |
| {29.8}                                                                                            | {29.8} | {75}    | {140}   | {180}   | {250}   |
| 77.0                                                                                              | 104.5  | 169.6   | 317.5   | 511.2   | 810.2   |
| {7.8}                                                                                             | {10.7} | {17.3}  | {32.4}  | {52.1}  | {82.6}  |
| 39.6                                                                                              | 54.2   | 98.5    | 177.9   | 290.8   | 486.9   |
| {4.0}                                                                                             | {5.5}  | {10.0}  | {18.1}  | {29.6}  | {49.6}  |
| 2                                                                                                 | 2      | 1.88    | 2.25    | 2.34    | 2.67    |
| 0.67                                                                                              | 0.67   | 0.63    | 0.75    | 0.78    | 0.89    |
| 1800                                                                                              | 1800   | 1800    | 1800    | 1800    | 1800    |
| 1800                                                                                              | 1800   | 1800    | 1800    | 1800    | 1800    |
| 500                                                                                               | 500    | 500     | 400     | 300     | 250     |
| 500                                                                                               | 500    | 400     | 350     | 270     | 200     |
| 416.3                                                                                             | 555.1  | 1040.9  | 2081.7  | 3252.7  | 5551.3  |
| {42.4}                                                                                            | {56.6} | {106.1} | {212.2} | {331.6} | {565.9} |
| Steel Pipe                                                                                        |        |         |         |         |         |
| Screw: Grease Reducer Unit: Grease Bath                                                           |        |         |         |         |         |
| Tsubaki Olive Grey (Munsell 5GY6/0.5)                                                             |        |         |         |         |         |
| - 15 to 80°C (Precautions #2)                                                                     |        |         |         |         |         |
| 85% or less (no dew condensation)                                                                 |        |         |         |         |         |
| Indoor Environment (Indoor room where rain and water cannot enter. Dust volume should be normal.) |        |         |         |         |         |
| Within 30% ED                                                                                     |        |         |         |         |         |

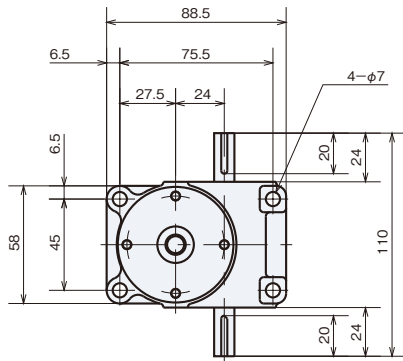
7. Since JWB (Ball Screw Type) is highly efficient, sufficient brake that over powers the "holding torque" is required to sustain its shaft.

- ⚠8. Be certain that the jack rating exceeds the maximum stroke. Over travel can cause the lift shaft to disengage from the ball nut. JWB (Ball Screw Type) is supported by a stopper (shaft end). However, this is merely for the purpose of securing the screw shaft during installation. While installing, take caution so that the screw shaft does not rotate by its own weight and

become disengaged. If rotation cannot be avoided, use a model with rotation prevention. (Contact TEM for details.)

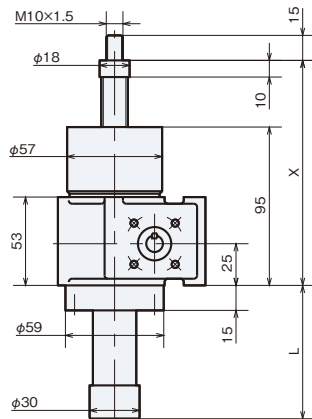
- ⚠9. Do not use mechanical stops under any circumstances. This will cause major internal damage.
10. Input shaft key is provided with each unit. (The input shaft key complies with JIS B 1301-1996 (normal grade).)

## JWB005 Dimensions - Standard Model

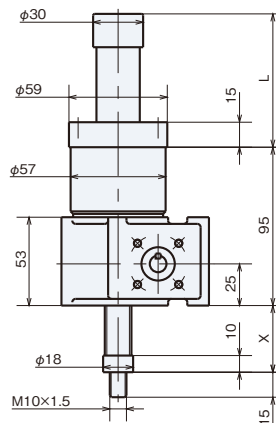


| Stroke | US Standard Model for Lifting |     |              |      |     | DS Standard Model for Suspending |     |              |     |     | Weight kg |
|--------|-------------------------------|-----|--------------|------|-----|----------------------------------|-----|--------------|-----|-----|-----------|
|        | X                             |     | X            |      | L   | X                                |     | X            |     | L   |           |
|        | Without Bellows               |     | With Bellows |      |     | Without Bellows                  |     | With Bellows |     |     |           |
|        | MIN                           | MAX | MIN          | MAX  |     | MIN                              | MAX | MIN          | MAX |     |           |
| 100    | 115                           | 215 | 160          | 260  | 188 | 20                               | 120 | 65           | 165 | 188 | 3.0       |
| 200    | 115                           | 315 | 160          | 360  | 288 | 20                               | 220 | 65           | 265 | 288 | 3.2       |
| 300    | 115                           | 415 | 200          | 500  | 428 | 20                               | 320 | 105          | 405 | 428 | 3.4       |
| 400    | 115                           | 515 | 200          | 600  | 528 | 20                               | 420 | 105          | 505 | 528 | 3.6       |
| 500    | 115                           | 615 | 235          | 735  | 663 | 20                               | 520 | 140          | 640 | 663 | 3.8       |
| 600    | 115                           | 715 | 235          | 835  | 763 | 20                               | 620 | 140          | 740 | 763 | 4.0       |
| 800    | 115                           | 915 | 270          | 1070 | 998 | 20                               | 820 | 175          | 975 | 998 | 4.3       |

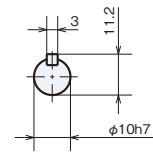
Lift (JWB005US)



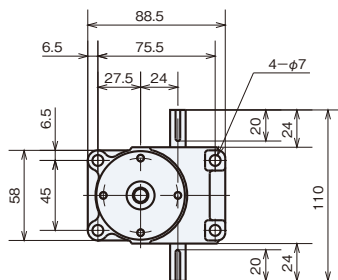
Suspend (JWB005DS)



● Input Shaft

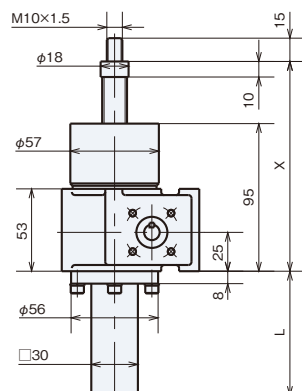


## JWB005 Dimensions - Rotation Prevention Type

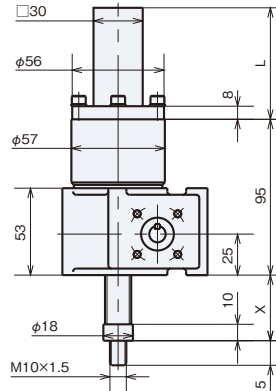


| Stroke | UM Rotation Prevention Type for Lifting |              |                 |              |      | DM Rotation Prevention Type for Suspending |     |     |     |      | Weight kg |
|--------|-----------------------------------------|--------------|-----------------|--------------|------|--------------------------------------------|-----|-----|-----|------|-----------|
|        | X                                       |              | X               |              | L    | X                                          |     | X   |     | L    |           |
|        | Without Bellows                         | With Bellows | Without Bellows | With Bellows |      |                                            |     |     |     |      |           |
|        | MIN                                     | MAX          | MIN             | MAX          |      | MIN                                        | MAX | MIN | MAX |      |           |
| 100    | 115                                     | 215          | 160             | 260          | 202  | 20                                         | 120 | 65  | 165 | 202  | 3.5       |
| 200    | 115                                     | 315          | 160             | 360          | 302  | 20                                         | 220 | 65  | 265 | 302  | 3.9       |
| 300    | 115                                     | 415          | 200             | 500          | 442  | 20                                         | 320 | 105 | 405 | 442  | 4.5       |
| 400    | 115                                     | 515          | 200             | 600          | 542  | 20                                         | 420 | 105 | 505 | 542  | 5.0       |
| 500    | 115                                     | 615          | 235             | 735          | 677  | 20                                         | 520 | 140 | 640 | 677  | 5.5       |
| 600    | 115                                     | 715          | 235             | 835          | 777  | 20                                         | 620 | 140 | 740 | 777  | 6.0       |
| 800    | 115                                     | 915          | 270             | 1070         | 1012 | 20                                         | 820 | 175 | 975 | 1012 | 7.0       |

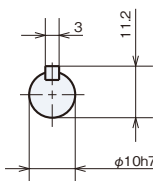
Lift (JWB005UM)



Suspend (JWB005DM)

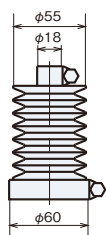


● Input Shaft

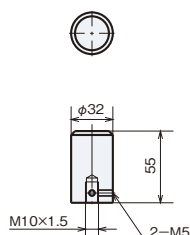


# Output Options

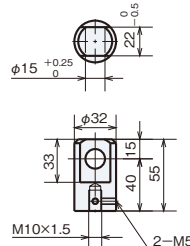
■ Bellows ( - J)



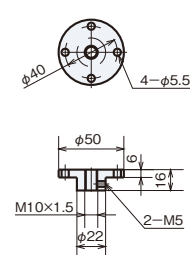
■ Rod Type End Fitting ( - B)



■ I Type End Fitting ( - I)

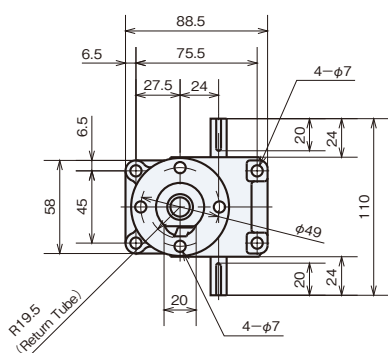


■ Table Type End Fitting ( - M)



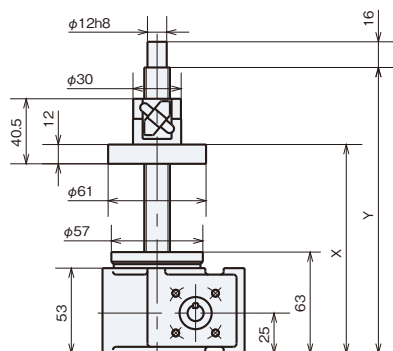
Note) For detailed measurements on units with bellows, see page 248.

## JWB005 Dimensions - Travel Nut Type

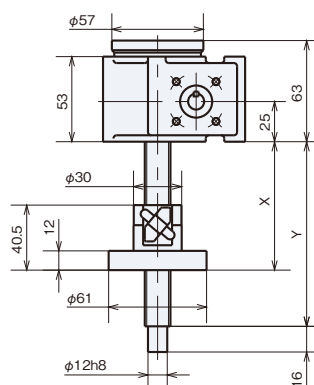


| Stroke | UR Travel Nut Type for Lifting |     |     | DR Travel Nut Type for Suspending |     |     | Weight kg |
|--------|--------------------------------|-----|-----|-----------------------------------|-----|-----|-----------|
|        | X                              |     | Y   | X                                 |     | Y   |           |
|        | MIN                            | MAX |     | MIN                               | MAX |     |           |
| 100    | 84                             | 184 | 224 | 51                                | 151 | 162 | 2.7       |
| 200    | 84                             | 284 | 324 | 51                                | 251 | 262 | 2.8       |
| 300    | 84                             | 384 | 424 | 51                                | 351 | 362 | 2.9       |
| 400    | 84                             | 484 | 524 | 51                                | 451 | 462 | 3.1       |
| 500    | 84                             | 584 | 624 | 51                                | 551 | 562 | 3.2       |
| 600    | 84                             | 684 | 724 | 51                                | 651 | 662 | 3.3       |
| 800    | 84                             | 884 | 924 | 51                                | 851 | 862 | 3.6       |

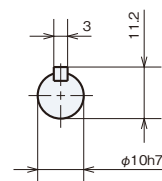
Lift (JWB005UR)



Suspend (JWB005DR)



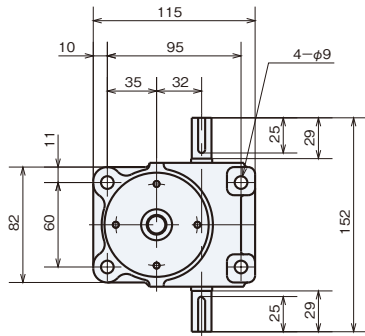
● Input Shaft



Note) Ball nut return tube and travel flange openings may vary from this drawing.  
Note the return tube measurements when installing to equipment.

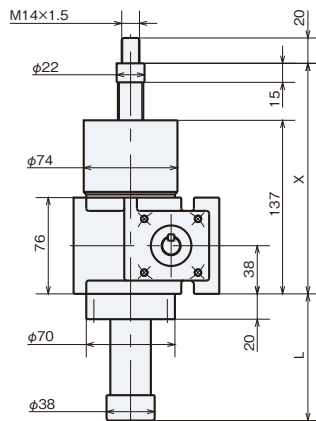
Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

## JWB010 Dimensions - Standard Model

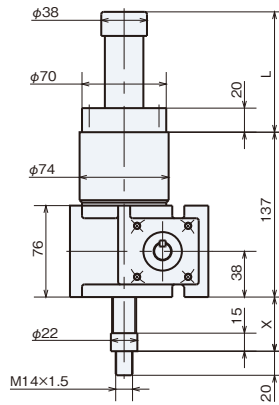


| Stroke | US Standard Model for Lifting |              |                 |              |      | DS Standard Model for Suspending |              |     |      |      | Weight kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|--------------|-----|------|------|-----------|
|        | X                             |              | X               |              | L    | X                                |              | X   |      | L    |           |
|        | Without Bellows               | With Bellows | Without Bellows | With Bellows |      | Without Bellows                  | With Bellows |     |      |      |           |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX          | MIN | MAX  |      |           |
| 100    | 162                           | 262          | 212             | 312          | 194  | 25                               | 125          | 75  | 175  | 194  | 6.7       |
| 200    | 162                           | 362          | 212             | 412          | 294  | 25                               | 225          | 75  | 275  | 294  | 7.0       |
| 300    | 162                           | 462          | 252             | 552          | 434  | 25                               | 325          | 115 | 415  | 434  | 7.4       |
| 400    | 162                           | 562          | 252             | 652          | 534  | 25                               | 425          | 115 | 515  | 534  | 7.6       |
| 500    | 162                           | 662          | 287             | 787          | 669  | 25                               | 525          | 150 | 650  | 669  | 8.0       |
| 600    | 162                           | 762          | 287             | 887          | 769  | 25                               | 625          | 150 | 750  | 769  | 8.2       |
| 800    | 162                           | 962          | 322             | 1122         | 1004 | 25                               | 825          | 185 | 985  | 1004 | 8.9       |
| 1000   | 162                           | 1162         | 352             | 1352         | 1234 | 25                               | 1025         | 215 | 1215 | 1234 | 9.5       |

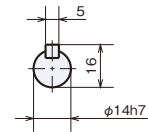
Lift (JWB010US)



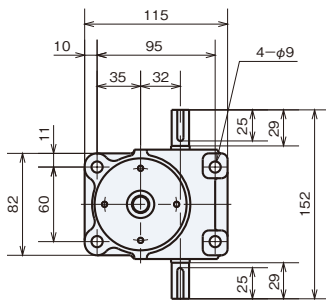
Suspend (JWB010DS)



●Input Shaft

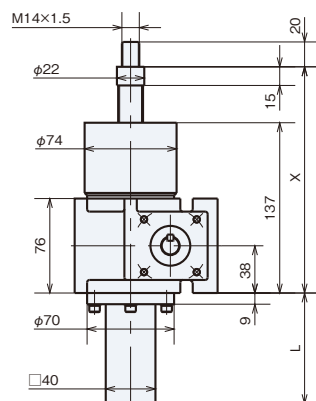


## JWB010 Dimensions - Rotation Prevention Type

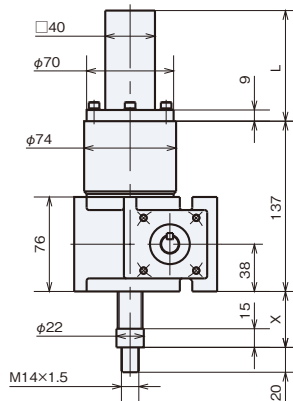


| Stroke | UM Rotation Prevention Type for Lifting |      |              |      |      | DM Rotation Prevention Type for Suspending |      |              |      |      | Weight kg |
|--------|-----------------------------------------|------|--------------|------|------|--------------------------------------------|------|--------------|------|------|-----------|
|        | X                                       |      | X            |      | L    | X                                          |      | X            |      | L    |           |
|        | Without Bellows                         |      | With Bellows |      |      | Without Bellows                            |      | With Bellows |      |      |           |
|        | MIN                                     | MAX  | MIN          | MAX  |      | MIN                                        | MAX  | MIN          | MAX  |      |           |
| 100    | 162                                     | 262  | 212          | 312  | 213  | 25                                         | 125  | 75           | 175  | 213  | 7.5       |
| 200    | 162                                     | 362  | 212          | 412  | 313  | 25                                         | 225  | 75           | 275  | 313  | 8.2       |
| 300    | 162                                     | 462  | 252          | 552  | 453  | 25                                         | 325  | 115          | 415  | 453  | 9.1       |
| 400    | 162                                     | 562  | 252          | 652  | 553  | 25                                         | 425  | 115          | 515  | 553  | 9.8       |
| 500    | 162                                     | 662  | 287          | 787  | 688  | 25                                         | 525  | 150          | 650  | 688  | 11        |
| 600    | 162                                     | 762  | 287          | 887  | 788  | 25                                         | 625  | 150          | 750  | 788  | 12        |
| 800    | 162                                     | 962  | 322          | 1122 | 1023 | 25                                         | 825  | 185          | 985  | 1023 | 13        |
| 1000   | 162                                     | 1162 | 352          | 1352 | 1253 | 25                                         | 1025 | 215          | 1215 | 1253 | 15        |

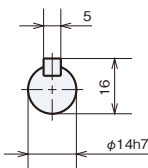
Lift (JWB010UM)



Suspend (JWB010DM)

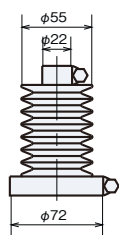


●Input Shaft

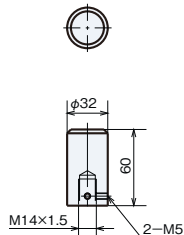


## Output Options

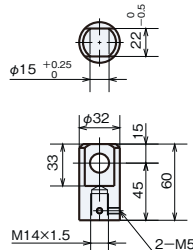
■ Bellows ( - J)



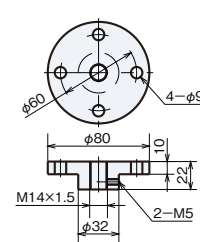
■ Rod Type End Fitting ( - B)



■ I Type End Fitting ( - I)

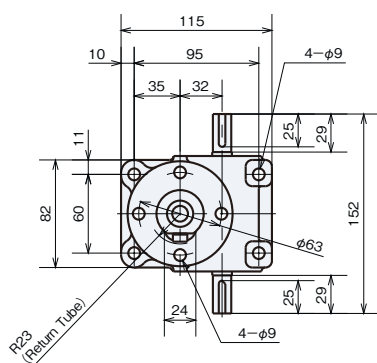


■ Table Type End Fitting ( - M)

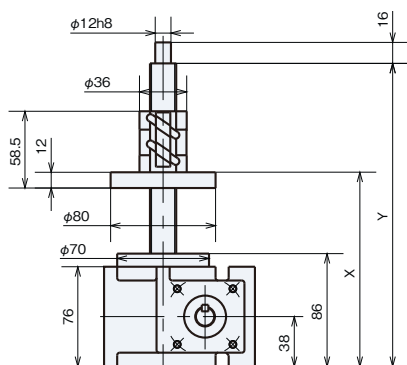


Note) For detailed measurements on units with bellows, see page 248.

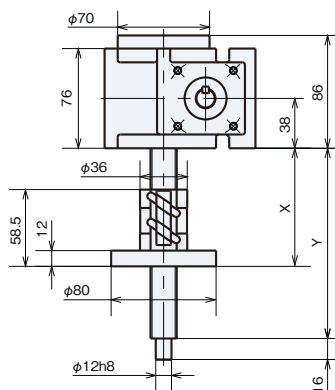
## JWB010 Dimensions - Travel Nut Type



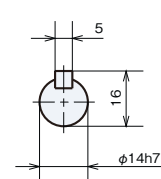
Lift (JWB010UR)



Suspend (JWB010DR)



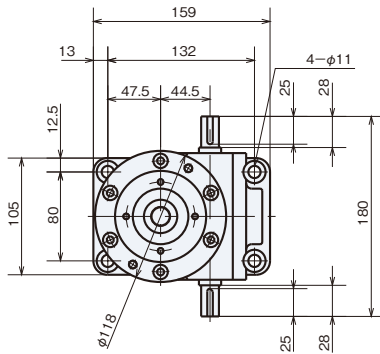
● Input Shaft



Note) Ball nut return tube and travel flange openings may vary from this drawing.  
Note the return tube measurements when installing to equipment.

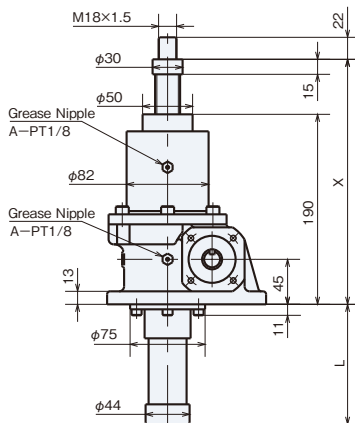
Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

## JWB025 Dimensions - Standard Model

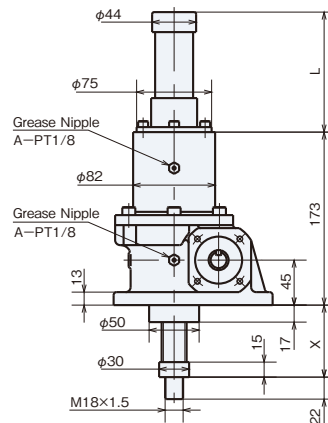


| Stroke | US Standard Model for Lifting |      |              |      |      | DS Standard Model for Suspending |      |              |      |      | Weight kg |
|--------|-------------------------------|------|--------------|------|------|----------------------------------|------|--------------|------|------|-----------|
|        | X                             |      | X            |      | L    | X                                |      | X            |      | L    |           |
|        | Without Bellows               |      | With Bellows |      |      | Without Bellows                  |      | With Bellows |      |      |           |
|        | MIN                           | MAX  | MIN          | MAX  |      | MIN                              | MAX  | MIN          | MAX  |      |           |
| 100    | 215                           | 315  | 230          | 330  | 149  | 42                               | 142  | 57           | 157  | 149  | 11        |
| 200    | 215                           | 415  | 230          | 430  | 249  | 42                               | 242  | 57           | 257  | 249  | 11        |
| 300    | 215                           | 515  | 250          | 550  | 369  | 42                               | 342  | 77           | 377  | 369  | 11        |
| 400    | 215                           | 615  | 250          | 650  | 469  | 42                               | 442  | 77           | 477  | 469  | 12        |
| 500    | 215                           | 715  | 270          | 770  | 589  | 42                               | 542  | 97           | 597  | 589  | 12        |
| 600    | 215                           | 815  | 270          | 870  | 689  | 42                               | 642  | 97           | 697  | 689  | 13        |
| 800    | 215                           | 1015 | 290          | 1090 | 909  | 42                               | 842  | 117          | 917  | 909  | 14        |
| 1000   | 215                           | 1215 | 310          | 1310 | 1129 | 42                               | 1042 | 137          | 1137 | 1129 | 14        |
| 1200   | 215                           | 1415 | 325          | 1525 | 1344 | 42                               | 1242 | 152          | 1352 | 1344 | 15        |

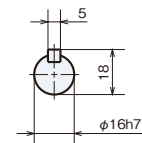
Lift (JWB025US)



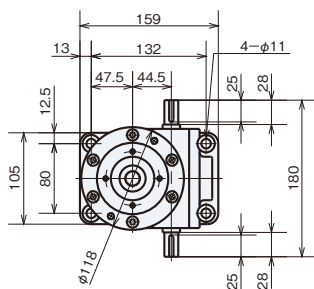
Suspend (JWB025DS)



●Input Shaft

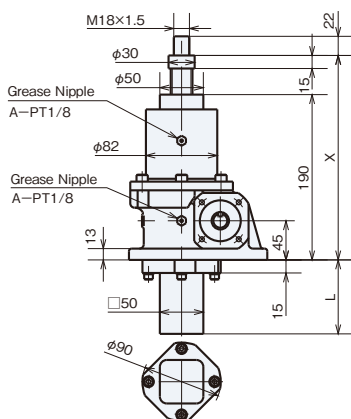


## JWB025 Dimensions - Rotation Prevention Type

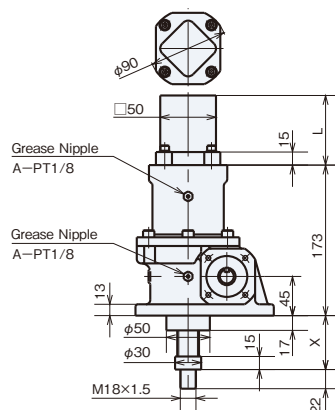


| Stroke | UM Rotation Prevention Type for Lifting |      |              |      |      | DM Rotation Prevention Type for Suspending |      |              |      |      | Weight kg |
|--------|-----------------------------------------|------|--------------|------|------|--------------------------------------------|------|--------------|------|------|-----------|
|        | X                                       |      | X            |      | L    | X                                          |      | X            |      | L    |           |
|        | Without Bellows                         |      | With Bellows |      |      | Without Bellows                            |      | With Bellows |      |      |           |
|        | MIN                                     | MAX  | MIN          | MAX  |      | MIN                                        | MAX  | MIN          | MAX  |      |           |
| 100    | 215                                     | 315  | 230          | 330  | 181  | 42                                         | 142  | 57           | 157  | 181  | 12        |
| 200    | 215                                     | 415  | 230          | 430  | 281  | 42                                         | 242  | 57           | 257  | 281  | 13        |
| 300    | 215                                     | 515  | 250          | 550  | 401  | 42                                         | 342  | 77           | 377  | 401  | 15        |
| 400    | 215                                     | 615  | 250          | 650  | 501  | 42                                         | 442  | 77           | 477  | 501  | 16        |
| 500    | 215                                     | 715  | 270          | 770  | 621  | 42                                         | 542  | 97           | 597  | 621  | 17        |
| 600    | 215                                     | 815  | 270          | 870  | 721  | 42                                         | 642  | 97           | 697  | 721  | 18        |
| 800    | 215                                     | 1015 | 290          | 1090 | 941  | 42                                         | 842  | 117          | 917  | 941  | 21        |
| 1000   | 215                                     | 1215 | 310          | 1310 | 1161 | 42                                         | 1042 | 137          | 1137 | 1161 | 23        |
| 1200   | 215                                     | 1415 | 325          | 1525 | 1376 | 42                                         | 1242 | 152          | 1352 | 1376 | 26        |

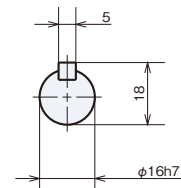
Lift (JWB025UM)



Suspend (JWB025DM)

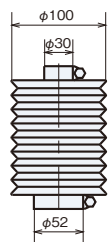


●Input Shaft

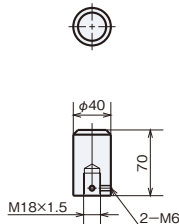


## Output Options

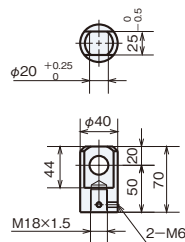
■ Bellows ( - J)



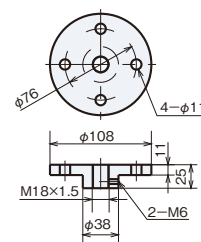
■ Rod Type End Fitting ( - B)



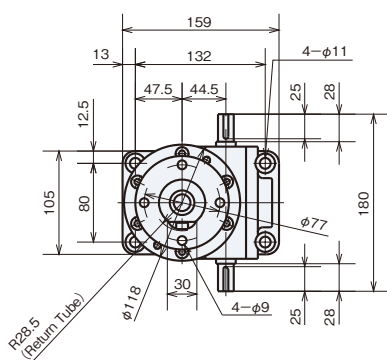
■ I Type End Fitting ( - I)



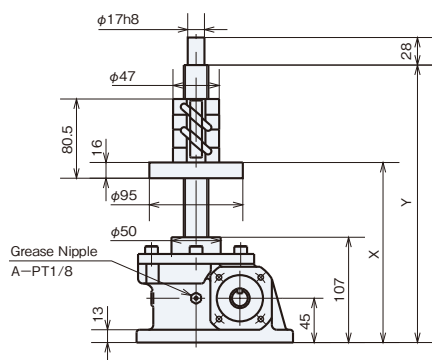
■ Table Type End Fitting ( - M)



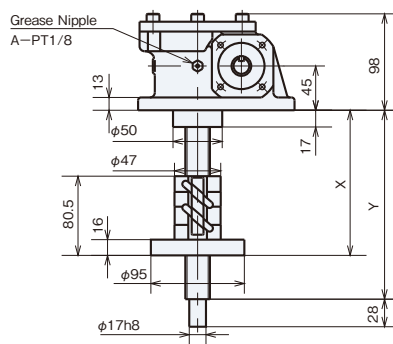
## JWB025 Dimensions - Travel Nut Type



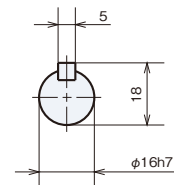
Lift (JWB025UR)



Suspend (JWB025DR)



● Input Shaft

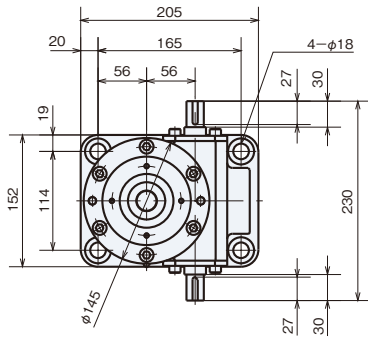


Note) Ball nut return tube and travel flange openings may vary from this drawing.  
Note the return tube measurements when installing to equipment.

Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

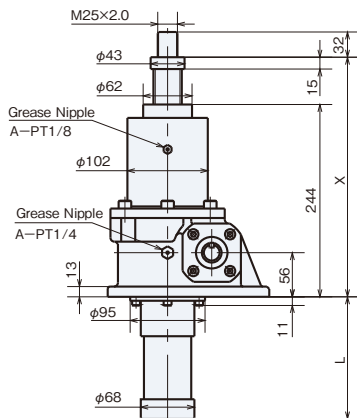
| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 133                            | 233  | 309  | 108                               | 208  | 219  | 9.2       |
| 200    | 133                            | 333  | 409  | 108                               | 308  | 319  | 9.5       |
| 300    | 133                            | 433  | 509  | 108                               | 408  | 419  | 9.8       |
| 400    | 133                            | 533  | 609  | 108                               | 508  | 519  | 11        |
| 500    | 133                            | 633  | 709  | 108                               | 608  | 619  | 11        |
| 600    | 133                            | 733  | 809  | 108                               | 708  | 719  | 11        |
| 800    | 133                            | 933  | 1009 | 108                               | 908  | 919  | 12        |
| 1000   | 133                            | 1133 | 1209 | 108                               | 1108 | 1119 | 13        |
| 1200   | 133                            | 1333 | 1409 | 108                               | 1308 | 1319 | 13        |

## JWB050 Dimensions - Standard Model

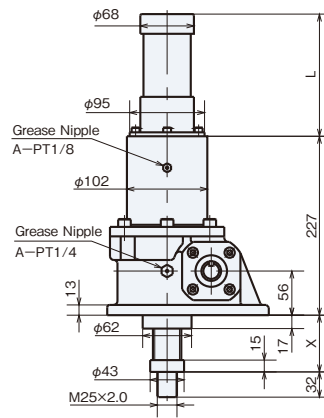


| Stroke | US Standard Model for Lifting |              |                 |              |      | DS Standard Model for Suspending |      |     |      |      | Weight kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|------|-----|------|------|-----------|
|        | X                             |              | X               |              | L    | X                                |      | X   |      | L    |           |
|        | Without Bellows               | With Bellows | Without Bellows | With Bellows |      |                                  |      |     |      |      |           |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX  | MIN | MAX  |      |           |
| 100    | 269                           | 369          | 284             | 384          | 147  | 42                               | 142  | 57  | 157  | 147  | 23        |
| 200    | 269                           | 469          | 284             | 484          | 247  | 42                               | 242  | 57  | 257  | 247  | 23        |
| 300    | 269                           | 569          | 304             | 604          | 367  | 42                               | 342  | 77  | 377  | 367  | 24        |
| 400    | 269                           | 669          | 304             | 704          | 467  | 42                               | 442  | 77  | 477  | 467  | 25        |
| 500    | 269                           | 769          | 324             | 824          | 587  | 42                               | 542  | 97  | 597  | 587  | 26        |
| 600    | 269                           | 869          | 324             | 924          | 687  | 42                               | 642  | 97  | 697  | 687  | 27        |
| 800    | 269                           | 1069         | 344             | 1144         | 907  | 42                               | 842  | 117 | 917  | 907  | 29        |
| 1000   | 269                           | 1269         | 364             | 1364         | 1127 | 42                               | 1042 | 137 | 1137 | 1127 | 30        |
| 1200   | 269                           | 1469         | 379             | 1579         | 1342 | 42                               | 1242 | 152 | 1352 | 1342 | 32        |
| 1500   | 269                           | 1769         | 404             | 1904         | 1667 | 42                               | 1542 | 177 | 1677 | 1667 | 35        |

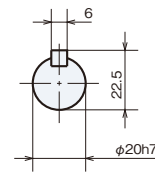
Lift (JWB050US)



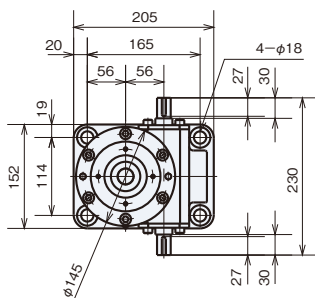
Suspend (JWB050DS)



●Input Shaft

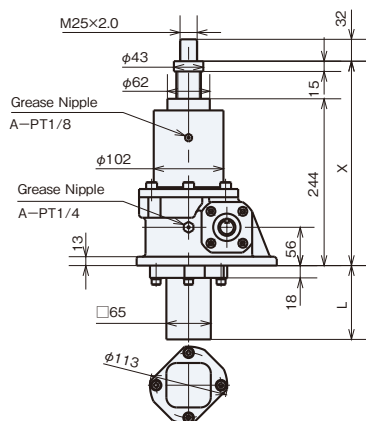


## JWB050 Dimensions - Rotation Prevention Type

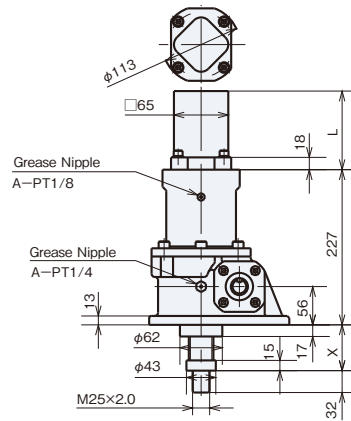


| Stroke | UM Rotation Prevention Type for Lifting |      |              |      |      | DM Rotation Prevention Type for Suspending |      |              |      |      | Weight kg |
|--------|-----------------------------------------|------|--------------|------|------|--------------------------------------------|------|--------------|------|------|-----------|
|        | X                                       |      | X            |      | L    | X                                          |      | X            |      | L    |           |
|        | Without Bellows                         |      | With Bellows |      |      | Without Bellows                            |      | With Bellows |      |      |           |
|        | MIN                                     | MAX  | MIN          | MAX  |      | MIN                                        | MAX  | MIN          | MAX  |      |           |
| 100    | 269                                     | 369  | 284          | 384  | 196  | 42                                         | 142  | 57           | 157  | 196  | 25        |
| 200    | 269                                     | 469  | 284          | 484  | 296  | 42                                         | 242  | 57           | 257  | 296  | 27        |
| 300    | 269                                     | 569  | 304          | 604  | 416  | 42                                         | 342  | 77           | 377  | 416  | 29        |
| 400    | 269                                     | 669  | 304          | 704  | 516  | 42                                         | 442  | 77           | 477  | 516  | 31        |
| 500    | 269                                     | 769  | 324          | 824  | 636  | 42                                         | 542  | 97           | 597  | 636  | 33        |
| 600    | 269                                     | 869  | 324          | 924  | 736  | 42                                         | 642  | 97           | 697  | 736  | 35        |
| 800    | 269                                     | 1069 | 344          | 1144 | 956  | 42                                         | 842  | 117          | 917  | 956  | 39        |
| 1000   | 269                                     | 1269 | 364          | 1364 | 1176 | 42                                         | 1042 | 137          | 1137 | 1176 | 43        |
| 1200   | 269                                     | 1469 | 379          | 1579 | 1391 | 42                                         | 1242 | 152          | 1352 | 1391 | 47        |
| 1500   | 269                                     | 1769 | 404          | 1904 | 1716 | 42                                         | 1542 | 177          | 1677 | 1716 | 52        |

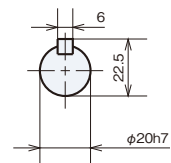
Lift (JWB050UM)



Suspend (JWB050DM)

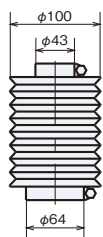


●Input Shaft

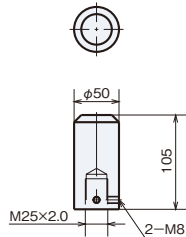


## Output Options

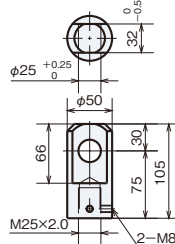
■ Bellows ( - J)



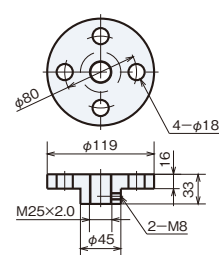
■ Rod Type End Fitting ( - B)



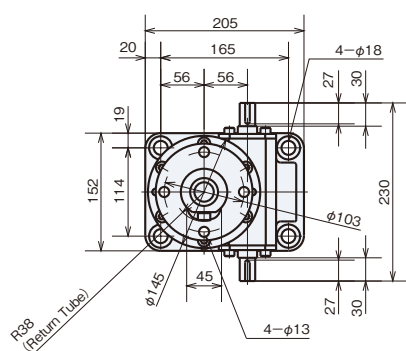
■ I Type End Fitting ( - I)



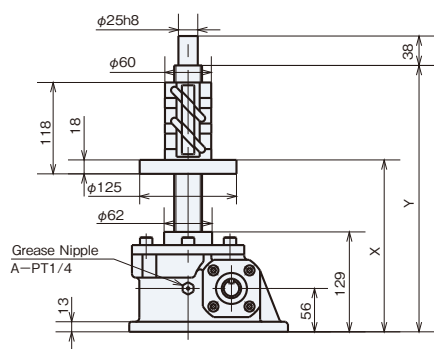
■ Table Type End Fitting ( - M)



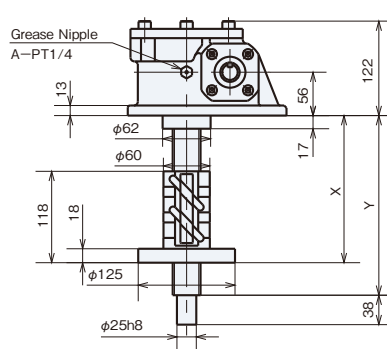
## JWB050 Dimensions - Travel Nut Type



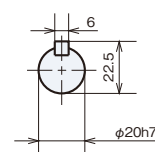
Lift (JWB050UR)



Suspend (JWB050DR)



● Input Shaft

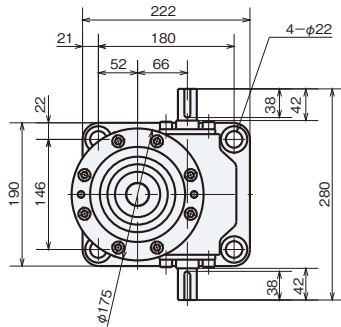


Note) Ball nut return tube and travel flange openings may vary from this drawing.  
Note the return tube measurements when installing to equipment.

Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

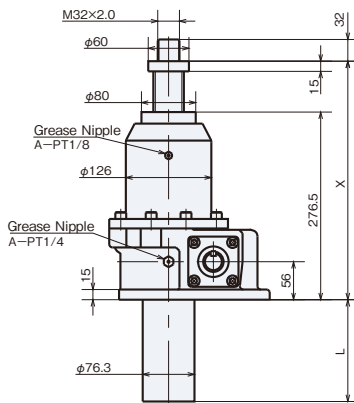
| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 157                            | 257  | 369  | 145                               | 245  | 257  | 21        |
| 200    | 157                            | 357  | 469  | 145                               | 345  | 357  | 22        |
| 300    | 157                            | 457  | 569  | 145                               | 445  | 457  | 22        |
| 400    | 157                            | 557  | 669  | 145                               | 545  | 557  | 23        |
| 500    | 157                            | 657  | 769  | 145                               | 645  | 657  | 24        |
| 600    | 157                            | 757  | 869  | 145                               | 745  | 757  | 24        |
| 800    | 157                            | 957  | 1069 | 145                               | 945  | 957  | 26        |
| 1000   | 157                            | 1157 | 1269 | 145                               | 1145 | 1157 | 27        |
| 1200   | 157                            | 1357 | 1469 | 145                               | 1345 | 1357 | 29        |
| 1500   | 157                            | 1657 | 1769 | 145                               | 1645 | 1657 | 31        |

## JWB100 Dimensions - Standard Model

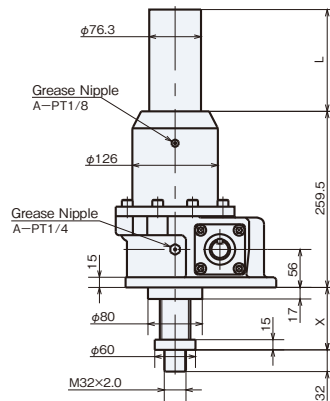


| Stroke | US Standard Model for Lifting |              |                 |              |      | DS Standard Model for Suspending |      |     |      |      | Weight kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|------|-----|------|------|-----------|
|        | X                             |              | X               |              | L    | X                                |      | X   |      | L    |           |
|        | Without Bellows               | With Bellows | Without Bellows | With Bellows |      |                                  |      |     |      |      |           |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX  | MIN | MAX  |      |           |
| 100    | 302                           | 402          | 312             | 412          | 151  | 42                               | 142  | 52  | 152  | 151  | 36        |
| 200    | 302                           | 502          | 312             | 512          | 252  | 42                               | 242  | 52  | 252  | 252  | 38        |
| 300    | 302                           | 602          | 327             | 627          | 366  | 42                               | 342  | 67  | 367  | 366  | 41        |
| 400    | 302                           | 702          | 327             | 727          | 466  | 42                               | 442  | 67  | 467  | 466  | 43        |
| 500    | 302                           | 802          | 352             | 852          | 591  | 42                               | 542  | 92  | 592  | 591  | 46        |
| 600    | 302                           | 902          | 352             | 952          | 691  | 42                               | 642  | 92  | 692  | 691  | 48        |
| 800    | 302                           | 1102         | 367             | 1167         | 906  | 42                               | 842  | 107 | 907  | 906  | 53        |
| 1000   | 302                           | 1302         | 377             | 1377         | 1116 | 42                               | 1042 | 117 | 1117 | 1116 | 58        |
| 1200   | 302                           | 1502         | 402             | 1602         | 1341 | 42                               | 1242 | 142 | 1342 | 1341 | 63        |
| 1500   | 302                           | 1802         | 427             | 1927         | 1666 | 42                               | 1542 | 167 | 1667 | 1666 | 71        |

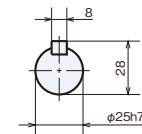
Lift (JWB100US)



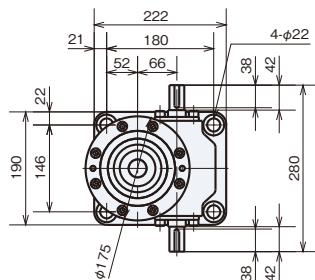
Suspend (JWB100DS)



●Input Shaft

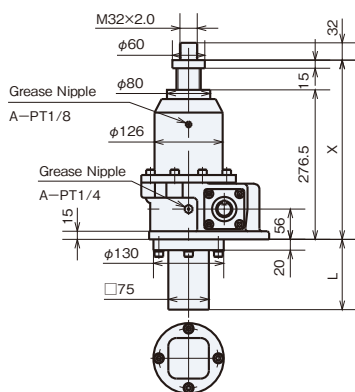


## JWB100 Dimensions - Rotation Prevention Type

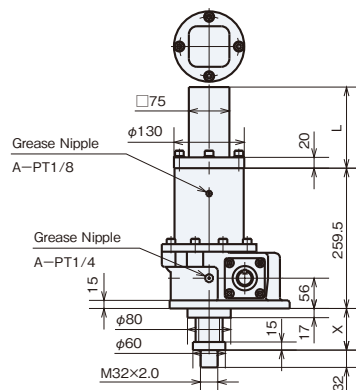


| Stroke | UM Rotation Prevention Type for Lifting |      |              |      |      | DM Rotation Prevention Type for Suspending |      |              |      |      | Weight kg |
|--------|-----------------------------------------|------|--------------|------|------|--------------------------------------------|------|--------------|------|------|-----------|
|        | X                                       |      | X            |      | L    | X                                          |      | X            |      | L    |           |
|        | Without Bellows                         |      | With Bellows |      |      | Without Bellows                            |      | With Bellows |      |      |           |
|        | MIN                                     | MAX  | MIN          | MAX  |      | MIN                                        | MAX  | MIN          | MAX  |      |           |
| 100    | 302                                     | 402  | 312          | 412  | 192  | 42                                         | 142  | 52           | 152  | 192  | 39        |
| 200    | 302                                     | 502  | 312          | 512  | 292  | 42                                         | 242  | 52           | 252  | 292  | 42        |
| 300    | 302                                     | 602  | 327          | 627  | 407  | 42                                         | 342  | 67           | 367  | 407  | 45        |
| 400    | 302                                     | 702  | 327          | 727  | 507  | 42                                         | 442  | 67           | 467  | 507  | 48        |
| 500    | 302                                     | 802  | 352          | 852  | 632  | 42                                         | 542  | 92           | 592  | 632  | 52        |
| 600    | 302                                     | 902  | 352          | 952  | 732  | 42                                         | 642  | 92           | 692  | 732  | 55        |
| 800    | 302                                     | 1102 | 367          | 1167 | 947  | 42                                         | 842  | 107          | 907  | 947  | 61        |
| 1000   | 302                                     | 1302 | 377          | 1377 | 1157 | 42                                         | 1042 | 117          | 1117 | 1157 | 67        |
| 1200   | 302                                     | 1502 | 402          | 1602 | 1382 | 42                                         | 1242 | 142          | 1342 | 1382 | 74        |
| 1500   | 302                                     | 1802 | 427          | 1927 | 1707 | 42                                         | 1542 | 167          | 1667 | 1707 | 84        |

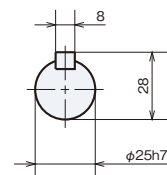
Lift (JWB100UM)



Suspend (JWB100DM)

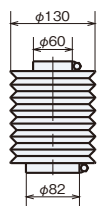


●Input Shaft

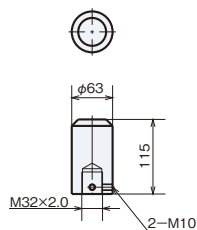


## Output Options

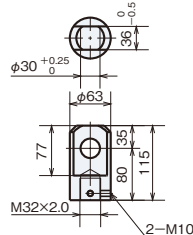
■ Bellows ( - J)



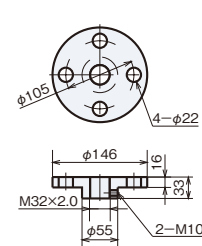
■ Rod Type End Fitting ( - B)



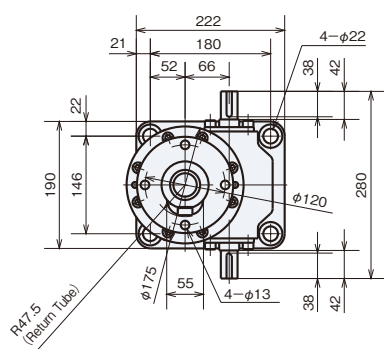
■ I Type End Fitting ( - I)



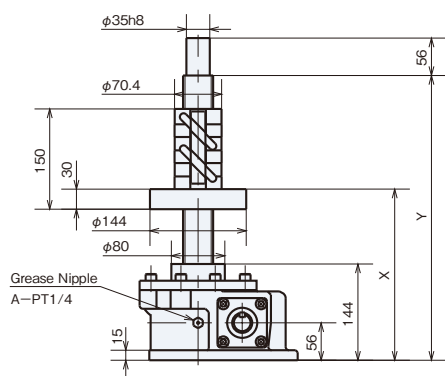
■ Table Type End Fitting ( - M)



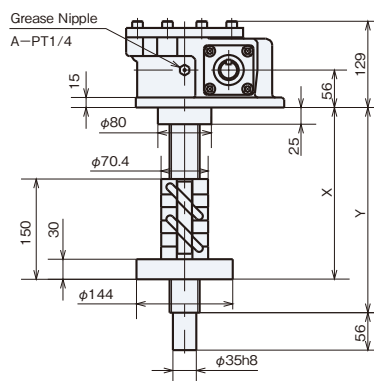
## JWB100 Dimensions - Travel Nut Type



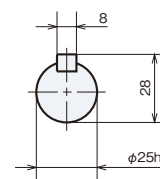
Lift (JWB100UR)



Suspend (JWB100DR)



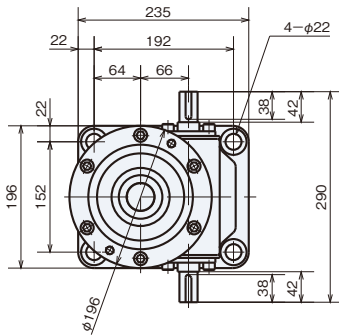
● Input Shaft



Note) Ball nut return tube and travel flange openings may vary from this drawing.  
Note the return tube measurements when installing to equipment.

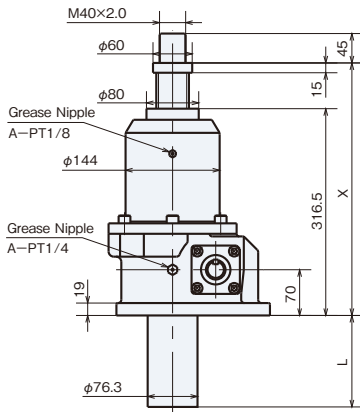
Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

## JWB150 Dimensions - Standard Model

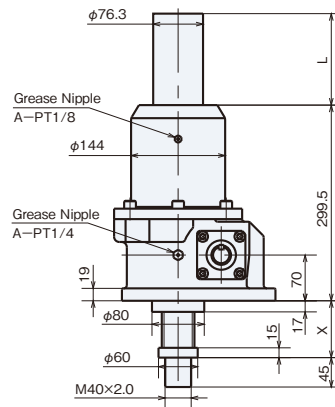


| Stroke | US Standard Model for Lifting |      |              |      |      | DS Standard Model for Suspending |      |              |      |      | Weight kg |
|--------|-------------------------------|------|--------------|------|------|----------------------------------|------|--------------|------|------|-----------|
|        | X                             |      | X            |      | L    | X                                |      | X            |      | L    |           |
|        | Without Bellows               |      | With Bellows |      |      | Without Bellows                  |      | With Bellows |      |      |           |
|        | MIN                           | MAX  | MIN          | MAX  |      | MIN                              | MAX  | MIN          | MAX  |      |           |
| 100    | 342                           | 442  | 352          | 452  | 151  | 42                               | 142  | 52           | 152  | 151  | 46        |
| 200    | 342                           | 542  | 352          | 552  | 252  | 42                               | 242  | 52           | 252  | 252  | 48        |
| 300    | 342                           | 642  | 367          | 667  | 366  | 42                               | 342  | 67           | 367  | 366  | 51        |
| 400    | 342                           | 742  | 367          | 767  | 466  | 42                               | 442  | 67           | 467  | 466  | 54        |
| 500    | 342                           | 842  | 392          | 892  | 591  | 42                               | 542  | 92           | 592  | 591  | 57        |
| 600    | 342                           | 942  | 392          | 992  | 691  | 42                               | 642  | 92           | 692  | 691  | 60        |
| 800    | 342                           | 1142 | 407          | 1207 | 906  | 42                               | 842  | 107          | 907  | 906  | 65        |
| 1000   | 342                           | 1342 | 417          | 1417 | 1116 | 42                               | 1042 | 117          | 1117 | 1116 | 70        |
| 1200   | 342                           | 1542 | 442          | 1642 | 1341 | 42                               | 1242 | 142          | 1342 | 1341 | 76        |
| 1500   | 342                           | 1842 | 467          | 1967 | 1666 | 42                               | 1542 | 167          | 1667 | 1666 | 84        |

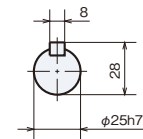
Lift (JWB150US)



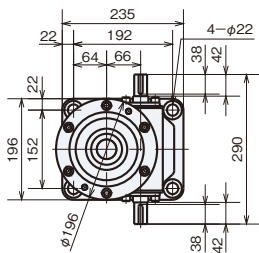
Suspend (JWB150DS)



● Input Shaft

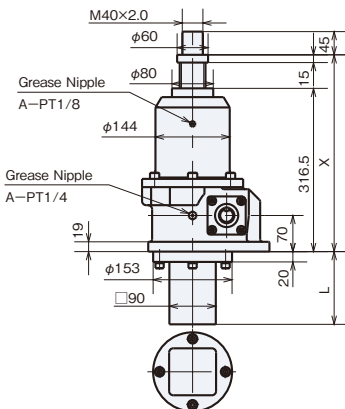


## JWB150 Dimensions - Rotation Prevention Type

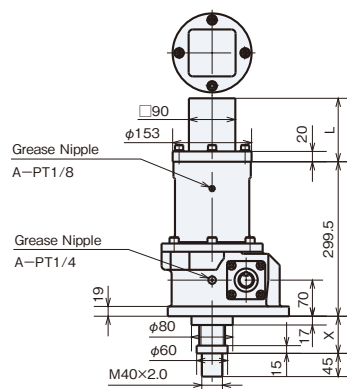


| Stroke | UM Rotation Prevention Type for Lifting |      |              |      |      | DM Rotation Prevention Type for Suspending |      |              |      |      | Weight kg |
|--------|-----------------------------------------|------|--------------|------|------|--------------------------------------------|------|--------------|------|------|-----------|
|        | X                                       |      | X            |      | L    | X                                          |      | X            |      | L    |           |
|        | Without Bellows                         |      | With Bellows |      |      | Without Bellows                            |      | With Bellows |      |      |           |
|        | MIN                                     | MAX  | MIN          | MAX  |      | MIN                                        | MAX  | MIN          | MAX  |      |           |
| 100    | 342                                     | 442  | 352          | 452  | 221  | 42                                         | 142  | 52           | 152  | 221  | 52        |
| 200    | 342                                     | 542  | 352          | 552  | 321  | 42                                         | 242  | 52           | 252  | 321  | 55        |
| 300    | 342                                     | 642  | 367          | 667  | 436  | 42                                         | 342  | 67           | 367  | 436  | 59        |
| 400    | 342                                     | 742  | 367          | 767  | 536  | 42                                         | 442  | 67           | 467  | 536  | 62        |
| 500    | 342                                     | 842  | 392          | 892  | 661  | 42                                         | 542  | 92           | 592  | 661  | 66        |
| 600    | 342                                     | 942  | 392          | 992  | 761  | 42                                         | 642  | 92           | 692  | 761  | 69        |
| 800    | 342                                     | 1142 | 407          | 1207 | 976  | 42                                         | 842  | 107          | 907  | 976  | 75        |
| 1000   | 342                                     | 1342 | 417          | 1417 | 1186 | 42                                         | 1042 | 117          | 1117 | 1186 | 82        |
| 1200   | 342                                     | 1542 | 442          | 1642 | 1411 | 42                                         | 1242 | 142          | 1342 | 1411 | 89        |
| 1500   | 342                                     | 1842 | 467          | 1967 | 1736 | 42                                         | 1542 | 167          | 1667 | 1736 | 99        |

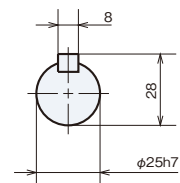
Lift (JWB150UM)



Suspend (JWB150DM)

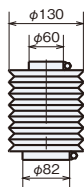


● Input Shaft

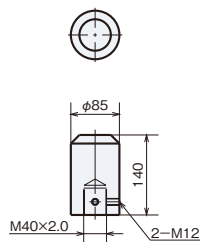


## Output Options

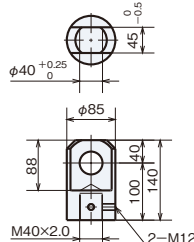
■ Bellows ( - J)



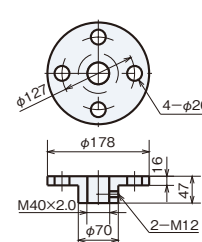
■ Rod Type End Fitting ( - B)



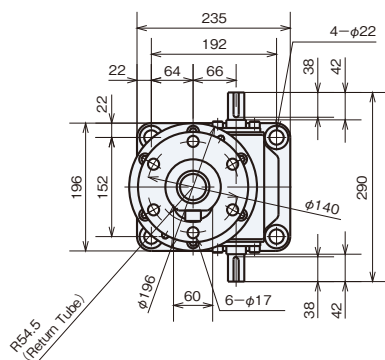
■ I Type End Fitting ( - I)



■ Table Type End Fitting ( - M)

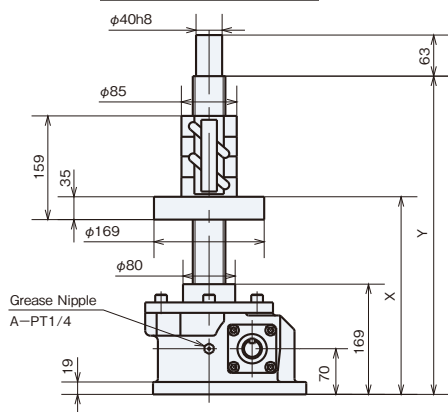


## JWB150 Dimensions - Travel Nut Type

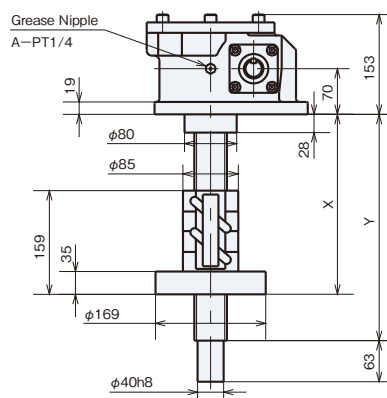


| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 214                            | 314  | 448  | 197                               | 297  | 308  | 41        |
| 200    | 214                            | 414  | 548  | 197                               | 397  | 408  | 42        |
| 300    | 214                            | 514  | 648  | 197                               | 497  | 508  | 43        |
| 400    | 214                            | 614  | 748  | 197                               | 597  | 608  | 45        |
| 500    | 214                            | 714  | 848  | 197                               | 697  | 708  | 46        |
| 600    | 214                            | 814  | 948  | 197                               | 797  | 808  | 47        |
| 800    | 214                            | 1014 | 1148 | 197                               | 997  | 1008 | 50        |
| 1000   | 214                            | 1214 | 1348 | 197                               | 1197 | 1208 | 53        |
| 1200   | 214                            | 1414 | 1548 | 197                               | 1397 | 1408 | 55        |
| 1500   | 214                            | 1714 | 1848 | 197                               | 1697 | 1708 | 59        |

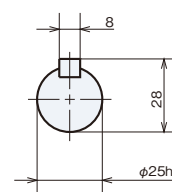
Lift (JWB150UR)



Suspend (JWB150DR)



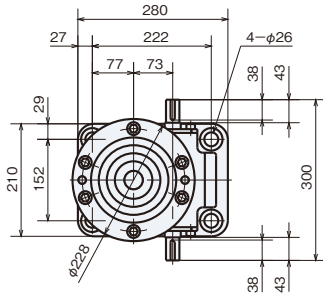
● Input Shaft



Note) Ball nut return tube and travel flange openings may vary from this drawing.  
Note the return tube measurements when installing to equipment.

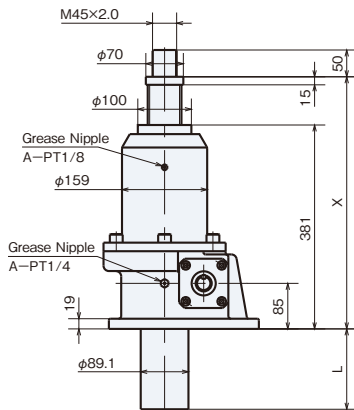
Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

## JWB200 Dimensions - Standard Model

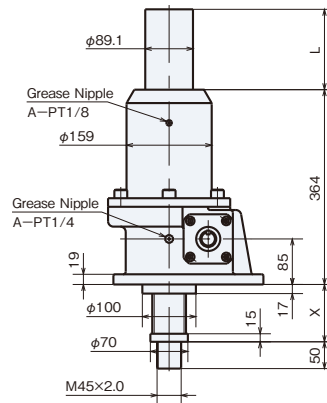


| Stroke | US Standard Model for Lifting |              |                 |              |      | DS Standard Model for Suspending |              |     |      |      | Weight kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|--------------|-----|------|------|-----------|
|        | X                             |              | X               |              | L    | X                                |              | X   |      | L    |           |
|        | Without Bellows               | With Bellows | Without Bellows | With Bellows |      | Without Bellows                  | With Bellows |     |      |      |           |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX          | MIN | MAX  |      |           |
| 100    | 406                           | 506          | 416             | 516          | 136  | 42                               | 142          | 52  | 152  | 136  | 65        |
| 200    | 406                           | 606          | 416             | 616          | 236  | 42                               | 242          | 52  | 252  | 236  | 68        |
| 300    | 406                           | 706          | 431             | 731          | 351  | 42                               | 342          | 67  | 367  | 351  | 72        |
| 400    | 406                           | 806          | 431             | 831          | 451  | 42                               | 442          | 67  | 467  | 451  | 76        |
| 500    | 406                           | 906          | 456             | 956          | 576  | 42                               | 542          | 92  | 592  | 576  | 80        |
| 600    | 406                           | 1006         | 456             | 1056         | 676  | 42                               | 642          | 92  | 692  | 676  | 83        |
| 800    | 406                           | 1206         | 471             | 1271         | 891  | 42                               | 842          | 107 | 907  | 891  | 90        |
| 1000   | 406                           | 1406         | 481             | 1481         | 1101 | 42                               | 1042         | 117 | 1117 | 1101 | 97        |
| 1200   | 406                           | 1606         | 506             | 1706         | 1326 | 42                               | 1242         | 142 | 1342 | 1326 | 105       |
| 1500   | 406                           | 1906         | 531             | 2031         | 1651 | 42                               | 1542         | 167 | 1667 | 1651 | 115       |
| 2000   | 406                           | 2406         | 576             | 2576         | 2196 | 42                               | 2042         | 212 | 2212 | 2196 | 133       |

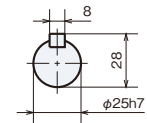
Lift (JWB200US)



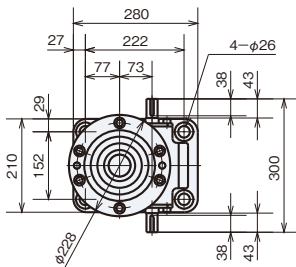
Suspend (JWB200DS)



● Input Shaft

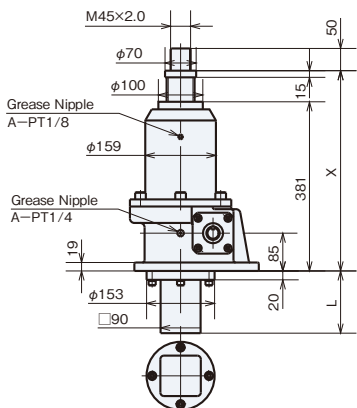


## JWB200 Dimensions - Rotation Prevention Type

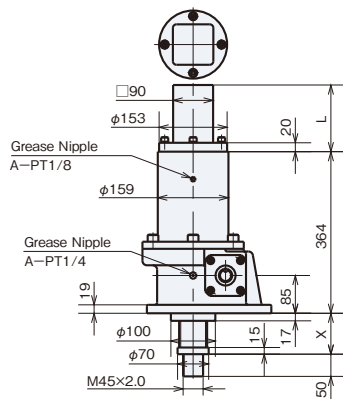


| Stroke | UM Rotation Prevention Type for Lifting |      |              |      |      | DM Rotation Prevention Type for Suspending |      |              |      |      | Weight kg |
|--------|-----------------------------------------|------|--------------|------|------|--------------------------------------------|------|--------------|------|------|-----------|
|        | X                                       |      | X            |      | L    | X                                          |      | X            |      | L    |           |
|        | Without Bellows                         |      | With Bellows |      |      | Without Bellows                            |      | With Bellows |      |      |           |
|        | MIN                                     | MAX  | MIN          | MAX  |      | MIN                                        | MAX  | MIN          | MAX  |      |           |
| 100    | 406                                     | 506  | 416          | 516  | 230  | 42                                         | 142  | 52           | 152  | 230  | 72        |
| 200    | 406                                     | 606  | 416          | 616  | 330  | 42                                         | 242  | 52           | 252  | 330  | 76        |
| 300    | 406                                     | 706  | 431          | 731  | 445  | 42                                         | 342  | 67           | 367  | 445  | 80        |
| 400    | 406                                     | 806  | 431          | 831  | 545  | 42                                         | 442  | 67           | 467  | 545  | 84        |
| 500    | 406                                     | 906  | 456          | 956  | 670  | 42                                         | 542  | 92           | 592  | 670  | 89        |
| 600    | 406                                     | 1006 | 456          | 1056 | 770  | 42                                         | 642  | 92           | 692  | 770  | 93        |
| 800    | 406                                     | 1206 | 471          | 1271 | 985  | 42                                         | 842  | 107          | 907  | 985  | 102       |
| 1000   | 406                                     | 1406 | 481          | 1481 | 1195 | 42                                         | 1042 | 117          | 1117 | 1195 | 110       |
| 1200   | 406                                     | 1606 | 506          | 1706 | 1420 | 42                                         | 1242 | 142          | 1342 | 1420 | 119       |
| 1500   | 406                                     | 1906 | 531          | 2031 | 1745 | 42                                         | 1542 | 167          | 1667 | 1745 | 131       |
| 2000   | 406                                     | 2406 | 576          | 2576 | 2290 | 42                                         | 2042 | 212          | 2212 | 2290 | 153       |

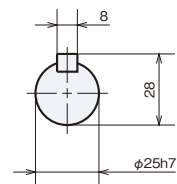
Lift (JWB200UM)



Suspend (JWB200DM)



● Input Shaft

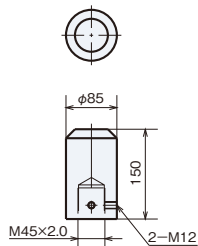


## Output Options

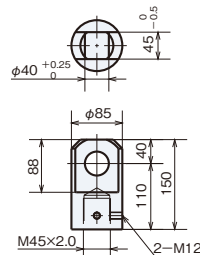
■ Bellows ( - J)



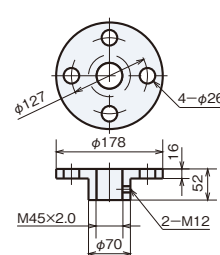
■ Rod Type End Fitting ( - B)



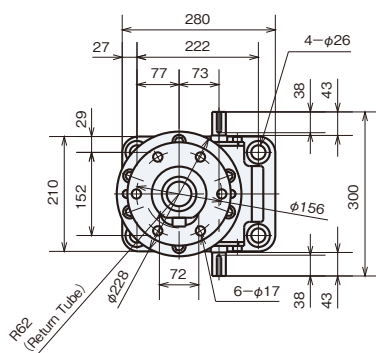
■ I Type End Fitting ( - I)



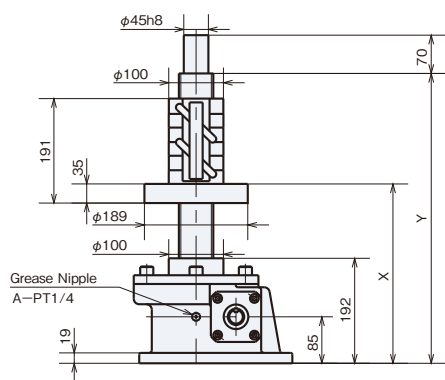
■ Table Type End Fitting ( - M)



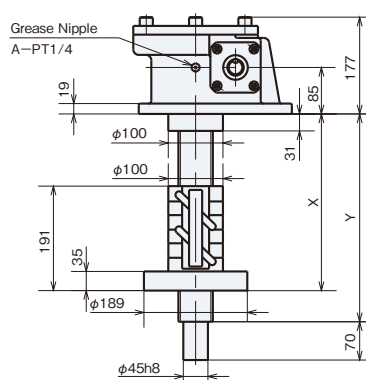
## JWB200 Dimensions - Travel Nut Type



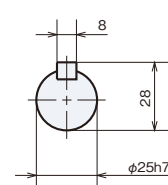
Lift (JWB200UR)



Suspend (JWB200DR)



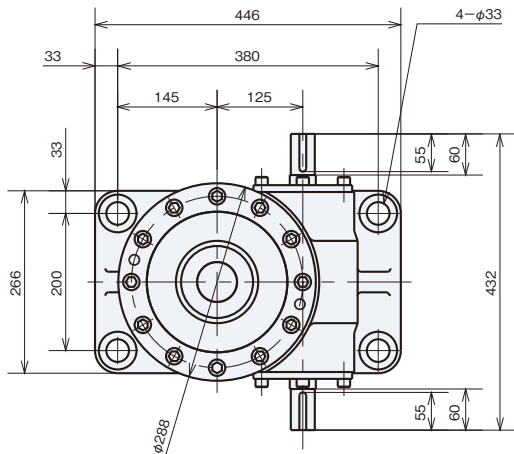
● Input Shaft



Note) Ball nut return tube and travel flange openings may vary from this drawing.  
Note the return tube measurements when installing to equipment.

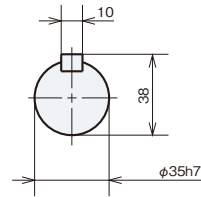
Travel nut type cannot be equipped with optional end fitting (B.I.M).  
For types with bellows, refer to page 249.

## JWB300 Dimensions - Standard Model

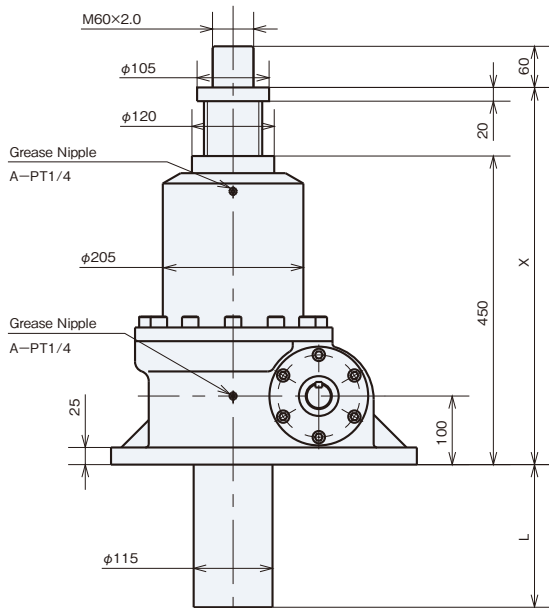


| Stroke | US Standard Model for Lifting |      |              |      |      | DS Standard Model for Suspending |      |              |      |      | Weight kg |
|--------|-------------------------------|------|--------------|------|------|----------------------------------|------|--------------|------|------|-----------|
|        | X                             |      | X            |      | L    | X                                |      | X            |      | L    |           |
|        | Without Bellows               |      | With Bellows |      |      | Without Bellows                  |      | With Bellows |      |      |           |
|        | MIN                           | MAX  | MIN          | MAX  |      | MIN                              | MAX  | MIN          | MAX  |      |           |
| 100    | 480                           | 580  | 490          | 590  | 135  | 55                               | 155  | 65           | 165  | 135  | 153       |
| 200    | 480                           | 680  | 490          | 690  | 235  | 55                               | 255  | 65           | 265  | 235  | 159       |
| 300    | 480                           | 780  | 505          | 805  | 350  | 55                               | 355  | 80           | 380  | 350  | 166       |
| 400    | 480                           | 880  | 505          | 905  | 450  | 55                               | 455  | 80           | 480  | 450  | 172       |
| 500    | 480                           | 980  | 520          | 1020 | 565  | 55                               | 555  | 95           | 595  | 565  | 178       |
| 600    | 480                           | 1080 | 520          | 1120 | 665  | 55                               | 655  | 95           | 695  | 665  | 184       |
| 800    | 480                           | 1280 | 535          | 1335 | 880  | 55                               | 855  | 110          | 910  | 880  | 197       |
| 1000   | 480                           | 1480 | 555          | 1555 | 1100 | 55                               | 1050 | 130          | 1130 | 1100 | 210       |
| 1200   | 480                           | 1680 | 565          | 1765 | 1310 | 55                               | 1255 | 140          | 1340 | 1310 | 223       |
| 1500   | 480                           | 1980 | 590          | 2090 | 1635 | 55                               | 1555 | 165          | 1665 | 1635 | 242       |
| 2000   | 480                           | 2480 | 625          | 2625 | 2170 | 55                               | 2055 | 200          | 2200 | 2170 | 274       |

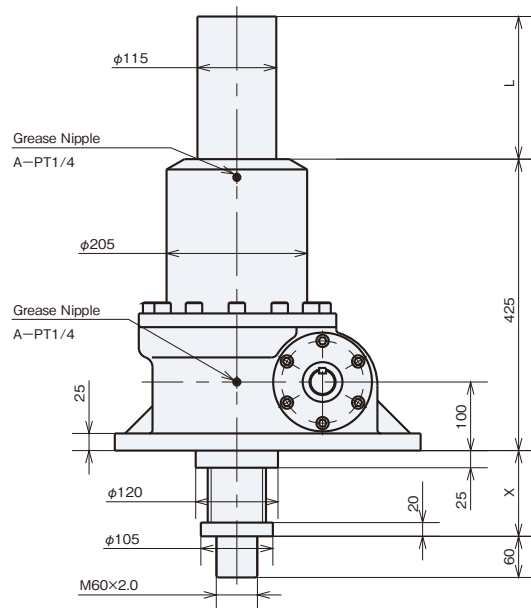
### Input Shaft



### Lift (JWB300US)



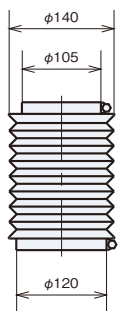
### Suspend (JWB300DS)



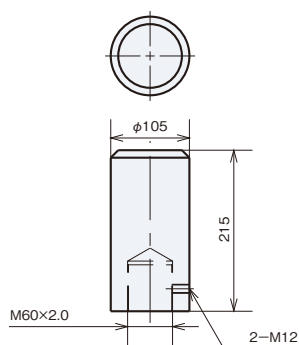
For JWBC300 (compact type), see page 257 - 260.

## Output Options

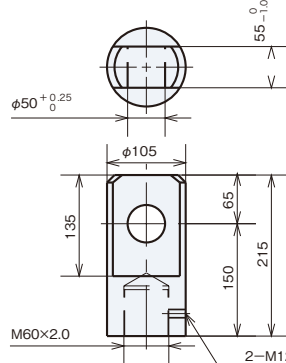
### ■ Bellows ( - J )



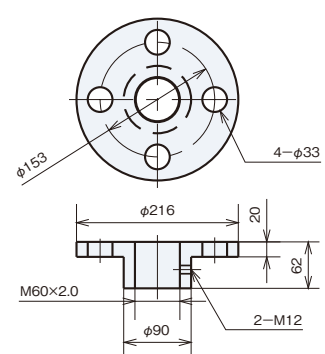
### ■ Rod Type End Fitting ( - B )



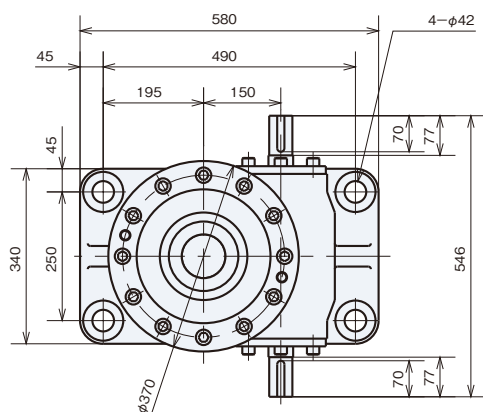
### ■ I Type End Fitting ( - I )



### ■ Table Type End Fitting ( - M )

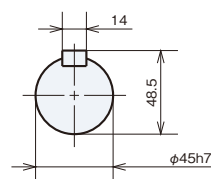


## JWB500 Dimensions - Standard Model

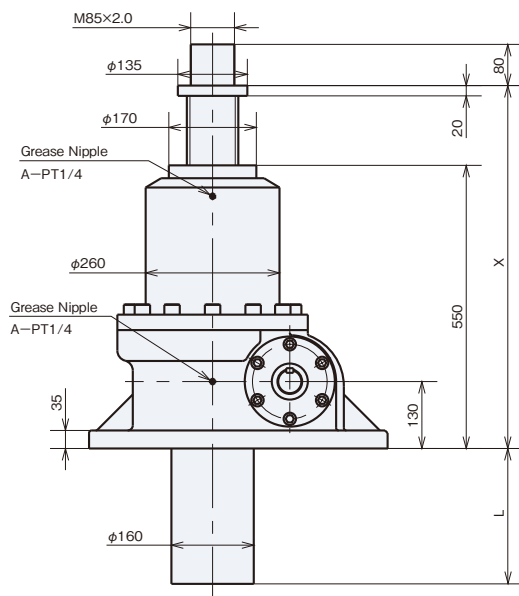


| Stroke | US Standard Model for Lifting |              |                 |              |      | DS Standard Model for Suspending |              |     |      |      | Weight kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|--------------|-----|------|------|-----------|
|        | X                             |              | X               |              | L    | X                                |              | X   |      | L    |           |
|        | Without Bellows               | With Bellows | Without Bellows | With Bellows |      | Without Bellows                  | With Bellows |     |      |      |           |
|        | MIN                           | MAX          | MIN             | MAX          | MIN  | MAX                              | MIN          | MAX |      |      |           |
| 100    | 580                           | 680          | 585             | 685          | 137  | 55                               | 155          | 60  | 160  | 137  | 310       |
| 200    | 580                           | 780          | 585             | 785          | 237  | 55                               | 255          | 60  | 260  | 237  | 320       |
| 300    | 580                           | 880          | 605             | 905          | 357  | 55                               | 355          | 80  | 380  | 357  | 330       |
| 400    | 580                           | 980          | 605             | 1005         | 457  | 55                               | 455          | 80  | 480  | 457  | 340       |
| 500    | 580                           | 1080         | 615             | 1115         | 567  | 55                               | 555          | 90  | 590  | 567  | 350       |
| 600    | 580                           | 1180         | 615             | 1215         | 667  | 55                               | 655          | 90  | 690  | 667  | 359       |
| 800    | 580                           | 1380         | 630             | 1430         | 882  | 55                               | 855          | 105 | 905  | 882  | 378       |
| 1000   | 580                           | 1580         | 645             | 1645         | 1097 | 55                               | 1055         | 120 | 1120 | 1097 | 398       |
| 1200   | 580                           | 1780         | 655             | 1855         | 1307 | 55                               | 1255         | 130 | 1330 | 1307 | 417       |
| 1500   | 580                           | 2080         | 675             | 2175         | 1627 | 55                               | 1555         | 150 | 1650 | 1627 | 446       |
| 2000   | 580                           | 2580         | 710             | 2710         | 2162 | 55                               | 2055         | 185 | 2185 | 2162 | 495       |

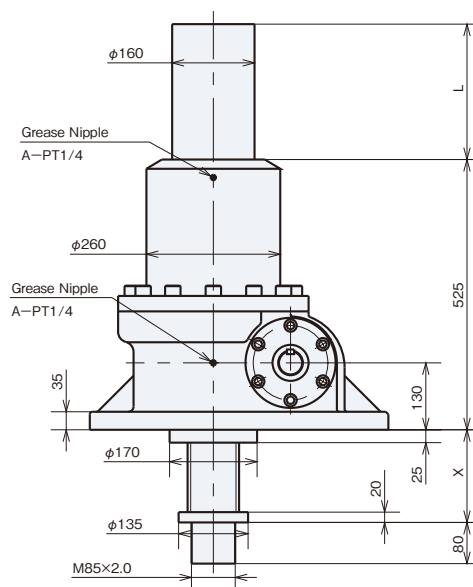
### Input Shaft



### Lift (JWB500US)



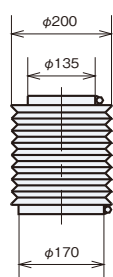
### Suspend (JWB500DS)



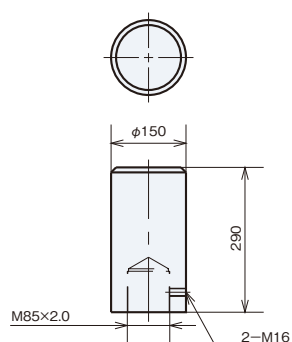
For JWB500 (compact type), see page 257 - 260.

## Output Options

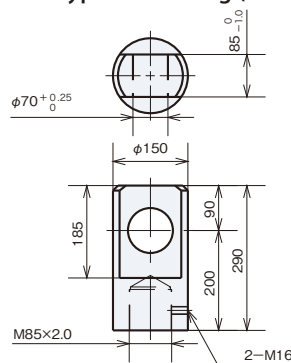
### ■ Bellows ( - J )



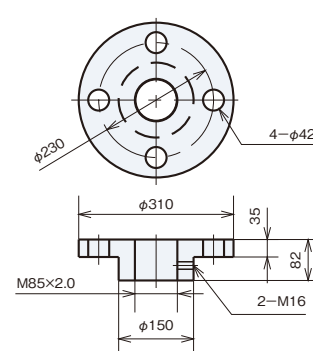
### ■ Rod Type End Fitting ( - B )



### ■ I Type End Fitting ( - I )



### ■ Table Type End Fitting ( - M )





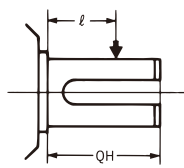
# Warning

## ■ Cautions for selecting

- Duty cycle of JWB (Ball Screw Type) is within 30% ED. Duty cycle is a ratio of operating time per 30 min on the basis of 30 min interval.
- JWB (Ball Screw Type) does not have a self-locking device, therefore, a brake mechanism is required.
- Activating torque for the drive unit should be maintained at 200% above the required torque.
- Allowable input rotation speed of linear power jack is 1800 r/min, however, when inputting a speed exceeding the maximum input rotation speed at the basic capacity, check the screw shaft speed (elevation speed) and allowable load related graphs on page 155.
- Select a stroke for the jack with an extra margin with respect to the used stroke.
- Rotating force is generated on the screw shaft (travel nut in the case of travel nut type) with thrust, therefore, rotation prevention is required. Screw rotation torque at the basic capacity is described in the standard specification list. When operating with the end unconnected, and pulling the rope with a sheave installed, use the rotation prevention type. However, the rotation prevention type cannot be manufactured for the travel nut type, therefore, provide a rotation prevention mechanism on the device.
- When installing a sprocket, gear, or belt to the input or output shaft, confirm that any overhang load applied to the shaft decreases to the allowable OHL or less.

$$\text{Allowable O. H. L.} \geq \frac{T \times f \times L_f}{R}$$

O.H.L. : Overhang load N {kgf}  
 T : Input torque N · m {kgf · m}  
 f : Coefficient - power transmission element  
 L<sub>f</sub> : Coefficient - Load operating position  
 R : Sprocket, Gear, V pulley or Pitch diameter m



Q : Shaft Length  
 l : Loaded Position

### ● Coefficient – Power Transmission Element (f)

|           |      |
|-----------|------|
| Sprocket  | 1.00 |
| Gear      | 1.25 |
| V-belt    | 1.50 |
| Flat belt | 2.50 |

### ● Coefficient (L<sub>f</sub>) – Load Position

| l / QH         | 0.25 | 0.38 | 0.5 | 0.75 | 1 |
|----------------|------|------|-----|------|---|
| L <sub>f</sub> | 0.8  | 0.9  | 1   | 1.5  | 2 |

### ● Allowable O.H.L

| Frame No.             |         | 002 | 005  | 010  | 025  | 050  | 100   | 150   | 200   | 300   | 500   | 750   | 1000  |
|-----------------------|---------|-----|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| JWB (Ball Screw Type) | N       | —   | 130  | 220  | 480  | 870  | 1290  | 2030  | 2490  | 3450  | 5240  | 7200  | 9790  |
| H Speed               | { kgf } | —   | {14} | {23} | {50} | {89} | {132} | {208} | {255} | {352} | {535} | {735} | {998} |
| JWB (Ball Screw Type) | N       | —   | 82   | 140  | 290  | 500  | 840   | 1300  | 1610  | 2400  | 3560  | 4940  | 6970  |
| L Speed               | { kgf } | —   | {8}  | {15} | {31} | {52} | {86}  | {133} | {165} | {245} | {363} | {504} | {711} |

## ■ Precautions for installation

- Some screw covers of jacks are made of hard vinyl chloride pipe. Do not lift jack and transport with this pipe, which may result in dropping.
- JWB (Ball Screw Type) rotates by self weight of the screw shaft or travel nut, therefore, retract its stroke to the minimum and provide a rotation prevention for installation.
- Take jack coasting amount into consideration to set the stroke adjusting limit switch.

