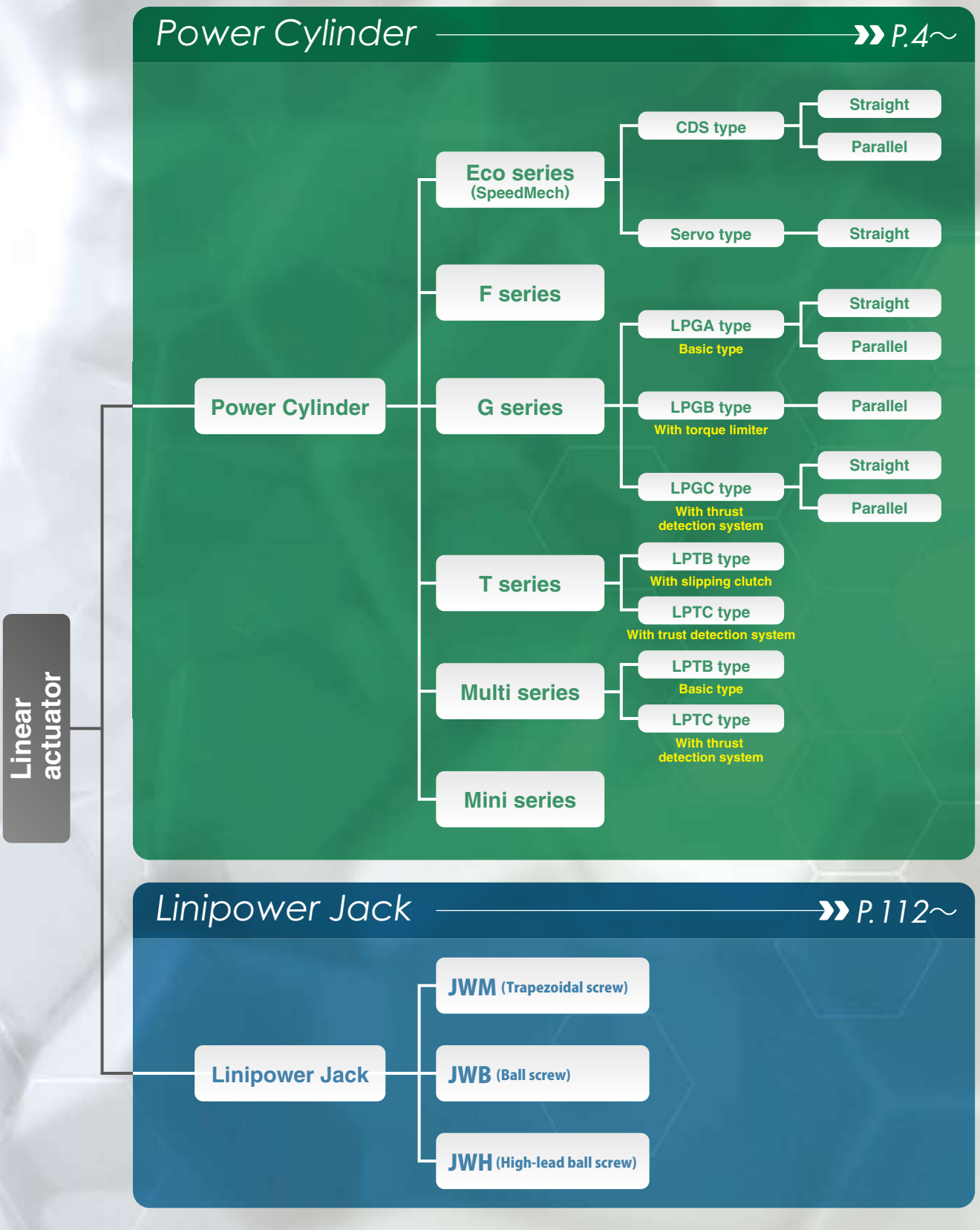
Innovation in Motion
TSUBAKI

TSUBAKI EMERSON
POWER CYLINDER
LINIPOWER JACK

Power Cylinder

Integrated Actuator

Linipower Jack



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).

Enhanced Website

L-Quote / J-Quote and L-Replace / J-Replace are available only in Japanese.

From Website of TSUBAKI EMERSON
(http://www.tsubakimoto.jp/tem/)
Go to Linear Actuator page

1 L-Quote / J-Quote
2 L-Replace / J-Replace
3 CAD drawing download service

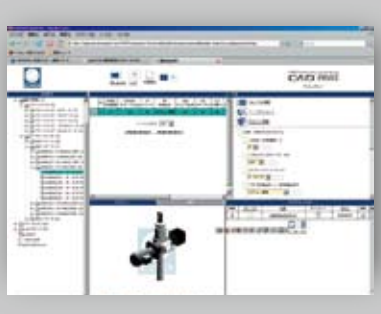
1 L-Quote / J-Quote Simple estimation software

- Quick search for standard price and standard delivery date using model number
- Drawings also downloadable

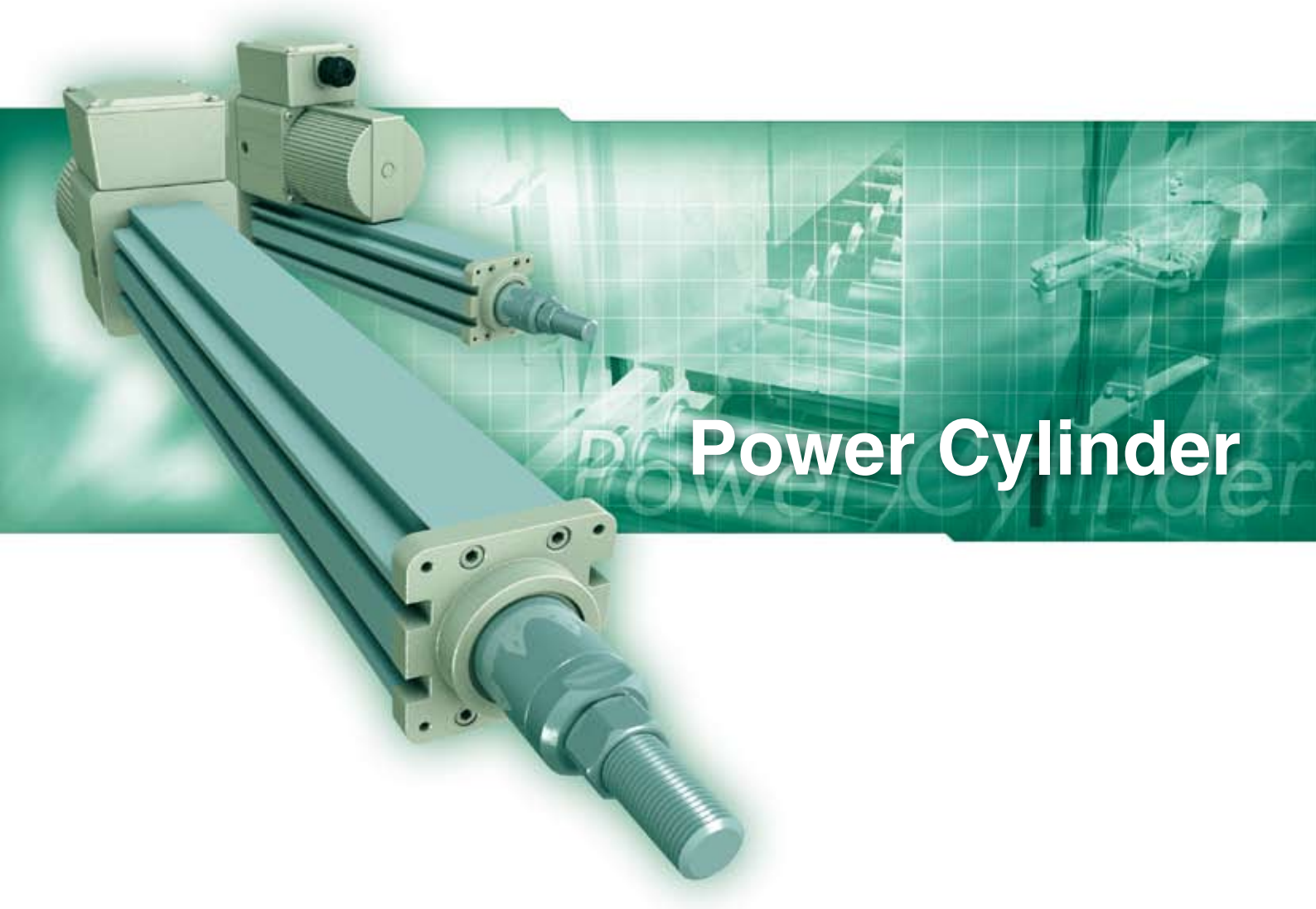
2 L-Replace / J-Replace Other company's product replacement software

- Quick search for our company's equivalent number using model number of other company
- The standard price and standard delivery date are displayed.

3 CAD drawing download service (2D / 3D)



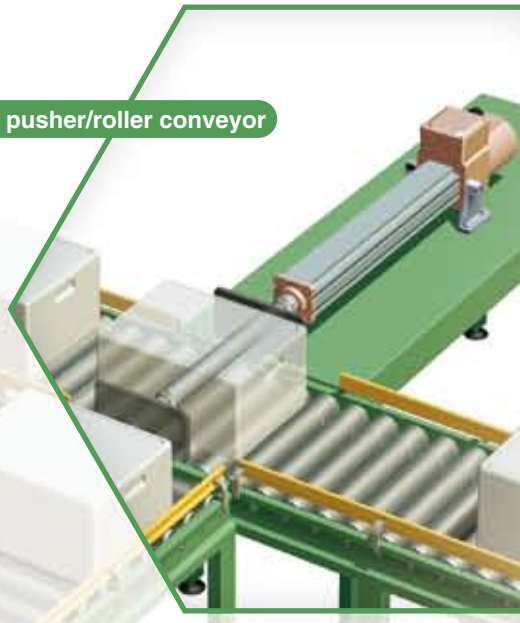
- Both two and three dimensional data are downloadable.
- Interface dimensions and interface with peripheral equipment can be checked.



Power Cylinder

Application Solutions

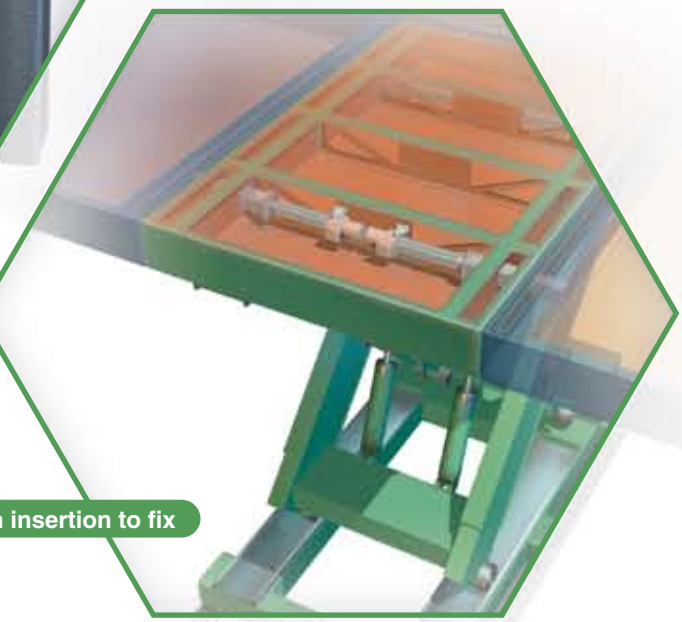
TSUBAKI EMERSON Power Cylinders were born over 40 years ago, and have been used across a variety of industries by a wide range of customers.
By taking advantage of our accumulated experience, we have continued to develop new products as well as upgrade technologies, and proactively address environmental 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

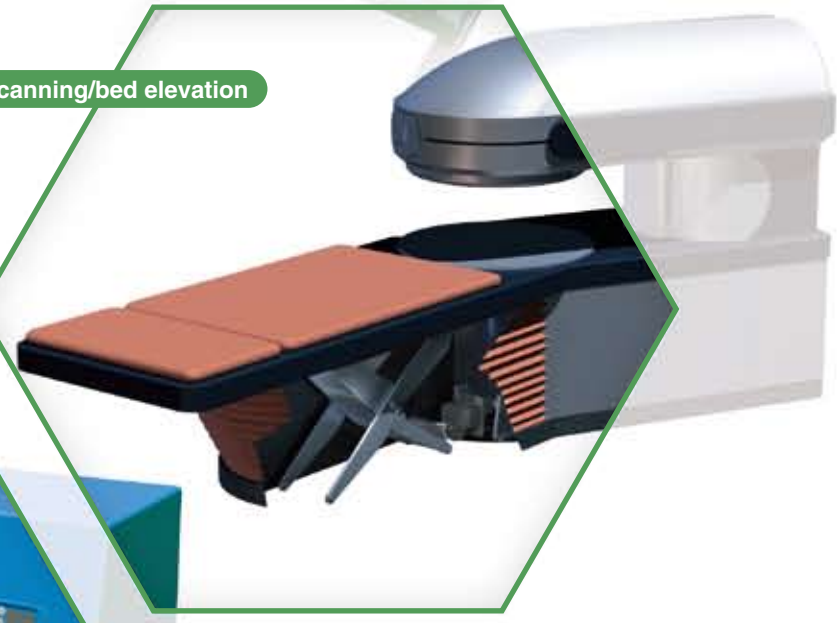
For heat treatment furnace/door opening and closing

LCD TVs



For lifters/pin insertion to fix

For CT scanning/bed elevation



For machine tools/door opening and closing

Power Cylinder Basic specifications list

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

		Eco series											F series						
* Rated thrust	N	0.25kN～1.00kN {25.5～103kgf}				0.40kN～15.0kN {40.8～1530kgf}							100N～6.00kN {10.2～612kgf}						
	{kgf}	25.5	51.0	51.0	102	40.8	153	306	408	816	1220	1530	10.2	20.4	40.8	102	204	306	612
Speed	Slow																		
	Low														15			9	8
	Medium		90/100		90/90									24			18		
	High	160/190		160/170		～300			～333				54			30			
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

	Eco series											F 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 column		○						○										
I-type end fitting		○						●										

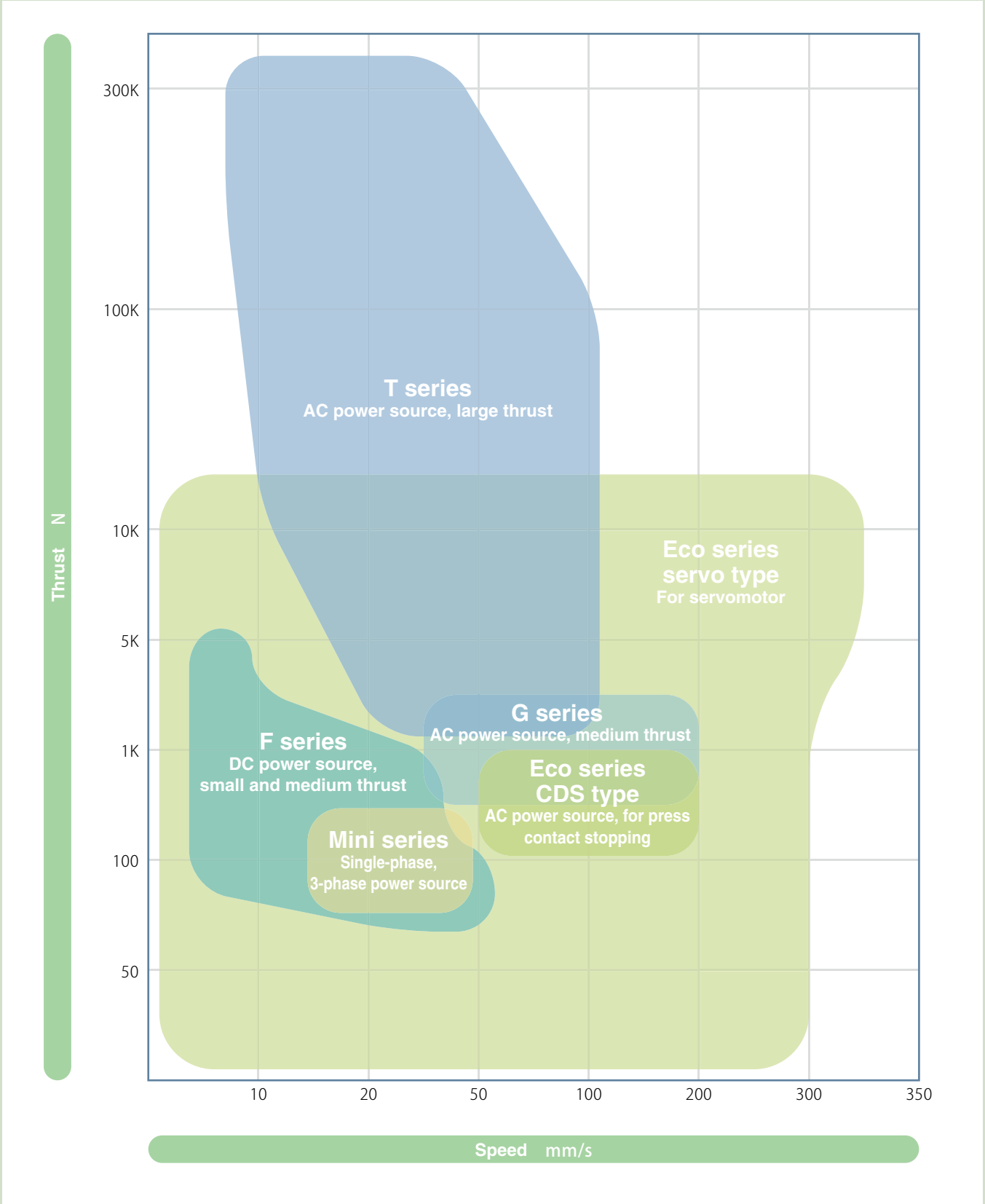
* For options with an * mark, the clevis fitting cannot be attached.
Note) ● indicates standard. ○ indicates an option.

G series				T series										Large series		Multi series									Mini series		
																											
700N～3.00kN {71.4～306kgf}				2.45N～313kN {250～32000kgf}										617kN～882kN {63000～90000kgf}		4.9N～313kN {500～32000kgf}									98.0N～392N {10～40kgf}		
70	100	150	300	250	500	1000	2000	4000	6000	8000	12000	16000	32000	63000	90000	500	1000	2000	4000	6000	8000	12000	16000	32000	10	20	40
				12.5/15	12.5/15	12.5/15	12.5/15	9/11	6.3/7.6	10/12																	
25/30	25/30	25/30	25/30	25/30	25/30	25/30	25/30	25/30	17.5/21	20/24	10/12	14.5/17.5	10/12	7.5/9	7.5/9	The cylinder speed varies depending on the input rotation speed. Refer to page 84 for details.											9/11
75/90	75/90	75/90	50/60	50/60	50/60	50/60	50/60	35/42	25/30	30/36	18/22	20/24	15/18	10/12	10/12											17/21	
100/120 200/240	100/120 200/240	100/120	67/80	100/120	100/120	100/120	75/90	60/72	42/50	43/52	30/36	31/37	20/24	15/18											34/42		
											●	●	●	●	●							●	●	●			
								●	●	●	●	●	●	●	●					●	●	●	●	●			
●	●	●	●				●	●											●								
●	●	●	●			●	●	●	●	●	●	●	●	●	●				●	●	●	●	●	●			
●	●	●	●		●	●	●	●									●	●	●								
●	●	●	●	●	●	●	●	●								●	●	●	●								
●	●	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●	●	●	●	●	●	●			
●	●	●	●	●	●	●	●	●								●	●	●	●								
●	●	●	●	●	●	●	●	●								●	●	●	●						●	●	●
●	●	●	●	●	●	●	●	●								●	●	●	●						●	●	●
●	●	●	●																						●	●	●

●	●	●	●			○
●	●	●	●			●
○						●
○	○	○	○	○	○	○
○	○	○	○			
○	○	○	○			○
○	○	○	○			
○	○	○	○	○	○	○
○	○	○	○			
○	○	○	○	○	○	○
○	○	●	●	○	●	

Power Cylinder capacity range

TSUBAKI EMERSON 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 CDS type

Thrust：250N～1.00kN {25.5kgf～102kgf}

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

Eco series servo type

Thrust：400N～15.0kN {40.8kgf～1530kgf}

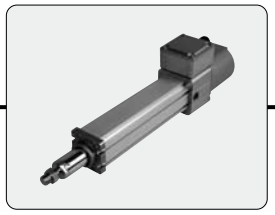
High speed and large thrust
High stop accuracy
For highly frequent operation

Guidance for selection

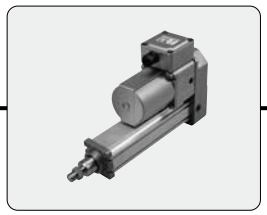
SpeedMech®

Power Cylinder Eco series

CDS type



Straight shape



Parallel shape

- **LPE025H**
  Rated thrust 250N {25.5kgf}
  Rated speed 160/190/200mm/s
- **LPE050L**
  Rated thrust 500N {51.0kgf}
  Rated speed 90/100/110mm/s
- **LPE050H**
  Rated thrust 500N {51.0kgf}
  Rated speed 160/170/190mm/s
- **LPE100L**
  Rated thrust 1.00kN {102kgf}
  Rated speed 90/90/110mm/s

Servo type

70 frame

- Maximum thrust 400N {40.8kgf}
  Maximum speed 300mm/s
- Maximum thrust 1.50kN {153kgf}
  Maximum speed 300mm/s
- Maximum thrust 3.00kN {306kgf}
  Maximum speed 300mm/s

105 frame

- Maximum thrust 4.00kN {408kgf}
  Maximum speed 333mm/s
- Maximum thrust 8.00kN {816kgf}
  Maximum speed 333mm/s
- Maximum thrust 12.0kN {1220kgf}
  Maximum speed 333mm/s
- Maximum thrust 15.0kN {1530kgf}
  Maximum speed 333mm/s

* The values of maximum thrust and maximum speed are determined by the servomotor to be installed.

Power Cylinder Eco series CDS type

Features of Eco series

1. Self-contained

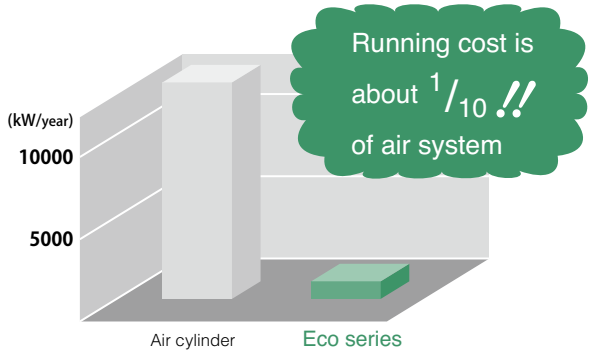
With a spring built in the linear actuating part and the **CDS*** mounted inside the terminal box, overcurrent is detected even when press contact stops or in the case of overload, and the motor is automatically stopped. The press contact force is retained by the built in spring during stoppage.
Press contact stopping is possible at any position within a stroke.
Neither electrical positioning direction nor limit switch, etc. is required.
* **CDS** ··· abbreviation of Current Detective System. It detects overcurrent and stops the motor.

2. Environmentally friendly

This is an environmentally friendly cylinder without noise or mist splash like an air or hydraulic system.
In addition, no parts containing harmful substances such as hexavalent chrome and lead are used. Furthermore, no metal parts such as staples are used for packaging making disposal easy. It also conforms to the **RoHS directive** that has been in effect since 2006.

3. Running cost reduction

Since this is electrically operated, it only consumes electric power when it is used and is therefore economical.
It is not necessary to operate a compressor all the time like in an air system, and the running cost can be considerably reduced.



4. Highly frequent operation and long life

In comparison to a conventional electro-mechanical cylinder, highly frequent operation is possible. **(15 times/minute maximum)**
And by adopting a ball screw, long life can be expected. **(Expected life: 1 million reciprocations)**
Note) The frequency varies depending on the conditions of load and stroke. Refer to page 15 for details.

5. Simple operation

This is operable only by connection of a 3-phase power source.
No limit switch for stroke adjustment is required, and no troublesome wiring, etc., is necessary.
A magnetic sensor (optional) to output a signal when reaching a specified position can be installed.
This is only a sensor to check the position, and is not a sensor to stop at an arbitrary position.

Model No. designation

LPE 100 L K 5 MSIJ

Power Cylinder Eco series

Rated thrust

025 : 250N {25.5kgf}
050 : 500N {51.0kgf}
100 : 1000N {102kgf}

Rated speed

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

Main body shape

T: straight
K: parallel

Stroke

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

Options

M: anti-rod rotation specifications
S: with magnetic sensor*
I : I-type end fitting
U: U-type end fitting
J : bellows

(the standard end part is a screw shape.)

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

Standard model list

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

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

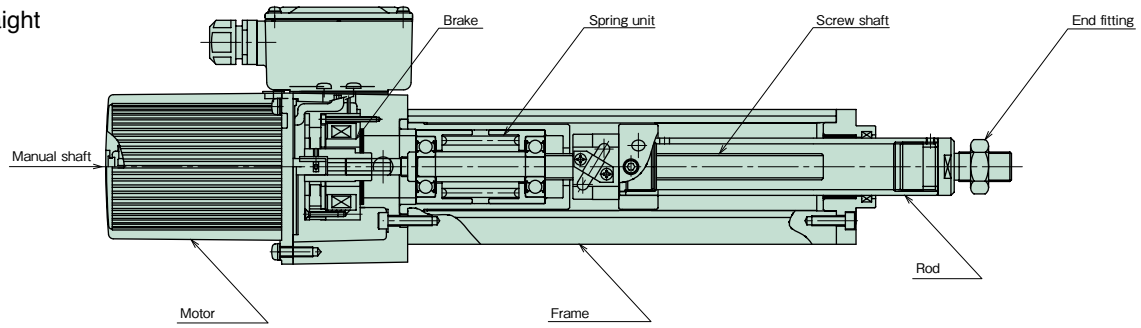
Standard environment of use

Environment \ Model	Indoor type
Ambient temperature	0～40℃
Relative humidity	45～85%
Shock resistance value	0.5G or less
Installation altitude	1000m or lower above sea level
Ambient	Normally indoors*

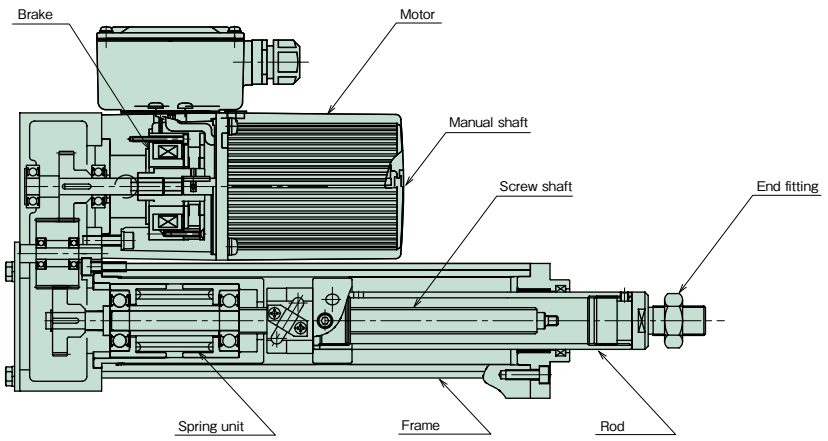
* Normally indoors means no exposure to wind, rain and water, and dust at a level inside an ordinary factory.

Structure

Straight

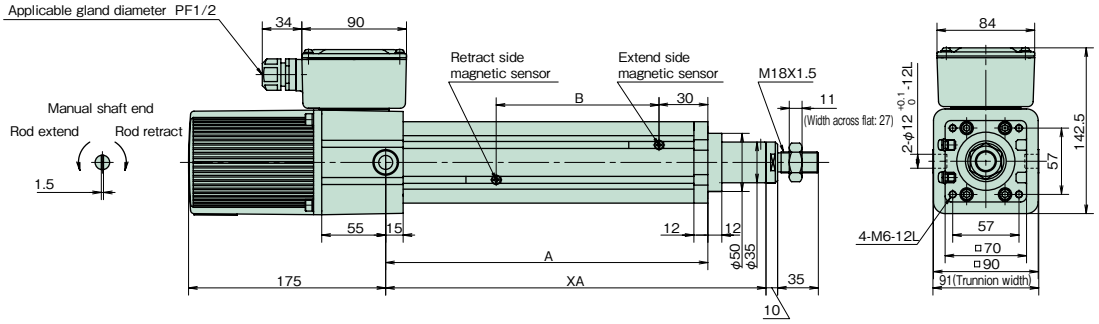


Parallel



Dimensions Table

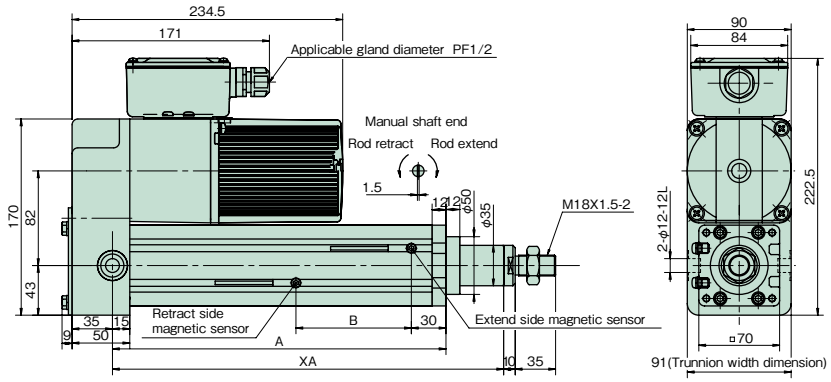
Straight



Unit: mm

Model	Main body shape	Stroke	A	B	XA		Approximate mass (kg)
					MIN	MAX	
LPE025H LPE050L LPE050H 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

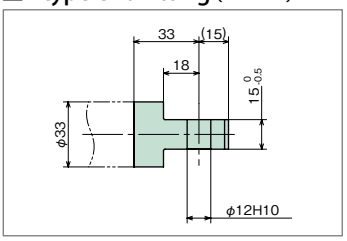


Unit: mm

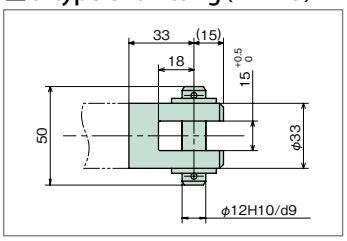
Model	Main body shape	Stroke	A	B	XA		Approximate mass (kg)
					MIN	MAX	
LPE025H LPE050L LPE050H LPE100L	K	100	289	100	339	439	14
		200	389	200	439	639	15
		300	489	300	539	839	16
		400	589	400	639	1039	17
		500	689	500	739	1239	18
		600	789	600	839	1439	19

Options

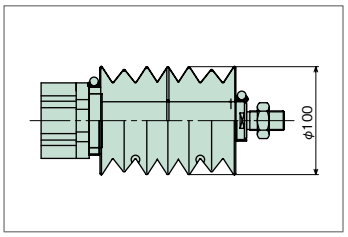
■I-type end fitting (— I)



■U-type end fitting (— U)

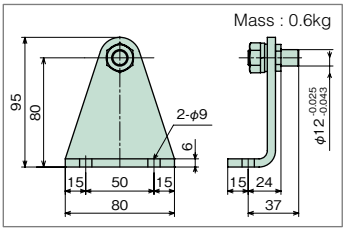


■Bellows (— J)



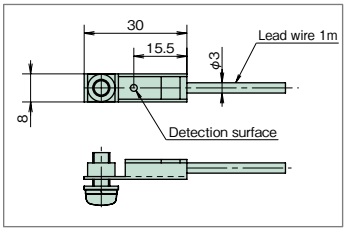
When bellows are equipped, flange mount is not available.

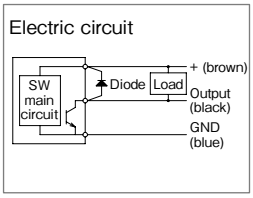
■Trunnion column (LPE025-T)



For the trunnion column, do not place the code at the end of the model number, but separately place an order from the main body model number.

■Magnetic sensor (— MS)





Magnetic sensor specifications

No contact switch (DC 3-wire system) (lead wire 1m)	
Power voltage	DC5～26V
Consumption current	8mA MAX (DC24V)
Output specifications	15mA MAX (DC24V) Open collector output

The magnetic sensor cannot be attached later. If it is necessary, place an order first. Types with a lamp or 2 wire type are also available. Refer to page 21.

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, starts/min.
6. Power voltage, frequency
7. Type of load of machine used
8. Environment of use
9. Hours of operation and annual number of operating days

Selection procedures

1. Select the suitable model number from the standard model list (page13) based on thrust, speed and stroke.
2. Check that the number of cycles of the selected cylinder is within the allowable range with reference to the table at the right. (Table 1)
3. Check that the use conditions are satisfied with reference to the thrust – speed graph. (Figure 1)
4. In the case of use for transportation, check that the mass of the conveyed material is within the allowable range. (Table 2)
5. Select options as required.

Table 1 Allowable number of starts

starts/min.