## ■ Precautions for use

- Do not perform manual operation from the input shaft with load applied. The input shaft is rotated by the load, which is dangerous.
- When JWB (Ball Screw Type) is used in the vertical direction, the jack may be reversed by the load because of its excellent efficiency. Never perform manual operation.
- Do not use mechanical stops under any circumstances.
- Operating Environment for jack is as follows.

|                             |                                                           |
|-----------------------------|-----------------------------------------------------------|
| Operating place             | Indoor room which cannot be splashed with rain or water.  |
| Ambient atmosphere          | Dust volume comparable to general factories.              |
| Operating temperature range | — 15 to 80°C (Refer to section 3 in general precautions.) |
| Relative humidity           | 85% or less (no dew condensation)                         |

- Operating part and reducer unit are factory greased. Therefore, use jack as delivered.
- For lubrication grease, lubrication cycle and lubrication amount to the screw shaft and reducer unit, refer to page 253.
- Inspect regularly for general backlash and screw unit condition. Jack life and replacement timing are determined by the following:  
 Metal particles due to wear on the screw surface are visible.  
 Replace gear when its input shaft exceeds 30 rpm with backlash (rattle between input shaft and worm wheel) at H speed, or exceeds 60 rpm at L speed.  
 In either case, if it is used at the replacement timing, this may cause rotation failure of screw shaft and input shaft, and further sudden drop of travel nut.

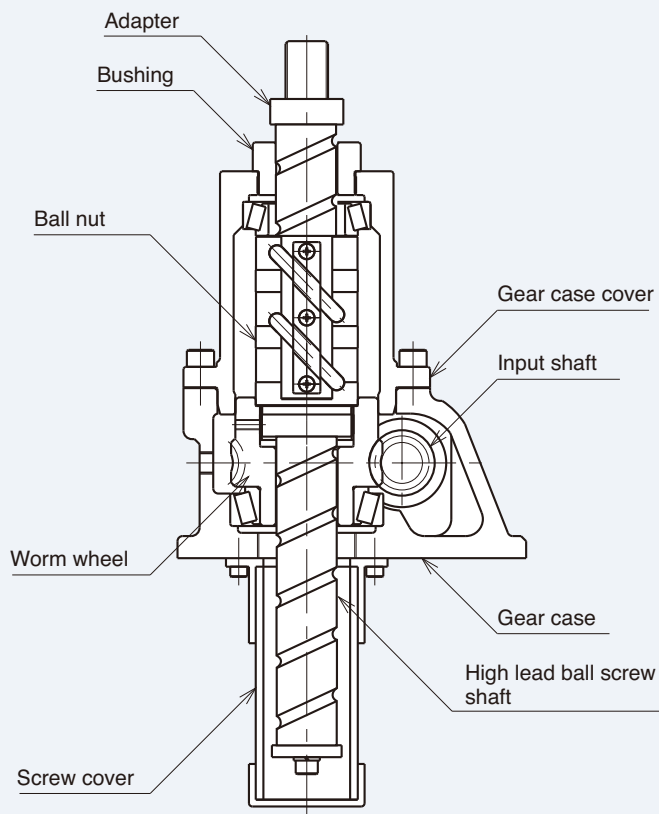
## Linipower Jack

# JWH (High Lead Ball Screw Type)

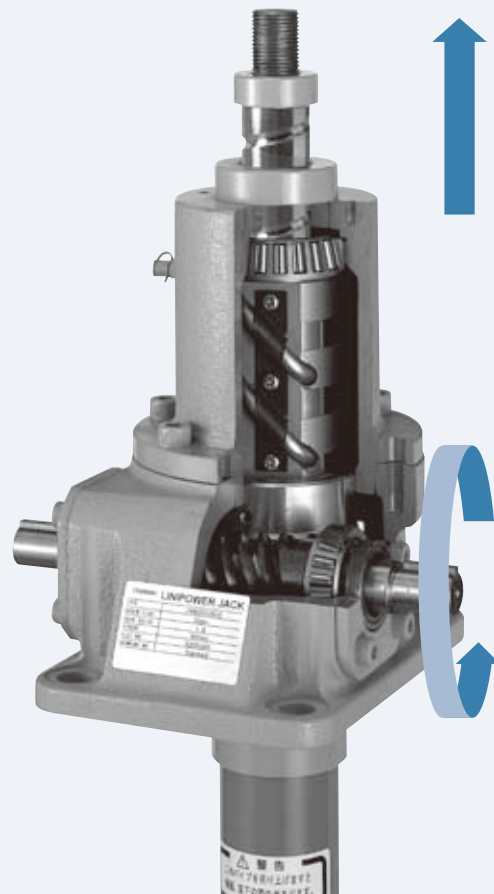
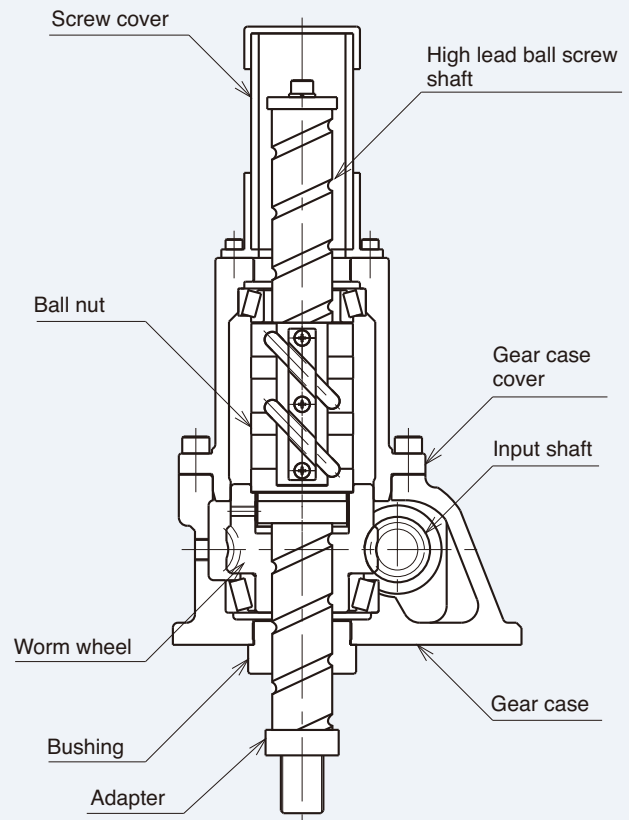


|                                  |          |
|----------------------------------|----------|
| Drawings                         | P215•216 |
| JWH Reference Number System      | P217•218 |
| Reference Table for Standard Use | P219•220 |
| Dimensions                       | P221~226 |
| Precautions                      | P227     |

JWH Standard Use for Lifting



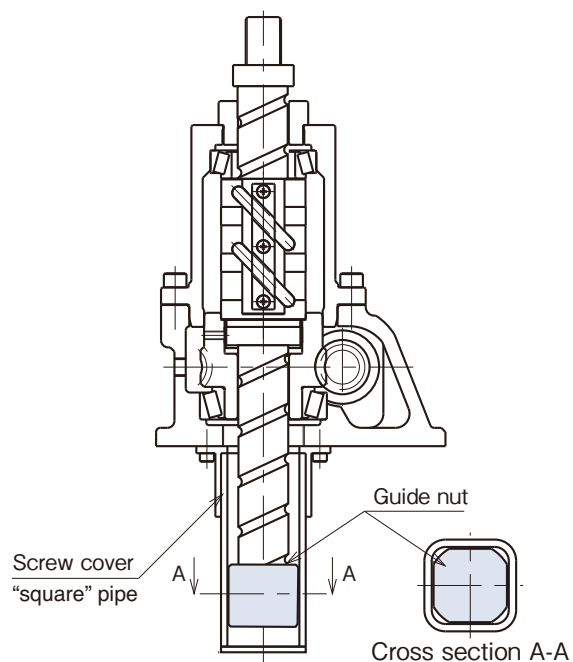
JWH Standard Use for Suspending



## JWH (High Lead Ball Screw Type) Rotation Prevention Type

### JWH010~200

〈With Rotation Prevention and Guide Nut〉



Note) The 10°space in each corner between the guide and the pipe allows smooth rotation.

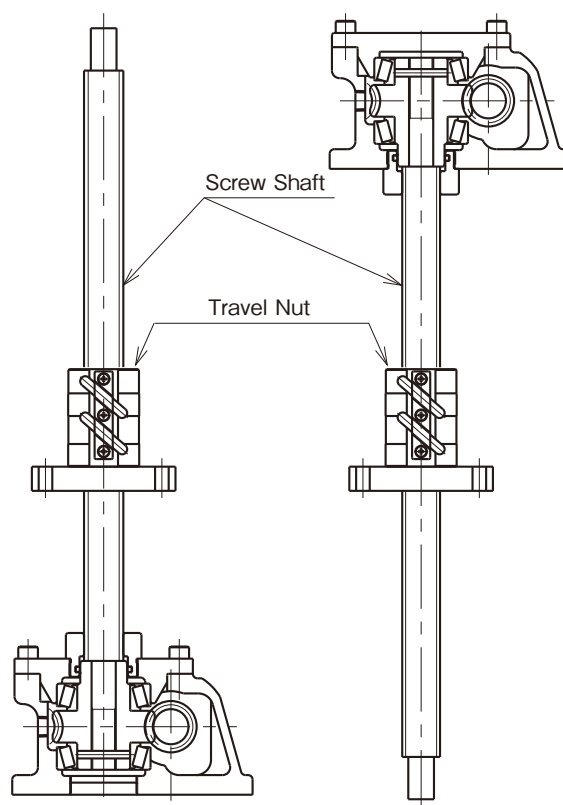
### Caution

Each High Lead Ball Screw Jack with rotation prevention is made-to-order based.

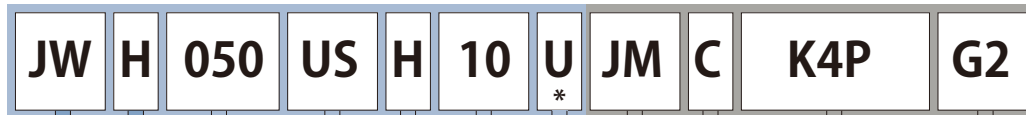
Inform TSUBAKI E&M of operating conditions such as a load per one jack and screw shaft speed of the jack.

We will take the conditions into account.

## JWH (High Lead Ball Screw Type) Travel Nut Type



# JWH (High Lead Ball Screw Type)



Linipower Jack

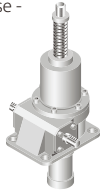
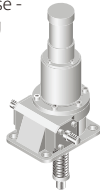
Jack Type

H : High Lead Ball Screw

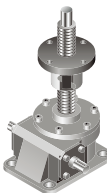
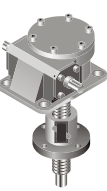
Basic Capacity

| Frame No. | kN   | {tf}  |
|-----------|------|-------|
| 010       | 9.80 | {1}   |
| 025       | 24.5 | {2.5} |
| 050       | 49.0 | {5}   |
| 100       | 98.0 | {10}  |
| 150       | 147  | {15}  |
| 200       | 196  | {20}  |

Installation Type

|    |                                                                                                                  |
|----|------------------------------------------------------------------------------------------------------------------|
| US | Standard Use - Lifting<br>     |
| DS | Standard Use - Suspending<br> |

\* Rotation prevention for JWH are available upon request. To request, provide TSUBAKI E&M with information on your operation conditions.

|    |                                                                                                                |
|----|----------------------------------------------------------------------------------------------------------------|
| UR | Travel Nut - Lifting<br>    |
| DR | Travel Nut - Suspending<br> |

\* Be sure to use the flange installation method U or D with travel nuts.

Stroke mm

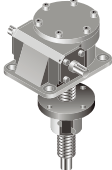
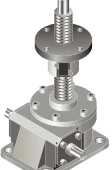
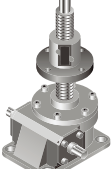
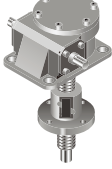
|    |      |
|----|------|
| 1  | 100  |
| 3  | 300  |
| 6  | 600  |
| 10 | 1000 |

\*The above values are examples. For actual stroke used, refer to the Model Comparison Table for JWH on page 145.

Gear Ratio

| symbol<br>Frame No. | H |
|---------------------|---|
| 010                 | 5 |
| 025                 | 6 |
| 050                 | 6 |
| 100                 | 8 |
| 150                 | 8 |
| 200                 | 8 |

Flange Installation

|   |                                                                                       |                                                                                       |
|---|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| U |  |  |
| D |  |  |

\* Above are only necessary with travel nuts.

## Examples)

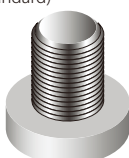
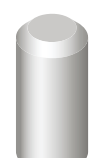
### JWH100UMH3

- High Lead Ball Screw Type
- 98.0kN {10tf}
- Standard use (for lifting)
- Gear ratio H (1/8)
- Stroke 300mm

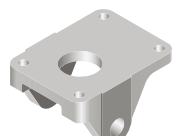
### JWH050USH10JMK4P

- High Lead Ball Screw Type
- 49.0kN {5tf}
- Standard use (for lifting)
- Gear ratio H (1/6)
- Stroke 1000mm
- Bellows / Table Type End Fitting
- 4 Internal LS / Potentiometer

## Output Option

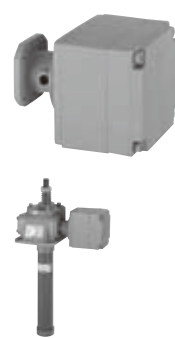
|           |                                                                                                                  |
|-----------|------------------------------------------------------------------------------------------------------------------|
| No symbol | Screw shaft end (standard)<br> |
| J         | Bellows<br>                   |
| B         | Rod Type End Fitting<br>      |
| I         | I Type End Fitting<br>        |
| M         | Table Type End Fitting<br>    |

## Installation Option

|   |                                                                                                                                 |
|---|---------------------------------------------------------------------------------------------------------------------------------|
| C | Clevis Mounting Adapter<br><br>(See page 245) |
|---|---------------------------------------------------------------------------------------------------------------------------------|

Note) For standard lifting only.

## Sensor Option

|                    |                                                                                                                                                                                                                 |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Y                  | LS Counter<br><br>(See page 239)                                                                                              |
| K2<br>K4<br>P<br>R | Position Sensor<br>K2...2 Internal LS<br>K4...4 Internal LS<br>P...Potentiometer<br>R...Rotary Encoder<br><br>(See page 241) |

Note) To request the above parts, provide their letter symbols in the order given.

## Input Option

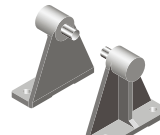
|          |                                                                                                                                                                                                                                                    |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E<br>EV  | 3 phase brake and motor<br>E...200V 50Hz<br>200/220V 60Hz<br>EV...400 50Hz<br>400/440V 60Hz<br><br>(Page 229~)                                                 |
| G1<br>G2 | 3 phase brake and gear-motor<br>G1...Gear ratio 1/5<br>200V 50Hz<br>200/220V 60Hz<br>G2...Reducer ratio 1/10<br>200V 50Hz<br>200/220V 60Hz<br><br>(Page 229~) |

## Accessories

### Control Options

|                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------|
| Stroke Meter and PCB<br>                |
| Meter Relay and PCB<br><br>(Page 242~) |

### Others

|                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Trunnion Mounting Adapter<br><br>*Use as a set with clevis mounting adapter.<br>(See page 245) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Note) To request the above parts, provide their letter symbols in the order given. When travel nuts are used, B, I and M are not required.

Note) Bellows is of special specification, therefore contact TSUBAKI E&M.

Note) Travel nut type with bellows is estimated for each order. Enter necessary information in the inquiry form on page 249 to contact TSUBAKI E&M.

## Reference Table for Standard Use JWH (High Lead Ball Screw Type)

| Frame No.                                           |                              | JWH010                                                                                            | JWH025  | JWH050 |
|-----------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------------------|---------|--------|
| Basic Capacity                                      | kN                           | 9.80                                                                                              | 24.5    | 49.0   |
|                                                     | {tf}                         | {1}                                                                                               | {2.5}   | {5}    |
| Outer Screw Diameter                                | mm                           | 20                                                                                                | 25      | 36     |
| Minor Screw Diameter                                | mm                           | 17.5                                                                                              | 21.9    | 31.1   |
| Screw Lead                                          | mm                           | 20                                                                                                | 25      | 25     |
| Gear Ratio                                          |                              | 5                                                                                                 | 6       | 6      |
| Overall Efficiency                                  | %                            | 63                                                                                                | 65      | 68     |
| Max. Allowable Input Capacity                       | kW                           | 0.75                                                                                              | 1.5     | 2.3    |
| Tare Drag Torque                                    | N•m                          | 0.29                                                                                              | 0.62    | 1.37   |
|                                                     | {kgf•m}                      | {0.03}                                                                                            | {0.063} | {0.14} |
| Holding Torque                                      | N•m                          | 5.22                                                                                              | 13.6    | 27.5   |
|                                                     | {kgf•m}                      | {0.53}                                                                                            | {1.4}   | {2.8}  |
| *Note 1<br>Allowable Input Torque                   | N•m                          | 19.6                                                                                              | 49.0    | 153.9  |
|                                                     | {kgf•m}                      | {2}                                                                                               | {5}     | {15.7} |
| Required Input Torque<br>for Basic Capacity *Note 2 | N•m                          | 10.2                                                                                              | 25.6    | 49.2   |
|                                                     | {kgf•m}                      | {1.0}                                                                                             | {2.6}   | {5.0}  |
| Screw Movement/<br>Per Revolution of Input Shaft    | mm                           | 4                                                                                                 | 4.17    | 4.17   |
| Max. Input R.P.M.                                   | r/min                        | 1800                                                                                              | 1800    | 1800   |
| Max. Input R.P.M.<br>for Basic Capacity             | r/min                        | 700                                                                                               | 550     | 450    |
| Screw Shaft Rotational<br>Torque for Basic Capacity | N•m                          | 33.2                                                                                              | 103.8   | 207.6  |
|                                                     | {kgf•m}                      | {3.4}                                                                                             | {10.6}  | {21.2} |
| Screw Cover Material                                |                              | Hard Vinyl Chloride                                                                               |         |        |
| Lubrication                                         |                              | Shaft: Grease Reducer Unit: Grease Bath                                                           |         |        |
| Color                                               |                              | Tsubaki Olive Grey (Munsell 5GY6/0.5)                                                             |         |        |
| Environment                                         | Operating Temperature Range  | - 15 to 80°C (Precautions #2)                                                                     |         |        |
|                                                     | Relative Humidity            | 85% or less (no dew condensation)                                                                 |         |        |
|                                                     | Operating ambient atmosphere | Indoor Environment (Indoor room where rain and water cannot enter. Dust volume should be normal.) |         |        |
| Duty Cycle *Note 3                                  |                              | Within 30% ED                                                                                     |         |        |

Note 1) The allowable torque is for jack input shaft only. (Reconfirm if synchronous drive.)

Note 2) Includes tare drag torque.

Note 3) Standard percentage duty cycle is 30 minutes. Thus, driving time is based on 30 minute intervals.

### Precautions

- 1.All loads (static, dynamic or shock) should be within the rated capacity of the jack at sufficient safety levels.
- 2.Operating Temperature Range refers to the surface temperature of the jack during operation. To check, measure the surface temperature of the input shaft unit or travel nut (if used). Be sure all the rotating parts have completely stopped before proceeding to measure.
- 3.Allowable input rpm is 1800r/min. Be sure to operate within this allowable capacity.
- 4.Number of synchronizing jacks which can be connected on

- the same line is limited by shaft strength. Refer to the allowable input shaft torque on the above table.
- 5.Activating torque for the drive unit should be maintained at 200% above the required torque.
- 6.If operating in freezing temperatures, a change in viscosity may reduce the efficiency of the grease. Set the drive unit so as to accommodate this change.
- 7.Since JWH (High Lead Ball Screw Type) is extremely efficient, sufficient brake that over powers the "holding torque" is required to sustain its shaft.

| JWH100                                                                                            | JWH150          | JWH200            |
|---------------------------------------------------------------------------------------------------|-----------------|-------------------|
| 98.0<br>{10}                                                                                      | 147<br>{15}     | 196<br>{20}       |
| 45                                                                                                | 50              | 63                |
| 38.9                                                                                              | 42.7            | 55.7              |
| 32                                                                                                | 32              | 32                |
| 8                                                                                                 | 8               | 8                 |
| 65                                                                                                | 65              | 64                |
| 4.1                                                                                               | 4.1             | 5.6               |
| 1.96<br>{0.2}                                                                                     | 2.65<br>{0.27}  | 3.92<br>{0.4}     |
| 52.8<br>{5.4}                                                                                     | 79.2<br>{8.1}   | 105.6<br>{10.8}   |
| 292.0<br>{29.8}                                                                                   | 292.0<br>{29.8} | 292.0<br>{29.8}   |
| 98.0<br>{10.0}                                                                                    | 146.8<br>{15.0} | 199.1<br>{20.3}   |
| 4                                                                                                 | 4               | 4                 |
| 1800                                                                                              | 1800            | 1800              |
| 400                                                                                               | 270             | 270               |
| 531.5<br>{54.2}                                                                                   | 797.3<br>{81.3} | 1063.0<br>{108.4} |
| Steel Pipe                                                                                        |                 |                   |
| Screw: Grease Reducer Unit: Grease Bath                                                           |                 |                   |
| Tsubaki Olive Grey (Munsell 5GY6/0.5)                                                             |                 |                   |
| - 15 to 80°C (Precautions #2)                                                                     |                 |                   |
| 85% or less (no dew condensation)                                                                 |                 |                   |
| Indoor Environment (Indoor room where rain and water cannot enter. Dust volume should be normal.) |                 |                   |
| Within 30% ED                                                                                     |                 |                   |

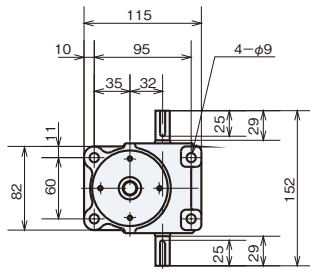
⚠ 8. Be certain that the jack rating exceeds the maximum stroke. Over travel can cause the lift shaft to disengage from the ball nut.

JWH (High Lead Ball Screw Type) is supported by a stopper (shaft end). However, this is merely for the purpose of securing the screw shaft during installation. While installing, take caution so that the screw shaft does not rotate by its own weight and become disengaged. If rotation cannot be avoided, use a model with rotation prevention. (Contact TEM for details.)

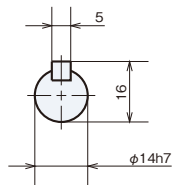
⚠ 9. Do not use mechanical stops under any circumstances. This will cause major internal damage.

10. Input shaft key is provided with each unit.  
(The input shaft key complies with JIS B 1301-1996 (normal grade).)

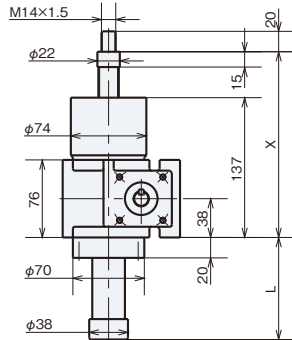
## JWH010 Dimensions - Standard Model



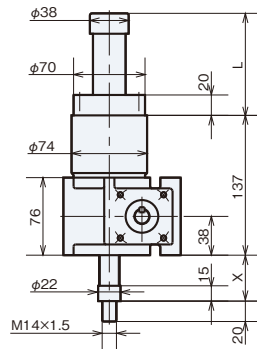
● Input Shaft



Lift (JWH010US)



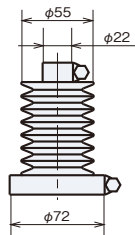
Suspend (JWH010DS)



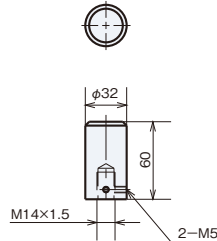
| Stroke | US Standard Model for Lifting |      |              |      |      | DS Standard Model for Suspending |      |              |      |      | Weight kg |
|--------|-------------------------------|------|--------------|------|------|----------------------------------|------|--------------|------|------|-----------|
|        | X                             |      | X            |      | L    | X                                |      | X            |      | L    |           |
|        | Without Bellows               |      | With Bellows |      |      | Without Bellows                  |      | With Bellows |      |      |           |
|        | MIN                           | MAX  | MIN          | MAX  |      | MIN                              | MAX  | MIN          | MAX  |      |           |
| 100    | 162                           | 262  | 212          | 312  | 194  | 25                               | 125  | 75           | 175  | 194  | 6.7       |
| 200    | 162                           | 362  | 212          | 412  | 294  | 25                               | 225  | 75           | 275  | 294  | 7.0       |
| 300    | 162                           | 462  | 252          | 552  | 434  | 25                               | 325  | 115          | 415  | 434  | 7.4       |
| 400    | 162                           | 562  | 252          | 652  | 534  | 25                               | 425  | 115          | 515  | 534  | 7.6       |
| 500    | 162                           | 662  | 287          | 787  | 669  | 25                               | 525  | 150          | 650  | 669  | 8.0       |
| 600    | 162                           | 762  | 287          | 887  | 769  | 25                               | 625  | 150          | 750  | 769  | 8.2       |
| 800    | 162                           | 962  | 322          | 1122 | 1004 | 25                               | 825  | 185          | 985  | 1004 | 8.9       |
| 1000   | 162                           | 1162 | 352          | 1352 | 1234 | 25                               | 1025 | 215          | 1215 | 1234 | 9.5       |

## Output Option

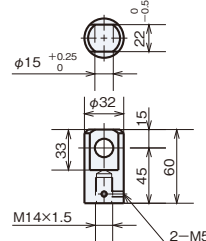
■ Bellows ( - J)



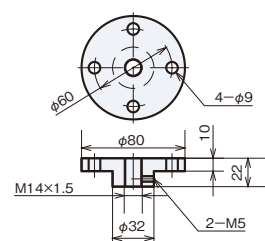
■ Rod Type End Fitting ( - B)



■ I Type End Fitting ( - I)

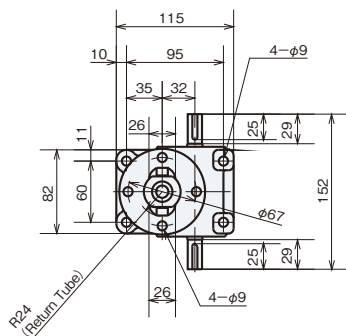


■ Table Type End Fitting ( - M)

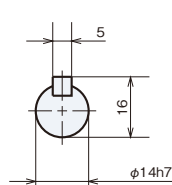


Note) For detailed measurements on units with bellows, see page 248.

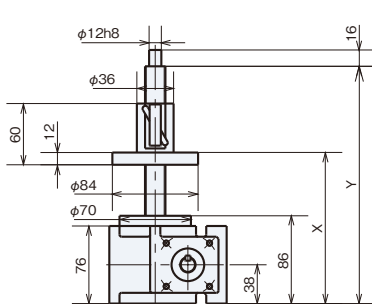
## JWH010 Dimensions - Travel Nut Type



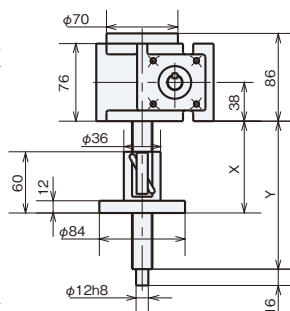
● Input Shaft



Lift (JWH010UR)



Suspend (JWH010DR)



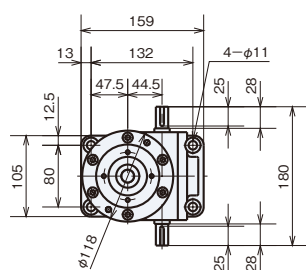
Note) Ball nut return tube and travel flange openings may vary from this drawing. Note the return tube measurements when installing to equipment.

| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 108                            | 208  | 265  | 69                                | 169  | 179  | 5.9       |
| 200    | 108                            | 308  | 365  | 69                                | 269  | 279  | 6.1       |
| 300    | 108                            | 408  | 465  | 69                                | 369  | 379  | 6.4       |
| 400    | 108                            | 508  | 565  | 69                                | 469  | 479  | 6.6       |
| 500    | 108                            | 608  | 665  | 69                                | 569  | 579  | 6.8       |
| 600    | 108                            | 708  | 765  | 69                                | 669  | 679  | 7.0       |
| 800    | 108                            | 908  | 965  | 69                                | 869  | 879  | 7.4       |
| 1000   | 108                            | 1108 | 1165 | 69                                | 1069 | 1079 | 7.9       |

Travel nut type cannot be equipped with optional end fitting (B.I.M). For types with bellows, refer to page 249.

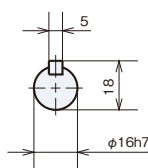
\* For dimensions with no tolerances, general tolerances shall apply, and they may be approximately 2 – 5mm larger than the dimensions shown. For machine design, take margins into consideration.

## JWH025 Dimensions - Standard Model

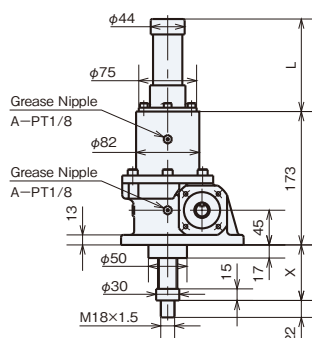
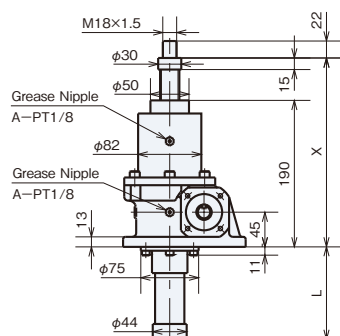


Lift (JWH025US)

### Input Shaft



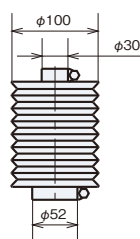
Suspend (JWH025DS)



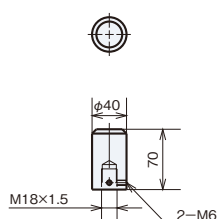
| Stroke | US Standard Model for Lifting |              |                 |              |      | DS Standard Model for Suspending |              |     |      |      | Weight kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|--------------|-----|------|------|-----------|
|        | X                             |              | X               |              | L    | X                                |              | X   |      | L    |           |
|        | Without Bellows               | With Bellows | Without Bellows | With Bellows |      | Without Bellows                  | With Bellows |     |      |      |           |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX          | MIN | MAX  |      |           |
| 100    | 215                           | 315          | 230             | 330          | 149  | 42                               | 142          | 57  | 157  | 149  | 11        |
| 200    | 215                           | 415          | 230             | 430          | 249  | 42                               | 242          | 57  | 257  | 249  | 11        |
| 300    | 215                           | 515          | 250             | 550          | 369  | 42                               | 342          | 77  | 377  | 369  | 11        |
| 400    | 215                           | 615          | 250             | 650          | 469  | 42                               | 442          | 77  | 477  | 469  | 12        |
| 500    | 215                           | 715          | 270             | 770          | 589  | 42                               | 542          | 97  | 597  | 589  | 12        |
| 600    | 215                           | 815          | 270             | 870          | 689  | 42                               | 642          | 97  | 697  | 689  | 13        |
| 800    | 215                           | 1015         | 290             | 1090         | 909  | 42                               | 842          | 117 | 917  | 909  | 14        |
| 1000   | 215                           | 1215         | 310             | 1310         | 1129 | 42                               | 1042         | 137 | 1137 | 1129 | 14        |
| 1200   | 215                           | 1415         | 325             | 1525         | 1344 | 42                               | 1242         | 152 | 1352 | 1344 | 15        |

## Output Option

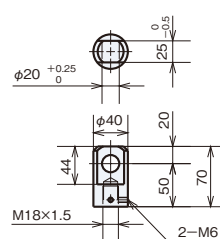
### ■ Bellows ( - J)



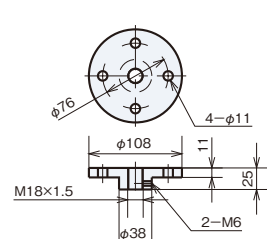
### ■ Rod Type End Fitting ( - B)



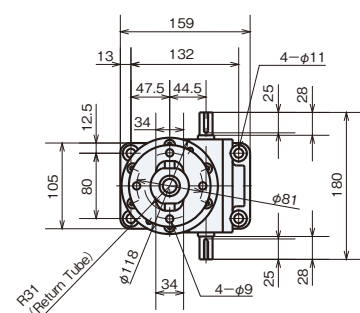
### ■ I Type End Fitting ( - I)



### ■ Table Type End Fitting ( - M)

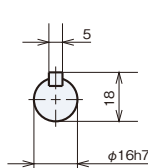


## JWH025 Dimensions - Travel Nut Type

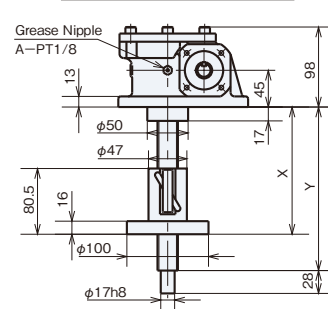
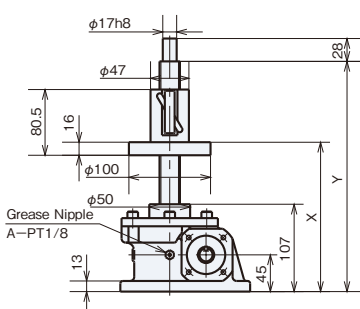


Lift (JWH025UR)

### Input Shaft



Suspend (JWH025DR)



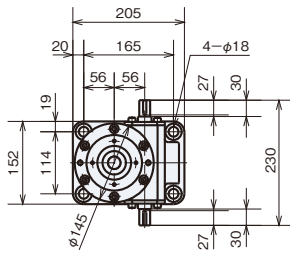
Note) Ball nut return tube and travel flange openings may vary from this drawing. Note the return tube measurements when installing to equipment.

| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 133                            | 233  | 309  | 108                               | 208  | 219  | 9.2       |
| 200    | 133                            | 333  | 409  | 108                               | 308  | 319  | 9.5       |
| 300    | 133                            | 433  | 509  | 108                               | 408  | 419  | 9.8       |
| 400    | 133                            | 533  | 609  | 108                               | 508  | 519  | 11        |
| 500    | 133                            | 633  | 709  | 108                               | 608  | 619  | 11        |
| 600    | 133                            | 733  | 809  | 108                               | 708  | 719  | 11        |
| 800    | 133                            | 933  | 1009 | 108                               | 908  | 919  | 12        |
| 1000   | 133                            | 1133 | 1209 | 108                               | 1108 | 1119 | 13        |
| 1200   | 133                            | 1333 | 1409 | 108                               | 1308 | 1319 | 13        |

Travel nut type cannot be equipped with optional end fitting (B.I.M). For types with bellows, refer to page 249.

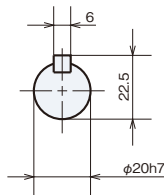
\* For dimensions with no tolerances, general tolerances shall apply, and they may be approximately 2 – 5mm larger than the dimensions shown. For machine design, take margins into consideration.

## JWH050 Dimensions - Standard Model



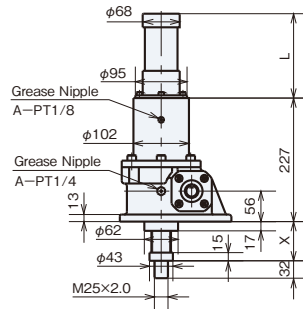
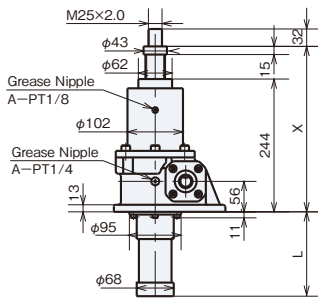
Lift (JWH050US)

● Input Shaft



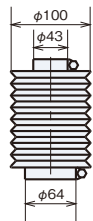
Suspend (JWH050DS)

| Stroke | US Standard Model for Lifting |              |                 |              |      | DS Standard Model for Suspending |      |     |      |      | Weight kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|------|-----|------|------|-----------|
|        | X                             |              | X               |              | L    | X                                |      | X   |      | L    |           |
|        | Without Bellows               | With Bellows | Without Bellows | With Bellows |      |                                  |      |     |      |      |           |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX  | MIN | MAX  |      |           |
| 100    | 269                           | 369          | 284             | 384          | 147  | 42                               | 142  | 57  | 157  | 147  | 23        |
| 200    | 269                           | 469          | 284             | 484          | 247  | 42                               | 242  | 57  | 257  | 247  | 23        |
| 300    | 269                           | 569          | 304             | 604          | 367  | 42                               | 342  | 77  | 377  | 367  | 24        |
| 400    | 269                           | 669          | 304             | 704          | 467  | 42                               | 442  | 77  | 477  | 467  | 25        |
| 500    | 269                           | 769          | 324             | 824          | 587  | 42                               | 542  | 97  | 597  | 587  | 26        |
| 600    | 269                           | 869          | 324             | 924          | 687  | 42                               | 642  | 97  | 697  | 687  | 27        |
| 800    | 269                           | 1069         | 344             | 1144         | 907  | 42                               | 842  | 117 | 917  | 907  | 29        |
| 1000   | 269                           | 1269         | 364             | 1364         | 1127 | 42                               | 1042 | 137 | 1137 | 1127 | 30        |
| 1200   | 269                           | 1469         | 379             | 1579         | 1342 | 42                               | 1242 | 152 | 1352 | 1342 | 32        |
| 1500   | 269                           | 1769         | 404             | 1904         | 1667 | 42                               | 1542 | 177 | 1677 | 1667 | 35        |

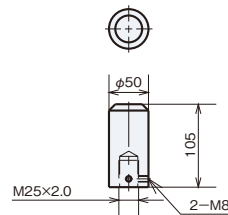


## Output Option

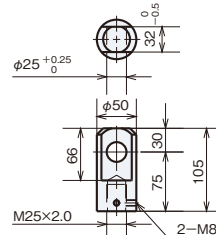
■ Bellows ( - J )



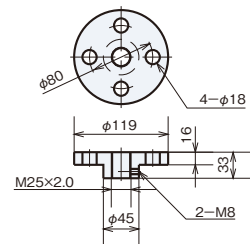
■ Rod Type End Fitting ( - B )



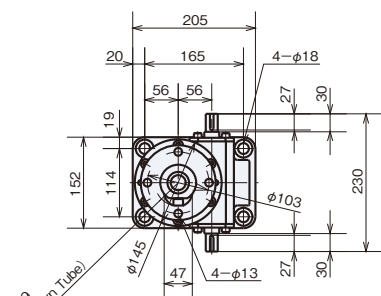
■ I Type End Fitting ( - I )



■ Table Type End Fitting ( - M )

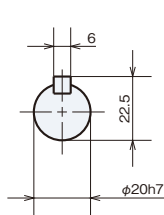


## JWH050 Dimensions - Travel Nut Type



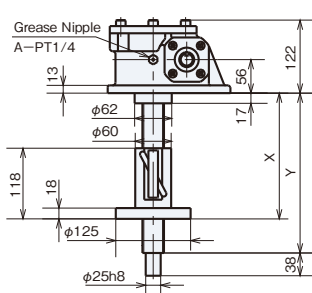
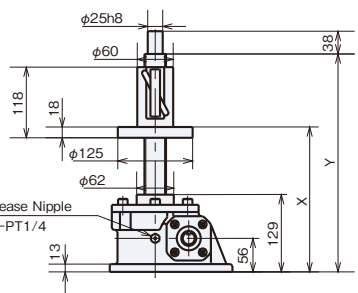
Lift (JWH050UR)

● Input Shaft



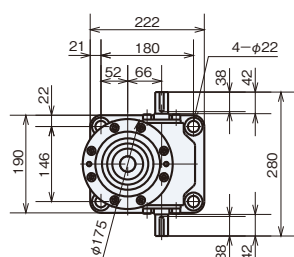
Suspend (JWH050DR)

| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 157                            | 257  | 369  | 145                               | 245  | 257  | 21        |
| 200    | 157                            | 357  | 469  | 145                               | 345  | 357  | 22        |
| 300    | 157                            | 457  | 569  | 145                               | 445  | 457  | 22        |
| 400    | 157                            | 557  | 669  | 145                               | 545  | 557  | 23        |
| 500    | 157                            | 657  | 769  | 145                               | 645  | 657  | 24        |
| 600    | 157                            | 757  | 869  | 145                               | 745  | 757  | 24        |
| 800    | 157                            | 957  | 1069 | 145                               | 945  | 957  | 26        |
| 1000   | 157                            | 1157 | 1269 | 145                               | 1145 | 1157 | 27        |
| 1200   | 157                            | 1357 | 1469 | 145                               | 1345 | 1357 | 29        |
| 1500   | 157                            | 1657 | 1769 | 145                               | 1645 | 1657 | 31        |



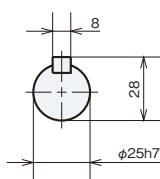
Note) Ball nut return tube and travel flange openings may vary from this drawing. Note the return tube measurements when installing to equipment.