Model number	Stroke mm	Thrust N			
		10	250	500	1000
LPE025H	100	15	12	—	—
	200	15	12	—	—
	300	10	10	—	—
	400	9	5	—	—
	500	8	4	—	—
	600	6	3	—	—
LPE050L	100	15	10	5	—
	200	8	8	5	—
	300	5	5	5	—
	400	5	5	3	—
	500	5	4	2	—
	600	4	4	2	—
LPE050H	100	15	12	10	—
	200	12	10	8	—
	300	10	10	6	—
	400	9	8	5	—
	500	8	7	4	—
	600	7	6	3	—
LPE100L	100	12	10	8	5
	200	8	8	8	5
	300	5	5	5	4
	400	5	5	5	3
	500	5	5	4	2
	600	4	4	4	2

Figure 1 Thrust – speed graph

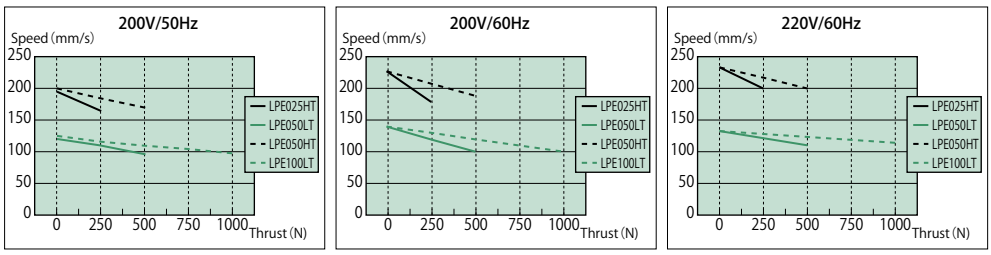


Table 2 Conveyed material mass in consideration of inertia

kg

Model number	Horizontal	Vertical
LPE025HT	50	25
LPE050LT	100	50
LPE050HT	100	50
LPE100LT	200	100

* The data of the above table 1 and figure 1 are numerical values at an ambient temperature of 20℃.
The numerical values may vary depending on the ambient temperature and other conditions, so use them as a guide.

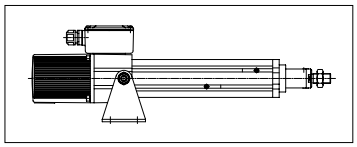
⚠ WARNING

■ Cautions for selecting

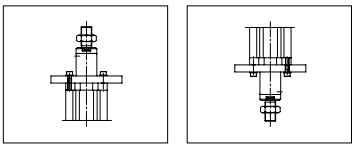
- No anti-rod rotation mechanism is attached to a cylinder with standard specifications. To use the end part freely, select the anti-rod rotation specifications (option).
  And when a magnetic sensor (option) is equipped, anti-rod rotation specifications are required.
- Refer to the allowable number table on page 15 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.

■ Cautions for installation

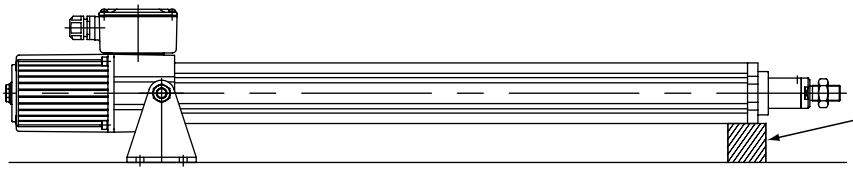
- Install the main body using a trunnion or a flange mount.
  When it is used with oscillation using a trunnion mount, select an I-type or an U-type end fitting.
- If lateral load is applied, provide a guide so as not to receive lateral load or bending moment directly.
- When it is installed with a flange 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

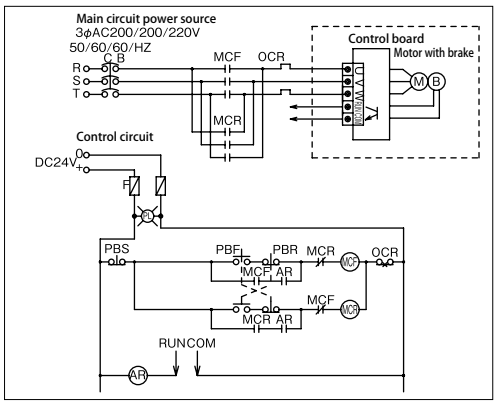


Flange mount



■ 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.

New model of Power Cylinder for high speed and large thrust

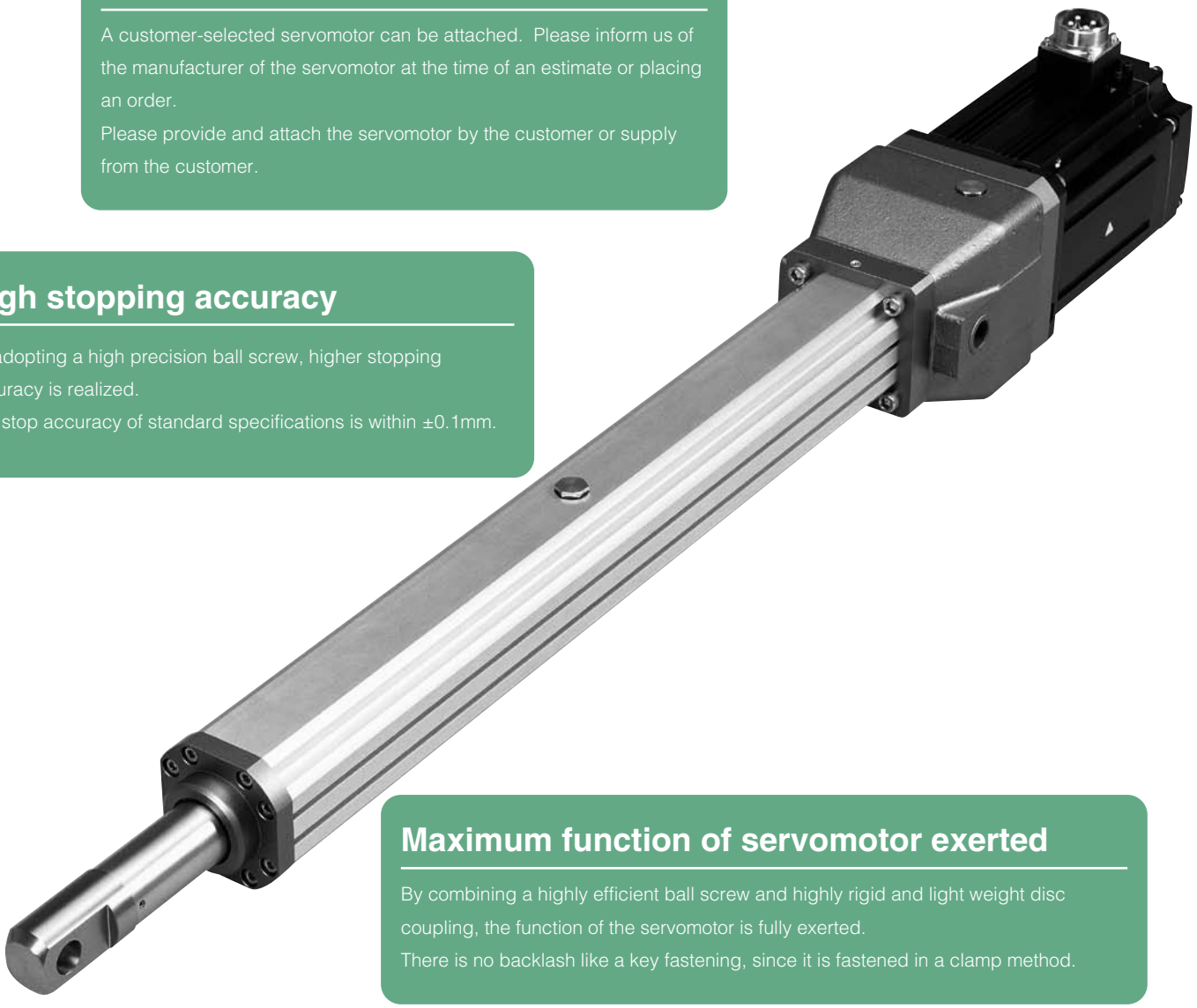
- High speed & Large thrust
- High stopping accuracy
- High frequent drive

Servomotor can be selected

A customer-selected servomotor can be attached. Please inform us of the manufacturer of the servomotor at the time of an estimate or placing an order.
Please provide and attach the servomotor by the customer or supply from the customer.

High stopping accuracy

By adopting a high precision ball screw, higher stopping accuracy is realized.
The stop accuracy of standard specifications is within ±0.1mm.



Maximum function of servomotor exerted

By combining a highly efficient ball screw and highly rigid and light weight disc coupling, the function of the servomotor is fully exerted.
There is no backlash like a key fastening, since it is fastened in a clamp method.

High speed and large thrust

It can be used at high speeds in a large thrust area.
Large thrust is maintained even at high speeds.
* 333mm/s at a maximum 15.0kN {1530kgf}

Model No. designation

LPES 300 F T 3 S3IJ A

Power Cylinder
Eco series servo type

Maximum thrust

040:	400N	{40.8kgf}
150:	1.50kN	{153kgf}
300:	3.00kN	{306kgf}
400:	4.00kN	{408kgf}
800:	8.00kN	{816kgf}
1200:	12.0kN	{1220kgf}
1500:	15.0kN	{1530kgf}

Mounting method
F : Motor direct mounting

Main body shape
T : straight

Stroke

1:	100mm
3:	300mm
6:	600mm
10:	1000mm

* The above numerical values are examples.
Refer to the standard model list below for the actual stroke.

Options
S3: with 3 magnetic sensors
I : I-type end fitting
U: U-type end fitting
J : bellows
(* Make sure to select I or U for the end fitting.)

Motor handling
A : Installed by customer
B : Supplied by customer

Standard model list

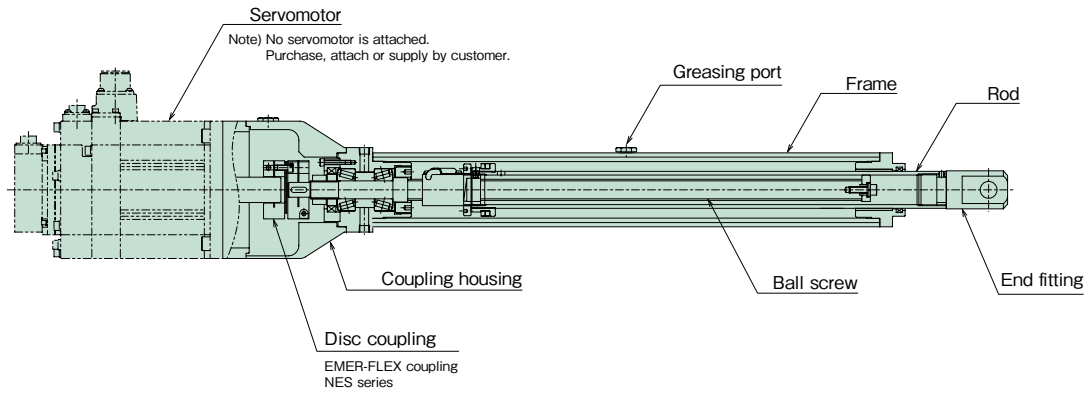
Model number	Maximum thrust N {kgf}	Maximum speed mm/s	Stroke mm	Screw lead mm	Frame size
LPES040	400 {40.8}	300	100 200 300 400 500 600	6	70
LPES150	1.50k {153}				
LPES300	3.00k {306}				
LPES400	4.00k {408}	333	200 300 400 500 600 800 1000	10	105
LPES800	8.00k {816}				
LPES1200	12.0k {1220}				
LPES1500	15.0k {1530}				

Standard use environment

Environment \ Model	Indoor type
Ambient temperature	0～40℃
Relative humidity	45～85%
Impact resistance value	1G or less
Installation altitude	1000m or lower above sea level
Atomsphere	Normally indoors*

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

Structure



Driving part

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

Coupling part

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

Actuating part

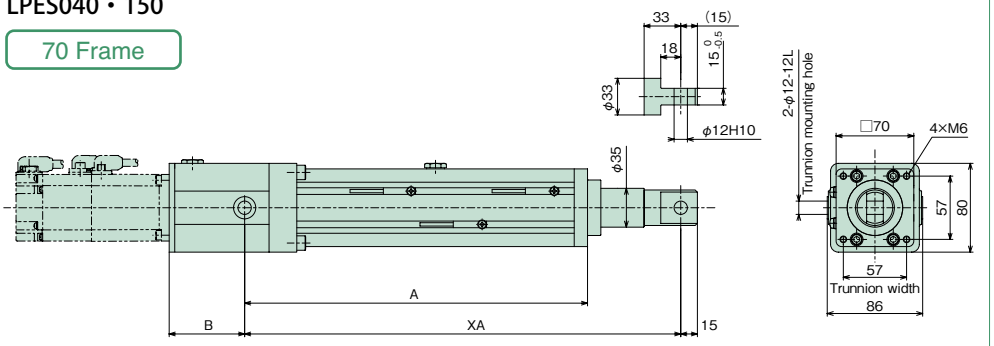
Ball screw
Highly efficient ball screw is adopted. It can withstand remarkably frequent operations and a long life can be expected.

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.

Dimensions Table

LPES040 • 150

70 Frame



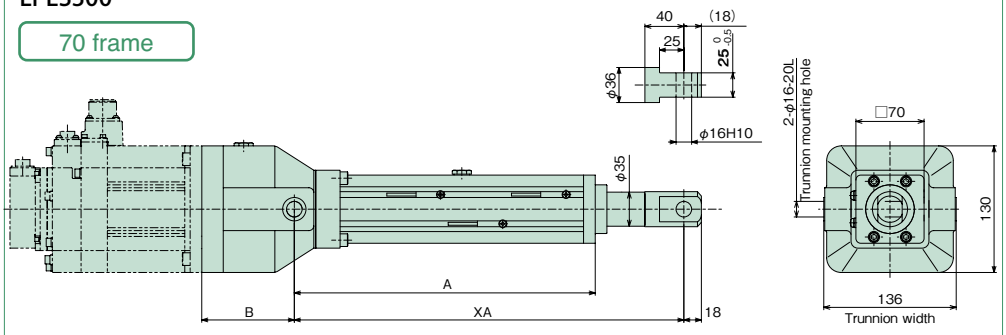
Unit: mm

Model number	B	Stroke	A	XA	
				MIN	MAX
LPES040	68	100	309	395	495
		200	409	495	695
		300	509	595	895
LPES150	77	400	609	695	1095
		500	709	795	1295
		600	809	895	1495

* B dimension in the above table shows a value when a servomotor J3 series of Mitsubishi Electric is mounted.
* A flange can be attached. Refer to page 23 for the installation method.

LPES300

70 frame



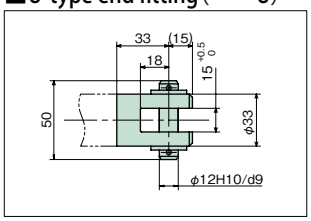
Unit: mm

Model number	B	Stroke	A	XA	
				MIN	MAX
LPES300	95	100	309	400	500
		200	409	500	700
		300	509	600	900
		400	609	700	1100
		500	709	800	1300
		600	809	900	1500

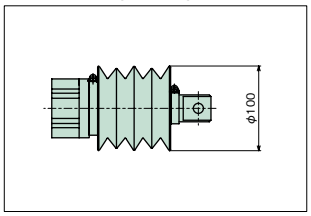
* B dimension in the above table shows a value when a servomotor J3 series of Mitsubishi Electric is mounted.
* No flange can be attached. Refer to page 23 for the installation method.

Options

■U-type end fitting (— U)

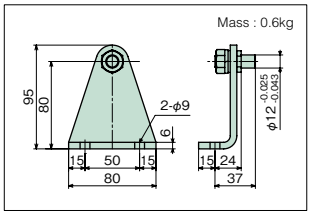


■Bellows (— J)



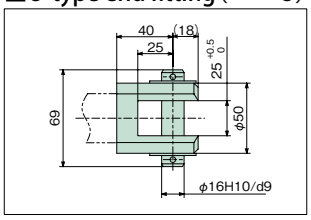
When bellows are equipped, flange mount is not available.

■Trunnion column (LPE025-T)

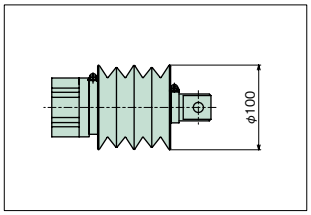


Place an order for a trunnion column separately from the main body model number, and do not provide the code at the end of the model number.

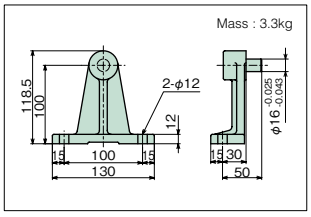
■U-type end fitting (— U)



■Bellows (— J)



■Trunnion column (LPE300-T)

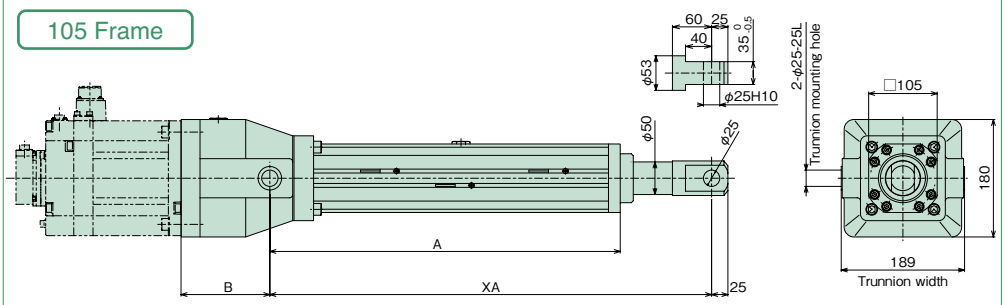


Place an order for a trunnion column separately from the main body model number, and do not provide the code at the end of the model number.

Dimensions Table

LPES400～1500

105 Frame



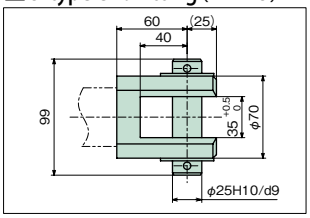
Unit: mm

Model number	B	Stroke	A	XA	
				MIN	MAX
LPES400	136	—	—	—	—
		200	537	680	880
LPES800		300	637	790	1090
		400	737	900	1300
LPES1200		500	837	1010	1510
		600	937	1115	1715
LPES1500		800	1137	1335	2135
		1000	1337	1555	2555

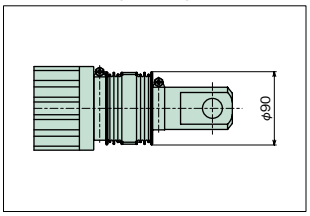
* B dimension in the above table shows a value when a servomotor J3 series of Mitsubishi Electric is mounted.
* No flange can be attached. Refer to page 23 for the installation method.

Options

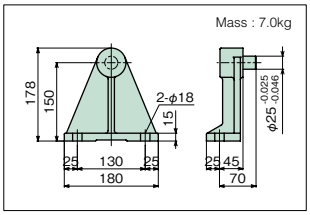
■U-type end fitting (— U)



■Bellows (— J)



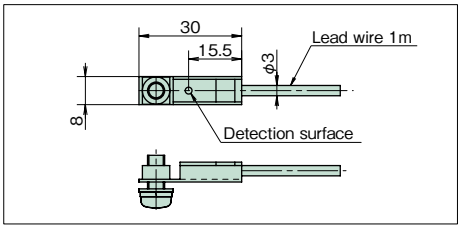
■Trunnion column (LPE400-T)

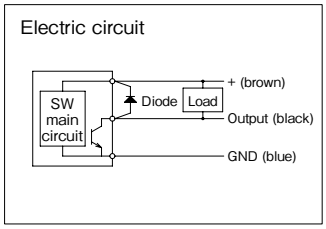


Place an order for a trunnion column separately from the main body model number, and do not provide the code at the end of the model number.

Sensor related option

Standard magnetic sensor (S3)





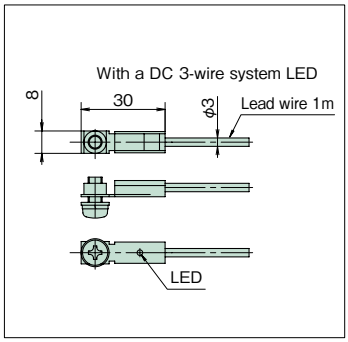
Magnetic sensor specifications

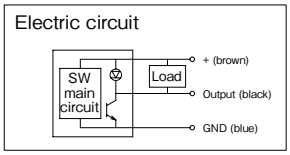
Non-contact switch (DC 3-wire system) (lead wire 1m)	
Power voltage	DC5～26V
Consumption current	8mA MAX (DC24V)
Output specifications	15mA MAX(DC24V) Open collector output

Special type

①With (LED) lamp

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



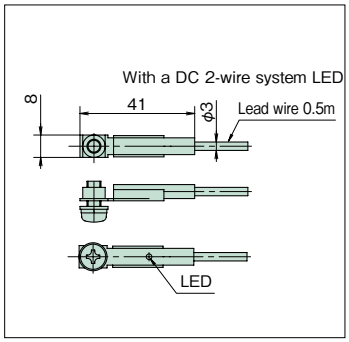


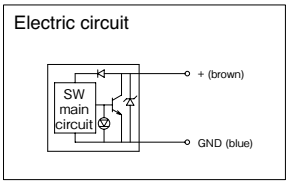
Magnetic sensor specifications

For position detection	
Power voltage	5～24V DC
Consumption current	8mA MAX (DC24V)
Output specifications	15mA MAX (DC24V) Open collector output

②2-wire system

* 2-wire system is only with lamp.





Magnetic sensor specifications

For position detection	
Power voltage	10～28V DC
Load current	5～40mA
Internal drop voltage	4V or less

Power transmission capacity

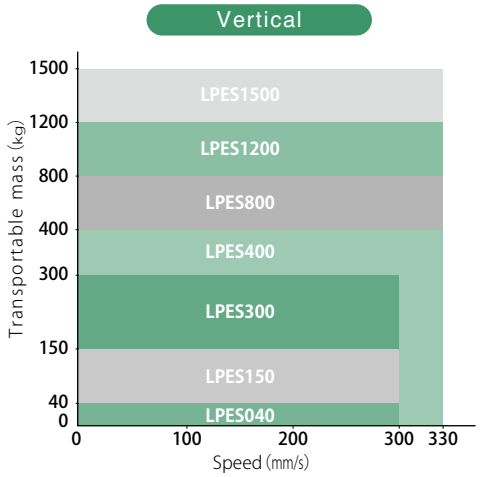
Basic model number	Maximum thrust N {kgf}	Maximum transportable mass note 1) note 2)		Maximum speed Maximum input rotation speed	Servomotor J3 series by Mitsubishi Electric	Screw lead mm
		Vertical kg	Horizontal kg			
LPES040	400 {40.8}	40.8	100	300mm/s (3000r/min)	HF-KP43B (400W)	6
LPES150	1.50k {153}	153	300	300mm/s (3000r/min)	HF-KP73B (750W)	6
LPES300	3.00k {306}	306	600	300mm/s (3000r/min)	HF-SP152B note 3) (1.5kW)	6
LPES400	4.00k {408}	408	800	333mm/s (2000r/min)	HF-SP202B (2.0kW)	10
LPES800	8.00k {816}	816	1600	333mm/s (2000r/min)	HF-SP352B (3.5kW)	10
LPES1200	12.0k {1220}	1220	2400	333mm/s (2000r/min)	HF-SP502B (5.0kW)	10
LPES1500	15.0k {1530}	1530	3000	333mm/s (2000r/min)	HF-SP702B (7.0kW)	10

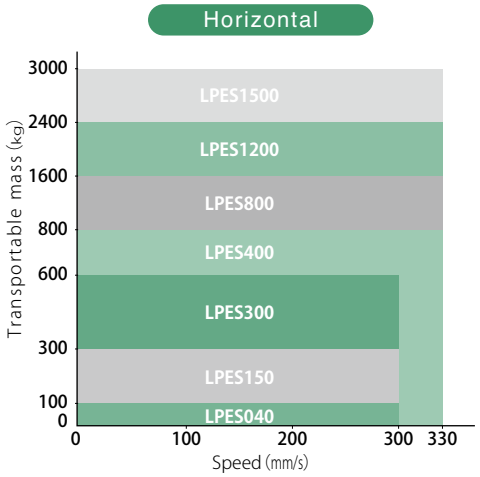
Note 1) The transportable mass shows a value when it is operated at an acceleration of 0.3G.

Note 2) In a case of horizontal transportation, use a linear guide.

Note 3) The rated rotation speed of HF-SP152B is 2000r/min. When use at the maximum rotation speed, set the input rotation speed to 3000r/min.

Simple selection graph





Operating frequency and duty factor

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

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.

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

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.

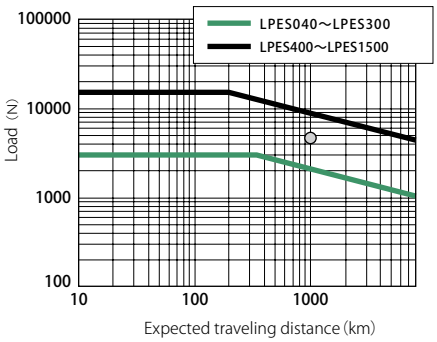
Life

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.

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

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 number in the following procedures from this graph. In this graph, the required expected traveling distance is set to 1000km and PM equivalent load is set to 5000N {510kgf}.
Each intersection point is the required size of a Power Cylinder to be LPES400 – 1500. However from the rated thrust, it will be LPES800 or larger. When the load changes greatly, calculate the equivalent load with the right formula.

Expected traveling distance



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

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

Input shaft conversion inertia moment, cylinder mass

Upper line: moment of inertia ×10^{-3} kg・m^2
Lower line: cylinder mass kg

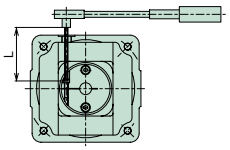
Basic model number	Stroke mm							
	100	200	300	400	500	600	800	1000
LPES040	0.103	0.115	0.128	0.14	0.153	0.165	—	—
	8.5	9.4	10.4	11.3	12.2	13.2	—	—
LPES150	0.103	0.115	0.128	0.14	0.153	0.165	—	—
	8.6	9.5	10.5	11.4	12.3	13.3	—	—
LPES300	0.171	0.184	0.196	0.208	0.221	0.233	—	—
	14.3	15.2	16.1	17.1	18	19	—	—
LPES400	—	1.24	1.31	1.37	1.43	1.49	1.62	1.74
	—	39	42	43.5	45.8	48	53	57
LPES800	—	1.24	1.31	1.37	1.43	1.49	1.62	1.74
	—	39	42	43.5	45.8	48	53	57
LPES1200	—	1.24	1.31	1.37	1.43	1.49	1.62	1.74
	—	39	42	43.5	45.8	48	53	57
LPES1500	—	1.24	1.31	1.37	1.43	1.49	1.62	1.74
	—	39	42	43.5	45.8	48	53	57

Note 1) The moment of inertia does not include the moment of inertia of the servomotor.
Note 2) The cylinder mass does not include the mass of the servomotor.

Servomotor mounting procedures (when installed by customer)

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.
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.
6. Smoothly insert the motor shaft to the coupling.
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
9. attaching bolt.
   Using a torque wrench, tighten the clamp bolt of the coupling at the
10. specified tightening torque.
    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}	Wrench length L mm
LPES040	M4	3.8 {0.39}	60
LPES150			
LPES300			70
LPES400	M6	12 {1.22}	90
LPES800			
LPES1200			
LPES1500			

⚠ 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	LPES040	LPES150	LPES300	LPES400	LPES800	LPES1200	LPES1500
Rod turning force N•m	0.43	1.60	3.19	7.08	14.2	21.3	26.6
{kgf•m}	{0.04}	{0.16}	{0.33}	{0.73}	{1.49}	{2.18}	{2.72}

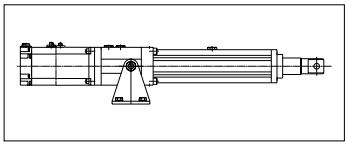
● Load holding mechanism is not provided with this cylinder in the cylinder main body. If a dangerous situation is anticipated during stoppage and when the product is broken, use a servomotor with a magnetic brake to hold the load, or provide a brake mechanism outside. It is same to use for elevating device or horizontal use and displacement is problem.

■ Cautions for installation

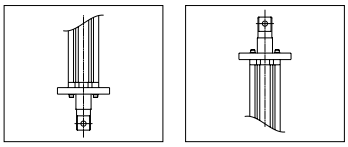
● Use a trunnion mount or a flange mount (possible only for LPES150 or smaller) to install the main body. When used with oscillation, select an I-type or a U-type end fitting. If a lateral load is applied, provide a guide so as not to receive the direct lateral load or the bending moment.

● 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.

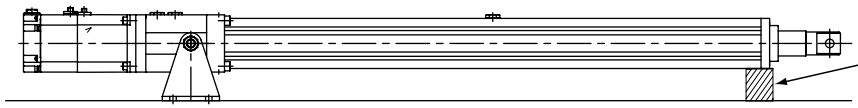
● When it is used horizontally for a long stroke, support the bottom part of the frame end as shown in the figure below. At this point, do not fix the frame and the supporting base.



Trunnion mount



Flange mount



■ Cautions for use

● Load holding 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
500 – 100 reciprocations/day	Every 3 months – 6 months
100 – 500 reciprocations/day	Every 6 months – 1 year
10 – 100 reciprocations/day or less	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.

Power Cylinder

F-Series

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

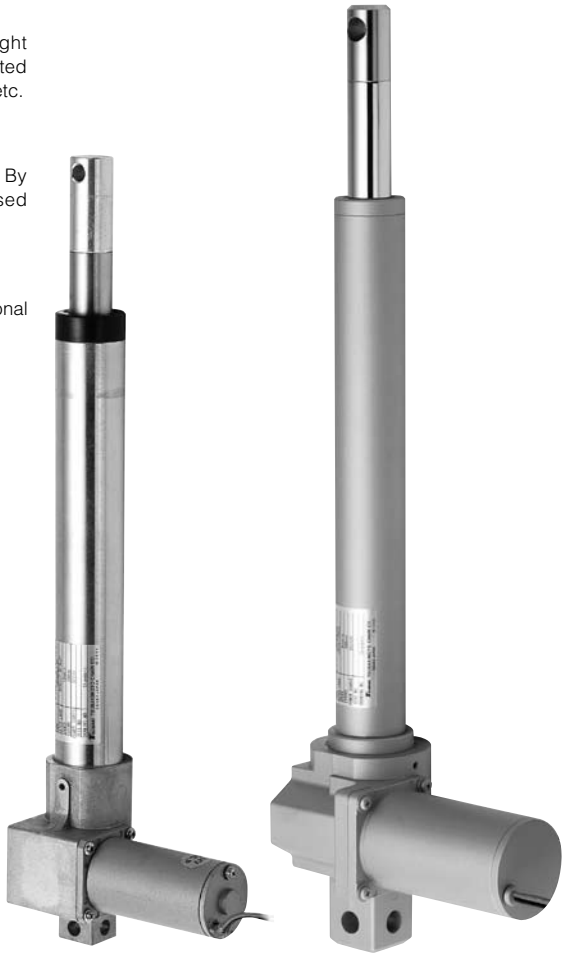
Small thrust type Power Cylinder, driven by DC (Battery) power source.
AC power source is also available with AC adaptor (Option).
Optimum for outdoor use, such as agricultural machine, multistory car parking.

● 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

LP F 040 L 2.0 V K2J

- **Power Cylinder**
- **F series**
- **Thrust**
  - **010**: 100N {10.2kgf}
  - **020**: 200N {20.4kgf}
  - **040**: 400N {40.8kgf}
  - **100**: 1.00kN {102kgf}
  - **200**: 2.00kN {204kgf}
  - **300**: 3.00kN {306kgf}
  - **600**: 6.00kN {612kgf}
- **Speed** **L, M, H**
  - * The speed is determined for each thrust.
- **Nominal stroke**
  - **0.5**: 50mm
  - **1.0**: 100mm
  - **1.5**: 150mm
  - **2.0**: 200mm
  - * The above values are display examples.
- **Voltage code**
  - No code: DC12V
  - **V**: DC24V
- **Options**
  - No code: Standard type
  - **L** : With external LS for stroke adjustment (not available for a stroke 50mm model)
  - **K2** : with internal LS for position detection (Cannot be used together with P) (LPF-600 cannot be manufactured)
  - **P** : With potentiometer (Cannot be used together with K2) (LPF-600 cannot be manufactured)
  - **J** : With bellows
  - * Arrange the optional codes in the above specified order.