## JWH100 Dimensions - Standard Model



Lift (JWH100US)

### Input Shaft

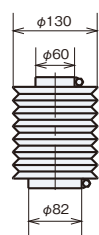


Suspend (JWH100DS)

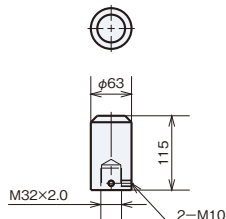
| Stroke | US Standard Model for Lifting |      |              |      |      | DS Standard Model for Suspending |      |              |      |      | Weight kg |
|--------|-------------------------------|------|--------------|------|------|----------------------------------|------|--------------|------|------|-----------|
|        | X                             |      | X            |      | L    | X                                |      | X            |      | L    |           |
|        | Without Bellows               |      | With Bellows |      |      | Without Bellows                  |      | With Bellows |      |      |           |
|        | MIN                           | MAX  | MIN          | MAX  |      | MIN                              | MAX  | MIN          | MAX  |      |           |
| 100    | 302                           | 402  | 312          | 412  | 151  | 42                               | 142  | 52           | 152  | 151  | 36        |
| 200    | 302                           | 502  | 312          | 512  | 252  | 42                               | 242  | 52           | 252  | 252  | 38        |
| 300    | 302                           | 602  | 327          | 627  | 366  | 42                               | 342  | 67           | 367  | 366  | 41        |
| 400    | 302                           | 702  | 327          | 727  | 466  | 42                               | 442  | 67           | 467  | 466  | 43        |
| 500    | 302                           | 802  | 352          | 852  | 591  | 42                               | 542  | 92           | 592  | 591  | 46        |
| 600    | 302                           | 902  | 352          | 952  | 691  | 42                               | 642  | 92           | 692  | 691  | 48        |
| 800    | 302                           | 1102 | 367          | 1167 | 906  | 42                               | 842  | 107          | 907  | 906  | 53        |
| 1000   | 302                           | 1302 | 377          | 1377 | 1116 | 42                               | 1042 | 117          | 1117 | 1116 | 58        |
| 1200   | 302                           | 1502 | 402          | 1602 | 1341 | 42                               | 1242 | 142          | 1342 | 1341 | 63        |
| 1500   | 302                           | 1802 | 427          | 1927 | 1666 | 42                               | 1542 | 167          | 1667 | 1666 | 71        |

## Output Option

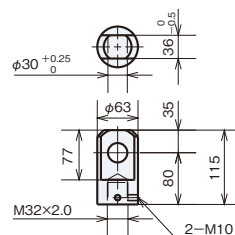
### ■ Bellows ( - J)



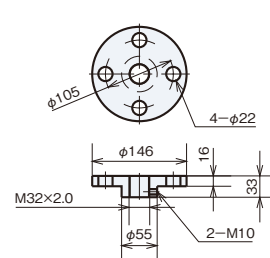
### ■ Rod Type End Fitting ( - B)



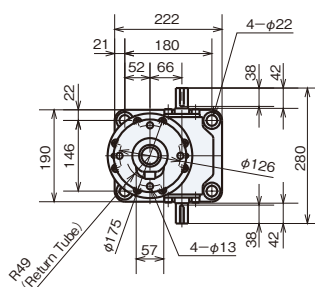
### ■ I Type End Fitting ( - I)



### ■ Table Type End Fitting ( - M)

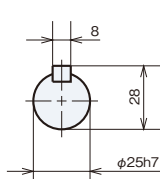


## JWH100 Dimensions - Travel Nut Type



Lift (JWH100UR)

### Input Shaft



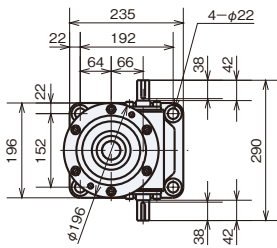
Suspend (JWH100DR)

| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 184                            | 284  | 414  | 185                               | 285  | 295  | 31        |
| 200    | 184                            | 384  | 514  | 185                               | 385  | 395  | 32        |
| 300    | 184                            | 484  | 614  | 185                               | 485  | 495  | 33        |
| 400    | 184                            | 584  | 714  | 185                               | 585  | 595  | 34        |
| 500    | 184                            | 684  | 814  | 185                               | 685  | 695  | 35        |
| 600    | 184                            | 784  | 914  | 185                               | 785  | 795  | 36        |
| 800    | 184                            | 984  | 1114 | 185                               | 985  | 995  | 39        |
| 1000   | 184                            | 1184 | 1314 | 185                               | 1185 | 1195 | 41        |
| 1200   | 184                            | 1384 | 1514 | 185                               | 1385 | 1395 | 43        |
| 1500   | 184                            | 1684 | 1814 | 185                               | 1685 | 1695 | 46        |

Travel nut type cannot be equipped with optional end fitting (B.I.M). For types with bellows, refer to page 249.

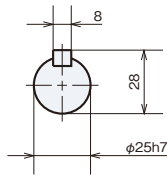
\* For dimensions with no tolerances, general tolerances shall apply, and they may be approximately 2 – 5mm larger than the dimensions shown. For machine design, take margins into consideration.

## JWH150 Dimensions - Standard Model



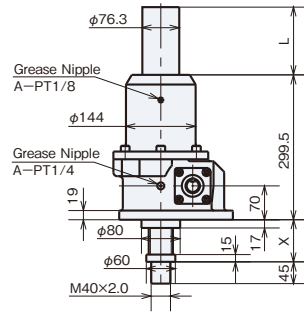
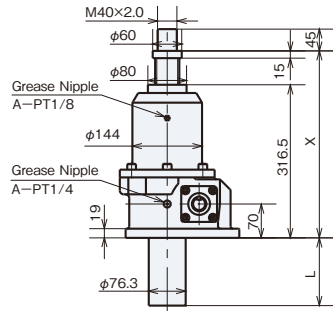
Lift (JWH150US)

● Input Shaft



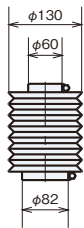
Suspend (JWH150DS)

| Stroke | US Standard Model for Lifting |      |              |      |      | DS Standard Model for Suspending |      |              |      |      | Weight kg |
|--------|-------------------------------|------|--------------|------|------|----------------------------------|------|--------------|------|------|-----------|
|        | X                             |      | X            |      | L    | X                                |      | X            |      | L    |           |
|        | Without Bellows               |      | With Bellows |      |      | Without Bellows                  |      | With Bellows |      |      |           |
|        | MIN                           | MAX  | MIN          | MAX  |      | MIN                              | MAX  | MIN          | MAX  |      |           |
| 100    | 342                           | 442  | 352          | 452  | 151  | 42                               | 142  | 52           | 152  | 151  | 46        |
| 200    | 342                           | 542  | 352          | 552  | 252  | 42                               | 242  | 52           | 252  | 252  | 48        |
| 300    | 342                           | 642  | 367          | 667  | 366  | 42                               | 342  | 67           | 367  | 366  | 51        |
| 400    | 342                           | 742  | 367          | 767  | 466  | 42                               | 442  | 67           | 467  | 466  | 54        |
| 500    | 342                           | 842  | 392          | 892  | 591  | 42                               | 542  | 92           | 592  | 591  | 57        |
| 600    | 342                           | 942  | 392          | 992  | 691  | 42                               | 642  | 92           | 692  | 691  | 60        |
| 800    | 342                           | 1142 | 407          | 1207 | 906  | 42                               | 842  | 107          | 907  | 906  | 65        |
| 1000   | 342                           | 1342 | 417          | 1417 | 1116 | 42                               | 1042 | 117          | 1117 | 1116 | 70        |
| 1200   | 342                           | 1542 | 442          | 1642 | 1341 | 42                               | 1242 | 142          | 1342 | 1341 | 76        |
| 1500   | 342                           | 1842 | 467          | 1967 | 1666 | 42                               | 1542 | 167          | 1667 | 1666 | 84        |

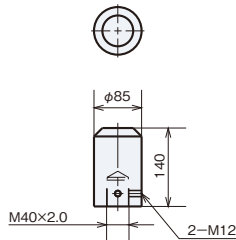


## Output Option

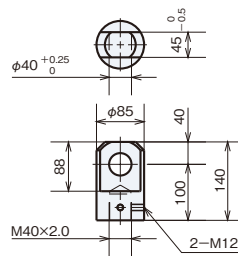
■ Bellows ( - J )



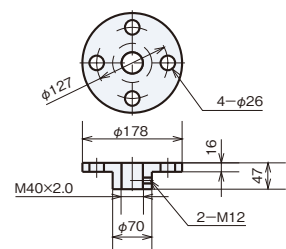
■ Rod Type End Fitting ( - B )



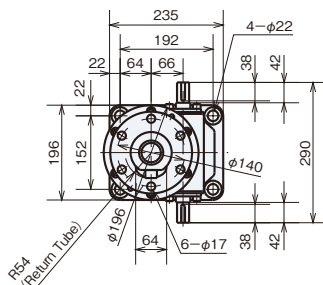
■ I Type End Fitting ( - I )



■ Table Type End Fitting ( - M )

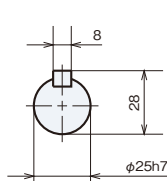


## JWH150 Dimensions - Travel Nut Type



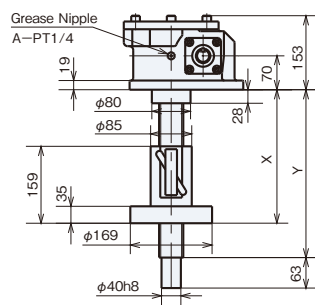
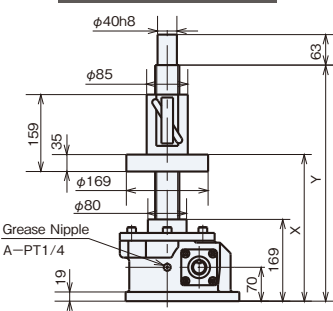
Lift (JWH150UR)

● Input Shaft



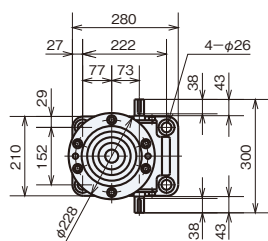
Suspend (JWH150DR)

| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 214                            | 314  | 448  | 197                               | 297  | 308  | 41        |
| 200    | 214                            | 414  | 548  | 197                               | 397  | 408  | 42        |
| 300    | 214                            | 514  | 648  | 197                               | 497  | 508  | 43        |
| 400    | 214                            | 614  | 748  | 197                               | 597  | 608  | 45        |
| 500    | 214                            | 714  | 848  | 197                               | 697  | 708  | 46        |
| 600    | 214                            | 814  | 948  | 197                               | 797  | 808  | 47        |
| 800    | 214                            | 1014 | 1148 | 197                               | 997  | 1008 | 50        |
| 1000   | 214                            | 1214 | 1348 | 197                               | 1197 | 1208 | 53        |
| 1200   | 214                            | 1414 | 1548 | 197                               | 1397 | 1408 | 55        |
| 1500   | 214                            | 1714 | 1848 | 197                               | 1697 | 1708 | 59        |

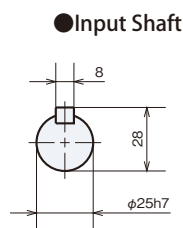


Note) Ball nut return tube and travel flange openings may vary from this drawing. Note the return tube measurements when installing to equipment.

## JWH200 Dimensions - Standard Model



Lift (JWH200US)

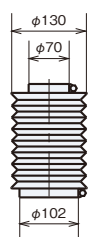


Suspend (JWH200DS)

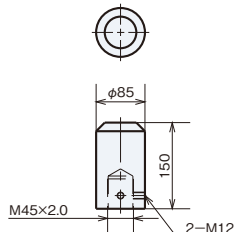
| Stroke | US Standard Model for Lifting |              |                 |              |      | DS Standard Model for Suspending |              |     |      |      | Weight kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|--------------|-----|------|------|-----------|
|        | X                             |              | X               |              | L    | X                                |              | X   |      | L    |           |
|        | Without Bellows               | With Bellows | Without Bellows | With Bellows |      | Without Bellows                  | With Bellows |     |      |      |           |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX          | MIN | MAX  |      |           |
| 100    | 406                           | 506          | 416             | 516          | 136  | 42                               | 142          | 52  | 152  | 136  | 65        |
| 200    | 406                           | 606          | 416             | 616          | 236  | 42                               | 242          | 52  | 252  | 236  | 68        |
| 300    | 406                           | 706          | 431             | 731          | 351  | 42                               | 342          | 67  | 367  | 351  | 72        |
| 400    | 406                           | 806          | 431             | 831          | 451  | 42                               | 442          | 67  | 467  | 451  | 76        |
| 500    | 406                           | 906          | 456             | 956          | 576  | 42                               | 542          | 92  | 592  | 576  | 80        |
| 600    | 406                           | 1006         | 456             | 1056         | 676  | 42                               | 642          | 92  | 692  | 676  | 83        |
| 800    | 406                           | 1206         | 471             | 1271         | 891  | 42                               | 842          | 107 | 907  | 891  | 90        |
| 1000   | 406                           | 1406         | 481             | 1481         | 1101 | 42                               | 1042         | 117 | 1117 | 1101 | 97        |
| 1200   | 406                           | 1606         | 506             | 1706         | 1326 | 42                               | 1242         | 142 | 1342 | 1326 | 105       |
| 1500   | 406                           | 1906         | 531             | 2031         | 1651 | 42                               | 1542         | 167 | 1667 | 1651 | 115       |
| 2000   | 406                           | 2406         | 576             | 2576         | 2196 | 42                               | 2042         | 212 | 2212 | 2196 | 133       |

## Output Option

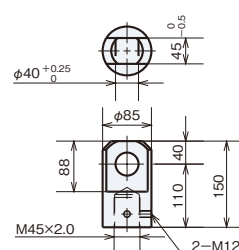
### ■ Bellows ( - J)



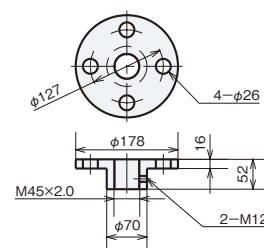
### ■ Rod Type End Fitting ( - B)



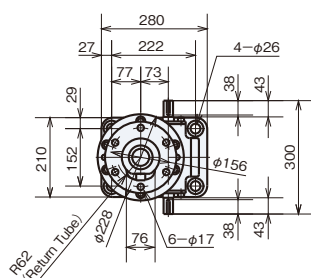
### ■ I Type End Fitting ( - I)



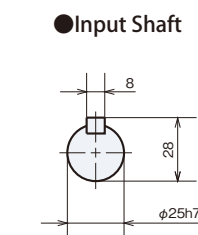
### ■ Table Type End Fitting ( - M)



## JWH200 Dimensions - Travel Nut Type

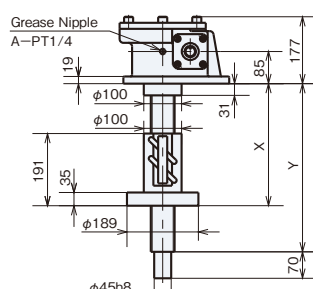
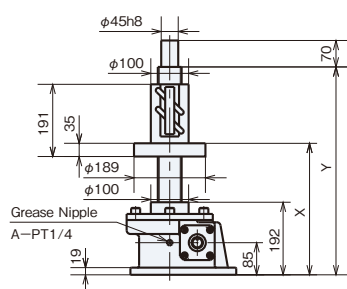


Lift (JWH200UR)



Suspend (JWH200DR)

| Stroke | UR Travel Nut Type for Lifting |      |      | DR Travel Nut Type for Suspending |      |      | Weight kg |
|--------|--------------------------------|------|------|-----------------------------------|------|------|-----------|
|        | X                              |      | Y    | X                                 |      | Y    |           |
|        | MIN                            | MAX  |      | MIN                               | MAX  |      |           |
| 100    | 237                            | 337  | 503  | 232                               | 332  | 342  | 56        |
| 200    | 237                            | 437  | 603  | 232                               | 432  | 442  | 58        |
| 300    | 237                            | 537  | 703  | 232                               | 532  | 542  | 60        |
| 400    | 237                            | 637  | 803  | 232                               | 632  | 642  | 62        |
| 500    | 237                            | 737  | 903  | 232                               | 732  | 742  | 65        |
| 600    | 237                            | 837  | 1003 | 232                               | 832  | 842  | 67        |
| 800    | 237                            | 1037 | 1203 | 232                               | 1032 | 1042 | 71        |
| 1000   | 237                            | 1237 | 1403 | 232                               | 1232 | 1242 | 76        |
| 1200   | 237                            | 1437 | 1603 | 232                               | 1432 | 1442 | 80        |
| 1500   | 237                            | 1737 | 1903 | 232                               | 1732 | 1742 | 86        |
| 2000   | 237                            | 2237 | 2403 | 232                               | 2232 | 2242 | 97        |



Note) Ball nut return tube and travel flange openings may vary from this drawing. Note the return tube measurements when installing to equipment.

Travel nut type cannot be equipped with optional end fitting (B.I.M). For types with bellows, refer to page 249.

\* For dimensions with no tolerances, general tolerances shall apply, and they may be approximately 2 – 5mm larger than the dimensions shown. For machine design, take margins into consideration.



# Warning

## ■ Cautions for selecting

- Duty cycle of JWH (High Lead Screw Type) is within 30% ED. Duty cycle is a ratio of operating time per 30 min on the basis of 30 min interval.
- JWH (High Lead Screw Type) does not have a self-locking device, therefore, a brake mechanism is required.
- Activating torque for the drive unit should be maintained at 200% above the required torque.
- Allowable input rotation speed of linear power jack is 1800 r/min, however, when inputting a speed exceeding the maximum input rotation speed at the basic capacity, check the screw shaft speed (elevation speed) and allowable load related graphs on page 157.
- Select a stroke for the jack with an extra margin with respect to the used stroke.  
JWH (High Lead Screw Type) is equipped with a fall stop, however, if the stroke range is exceeded, the screw shaft falls out.
- Rotating force is generated on the screw shaft (travel nut in the case of travel nut type) with thrust, therefore, rotation prevention is required. Screw rotation torque at the basic capacity is described in the standard specification list. When operating with the end unconnected, and pulling the rope with a sheave installed, use the rotation prevention type.  
Rotation prevention type of JWH (High Lead Screw Type) is of special specification, therefore, contact TSUBAKI E&M.  
However, the rotation prevention type cannot be manufactured for the travel nut type, therefore, provide a rotation prevention mechanism on the device.
- Bellows is of special specification, therefore, contact TSUBAKI E&M.
- When installing a sprocket, gear, or belt to the input or output shaft, confirm that any overhang load applied to the shaft decreases to the allowable OHL or less.

$$\text{Allowable O. H. L.} \geq \frac{T \times f \times L_f}{R}$$

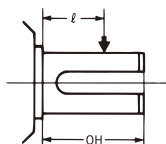
O.H.L. : Overhang load N (kgf)

T : Input torque N · m (kgf · m)

f : Coefficient - power transmission element

L<sub>f</sub> : Coefficient - Load operating position

R : Sprocket, Gear, V pulley or  
Pitch diameter m



Q : Shaft Length

l : Loaded Position

### ● Coefficient – Power Transmission Element (f)

|           |      |
|-----------|------|
| Sprocket  | 1.00 |
| Gear      | 1.25 |
| V-belt    | 1.50 |
| Flat belt | 2.50 |

### ● Coefficient (L<sub>f</sub>) – Load Position

| l / QH         | 0.25 | 0.38 | 0.5 | 0.75 | 1 |
|----------------|------|------|-----|------|---|
| L <sub>f</sub> | 0.8  | 0.9  | 1   | 1.5  | 2 |

### ● Allowable O.H.L.

| Frame No.                  |         | 002 | 005 | 010  | 025   | 050   | 100   | 150   | 200   | 300 | 500 | 750 | 1000 |
|----------------------------|---------|-----|-----|------|-------|-------|-------|-------|-------|-----|-----|-----|------|
| JWH (High Lead Screw Type) | N       | —   | —   | 530  | 980   | 1510  | 2390  | 3130  | 3840  | —   | —   | —   | —    |
| H Speed                    | { kgf } | —   | —   | {54} | {100} | {154} | {244} | {320} | {392} | —   | —   | —   | —    |

## ■ Precautions for installation

- Some screw covers of jacks are made of hard vinyl chloride pipe. Do not lift jack and transport with this pipe, which may result in dropping.
- JWH (High Lead Screw Type) rotates by self weight of the screw shaft or travel nut, therefore, retract its stroke to the minimum and provide a rotation prevention for installation.
- Take jack coasting amount into consideration to set the stroke adjusting limit switch.

## ■ Precautions for use

- Do not perform manual operation from the input shaft with load applied. The input shaft is rotated by the load, which is dangerous.
- When JWH (High Lead Screw Type) is used in the vertical direction, the jack may be reversed by the load because of its excellent efficiency. Never perform manual operation.
- Do not use mechanical stops under any circumstances.
- Operating Environment for jack is as follows.

|                             |                                                          |
|-----------------------------|----------------------------------------------------------|
| Operating place             | Indoor room which cannot be splashed with rain or water. |
| Ambient atmosphere          | Dust volume comparable to general factories.             |
| Operating temperature range | −15 to 80°C (Refer to section 3 in general precautions.) |
| Relative humidity           | 85% or less (no dew condensation)                        |

- Operating part and reducer unit are factory greased. Therefore, use jack as delivered.
- For lubrication grease, lubrication cycle and lubrication amount to the screw shaft and reducer unit, refer to page 253.
- Inspect regularly for general backlash and screw unit condition. Jack life and replacement timing are determined by the following:  
Metal particles due to wear on the screw surface are visible.  
Replace gear when its input shaft exceeds 30 rpm with backlash (rattle between input shaft and worm wheel) at H speed, or exceeds 60 rpm at L speed.  
In either case, if it is used at the replacement timing, this may cause rotation failure of screw shaft and input shaft, and further sudden drop of travel nut.

Linipower Jack

# Options

## Jacks with Motors

|              |          |
|--------------|----------|
| Gearmotor    | P229~232 |
| Motor        | P233~235 |
| Hypoid Motor | P236     |
| Servo Motor  | P236     |

## Control Option

|                                                                 |          |
|-----------------------------------------------------------------|----------|
| Jack Control System                                             | P237•238 |
| LS Counter                                                      | P239•240 |
| Position Sensors                                                | P241~244 |
| Internal LS                                                     | P242     |
| Potentiometer                                                   | P242•243 |
| ( Stroke Display Meter, Printed Circuit Board, )<br>Meter Relay |          |
| Rotary Encoder                                                  | P244     |

## Others

|                                       |      |
|---------------------------------------|------|
| Clevis and Trunnion Mounting Adapters | P245 |
| Hand Wheel, Columns                   | P246 |
| Safety Caps                           | P247 |
| Bellows                               | P248 |

**Bellows Inquiry Form for travel nut type** P249

## With Gearmotor JWM (Machine Screw Type)



| Model No. | Motor Weight | Gear Ratio | Jack Gear Ratio H            |                    |                              |                    |
|-----------|--------------|------------|------------------------------|--------------------|------------------------------|--------------------|
|           |              |            | 50Hz (1500r/min)             |                    | 60Hz (1800r/min)             |                    |
|           |              |            | Shaft Speed<br>mm/min (mm/s) | Thrust<br>kN {kgf} | Shaft Speed<br>mm/min (mm/s) | Thrust<br>kN {kgf} |
| JWM005    | 25W          | 1/5        | 216 (3.6)                    | 1.27 {130}         | 258 (4.3)                    | 1.08 {110}         |
|           |              | 1/10       | 108 (1.8)                    | 2.55 {260}         | 126 (2.1)                    | 2.16 {220}         |
| JWM010    | 40W          | 1/5        | 210 (3.5)                    | 1.76 {180}         | 258 (4.3)                    | 1.47 {150}         |
|           |              | 1/10       | 108 (1.8)                    | 3.63 {370}         | 126 (2.1)                    | 2.84 {290}         |
| JWM025    | 0.1kW        | 1/5        | 252 (4.2)                    | 4.41 {450}         | 300 (5.0)                    | 3.63 {370}         |
|           |              | 1/10       | 126 (2.1)                    | 8.92 {910}         | 150 (2.5)                    | 7.55 {770}         |
|           |              | 1/15       | 84 (1.4)                     | 13.6 {1390}        | 102 (1.7)                    | 11.3 {1150}        |
|           |              | 1/20       | 60 (1.0)                     | 18.6 {1900}        | 78 (1.3)                     | 15.0 {1530}        |
|           |              | 1/25       | 48 (0.8)                     | 23.2 {2370}        | 60 (1.0)                     | 18.6 {1900}        |
|           | 0.2kW        | 1/5        | 252 (4.2)                    | 8.92 {910}         | 300 (5.0)                    | 7.45 {760}         |
|           |              | 1/10       | 126 (2.1)                    | 18.6 {1900}        | 150 (2.5)                    | 15.0 {1530}        |
|           |              | 1/15       | 84 (1.4)                     | 24.5 {2500}        | 102 (1.7)                    | 23.2 {2370}        |
| JWM050    | 0.2kW        | 1/5        | 402 (6.7)                    | 5.88 {600}         | 480 (8.0)                    | 4.80 {490}         |
|           |              | 1/10       | 198 (3.3)                    | 11.8 {1200}        | 240 (4.0)                    | 9.80 {1000}        |
|           |              | 1/15       | 132 (2.2)                    | 18.2 {1860}        | 162 (2.7)                    | 15.2 {1550}        |
|           |              | 1/20       | 102 (1.7)                    | 23.3 {2380}        | 120 (2.0)                    | 20.3 {2070}        |
|           | 0.4kW        | 1/25       | 78 (1.3)                     | 29.4 {3000}        | 96 (1.6)                     | 24.3 {2480}        |
|           |              | 1/5        | 402 (6.7)                    | 12.4 {1270}        | 480 (8.0)                    | 10.3 {1050}        |
|           |              | 1/10       | 198 (3.3)                    | 25.4 {2590}        | 240 (4.0)                    | 21.3 {2170}        |
|           |              | 1/15       | 132 (2.2)                    | 37.5 {3830}        | 162 (2.7)                    | 31.5 {3210}        |
| JWM100    | 0.4kW        | 1/20       | 102 (1.7)                    | 49.0 {5000}        | 120 (2.0)                    | 41.7 {4250}        |
|           |              | 1/5        | 378 (6.3)                    | 13.2 {1350}        | 450 (7.5)                    | 11.0 {1120}        |
|           |              | 1/10       | 186 (3.1)                    | 27.0 {2760}        | 228 (3.8)                    | 22.7 {2320}        |
|           |              | 1/15       | 126 (2.1)                    | 40.1 {4090}        | 150 (2.5)                    | 33.5 {3420}        |
|           |              | 1/20       | 96 (1.6)                     | 53.0 {5410}        | 114 (1.9)                    | 44.4 {4530}        |
|           | 0.75kW       | 1/25       | 78 (1.3)                     | 67.1 {6850}        | 90 (1.5)                     | 55.3 {5640}        |
|           |              | 1/30       | 60 (1.0)                     | 80.2 {8180}        | 78 (1.3)                     | 67.1 {6850}        |
|           |              | 1/5        | 378 (6.3)                    | 24.9 {2540}        | 450 (7.5)                    | 20.8 {2120}        |
|           |              | 1/10       | 186 (3.1)                    | 49.8 {5080}        | 228 (3.8)                    | 42.2 {4310}        |
|           |              | 1/15       | 126 (2.1)                    | 74.8 {7630}        | 150 (2.5)                    | 62.8 {6410}        |
|           |              | 1/20       | 96 (1.6)                     | 98.0 {10000}       | 114 (1.9)                    | 83.4 {8510}        |
|           |              | 1/25       | 78 (1.3)                     | 114 {11660}        | 90 (1.5)                     | 94.6 {9650}        |
| JWM150    | 0.4kW        | 1/5        | 378 (6.3)                    | 12.1 {1230}        | 450 (7.5)                    | 10.0 {1020}        |
|           |              | 1/10       | 186 (3.1)                    | 24.6 {2510}        | 228 (3.8)                    | 20.7 {2110}        |
|           |              | 1/15       | 126 (2.1)                    | 36.5 {3720}        | 150 (2.5)                    | 30.5 {3110}        |
|           |              | 1/20       | 96 (1.6)                     | 48.2 {4920}        | 114 (1.9)                    | 40.4 {4120}        |
|           |              | 1/25       | 78 (1.3)                     | 61.1 {6230}        | 90 (1.5)                     | 50.2 {5120}        |
|           | 0.75kW       | 1/30       | 60 (1.0)                     | 69.9 {7130}        | 78 (1.3)                     | 61.1 {6230}        |
|           |              | 1/5        | 378 (6.3)                    | 22.6 {2310}        | 450 (7.5)                    | 18.9 {1930}        |
|           |              | 1/10       | 186 (3.1)                    | 45.3 {4620}        | 228 (3.8)                    | 38.4 {3920}        |
|           |              | 1/15       | 126 (2.1)                    | 67.9 {6930}        | 150 (2.5)                    | 57.1 {5830}        |
|           |              | 1/20       | 96 (1.6)                     | 91.5 {9340}        | 114 (1.9)                    | 75.9 {7740}        |
|           |              | 1/25       | 78 (1.3)                     | 114 {11660}        | 90 (1.5)                     | 94.6 {9650}        |
|           |              | 1/30       | 60 (1.0)                     | 121 {1230}         | 78 (1.3)                     | 107 {1090}         |
| JWM200    | 0.75kW       | 1/5        | 450 (7.5)                    | 18.9 {1930}        | 540 (9.0)                    | 15.7 {1600}        |
|           |              | 1/10       | 228 (3.8)                    | 37.7 {3850}        | 270 (4.5)                    | 31.9 {3260}        |
|           |              | 1/15       | 150 (2.5)                    | 56.6 {5780}        | 180 (3.0)                    | 47.5 {4850}        |
|           |              | 1/20       | 114 (1.9)                    | 76.3 {7790}        | 138 (2.3)                    | 63.2 {6450}        |
|           |              | 1/25       | 90 (1.5)                     | 95.2 {9710}        | 108 (1.8)                    | 78.8 {8040}        |
|           | 1.5kW        | 1/5        | 450 (7.5)                    | 37.9 {3870}        | 540 (9.0)                    | 31.5 {3220}        |
|           |              | 1/10       | 228 (3.8)                    | 76.3 {7790}        | 270 (4.5)                    | 63.2 {6450}        |
|           |              | 1/15       | 150 (2.5)                    | 114 {11640}        | 180 (3.0)                    | 95.1 {9710}        |
|           |              | 1/20       | 114 (1.9)                    | 151 {15490}        | 138 (2.3)                    | 126 {12900}        |
|           |              | 1/25       | 90 (1.5)                     | 189 {19350}        | 108 (1.8)                    | 158 {16160}        |
|           |              | 1/30       | 75 (1.25)                    | 225 {22950}        | 90 (1.5)                     | 195 {19950}        |
|           |              | 1/40       | 60 (1.0)                     | 270 {27540}        | 72 (1.2)                     | 234 {23940}        |

|  |                 |
|--|-----------------|
|  | : Standard      |
|  | : Rush Order    |
|  | : Made-to-Order |

\* Other shaft speeds and thrusts also available.

\* Values in striped cells indicate thrust rates that exceed allowable capacities. Be sure to adjust thrust to below these rates.

\* These thrust rates do not take allowable buckling rates into account. Consider as necessary.

## With Gearmotor JWB (Ball Screw Type)



| Model No. | Motor Weight | Gear Ratio | Jack Gear Ratio H            |                    |                              |                    |
|-----------|--------------|------------|------------------------------|--------------------|------------------------------|--------------------|
|           |              |            | 50Hz (1500r/min)             |                    | 60Hz (1800r/min)             |                    |
|           |              |            | Shaft Speed<br>mm/min (mm/s) | Thrust<br>kN {kgf} | Shaft Speed<br>mm/min (mm/s) | Thrust<br>kN {kgf} |
| JWB005    | 25W          | 1/5        | 270 (4.5)                    | 2.55 {260}         | 318 (5.3)                    | 2.16 {220}         |
|           |              | 1/10       | 138 (2.3)                    | 4.90 {500}         | 162 (2.7)                    | 4.21 {430}         |
| JWB010    | 40W          | 1/5        | 264 (4.4)                    | 4.12 {420}         | 318 (5.3)                    | 3.43 {350}         |
|           |              | 1/10       | 132 (2.2)                    | 8.62 {880}         | 162 (2.7)                    | 6.66 {680}         |
| JWB025    | 0.1kW        | 1/5        | 402 (6.7)                    | 8.23 {840}         | 480 (8.0)                    | 6.86 {700}         |
|           |              | 1/10       | 198 (3.3)                    | 16.6 {1690}        | 240 (4.0)                    | 14.0 {1430}        |
|           |              | 1/15       | 132 (2.2)                    | 24.5 {2500}        | 162 (2.7)                    | 20.9 {2130}        |
|           | 0.2kW        | 1/5        | 402 (6.7)                    | 16.6 {1690}        | 480 (8.0)                    | 13.7 {1400}        |
| JWB050    | 0.2kW        | 1/5        | 498 (8.3)                    | 13.6 {1390}        | 600 (10)                     | 11.3 {1150}        |
|           |              | 1/10       | 252 (4.2)                    | 28.3 {2890}        | 300 (5.0)                    | 22.8 {2330}        |
|           |              | 1/15       | 168 (2.8)                    | 42.5 {4340}        | 198 (3.3)                    | 35.4 {3610}        |
|           | 0.4kW        | 1/5        | 498 (8.3)                    | 29.1 {2967}        | 600 (10)                     | 24.1 {2461}        |
| JWB100    | 0.4kW        | 1/5        | 450 (7.5)                    | 31.8 {3240}        | 540 (9.0)                    | 26.4 {2690}        |
|           |              | 1/10       | 228 (3.8)                    | 64.6 {6590}        | 270 (4.5)                    | 54.2 {5530}        |
|           |              | 1/15       | 150 (2.5)                    | 95.6 {9760}        | 180 (3.0)                    | 80.2 {8180}        |
|           | 0.75kW       | 1/5        | 450 (7.5)                    | 59.5 {6070}        | 540 (9.0)                    | 49.6 {5060}        |
| JWB150    | 0.4kW        | 1/5        | 600 (10)                     | 23.8 {2430}        | 720 (12)                     | 19.7 {2010}        |
|           |              | 1/10       | 300 (5.0)                    | 48.4 {4940}        | 360 (6.0)                    | 40.7 {4150}        |
|           |              | 1/15       | 198 (3.3)                    | 71.7 {7320}        | 240 (4.0)                    | 60.1 {6130}        |
|           |              | 1/20       | 150 (2.5)                    | 95.0 {9690}        | 180 (3.0)                    | 79.5 {8110}        |
|           | 0.75kW       | 1/5        | 600 (10)                     | 44.6 {4550}        | 720 (12)                     | 37.2 {3800}        |
|           |              | 1/10       | 300 (5.0)                    | 89.2 {9100}        | 360 (6.0)                    | 75.6 {7710}        |
| JWB200    | 0.75kW       | 1/15       | 198 (3.3)                    | 134 {13650}        | 240 (4.0)                    | 112 {11470}        |
|           |              | 1/5        | 600 (10)                     | 44.0 {4490}        | 720 (12)                     | 36.6 {3730}        |
|           |              | 1/10       | 300 (5.0)                    | 87.7 {8950}        | 360 (6.0)                    | 74.4 {7590}        |
|           |              | 1/15       | 198 (3.3)                    | 132 {13440}        | 240 (4.0)                    | 111 {11290}        |
|           | 1.5kW        | 1/20       | 150 (2.5)                    | 177 {18110}        | 180 (3.0)                    | 147 {14990}        |
|           |              | 1/5        | 600 (10)                     | 88.1 {8990}        | 720 (12)                     | 73.4 {7490}        |
|           |              | 1/10       | 300 (5.0)                    | 177 {18110}        | 360 (6.0)                    | 147 {14990}        |

## With Gearmotor JWH (High Lead Ball Screw Type)



| Model No. | Motor Weight | Gear Ratio | Jack Gear Ratio H            |                    |                              |                    |
|-----------|--------------|------------|------------------------------|--------------------|------------------------------|--------------------|
|           |              |            | 50Hz (1500r/min)             |                    | 60Hz (1800r/min)             |                    |
|           |              |            | Shaft Speed<br>mm/min (mm/s) | Thrust<br>kN {kgf} | Shaft Speed<br>mm/min (mm/s) | Thrust<br>kN {kgf} |
| JWH010    | 40W          | 1/5        | 1200 (20)                    | 0.98 {100}         | 1440 (24)                    | 0.88 {90}          |
|           |              | 1/10       | 600 (10)                     | 2.16 {220}         | 720 (12)                     | 1.67 {170}         |
| JWH025    | 0.1kW        | 1/5        | 1260 (21)                    | 2.74 {280}         | 1500 (25)                    | 2.25 {230}         |
|           |              | 1/10       | 600 (10)                     | 5.49 {560}         | 780 (13)                     | 4.70 {480}         |
|           | 0.2kW        | 1/5        | 1260 (21)                    | 5.49 {560}         | 1500 (25)                    | 4.61 {470}         |
|           |              | 1/10       | 600 (10)                     | 11.5 {1170}        | 780 (13)                     | 9.31 {950}         |
| JWH050    | 0.2kW        | 1/5        | 1260 (21)                    | 5.78 {590}         | 1500 (25)                    | 4.80 {490}         |
|           |              | 1/10       | 600 (10)                     | 12.1 {1230}        | 780 (13)                     | 9.70 {990}         |
|           | 0.4kW        | 1/5        | 1260 (21)                    | 12.3 {1260}        | 1500 (25)                    | 10.2 {1040}        |
|           |              | 1/10       | 600 (10)                     | 25.1 {2560}        | 780 (13)                     | 21.1 {2150}        |
| JWH100    | 0.4kW        | 1/5        | 1200 (20)                    | 12.3 {1250}        | 1440 (24)                    | 10.2 {1040}        |
|           |              | 1/10       | 600 (10)                     | 25.0 {2550}        | 720 (12)                     | 21.0 {2140}        |
|           | 0.75kW       | 1/5        | 1200 (20)                    | 22.9 {2340}        | 1440 (24)                    | 19.2 {1960}        |
|           |              | 1/10       | 600 (10)                     | 46.0 {4690}        | 720 (12)                     | 39.0 {3980}        |
| JWH150    | 0.4kW        | 1/5        | 1200 (20)                    | 12.3 {1250}        | 1440 (24)                    | 10.2 {1040}        |
|           |              | 1/10       | 600 (10)                     | 25.0 {2550}        | 720 (12)                     | 21.0 {2140}        |
|           | 0.75kW       | 1/5        | 1200 (20)                    | 22.9 {2340}        | 1440 (24)                    | 19.2 {1960}        |
|           |              | 1/10       | 600 (10)                     | 46.0 {4690}        | 720 (12)                     | 39.0 {3980}        |
| JWH200    | 0.75kW       | 1/5        | 1200 (20)                    | 22.6 {2310}        | 1440 (24)                    | 18.9 {1930}        |
|           |              | 1/10       | 600 (10)                     | 45.3 {4620}        | 720 (12)                     | 38.4 {3920}        |

: Standard  
 : Rush Order  
 : Made-to-Order

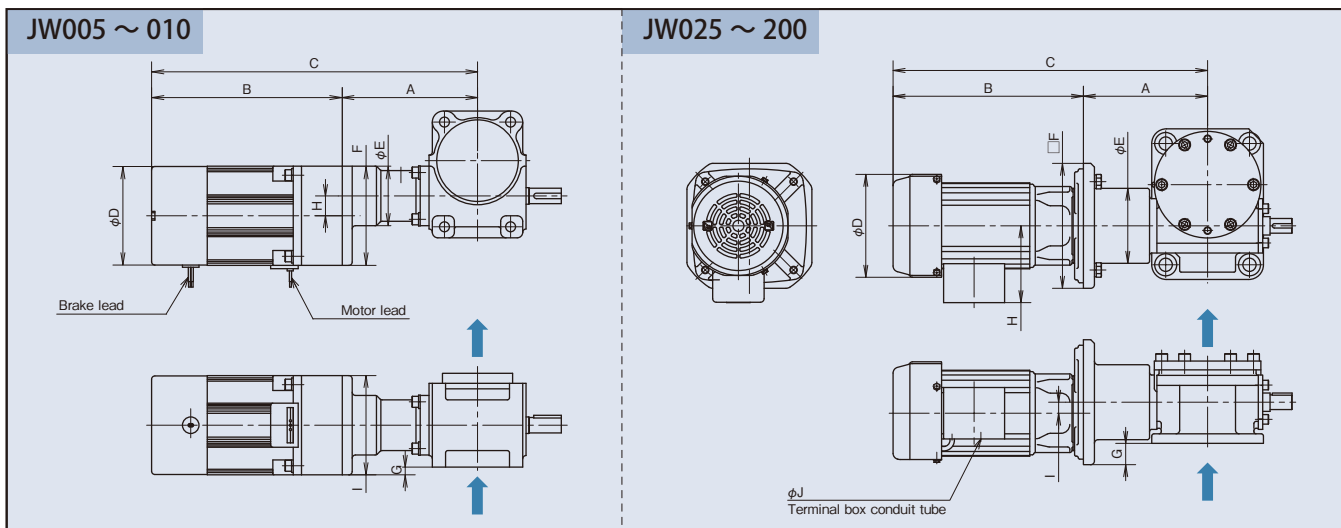
\* Other shaft speeds and thrusts also available.

\* Values in striped cells indicate thrust rates that exceed allowable capacities. Be sure to adjust thrust to below these rates.

\* These thrust rates do not take allowable buckling rates into account. Consider as necessary.

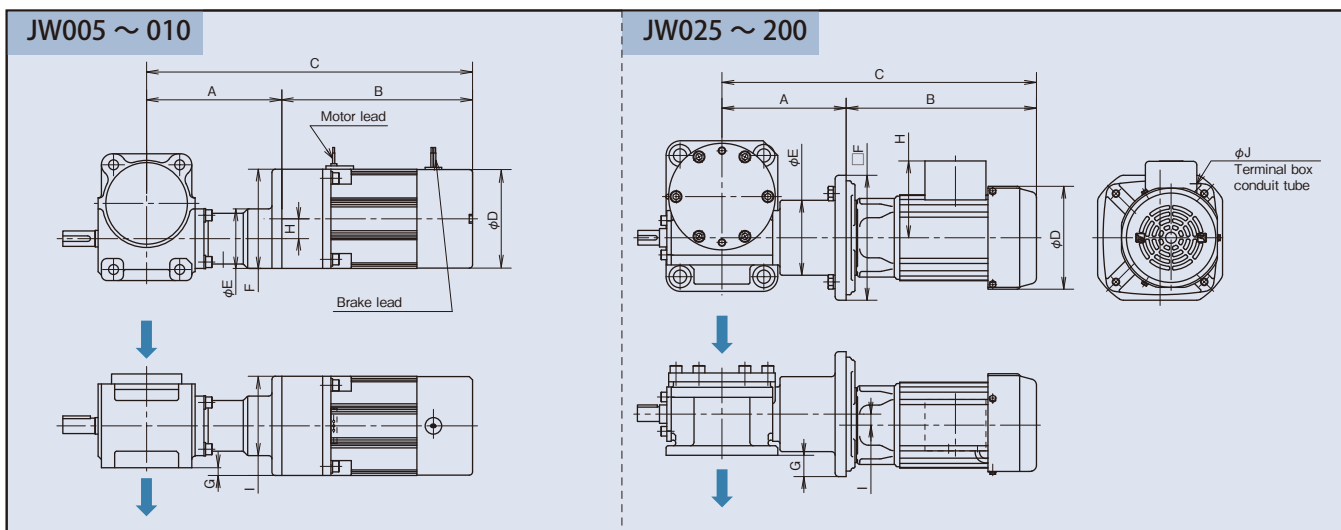
# Outline Drawings for Motored Jacks

## Standard Gearmotor Mounting



Note) For standard (US, DS) and rotation prevention types (UM, DM), screw shafts will lift in the direction of with normal wiring.  
For travel nut types (UR, DR), nuts will lift in the direction of with normal wiring.

## Gearmotor Mounting on the Opposite Side



Note) For standard (US, DS) and rotation prevention types (UM, DM), screw shafts will lift in the direction of with normal wiring.  
For travel nut types (UR, DR), nuts will lift in the direction of with normal wiring.

Unit: mm

| Frame No. | Motor Weight | A   | B        | C        | D   | E   | F   | G  | H   | I      | J  |
|-----------|--------------|-----|----------|----------|-----|-----|-----|----|-----|--------|----|
| JW005     | 25W          | 106 | 160      | 266      | 84  | 60  | 85  | 15 | 15  | 80     | —  |
| JW010     | 40W          | 123 | 188      | 311      | 93  | 54  | 90  | 7  | 18  | 90     | —  |
| JW025     | 0.1kW        | 144 | 242      | 386      | 140 | 93  | 170 | 40 | 105 | 15     | 12 |
|           | 0.2kW        | 144 | 259      | 403      | 140 | 93  | 170 | 40 | 105 | 15     | 12 |
| JW050     | 0.2kW        | 169 | 259      | 428      | 140 | 102 | 170 | 29 | 105 | 15     | 12 |
|           | 0.4kW        | 191 | 301      | 492      | 140 | 102 | 200 | 44 | 105 | 18     | 12 |
| JW100     | 0.4kW        | 207 | 301(323) | 508(530) | 140 | 131 | 200 | 44 | 105 | 18(23) | 12 |
|           | 0.75kW       | 207 | 353      | 558      | 158 | 131 | 200 | 44 | 114 | 23     | 12 |
| JW150     | 0.4kW        | 211 | 301(323) | 512(534) | 140 | 131 | 200 | 30 | 105 | 18(23) | 12 |
|           | 0.75kW       | 211 | 353      | 564      | 158 | 131 | 200 | 30 | 114 | 23     | 12 |
| JW200     | 0.75kW       | 231 | 353      | 584      | 158 | 144 | 200 | 15 | 114 | 23     | 12 |
|           | 1.5kW        | 246 | 461      | 707      | 198 | 150 | 280 | 55 | 143 | 27     | 27 |

\* ( ) assumes 1/30 rpm.

## Standard Gearmotor

| Output           | 25W ~ 40W                   | 0.1kW ~ 1.5kW |
|------------------|-----------------------------|---------------|
| Model            | With Brake/Totally Enclosed |               |
| Voltage          | 200/200/220V                |               |
| Frequency        | 50/60/60Hz                  |               |
| Pole             | 4P                          |               |
| Phase            | 3 Phase                     |               |
| Protection       | IP20                        |               |
| Rating           | Continuous                  |               |
| Insulation Class | E                           |               |

## Specialized Gearmotor

| Specifications                 | 25W ~ 40W | 0.1kW ~ 1.5kW      | 1.5kW |
|--------------------------------|-----------|--------------------|-------|
| Single Phase 100V 50/60Hz      | ○         | ○ (100W,200W only) | —     |
| Inverter Motor                 | —         | ○                  | ○     |
| Out door Use (IP55)            | —         | ○                  | ○     |
| 400V Class Voltage             | △*        | ○                  | ○     |
| Special Voltage                | —         | ○                  | ○     |
| Global Use (CCC,CE,UL)         | △*        | ○                  | —     |
| One touch brake manual release | —         | ○                  | ○     |
| Manual shaft                   | —         | ○                  | ○     |
| Rotary encoder                 | —         | ○                  | ○     |

\* Consult TEM

## Motor current value and brake current value

| Output and frame No. | Motor current value (A) |           |           | Brake model No. | Brake current value (A) |           |           |
|----------------------|-------------------------|-----------|-----------|-----------------|-------------------------|-----------|-----------|
|                      | 200V 50Hz               | 200V 60Hz | 220V 60Hz |                 | 200V 50Hz               | 200V 60Hz | 220V 60Hz |
| 4P - 25W             | 0.25                    | 0.22      | 0.23      |                 | 0.03                    | 0.03      | 0.03      |
| 4P - 40W             | 0.31                    | 0.29      | 0.28      |                 | 0.07                    | 0.07      | 0.08      |
| 4P - 0.1 kW          | 0.63                    | 0.57      | 0.58      | SLB01           | 0.178                   | 0.178     | 0.178     |
| 4P - 0.2 kW          | 1.2                     | 1.1       | 1.1       | SLB02           | 0.178                   | 0.178     | 0.178     |
| 4P - 0.75kW          | 3.8                     | 3.4       | 3.4       | SLB07           | 0.273                   | 0.273     | 0.273     |
| 4P - 1.5 kW          | 7.0                     | 6.2       | 6.0       | SLB15           | 0.289                   | 0.289     | 0.289     |

Note) 1. The above values are the rated current values of motors and brakes.

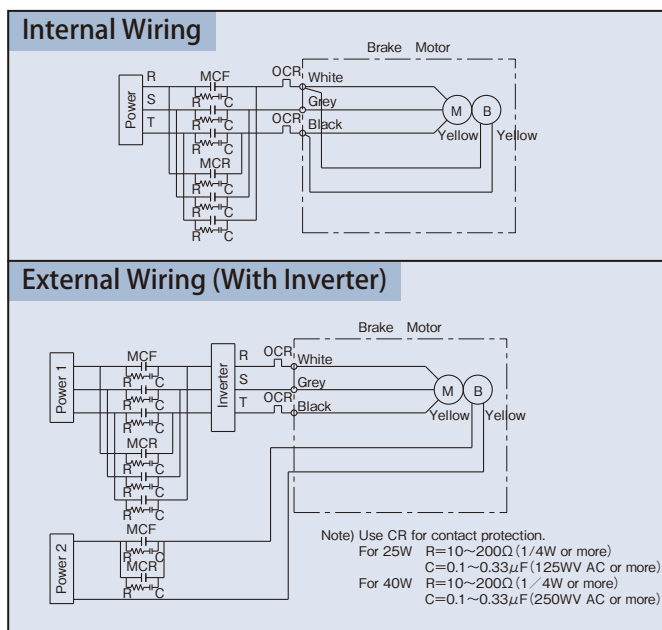
They are given for reference because they may differ according to the actually acting thrust, jack efficiency, etc.

2. The rated current values do not include brake current values.

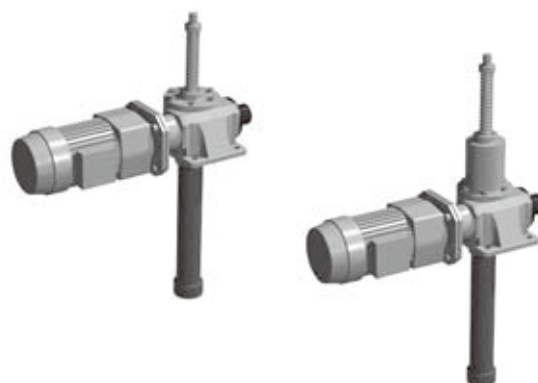
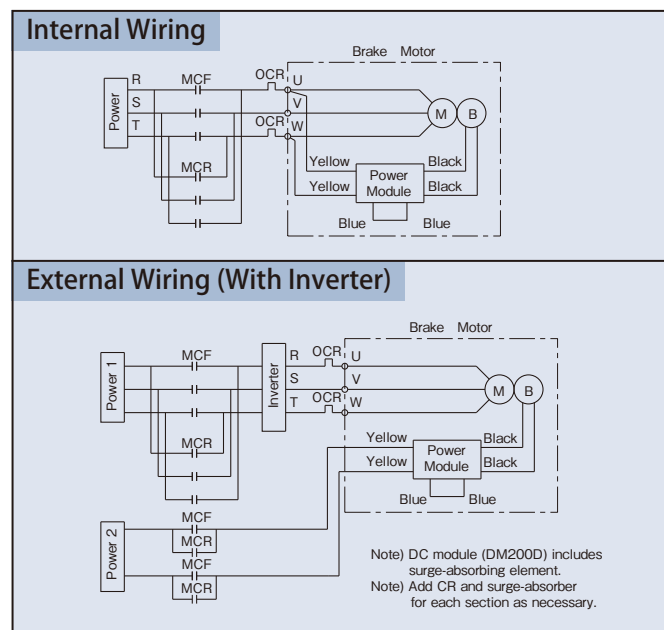
3. The brake current values show the values on the secondary side of the power supply module (0.1kW up to 1.5kW).

## Circuit Diagrams

### Circuit Diagrams for 25~40W



### Circuit Diagrams for 0.1~1.5kW



## With Motor JWM (Machine Screw Type)

| Model No. | Motor Weight | Jack Gear Ratio H            |                    |                              |                    |
|-----------|--------------|------------------------------|--------------------|------------------------------|--------------------|
|           |              | 50Hz (1500r/min)             |                    | 60Hz (1800r/min)             |                    |
|           |              | Shaft Speed<br>mm/min (mm/s) | Thrust<br>kN {kgf} | Shaft Speed<br>mm/min (mm/s) | Thrust<br>kN {kgf} |
| JWM025    | 0.2kW        | 1260 (21)                    | 1.96 {200}         | 1500 (25)                    | 1.66 {170}         |
|           | 0.4kW        | 1260 (21)                    | 4.02 {410}         | 1500 (25)                    | 3.33 {340}         |
|           | 0.75kW       | 1260 (21)                    | 7.55 {770}         | 1500 (25)                    | 6.27 {640}         |
|           | 1.5kW        | 1260 (21)                    | 10.0 {1020}        | 1500 (25)                    | 8.33 {850}         |
| JWM050    | 0.75kW       | 1980 (33)                    | 4.98 {508}         | 2400 (40)                    | 4.12 {420}         |
|           | 1.5kW        | 1980 (33)                    | 9.80 {1000}        | 2400 (40)                    | 8.23 {840}         |
| JWM100    | 2.2kW        | 1860 (31)                    | 15.5 {1580}        | 2280 (38)                    | 12.8 {1310}        |
|           | 3.7kW        | 1860 (31)                    | 19.6 {2000}        | 2280 (38)                    | 16.4 {1670}        |
| JWM150    | 2.2kW        | 1860 (31)                    | 14.0 {1430}        | 2280 (38)                    | 11.7 {1190}        |
|           | 3.7kW        | 1860 (31)                    | 19.8 {2020}        | 2280 (38)                    | 16.4 {1670}        |
| JWM200    | 2.2kW        | 2280 (38)                    | 11.7 {1190}        | 2700 (45)                    | 9.70 {990}         |
|           | 3.7kW        | 2280 (38)                    | 19.7 {2010}        | 2700 (45)                    | 16.4 {1670}        |

## With Motor JWB (Ball Screw Type)

| Model No. | Motor Weight | Jack Gear Ratio H            |                    |                              |                    |
|-----------|--------------|------------------------------|--------------------|------------------------------|--------------------|
|           |              | 50Hz (1500r/min)             |                    | 60Hz (1800r/min)             |                    |
|           |              | Shaft Speed<br>mm/min (mm/s) | Thrust<br>kN {kgf} | Shaft Speed<br>mm/min (mm/s) | Thrust<br>kN {kgf} |
| JWB025    | 0.2kW        | 1980 (33)                    | 3.72 {380}         | 2400 (40)                    | 3.13 {320}         |
|           | 0.4kW        | 1980 (33)                    | 7.45 {760}         | 2400 (40)                    | 6.27 {640}         |
|           | 0.75kW       | 1980 (33)                    | 14.0 {1430}        | 2400 (40)                    | 11.7 {1190}        |
|           | 1.5kW        | 1980 (33)                    | 24.4 {2490}        | 2400 (40)                    | 20.0 {2050}        |
| JWB050    | 0.75kW       | 2520 (42)                    | 11.6 {1180}        | 3000 (50)                    | 9.60 {980}         |
|           | 1.5kW        | 2520 (42)                    | 22.9 {2340}        | 3000 (50)                    | 19.1 {1950}        |
| JWB100    | 2.2kW        | 2280 (38)                    | 36.9 {3770}        | 2700 (45)                    | 30.8 {3140}        |
|           | 3.7kW        | 2280 (38)                    | 59.5 {6080}        | 2700 (45)                    | 50.3 {5140}        |
| JWB150    | 2.2kW        | 3000 (50)                    | 27.7 {2830}        | 3600 (60)                    | 23.0 {2350}        |
|           | 3.7kW        | 3000 (50)                    | 46.6 {4750}        | 3600 (60)                    | 38.7 {3950}        |
| JWB200    | 2.2kW        | 3000 (50)                    | 27.2 {2780}        | 3600 (60)                    | 22.6 {2310}        |
|           | 3.7kW        | 3000 (50)                    | 45.8 {4670}        | 3600 (60)                    | 38.1 {3890}        |

## With Motor JWH (High Lead Ball Screw Type)

| Model No. | Motor Weight | Jack Gear Ratio H            |                    |                              |                    |
|-----------|--------------|------------------------------|--------------------|------------------------------|--------------------|
|           |              | 50Hz (1500r/min)             |                    | 60Hz (1800r/min)             |                    |
|           |              | Shaft Speed<br>mm/min (mm/s) | Thrust<br>kN {kgf} | Shaft Speed<br>mm/min (mm/s) | Thrust<br>kN {kgf} |
| JWH025    | 0.4kW        | 6240 (104)                   | 2.45 {250}         | 7500 (125)                   | 2.06 {210}         |
|           | 0.75kW       | 6240 (104)                   | 4.70 {480}         | 7500 (125)                   | 3.92 {400}         |
|           | 1.5kW        | 6240 (104)                   | 9.31 {950}         | 7500 (125)                   | 7.74 {790}         |
| JWH050    | 0.75kW       | 6240 (104)                   | 4.90 {500}         | 7500 (125)                   | 4.12 {420}         |
|           | 1.5kW        | 6240 (104)                   | 9.70 {990}         | 7500 (125)                   | 8.13 {830}         |
| JWH100    | 2.2kW        | 6000 (100)                   | 14.3 {1460}        | 7200 (120)                   | 11.9 {1210}        |
|           | 3.7kW        | 6000 (100)                   | 24.0 {2450}        | 7200 (120)                   | 20.0 {2040}        |
| JWH150    | 2.2kW        | 6000 (100)                   | 14.3 {1460}        | 7200 (120)                   | 11.9 {1210}        |
|           | 3.7kW        | 6000 (100)                   | 24.0 {2450}        | 7200 (120)                   | 20.0 {2040}        |
| JWH200    | 2.2kW        | 6000 (100)                   | 14.0 {1430}        | 7200 (120)                   | 11.7 {1190}        |
|           | 3.7kW        | 6000 (100)                   | 23.6 {2410}        | 7200 (120)                   | 19.7 {2010}        |

|  |                 |
|--|-----------------|
|  | : Standard      |
|  | : Rush Order    |
|  | : Made-to-Order |

\* Other shaft speeds and thrusts also available.

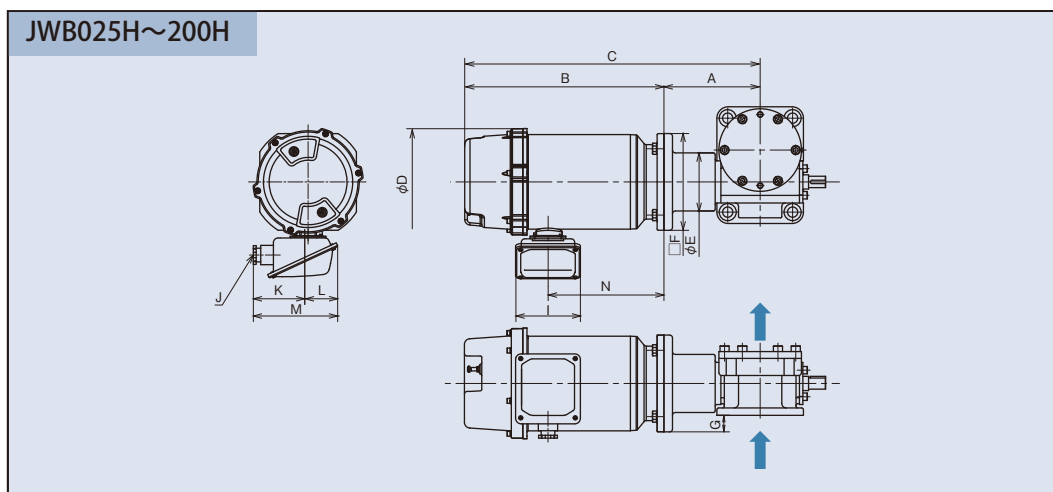
\* Values in striped cells indicate thrust rates that exceed allowable capacities. Be sure to adjust thrust to below these rates.

\* These thrust rates do not take allowable buckling rates into account. Consider as necessary.

\* As for worm ratio L, consult TEM.

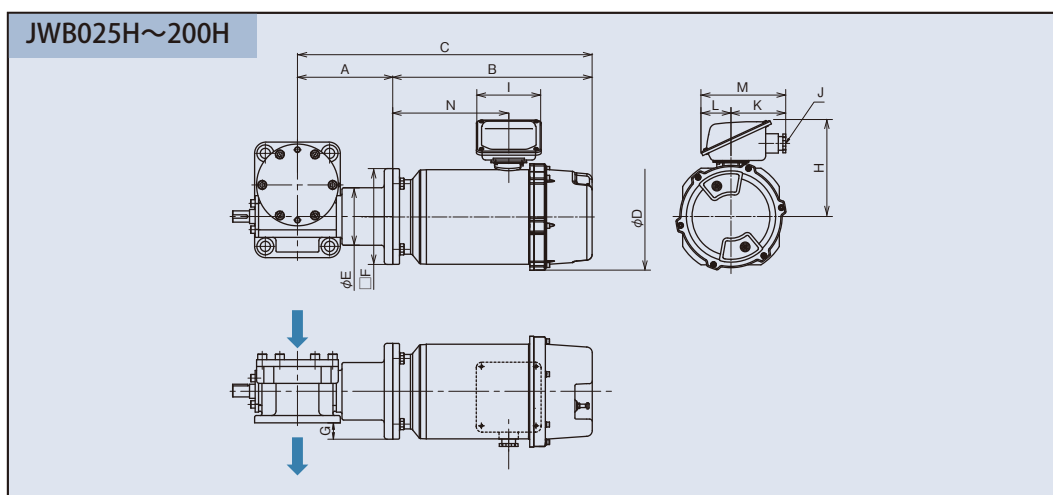
## Outline Drawings for Motored Jacks

### Standard Gearmotor Mounting



Note) For standard (US, DS) and rotation prevention types (UM, DM), screw shafts will lift in the direction of with normal wiring.  
For travel nut types (UR, DR), nuts will lift in the direction of with normal wiring.

### Gearmotor Mounting on the Opposite Side



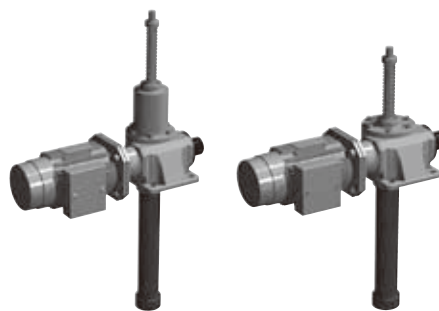
Note) For standard (US, DS) and rotation prevention types (UM, DM), screw shafts will lift in the direction of with normal wiring.  
For travel nut types (UR, DR), nuts will lift in the direction of with normal wiring.

Unit: mm

| Frame No. | Motor Weight | A   | B   | C   | D   | E   | F   | G  | H   | I   | J             | K   | L  | M   | N   |
|-----------|--------------|-----|-----|-----|-----|-----|-----|----|-----|-----|---------------|-----|----|-----|-----|
| JW025     | 0.2kW        | 132 | 231 | 363 | 132 | 95  | 120 | 15 | 125 | 84  | SK-14L(PF1/2) | 79  | 45 | 124 | 112 |
|           | 0.4kW        | 139 | 253 | 392 | 132 | 95  | 120 | 15 | 125 | 84  | SK-14L(PF1/2) | 79  | 45 | 124 | 134 |
|           | 0.75kW       | 146 | 289 | 435 | 180 | 102 | 170 | 40 | 166 | 114 | A20C(PF3/4)   | 106 | 49 | 155 | 145 |
|           | 1.5kW        | 146 | 351 | 497 | 194 | 102 | 170 | 40 | 178 | 114 | A20C(PF3/4)   | 106 | 49 | 155 | 204 |
| JW050     | 0.75kW       | 169 | 289 | 458 | 180 | 102 | 170 | 29 | 166 | 114 | A20C(PF3/4)   | 106 | 49 | 155 | 145 |
|           | 1.5kW        | 169 | 351 | 520 | 194 | 102 | 170 | 29 | 178 | 114 | A20C(PF3/4)   | 106 | 49 | 155 | 204 |
| JW100     | 2.2kW        | 207 | 381 | 588 | 207 | 131 | 200 | 44 | 178 | 114 | A25C(PF1)     | 110 | 49 | 159 | 213 |
|           | 3.7kW        | 207 | 414 | 621 | 229 | 144 | 200 | 44 | 189 | 114 | A25C(PF1)     | 110 | 49 | 159 | 239 |
| JW150     | 2.2kW        | 211 | 381 | 592 | 207 | 131 | 200 | 44 | 178 | 114 | A25C(PF1)     | 110 | 49 | 159 | 213 |
|           | 3.7kW        | 211 | 414 | 625 | 229 | 144 | 200 | 44 | 189 | 114 | A25C(PF1)     | 110 | 49 | 159 | 239 |
| JW200     | 2.2kW        | 231 | 381 | 612 | 207 | 131 | 200 | 15 | 178 | 114 | A25C(PF1)     | 110 | 49 | 159 | 213 |
|           | 3.7kW        | 231 | 414 | 645 | 229 | 144 | 200 | 15 | 189 | 114 | A25C(PF1)     | 110 | 49 | 159 | 239 |

## Motor Specifications

| Output           | 0.2kW~0.4kW                                     | 0.75kW~3.7kW |
|------------------|-------------------------------------------------|--------------|
| Power Source     | 200/200/220V<br>400/400/440V                    |              |
| Frequency        | 50/60/60Hz                                      |              |
| Pole             | 4P                                              |              |
| Phase            | 3 Phase                                         |              |
| Protection       | IP55                                            |              |
| Rating           | S2 30min                                        |              |
| Insulation Class | E (B for 400V)                                  |              |
| With Brake       | Electromagnetic Brake (DC, non-excitation type) |              |



## Motor current value and brake current value

| Output and frame No. | Motor current value (A) |               |               |                |                |                | Brake model No. | Brake current value (A) |              |              |              |              |              |
|----------------------|-------------------------|---------------|---------------|----------------|----------------|----------------|-----------------|-------------------------|--------------|--------------|--------------|--------------|--------------|
|                      | 200V<br>50Hz            | 200V<br>60Hz  | 220V<br>60Hz  | 400V<br>50Hz   | 400V<br>60Hz   | 440V<br>60Hz   |                 | 200V<br>50Hz            | 200V<br>60Hz | 220V<br>60Hz | 400V<br>50Hz | 400V<br>60Hz | 440V<br>60Hz |
| 4P - 0.2 kW          | 1.3<br>(4.91)           | 1.1<br>(4.68) | 1.1<br>(5.14) | 0.63<br>(2.40) | 0.55<br>(2.22) | 0.56<br>(2.41) | SBH02LP         | 0.17<br>0.26            | 0.17<br>0.26 | 0.17<br>0.28 | 0.17<br>0.26 | 0.17<br>0.26 | 0.17<br>0.28 |
| 4P - 0.4 kW          | 2.4<br>(11.6)           | 2.1<br>(10.2) | 2.1<br>(11.0) | 1.2<br>(5.14)  | 1.1<br>(4.88)  | 1.1<br>(5.39)  | SBH04LP         | 0.17<br>0.26            | 0.17<br>0.26 | 0.17<br>0.28 | 0.17<br>0.26 | 0.17<br>0.26 | 0.17<br>0.28 |
| 4P - 0.75 kW         | 3.9<br>(24.0)           | 3.5<br>(22.0) | 3.4<br>(24.0) | 1.9<br>(12.0)  | 1.7<br>(11.0)  | 1.7<br>(12.0)  | SLB07LP         | 0.21<br>0.28            | 0.21<br>0.28 | 0.23<br>0.31 | 0.11<br>0.15 | 0.11<br>0.15 | 0.12<br>0.16 |
| 4P - 1.5 kW          | 6.5<br>(49.0)           | 6.1<br>(45.0) | 5.8<br>(50.0) | 3.2<br>(24.5)  | 3.1<br>(22.5)  | 2.9<br>(25.0)  | SLB15LP         | 0.22<br>0.29            | 0.22<br>0.29 | 0.24<br>0.32 | 0.11<br>0.15 | 0.11<br>0.15 | 0.12<br>0.16 |
| 4P - 2.2 kW          | 9.6<br>(67.0)           | 9.0<br>(59.0) | 8.6<br>(64.9) | 4.8<br>(33.5)  | 4.5<br>(29.5)  | 4.3<br>(32.5)  | TB-A2.2         | 0.25<br>0.34            | 0.25<br>0.34 | 0.25<br>0.34 | 0.13<br>0.17 | 0.13<br>0.17 | 0.13<br>0.17 |
| 4P - 3.7 kW          | 15.2<br>(122)           | 14.2<br>(104) | 13.6<br>(114) | 7.6<br>(61.0)  | 7.2<br>(51.8)  | 6.8<br>(57.0)  | TB-A3.7         | 0.34<br>0.44            | 0.34<br>0.44 | 0.34<br>0.44 | 0.17<br>0.22 | 0.17<br>0.22 | 0.17<br>0.22 |

Note) 1. The above values are rated current values of the motor and brake. A numerical value in parentheses is a start current value of the motor.

2. The rated current values and start current values do not include a brake current value.

3. A DC brake is used as a brake. The upper stage of the brake current value indicates a value on the primary side of the power module, and the lower stage indicates a value on the secondary side.

4. The above values are references because the rated current values for the power cylinder vary depending on operating conditions.

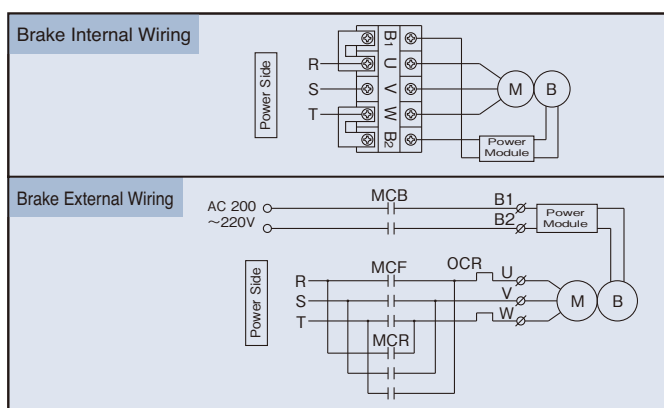
5. For simultaneous turnoff of 0.1kW to 0.4kW, 400V class, the voltage is converted to 200V through the motor intermediate tap to be input. For individual turnoff, decrease the voltage to 200 to 220V by a transformer. The capacity of the transformer capacity shall be 90VA or more.

6. For individual turnoff of 0.75kW or more, 400V class, the DC module is applicable for 400V class, therefore, it is unnecessary to decrease the voltage.

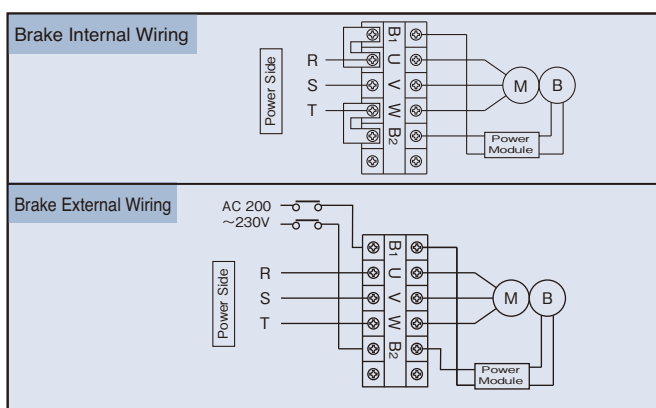
7. For 0.75kW and 1.5kW of 400V class, the brake model Nos. are "SLB07LPV" and "SLB15LPV," respectively.

## Circuit Diagrams

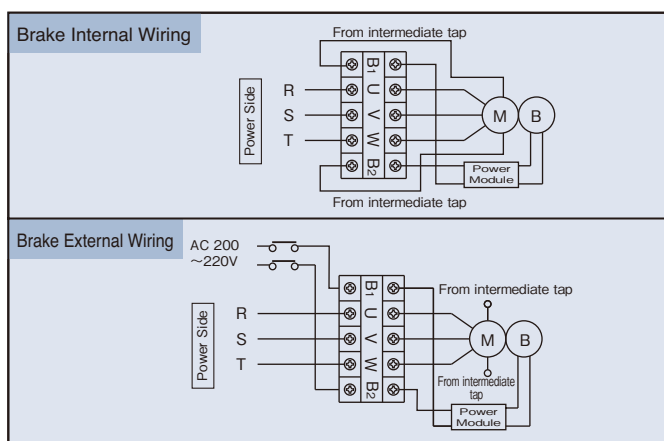
### Circuit Diagrams for 0.2~0.4kW(200V)



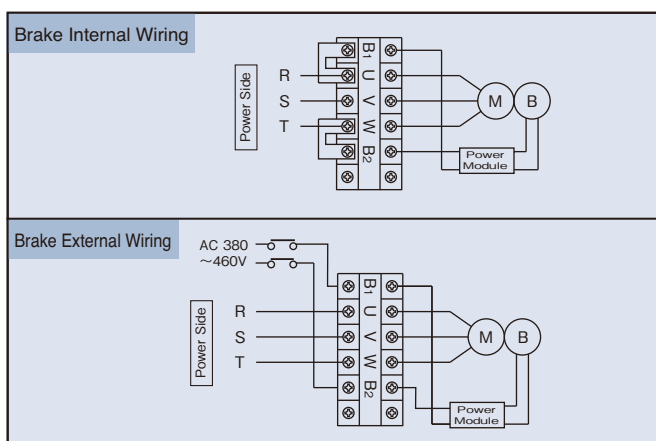
### Circuit Diagrams for 0.75~3.7kW(200V)



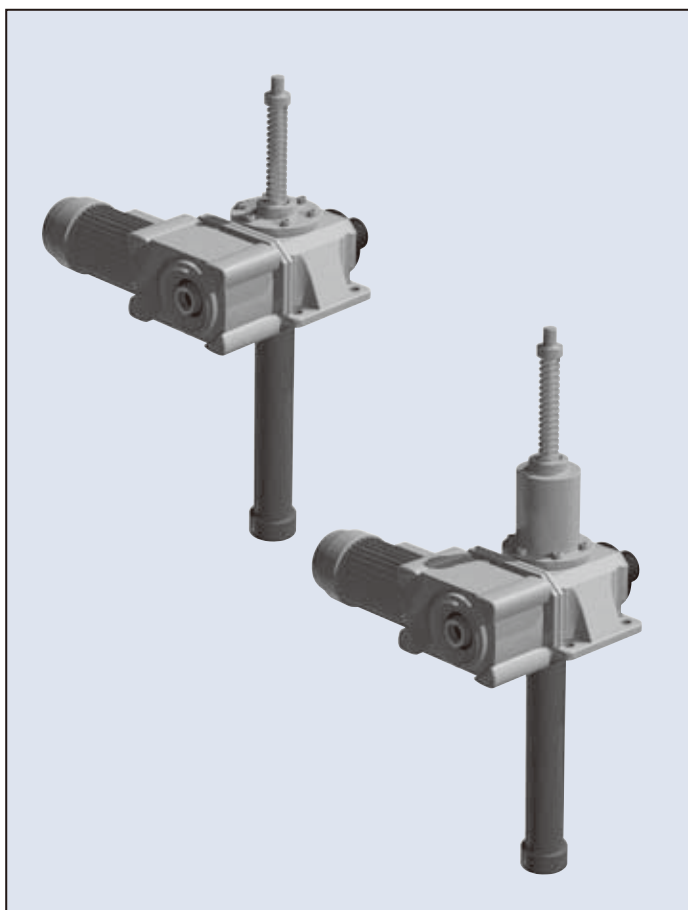
### Circuit Diagrams for 0.2~0.4kW(400V)



### Circuit Diagrams for 0.75~3.7kW(400V)



## Hypoid Motor Type

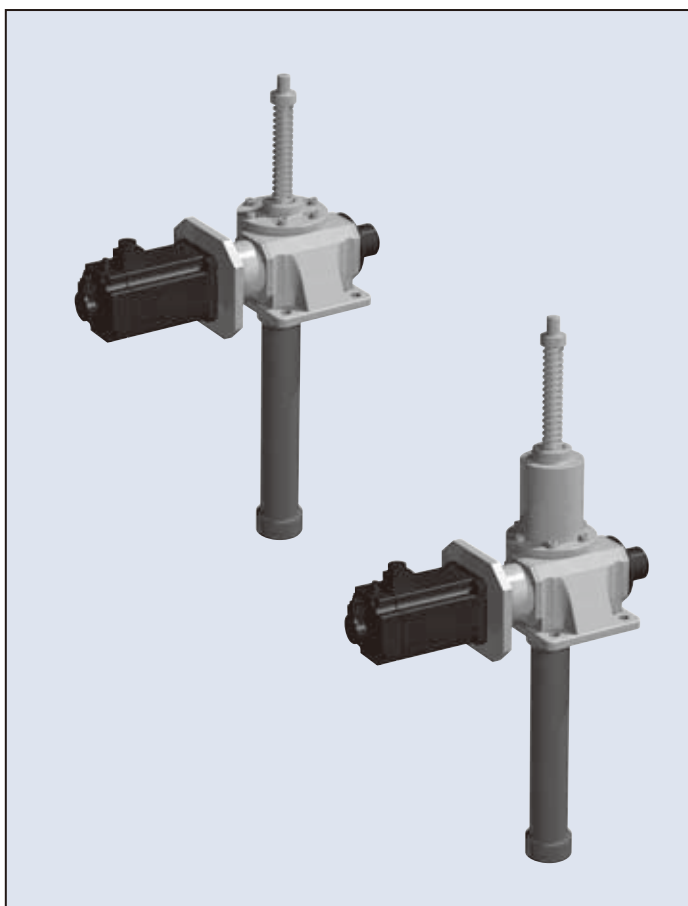


### Notes

1. TSUBAKI E&M compact Hypoid Motor is a space saver.
2. To install, the Hypoid Motor can be adjusted at 90° intervals from the input shaft, based on specific applications.

\* Hypoid Motor is a space saving right-angle reducer with high starting and running efficiencies. (Another TSUBAKI E&M product)

## Servo Motor Type

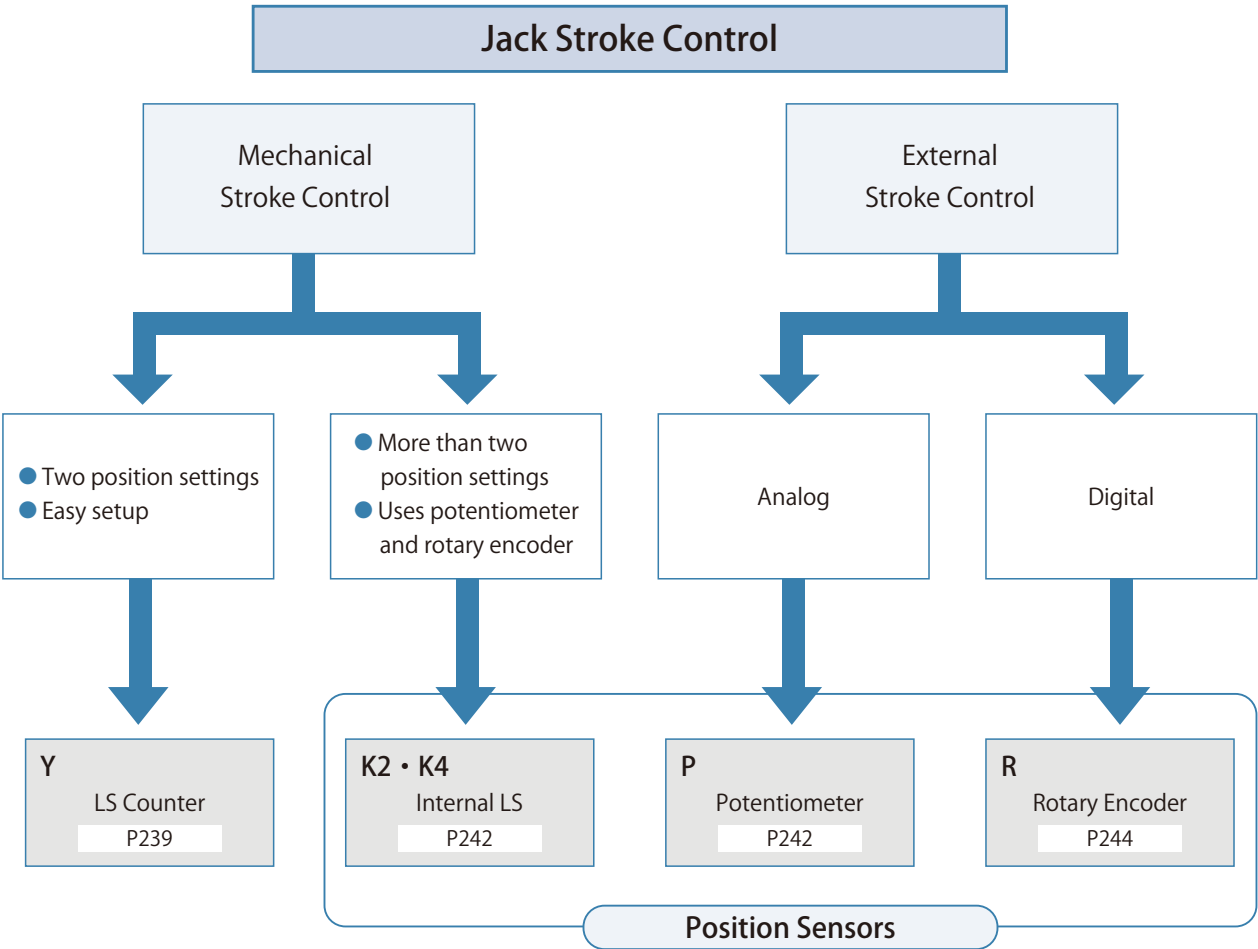


### Notes

1. Allows complete control of screw shaft speed.
2. Allows accurate control of stopping.
3. Allows accurate control of force applied to the jack.
4. Maintains load with Servo Lock function.
5. Operates multiple jack systems without mechanical connections.
6. Compatible with any brand of servo motor.

# Jack Control System

We offer various stroke control options to suit your specific needs and conditions. Select from a limit switch, analog device with potentiometer, and digital device with an encoder.



Note) LS Counter and position sensor cannot be used together. If a limit switch is required in addition to a potentiometer or rotary encoder, be sure to use the Internal LS.



LS Counter



Position Sensor

\*Above is a standard model. Installation of input shaft on the opposite side is also possible.  
Note) LS Counters and position sensors with motor or gearmotors cannot be used for manual operations, due to both sides of the manual shaft being occupied.

## LS Counter

A compact stroke adjusting device as well as a detection unit that combines a cam mechanism with a microswitch. It can be mounted directly to the input shaft of a jack, and mechanical positioning of upper and lower limits of strokes can easily be performed. Stroke control can be performed only by setting the stop position by the reset button. This economy-type limit switch allows for easy adjustment.

## Position Sensor

- |                                                                                                                          |   |                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------|---|----------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>(1) Internal LS</li> <li>(2) Potentiometer</li> <li>(3) Rotary Encoder</li> </ul> | } | <p>3 options are available based on specific needs.</p> <p>A combination of all 3 is also available.</p> |
|--------------------------------------------------------------------------------------------------------------------------|---|----------------------------------------------------------------------------------------------------------|

### (1) Internal LS

Can be used in addition to a potentiometer and rotary encoder, and is effective under dusty conditions. 2 or 4 microswitch types available. (K2 or K4)

### (2) Potentiometer

Comes with a convenient meter that displays stroke range, and allows full adjustment of stroke. It also measures changes in stroke resistance. Below are options available with a potentiometer.

- Stroke display meter (PCB provided)
- Meter relay (PCB provided)

### (3) Rotary Encoder

Digital signal of Sequencer or PLC (programmable controller) allows you to control jack stroke.

Open collector and line driver output power sources are available.

The following option is possible with a rotary encoder.

## LS Counter

A Limit Switch that uses a mechanical counter to accurately measure and adjust stroke at small intervals. It can be mounted directly to the input shaft. Use two counters and limit switches to control both the upper and lower travel limits. Its one-touch reset button also allows you to stop or reset stroke at any time.