Standard model list

Model number		Rated thrust N	Rated thrust {kgf}	Stroke mm	Rated speed mm/s	Power source V	Rated load current A	Locked rotor current A
0.5	0.5 V	100	10.2	50	54	12 DC or 24 DC	3.2 (1.6)	16.7 (7.5)
1.0	1.0 V			100				
LPF010H 1.5	LPF010H 1.5 V			150				
2.0	2.0 V			200				
3.0	3.0 V			300				
0.5	0.5 V	200	20.4	50	24		3.2 (1.6)	16.7 (7.5)
1.0	1.0 V			100				
LPF020M 1.5	LPF020M 1.5 V			150				
2.0	2.0 V			200				
3.0	3.0 V			300				
0.5	0.5 V	400	40.8	50	15		3.7 (1.8)	16.7 (7.5)
1.0	1.0 V			100				
LPF040L 1.5	LPF040L 1.5 V			150				
2.0	2.0 V			200				
3.0	3.0 V			300				
0.5	0.5 V	1.00k	102	50	30		18 (10)	63 (52)
1.0	1.0 V			100				
LPF100H 1.5	LPF100H 1.5 V			150				
2.0	2.0 V			200				
3.0	3.0 V			300				
0.5	0.5 V	2.00k	204	50	18		22 (11)	63 (52)
1.0	1.0 V			100				
LPF200M 1.5	LPF200M 1.5 V			150				
2.0	2.0 V			200				
3.0	3.0 V			300				
0.5	0.5 V	3.00k	306	50	9		22 (11)	63 (52)
1.0	1.0 V			100				
LPF300L 1.5	LPF300L 1.5 V			150				
2.0	2.0 V			200				
3.0	3.0 V			300				
1.0	1.0 V	6.00k	612	100	8		20 (10)	63 (52)
2.0	2.0 V			200				
3.0	3.0 V			300				
LPF600L 4.0	LPF600L 4.0 V			400				
5.0	5.0 V			500				
6.0	6.0 V			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 V	Output 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		
LPF100 H	12	160	5 minutes
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		

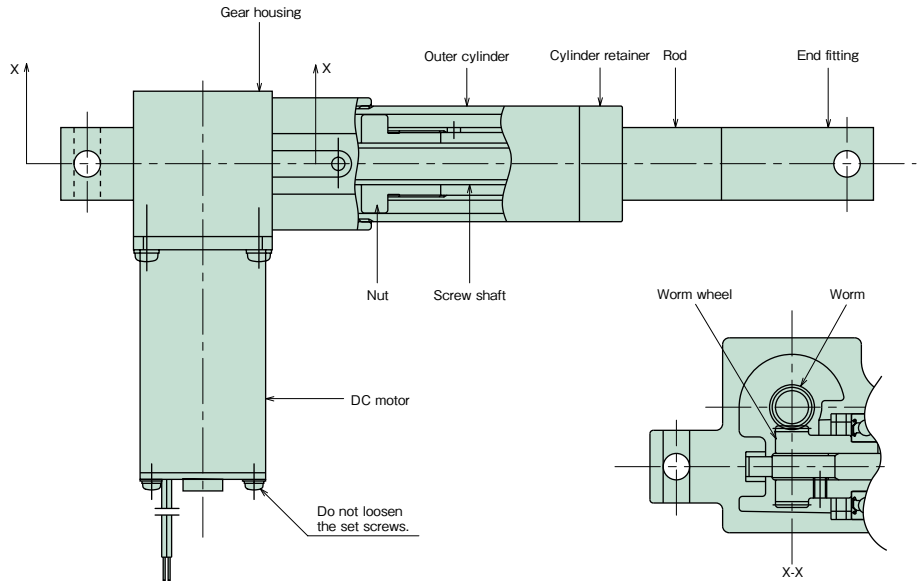
Standard use environment

Environment \ Model	Outdoor type
Ambient temperature	−5℃～40℃
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

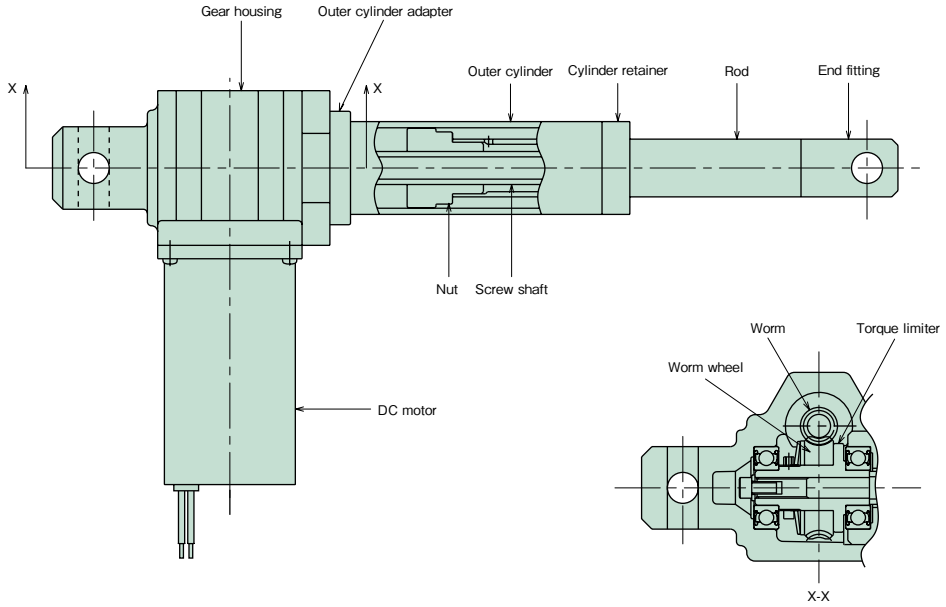
1) If used below the freezing point, the characteristics of the cylinder (current value, speed) may change from the influence of grease.
2) Cylinders with bellows are recommended in an excessively dusty location.
3) All models are totally enclosed structures so that they can be used normally outdoors, however, when exposed to constant adverse conditions such as water, steam and snow accumulation, an appropriate cover is required. When using at 40℃ 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.

Structure

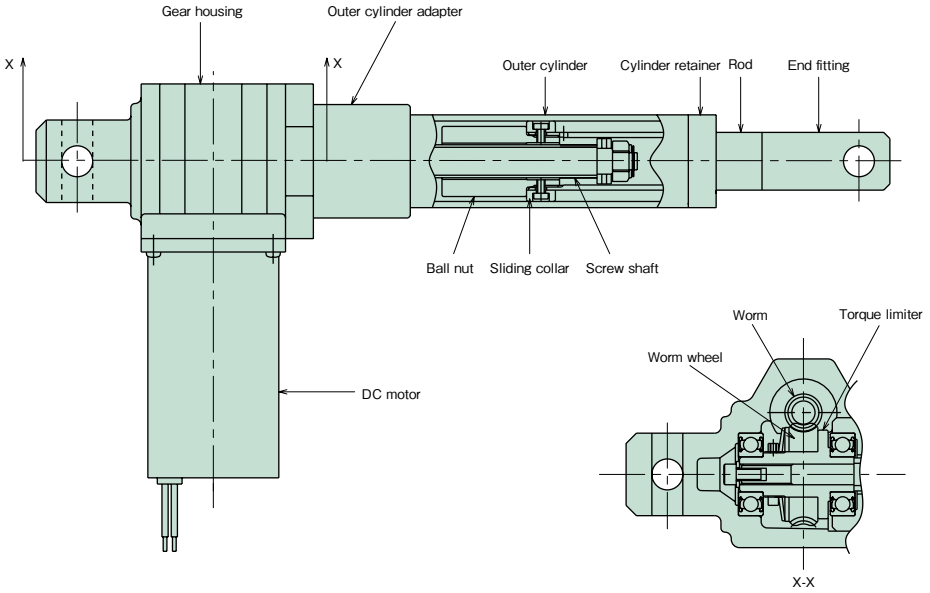
LPF010～LPF040



LPF100～LPF300



LPF600



Selection

Operating conditions required for selection

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

Selecting procedures

1. Select a suitable model number based on the thrust or load N { kg f}, 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.

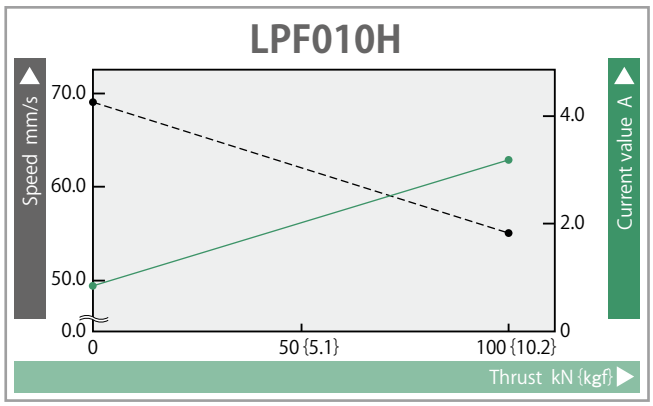
$$\text{Working time rate (\%ED)} = \frac{\text{Operating time of 1 cycle}}{\text{Operating time of 1 cycle + dwell time}} \times 100\%$$

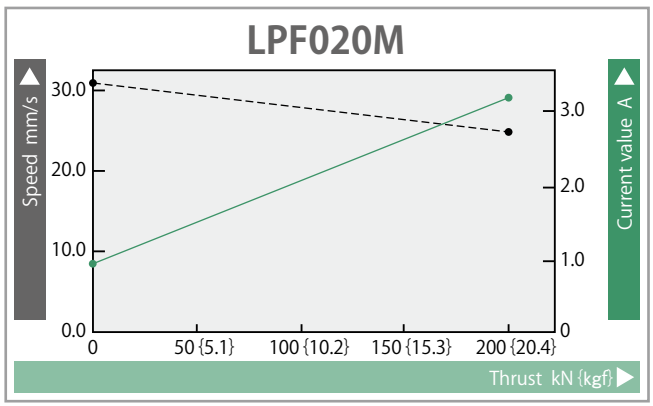
Duration of life as a guide

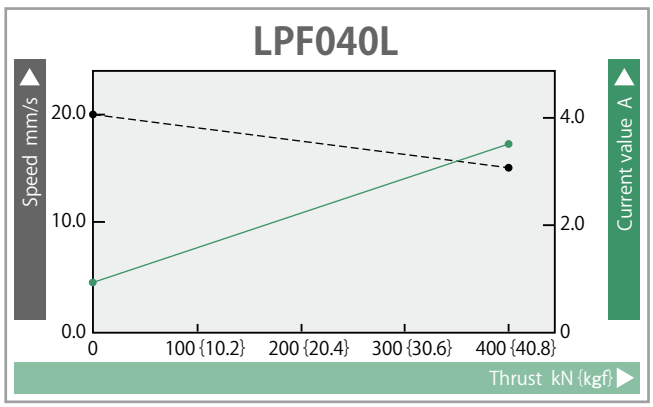
Duration of life is 15,000 reciprocations, as a guide.

Characteristics graph

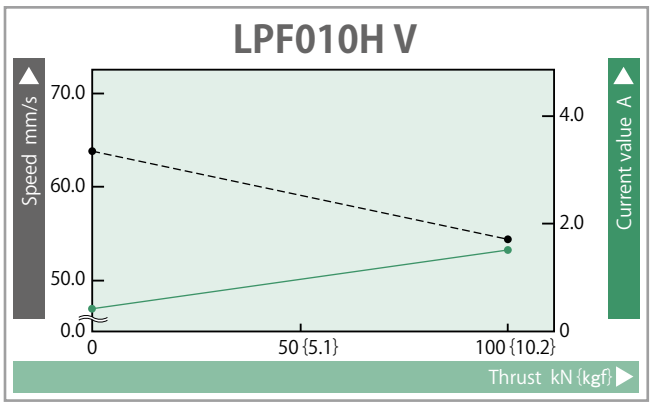
12V DC power source

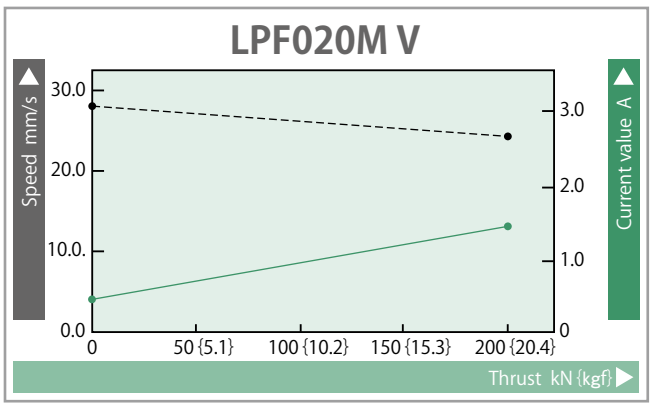


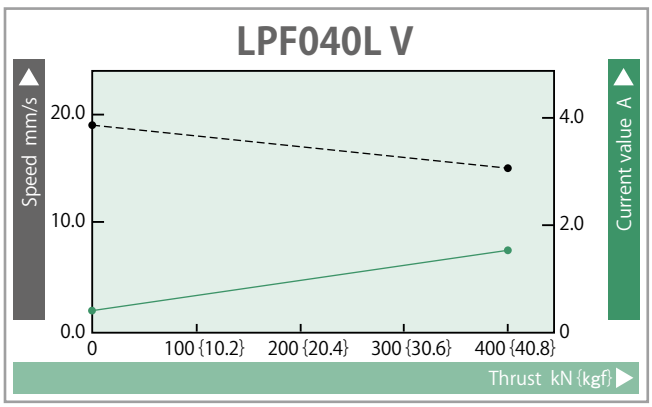




24V DC power source





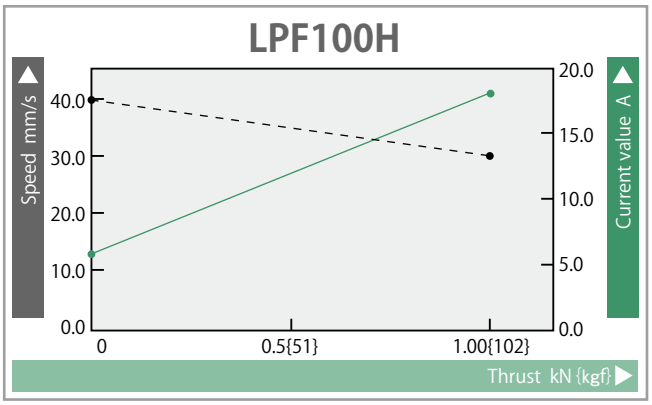


Note) The graphs show standard values (12V/24V DC power source, ambient temperature 20°C). The speed and the current value vary depending on conditions of power source and ambient temperatures, etc.

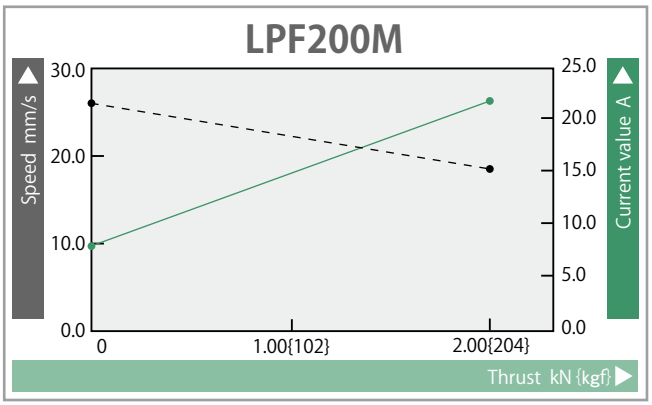
Legend: Speed, Current

12V DC power source

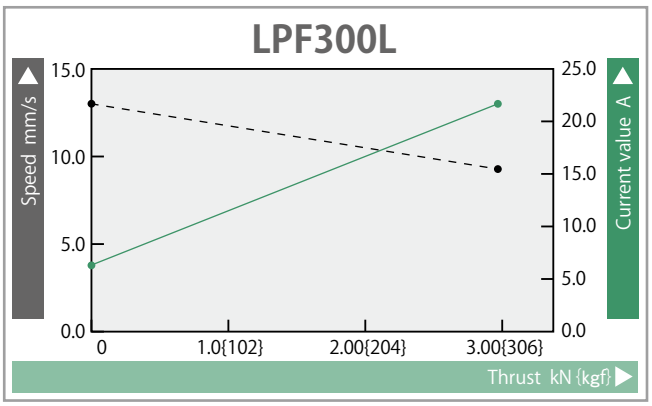
LPF100H



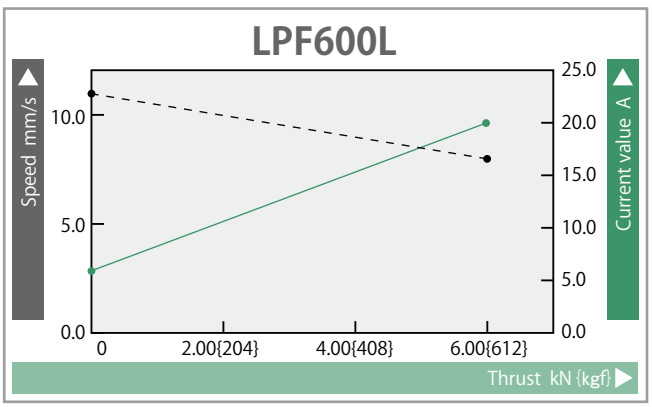
LPF200M



LPF300L

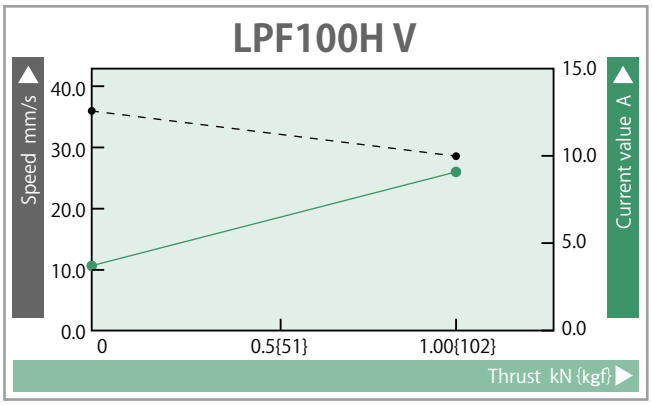


LPF600L

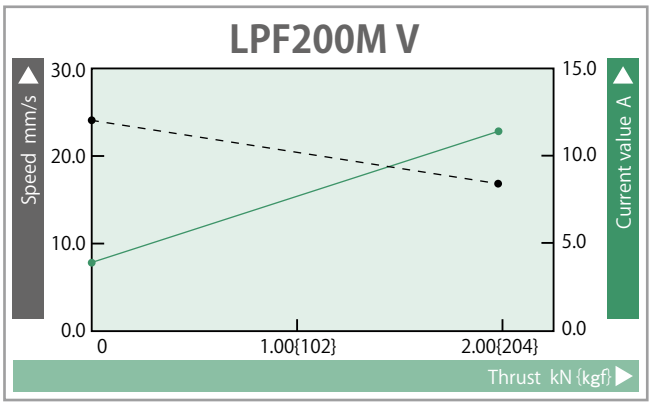


24V DC power source

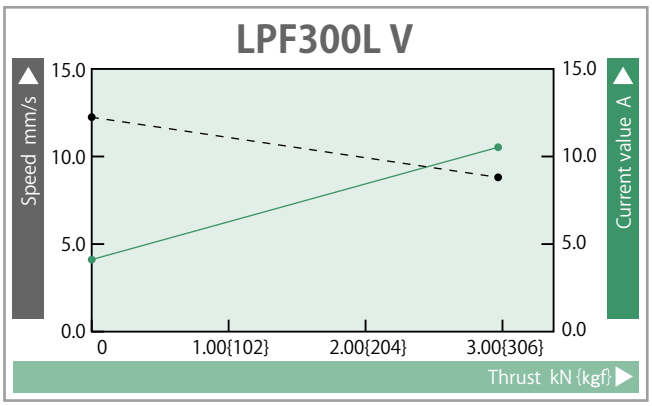
LPF100H V



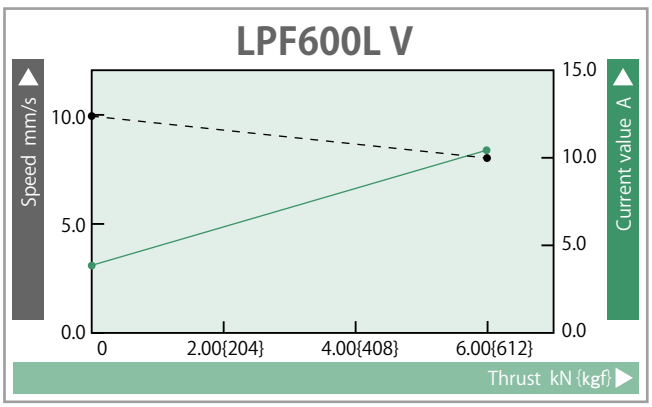
LPF200M V



LPF300L V



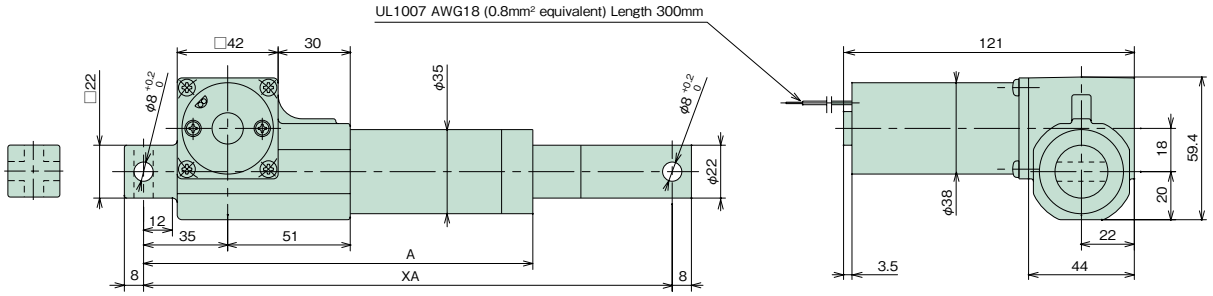
LPF600L V



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



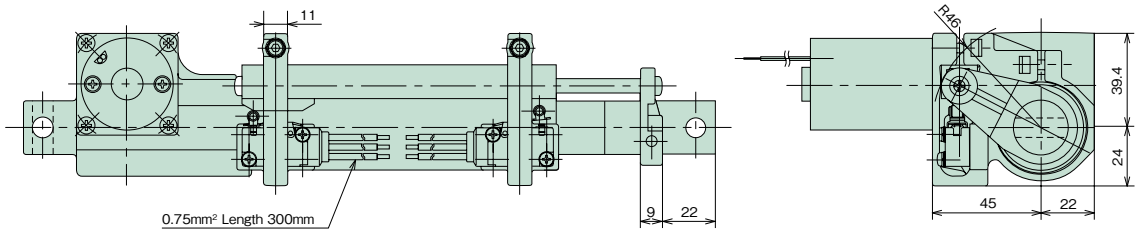
Model number		Rated thrust		Stroke	Rated speed	Dimensions mm A	Dimensions mm XA MIN.	Dimensions mm XA MAX.	Approximate mass
		N	{kgf}	mm	mm/s				kg
0.5	0.5 V	100	10.2	50	54	162	220	270	1.0
1.0	1.0 V			100		212	270	370	1.2
LPF010H 1.5	LPF010H 1.5 V			150		262	320	470	1.4
2.0	2.0 V			200		312	370	570	1.6
3.0	3.0 V			300		412	480	780	2.0
0.5	0.5 V	200	20.4	50	24	162	220	270	1.0
1.0	1.0 V			100		212	270	370	1.2
LPF020M 1.5	LPF020M 1.5 V			150		262	320	470	1.4
2.0	2.0 V			200		312	370	570	1.6
3.0	3.0 V			300		412	480	780	2.0
0.5	0.5 V	400	40.8	50	15	162	220	270	1.0
1.0	1.0 V			100		212	270	370	1.2
LPF040L 1.5	LPF040L 1.5 V			150		262	320	470	1.4
2.0	2.0 V			200		312	370	570	1.6
3.0	3.0 V			300		412	480	780	2.0

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

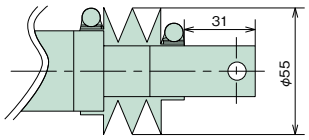
Options

■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

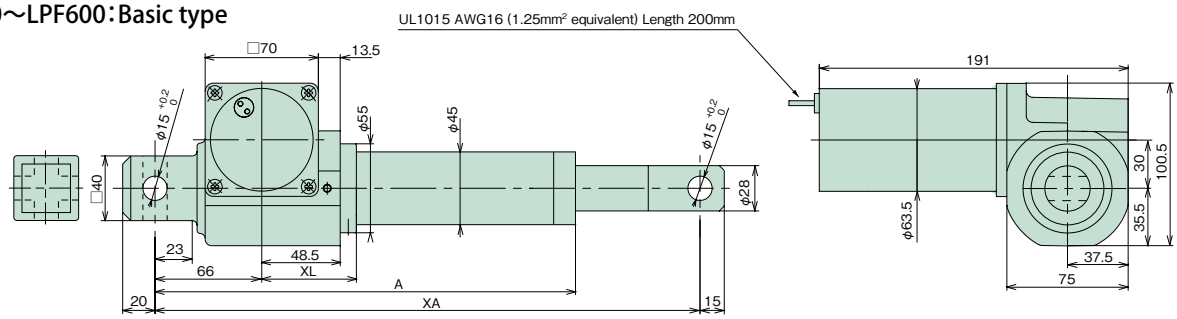


■LS specification (common for LPF010H – LPF600L)

Model	D2VW-5L2A-1M equivalent OMRON
Circuit configuration	Red / Blue / Black
Power rating	AC250V 4A（cos φ=0.7）、DC30V 4A（time constant 7ms or less）
Connection	0.75mm²×3C Length 300m, discrete lead wire

Dimensions Table

LPF100～LPF600：Basic type



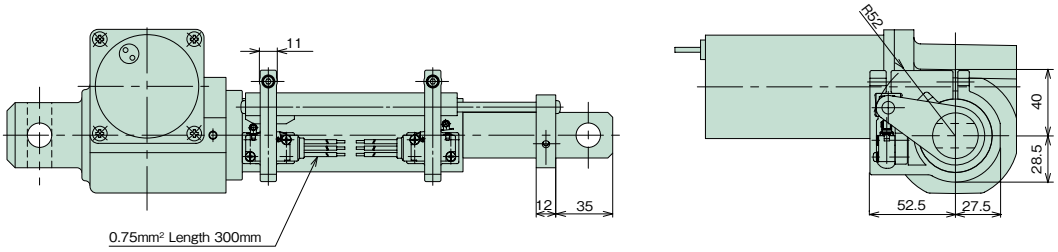
Model number		Rated thrust		Stroke	Rated speed	Dimensions mm				Approximate mass
						XL	A	XA		
		kN	{kgf}	mm	mm/s			MIN.	MAX.	kg
0.5	0.5 V	1.00	102	50	30	58.5	210	275	325	5.0
1.0	1.0 V			100			260	325	425	5.3
LPF100H 1.5	LPF100H 1.5 V			150			310	395	545	5.6
2.0	2.0 V			200			360	445	645	5.9
3.0	3.0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

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

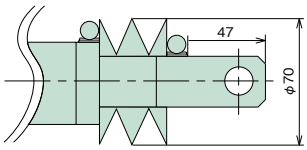
Options

■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.

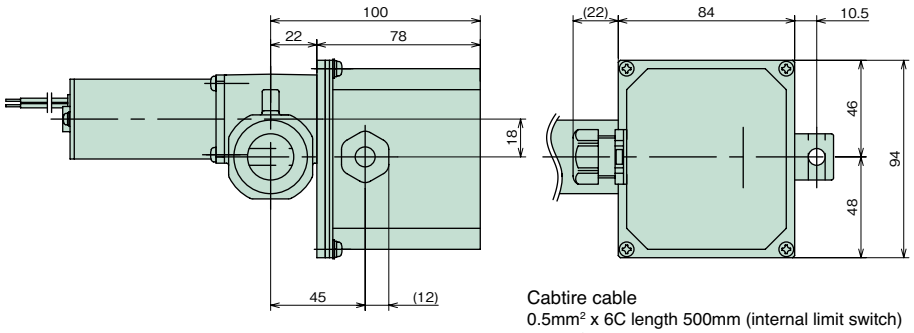


■With bellows



Position Detection unit

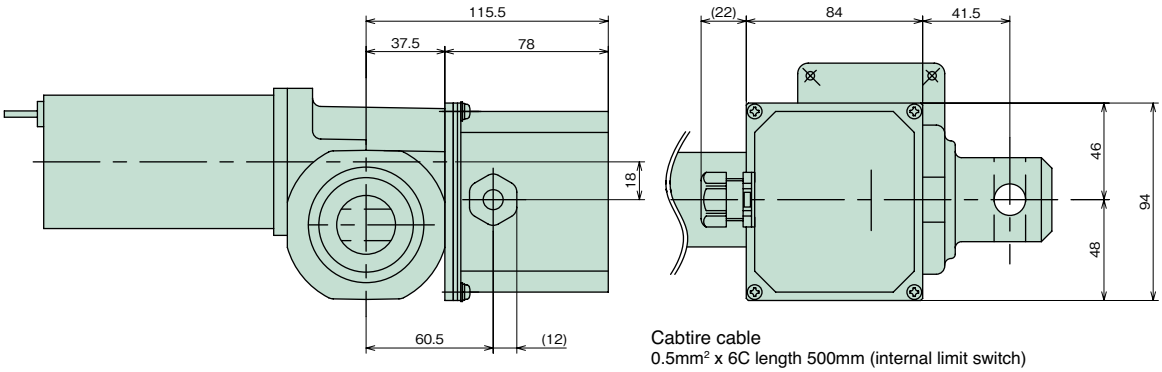
① LPF010～LPF040



Cabtire cable
0.5mm² x 6C length 500mm (internal limit switch)
0.5mm² x 3C length 500mm (potentiometer)

For connection, see the position detecting device specifications on page 32.

② LPF100～LPF300



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

Cabtire cable
0.5mm² x 6C length 500mm (internal limit switch)
0.5mm² x 3C length 500mm (potentiometer)

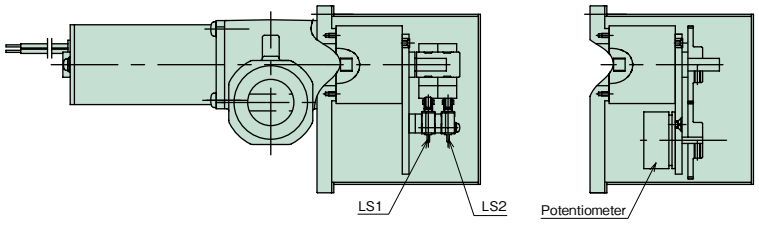
For connection, see the position detecting device specifications on page 32.

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

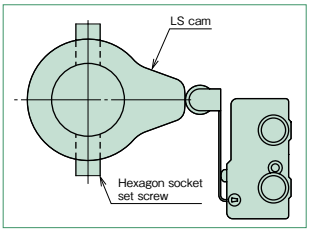
Use this LS when an external limit switch cannot be attached for reasons of installation space, or when the atmosphere is an adverse environment (with litter, dust, corrosion, etc.). When attaching 2 positions: Option code K2

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

Model	SS-5GL2 equivalent OMRON
Circuit configuration	LS 1 for extend: Red, Black, White / LS 2 for retract: Green, Yellow, Brown
Electrical rating	AC250V 2A (cos ϕ=0.4)
Connection	0.5mm²×6C Length 500 mm Cabtire cable

Setting of limit switch

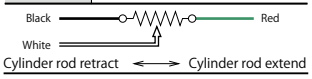
1. Operate the power cylinder individually before installing to the machine and check the rotation direction of the LS cam.
2. Install the power cylinder to the machine, and move the rod to a desired position to stop or to a position to detect the position.
3. Rotate the LS cam and tighten the hexagon 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.



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.