**Note)** LS Counters cannot be used with a rotary encoder or potentiometer. Rotary encoders and potentiometers must be used with a position detection unit (with internal LS).

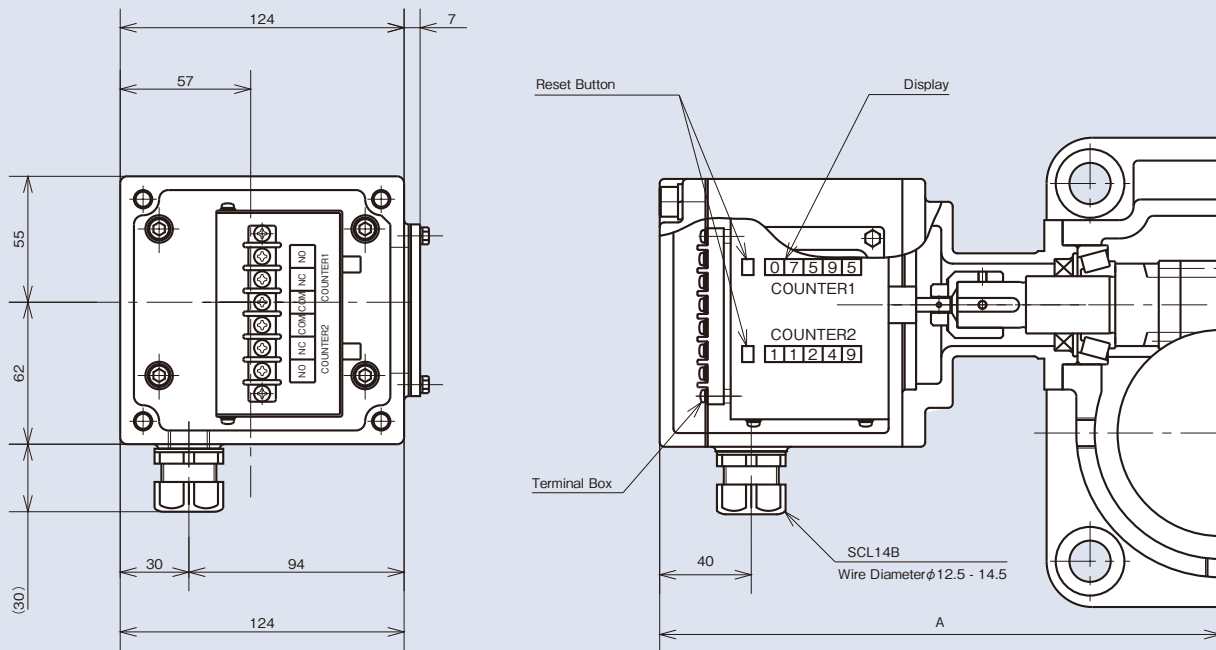
| Form                          | Mechanical Counter                 |
|-------------------------------|------------------------------------|
| No. of Counter Digits         | 5 (1 Count/Input Shaft Revolution) |
| Allowable Max. Input Rotation | 1800r/min                          |
| Limit Switch Used             | AVT3254 (Matsushita Electronics)   |
| Contact Composition           | 1 C (Max. and Min. 1 pt. each)     |
| Power Voltage                 | 250V AC 3A                         |
| Ambient Temperature           | −5 to 40°C                         |

\* LS is not factory adjusted and requires initial setting before use.

\* Take caution so as to avoid water from contacting internal parts while adjusting.

When the limit switch is working, the numbers displayed on the LS Counter unit changes from 00000 to 99999 (or 99999 to 00000).

### ■ Dimensions and Features



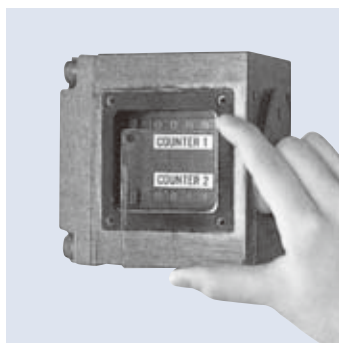
\* The above installation position (left of input shaft) is standard.

Unit: mm

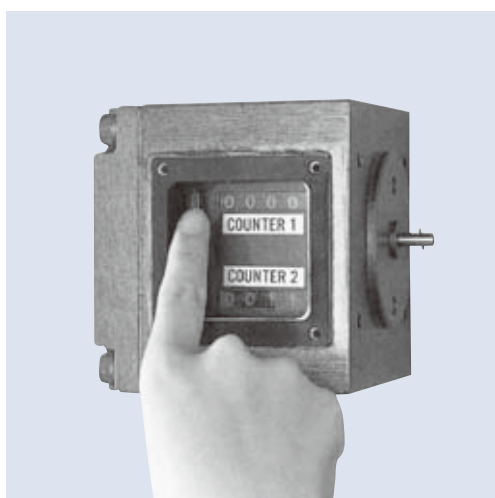
| Frame No. | 002 | 005 | 010 | 025 | 050 | 100 | 150 | 200 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|
| A         | 187 | 187 | 211 | 220 | 245 | 271 | 275 | 280 |

## Setting the LS Counter

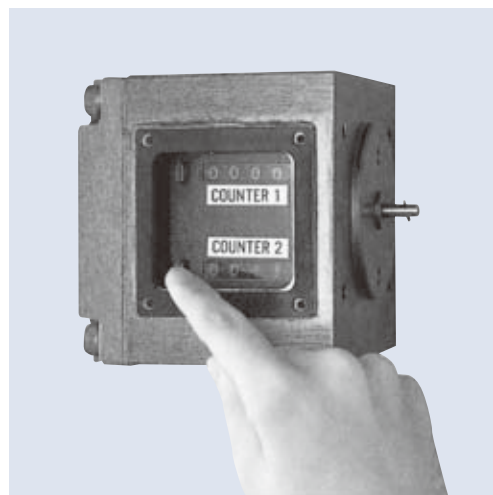
Setting the limit switch is as easy as 1 ~ 6 below.



1. Remove cover.



2. Set jack at desired maximum and minimum positions manually or by inching.
3. Press the counter reset button.  
(The display will show 00000 and measure from this position.)
4. Confirm by moving the jack and then returning it to the set position. Limit switch is now activated.



5. Next, set the jack at another position and confirm in the same manner.



6. Replace cover.

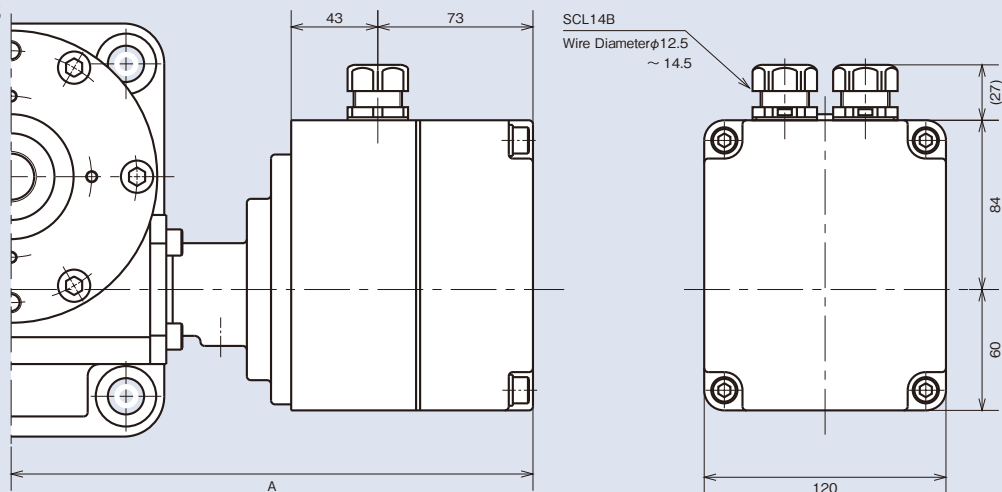
Note) Turning the shaft or travel nut after adjustment will change the setting.

## Position Sensors

3 kinds of position sensors are available.

- ① Internal LS (2 or 4)
- ② Potentiometer
- ③ Rotary Encoder

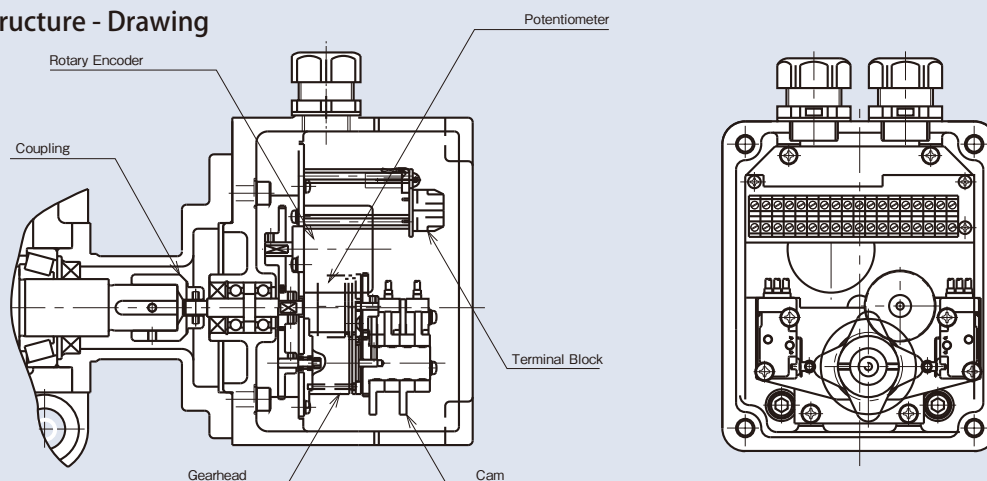
### ■Dimensions



Unit: mm

| Frame No. | JWM 002 | JWM JWB 005 | JWM JWB 010 JWH | JWM JWB 025 JWH | JWM JWB 050 JWH | JWM JWB 100 JWH | JWM JWB 150 JWH | JWM JWB 200 JWH |
|-----------|---------|-------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| A         | 197     | 197         | 222             | 230             | 255             | 281             | 285             | 290             |

### ■Internal Structure - Drawing



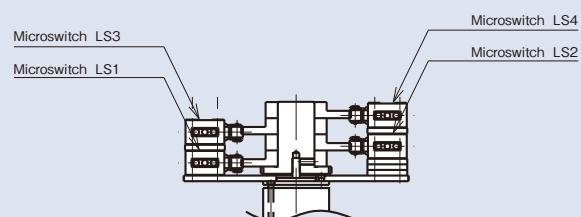
#### Position detection unit wiring

To connect internal LS, potentiometer or rotary encoder, use the terminal block installed in the unit.

Use a shield wire in wiring a rotary encoder.



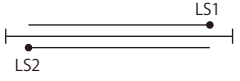
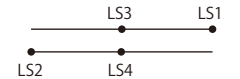
Terminal No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

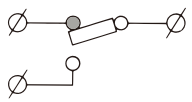


| Option       | Internal LS (K2,K4) |    |     |   |     |    |     |   |        | Potentiometer |   |   | Rotary Encoder |    |    |        |    |      |
|--------------|---------------------|----|-----|---|-----|----|-----|---|--------|---------------|---|---|----------------|----|----|--------|----|------|
| Symbol       | LS1                 |    | LS2 |   | LS3 |    | LS4 |   | Common | P             |   |   | R              |    |    |        |    |      |
| Contact      | a                   | b  | a   | b | a   | b  | a   | b | c      | 1             | 2 | 3 | 1              | 2  | Z  | +5~24V | 0V | Case |
| Terminal No. | 18                  | 17 | 5   | 6 | 16  | 15 | 7   | 8 | 4      | 1             | 2 | 3 | 9              | 10 | 11 | 12     | 13 | 14   |

## ① Internal LS

- K2……Arrange microswitches LS1 and LS2 as shown below.
- K4……Arrange microswitches LS1, LS2, LS3, LS4 as shown below.

|                                     | Option Symbol | Example                                                                           |                                                                                                     |
|-------------------------------------|---------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Position Detection Unit Internal LS | K2            |  | Both ends fixed                                                                                     |
| Position Detection Unit Internal LS | K4            |  | Forward:<br>Fixed at midway position. Fixed end.<br>Return:<br>Fixed at midway position. Fixed end. |

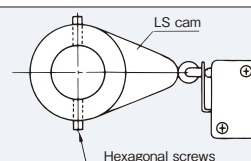
| Model No.            | D2VW-5L2A-1M Equivalent                                                                   |
|----------------------|-------------------------------------------------------------------------------------------|
| Electric Composition | 250V AC 4A (cosφ0.7)                                                                      |
| Contact Composition  | 1C<br> |

### 〈LS Setting〉

Consider inertia when adjusting LS Cam.

To adjust LS Cam, use a hexagonal wrench and loosen the hexagonal screws (2).

\*LS is not factory adjusted.



## ② Potentiometer

Potentiometers are programmed to activate within effective angles.

Do not rotate the input shaft before installing the screw shaft to your equipment. This can shift the stroke phase.

Note that the output resistance value varies depending on each frame No. and each stroke.

Total resistance value is 1.0 kΩ, however, depending on the stroke, approximately 1/3 of the total resistance value may be output according to the rotation angle, therefore, confirm it before use.

| Model No.                   | CP-30 Equivalent     |
|-----------------------------|----------------------|
| Maker                       | Sakae Tsushin Kogyou |
| Maximum Resistance          | 1.0kΩ                |
| Rated Power                 | 0.75W                |
| Dielectric Strength Voltage | 1000V AC (1min)      |
| Effective Electrical Angle  | 355°                 |
| Effective Mechanical Angle  | 360° Endless         |



### Potentiometer Control Option 1

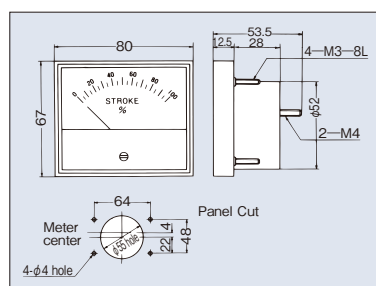
#### ■ Stroke Display Meter

Displays stroke in % by receiving signals from the Printed Circuit Board.

Jack models with a potentiometer should be used.

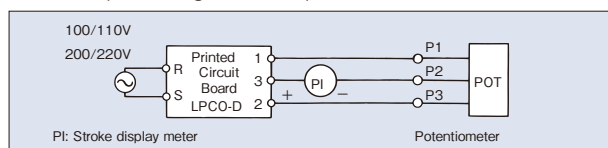
| Model No.  | RM-80B (100μA DC) Equivalent |
|------------|------------------------------|
| Class      | JIS C 1102 2.5               |
| Exterior   | Black Frame                  |
| Scale Used | Maximum Stroke 100%          |

\* A separate printed board is also required.



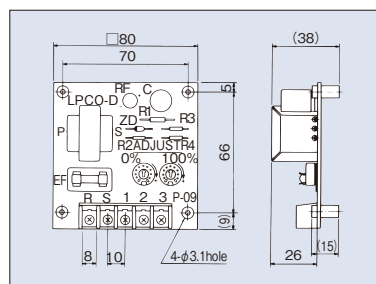
#### ■ Printed Circuit Board

Converts power signals from potentiometer into currents.



In order to adjust the meter, adjust the volume on the printed circuit board. Do not confuse - and +. When adjusting the meter to 100% while stroke is at MIN, replace the terminal 1.2 of the printed circuit board.

Model no. LPCO-D1 (voltage 100/110V 50/60Hz)  
LPCO-D2 (voltage 200/220V 50/60Hz)

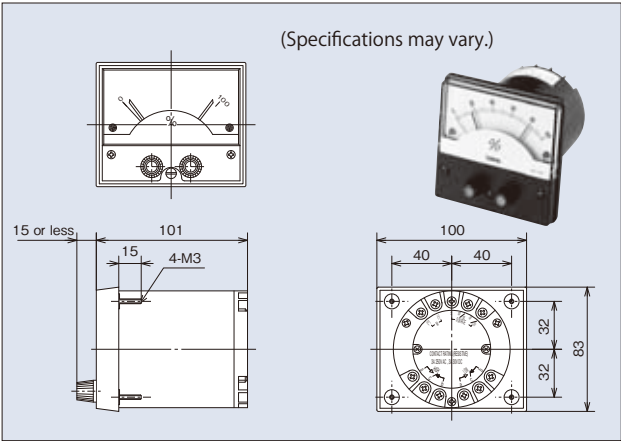


Potentiometer Control Option 2

Meter Relay

Easy stroke adjustment is possible using the display panel.  
(Standard model comes with a metal panel.  
Aluminum panels are available upon request.)

Note) For using 4 – 20mA output, designate as "for 4 – 20mA output."  
\* A separate printed board is also required.

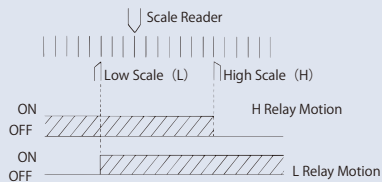


| Model No.                  | NRC-100HL (TSURUGA) or Equivalent   |
|----------------------------|-------------------------------------|
| Class                      | JIS C1102 2.5                       |
| Exterior                   | Black Frame                         |
| Scale                      | Maximum Stroke 100%                 |
| Power                      | 100/100V AC 200/220V AC 50/60 Hz    |
| Input                      | Maximum 100 μA DC                   |
| Output Contact Composition | High, Low both 1C (see graph below) |
| Contact Capacity           | 250V AC 3A (cos φ=1)                |

Use Linipower Jack models with a potentiometer. Take caution so that the input shaft does not rotate while the shaft and the potentiometer are not fully connected. This can shift the phase of the stroke.  
Once the maximum and minimum stroke positions are roughly set using the LS, use the meter relay thereafter.

<Relay> (Brake Contact)

Wiring is the same as that for a stroke display meter. However, a separate power source is necessary for the relay. Supply power from the main source used for operation and connect brakes contact in series rather than arranging them in a parallel method.



### ③Rotary Encoder

| Rotary encoder specifications |                                                                   |                    |
|-------------------------------|-------------------------------------------------------------------|--------------------|
| Model                         | TS5305N251                                                        |                    |
| Manufacturer                  | Tamagawa Seiki Co., Ltd.                                          |                    |
| Output pulse number           | 600P/R                                                            |                    |
| Output waveform               | 90° phase difference two-phase square wave + home position output |                    |
| Output voltage                | H                                                                 | — Note 1)          |
|                               | L                                                                 | 1V or less Note 1) |
| Power supply                  | 5 to 24V DC                                                       |                    |

The output signal of the standard specification is of an incremental type, however, an absolute type is also available.

The output type in standard specifications is open collector.

If voltage output type is required, see (Note 1) below.

If the specification of line driver output is required, contact us.

Note 1) Due to the open collector output, output signals are obtained when the pull-up resistor is connected.

Signal 1 and signal 2 are output voltages of H "(power supply voltage – 1)V or more" and L "1V or less."

For the Z-phase, negative logic applies.

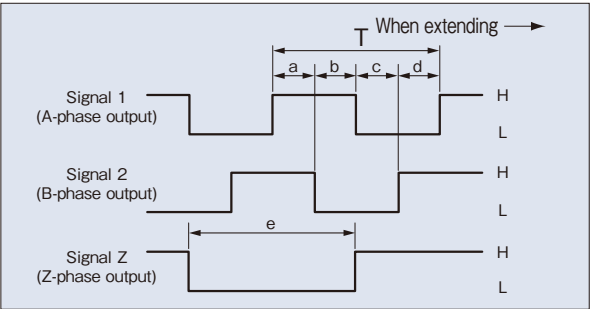
<Reference resistance values> 5V: 220Ω, 12V: 470Ω, 24V: 1kΩ

#### Output connection

| Signal 1 | Signal 2 | Signal Z | +5V to 24V | 0V   | Case |
|----------|----------|----------|------------|------|------|
| (9)      | (10)     | (11)     | (12)       | (13) | (14) |

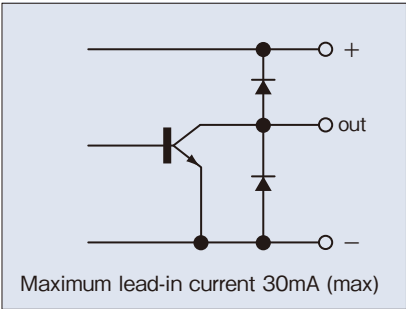
Figures in parentheses indicate terminal No.

#### Output waveform



a. b. c. d =  $T/4 \pm T/8$   $T/2 \leq e \leq 3T/2$

#### Output circuit



\* Best suited to controlling the stroke by a sequencer or programmable controller, etc.

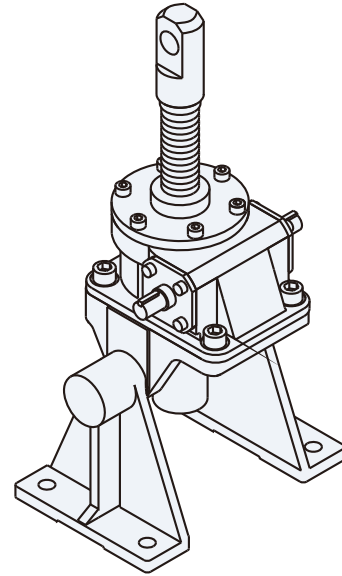
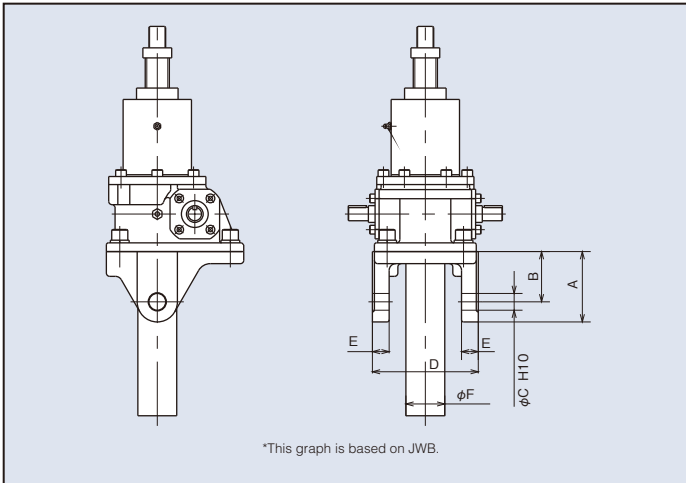
More accurate positioning control is possible in combination with motor speed control by an inverter, etc.

- ① The standard products incorporate an incremental type encoder.
  - ② It has been set to output 300 pulses per revolution of the input shaft.
  - ③ It is possible to set an accurate home position of the machine in combination with a limit switch because home position output is read out every 600 pulses.
  - ④ Do not apply vibration or impact to the rotary encoder because it is precision equipment.
  - ⑤ Use shield wire for wiring to the rotary encoder.
  - ⑥ As a guide for the distance between the rotary encoder and control panel, a collector current of 20mA should be able to be transmitted approximately 50m (12V pull-up).
- For distances other than the above, consult with us.

## Clevis and Trunnion Mounting Adapters

### 1. Clevis Mounting Adapter

Convenient for use with opening/closing or tilting devices.



#### Clevis Measurements

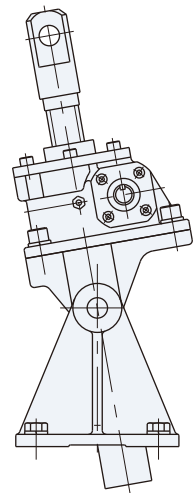
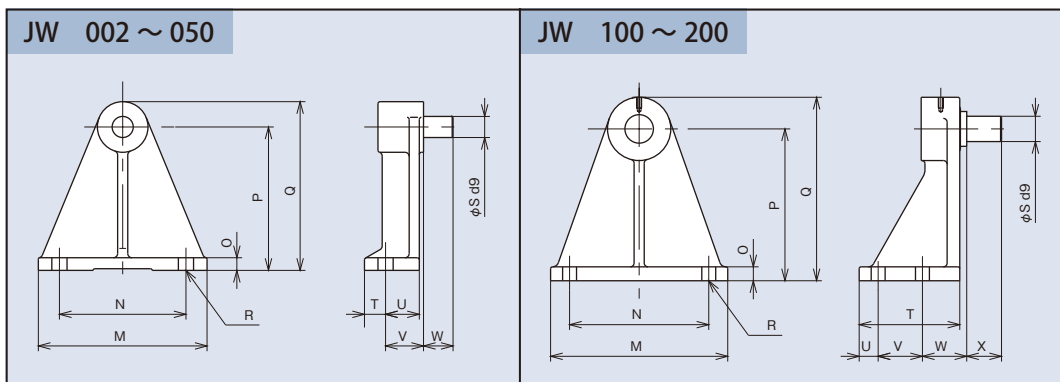
Unit: mm

| Frame No. | A    | B   | C  | D   | E  | ϕF   |
|-----------|------|-----|----|-----|----|------|
| 002       | 75   | 60  | 15 | 64  | 12 | 25   |
| 005       | 75   | 60  | 15 | 64  | 12 | 25   |
| 010       | 77.5 | 60  | 15 | 86  | 15 | 35   |
| 025       | 100  | 75  | 20 | 115 | 20 | 45   |
| 050       | 105  | 75  | 25 | 158 | 25 | 58   |
| 100       | 145  | 100 | 40 | 201 | 30 | 76.3 |
| 150       | 155  | 105 | 50 | 224 | 44 | 76.3 |
| 200       | 173  | 110 | 63 | 244 | 50 | 89.1 |

Note) Although standard clevis mounting adapters are for lifting, suspending types are also available.  
 Note) Clevis mounting adapters for rotation prevention are also available in different configurations.

### 2. Trunnion Mounting Adapter

This trunnion mounting adapter is the same as those for power cylinders.



#### Trunnion Measurements

Unit: mm

| Frame No. | Trunnion Model No.s | M   | N   | O  | P   | Q     | R     | S  | T   | U  | V  | W  | X  |
|-----------|---------------------|-----|-----|----|-----|-------|-------|----|-----|----|----|----|----|
| 002       | LPD300KT-T          | 130 | 100 | 12 | 100 | 118.5 | 2-ϕ12 | 15 | 15  | 28 | 30 | 15 | —  |
| 005       | LPD300KT-T          | 130 | 100 | 12 | 100 | 118.5 | 2-ϕ12 | 15 | 15  | 28 | 30 | 15 | —  |
| 010       | LP500L-T            | 180 | 130 | 15 | 150 | 178   | 2-ϕ18 | 15 | 25  | 40 | 45 | 17 | —  |
| 025       | LPTB1000-T          | 180 | 130 | 15 | 150 | 178   | 2-ϕ18 | 20 | 25  | 40 | 45 | 30 | —  |
| 050       | LPTB2000-T          | 200 | 150 | 15 | 170 | 200   | 2-ϕ18 | 25 | 25  | 40 | 45 | 35 | —  |
| 100       | LPTB6000-T          | 280 | 220 | 22 | 240 | 290   | 4-ϕ22 | 40 | 159 | 30 | 70 | 70 | 55 |
| 150       | LPTB12000-T         | 360 | 280 | 27 | 300 | 360   | 4-ϕ33 | 50 | 195 | 40 | 85 | 85 | 70 |
| 200       | LPTB16000-T         | 400 | 320 | 30 | 380 | 450   | 4-ϕ33 | 63 | 210 | 40 | 90 | 90 | 75 |

## Hand Wheel and Fitting

### 1. Hand Wheel

Hand wheels are available for Linipower Jack so that it can be easily used for manual operation.

Types of hand wheels and applicable jack frame No. are as follows.

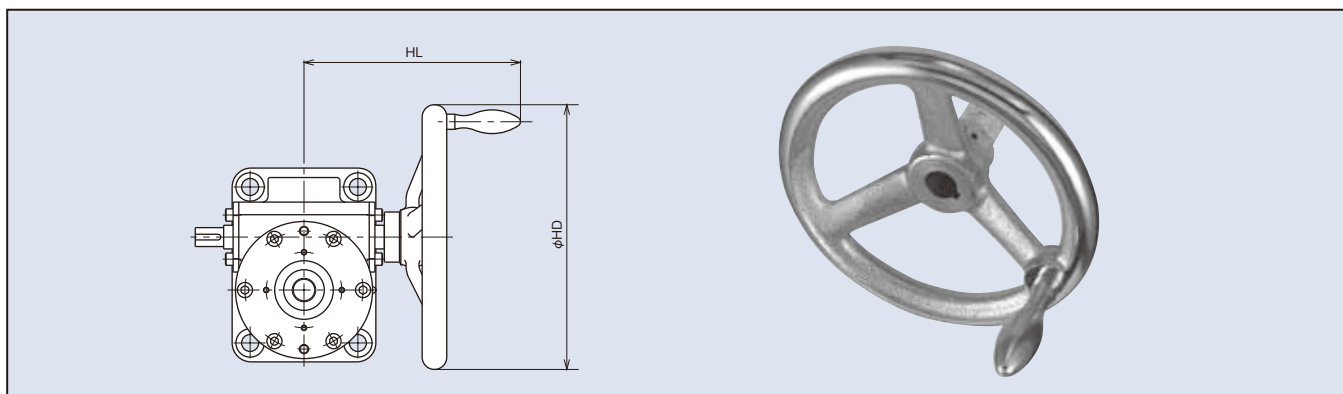
Hand wheels are used for self-lock equipped JWM (Machine Screw Type) only.

Hand wheels are not available for JWB (ball screw type) and JWH (high lead ball screw type) because they are not equipped with a self-lock with the result that the input shaft may be reversed by a load, where it is dangerous to use the hand wheel. Hand wheel efficiency is determined by the required torque for a specified load and the diameter of the hand wheel via the following equation.

$$\text{Hand Wheel Efficiency} = \frac{\text{Required Input Torque}}{\text{Hand Wheel Radius}}$$

Hand wheel efficiency equivalent to or below 49N {5kgf} is recommended.

Also, vibration and shock may cause self-lock failure, in which case a brake unit is recommended.



### Hand Wheel Measurements

Example model No. for order placement: JWM010-NV100

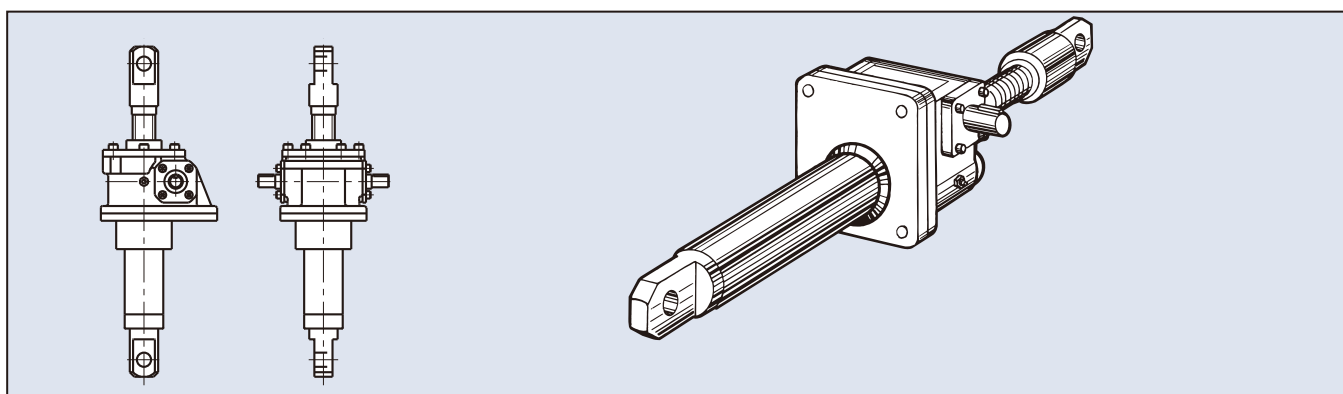
Unit: mm

| Handle Size | NV80-005 |     | NV80-010 |     | NV100-010 |     | NV100-025 |     | NV200-025 |     | NV200-050 |     | NV280-050* |     | NV280-100* |     | NV450-100* |     |
|-------------|----------|-----|----------|-----|-----------|-----|-----------|-----|-----------|-----|-----------|-----|------------|-----|------------|-----|------------|-----|
| Frame No.   | HD       | HL  | HD       | HL  | HD        | HL  | HD        | HL  | HD        | HL  | HD        | HL  | HD         | HL  | HD         | HL  | HD         | HL  |
| JWM002      | 80       | 108 | —        | —   | —         | —   | —         | —   | —         | —   | —         | —   | —          | —   | —          | —   | —          | —   |
| JWM005      | 80       | 108 | —        | —   | —         | —   | —         | —   | —         | —   | —         | —   | —          | —   | —          | —   | —          | —   |
| JWM010      | —        | —   | 80       | 122 | 100       | 125 | —         | —   | —         | —   | —         | —   | —          | —   | —          | —   | —          | —   |
| JWM025      | —        | —   | —        | —   | —         | —   | 100       | 140 | 200       | 198 | —         | —   | —          | —   | —          | —   | —          | —   |
| JWM050      | —        | —   | —        | —   | —         | —   | —         | —   | —         | —   | 200       | 221 | 280        | 229 | —          | —   | —          | —   |
| JWM100      | —        | —   | —        | —   | —         | —   | —         | —   | —         | —   | —         | —   | —          | —   | 280        | 242 | 450        | 295 |
| JWM150      | —        | —   | —        | —   | —         | —   | —         | —   | —         | —   | —         | —   | —          | —   | 280        | 247 | 450        | 300 |
| JWM200      | —        | —   | —        | —   | —         | —   | —         | —   | —         | —   | —         | —   | —          | —   | —          | —   | 450        | 304 |

Note) When using in combination with hand wheels marked with an \* and crevice fitting, trunnion fitting, hand wheel interferes with trunnion fitting.  
Separately contact TSUBAKI E&M.

### 2. Fitting

This can be used with Open/Close, Reverse Rotation, Positioning and other devices.



## Safety Cap

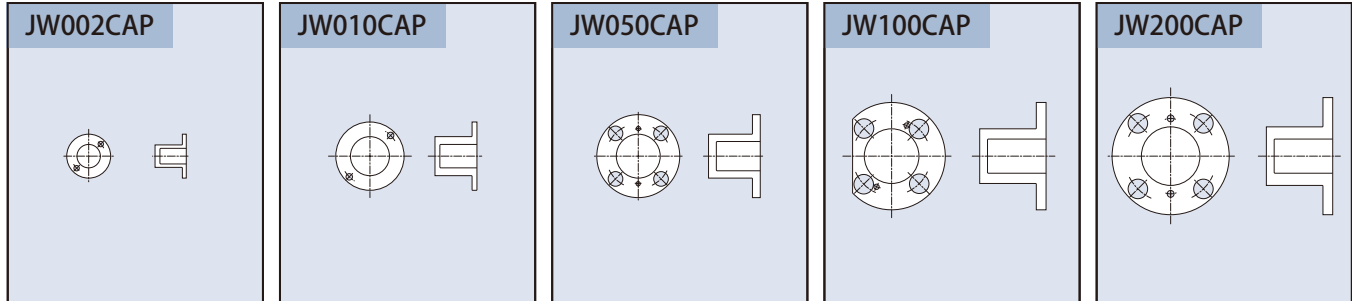
The cap is attached to the jack input shaft, on the other side of the motor unit.

By covering the shaft, a safety cap can prevent accidents and even prevent dust generation for clean room operations.

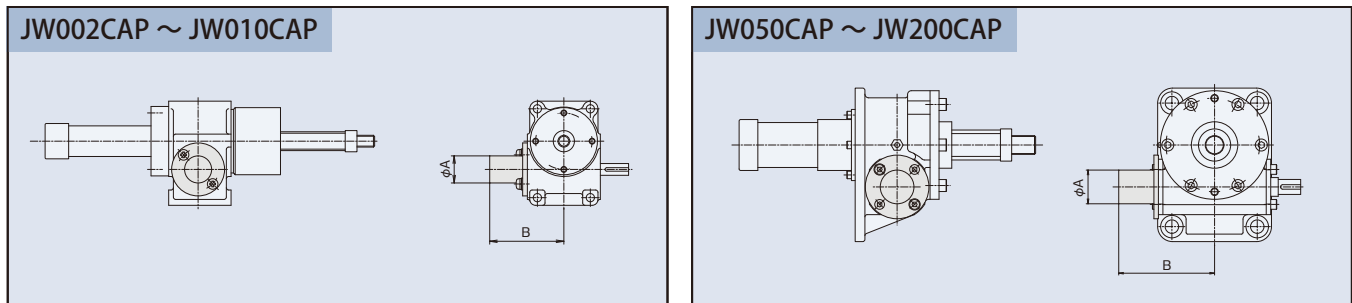
It is compatible with any of the three jack models: JWM (Machine Screw Type), JWB (Ball Screw Type) and JWH (High Lead Ball Screw Type).

Even if the jack body has already been purchased, safety caps can be installed subsequently.

### Cap structure



### Dimensional drawing



Unit: mm

| Safety Cap Model No. | Suitable Jack Model No. | A   | B   |
|----------------------|-------------------------|-----|-----|
| JW002CAP             | JW002                   | φ22 | 63  |
|                      | JW005                   |     |     |
| JW010CAP             | JW010                   | φ40 | 87  |
|                      | JW025                   |     | 100 |
| JW050CAP             | JW050                   | φ45 | 128 |
| JW100CAP             | JW100                   | φ52 | 155 |
|                      | JW150                   |     | 159 |
| JW200CAP             | JW200                   | φ60 | 163 |

\*All of the above are in stock. Installation screws are provided.

Material : MC Nylon Color : Black

Safety caps made from other materials are also available.

## Bellows

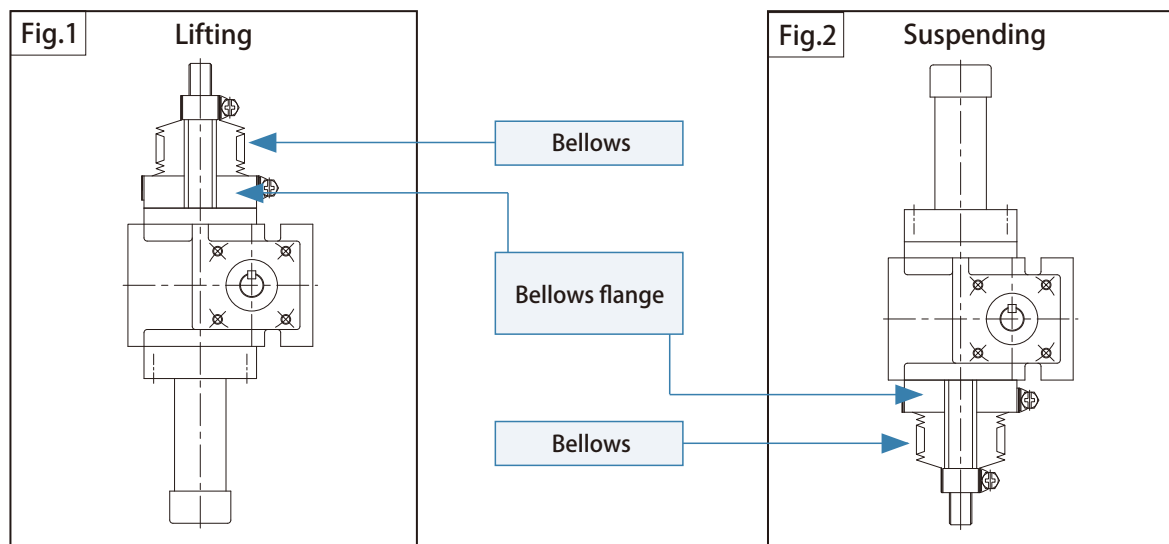
Use to protect jack components from liquid, chips, dirt, dust and other debris.

### Bellows Below JW010

Sizes below JW010 with bellows are as follows.

Take caution in jack sizing, especially when using for suspension.

Jack Models { JWM002 • 005 • 010  
JWB005 • 010  
JWH010

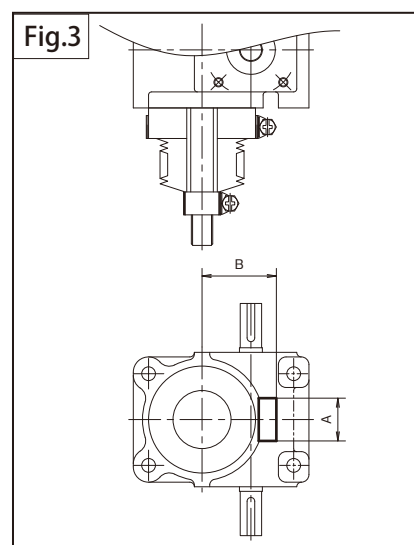


A flange is provided for jacks under JW010 with bellows.

When using for suspension, avoid the bellows interfering with machine parts, including the bellows band.

Unit: mm

| Frame No. | A  | B  |
|-----------|----|----|
| JW002     | 28 | 42 |
| JW005     | 28 | 42 |
| JW010     | 28 | 47 |



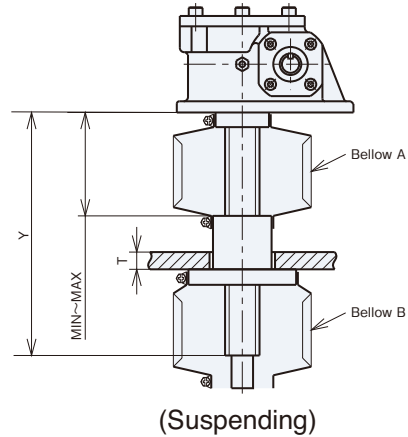
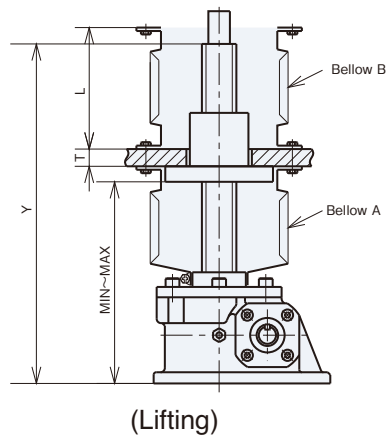
### High Lead Ball Screw

Bellows for High Lead Ball Screw Types are specially designed for specific shaft rpm.

Contact TSUBAKI E&M to select the most suitable bellows for your High Lead Ball Screw.

## Bellows Inquiry Form for Travel Nut Type

Select bellows for use with travel nuts based on the diagrams below. Select from band or flange type bellows.