Model	CP-30 equivalent Sakae Tsushin Kogyo
Total resistance	1kΩ
Power rating	0.75W
Dielectric strength	AC1000V 1min.
Effective electrical angle	355° ±5°
Effective mechanical angle	360° Endless
Connection	0.5mm²×3C Length 500 mm Cabtire cable



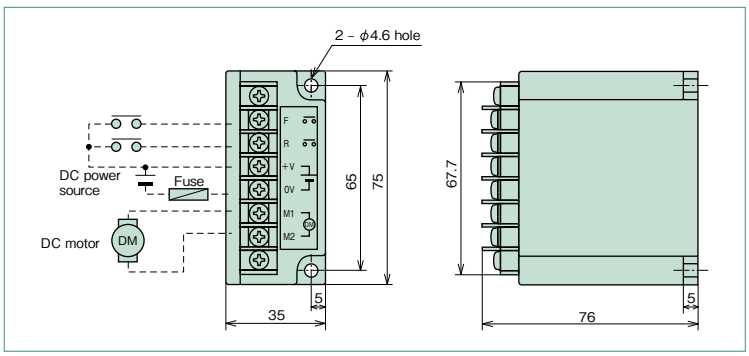
<Cautions>

* 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

Applicable for LPF010, LPF020, LPF040

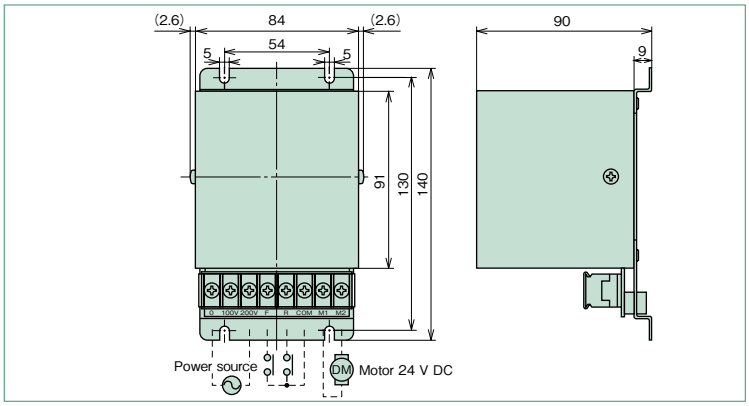


Model number		LPF−K12	LPF−K24
Power source		10 ~ 14VDC	20 ~ 28VDC
Rated current		3.7ADC	1.8ADC
Overload protection function	Load current	7.0ADC (fixed)	4.0ADC (fixed)
	Start time	0.3s (fixed)	
	Shock time	0.1s or less (fixed)	
Operation specifications		Rod extend at ON between F and +V Rod retract at ON between R and +V Rod stops with ON both between F and +V and between R and +V	
Ambient temperature		−15 ~ 40℃	
Ambient humidity		45 ~ 85%RH (no dew condensation)	
Structure		Panel inside storing type Case: ABS	
Mass		0.2kg	

AC adapter

Applicable for LPF010, LPF020, LPF040

* AC adaptor for LPF100 to 600 is not available.
* As for LPF100 to 300, a special type with an AC motor is manufactured.



Model number		LPF−A24
Applicable motor		24VDC 29W
Power source		Commercial power source 100VAC 50/60Hz 200/220VAC 50/60Hz
Rated current		1.8ADC
Overload protection function	Load current	4.0ADC (fixed)
	Start time	0.3s (fixed)
	Shock time	0.1s or less (fixed)
Operation specifications		Rod extend at ON between F and COM Rod retract at ON between R and COM 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

Note) Check the cautions on page 34 when using an AC adapter.

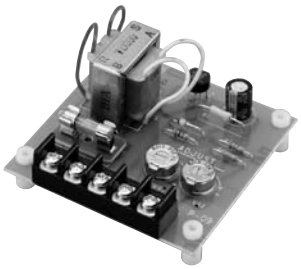
* The overload protection function is built in the AC adapter.

Control option (for potentiometer)

Stroke indication meter

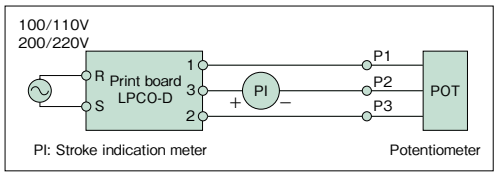
Stroke is indicated by % according to the signal from the print board.

Model number	RM80B（DC100μA）equivalent
Class	JIS C 1102 2.5 class
Appearance	Frame・Black
Scale specifications	Full stroke indicated by 100%

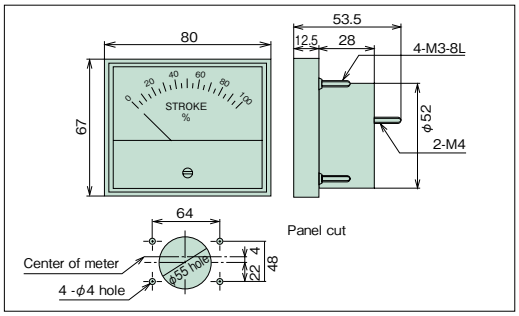


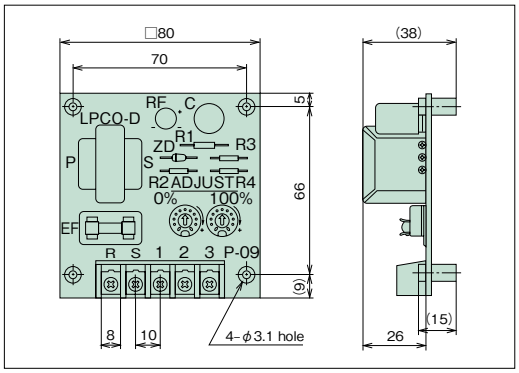
Print board Model number | LPCO—D1 (Operation power: 100/110 V 50/60Hz) LPCO—D2 (Operation power: 200/220 V 50/60Hz)

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.

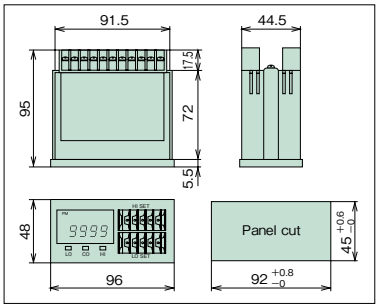


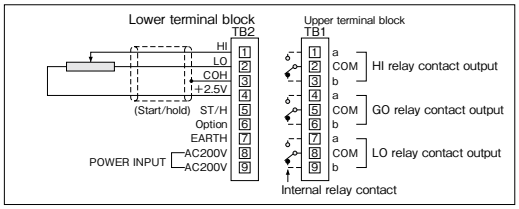


R controller

This converts the voltage signal from the potentiometer of the position detecting unit of the Power Cylinder F series into a digital value, for display and stroke control. A scaling function is built in and actual stroke and elongation (%) can be displayed. This R controller can be directly connected to a potentiometer.

Model number	RX-5455-NBAS (BURRUF) equivalent
Total resistance of input potentiometer	0.8kΩ～12kΩ
Display	4 digits 7 segment LED
Appearance	Black
Comparative output	HI,LO,GO (Relay output)
Comparative preset value	0－±9999
Comparative output contact capacity	DC30V/1A AC250V/0.2A
Output contact structure	1C (for all HI, LO, and GO sides)
Power source	200V AC±10% 50/60Hz



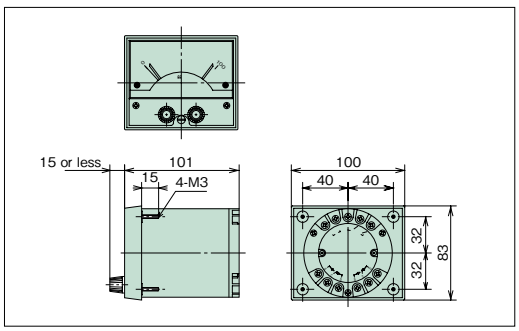


Meter relay (the print board is the same as the print board of the stroke indication meter.)

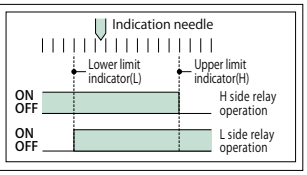
Used for simple adjustment of stroke on the operation panel.

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

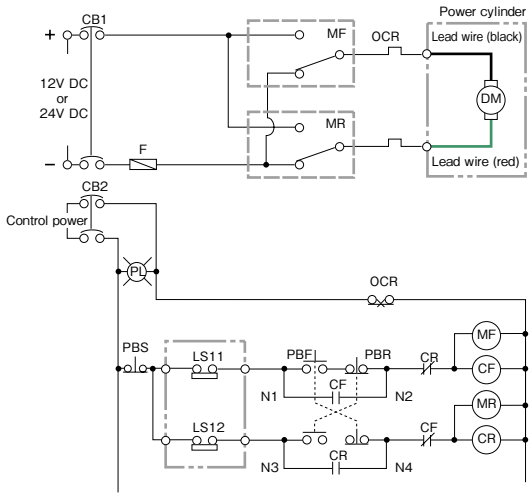
Model number	NRC-100HL (TSURUGA) equivalent
Class	JIS C 1102 2.5 class
Appearance	Frame: Black
Scale	Full stroke indicated by 100%
Power source	AC100/100, 200/220V 50/60Hz
Input	100μA DC maximum
Output contact structure	1C for both HIGH, LOW sides (Refer to the figure at the right)
Contact capacity	AC250V3A（cosφ=1）



<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.)

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

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

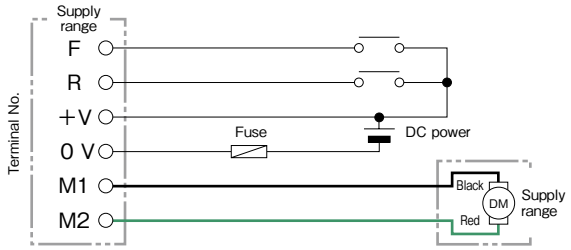
Use fuses with the following capacities as a guide.

Model	12V DC Spec.	24V DC Spec.
LPF010H LPF020M LPF040L	10A	5A
LPF100H LPF200M LPF300L 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.

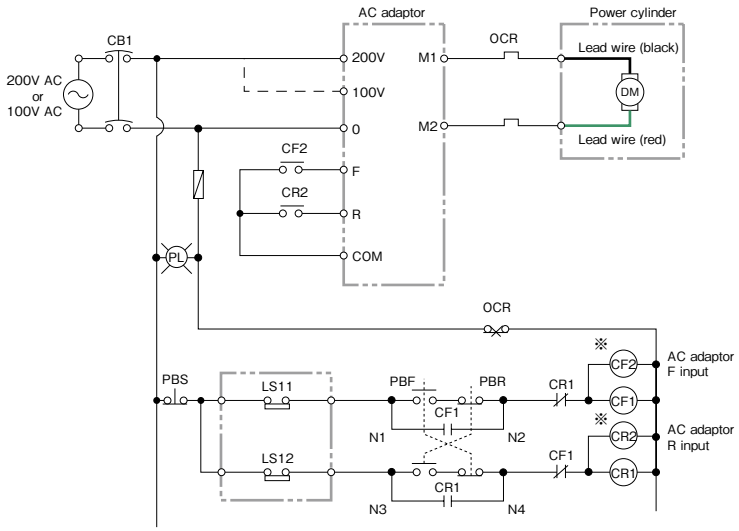
Overload detection unit (used for LPF010 through LPF040)



*** 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)

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℃ to 40℃, although it varies depending on the use conditions. 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.
- ● 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 ±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.
- ● 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.

F series plus α

With AC motor

Plus α Ver.1

Optimum for food machines, air conditioning equipment and incineration equipment!

(Suitable for indoor use in a relatively low frequency)

Operable with commercial power (single-phase, three-phase)

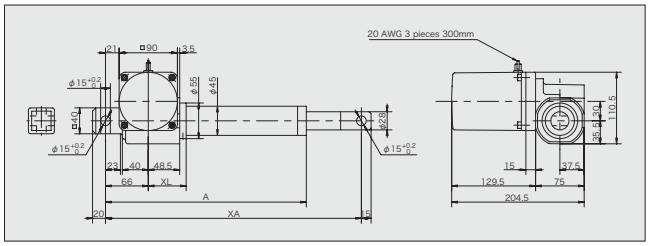
With AC motor (single-phase, three-phase)

Model designation **LPF 100 H 2.0 X - TK**

LPF series	Thrust	Speed	Stroke	With special motor	Special model

■ Operable with commercial power (single-phase, three-phase)
* Specify single-phase or three-phase power voltage.

■ Power cylinder with brake is also available. Contact us separately.



■Dimensions Table

Model	Stroke mm	Dimensions mm XL	A	XA MIN	XA MAX
LPF100H LPF200M 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

■Nominal speed list mm/s

Type	Single-phase 100/100v 50/60Hz	Single-phase 200/200v 50/60Hz	Three-phase 200/200/220v 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

■Motor specification

	Single-phase		Three-phase
Model	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	200/200/220V
Power Frequency	50/60Hz	50/60Hz	50/60/60Hz
Heat resistance class	E	E	E
Capacitor capacity	30μF (Attached)	7.5μF (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
Environment	Ambient temperature	5 ~ 40℃
	Relative humidity	85% or less
	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/m³ or less)

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.

With ball clutch type overload protection device

Plus α Ver.2

Optimum for agricultural machines!

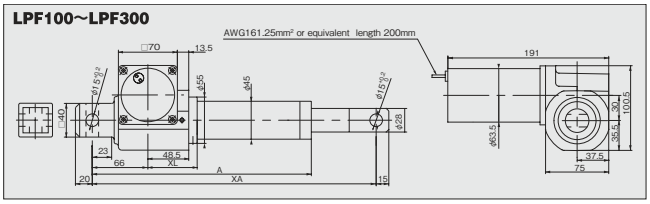
Clicking sound informs of overload!

With ball clutch type overload protection device

Model designation **LPF 200 M 1.0 - TK**

LPF series	Thrust	Speed	Stroke	Special model

■ A ball clutch type overload protection device is built in, and protects the equipment if any overload occurs.
■ Generation of "clicking sound" informs of an overload state if any overload occurs.



■Dimensions Table

Model		Rated thrust kN	Rated thrust (kgf)	Stroke mm	Rated speed mm/s	Dimensions (mm) XL	XA A	XA MIN	XA MAX	Approx. Mass kg
LPF100H 1.5	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 1.5	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 1.5	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

■Motor specifications

Model \ Item	Voltage V	Output W	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
Environment	Ambient temperature	-5 ~ 40℃
	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℃ 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.

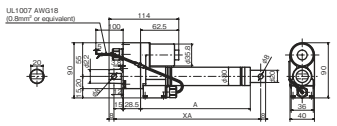
Parallel

Standard model

Model	Rated thrust N	Rated thrust {kgf}	Thrust detecting load N	Thrust detecting load {kgf}	Stroke mm	Rated speed mm/s	Power V	Rated load current A	Locked rotor current A
LPF010MK	100	10.2	157	16	50 100 150 200	50	DC12V (DC24V)	3.4 (1.7)	9.0 (4.2)
LPF040LK	400	40.8	490	50	50 100 150 200	15	DC12V (DC24V)	3.0 (1.5)	9.0 (4.2)
LPF100MK	1.00k	102	Without thrust detecting mechanism * A ball clutch is built in for overload protection. However, it cannot be used for press stopping.		50 100 150 200	27	DC12V (DC24V)	13 (6.5)	58 (34)
LPF150LK	1.50k	153			50 100 150 200	17	DC12V (DC24V)	13 (6.5)	58 (34)

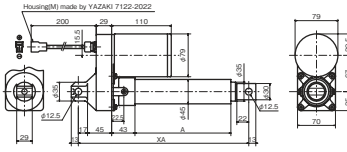
Dimensions Table

LPF010-040



Model	Stroke mm	Dimension mm A	XA MIN	XA MAX	Approx. mass kg
LPF010MK 0.5(V)	50	129.5	190	240	0.8
LPF040LK 0.5(V)					
LPF010MK 1.0(V)	100	179.5	240	340	0.9
LPF040LK 1.0(V)					
LPF010MK 1.5(V)	150	229.5	290	440	1.0
LPF040LK 1.5(V)					
LPF010MK 2.0(V)	200	279.5	340	540	1.1
LPF040LK 2.0(V)					

LPF100-150



Model	Stroke mm	Dimension mm A	XA MIN	XA MAX	Approx. mass kg
LPF100MK 0.5(V)	50	77	205	255	3.6
LPF150LK 0.5(V)					
LPF100MK 1.0(V)	100	127	255	355	3.9
LPF150LK 1.0(V)					
LPF100MK 1.5(V)	150	177	305	455	4.2
LPF150LK 1.5(V)					
LPF100MK 2.0(V)	200	227	355	555	4.5
LPF150LK 2.0(V)					

*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.

Standard use environment

Model		Outdoor type
Environment	Ambient temperature	-5 ~ 40℃
	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) 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℃ 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.

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

● Stable high efficiency and long life

Stable high efficiency and long life have been realized by adopting a nut material excellent in compatibility with an aligning trapezoidal screw (centralizing screw) designed only for the power cylinder.
(L, M, H speed of 700N, L, M, H speed of 1.00KN, L, M speed of 1.50KN, L speed of 3.00KN)

● 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 K2PIJ

Power Cylinder

G series

- **LPGA**: LPGA: Basic type
- **LPGB**: LPGB: With torque limiter *1
- **LPGC**: With thrust detection mechanism

*1 Only parallel type is available.

Thrust

- **070**: 700N{71.4kgf}
- **100**: 1.00kN{102kgf}
- **150**: 1.50kN{153kgf}
- **300**: 3.00kN{306kgf}

Speed: **L, M, H, U**

Shape of main body

- **T**: Straight
- **K**: Parallel

Nominal stroke

- **1**: 100mm
- **3**: 300mm
- **5**: 500mm
- **10**: 1000mm

* The above shows display examples.

Voltage symbol

- No symbol: 200V class
- **V**: 400V class

200V class: 200/200/220V 50/60/60Hz
400V class: 400/400/440V 50/60/60Hz

Options

- No symbol: Standard type
- **M** *2: Anti-rod rotation specifications
- **L**: External limit switch for stroke adjustment
- **K2,K4**: Internal limit switch for positioning detection
- **P**: Potentiometer
- **R**: Rotary encoder
- **C**: Clevis fitting
- **I**: I-type end fitting
- **J**: Bellows

*2 Anti-rotation mechanism for LPGC type is not available.

Standard model list

Model	Speed symbol	Rated thrust N {kgf}	Nominal speed mm/s 50/60Hz	Motor capacity kW	Rod moving amount per one turn of manual shaft mm	Rod rotation force N·m	Rod rotation force {kgf·m}	Nominal stroke mm	Shape of main body: Straight	Shape of main body: Parallel	Type: Basic model	Type: With torque limiter	Type: With thrust detectio mechanism	Option: Bellows	Option: External LS	Option: Position detectin unit	Option: I-type end fitting	Option: Clevis fitting	Option: Anti-rotation mechanism
LPGA070 LPGB070 LPGC070	L	700 {71.4}	25/30	0.1	1	1.54	0.16	100	○	○	○	*1 ○	○	○	○	○	*1 ○	○	*1 ○	*2 ○
	M		75/90	0.2	3	2.31	0.24	200												
	H		100/120	0.4	4	1.54	0.16													
	U		200/240	0.4	8	0.99	0.10	300					○ *3							
LPGA100 LPGB100 LPGC100	L	1.00k {102}	25/30	0.1	1	2.20	0.22	400	○	○	○	*1 ○	○	○	○	○	*1 ○	○	*1 ○	*2 ○
	M		75/90	0.2	3	3.29	0.34													
	H		100/120	0.4	4	2.20	0.22	500												
	U		200/240	0.4	8	1.41	0.14						○ *3							
LPGA150 LPGB150 LPGC150	L	1.50k {153}	25/30	0.2	1	3.29	0.34	600	○	○	○	*1 ○	○	○	○	○	*1 ○	○	*1 ○	*2 ○
	M		75/90	0.4	3	4.94	0.50	800												
	H		100/120	0.4	4	4.94	0.50													
LPGA300 LPGB300 LPGC300	L	3.00k {306}	25/30	0.4	1	6.59	0.67	1000	○	○	○	*1 ○	○	○	○	○	*1 ○	○	*1 ○	*2 ○
	M		50/60	0.2	2	4.24	0.43	1200												
	H		67/80	0.4	2.67	4.24	0.43													

Note) 1. For LPGC070H, LPGC100H types in the above table, the motor capacity is 0.2kW.
2. Rod rotating force of LPGC70H type in the above table is 2.31N-m(0.24{kgf-m}), and rotating force of LPGC100H type is 3.29N-m(0.34{kgf-m}).

*1 Only parallel type is available.
*2 LPGC type is not available.
*3 At the U speed, press and stop cannot be used.

Motor specifications

Model		Totally enclosed self cooling type with brake
Output		Standard model list
Number of poles		4 poles
Power supply	Voltage	3φ 200V /200V /220V
	Frequency	50Hz/ 60Hz/ 60Hz
Heat resistance class		E
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 51.

Painting color

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

Standard use environment

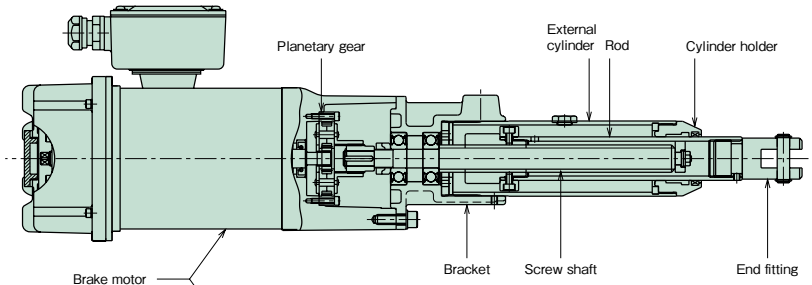
Environment / Model	Ambient temperature	Relative humidity (no dew condensation)	Impact resistance value	Installation altitude	Atmosphere
Outdoor type	−15℃ to 40℃	85%or less	1G or less	1000m or lower above sea level	Normally outdoors

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℃ 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.

Structure

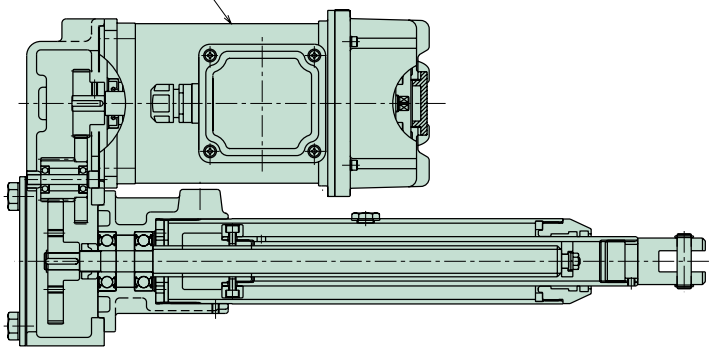
LPGA：Basic type

● Straight



Brake motor

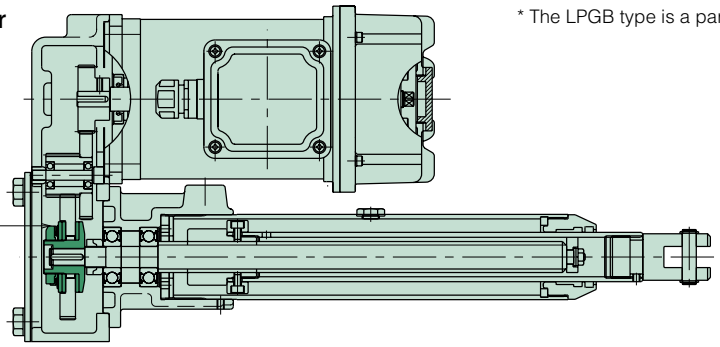
● Parallel



LPGB：With torque limiter

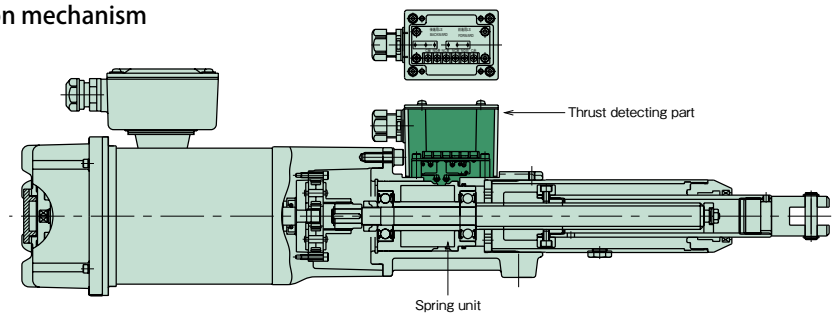
* The LPGB type is a parallel type only due to the mechanism.

● Parallel

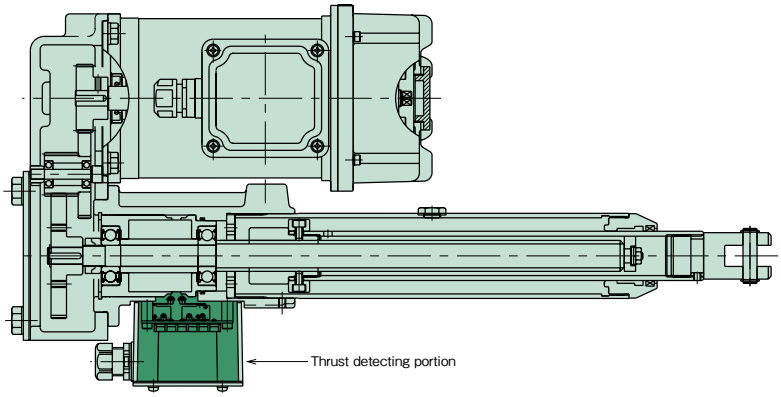


LPGC：With thrust detection mechanism

● 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.

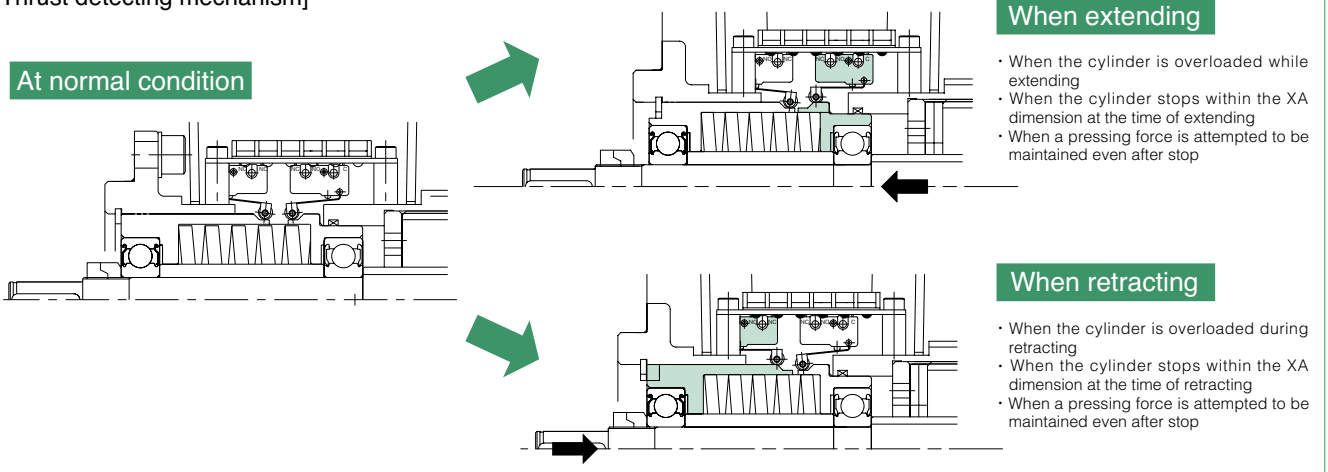
LPGB (with torque limiter) ——
* Only parallel type is available.

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.

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.

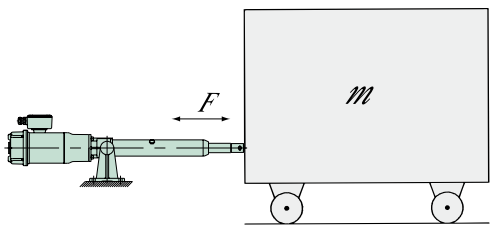
[Thrust detecting mechanism]



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.

Mass of carriage: m kg
Coefficient of friction: μ
Carriage traveling resistance: $F = \mu m \leqq$ Rated thrust



<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.

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.

Selection 1

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 starts/min.
6. Power source voltage, frequency
7. Type of load of machine used
8. Environment of use
9. Hours of operation a day and annual operating days

Selection procedures

1. Select the suitable model number from the standard model list (page 39) 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

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

The working time rate is a ratio of the operating time per 10 minutes on a 10-minute basis.
The working time rate is calculated with the formula at the right.

Duration of life as a guide

The duration of life of the main body is 25 km of a traveling distance of the cylinder (nut). (With rated thrust of the power cylinder)
However, the wear lives of screws and nuts vary depending on the use conditions and the lubricating state.
Select a brake with an operating life of 2 million times as a guide. However, gap adjustment is required until the expiration of life.
Either one of the standards first reached is a guide for the life.

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.

Selection 2

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

<Coasting distance and stop accuracy>

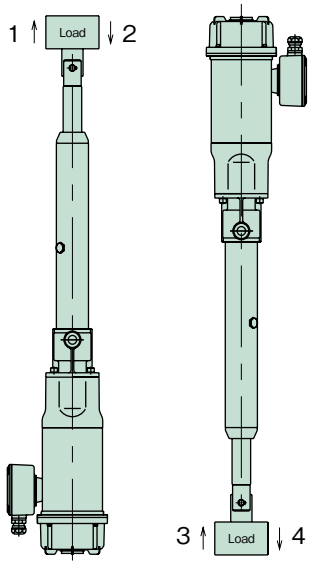
Coasting amount and stop accuracy vary depending on the operation speed and load. When you attempt to correctly position, cylinders with low operation speed are recommended.
Set the limit switch in consideration of the coasting distance.
Reference values of the coasting distance and stop accuracy are shown in the following table.

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

Unit: mm

Model \ Usage		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 LPGB070 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 LPGB100 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 LPGB150 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 LPGB300 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

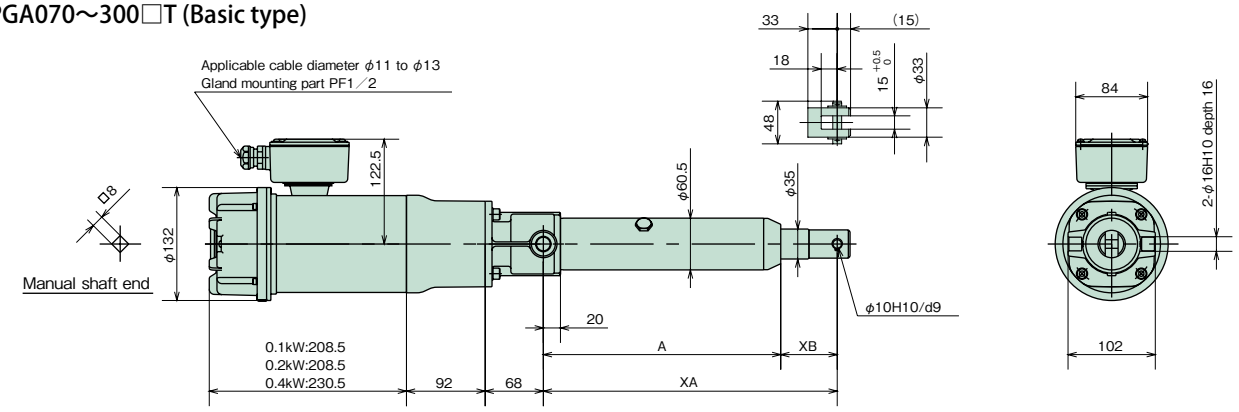
* The values in the above table slightly vary depending on the models.
* Coasting distance: This indicates a distance from a time when the limit switch or the stop button is operated until the cylinder stops. This coasting distance varies depending on how a load is applied and the operation circuit.
* 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.



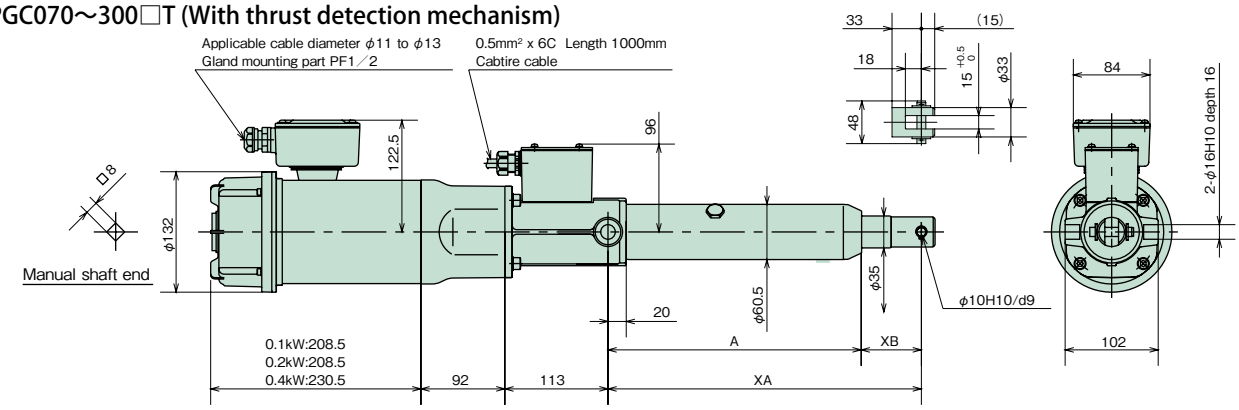
* An anti-rod rotation mechanism is required.

Dimensions Table Straight type

LPGA070～300□T (Basic type)



LPGC070～300□T (With thrust detection mechanism)



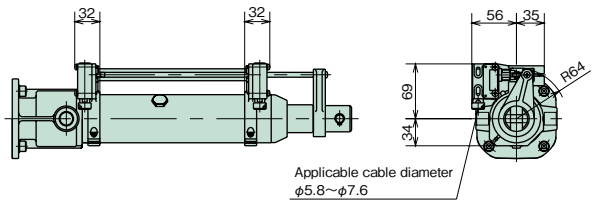
Unit: mm

Model		Speed symbol	Shape of main body	Nominal stroke	A	XA		XB		Approx. mass (kg)	
						MIN	MAX	MIN	MAX	LPGA	LPGC
LPGA LPGC	070 100 150 300	L M H 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

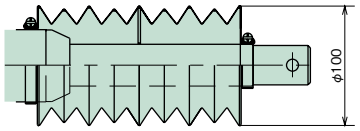
Note) 1. The mechanical stroke includes a margin of 3 to 8 mm of the nominal stroke on both sides.
2. For U speed, only 070 and 100 are applied.