① Jack model No. \_\_\_\_\_

② Actual stroke \_\_\_\_\_ mm  
MIN \_\_\_\_\_ mm ~ MAX \_\_\_\_\_ mm

③ Type of bellows  
Bellows A Band-band, band-flange, flange-flange  
Bellows B Band-band, band-flange, flange-flange

④ Jack screw shaft length limited yes / no  
Y= \_\_\_\_\_ mm

⑧ Bellows L measurements L  
L<sub>AMIN</sub> \_\_\_\_\_ mm ~ L<sub>AMAX</sub> = \_\_\_\_\_ mm (bellows A)  
L<sub>BMIN</sub> \_\_\_\_\_ mm ~ L<sub>BMAX</sub> = \_\_\_\_\_ mm (bellows B)

⑤ Base measurements  
T= \_\_\_\_\_ mm

⑨ Bellows attachment opening  $\phi C$   
 $\phi C_{A1}$  = \_\_\_\_\_ mm  $\phi C_{A2}$  = \_\_\_\_\_ mm (bellows A)  
 $\phi C_{B1}$  = \_\_\_\_\_ mm  $\phi C_{B2}$  = \_\_\_\_\_ mm (bellows B)

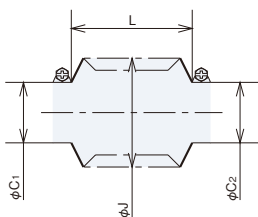
⑥ Maximum outer diameter of bellow  $\phi J$   
No Limit,  $\phi J_A$  = \_\_\_\_\_ mm  $\phi J_B$  = \_\_\_\_\_ mm

⑦ Flange type and structure (Record only if flange type was selected in ③).

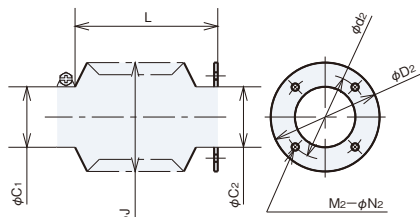
|                          |                          |                    |                |                       |             |
|--------------------------|--------------------------|--------------------|----------------|-----------------------|-------------|
| $\phi D_{A1}$ = _____ mm | $\phi d_{A1}$ = _____ mm | bolt mounting part | M1 = _____ Pcs | $\phi N_1$ = _____ mm | (bellows A) |
| $\phi D_{A2}$ = _____ mm | $\phi d_{A2}$ = _____ mm | bolt mounting part | M2 = _____ Pcs | $\phi N_2$ = _____ mm |             |
| $\phi D_{B1}$ = _____ mm | $\phi d_{B1}$ = _____ mm | bolt mounting part | M1 = _____ Pcs | $\phi N_1$ = _____ mm | (bellows B) |
| $\phi D_{B2}$ = _____ mm | $\phi d_{B2}$ = _____ mm | bolt mounting part | M2 = _____ Pcs | $\phi N_2$ = _____ mm |             |

### ● Bellows Types

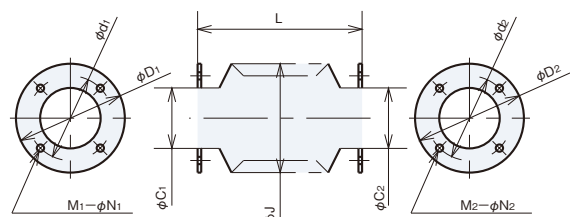
#### Band - Band Type



#### Band - Flange Type



#### Flange - Flange Type



Linipower Jack

# Notes on Installation

|                            |          |
|----------------------------|----------|
| Installation               | P251•252 |
| Maintenance and Inspection | P253     |
| General Notes              | P254     |
| Glossary                   | P255     |

# Installation

## 1. Orientation

Jacks can be installed horizontally, perpendicularly or inclined. Before installing, however, be sure to select the correct (lifting or suspending) jack type.

Since jacks have an open structure, grease or oil separated from grease may splatter or drop. Prepare oil pans or the like. Especially in the case of using a jack for suspending, grease may run down the screw shaft.

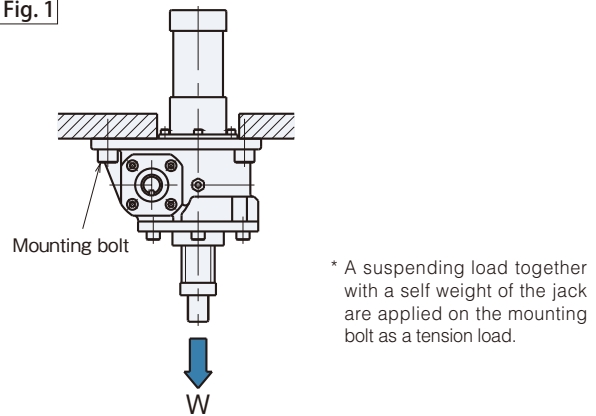
## 2. Installation Method

Tighten bolts into the 4 mounting holes in the gear case (mounting bolts are not provided). See Table 1 for bolt sizes. Strength class 8.8 or 10.9 bolts are usually used for mounting. Use 10.9 when load applies directly to the mounting bolts as in Fig. 1.

Table 1. Bolt Sizes

| Frame No. | Mounting Hole | Bolt Size |
|-----------|---------------|-----------|
| JW002     | 4- $\phi$ 7   | M6        |
| JW005     | 4- $\phi$ 7   | M6        |
| JW010     | 4- $\phi$ 9   | M8        |
| JW025     | 4- $\phi$ 11  | M10       |
| JW050     | 4- $\phi$ 18  | M16       |
| JW100     | 4- $\phi$ 22  | M20       |
| JW150     | 4- $\phi$ 22  | M20       |
| JW200     | 4- $\phi$ 26  | M24       |
| JW300     | 4- $\phi$ 33  | M30       |
| JW500     | 4- $\phi$ 42  | M39       |
| JW750     | 4- $\phi$ 42  | M39       |
| JW1000    | 6- $\phi$ 42  | M39       |

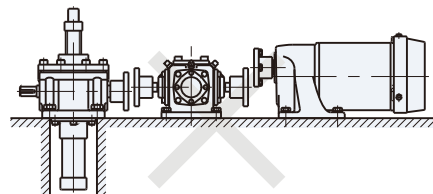
Fig. 1



## 3. Installing Motor, Reducer

When installing a motor and reducer unit in addition to the jack body, prepare a robust counter making allowance for a safety factor to prevent alignment accuracy at installation from being reduced even if the maximum load is applied. Make sure that the transmission shaft connected to the input shaft is aligned accurately (Fig.2). Using a floating shaft may result in malfunction due to vibration depending on rotation speed, therefore, sufficiently consider rigidity of the shaft and backlash of the coupling.

Fig. 2



## 4. Rotation Prevention

The jack's thrusting force may cause the screw shaft (nut in the case of ravel nut type) to rotate, in which case a rotation prevention is required. Screw rotation torque at the basic capacity is described in the standard specification list. When operating with the end connected, and pulling the rope or chain with a sheave or sprocket installed, use the rotation prevention type (symbol M).

## 5. Shaft End

Attach shaft end by applying an adhesive agent to its setscrew. It is possible for the shaft end to become detached by the rotational torque applied to the shaft. To avoid this, use one of the following adhesives:

### <Tightening Agents>

Use the following brands or their equivalent.

Read instructions and safety precautions provided with each product before applying.

### Tightening Agents

| Maker            | Brand      |
|------------------|------------|
| Nihon Lock Tight | # 262, 271 |
| Three Bond       | # 1307N    |

### <Fixing with set screw>

After tightening the end fitting, fix with the attached set screw (hexagon socket head screw) as a locking device.

## 6. Setting the Limit Switch

Consider maximum possible inertia before setting the limit switch. This means calculating the maximum coasting distance affected by specific load and installation conditions. Also, install a mechanical stopper within the stroke range in case of emergencies.

## 7. Setting the Position Detection Unit

An optional position detection unit (internal LS, potentiometer or rotary encoder) is not factory adjusted for its stroke. Make sure to adjust stroke prior to use. Control units such as the potentiometer and rotary encoder generate various signals by measuring the rotation number of the input shaft. Do not allow the screw shaft (nut in the case of the travel nut) to rotate after adjustment because the setting will deviate if the screw shaft is rotated with the input shaft fixed. When adjusting the internal LS, operate the jack manually or by inching with sufficient care so as not to exceed the stroke range of the jack. If the jack exceeds its stroke limit, the screw shaft may fall off or the bellows may be damaged.

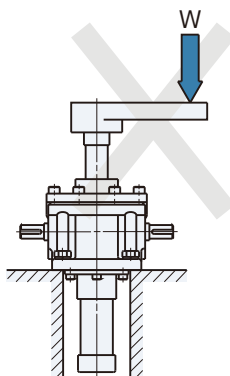
## 8. Horizontal use of jack with bellows

When using a jack with bellows in the horizontal direction (including use with swing), the screw shaft may catch the bellows, and damage the bellows, or result in failure of the jack. Please contact TSUBAKI E&M.

## 9. Caution

- ⚠ (1) Jacks that range under the standard capacity of 49.0kN {5tf} are provided with screw covers made of hard vinyl chloride pipe. Never suspend or carry a jack by its cover.
- ⚠ (2) Be certain that the jack rating exceeds the maximum possible stroke. If the stroke capacity is exceeded, the shaft may disengage from the unit or fail to function. Preventative devices for such situations are not provided for JWMs (Machine Screw Type) so over stroke must be avoided. Shaft protection provided for JWBs (Ball Screw Type) and JWHs (High Lead Ball Screw Type) is solely for the purpose of preventing shaft rotation during installation. When installing, be sure that the shaft does not rotate or move. When rotation cannot be avoided, use a rotation prevention type.
- ⚠ (3) Do not operate input shaft manually while loaded. Load pressure will rotate the shaft.
- ⚠ (4) Do not use mechanical stops. This will cause major internal damage.
- (5) Provide oil pans for food manufacturing machines to prevent oil from leaking into food products.
- (6) To install a screw shaft or cover to the base, avoid drilling large holes so as not to reduce the surface area of contact between the jack and the base.
- (7) Apply load in the same direction as that of the screw shaft. Load from inappropriate angles can bend the shaft (Fig. 3). For side load, make sure to use guides so the load or bending momentum do not apply directly to the jack.

Fig. 3



## Maintenance and Inspection

1. Screw shaft and reducer unit are factory greased. See Table 1 for the type of grease used.
2. Regular lubrication intervals for the shaft screw are as recommended in Table 2. For the amount of grease, see Table 3. To regrease, expand the shaft to full stroke, remove old grease and apply using a grease gun or brush.  
Grease for maintenance is also available. Contact TSUBAKI E&M.
3. Reducer units should be greased based on the lubrication intervals shown in Table 2. However, these intervals may vary depending on operation frequency and conditions. Reducer units of JW025 or greater are provided with grease nipples and hexagon socket head plug. When greasing, remove the hexagon socket head plug and pour grease until grease seeps from the hole for the hexagon socket head plug. After greasing, firmly rewind the seal tape on the hexagon socket head plug to tighten so as to prevent grease from leaking.

Table 1. Recommended Grease

| Part         | Maker            | Grease                         |
|--------------|------------------|--------------------------------|
| Shaft        | TSUBAKI E&M      | JWGS100G                       |
|              | Idemitsu         | * Daphne Eponex Grease SR No.1 |
|              | Nippon Grease    | Niglube EP-1K                  |
| Reducer Unit | Exxon Mobil      | Mobilux EP No.1                |
|              | Cosmo Lubricants | Cosmo Grease Dynamax EP No.1   |
|              | Showa Shell      | Shell Alvania EP Grease 1      |

\* Factory filled with this grease.

Note) JWGS100G is separately sold in a 100g container. (See page 262.)

Table 2. Lubrication Intervals

| Operation Frequency | Lubrication Intervals |                   |                   |
|---------------------|-----------------------|-------------------|-------------------|
|                     | Machine screw shaft   | Ball screw shaft  | Reducer unit      |
| 50~100/day          | 1 month               | 3 months          | 3 months          |
| 10~50/day           | 3 months              | 3 months~6 months | 3 months~6 months |
| 1~10/day            | 6 mo.s~1 yr.          | 6 mo.s~1 yr.      | 6 mo.s~1 yr.      |

\* Numerical values described above do not indicate the life of screws and reducer units.

Table 3. Amount of Grease

| Frame No. | Application quantity | Initial enclosed quantity |
|-----------|----------------------|---------------------------|
|           | Shaft (Stroke 100mm) | Reducer Unit              |
| JW002     | 5g                   | 35g                       |
| JW005     | 5g                   | 35g                       |
| JW010     | 5g                   | 80g                       |
| JW025     | 10~15g               | 170g                      |
| JW050     | 10~15g               | 370g                      |
| JW100     | 20~30g               | 470g                      |
| JW150     | 20~30g               | 700g                      |
| JW200     | 40~50g               | 830g                      |
| JW300     | 40~50g               | 2600g                     |
| JW500     | 50~100g              | 5500g                     |

4. Grease upper bearings for JWB (Ball Screw Type) and JWH (High Lead Ball Screw Type) using the grease nipple set attached to their housings, at 6-month intervals. Not necessary for jacks JWB/JWH010 and below.
5. Inspect regularly for general backlash and screw unit condition. Jack life and replacement timing are determined by the following:
  - JWM···Backlash in the direction of screw shaft and nut hits 1/4 of the screw pitch.
  - JWB · JWH···Visible particles due to wear and tear of the screw unit.
  - All types···Replace gear when its input shaft exceeds 30 rpm with backlash at H speed, or exceeds 60 rpm at L speed.

⚠ Generally, continuous use without lubrication at recommended intervals may cause inefficiency of shafts and failure of travel nuts.
6. Adjust brake gaps for brake and gearmotors before their gaps reach their maximum capacities. Gap adjustment is not possible for gearmotors with outputs 25W or 40W. For details, see respective instruction manuals.

## General Notes

1. Carefully consider jack ratings before making a selection. Make sure that all anticipated loads, whether static, dynamic or shock, fall within the rated capacity of the jack at reasonable safety levels.
2. Carefully consider the combination of screw shaft rpm and rated load. Also, take extra care in verifying rated buckling load, overhang load and shaft rpm. Exceeding the data provided in this catalog can cause major damage to the system.
3. Confirm that the operating temperature of the jack is within  $-15\sim 80^{\circ}\text{C}$ . To measure, check the surface temperature of input shaft (or nut, if used). Make sure that all rotating parts are completely stopped before proceeding to measure.
4. Do not exceed the maximum rpm of 1800/min.
5. Continuous operation is not possible. Duty cycle at 30 minute intervals for JWM is within 20% ED, JWB and JWH are within 30% ED.

$$\text{Duty cycle (\%ED)} = \frac{1 \text{ Duty cycle}}{1 \text{ Duty cycle} + 1 \text{ Rest cycle}} \times 100\%$$

6. Be sure not to exceed the maximum input torque for multiple jack systems by verifying the rated input torque for each jack.
7. Activating torque should be maintained at 200% above the required torque.
8. If operating in freezing temperatures, a change in viscosity may reduce the efficiency of the grease. Set the drive unit so as to accommodate this change.
9. Although JWM is equipped with a self-locking device, vibration and shock may affect its efficiency, in which case a brake unit is required. Because of their extremely high efficiencies, JWB and JWH must have sufficient brake units that over power their holding torques.
10. Evaluate operating environment based on the following:

|                     |                                                                        |
|---------------------|------------------------------------------------------------------------|
| Location            | Indoors where rain and moisture are not present                        |
| Room Condition      | Dust Volume - Normal                                                   |
| Ambient Temperature | $-15^{\circ}\text{C}$ to $80^{\circ}\text{C}$ (See General Notes No.3) |
| Relative Humidity   | 85% or less (no dew condensation)                                      |

11. When dust level is high, protect shaft with a bellows.  
The bellows, which are not water-proof, do not prevent external water from entering and grease in the jack from penetrating to the outside.  
(For outdoor use, place a cover to protect jack from factors such as rain and wind).

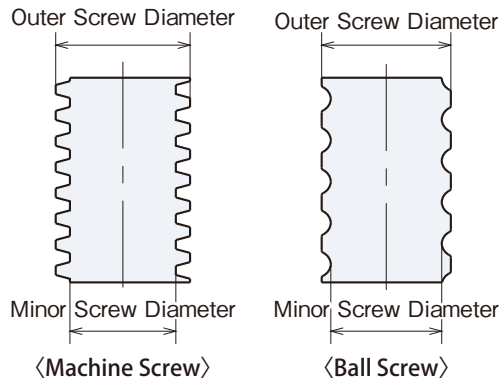
## Glossary

### ① Basic Capacity :

The maximum possible load sustained or lifted by a jack.  
Must be calculated by using the safety rate Sf.

### ② Outer Screw Diameter / Minor Screw Diameter:

As illustrated below.



### ③ Screw Lead :

Distance the shaft (or nut, if used) advances in one revolution of worm wheel.

### ④ Stroke :

Possible distance traveled by screw shaft (or nut). Derived from  $X_{MAX} - X_{MIN}$ .

### ⑤ Worm Ratio :

Number of input shaft revolutions required to complete one worm wheel revolution. (Gear ratio of input shaft and worm wheel.)

### ⑥ Overall Efficiency :

Total efficiency of the jack including those of the screw and the worm wheel.

### ⑦ Maximum Allowable Input Capacity :

Input capacity that can regulate the balance between load and screw shaft speed or input rpm.  
Operate within the rated capacity of duty cycle (%ED) and reducer unit surface temperature (max.80°C).

### ⑧ Tare Drag Torque :

Torque required to rotate the input shaft of an unloaded jack.

### ⑨ Holding Torque :

Input torque required for sustaining basic load capacity.

### ⑩ Allowable Input Shaft Torque :

Maximum possible torque allowed for input shaft only. For multiple jack systems, it is the sum of total torque required for synchronous drive, and the actual amount of torque transferred from one jack to another.

### ⑪ Required Input Torque of Basic Capacity :

Input torque required at the input shaft to lift load of basic capacity.

### ⑫ Screw Movement Per Revolution of Input Shaft :

Distance the screw shaft (or nut) advances in one revolution of the input shaft.

### ⑬ Maximum Input rpm for Basic Capacity :

Maximum possible rpm applied to the input shaft to lift load of basic capacity.

### ⑭ Screw Shaft Rotational Torque for Basic Capacity :

Torque generated when the screw (or nut) auto-rotates to lift load of basic capacity. Rotation prevention must be installed either on the machine or the jack to prevent screw and nut from rotating simultaneously.

### ⑮ Rated Load :

Load derived from the maximum allowable input capacity once the input screw shaft rpm is determined.

### ⑯ Buckling :

Buckling is produced when the jack rapidly bends from excessive thrusts. Buckling load varies depending on installation condition and/or position.

### ⑰ Rated Screw Shaft rpm :

Screw shaft may resonate and vibrate when its rpm comes close to the eigen frequency. It is important that the rpm is lower than the resonance point or the rated screw shaft rpm. Must confirm this for travel nut types.

### ⑱ Coasting Distance (Inertia) :

Distance traveled after the motor is switched off. System inertia results in over travel depending on the load, brake size and operation circuit.

### ⑲ Stopping Accuracy :

Range of positions where the screw shaft stops after each operation.

### ⑳ Self-lock :

The ability to maintain load with no brake unit. Self-lock applies to all frame numbers for JWM (Machine Screw Type) 002~1000.

### ㉑ Duty Cycle :

The ratio of run time to total cycle time.

$$\text{Duty cycle (\%ED)} = \frac{1 \text{ Duty cycle}}{1 \text{ Duty cycle} + 1 \text{ Rest cycle}} \times 100 (\%)$$

### ㉒ Thrust :

Power converted from rated torque that is used to lift maximum loads for motored or geared jacks. Motors must be selected carefully when used to run a jack with another motored jack. Also, select thrust for motored jacks with care.

### ㉓ Ball Screw Wear Life :

Ball screw wear life is determined by the distance advanced by the screw nut until the ball "flakes" from friction and fatigue. This distance varies even when operated under similar conditions. If the system runs without this "flaking" of the nut for more than 90% of the time, this is considered B10 or the rated ball screw wear life.

Linipower Jack

# Product Information

|                                |          |
|--------------------------------|----------|
| Linipower Jack Compact Type    | P257~260 |
| Linipower Jack LD Type         | P261     |
| Linipower Jack Bevel Gear Type | P262     |
| Mechatro Center                | P263•264 |
| Quick Delivery                 | P265     |

## Linipower Jack Compact Type

Debut of compact type  
for 30/50t

Lightweight and compact

Downsizing

High performance and high efficiency

### ● Features

Technology is concentrated in a compact size.

Best suited for downsizing as it is lightweight and compact.

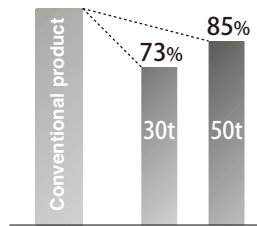
High performance and high efficiency

### Comparison with conventional product

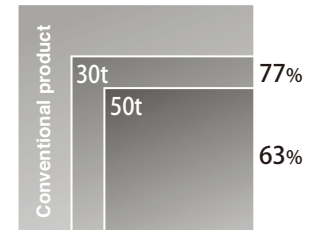
Mass ratio (max): 73% (30t type), 85% (50t type)

Installation area ratio: 77% (30t type), 63% (50t type)

■ Mass ratio



■ Installation area ratio



## Model No. designation

**JW M C 300 US H 10 JM - TK**

Linipower jack

Compact type

Stroke (mm)

1 : 100  
3 : 300  
6 : 600  
10 : 1000

\* The above shows examples.

Output option

No symbol: Screw shaft end (standard)

J: Bellows

B: Rod type end fitting

I: I-type end fitting

M: Table type end fitting

Note) Output options are the same as conventional products.

However, contact us for installation of position detecting unit to 50t type.

Jack type

Basic capacity

Installation type

M: Trapezoidal screw  
B: Ball screw

300: 294kN {30tf}  
500: 490kN {50tf}

US: Standard model for lifting  
DS: Standard model for suspending

Worm gear ratio

| Symbol | H      | L  |
|--------|--------|----|
| 300    | 10 2/3 | 32 |
| 500    | 10 2/3 | 32 |

## Basic specifications list

|                                  |             | JWMC300  | JWBC300  | JWMC500  | JWBC500  |
|----------------------------------|-------------|----------|----------|----------|----------|
| Basic capacity                   | kN {tf}     | 294 {30} | 294 {30} | 490 {50} | 490 {50} |
| Major diameter of screw          | mm          | 85       | 85       | 120      | 100      |
| Minor diameter of screw          | mm          | 67       | 74.8     | 102      | 87       |
| Screw lead                       | mm          | 16       | 20       | 16       | 24       |
| Worm gear ratio                  | H           | 10 2/3   | 10 2/3   | 10 2/3   | 10 2/3   |
|                                  | L           | 32       | 32       | 32       | 32       |
| Overall efficiency               | %           |          |          |          |          |
|                                  | H           | 20       | 59       | 15       | 59       |
| Maximum allowable input capacity | kW          |          |          |          |          |
|                                  | H           | 6.0      | 6.0      | 10.6     | 11.8     |
| Drag torque in no-load idling    | N·m {kgf·m} |          |          |          |          |
|                                  | L           | 2.8      | 2.8      | 5.4      | 5.1      |
|                                  |             | 9.8 {1}  |          | 19.6 {2} |          |

|                                              |             | JWMC300      | JWBC300      | JWMC500      | JWBC500      |
|----------------------------------------------|-------------|--------------|--------------|--------------|--------------|
| Allowable input shaft torque *1              | N·m {kgf·m} | 735.0 {75}   |              | 912.0 {93}   |              |
| Required input torque for basic capacity*2   | N·m {kgf·m} |              |              |              |              |
|                                              | H           | 361.0 {36.8} | 159.0 {16.2} | 800.0 {81.6} | 318.0 {32.4} |
| Screw movement per revolution of input shaft | mm          |              |              |              |              |
|                                              | L           | 205.0 {20.9} | 89.0 {9.1}   | 453.0 {46.2} | 182.0 {18.6} |
| Maximum input rpm for basic capacity         | r/min       |              |              |              |              |
|                                              | H           | 1.50         | 1.88         | 1.50         | 2.25         |
|                                              | L           | 0.50         | 0.63         | 0.50         | 0.75         |
|                                              |             |              |              |              |              |
|                                              | H           | 160          | 380          | 130          | 380          |
|                                              | L           | 140          | 340          | 120          | 300          |

\*1 The allowable torque is for a jack input shaft only. (Reconfirm for linkage operation.)

\*2 The values include drag torque in no-load idling.

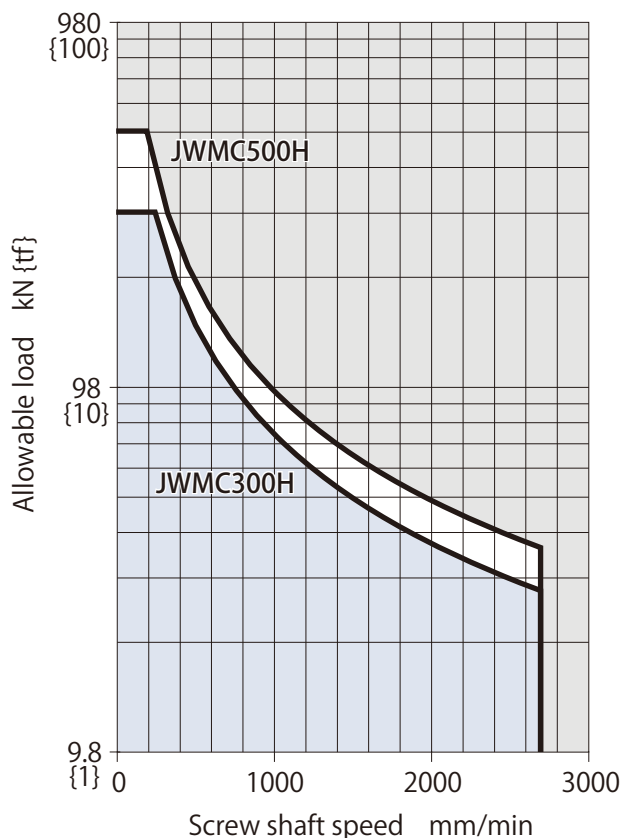
## Screw shaft speed (elevation speed) and allowable load related graphs

These graphs show the relationship between screw shaft speed and allowable load. Since these graphs have been prepared in consideration of the maximum allowable input capacity of each jack frame No., check the allowable load with these graphs to determine the frame No.

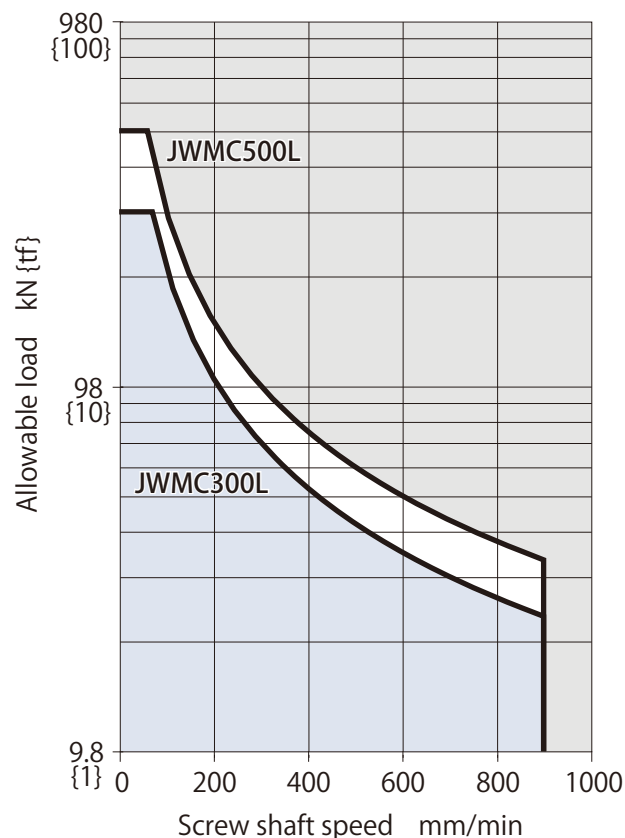
If detailed consideration is required, confirm by calculation (page 149).

### JWMC (trapezoidal screw type)

#### ■ H speed

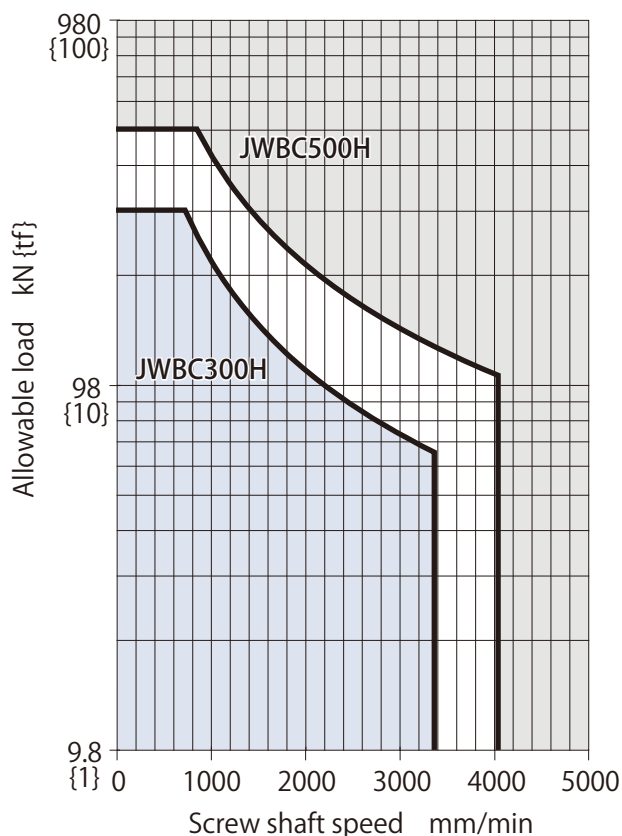


#### ■ L speed

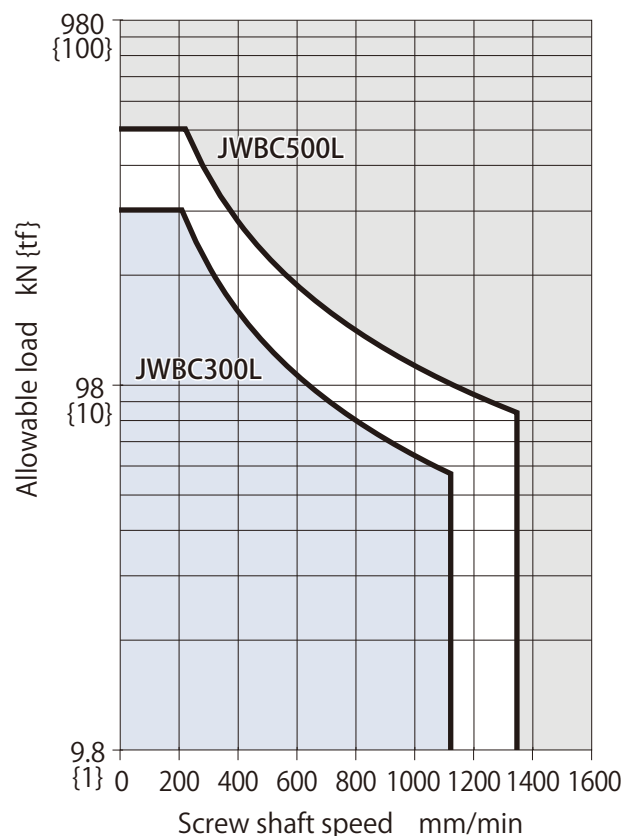


### JWBC (ball screw type)

#### ■ H speed



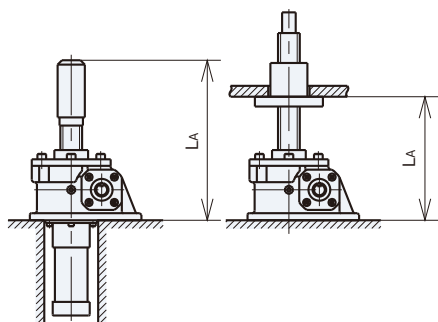
#### ■ L speed



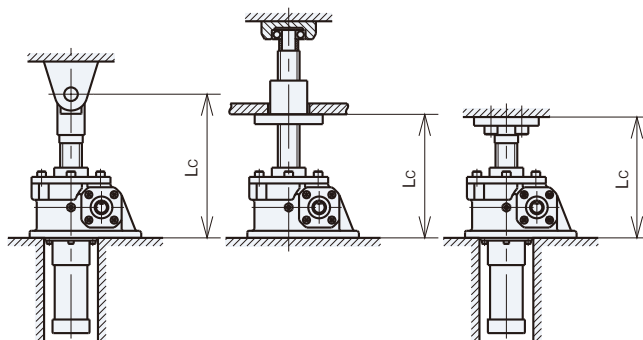
## Allowable buckling load

- For use with compression loads, determine the jack frame No. with respect to buckling load from these graphs.  
The buckling selection graphs assume the safety rate  $S_f=4$ .
- ① From the installation conditions A and C shown below, select stroke distances  $L_A$  and  $L_C$ . (For installation conditions other than the following, see page 160.)
- ② Select a jack frame No. from the intersection point of the load  $W$  (vertical shaft) and stroke distance (horizontal shaft) per jack.
- Lateral load should not be applied.  
No lateral load is considered in the following buckling selection graphs.
- In an installed condition, if the equipment is devised so that the screw shaft becomes a tensile load, it will be economical having no buckling.

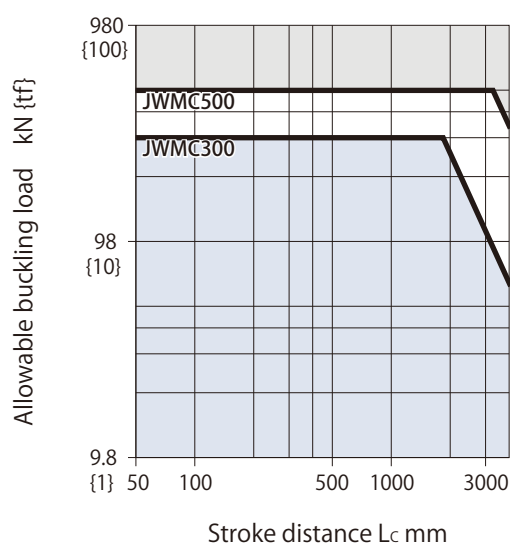
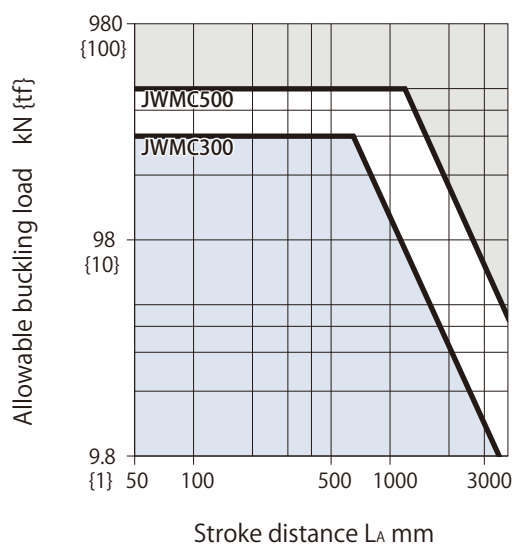
### A Fixed base – Shaft end free



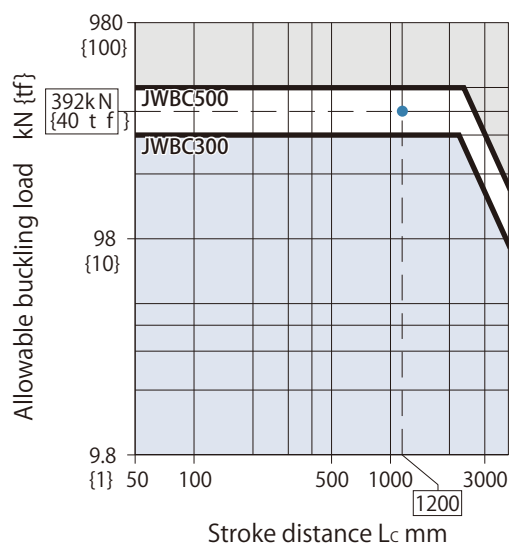
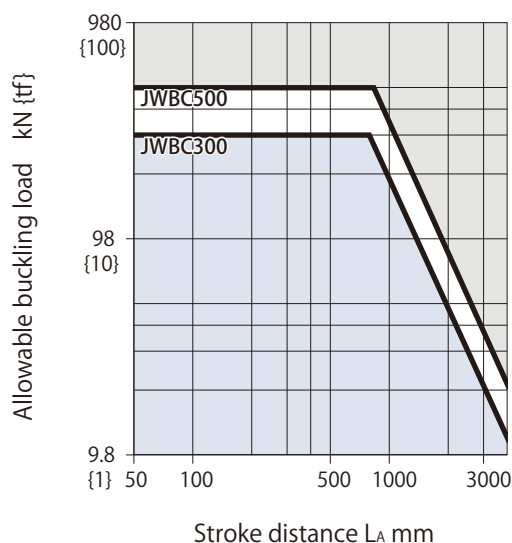
### C Fixed base – Guided shaft end/Fixed shaft end



### JWMC (trapezoidal screw type)



### JWBC (ボールネジタイプ)

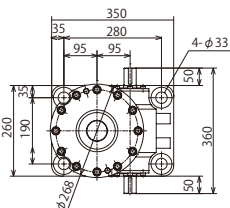


Note)1. The dotted lines on the above graph show an example in which the load is  $W_{392\text{kN}}$  (40tf) and the stroke distance is 1200mm in the installation condition C with the buckling safety rate  $S_f=4$ . In this case, jack JWBC500 that satisfies the intersection point of the vertical axis and horizontal axis can be selected.

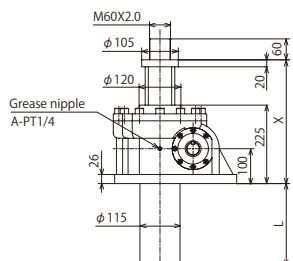
2. If detailed consideration is required, confirm by calculation (page 160).