Options

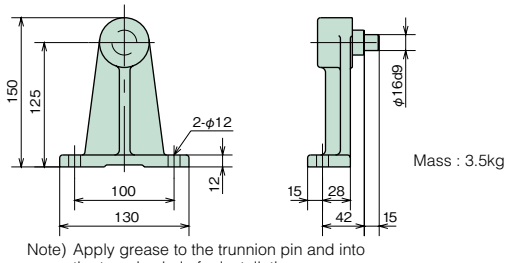
■ External LS



■ Bellows (— J)



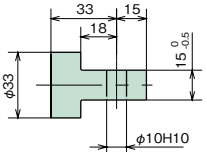
■ Trunnion column (LPGA300-T)



Mass : 3.5kg

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

■ I-type end fitting (LPGA300-I)

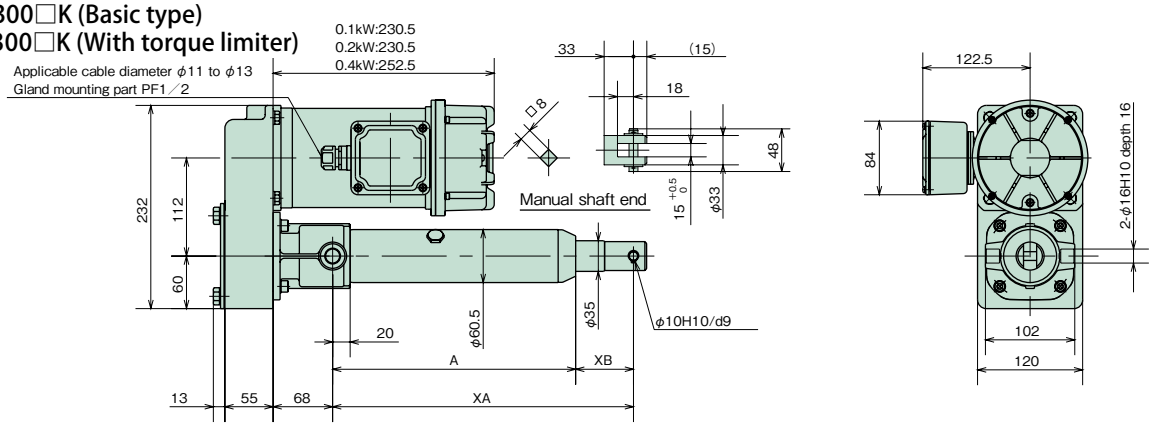


* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions. When designing the machine, take margins into consideration.

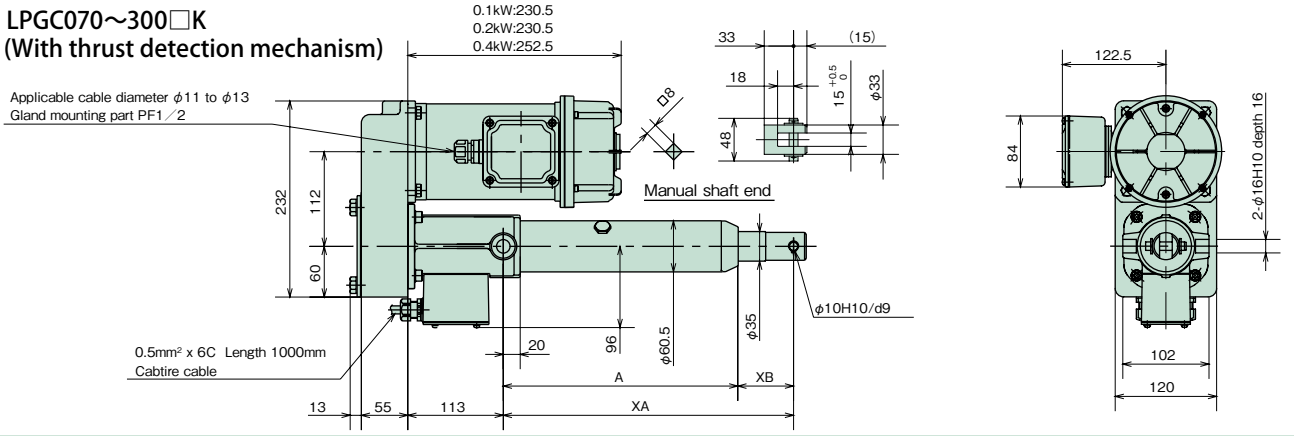
MEMO

Dimensions Table Parallel type

LPGA070～300□K (Basic type)
LPGB070～300□K (With torque limiter)



LPGC070～300□K
(With thrust detection mechanism)



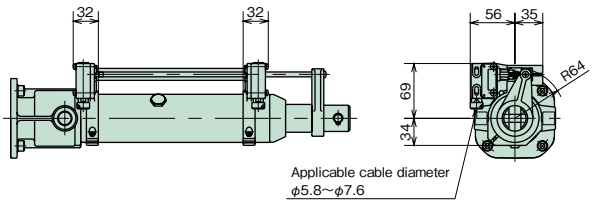
Unit: mm

Model		Speed symbol	Shape of main body	Nominal stroke	A	XA		XB		Approx. mass (kg)		
						MIN	MAX	MIN	MAX	LPGA	LPGB	LPGC
LPGA LPGB LPGC	070 100 150 300	L M H 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

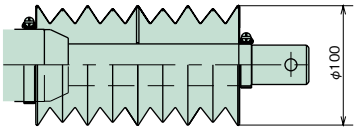
Note) 1. The mechanical stroke includes a margin of 3 to 8 mm of the nominal stroke on both sides.
2. For U speed, only 070 and 100 are applied.

Options

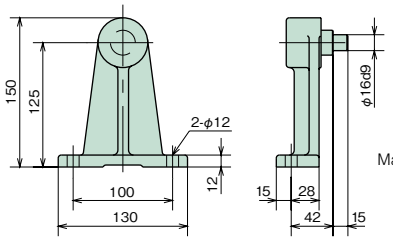
■ External LS



■ Bellows (　－J)



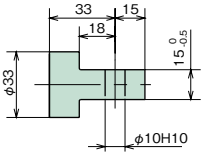
■ Trunnion column (LPGA300-T)



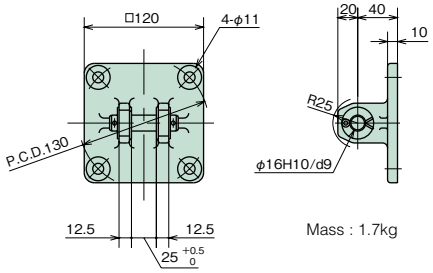
Mass : 3.5kg

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

■ I-type end fitting (LPGA300-I)



■ Clevis fitting (LPTB500-C)



Mass : 1.7kg

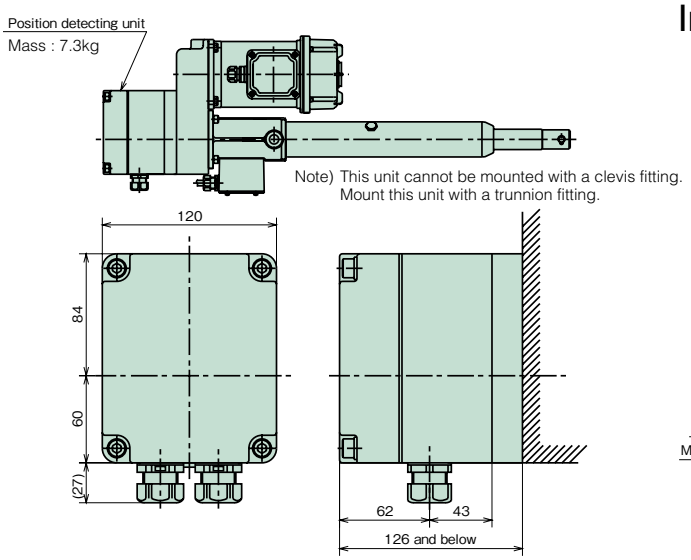
* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions. When designing the machine, take margins into consideration.

MEMO

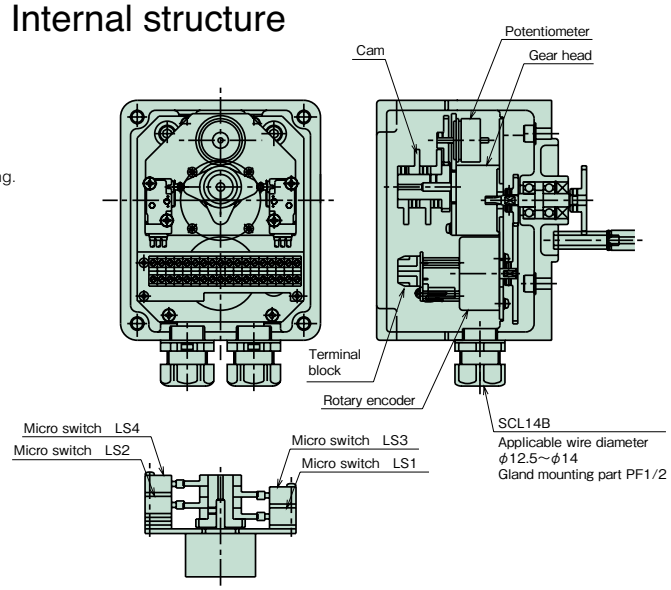
Position detecting unit

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

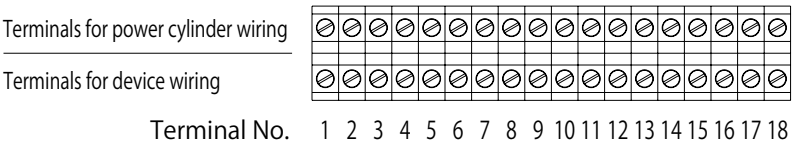


Internal structure



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.



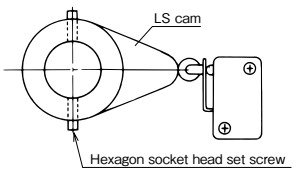
Option	Internal limit switch (K2, K4)									Potentiometer			Rotary encoder					
Symbol	LS1		LS2		LS3		LS4		Common	P			R					
Contact	a	b	a	b	a	b	a	b	c	1	2	3	1	2	Z	5V～12V	0V	Case
Terminal No.	18	17	5	6	16	15	7	8	4	1	2	3	9	10	11	12	13	14

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 D2VW-5LA2-1M or equivalent
Circuit configuration	NC (Red) NO (Blue) COM (Black)
Electric rating	AC250V 4A (cosϕ0.7)
Connection	Terminal block connection in position detecting unit

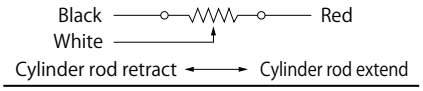


Position detecting unit

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	1kΩ
Rated power	0.75W
Dielectric strength	AC1000V 1min.
Effective electric angle	355°±5°
Effective mechanical angle	360°endless
Connection	Connected to terminal block in position detecting unit



3. Rotary encoder

Rotary encoder specifications		
Model	OVW2-003-2M or equivalent	
Manufacturer	Nidec Nemicon Corporation	
Output pulse number	30P/R	
Output waveform	90° phase difference two-phase square wave + home position output	
Output voltage	H	Power voltage – 1V or more (No load)
	L	0.5V or more (at maximum lead-in current)
Power supply	DC4.5～13.2V 80mA	

* Output pulse number from the power cylinder has been set to one pulse/stroke 1mm.

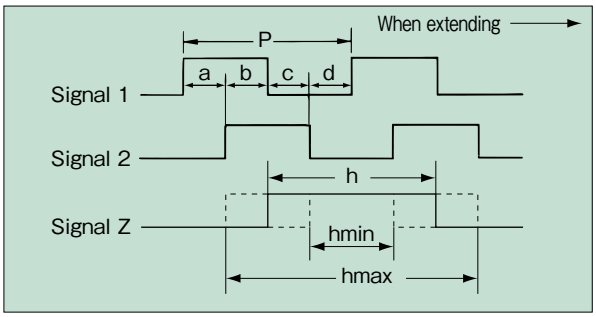
The output signal of the standard specification is of an incremental type, however, an absolute type is also available.
The output type of the standard specification is voltage output, however, open collector output and line driver output specifications are also available.

Output connection

Signal 1	Signal 2	Signal Z	+5V to 12V	0V	Case
Green (9)	White (10)	Yellow (11)	Red (12)	Black (13)	Shield (14)

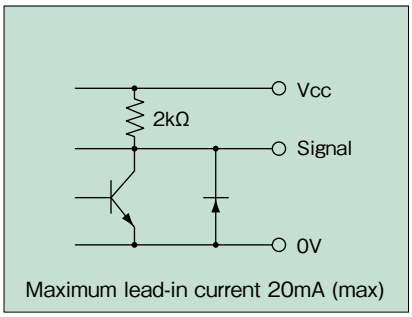
Figures in parentheses indicate terminal No.

Output waveform



a. b. c. d = P/4 ± P/8 P/2 ≦ h ≦ 3P/2

Output circuit



* Use together with equipment such as the sequencer and a programmable controller to control a stroke as a digital signal.
① The standard products incorporate an incremental type encoder.
② The rotary encoder has been set to output one 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 30 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 Distance between rotary encoder and controller should be within 5m.

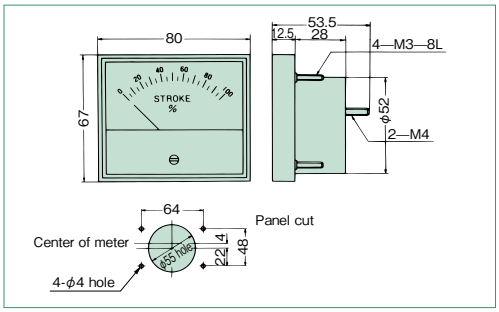
Control option

For potentiometer

■ Stroke indication meter

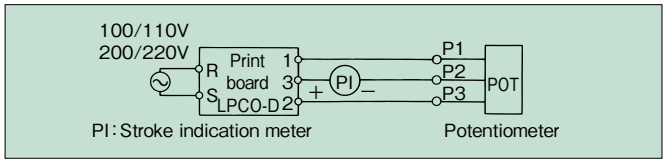
This meter indicates a stroke in % by a signal from the print board.

Model	RM-80B(DC100 μ A) or equivalent
Grade	JIS C 1102 2.5 class
Appearance	Frame・black
Scale specification	Entire stroke is indicated in 100%

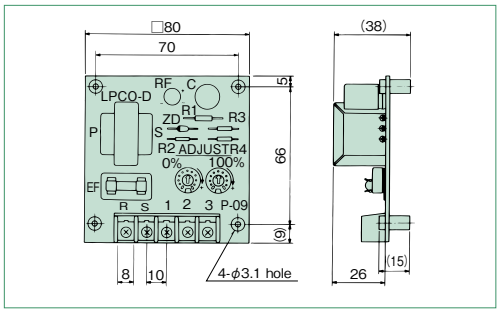


■ Printed board

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



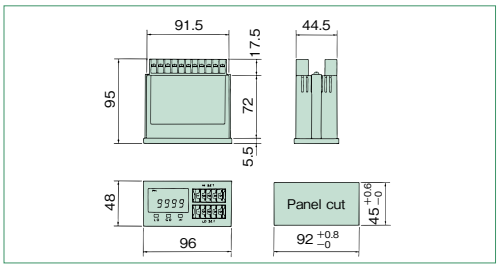
Adjust the meter with an ADJUST volume on the print board. Do not make a mistake with the stroke indication meter + and -. Replace the terminals 1 and 2 on the print board to set the indication meter to 100% when the stroke is MIN.
Model LPCO-D1 (Operation power 100/110V 50/60Hz)
LPCO-D2 (Operation power 200/220V 50/60Hz)

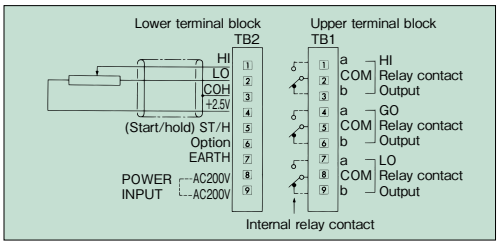


■ R controller

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	0.8kΩ～12kΩ
Indication	4 digits 7 segment LED
Appearance	Black
Comparison output	HI,LO,GO (Relay output)
Comparison preset value	0－±9999
Comparison output contact capacity	DC30V/1A AC250V/0.2A
Output contact configuration	1C (for all of HI, GO, LO sides)
Power supply	200V AC±10% 50/60Hz





■ Meter relay

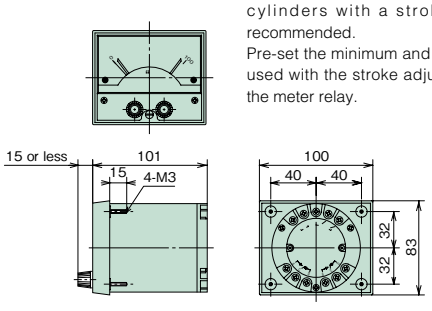
Used for simple adjustment of stroke on the operation panel.

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

Note) Specify for output of 4 to 20mA if the IC unit (4 to 20mA output), etc., is used.

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	AC100/100, 200/220V 50/60Hz
Input	Max. DC100μA
Output contact configuration	For both of HIGH, LOW sides 1C (See the right Fig.)
Contact capacity	AC250V3A (cosφ＝1)

The power cylinder body is equipped with a potentiometer. Since the phase of the stroke will deviate if the rod is rotated before installation, cylinders with a stroke adjusting LS are recommended.
Pre-set the minimum and maximum strokes to be used with the stroke adjusting LS, and then use the meter relay.



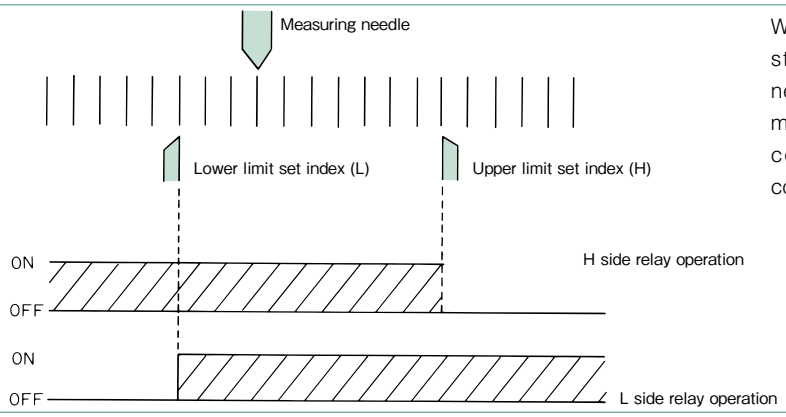
(The described specifications and dimensions may be subject to change due to circumstances.)

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.

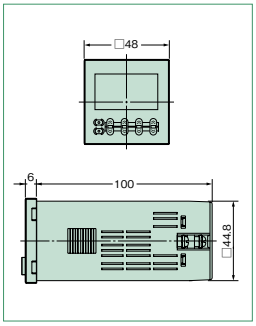
For rotary encoder

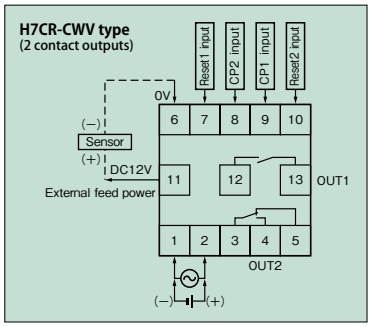
■ Pulse counter

This counter indicates the number of pulses from the rotary encoder and produces relay output. This has a pre-scale function and can indicate the real moving amount. When using this counter for stroke control, combine with a self hold circuit. Indicated values and internal counter value do not change even at power failure because they are backed up by a built-in battery.

Note) Do not move the power cylinder in the event of a power failure because this counter cannot count at that time.

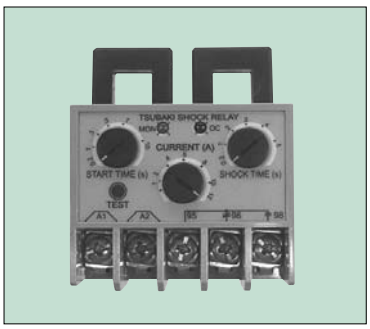
Model	OMRON H7CX-AW or equivalent
Type	Preset counter
Protecting structure	IP54F (Panel surface)
Pre-scale function	With (0.001 to 99.999)
Indication method	Values calculated by 7 segment LCD, with back light
Rated voltage	AC100～240V (50/60Hz)
Power consumption	Approx. 6.6V (at 240V AC 50Hz)
Control output	With contact：AC250V 3A (cosϕ=0.8～1)
External feed power	DC12V±10%100mA (Ripple 5% or less)
Operating ambient temperature	-10 to 55°C (however, shall not be frozen)
Storage temperature	-25 to 65°C (however, shall not be frozen)
Operating ambient humidity	35～80%RH



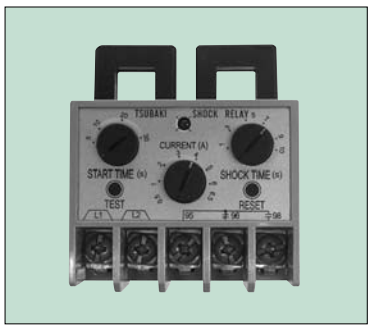


Shock relay

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



Shock relay TSBSA series
(Economy, automatic reset type)



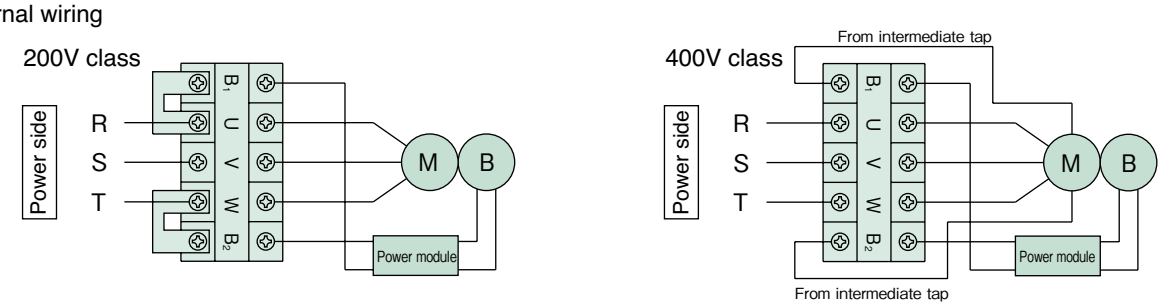
Shock relay TSBSS series
(Economy, self-holding type)

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

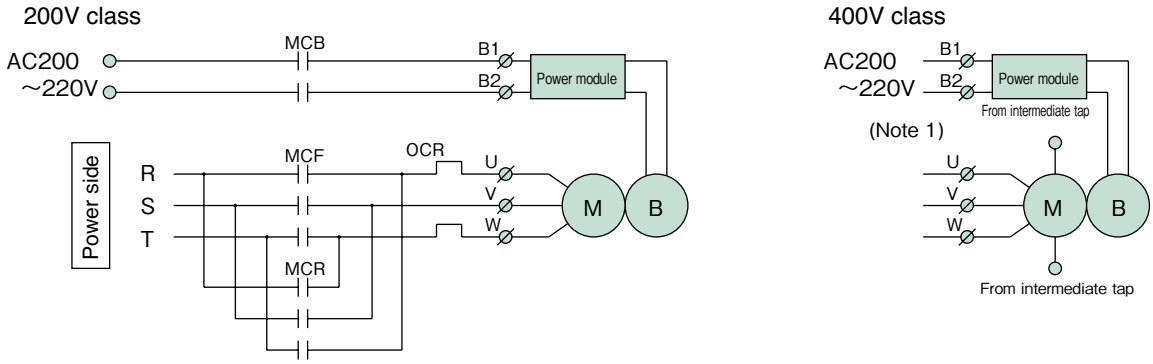
Wire connection

Wire connection for brake motor (motor with DC brake)

AC internal wiring



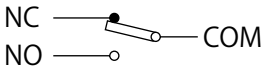
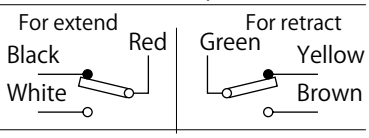
AC external wiring



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.)

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

Limit switch specification

	Stroke adjusting external LS	Thrust detecting LS
Model	OMRON D4E-1B20N or equivalent	OMRON SS-5GL2D or equivalent
Circuit configuration		
Electric rating	AC250 V 3A (cosϕ0.4)	AC250V 2A (cosϕ=0.4)
Connection	M3 screw x3 Applicable cable diameter φ5.8 to φ7.6	0.5E x 6C Length 1000A Cabtire cable draw-out

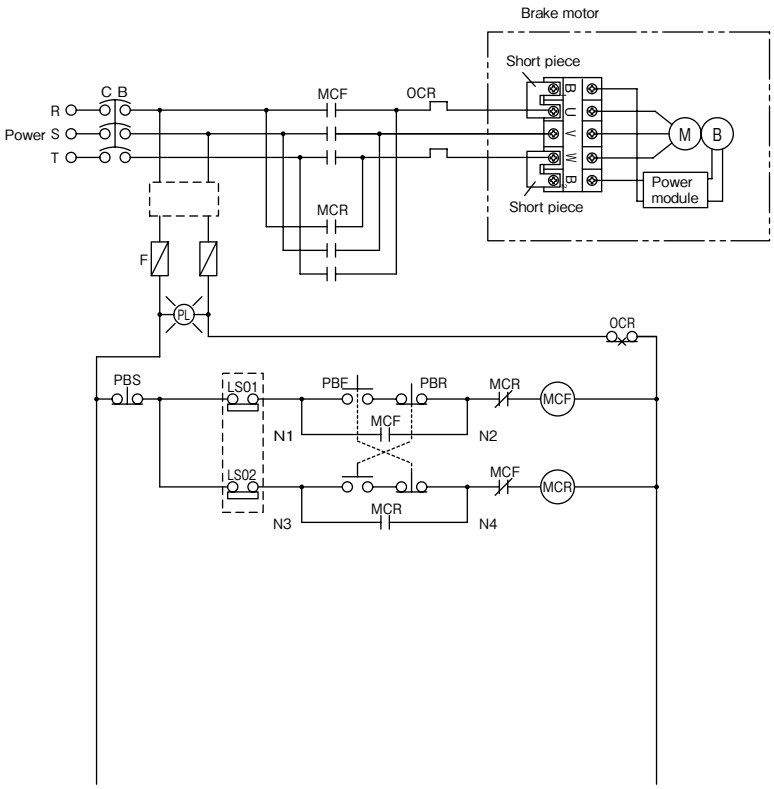
Motor current value, Brake current value

Output, frame No.	Motor current value (A)						Brake model	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	0.73 (2.7)	0.63 (2.4)	0.65 (2.6)	0.38 (1.5)	0.33 (1.3)	0.34 (1.4)	SBH01LP	0.17 0.26	0.17 0.26	0.17 0.28	0.17 0.26	0.17 0.26	0.17 0.28
4P - 0.2 kW	1.26 (5.6)	1.1 (5.2)	1.1 (5.7)	0.63 (2.5)	0.55 (2.2)	0.55 (2.4)	SBH02LP	0.17 0.26	0.17 0.26	0.17 0.28	0.17 0.26	0.17 0.26	0.17 0.28
4P - 0.4 kW	2.2 (9.0)	2.0 (7.7)	2.0 (8.5)	1.1 (4.4)	1.0 (3.8)	1.00 (4.2)	SBH04LP	0.17 0.26	0.17 0.26	0.17 0.28	0.17 0.26	0.17 0.26	0.17 0.28

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 brake AC internal wiring reference circuit



LS01: Extend stroke adjusting external limit switch

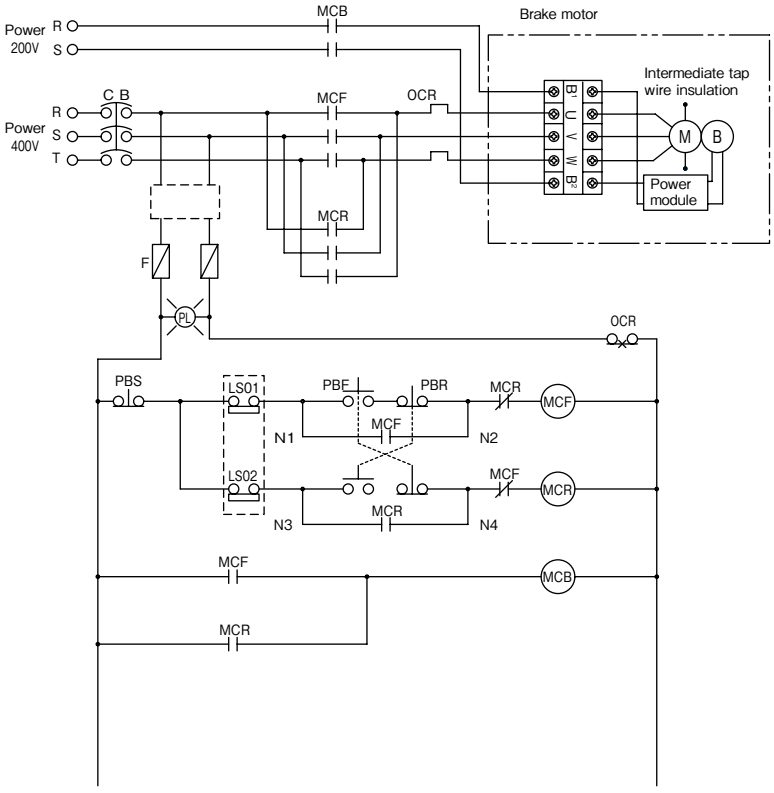
LS02: Retract stroke adjusting external limit switch

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 86.

400V class Brake AC external 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 AC250V, 7A or more.

* For wire connection when an inverter is used, refer to page 86.

Installation

Installation direction

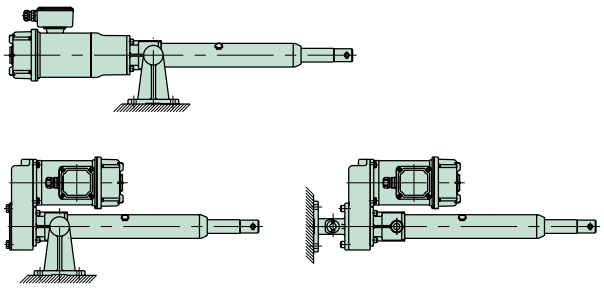
Either horizontal, vertical and inclined directions are allowed.

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.



Trunnion mount　　Clevis mount

Mannual 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 39).

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).

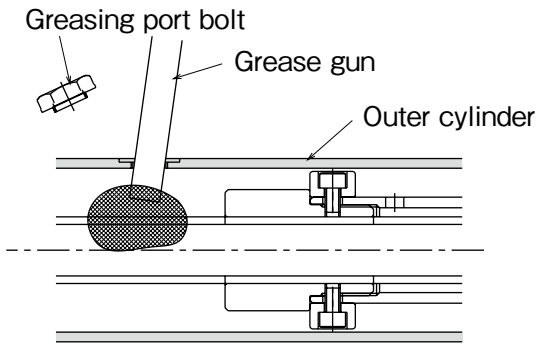
Setting of stroke adjusting external LS

1. Take the coasting amount (page 42) 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.

Maintenance

Greasing on ball screw

Use the ball 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 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 EMERSON	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 100.

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.)

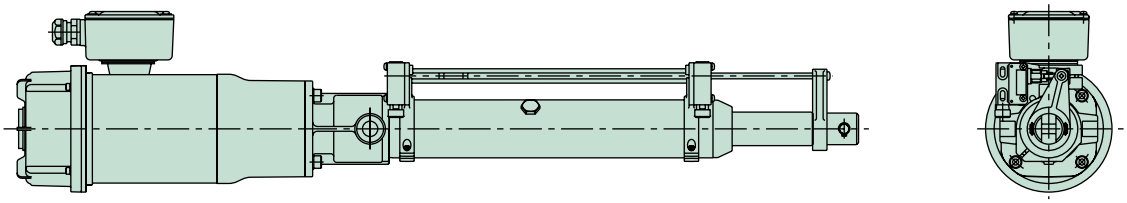
Helical gear (parallel type): Moly gear grease No. 1 (SUMICO LUBRICANT CO., LTD.)