## Dimensions table; trapezoidal screw type

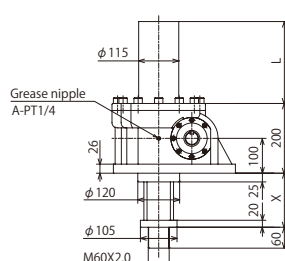
### JWMC300



#### For lifting

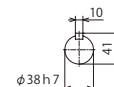
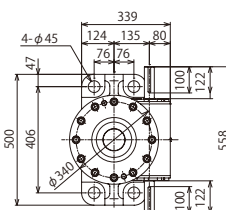


#### For suspending

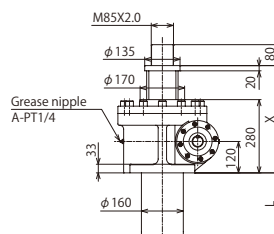


| Stroke | US standard model for lifting |              |                 |              |      | DS standard model for suspending |              |     |      |      | Approximate mass kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|--------------|-----|------|------|---------------------|
|        | X                             |              | X               |              | L    | X                                |              | X   |      | L    |                     |
|        | Without bellows               | With bellows | Without bellows | With bellows |      | Without bellows                  | With bellows |     |      |      |                     |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX          | MIN | MAX  |      |                     |
| 100    | 255                           | 355          | 265             | 365          | 135  | 55                               | 155          | 65  | 165  | 135  | 86                  |
| 200    | 255                           | 455          | 265             | 465          | 235  | 55                               | 255          | 65  | 265  | 235  | 92                  |
| 300    | 255                           | 555          | 280             | 580          | 350  | 55                               | 355          | 80  | 380  | 350  | 97                  |
| 400    | 255                           | 655          | 280             | 680          | 450  | 55                               | 455          | 80  | 480  | 450  | 102                 |
| 500    | 255                           | 755          | 295             | 795          | 565  | 55                               | 555          | 95  | 595  | 565  | 108                 |
| 600    | 255                           | 855          | 295             | 895          | 665  | 55                               | 655          | 95  | 695  | 665  | 113                 |
| 800    | 255                           | 1055         | 310             | 1110         | 880  | 55                               | 855          | 110 | 910  | 880  | 124                 |
| 1000   | 255                           | 1255         | 330             | 1330         | 1100 | 55                               | 1055         | 130 | 1130 | 1100 | 136                 |
| 1200   | 255                           | 1455         | 340             | 1540         | 1310 | 55                               | 1255         | 140 | 1340 | 1310 | 146                 |
| 1500   | 255                           | 1755         | 365             | 1865         | 1635 | 55                               | 1555         | 165 | 1665 | 1635 | 163                 |
| 2000   | 255                           | 2255         | 400             | 2400         | 2170 | 55                               | 2055         | 200 | 2200 | 2170 | 190                 |

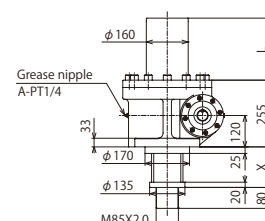
### JWMC500



#### For lifting



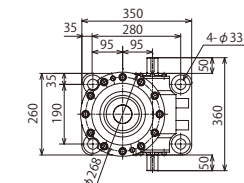
#### For suspending



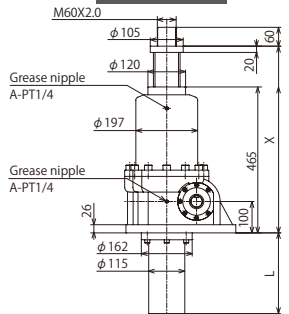
| Stroke | US standard model for lifting |              |                 |              |      | DS standard model for suspending |              |     |      |      | Approximate mass kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|--------------|-----|------|------|---------------------|
|        | X                             |              | X               |              | L    | X                                |              | X   |      | L    |                     |
|        | Without bellows               | With bellows | Without bellows | With bellows |      | Without bellows                  | With bellows |     |      |      |                     |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX          | MIN | MAX  |      |                     |
| 100    | 310                           | 410          | 315             | 415          | 137  | 55                               | 155          | 60  | 160  | 137  | 211                 |
| 200    | 310                           | 510          | 315             | 515          | 237  | 55                               | 255          | 60  | 260  | 237  | 222                 |
| 300    | 310                           | 610          | 335             | 635          | 357  | 55                               | 355          | 80  | 380  | 357  | 236                 |
| 400    | 310                           | 710          | 335             | 735          | 457  | 55                               | 455          | 80  | 480  | 457  | 247                 |
| 500    | 310                           | 810          | 345             | 845          | 567  | 55                               | 555          | 90  | 590  | 567  | 259                 |
| 600    | 310                           | 910          | 345             | 945          | 667  | 55                               | 655          | 90  | 690  | 667  | 271                 |
| 800    | 310                           | 1110         | 360             | 1160         | 882  | 55                               | 855          | 105 | 905  | 882  | 295                 |
| 1000   | 310                           | 1310         | 375             | 1375         | 1097 | 55                               | 1055         | 120 | 1120 | 1097 | 320                 |
| 1200   | 310                           | 1510         | 385             | 1585         | 1307 | 55                               | 1255         | 130 | 1330 | 1307 | 344                 |
| 1500   | 310                           | 1810         | 405             | 1905         | 1627 | 55                               | 1555         | 150 | 1650 | 1627 | 379                 |
| 2000   | 310                           | 2310         | 440             | 2440         | 2162 | 55                               | 2055         | 185 | 2185 | 2162 | 440                 |

## Dimensions table; Ball screw type

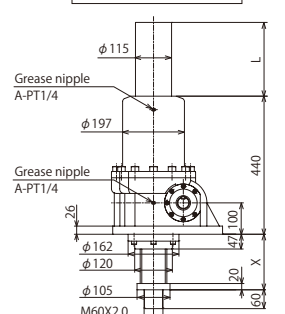
### JWBC300



#### For lifting

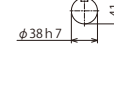
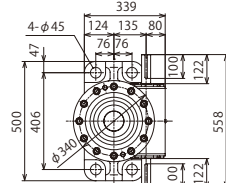


#### For suspending

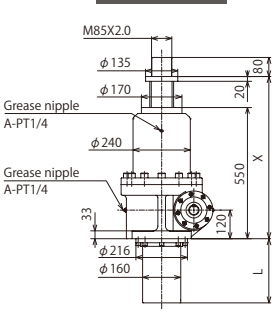


| Stroke | US standard model for lifting |              |                 |              |      | DS standard model for suspending |              |     |      |      | Approximate mass kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|--------------|-----|------|------|---------------------|
|        | X                             |              | X               |              | L    | X                                |              | X   |      | L    |                     |
|        | Without bellows               | With bellows | Without bellows | With bellows |      | Without bellows                  | With bellows |     |      |      |                     |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX          | MIN | MAX  |      |                     |
| 100    | 495                           | 595          | 505             | 605          | 168  | 77                               | 177          | 87  | 187  | 146  | 132                 |
| 200    | 495                           | 695          | 505             | 705          | 268  | 77                               | 277          | 87  | 287  | 246  | 138                 |
| 300    | 495                           | 795          | 520             | 820          | 383  | 77                               | 377          | 102 | 402  | 361  | 145                 |
| 400    | 495                           | 895          | 520             | 920          | 483  | 77                               | 477          | 102 | 502  | 461  | 151                 |
| 500    | 495                           | 995          | 535             | 1035         | 598  | 77                               | 577          | 117 | 617  | 576  | 157                 |
| 600    | 495                           | 1095         | 535             | 1135         | 698  | 77                               | 677          | 117 | 717  | 676  | 163                 |
| 800    | 495                           | 1295         | 550             | 1350         | 913  | 77                               | 877          | 132 | 932  | 891  | 176                 |
| 1000   | 495                           | 1495         | 570             | 1570         | 1133 | 77                               | 1077         | 152 | 1152 | 1111 | 189                 |
| 1200   | 495                           | 1695         | 580             | 1780         | 1343 | 77                               | 1277         | 162 | 1362 | 1321 | 202                 |
| 1500   | 495                           | 1995         | 605             | 2105         | 1668 | 77                               | 1577         | 187 | 1687 | 1644 | 221                 |
| 2000   | 495                           | 2495         | 640             | 2640         | 2203 | 77                               | 2077         | 222 | 2222 | 2181 | 253                 |

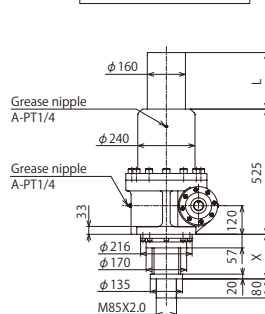
### JWBC500



#### For lifting



#### For suspending

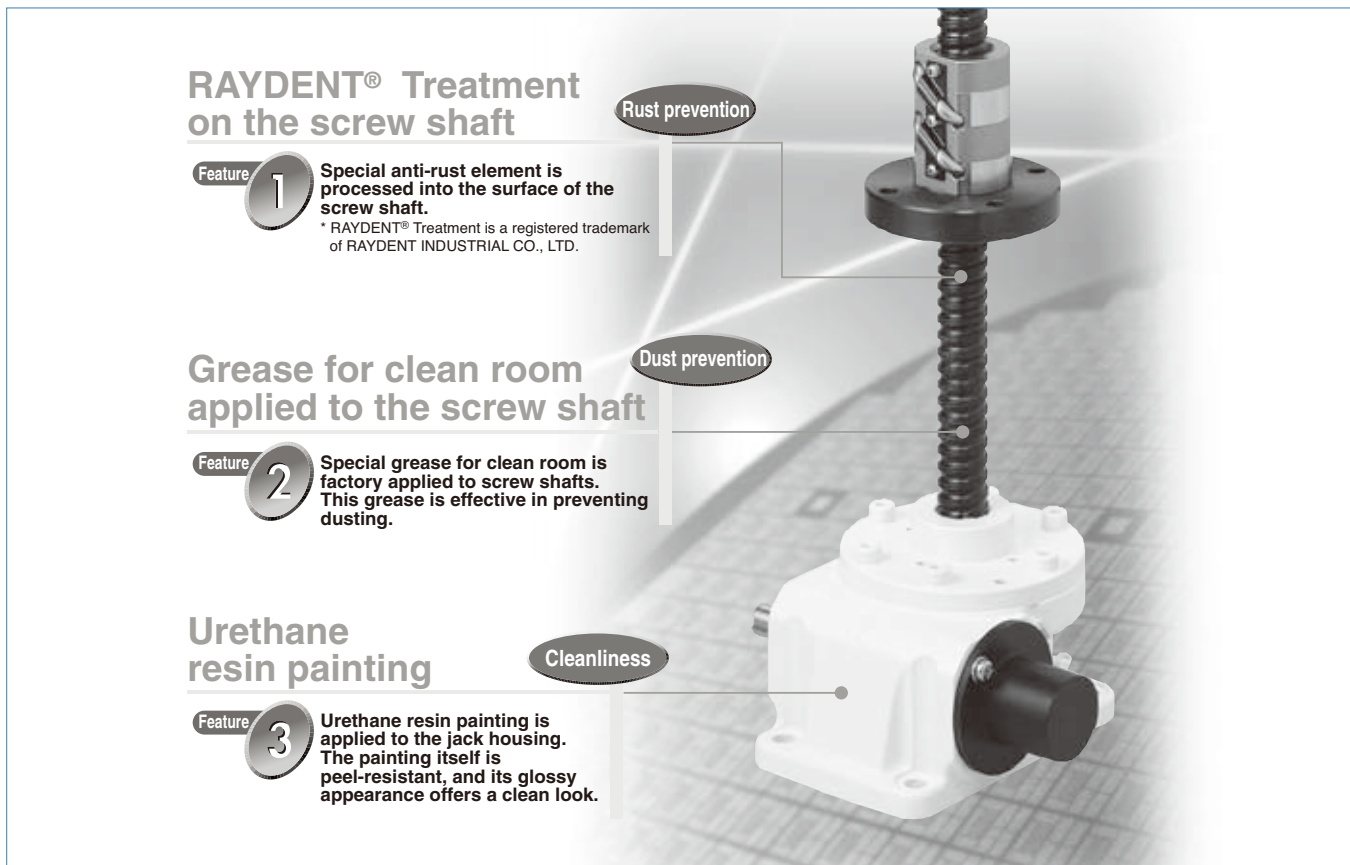


| Stroke | US standard model for lifting |              |                 |              |      | DS standard model for suspending |              |     |      |      | Approximate mass kg |
|--------|-------------------------------|--------------|-----------------|--------------|------|----------------------------------|--------------|-----|------|------|---------------------|
|        | X                             |              | X               |              | L    | X                                |              | X   |      | L    |                     |
|        | Without bellows               | With bellows | Without bellows | With bellows |      | Without bellows                  | With bellows |     |      |      |                     |
|        | MIN                           | MAX          | MIN             | MAX          |      | MIN                              | MAX          | MIN | MAX  |      |                     |
| 100    | 580                           | 680          | 585             | 685          | 172  | 87                               | 187          | 92  | 192  | 140  | 280                 |
| 200    | 580                           | 780          | 585             | 785          | 272  | 87                               | 287          | 92  | 292  | 240  | 289                 |
| 300    | 580                           | 880          | 605             | 905          | 392  | 87                               | 387          | 112 | 412  | 360  | 300                 |
| 400    | 580                           | 980          | 605             | 1005         | 492  | 87                               | 487          | 112 | 512  | 460  | 309                 |
| 500    | 580                           | 1080         | 615             | 1115         | 602  | 87                               | 587          | 122 | 622  | 570  | 319                 |
| 600    | 580                           | 1180         | 615             | 1215         | 702  | 87                               | 687          | 122 | 722  | 670  | 328                 |
| 800    | 580                           | 1380         | 630             | 1430         | 917  | 87                               | 887          | 137 | 937  | 885  | 348                 |
| 1000   | 580                           | 1580         | 645             | 1645         | 1132 | 87                               | 1087         | 152 | 1152 | 1100 | 368                 |
| 1200   | 580                           | 1780         | 655             | 1855         | 1342 | 87                               | 1287         | 162 | 1362 | 1310 | 386                 |
| 1500   | 580                           | 2080         | 675             | 2175         | 1662 | 87                               | 1587         | 182 | 1682 | 1630 | 415                 |
| 2000   | 580                           | 2580         | 710             | 2710         | 2197 | 87                               | 2087         | 217 | 2217 | 2165 | 464                 |

## Linipower Jack LD Type

Excellent choice for clean room systems such as FDP (Liquid Crystal/PDP). This model regulates dust generation caused by wear as well as rust produced from the screw. Factory tested for dust volume, it is highly reliable for clean room operations.

### 1. Basic Specifications



**RAYDENT® Treatment on the screw shaft**

**Feature 1** Special anti-rust element is processed into the surface of the screw shaft.  
\* RAYDENT® Treatment is a registered trademark of RAYDENT INDUSTRIAL CO., LTD.

**Rust prevention**

**Grease for clean room applied to the screw shaft**

**Feature 2** Special grease for clean room is factory applied to screw shafts. This grease is effective in preventing dusting.

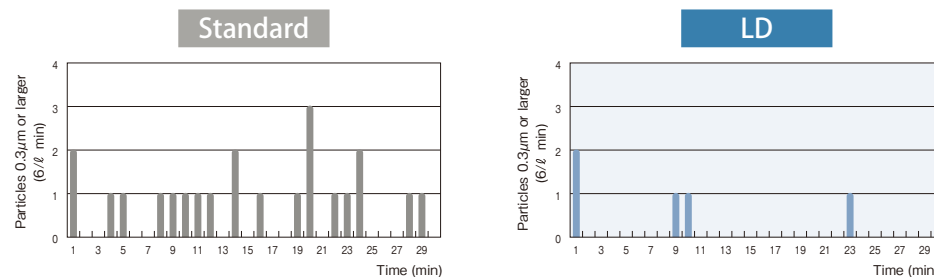
**Dust prevention**

**Urethane resin painting**

**Feature 3** Urethane resin painting is applied to the jack housing. The painting itself is peel-resistant, and its glossy appearance offers a clean look.

**Cleanliness**

### 2. Dust Emission Comparison Graphs (Our test results)



#### [Test Conditions]

| Heading                    | Contents                                           |
|----------------------------|----------------------------------------------------|
| Frame no.                  | JWB025URH5D (Travel nut type)                      |
| Speed                      | 40mm/s (Fixed nut, lift/lower repetition, no load) |
| Location                   | Clean Room Clean Bench                             |
| Portion                    | Bottom of screw                                    |
| Equipment                  | Laser Dust Monitor                                 |
| Flow                       | 6 L/min                                            |
| Measured dia. of particles | 0.3 μm and larger                                  |

\* The above data is based on dust emitted from the screw portion. Use a safety cap to prevent dust from the oil seal in the input shaft portion. Dust is collected in this cap and prevented from entering into the atmosphere.

### 3. Options

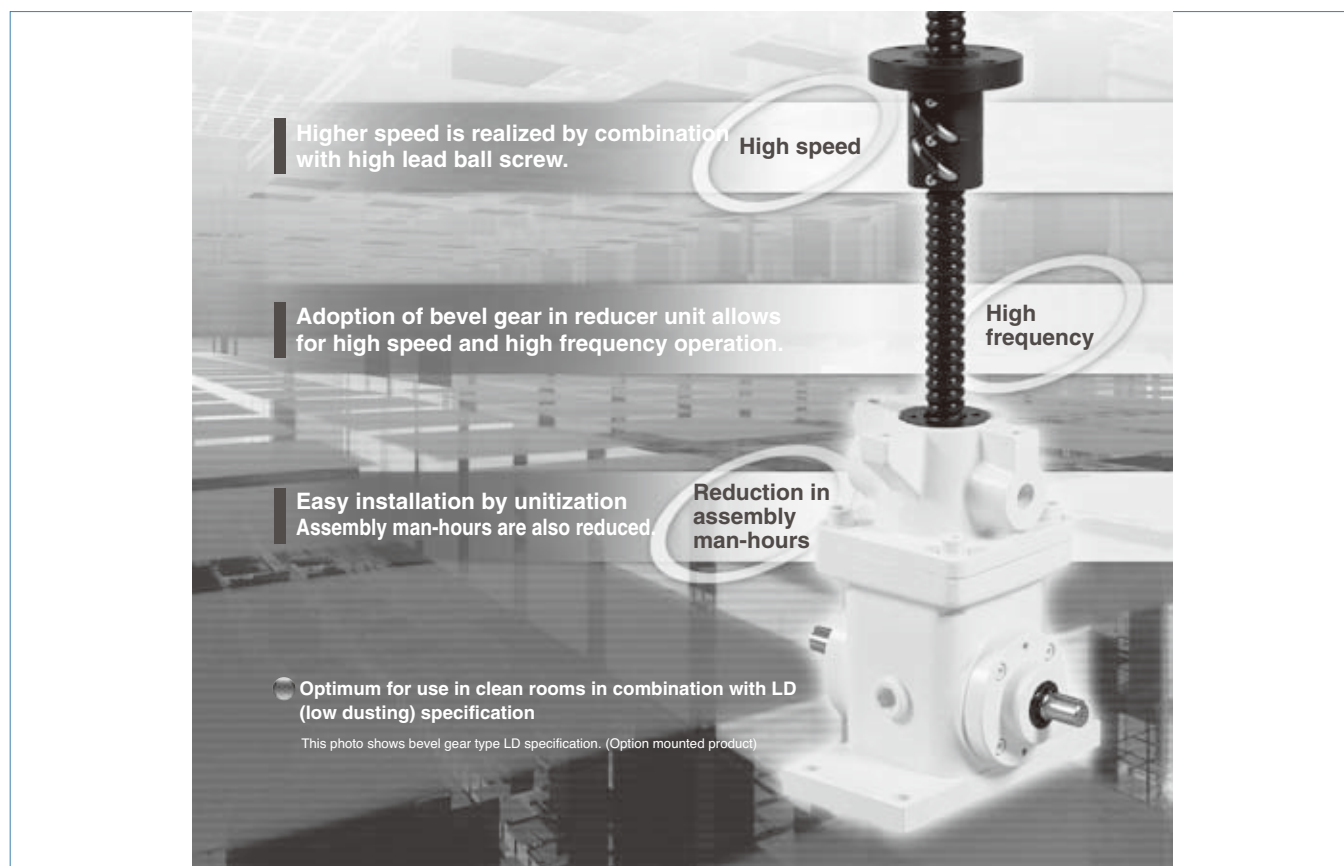
The following options are available with Linipower Jack LD Type:  
(Select according to specific requirements)

- Input shaft.....Electroless nickel plating
- End fitting.....Electroless nickel plating
- Steel pipe.....Metallic screw cover
- Safety cap.....Plastic
- Ball nut.....RAYDENT® treatment.

## Linipower Jack Bevel Gear Type

Bevel gear type released in response to voices demanding high speed and high frequency operation.

### 1. Basic Specifications



## Lubrication Grease for Power Cylinder Linipower Jack

### TSUBAKI E&M Low dusting grease for screw shaft LD grease

Effective for use in clean rooms!

Model No.: JWGC100G



### TSUBAKI E&M screw shaft lubrication grease

Effective for use in clean rooms!

Model No.: JWGS100G



## Linipower jack screw set on sale

Sets of screw shafts and nuts for linipower jacks are on sale. For screw specifications (screw diameter and screw lead), see the following pages.

|                   |                         |
|-------------------|-------------------------|
| Trapezoidal screw | P169~170 (~ $\phi 85$ ) |
| Ball screw        | P195~196 (~ $\phi 85$ ) |

For use and selection set with coupling and reducer, please feel free to consult with us.



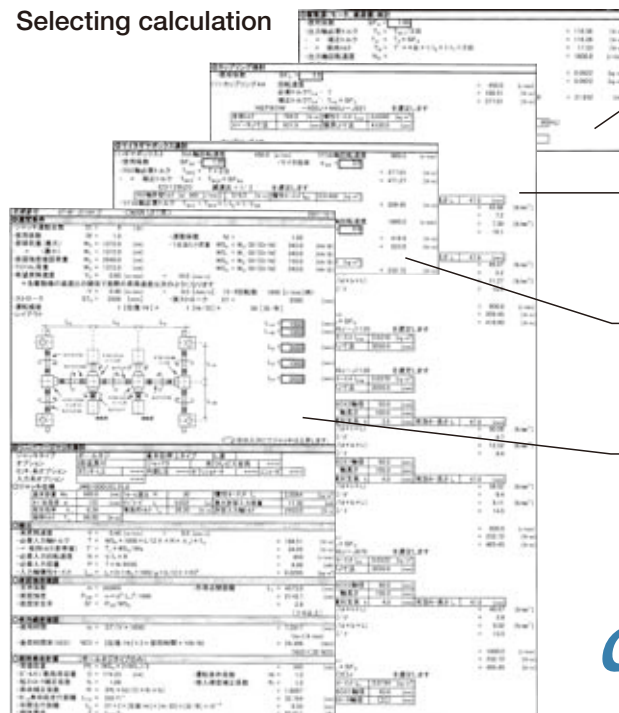
# Selection service

## ● Service contents

An optimum jack linkage system is offered according to customer application.

Selection of drive part and peripheral equipment, preparation of layout drawing, etc., are flexibly handled.

### Selecting calculation



Selection of drive source  
 · Type  
 · Characteristics  
 · Torque

Selection of coupling  
 · Size  
 · Length  
 · Shaft diameter

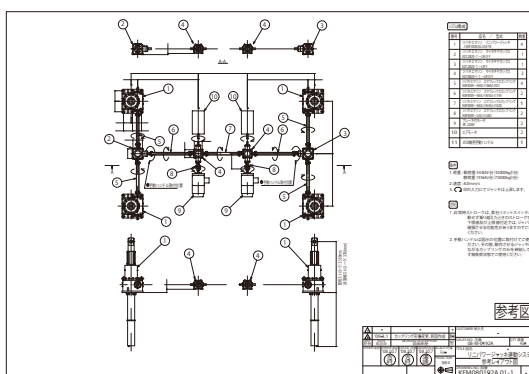
Selection of gearbox  
 · Capacity  
 · Gear ratio  
 · Shaft arrangement

Selection of jack  
 · Model No.  
 · Buckling  
 · Life

*Quick response!*

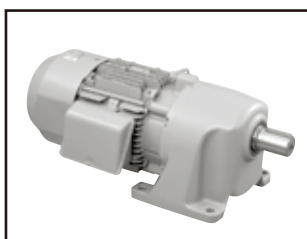
*To improve design efficiency!*

Preparation of layout drawing



## [Reducers]

### Gearmotor



- Low noise, compact, light
- 0.1~5.5 kW
- Gear ratio 1/5~1/1200
- Unique face mount (standard)
- Quiet, high performance brake.

### Hypoid Motor



- Space saver
- 0.1~5.5kW
- Gear ratio 1/5~1/1200
- Face or foot mounting and hollow shaft (all standard).
- Quiet, high performance brake.

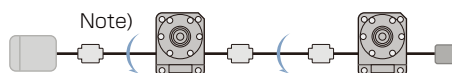
Cosult with Mechatronics Center

TEL : +81-790-47-1801 FAX : +81-790-47-1939

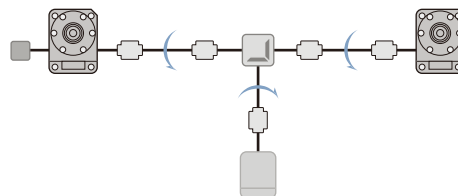
### For linkage of two

[Ideally, T-type]

#### Straight type

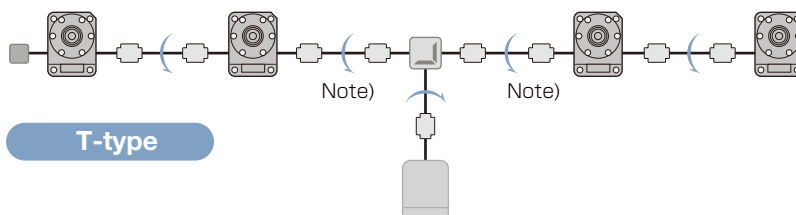


#### T-type

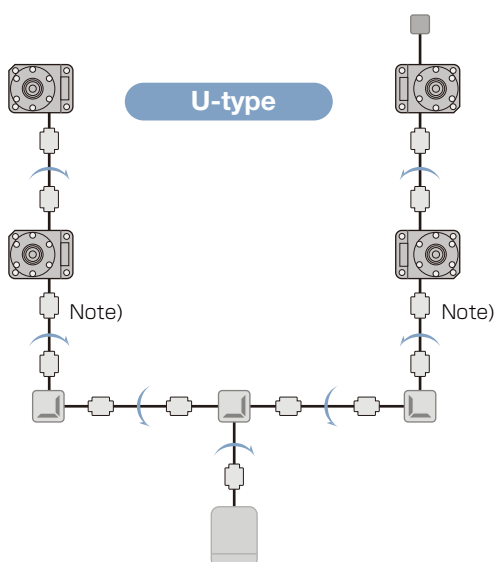


### For linkage of four

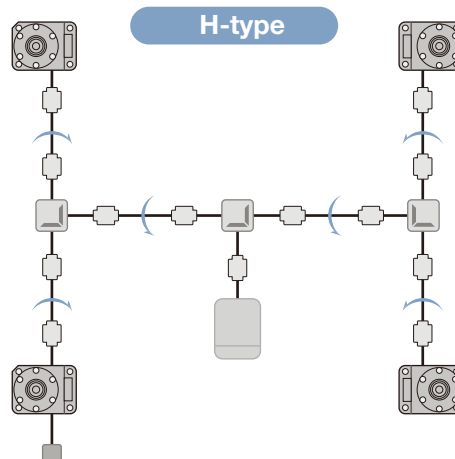
Ideally, H-type



#### T-type



#### U-type



#### H-type



... Linipower Jack



... Drive Source



... Coupling



... LS Counter Position Sensor



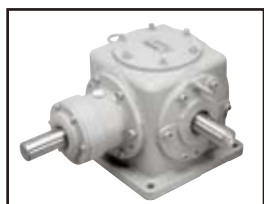
... Gear Box



Jacks lift as rotational input is applied in the direction of each arrow.  
Note) Consider allowable input torque when driving in series.

## [Gear Boxes]

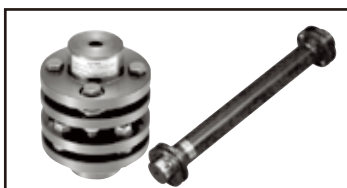
### Miter Gear Box



- Gear ratio 1 : 1 size 10
- Gear ratio 1.5 : 1 size 5
- Gear ratio 2 : 1 size 9
- Gear ratio 2.5 : 1 size 5
- Gear ratio 3 : 1 size 5
- Enhanced performance by new AGMA standards.
- Wide variation of models.
- High reliability

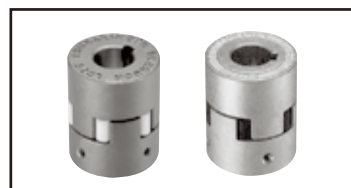
## [Coupling]

### ECHT-FLEX coupling



- Torque range : 2.9~176400 N·m
- Bore diameter range : 5~289 mm
- No backlash, high efficiency and servo motor compatible.
- Requires less maintenance, no lubrication and long life.
- Long Spacer Types requiring no bearings available.

### Jaw Flex Coupling

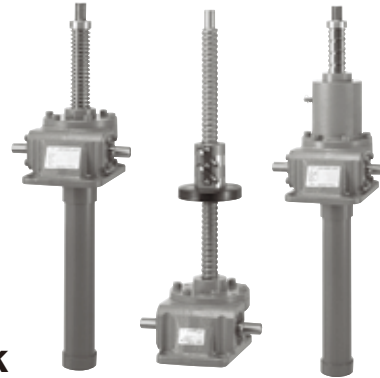
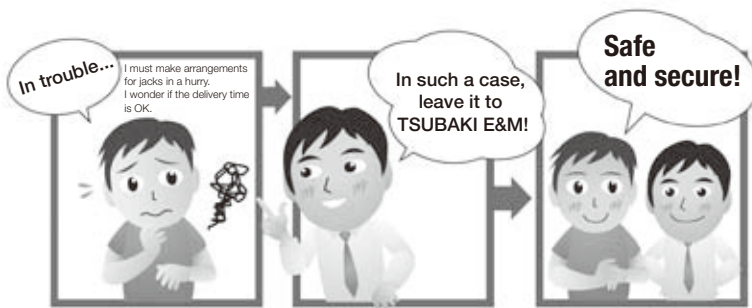


- Compact, light
- Simple
- Easy to un/install

Ask TSUBAKI E&M for other protecting devices such as shock relays, torque limiters, and torque guards.

# SAVE YOUR TIME!!

That is our promise.



## Delivery chart for standard Linipower Jack

|                          | Type                               | Installation type | Basic Capacity | Stroke (mm) | Delivery    |
|--------------------------|------------------------------------|-------------------|----------------|-------------|-------------|
| Standard Model           | JWM<br>(Machine Screw Type)        | US<br>DS          | 002            | 100~400     | 5<br>days   |
|                          | JWB<br>(Ball Screw Type)           |                   | 005~200        | 100~600     |             |
|                          | JWB<br>(Ball Screw Type)           |                   | 005~200        | 100~600     |             |
|                          | JWH<br>(High Lead Ball Screw Type) |                   | 010~200        | 100~600     |             |
| Rotation Prevention Type | JWM<br>(Machine Screw Type)        | UM<br>DM          | 002            | 100~400     | 1<br>week   |
|                          | JWB<br>(Ball Screw Type)           |                   | 005~050        | 100~600     |             |
|                          | JWB<br>(Ball Screw Type)           |                   | 005~050        | 100~600     |             |
|                          | JWB<br>(Ball Screw Type)           |                   | 005~050        | 100~600     |             |
| Travel Nut Type          | JWM<br>(Machine Screw Type)        | UR<br>DR          | 002            | 100~400     | 1<br>week   |
|                          | JWB<br>(Ball Screw Type)           |                   | 005~200        | 100~600     |             |
|                          | JWB<br>(Ball Screw Type)           |                   | 005~200        | 100~600     |             |
|                          | JWB<br>(Ball Screw Type)           |                   | 005~200        | 100~600     |             |
| Compact Jack Type        | JWM<br>(Machine Screw Type)        | US<br>DS          | 002            | 100~400     | 2<br>months |
|                          | JWB<br>(Ball Screw Type)           |                   | 005~200        | 100~600     |             |
|                          | JWB<br>(Ball Screw Type)           |                   | 005~200        | 100~600     |             |
|                          | JWB<br>(Ball Screw Type)           |                   | 005~200        | 100~600     |             |

\* Contact us for a lot of 5 units or more regarding the above.

# *Inquiry Form*

## Power Cylinder Inquiry Form

Inform TSUBAKI E&M of the following items when making an inquiry.

Company name: \_\_\_\_\_

Your name: \_\_\_\_\_

TEL : \_\_\_\_\_

FAX : \_\_\_\_\_

(〒       -       )

Address: \_\_\_\_\_

|                        |                              |                                                                                                                                |        |            |        |
|------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------|------------|--------|
| Standard Specification | 1. Application load (thrust) | Normal operation                                                                                                               | N{kgf} | Max        | N{kgf} |
|                        | 2. Speed                     | mm/s (at 50Hz, 60Hz)                                                                                                           |        |            |        |
|                        | 3. Stroke                    | Actual stroke                                                                                                                  | mm     | Max stroke | mm     |
| Electric Motor         | 4. Power                     | 3-phase 200V/50Hz, 200V/60Hz, 220V/60Hz<br>3-phase 400V/50Hz, 400V/60Hz, 440V/60Hz<br>[ Others ]                               |        |            |        |
|                        | 5. Special Specification     | Brake,      Outdoors,      Explosion-proof<br>[ Others ]                                                                       |        |            |        |
| Operating Environment  | 6. Operation                 | times/min x      min/hrs. x      hrs./day x      days/yr.<br>(Back and forth count as 2)                                       |        |            |        |
|                        | 7. Ambient Temperature       | °C                                                                                                                             |        |            |        |
|                        | 8. Mounting Location         | Indoor,      Outdoors,      Explosion-proof<br>[ Others ]                                                                      |        |            |        |
|                        | 9. Dust                      | Average,      High                                                                                                             |        |            |        |
|                        | 10. Control Device           | Stroke adjustment external LS,      Thrust detection LS,<br>Internal LS,      Potentiometer,      Rotary Encoder<br>[ Others ] |        |            |        |
|                        | 11. Others                   | Trunnion fitting, crevice fitting, I-shape end fitting<br>[ Others ]                                                           |        |            |        |

Layout    Other information

## Servo Type Inquiry Form

Inform TSUBAKI E&M of the following items when making an inquiry.

Company name: \_\_\_\_\_

Your name: \_\_\_\_\_

TEL : \_\_\_\_\_

FAX : \_\_\_\_\_

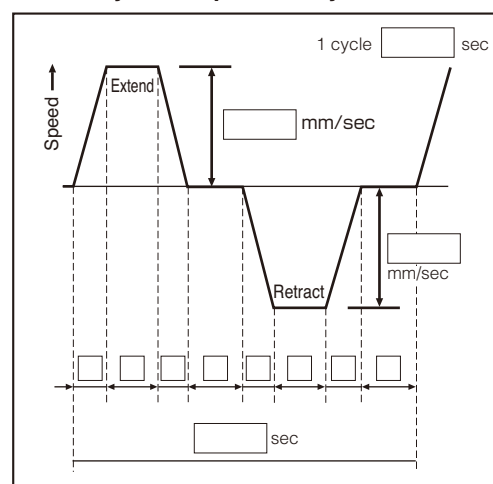
( 〒                      -                      )

Address: \_\_\_\_\_

### [Equipment standard condition] Description of equipment used

|                                                 |                                                                                                                                                                                                                                                                                                             |                    |            |          |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------|----------|
| Type and property of load                       | <input type="checkbox"/> Horizontal <input type="checkbox"/> lift <input type="checkbox"/> suspension <input type="checkbox"/> tilt <input type="checkbox"/> others<br>extent of shock, inertia and vibration <input type="checkbox"/> Small <input type="checkbox"/> Middle <input type="checkbox"/> Large |                    |            |          |
| Transfer mass                                   | _____ kg                                                                                                                                                                                                                                                                                                    |                    | _____ kg   |          |
| Necessary thrust                                | Normal operation _____ N (kgf)                                                                                                                                                                                                                                                                              | Max. _____ N (kgf) |            |          |
| Speed                                           | Normal operation _____ mm/s                                                                                                                                                                                                                                                                                 | Max. _____ mm/s    |            |          |
| Stroke                                          | Normal operation _____ mm                                                                                                                                                                                                                                                                                   | Max. _____ mm      |            |          |
| Operating frequency (Back and forth count as 2) | times/min x                                                                                                                                                                                                                                                                                                 | min/hrs. x         | hrs./day x | days/yr. |
| Power cylinder expected life                    | (                      ) years operating schedule                                                                                                                                                                                                                                                           |                    |            |          |

### [Power cylinder operation cycle]



### [Servomotor used]

|                         |       |                      |       |
|-------------------------|-------|----------------------|-------|
| Servomotor manufacturer | _____ | Servomotor model No. | _____ |
|-------------------------|-------|----------------------|-------|

### [Other conditions]

|                       |                     |                                                                                                                                                                                                                          |
|-----------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Environment | Ambient temperature | _____ °C                                                                                                                                                                                                                 |
|                       | Installing place    | <input type="checkbox"/> Indoor<br><input type="checkbox"/> Others (                      )                                                                                                                              |
|                       | Dust                | <input type="checkbox"/> Nearly average<br><input type="checkbox"/> Others (                      )                                                                                                                      |
|                       | Power source        | <input type="checkbox"/> 3-phase 200/200 220V AC 50/60/60Hz<br><input type="checkbox"/> Others (                      )                                                                                                  |
|                       | Others              | <input type="checkbox"/> Trunnion fitting <input type="checkbox"/> U-shape fitting <input type="checkbox"/> Magnetic sensor<br><input type="checkbox"/> Bellows <input type="checkbox"/> Others (                      ) |

Layout    Other information

## Linipower Jack Inquiry Form

Inform TSUBAKI E&M of the following items when making an inquiry.

Company name: \_\_\_\_\_

Your name: \_\_\_\_\_

TEL : \_\_\_\_\_

FAX : \_\_\_\_\_

(〒       -       )

Address: \_\_\_\_\_

|                     |                                                     |                                                                                                                                                       |
|---------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating condition | Equipment or Load Condition                         | Equip. Description _____ • No Shock Light Load • Moderate Shock Medium Load • Severe Shock Heavy Load                                                 |
|                     | Overall Equip. Weight/No.of Jacks                   | Equip. Max load _____ kN { _____ tf}/Jack (Equip. Min. load _____ kN { _____ tf}/Jack)                                                                |
|                     | Installation form                                   | Standard specification (Lift/Suspend) With/Without Rotation prevention Travel Nut (Lift/Suspend)                                                      |
|                     | Installation Condition<br>(Buckling Safety Rate Sf) | A. Fixed Base Shaft end free B. Crevice-Both End C. Fixed Base Fixed Shaft End<br>(Sf= _____ ) Leave open if no buckling load applies to screw shaft. |
|                     | Screw Type                                          | Machine Screw Type Ball Screw Type High Lead Screw Type                                                                                               |

|                      |                     |                                                                    |
|----------------------|---------------------|--------------------------------------------------------------------|
| Three specifications | 1. Load Requirement | Load /Jack based on the above the information _____ kN { _____ tf} |
|                      | 2. Speed            | _____ ~ _____ mm/s ( _____ ~ _____ mm/min)                         |
|                      | 3. Stroke           | Actual Stroke _____ mm Max. stroke _____ mm                        |

|                     |                                                                         |                                                                                                   |
|---------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Operating condition | Operation                                                               | _____ times/min x _____ min/hrs. x _____ hrs./day x _____ days/yr.<br>(Back and forth count as 2) |
|                     | Reducer Unit                                                            | Motor with brake (Gearmotor with brake)                                                           |
|                     | Power                                                                   | _____ kW (1/ _____ ) Others _____                                                                 |
|                     | Input R.P.M                                                             | _____ V _____ Hz                                                                                  |
|                     | Ambient Temperature                                                     | _____ r/min _____ °C                                                                              |
|                     | Equipment Condition                                                     | Mounting Location _____ with/without guides                                                       |
|                     | Dust                                                                    | Average High with / without bellows Others                                                        |
|                     | Control Device                                                          | Counter LS • Internal LS K2•K4 • Potentiometer • Rotary Encoder • Others _____                    |
| Others              | Shaft end (B•I•M type end fitting) • Hand wheel • Clevis • Others _____ |                                                                                                   |

Layout    Other information

# SAFETY



## Warning Observe the following safety precautions to prevent serious injuries.

- Do not release the brake while jack is loaded. If the brake is released under loaded conditions, suspended objects may fall and lead to accidents.
- Make sure the jack is not loaded when manually operated. Operate jack according to the instruction manual.
- During suspending operations, provide safety guards to prevent load from falling and never stand under the jack.
- Observe the Labor Safety & Hygiene Regulations, General Criteria, Paragraph 1, Chapter 1, Edition 2, or your local regulations.
- Installation, removal, maintenance and inspection:
  - Carry out operation according to the instruction manual.
  - While performing electrical wiring, observe laws and regulations such as Electricity Equipment Criteria and Extension Rules, as well as the cautions (e.g. direction, space, operating conditions, etc.) indicated in the manual. Be especially careful in following the instructions on grounding to prevent electric shocks.
  - Turn off the power and make sure that it does not reconnect accidentally.
  - Wear appropriate clothing and protective gears (safety glasses, gloves, safety shoes, etc.).



## Caution Observe the following safety precautions to prevent accidents.

- Always operate within the allowable stroke range. Operating a jack outside its allowable stroke range may result in accidents.
- Before switching on the jack, make sure the limit switches have been wired correctly and the stroke has been adjusted appropriately.
- The motor must be driven within the correct electrical voltage range to prevent motor burnout or fire.
- Efficiencies of parts may decrease with wear and age. Carry out periodic inspections as set forth in the manual.

When the parts are no longer functioning or are ineffective, please contact a TSUBAKI E&M distributor for repair.
- Read the manual provided with the product thoroughly before operating and refer to it as necessary. If the instruction manual is misplaced, request a replacement copy from TSUBAKI E&M or your TSUBAKI E&M distributor, indicating the product name, series, and model number.
- The instruction manual must be delivered to the final user.

## Warranty

### 1. Warranty period without charge

18 months effective the date of shipment or 12 months effective the first use of Goods, including installation of Goods to Buyer's equipment or machine - whichever comes first.

### 2. Warranty coverage

Should any damage or problem with the Goods arise within the warranty period, given that the Goods were operated and maintained according to the instructions provided in the manual, Seller will repair and replace at no charge once the Goods are returned to the Seller. This warranty does not cover the following:

- 1) Any costs related to removal of Goods from the Buyer's equipment or machine to repair or replace parts.
- 2) Cost to transport Buyer's equipment or machine to the Buyer's repair shop.
- 3) Costs to reimburse any profit loss due to any repair or damage and other consequential losses caused by the Buyer.

### 3. Warranty with charge

Seller will charge any investigation and repair of Goods caused by:

- 1) Improper installation by failing to follow the instruction manual.
- 2) Insufficient maintenance or improper operation by the Buyer.
- 3) Incorrect installation of Goods to other equipment or machine.

4) Any modifications or alterations of Goods by the Buyer.

5) Any repair by engineers other than the Seller or those designated by the Seller.

6) Operation in an inappropriate environment not specified in the manual.

7) Force Majeure or forces beyond the Seller's control such as natural disasters and injustices done by a third party.

8) Secondary damage or problem incurred by the Buyer's equipment or machine.

9) Defected parts supplied, or specified by the Buyer.

10) Incorrect wiring or parameter setting by the Buyer.

11) The end of life cycle of the Goods under normal usage.

12) Loss or damage not liable to the Seller

### 4. Dispatch service

Service to dispatch a Seller's engineer to investigate, adjust or trial test Seller's Goods is at the Buyer's expense.



## Caution This catalog does not include operating instructions. Read the actual manual thoroughly before installing or operating the product.



## TSUBAKIMOTO CHAIN CO.

### Headquarters

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3-3-3 Nakanoshima, Kita-ku  
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URL : <http://tsubakimoto.com>

### Chain & Power Transmission Sales

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Kyotanabe,  
Kyoto, 610-0380, Japan  
Phone : +81-774-64-5022

### Group companies

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301 E. Marquardt Drive, Wheeling, IL 60090, U.S.A.  
Phone : +1-847-459-9500  
URL : <http://www.ustsubaki.com>

**TSUBAKI of CANADA LIMITED**  
1630 Drew Road, Mississauga, Ontario, L5S 1J6, Canada  
Phone : +1-905-676-0400  
URL : <http://tsubaki.ca>

**TSUBAKI BRASIL EQUIPAMENTOS INDUSTRIAIS LTDA.**  
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CEP 01405-001, São Paulo, S.P.Brazil  
Phone : +55-11-3253-5656  
URL : <http://tsubaki.ind.br>

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URL : <http://tsubaki.eu>

**TSUBAKIMOTO U.K. LTD**  
Osier Drive, Sherwood Park, Annesley, Nottingham  
NG15 0DX, United Kingdom  
Phone : +44-1623-688-700  
URL : <http://tsubaki.eu>

**TSUBAKI DEUTSCHLAND GmbH**  
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Phone : +49-8105-7307100  
URL : <http://tsubaki.eu>

**OOO "TSUBAKI KABELSCHLEPP"**  
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115432 Moscow, Russia  
Phone : +7-499-418212  
URL : <http://tsubaki.eu>

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URL : <http://tsubakimoto.com.tw>

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Phone : +65-6861-0422/3/4  
URL : <http://tsubaki.sg>

**Vietnam Representative Office**  
Phone : +84-8-3999-0131/2

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**New Zealand Branch**  
Phone : +64-275-082-726

**TSUBAKIMOTO CHAIN (SHANGHAI) CO. LTD.**  
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Huangpu District, Shanghai 2000020,  
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Phone : +86-21-5396-6651/2  
URL : <http://chunben.com>

**TSUBAKIMOTO (THAILAND) CO. LTD.**  
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Phone : +66-2-262-0667/8/9  
URL : <http://tsubaki.co.th>

**TSUBAKI INDIA POWER TRANSMISSION PTE. LTD.**  
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Royapettah, Chennai, Tamil Nadu 600014, India  
Phone : +91-44-4231-5251  
URL : <http://tsubaki.sg>

**PT. TSUBAKI INDONESIA TRADING**  
Wisma 46 - Kota BNI, 24th Floor, Suite 24.15  
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Phone : +62-21-571-4230/31  
URL : <http://tsubaki.sg>

**TSUBAKI POWER TRANSMISSION (MALAYSIA) SDN. BHD.**  
No. 22, Jalan Astaka U8/84A, Bukit Jelutong Industrial Park  
Section U8, 40150 Shah Alam, Selangor, Malaysia  
Phone : +60-3-7859-8585  
URL : <http://tsubaki.sg>

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