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

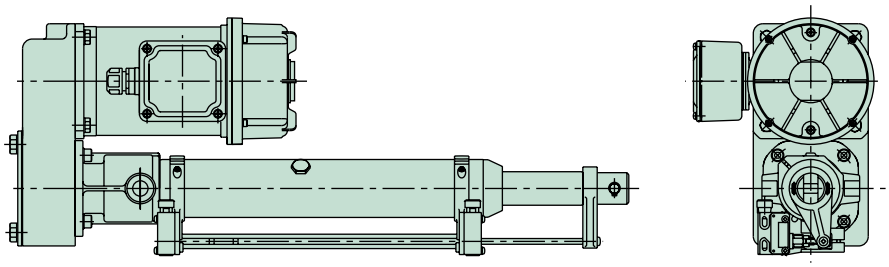
Adjustment of external limit switch and variation of mounting

1. Standard Mounting Form

● Straight



● Parallel

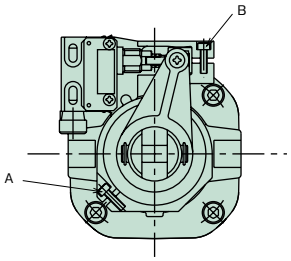


2. Adjustment method

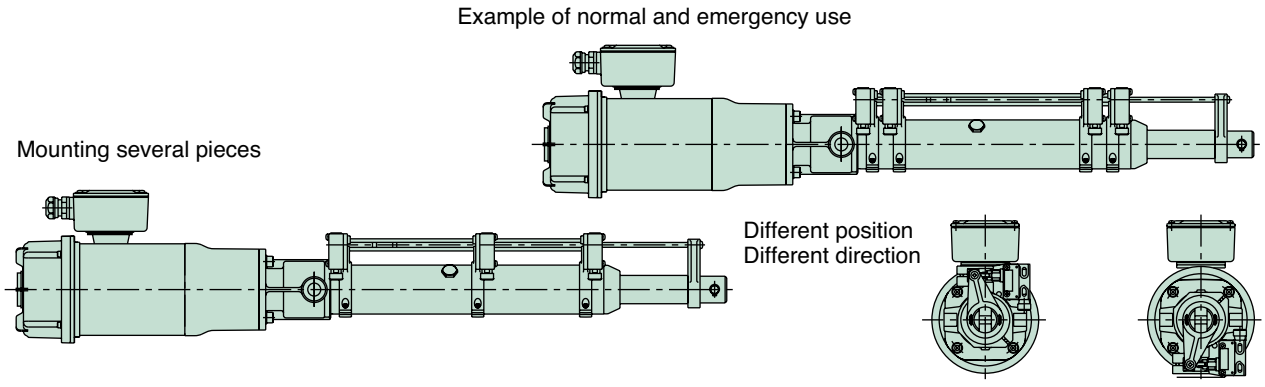
The power cylinder G series has a margin of approximately 3 to 8mm of the nominal stroke on both sides which allows for mechanical stroke. The stroke to be used is within the nominal stroke, therefore, adjust the limit switch so that operation is made in this range. If the nominal stroke is exceeded, 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.

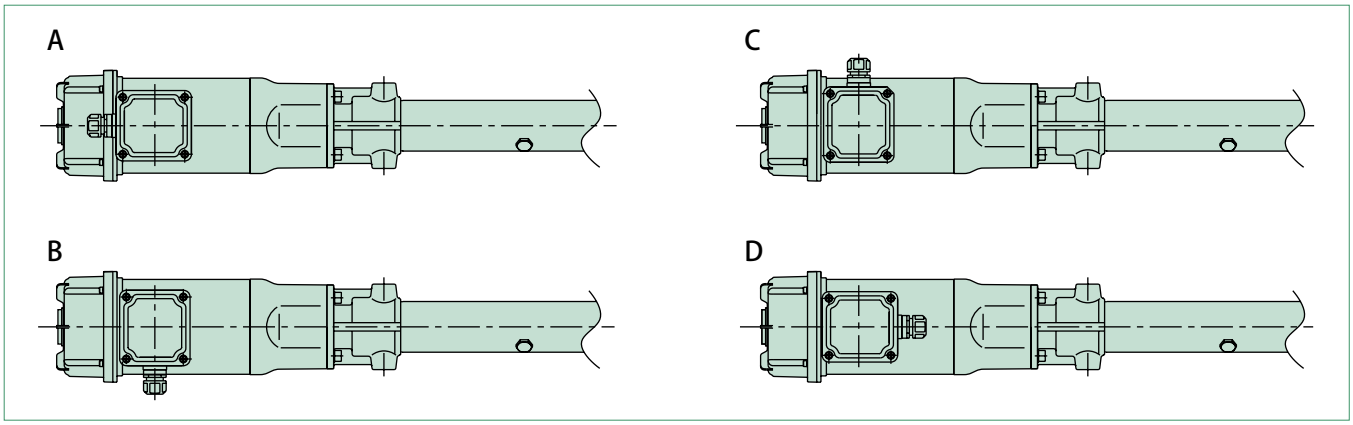
Variation in direction and position of terminal box

“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.
Procedures to change are as follows.

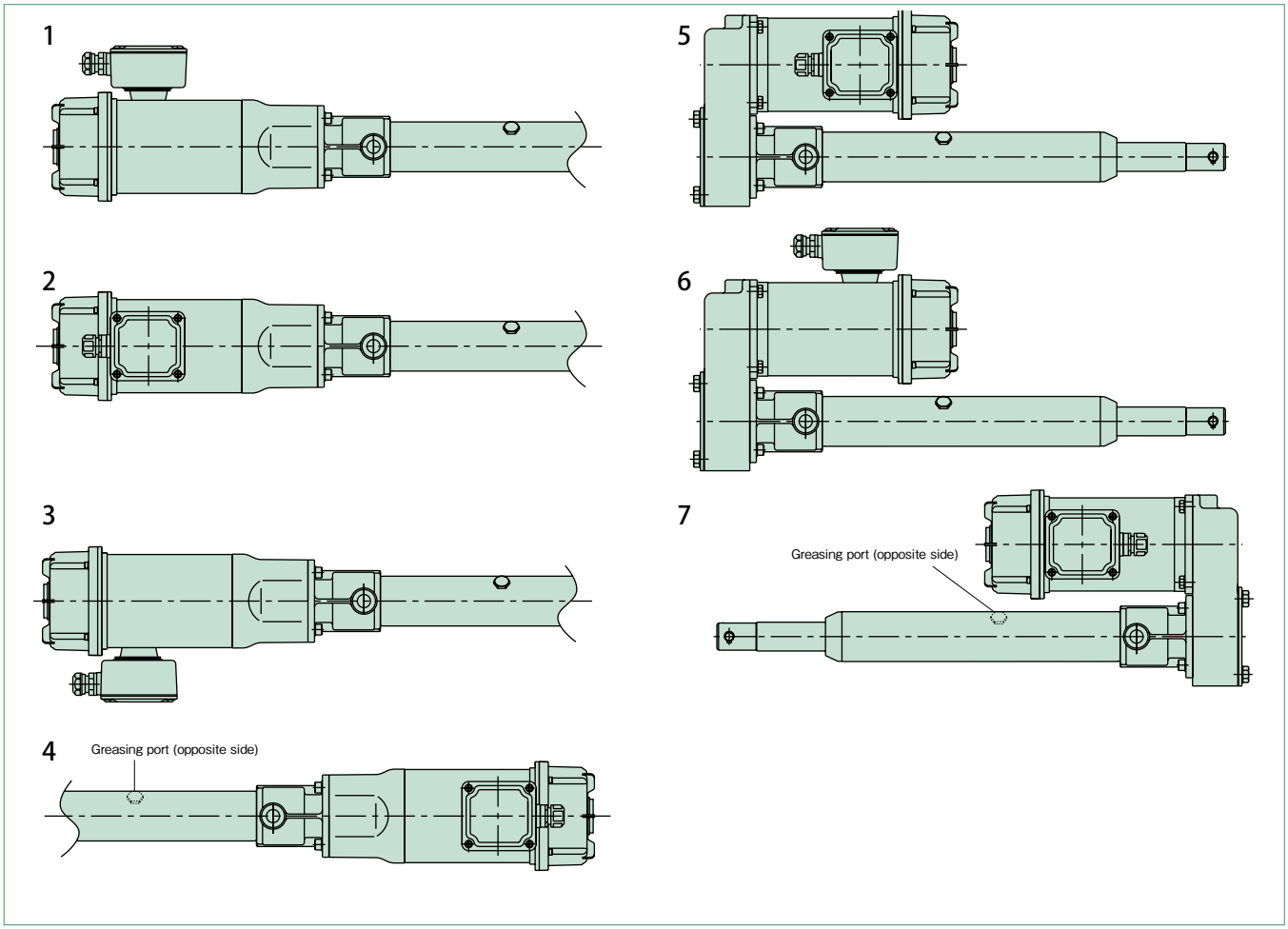
1. Remove the lid of the terminal box.
2. Remove the two screws fixed to the terminal block.
3. Bring up the terminal block without removing the wire connection for the motor and the brake, and remove the four screws fixed to the terminal box.
4. Rotate the terminal box in the desired direction and re-fix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



“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℃ to 40℃, although it varies depending on the use conditions. 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.
- When using a cylinder of the cabtire cable lead wire specification outdoors, carry out waterproofing treatment

■ 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.
- 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.

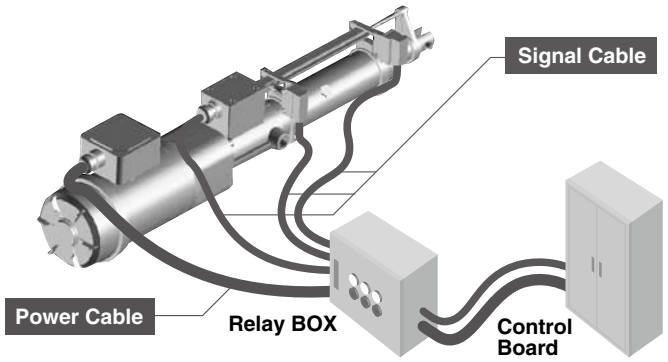
Power cylinder G series have become easier to use.

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.**



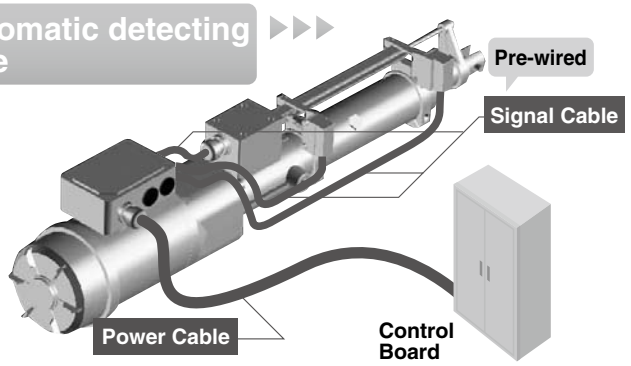
Needs simplicity!

By adoption of easy wiring specifications

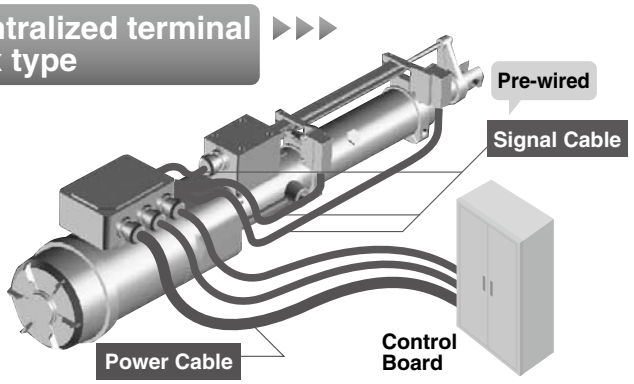
Advantages

- **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. (LP55)

● 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.

Model No. designation

LP TB 1000 L 4 V LPCIJF

Power cylinder

T series

LPTB : Wet slip clutch type
LPTC : Thrust detection mechanism type

Thrust

250	: 2.45kN {250kgf}
500	: 4.90kN {500kgf}
1000	: 9.80kN {1000kgf}
2000	: 19.6kN {2000kgf}
4000	: 39.2kN {4000kgf}
6000	: 58.8kN {6000kgf}
8000	: 78.4kN {8000kgf}
12000	: 117kN {12000kgf}
16000	: 156kN {16000kgf}
32000	: 313kN {32000kgf}

Speed : S、L、M、H

Voltage doubler specifications 400V/440V
(Standard voltage specifications have no symbol.)

Nominal stroke

2	: 200mm
3	: 300mm
5	: 500mm
10	: 1000mm

* The above values are examples of indication.

Options

L	: Stroke adjusting external LS	
L3 *2	: With three stroke adjusting external LSs	
K2,K4	: Position detecting internal LS	
P	: Potentiometer	
R	: Rotary encoder	
C	: With clevis fitting	*3
I	: I -shaped end fitting	*4
J	: With bellows	*5
F	: Motor terminal box and external LS mirror image specifications	

*2 When four or more clevises are installed, indicate this to us separately.
*3 This cannot be used in combination with a position detecting internal LS (K2, K4), potentiometer (P) and rotary encoder (R).
*4 The standard has no symbol.
*5 The stroke is not changed.

* 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 N	Rated thrust {kgf}	Nominal speed 50/60Hz mm/s	Motor output kW	Rod movement per one turn of manual shaft mm	Rod rotating force N·m	Rod rotating force {kgf·m}	Nominal stroke mm	Brake specifications
LPTB LPTC	250	S	2.45k	250	12.5/15	0.1	2.0	2.65	0.27	200, 300, 400 500, 600	● DC brake ● Brake external wiring is available
		L			25/30	0.1	1.0				
		M			50/60	0.2	2.0				
		H			100/120	0.4	4.0				
LPTB LPTC	500	S	4.90k	500	12.5/15	0.1	2.0	5.29	0.54	200, 300, 400 500, 600, 800	
		L			25/30	0.2	1.0				
		M			50/60	0.4	2.0				
		H			100/120	0.75	3.9				
LPTB LPTC	1000	S	9.80k (7.84k)	1000 (800)	12.5/15	0.2	2.0	14.7	1.50	200, 300, 400 500, 600, 800 ※1000 (Rated thrust is 7.84kN)	
		L			25/30	0.4	1.0				
		M			50/60	0.75	2.0				
		H			100/120	1.5	4.0				
LPTB LPTC	2000	S	19.6k (15.6k) (12.2k)	2000 (1600) (1250)	12.5/15	0.4	2.0	35.3	3.60	200, 300, 400 500, 600, 800 ※1000 (Rated thrust is 15.7kN) ※1200 (Rated thrust is 12.3kN)	
		L			25/30	0.75	1.0				
		M			50/60	1.5	2.0				
		H			75/90	2.2	3.0				
LPTB LPTC	4000	S	39.2k (33.3k)	4000 (3400)	9/11	0.75	1.4	83.3	8.50	200, 300, 400 500, 600, 800 1000,1200, ※1500 (Rated thrust is 33.3kN)	
		L			25/30	1.5	1.0				
		M			35/42	2.2	1.4				
		H			60/72	3.7	2.4				
LPTB LPTC	6000	S	58.8k	6000	6.3/7.6	0.75	1.0	124	12.7	500 1000 1500	
		L			17.5/21	1.5	0.7				
		M			25/30	2.2	1.0				
		H			42/50	3.7	1.7				
LPTB LPTC	8000	S	78.4k	8000	10/12	1.5	1.2	222	22.7	500 1000 1500	
		L			20/24	2.2	0.8				
		M			30/36	3.7	1.2				
		H			43/52	5.5	1.7				
LPTB LPTC	12000	L	117k	12000	10/12	2.2	1.2	333	34.0	500 1000 1500 2000	
		M			18/22	3.7	2.2				
		H			30/36	5.5	1.2				
LPTB LPTC	16000	L	156k	16000	14.5/17.5	3.7	2.9	666	68.0	500 1000 1500 2000	
		M			20/24	5.5	3.2				
		H			31/37	7.5	3.7				
LPTB LPTC	32000	L	313k	32000	10/12	5.5	0.4	1.33k	136	500 1000 1500 2000	
		M			15/18	7.5	0.6				
		H			20/24	11	0.8				

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	3φ 200V/200V/220V
Frequency	50Hz/60Hz/60Hz
Heat resistance class	E
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 87.

Painting color

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

Standard use environment

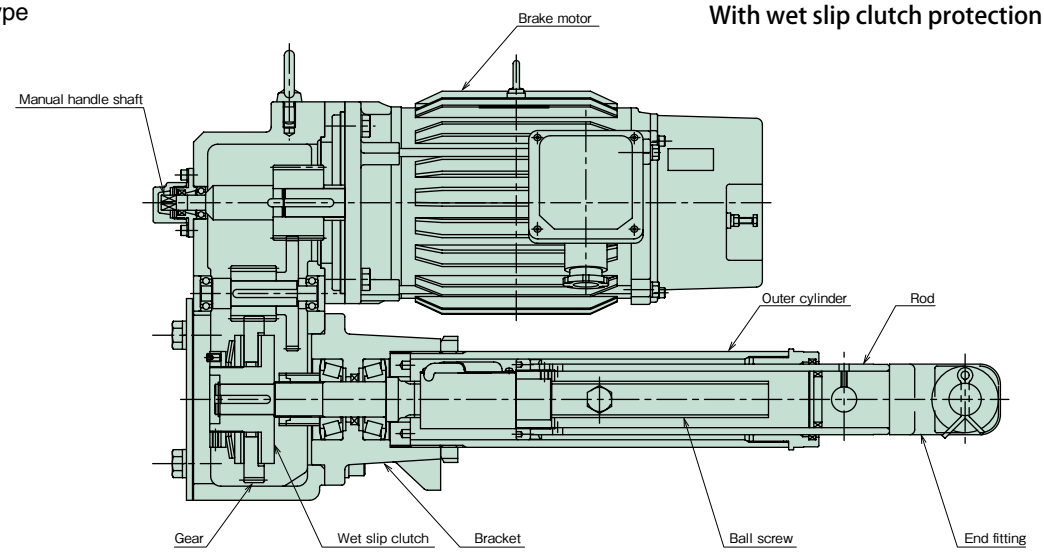
Environment / Model	Ambient temperature	Relative humidity	Impact resistance value	Installation altitude	Atmosphere
Outdoor type	−15℃ ～ 40℃	85% or less (no dew condensation)	1G or less	1000m or lower above sea level	Normally outdoors

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.

Structure

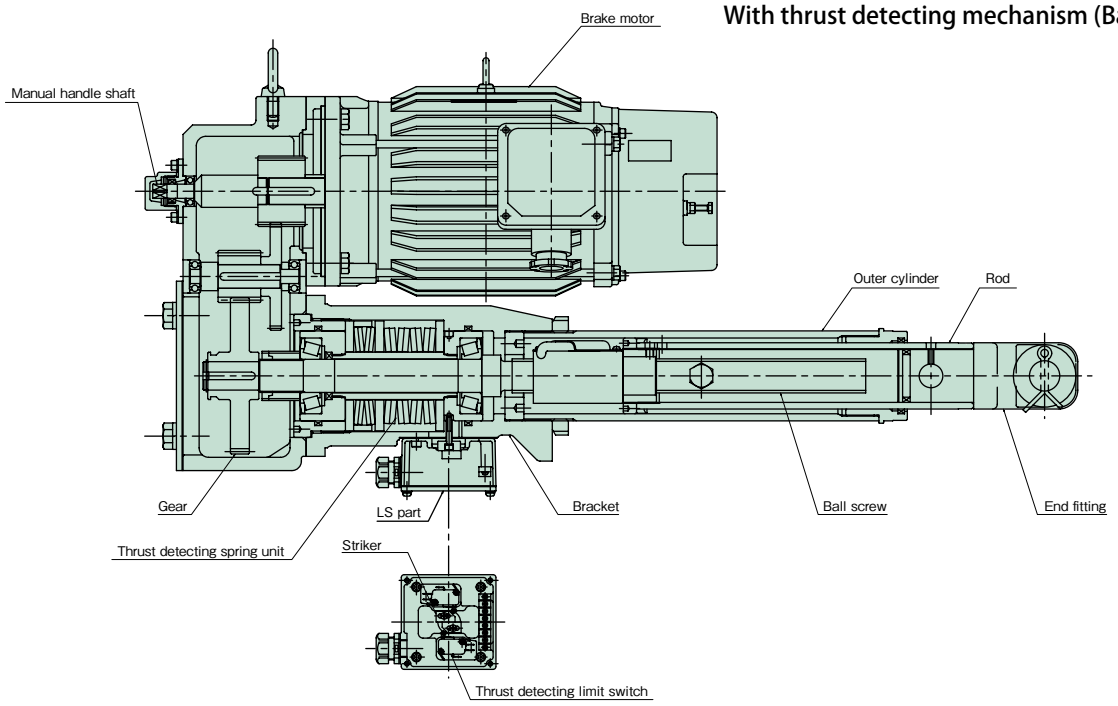
TB type

With wet slip clutch protection device (Basic type)



TC type

With thrust detecting mechanism (Basic type)



* 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

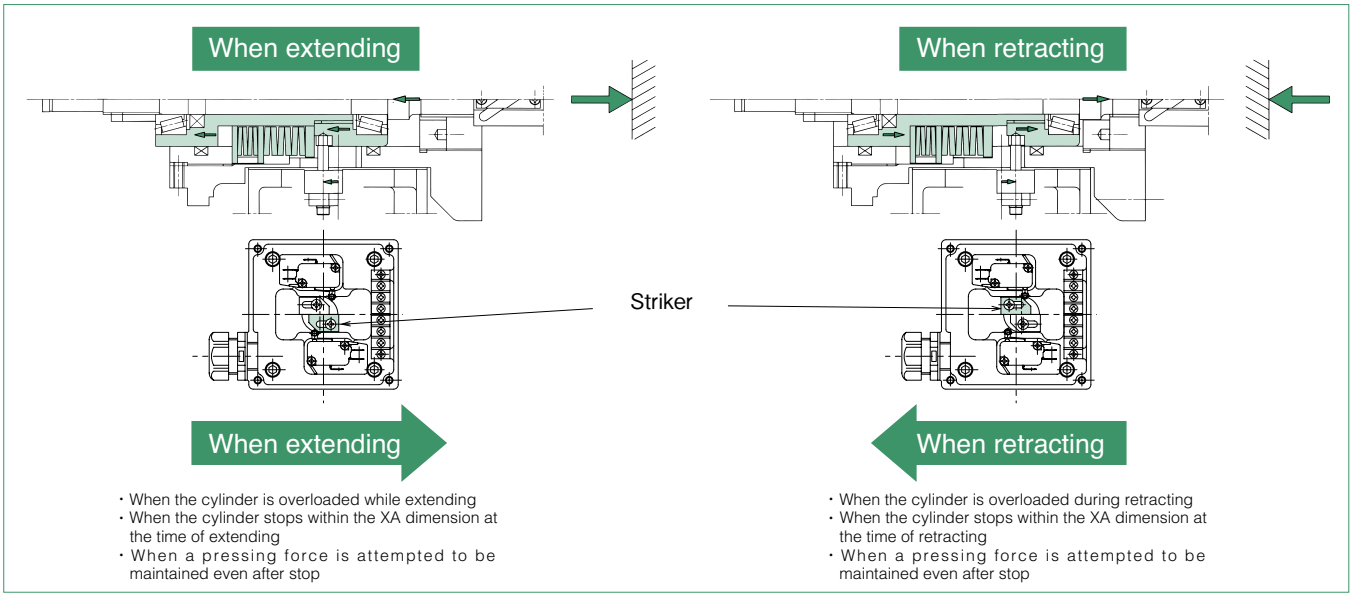
② When requiring an electric signal at the time of overload

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.

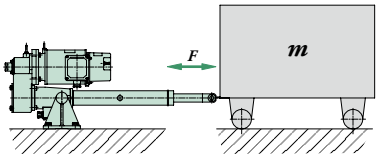
[Thrust detecting mechanism]

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. Allowable mass m for every model is shown in the diagram at the right.



Mass of carriage: m kg
Coefficient of friction: μ
Carriage traveling resistance: $F=\mu m \leqq$ Rated thrust

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 (×10⁴times)	30	10	5	10	3	1

Note) When the power cylinder is used with press (pull) stop, and with internal stop, wire connection for the brake is recommended to be external wiring.
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

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

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

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

2. Obtain an operation factor from the characteristics of load, machine to be used and annual traveling distance.
3. Multiply thrust or load by operation factor to obtain a corrected thrust.
4. Select an applicable model No. from the standard models (page 59) based on the corrected thrust and stroke, speed, power voltage and frequency.

Characteristics check STEP 3

1. Use the power cylinder at a frequency of operation below the allowable frequency of operation (Table 2).
2. Check the load time ratio.
3. Positioning accuracy varies depending on the stopping method. Refer to the stopping method (page 63).

Table 1 Operation factor

Characteristics of load	Example of machine used	Operation factor
Smooth operation without impact Small inertia	Damper, opening/closing of valve, conveyor changeover device	1.0～1.3
Operation with light impact Intermediate inertia	Opening/closing of hopper gate, various transfer equipment, various lifter elevation	1.3～1.5
Operation with large impact and vibration 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 250L 500S	250M 500L 1000S	250H 500M 1000L 2000S	500H 1000M 2000L 4000S 6000S	1000H 2000M 4000L 6000L 8000S	2000H 4000M 6000M 8000L 12000L	4000H 6000H 8000M 12000M 16000L	8000H 12000H 16000M 32000L	16000H 32000M	32000H
Number of starting times (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.

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

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).
Traveling distances of the cylinder (nut) are values at the rated thrust.
If you inform us of the operating conditions, we will calculate expected traveling life of the ball screw.

1. Number of operation times of brake
   Expected life 2 million times

2. Traveling distance of cylinder (nut)
   Calculate life from the load – life chart on the right and compare it with the expected traveling distance (= annual traveling distance x age of service) to check the life.
   However, life of the cylinder varies depending on model No., operating conditions and lubricating status. 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.

   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 }

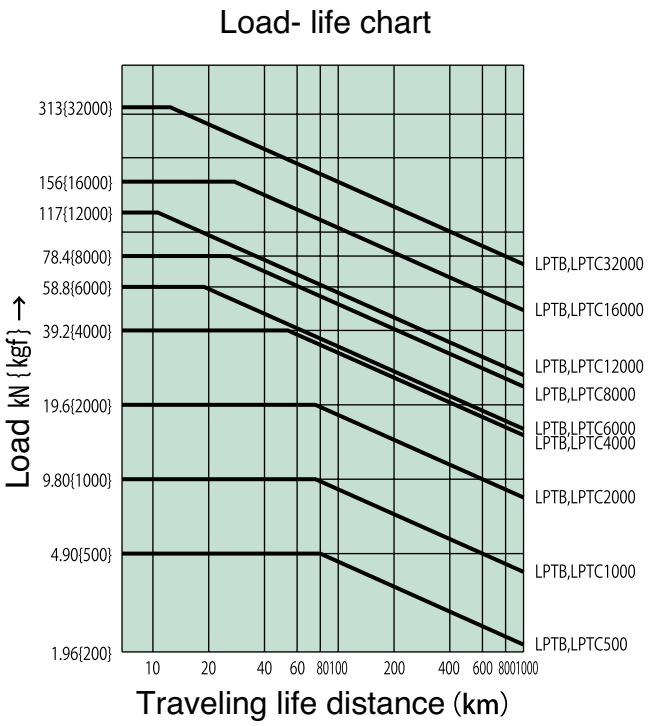
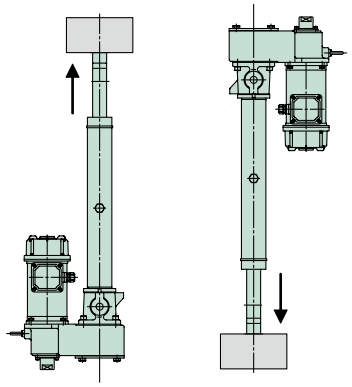


Table 3 Coasting distance and stop accuracy (Reference value)

Unit: mm

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

Fig. 1 Type of load



Vertical operation

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

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.

Stoppage

This method operates and stops the brake by the limit switch or operation of the stop button, and allows for positioning on multi-stages such as the upper limit, lower limit and middle of the stroke. Coasting distance and stop accuracy vary depending on operating speed and load. When accurate positioning is required, low operation speed or brake individual turnoff is recommended. Take coasting distance into consideration to set the limit switch and the output stop signal. Reference values are shown in Table 3.

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.

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℃～35℃
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 $\frac{K2}{\text{Stop at two middle points}}$ $\frac{J}{\text{With bellows (much dust)}}$

<Characteristics check>: 1. **Number of starting times**

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

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

2. **Number of total press (pull) stop times**：2 times/1 reciprocation, durable years: 5 years (250 days/year)
$2\times 6\times 10\times 250\times 5 = 15\times 10^4 \text{ times} < 30\times 10^4 \text{ times}$

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

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

3. **Equivalent load**：$Pm = \frac{16.5 \quad \frac{16.5\times 2}{3}}{} = 16.5\text{kN}$ {1680kgf}

This calculated value satisfies the expected traveling life of LPTC 2000 according to the load-life diagram on page 62.

Selection 2

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

Unit: kg

Power cylinder model	LPTB LPTC : 250			LPTB LPTC : 500			LPTB LPTC : 1000			LPTB LPTC : 2000			LPTB 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 LPTC : 6000			LPTB LPTC : 8000			LPTB LPTC : 12000			LPTB LPTC : 16000			LPTB 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

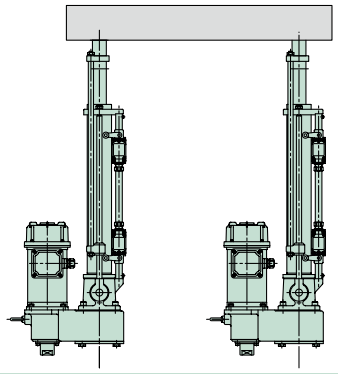
Note) There is no problem with low speed S.

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 88).

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 94)

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

Table 5 Multiple factor

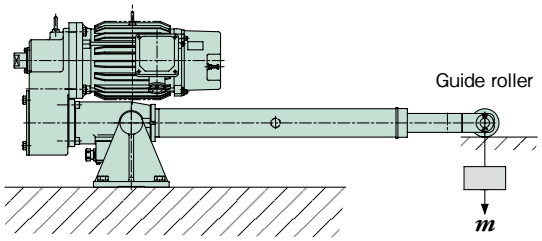
Number of power cylinders used	2 cylinders	3 cylinders	4 cylinders	5 cylinders	6 cylinders
Multiple factor	0.8	0.7	0.6	0.55	0.5

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)

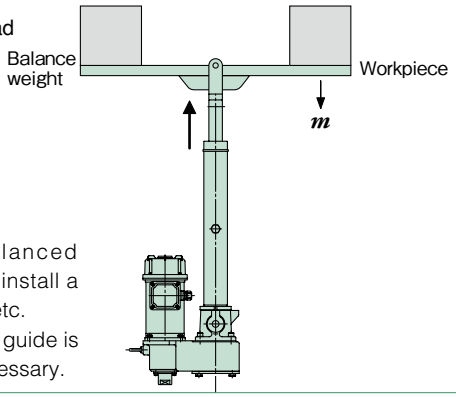
Fig. 3 Lateral load



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

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

Fig. 4 Biased load

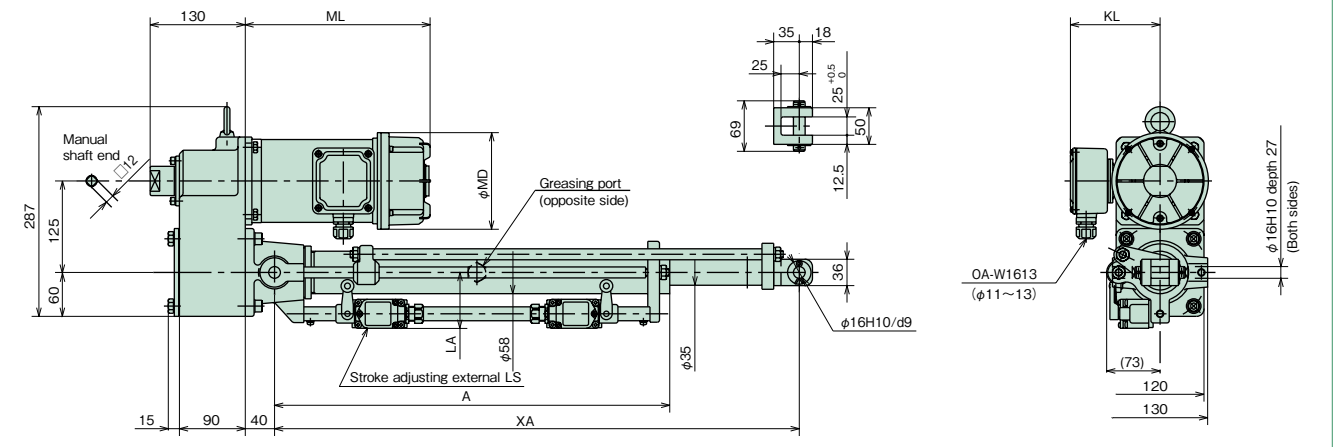


When an unbalanced load is applied, install a balance weight etc.
* In this layout, a guide is separately necessary.

③ Anti-rod rotation A rotating force is generated on the rod with thrust (page 59), therefore, prevent rotation on the equipment side.

Dimensions Table T Series 250

LPTB250



Unit: mm

Model	Nominal speed mm/s 50/60Hz	Motor kW	MD	ML	KL
LPTB250S	12.5/15	0.1	132	296	123
LPTB250L	25/30			231	
LPTB250M	50/60	0.2			
LPTB250H	100/120	0.4		253	

Unit: mm

Nominal stroke	Thrust kN	Thrust {kgf}	A	XA MIN	XA MAX	LA
200	2.45	250	340	435	635	161
300			440	545	845	
400			540	655	1055	76.5
500			640	765	1265	
600			740	870	1470	

Approximate mass of main body

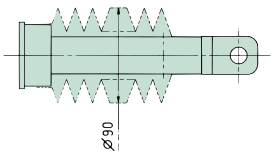
Unit: kg

Model \ Nominal stroke	200	300	400	500	600
LPTB250S	35	36	37	38	39
LPTB250L	31	33	34	35	36
LPTB250M	31	33	34	35	36
LPTB250H	34	35	36	37	38

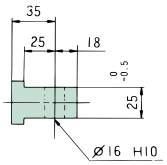
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger.
3. Mechanical stroke has a margin of approximately 10m 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 87.

Options

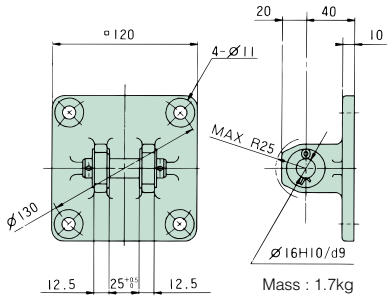
■ Bellows (— J)



■ I-type end fitting (LPTB500-I)

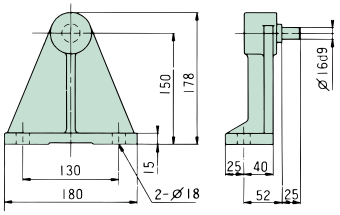


■ Clevis fitting (LPTB500-C)



Mass : 1.7kg

■ Trunnion column (LPTB500-T)



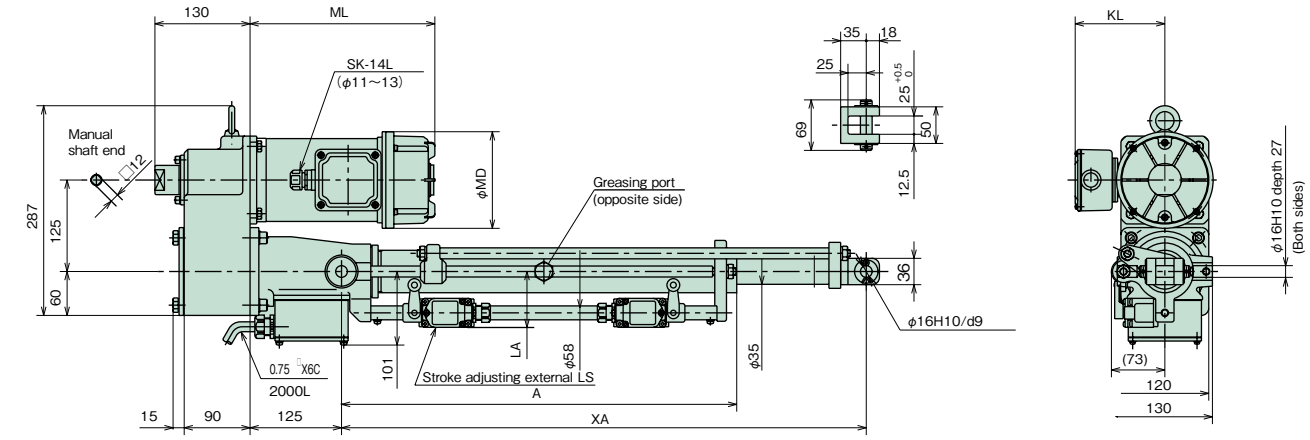
Mass : 7.0kg

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

LPTC250



Unit: mm

Model	Nominal speed mm/s 50/60Hz	Motor kW	MD	ML	KL
LPTC250S	12.5/15	0.1	132	296	123
LPTC250L	25/30			231	
LPTC250M	50/60	0.2			
LPTC250H	100/120	0.4		253	

Unit: mm

Nominal stroke	Thrust kN	Thrust {kgf}	A	XA MIN	XA MAX	LA
200	2.45	250	340	435	635	161
300			440	545	845	
400			540	655	1055	76.5
500			640	765	1265	
600			740	870	1470	

Approximate mass of main body

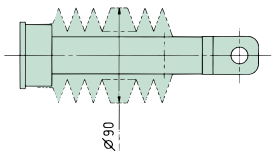
Unit: kg

Model \ Nominal stroke	200	300	400	500	600
LPTC250S	39	40	41	42	43
LPTC250L	35	37	38	39	40
LPTC250M	35	37	38	39	40
LPTC250H	38	39	40	41	42

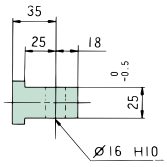
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger.
3. Mechanical stroke has a margin of approximately 10m 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 87.

Options

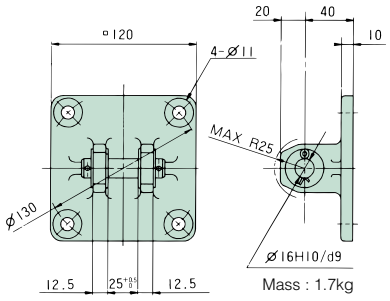
■ Bellows (— J)



■ I-type end fitting (LPTB500-I)

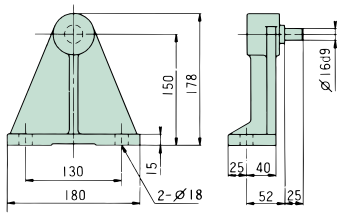


■ Clevis fitting (LPTB500-C)



Mass : 1.7kg

■ Trunnion column (LPTB500-T)



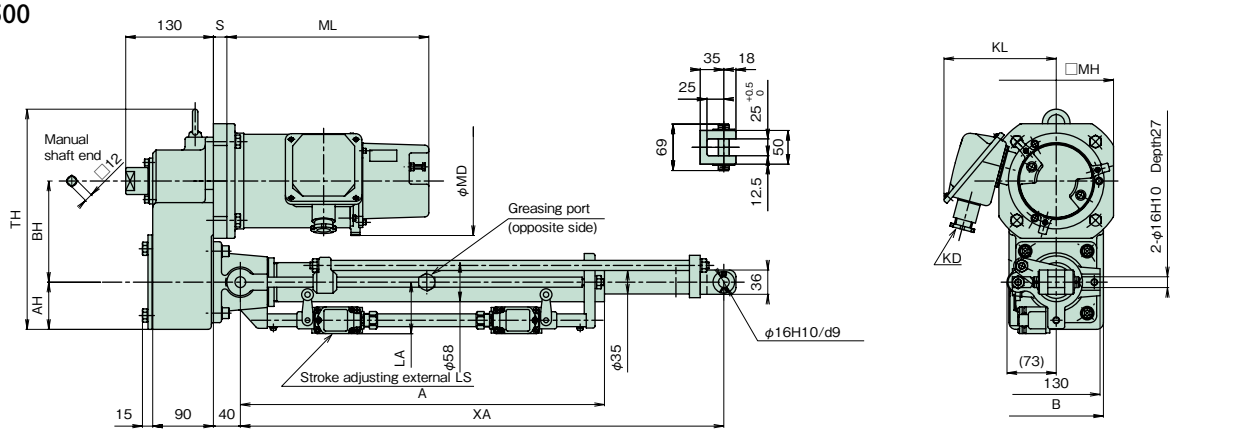
Mass : 7.0kg

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 mm/s 50/60Hz	Motor 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	123	SK-14L	120	60	125	287	65	120	12.5	25	20	40	10	130	25	16
LPTB500L	25/30	0.2									—									
LPTB500M	50/60	0.4		253																
LPTB500H	100/120	0.75	162	300	159	A20C	170	70	150	327	20	140	15	30	25		12	140	31	20

Unit: mm

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

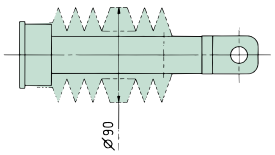
Approximate mass of main body Unit: kg

Model \ Nominal stroke	200	300	400	500	600	800
LPTB500S	35	36	37	38	39	42
LPTB500L	31	33	34	35	36	39
LPTB500M	34	35	36	37	38	40
LPTB500H	42	43	45	46	47	49

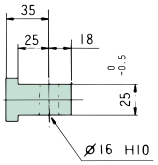
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger.
3. Mechanical stroke has a margin of approximately 10m 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 87.

Options

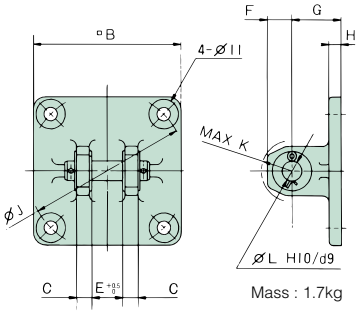
■ Bellows (— J)



■ I-type end fitting (LPTB500-I)

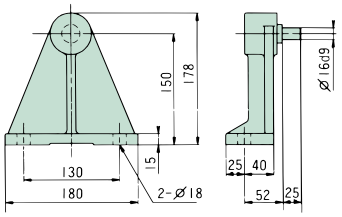


■ Clevis fitting (LPTB500-C)



Mass : 1.7kg

■ Trunnion column (LPTB500-T)



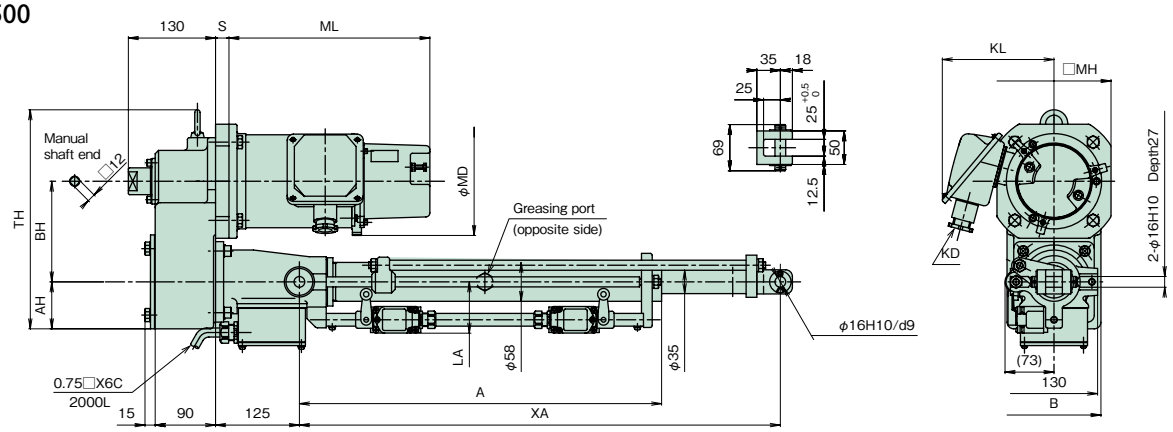
Mass : 7.0kg

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

LPTC500



Unit: mm

Model	Nominal speed mm/s 50/60Hz	Motor 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	123	SK-14L	120	60	125	287	65	120	12.5	25	20	40	10	130	25	16
LPTC500L	25/30	0.2									—									
LPTC500M	50/60	0.4		253																
LPTC500H	100/120	0.75	162	300	159	A20C	170	70	150	327	20	140	15	30	25		12	140	31	20

Unit: mm

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

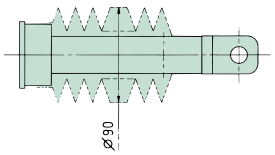
Approximate mass of main body Unit: kg

Model \ Nominal stroke	200	300	400	500	600	800
LPTC500S	39	40	41	42	43	46
LPTC500L	35	37	38	39	40	43
LPTC500M	38	39	40	41	42	44
LPTC500H	46	47	49	50	51	53

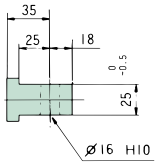
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger.
3. Mechanical stroke has a margin of approximately 10m 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 87.

Options

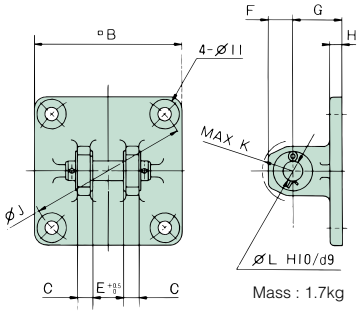
■ Bellows (— J)



■ I-type end fitting (LPTB500-I)

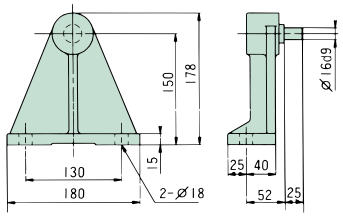


■ Clevis fitting (LPTB500-C)



Mass : 1.7kg

■ Trunnion column (LPTB500-T)

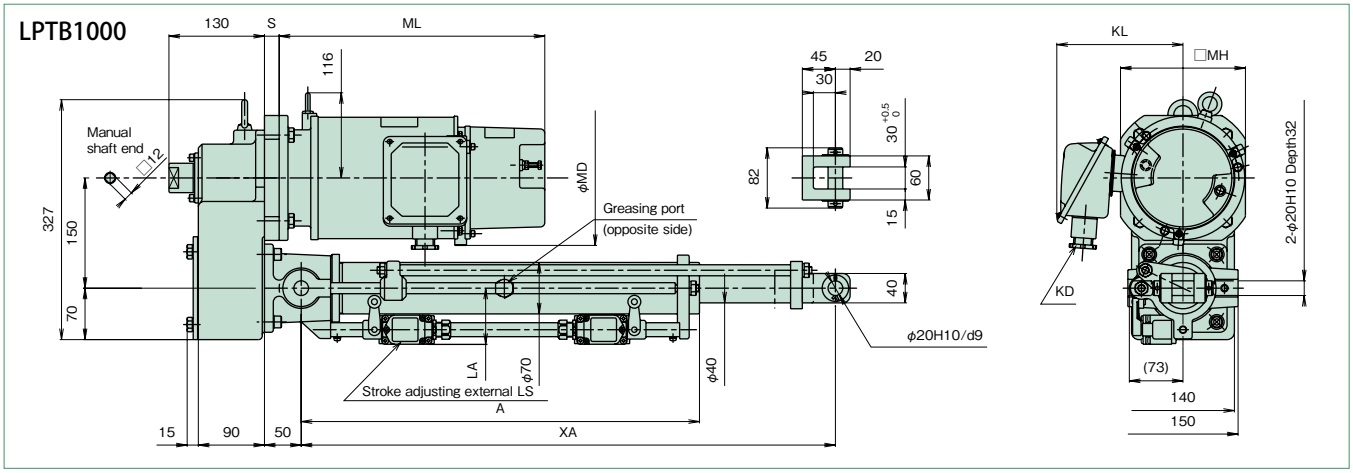


Mass : 7.0kg

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 mm/s 50/60Hz	Motor kW	MD	ML	KL	KD	MH	S
LPTB1000S	12.5/15	0.2	132	231	123	SK-14L	120	65
LPTB1000L	25/30	0.4		253				—
LPTB1000M	50/60	0.75	162	300	159	A20C	170	20
LPTB1000H	100/120	1.5	184	362	172			

Unit: mm

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

Approximate mass of main body

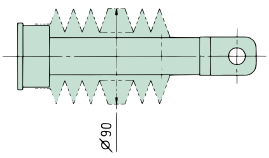
Unit: kg

Model \ Nominal stroke	200	300	400	500	600	800	1000
LPTB1000S	42	44	45	47	49	52	56
LPTB1000L	40	42	44	45	47	51	54
LPTB1000M	46	48	50	52	53	57	60
LPTB1000H	50	52	54	55	57	61	64

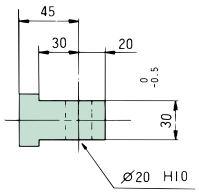
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger.
3. Mechanical stroke has a margin of approximately 10m 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 87.

Options

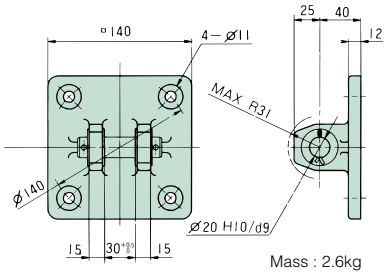
■ Bellows (— J)



■ I-type end fitting (LPTB1000-I)

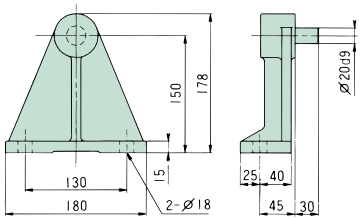


■ Clevis fitting (LPTB1000-C)



Mass : 2.6kg

■ Trunnion column (LPTB1000-T)

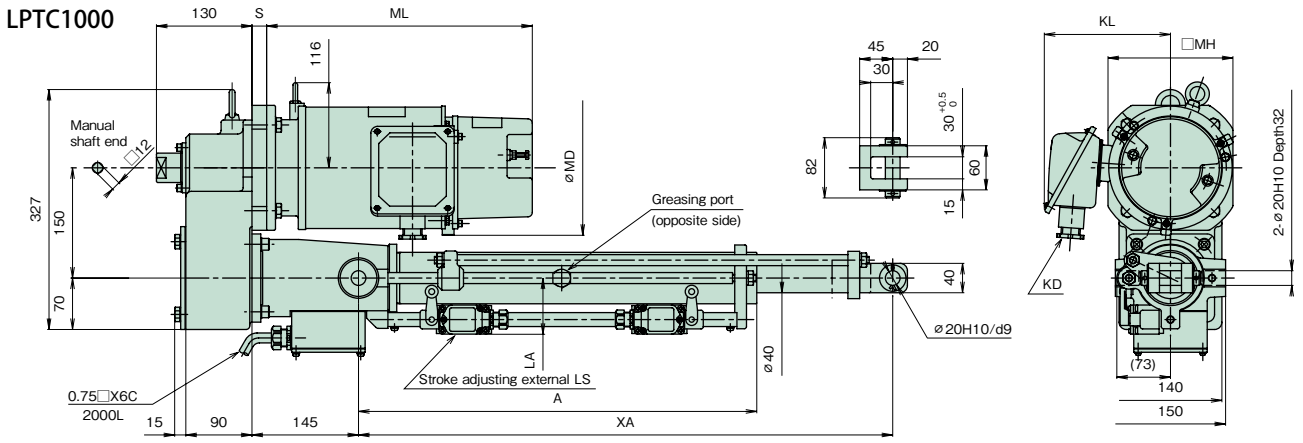


Mass : 7.0kg

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 mm/s 50/60Hz	Motor kW	MD	ML	KL	KD	MH	S
LPTC1000S	12.5/15	0.2	132	231	123	SK-14L	120	65
LPTC1000L	25/30	0.4		253				—
LPTC1000M	50/60	0.75	162	300	159	A20C	170	20
LPTC1000H	100/120	1.5	184	362	172			

Unit: mm

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

Approximate mass of main body

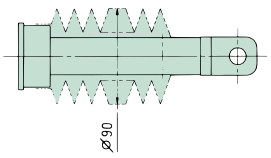
Unit: kg

Model \ Nominal stroke	200	300	400	500	600	800	1000
LPTC1000S	48	50	51	53	55	58	62
LPTC1000L	46	48	50	51	53	57	60
LPTC1000M	52	54	56	58	59	63	66
LPTC1000H	56	58	60	61	63	67	70

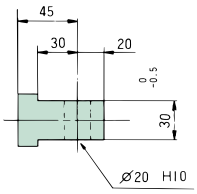
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger.
3. Mechanical stroke has a margin of approximately 10m 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 87.

Options

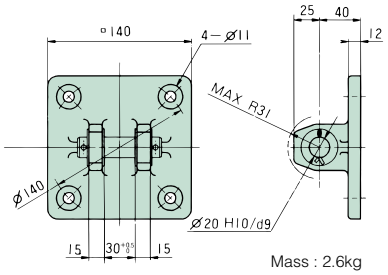
■ Bellows (— J)



■ I-type end fitting (LPTB1000-I)

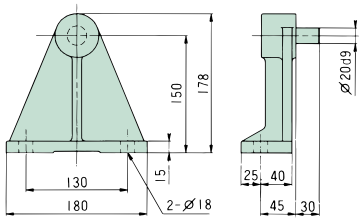


■ Clevis fitting (LPTB1000-C)



Mass : 2.6kg

■ Trunnion column (LPTB1000-T)

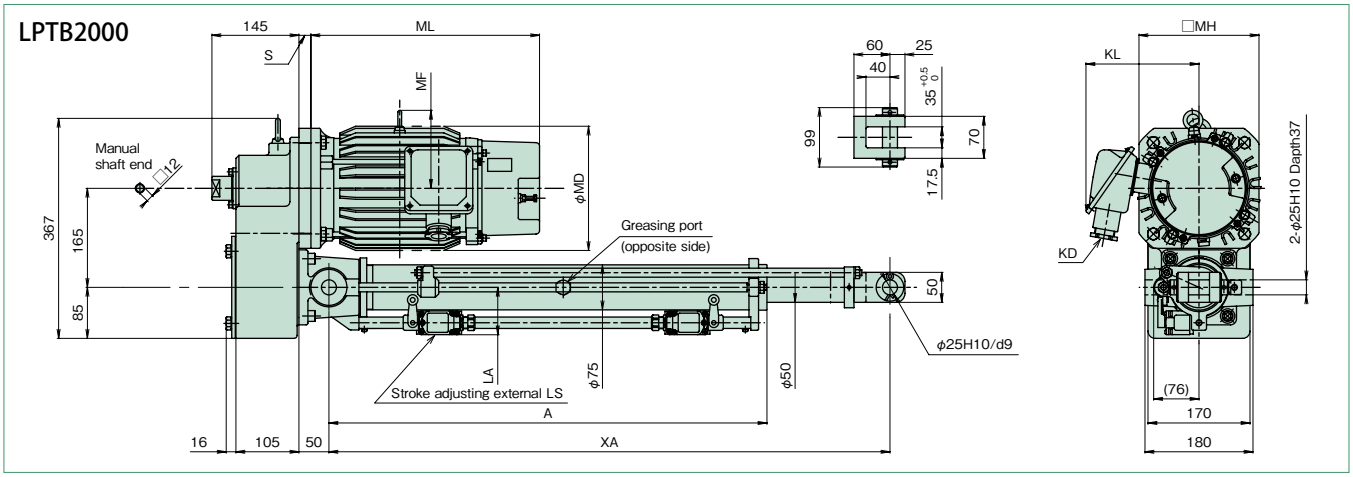


Mass : 7.0kg

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 mm/s 50/60Hz	Motor kW	MD	ML	MF	KL	KD	MH	S
LPTB2000S	12.5/15	0.4	132	253	—	123	SK-14L	120	70
LPTB2000L	25/30	0.75	162	300		159	A20C	170	—
LPTB2000M	50/60	1.5	184	362		172			
LPTB2000H	75/90	2.2	207	381	130	190	A25C	200	20

Unit: mm

Nominal stroke	Thrust kN	Thrust {kgf}	A	XA MIN	XA MAX	LA
200	19.6	2000	400	520	720	164
300			500	630	930	
400			600	740	1140	79
500			700	850	1350	
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

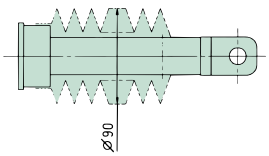
Unit: kg

Model \ Nominal stroke	200	300	400	500	600	800	1000	1200
LPTB2000S	56	58	60	63	65	69	73	77
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

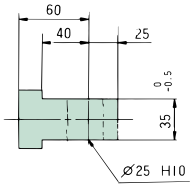
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger.
3. Mechanical stroke has a margin of approximately 10m 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 87.

Options

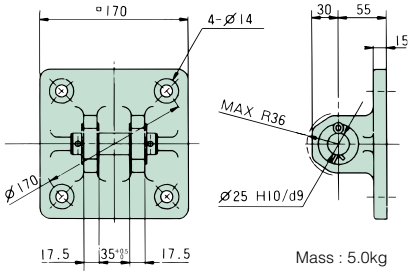
■ Bellows (— J)



■ I-type end fitting (LPTB2000-I)

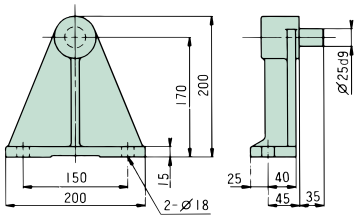


■ Clevis fitting (LPTB2000-C)



Mass : 5.0kg

■ Trunnion column (LPTB2000-T)



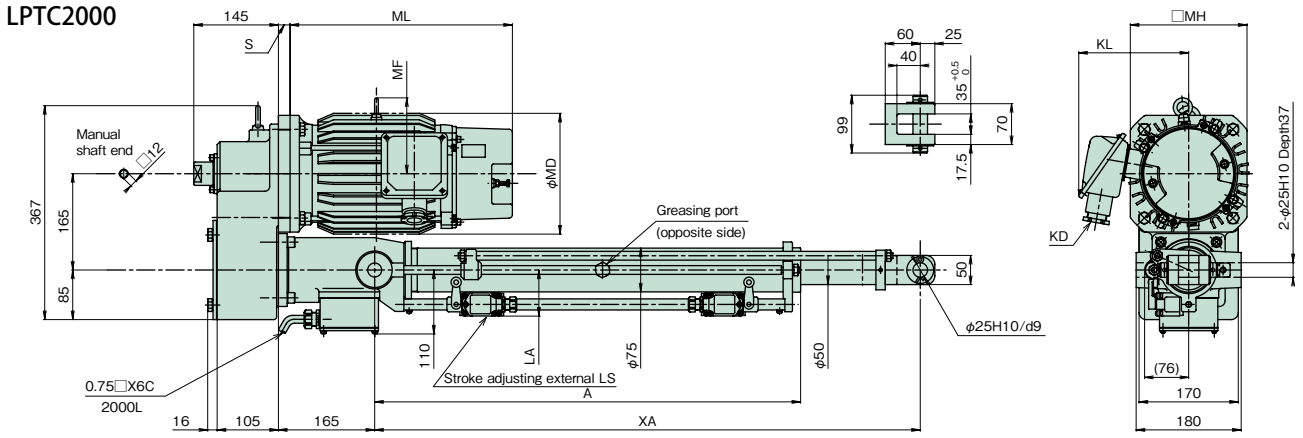
Mass : 9.2kg

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 mm/s 50/60Hz	Motor kW	MD	ML	MF	KL	KD	MH	S
LPTC2000S	12.5/15	0.4	132	253	—	123	SK-14L	120	70
LPTC2000L	25/30	0.75	162	300		159	A20C	170	—
LPTC2000M	50/60	1.5	184	362		172			
LPTC2000H	75/90	2.2	207	381	130	190	A25C	200	20

Unit: mm

Nominal stroke	Thrust kN	Thrust {kgf}	A	XA MIN	XA MAX	LA
200	19.6	2000	400	520	720	164
300			500	630	930	
400			600	740	1140	79
500			700	850	1350	
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

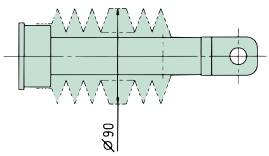
Unit: kg

Model \ Nominal stroke	200	300	400	500	600	800	1000	1200
LPTC2000S	64	66	68	71	73	77	81	85
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

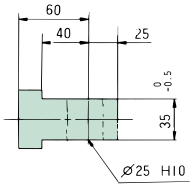
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger.
3. Mechanical stroke has a margin of approximately 10m 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 87.

Options

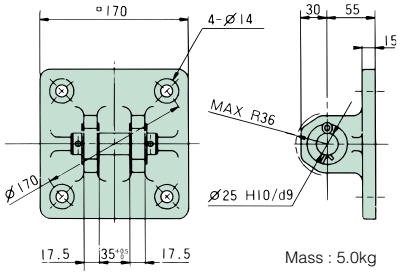
■ Bellows (— J)



■ I-type end fitting (LPTB2000-I)

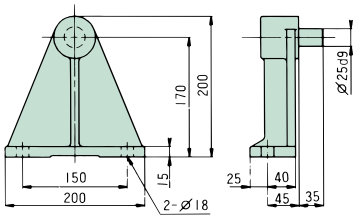


■ Clevis fitting (LPTB2000-C)



Mass : 5.0kg

■ Trunnion column (LPTB2000-T)



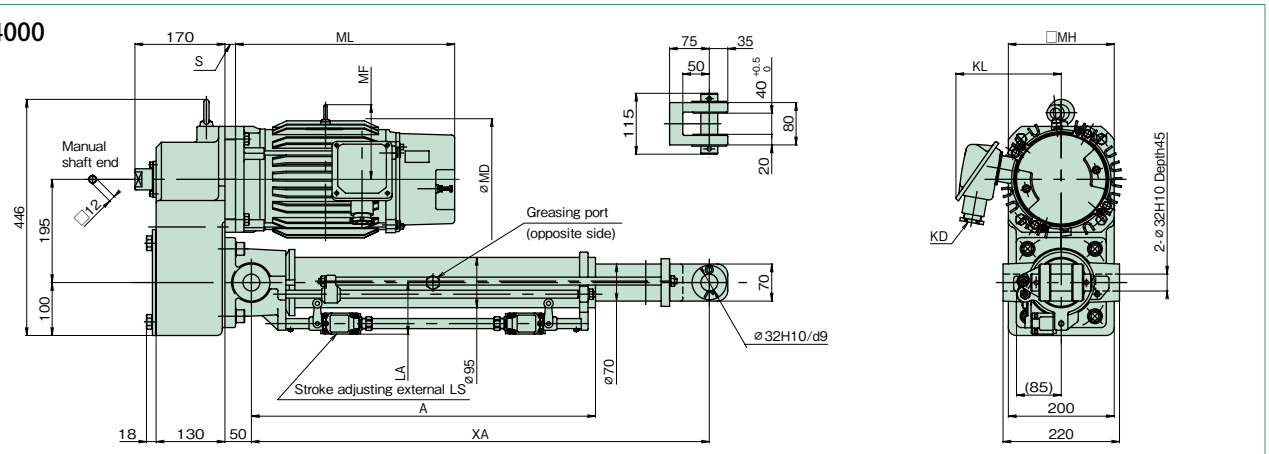
Mass : 9.2kg

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 4000

LPTB4000



Unit: mm

Model	Nominal speed mm/s 50/60Hz	Motor kW	MD	ML	MF	KL	KD	MH	S
LPTB4000S	9/11	0.75	162	300	—	159	A20C	170	90
LPTB4000L	25/30	1.5	184	362		172			—
LPTB4000M	35/42	2.2	207	381	130	190	A25C	200	20
LPTB4000H	60/72	3.7	229	414	141	201			

Unit: mm

Nominal stroke	Thrust kN	Thrust {kgf}	A	XA MIN	XA MAX	LA
200	39.2	4000	440	585	785	182
300			550	695	995	
400			650	805	1205	97.5
500			750	910	1410	
600			850	1020	1620	
800			1050	1235	2035	
1000			1250	1450	2450	
1200			1450	1670	2870	
1500	33.3	3400	1750	1995	3495	

Approximate mass of main body

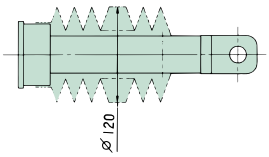
Unit: kg

Model \ Nominal stroke	200	300	400	500	600	800	1000	1200	1500
LPTB4000S	90	94	97	101	104	111	118	125	136
LPTB4000L	87	90	94	97	100	104	114	121	132
LPTB4000M	97	101	105	108	111	119	125	131	143
LPTB4000H	116	119	123	126	130	137	144	151	161

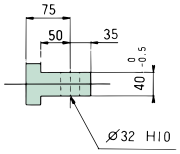
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger.
3. Mechanical stroke has a margin of approximately 10m 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 87.

Options

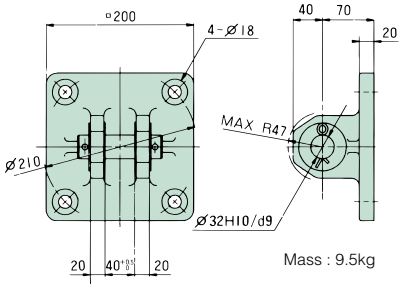
■ Bellows (— J)



■ I-type end fitting (LPTB4000-I)

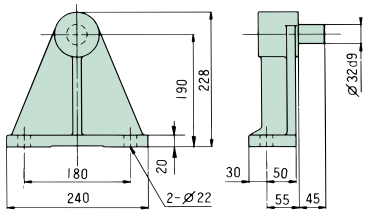


■ Clevis fitting (LPTB4000-C)



Mass : 9.5kg

■ Trunnion column (LPTB4000-T)



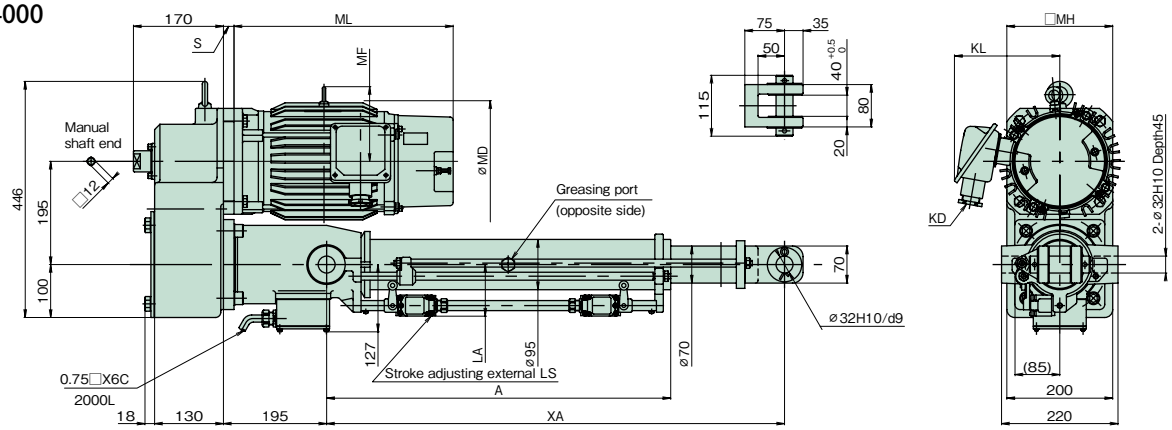
Mass : 16.4kg

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 4000

LPTC4000



Unit: mm

Model	Nominal speed mm/s 50/60Hz	Motor kW	MD	ML	MF	KL	KD	MH	S
LPTC4000S	9/11	0.75	162	300	—	159	A20C	170	90
LPTC4000L	25/30	1.5	184	362		172			—
LPTC4000M	35/42	2.2	207	381	130	190	A25C	200	20
LPTC4000H	60/72	3.7	229	414	141	201			

Unit: mm

Nominal stroke	Thrust kN	Thrust {kgf}	A	XA MIN	XA MAX	LA
200	39.2	4000	440	585	785	182
300			550	695	995	
400			650	805	1205	97.5
500			750	910	1410	
600			850	1020	1620	
800			1050	1235	2035	
1000			1250	1450	2450	
1200			1450	1670	2870	
1500	33.3	3400	1750	1995	3495	

Approximate mass of main body

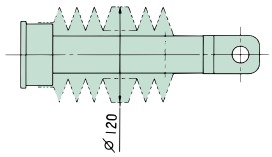
Unit: kg

Model \ Nominal stroke	200	300	400	500	600	800	1000	1200	1500
LPTC4000S	105	109	112	116	119	126	133	140	151
LPTC4000L	102	105	109	112	115	119	129	126	147
LPTC4000M	112	116	120	123	127	134	140	147	158
LPTC4000H	131	134	138	141	145	152	159	166	176

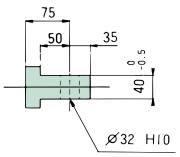
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. If the stroke is 300mm or less and a limit switch for stroke adjustment is equipped, the limit switch is vertically mounted. Note that the LA dimension becomes larger.
3. Mechanical stroke has a margin of approximately 10m 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 1500mm 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 87.

Options

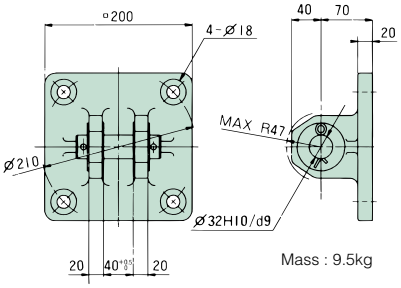
■ Bellows (— J)



■ I-type end fitting (LPTB4000-I)

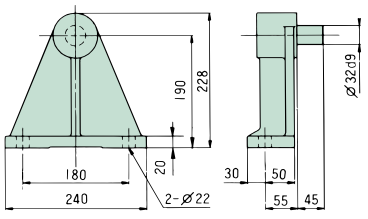


■ Clevis fitting (LPTB4000-C)



Mass : 9.5kg

■ Trunnion column (LPTB4000-T)



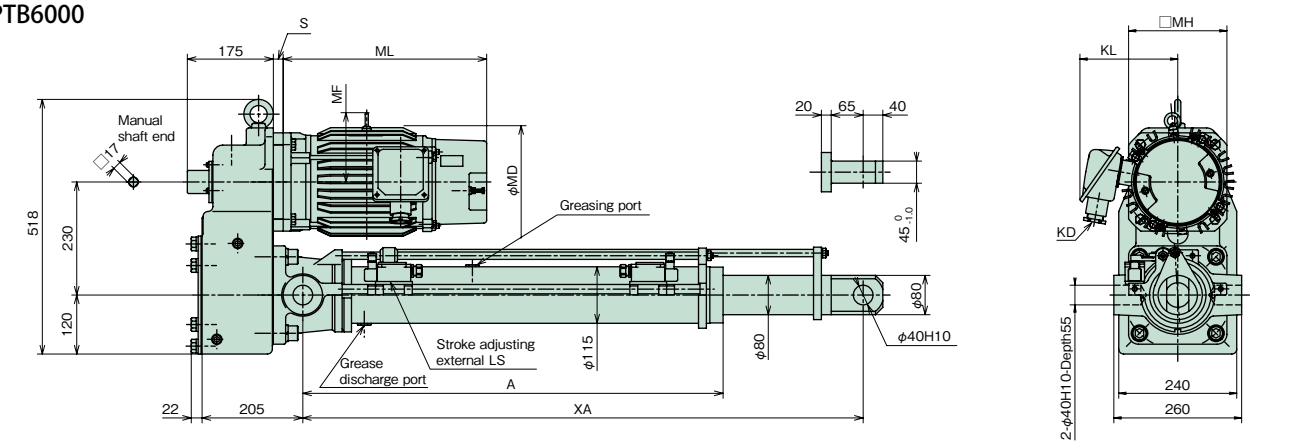
Mass : 16.4kg

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

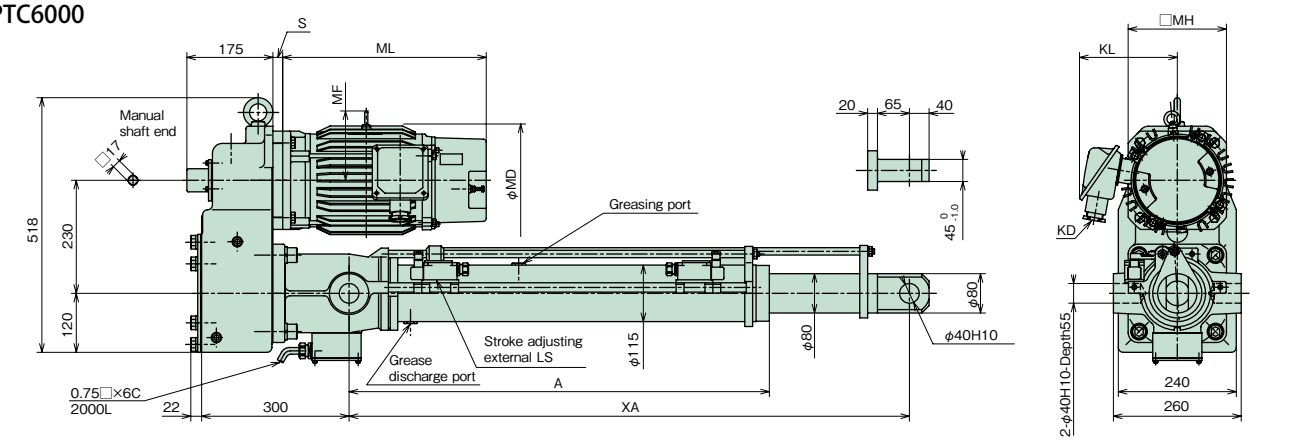
* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions. When designing the machine, take the margin into consideration.

Dimensions Table T Series 6000

LPTB6000



LPTC6000



Unit: mm

Model	Nominal speed mm/s 50/60Hz	Motor kW	MD	ML	MF	KL	KD	MH	S
LPTB6000S LPTC6000S	6.3/7.6	0.75	162	300	—	159	A20C	170	90
LPTB6000L LPTC6000L	17.5/21	1.5	184	362	—	172			—
LPTB6000M LPTC6000M	25/30	2.2	207	381	130	190	A25C	200	20
LPTB6000H LPTC6000H	42/50	3.7	229	414	141	201			

Unit: mm

Nominal stroke	Thrust kN	Thrust {kgf}	A	XA MIN	XA MAX
500	58.8	6000	855	1010	1510
1000			1355	1560	2560
1500			1955	2210	3710

Approximate mass of main body

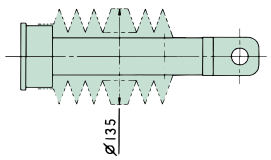
Unit: kg

Model \ Nominal stroke	500	1000	1500
LPTB6000S	143	168	193
LPTC6000S	165	188	215
LPTB6000L	151	176	201
LPTC6000L	174	198	213
LPTB6000M	157	182	207
LPTC6000M	179	202	229
LPTB6000H	172	197	222
LPTC6000H	199	217	244

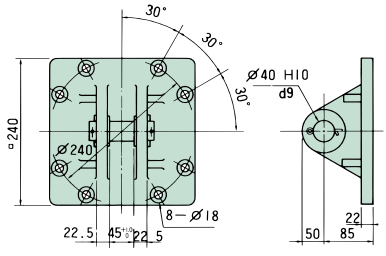
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. Mechanical stroke has a margin of approximately 10m on both sides for the nominal stroke.
3. For the cylinder with bellows, the stroke will also not change.
4. Use TC type model in brake individual turnoff.
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 87.

Options

■ Bellows (— J)

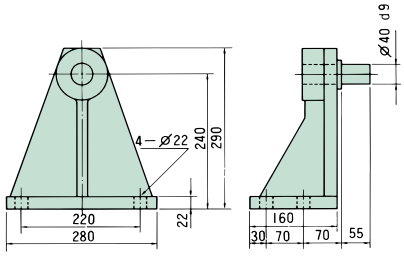


■ Clevis fitting (LPTB6000-C)



Mass : 16.5kg

■ Trunnion column (LPTB6000-T)



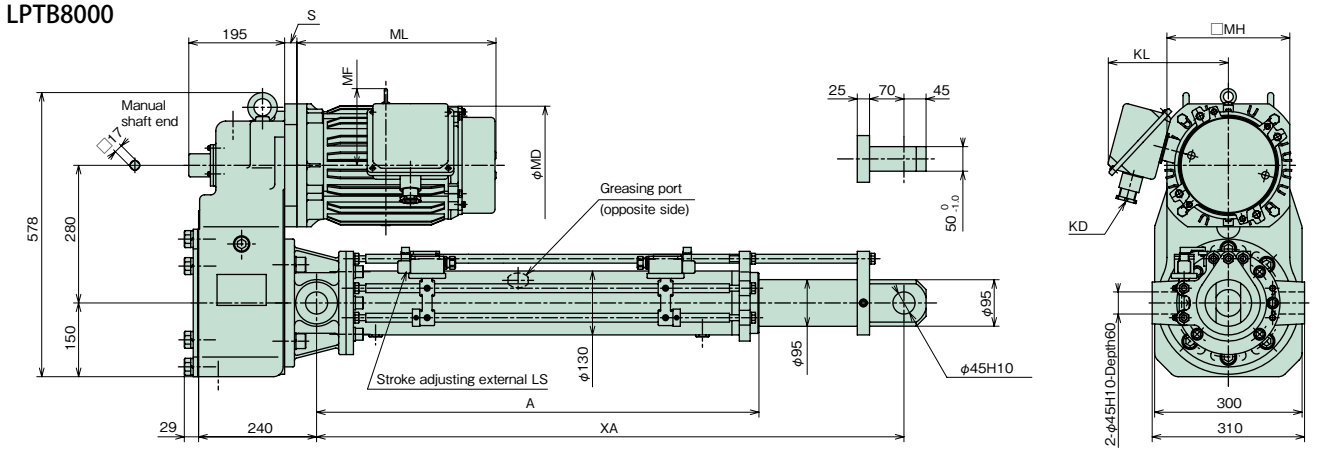
Mass : 39.0kg

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

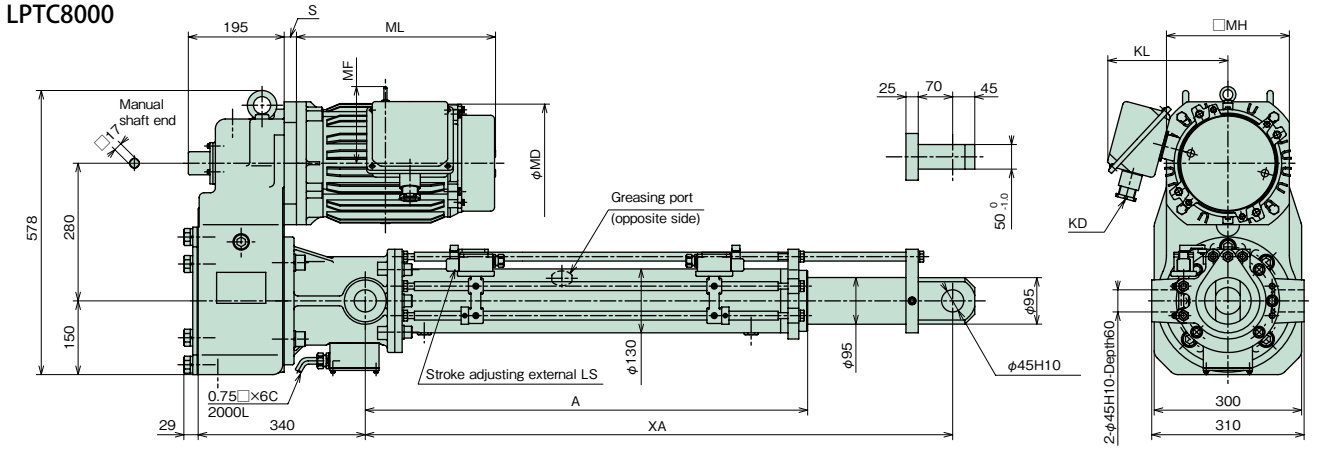
* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions. When designing the machine, take the margin into consideration.

Dimensions Table T Series 8000

LPTB8000



LPTC8000



Unit: mm

Model	Nominal speed mm/s 50/60Hz	Motor kW	MD	ML	MF	KL	KD	MH	S
LPTB8000S LPTC8000S	10/12	1.5	184	362	—	172	A20C	170	137
LPTB8000L LPTC8000L	20/24	2.2	207	381	130	190	A25C	200	—
LPTB8000M LPTC8000M	30/36	3.7	229	414	141	201			—
LPTB8000H LPTC8000H	43/52	5.5	265	403	156	229		250	25

Unit: mm

Nominal stroke	Thrust kN	Thrust {kgf}	A	XA MIN	XA MAX
500	78.4	8000	900	1065	1565
1000			1400	1615	2615
1500			1900	2165	3665

Approximate mass of main body

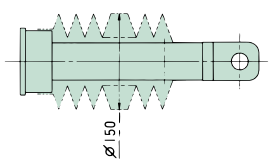
Unit: kg

Model \ Nominal stroke	500	1000	1500
LPTB8000S	224	255	286
LPTC8000S	254	285	316
LPTB8000L	212	242	272
LPTC8000L	242	272	302
LPTB8000M	230	260	291
LPTC8000M	260	290	321
LPTB8000H	241	271	301
LPTC8000H	271	301	331

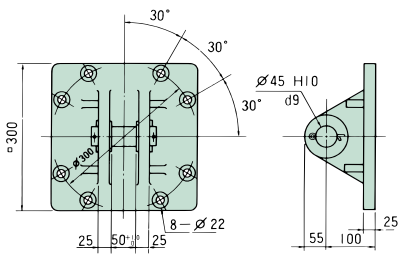
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. Mechanical stroke has a margin of approximately 10m on both sides for the nominal stroke.
3. For the cylinder with bellows, the stroke will also not change.
4. Use TC type model in brake individual turnoff.
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 87.

Options

■ Bellows (— J)

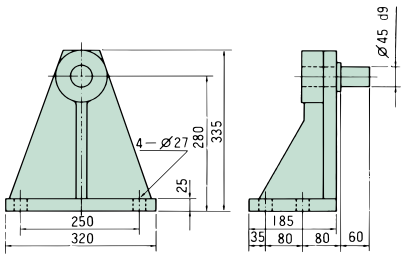


■ Clevis fitting (LPTB8000-C)



Mass : 27.0kg

■ Trunnion column (LPTB8000-T)



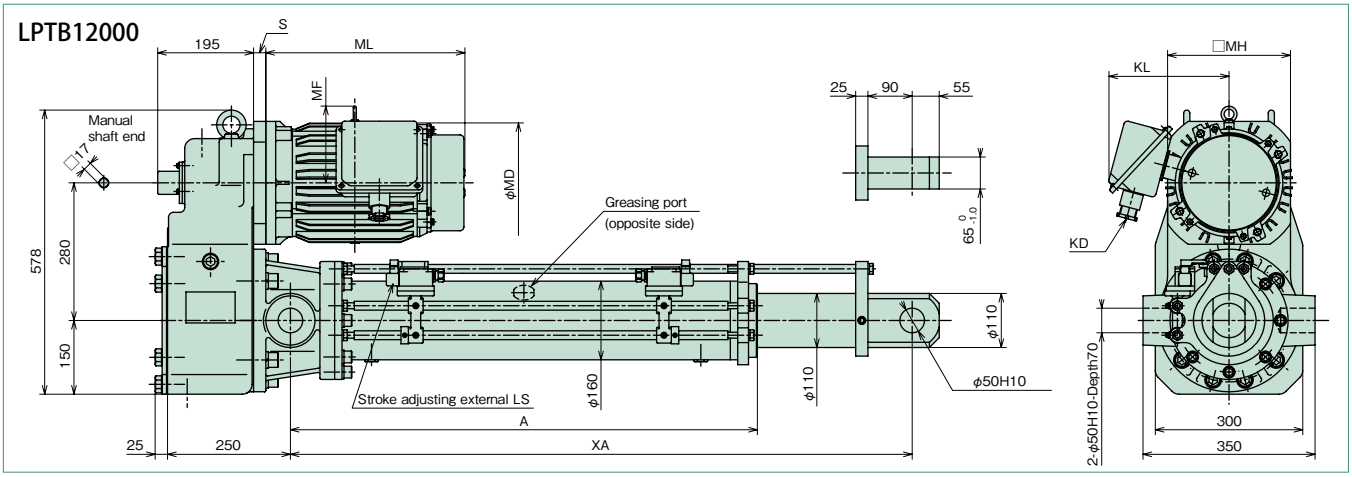
Mass : 70.6kg

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

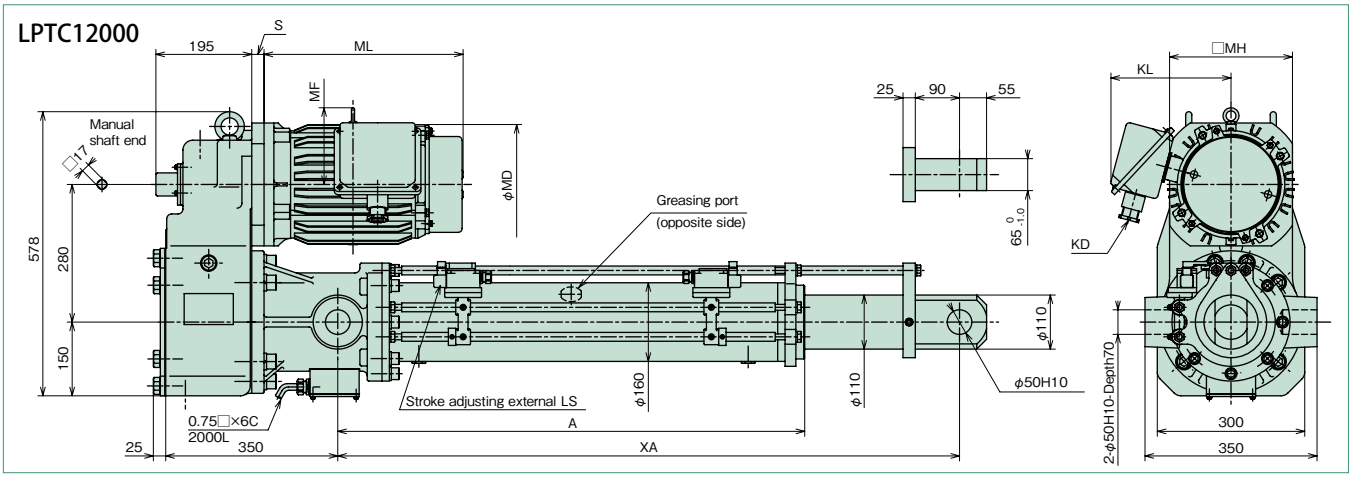
* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions. When designing the machine, take the margin into consideration.

Dimensions Table T Series 12000

LPTB12000



LPTC12000



Unit: mm

Model	Nominal speed mm/s 50/60Hz	Motor kW	MD	ML	MF	KL	KD	MH	S
LPTB12000L LPTC12000L	10/12	2.2	207	381	130	190	A25C	200	145
LPTB12000M LPTC12000M	18/22	3.7	229	414	141	201		250	145
LPTB12000H LPTC12000H	30/36	5.5	265	403	156	229		250	25

Unit: mm

Nominal stroke	Thrust kN	Thrust {kgf}	A	XA MIN	XA MAX
500	117	12000	950	1135	1635
1000			1450	1685	2685
1500			1950	2235	3735
2000			2450	2785	4785

Approximate mass of main body

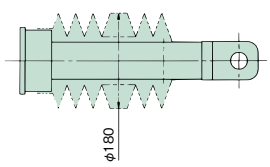
Unit: kg

Model \ Nominal stroke	500	1000	1500	2000
LPTB12000L	270	312	354	396
LPTC12000L	309	351	393	435
LPTB12000M	285	327	368	411
LPTC12000M	324	366	407	450
LPTB12000H	295	337	377	419
LPTC12000H	334	376	416	459

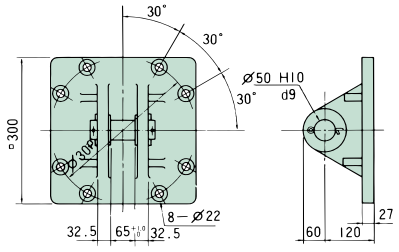
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. Mechanical stroke has a margin of approximately 10m on both sides for the nominal stroke.
3. For the cylinder with bellows, the stroke will also not change.
4. Use TC type model in brake individual turnoff.
5. When the model of the TC type nominal stroke 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 87.

Options

■ Bellows (— J)

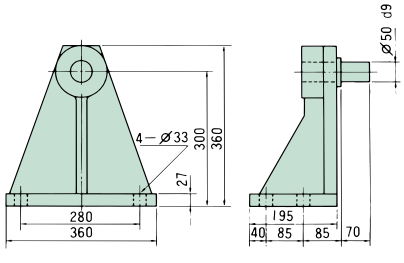


■ Clevis fitting (LPTB12000-C)



Mass : 33.0kg

■ Trunnion column (LPTB12000-T)



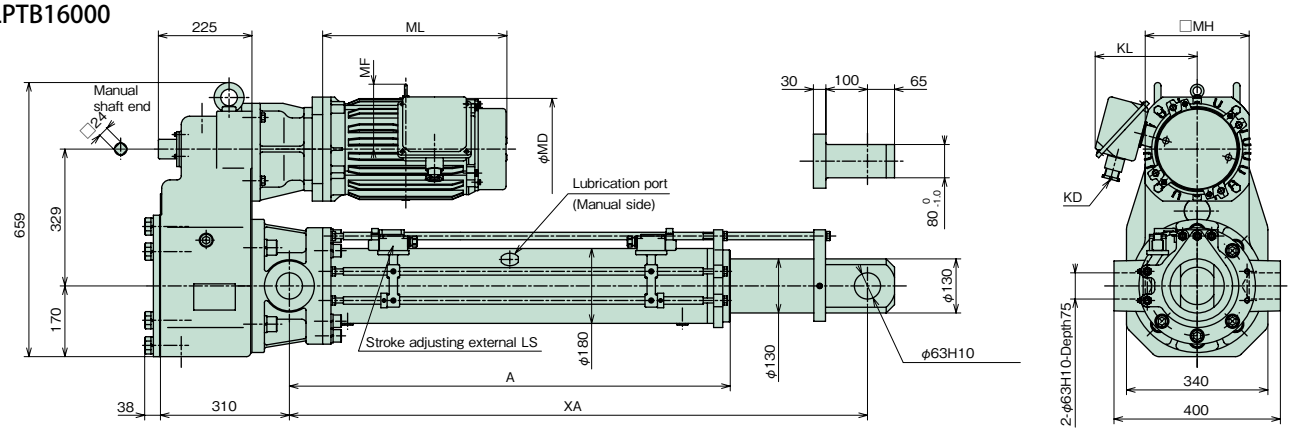
Mass : 84.4kg

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

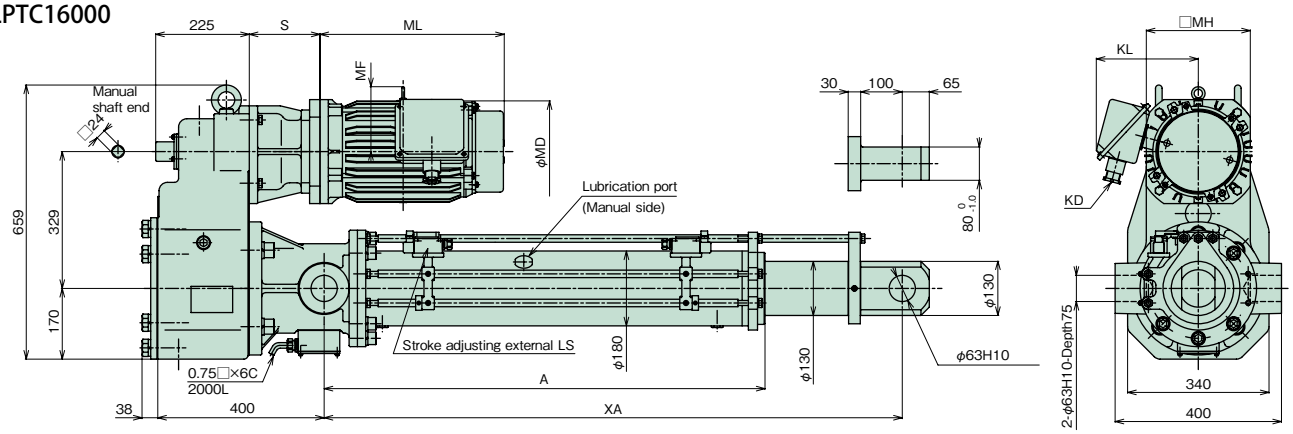
* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions. When designing the machine, take the margin into consideration.

Dimensions Table T Series 16000

LPTB16000



LPTC16000



Unit: mm

Model	Nominal speed mm/s 50/60Hz	Motor kW	MD	ML	MF	KL	KD	MH	S
LPTB16000L LPTC16000L	14.5/17.5	3.7	229	414	141	201	A25C	250	145
LPTB16000M LPTC16000M	20/24	5.5	265	403	156	229			170
LPTB16000H LPTC16000H	31/37	7.5	265	441	156	229			170

Unit: mm

Nominal stroke	Thrust kN	Thrust {kgf}	A	XA MIN	XA MAX
500	156	16000	1060	1260	1760
1000			1560	1810	2810
1500			2060	2360	3860
2000			2560	2910	4910

Approximate mass of main body

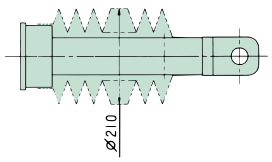
Unit: kg

Model \ Nominal stroke	500	1000	1500	2000
LPTB16000L	469	525	581	636
LPTC16000L	518	574	630	685
LPTB16000M	480	536	592	648
LPTC16000M	529	585	641	697
LPTB16000H	490	546	502	660
LPTC16000H	539	595	651	709

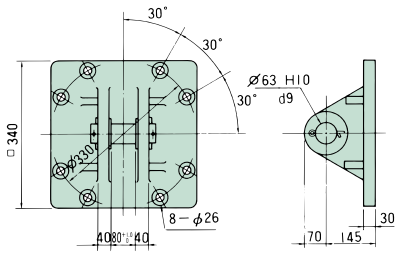
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. Mechanical stroke has a margin of approximately 10m on both sides for the nominal stroke.
3. For the cylinder with bellows, the stroke will also not change.
4. Use TC type model in brake individual turnoff.
5. When the model of the TC type nominal stroke 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 87.

Options

■ Bellows (— J)

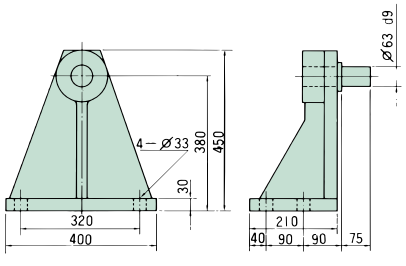


■ Clevis fitting (LPTB16000-C)



Mass : 54.0kg

■ Trunnion column (LPTB16000-T)



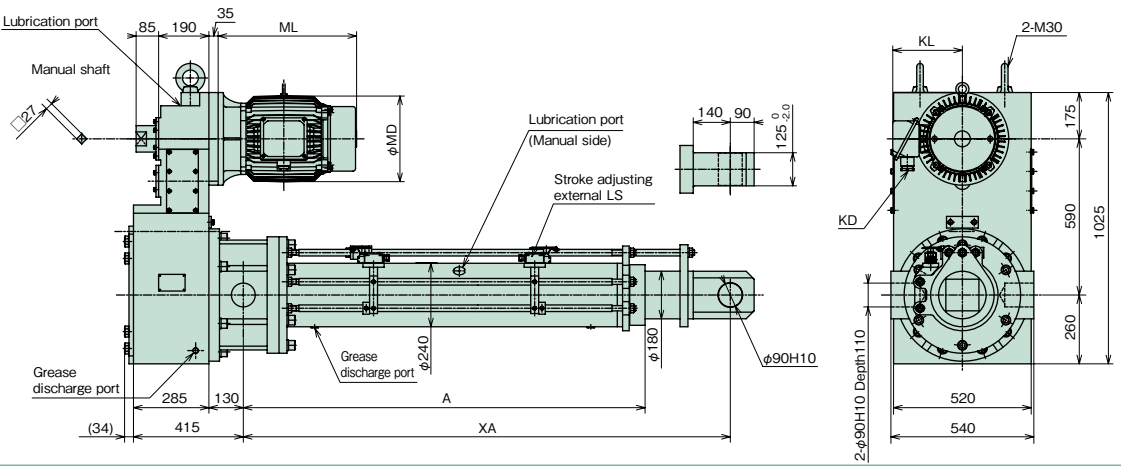
Mass : 124.6kg

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

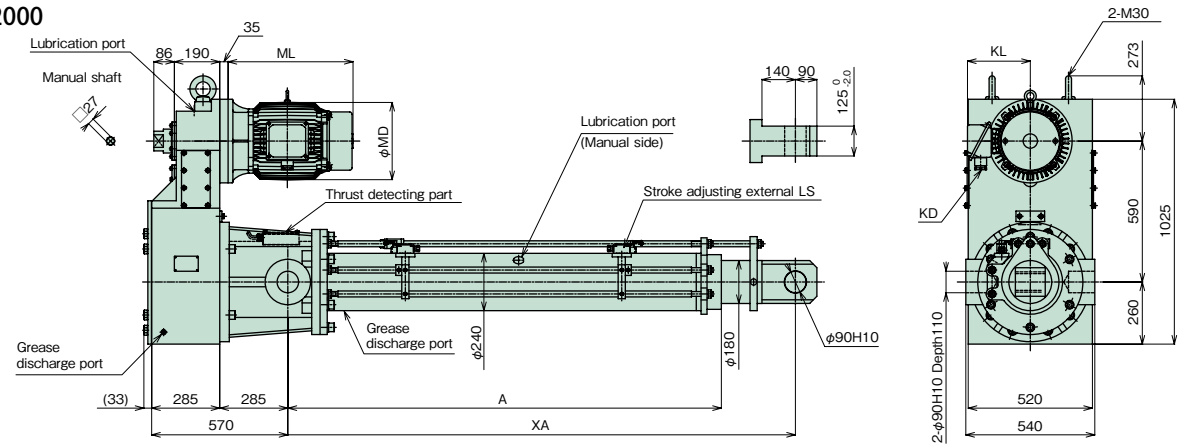
* Dimensions with no tolerance described have general tolerance, and their sizes become larger by approximately 2 to 5mm from the described dimensions. When designing the machine, take the margin into consideration.

Dimensions Table T Series 32000

LPTB32000



LPTC32000



Unit: mm

Model	Thrust kN	Thrust {kgf}	Nominal speed mm/s	Motor kW	MD	ML	KL	KD
LPTB32000L LPTC32000L	313	32000	10/12	5.5	265	403	229	A25C
LPTB32000M LPTC32000M			15/18	7.5	265	441	229	A25C
LPTB32000H LPTC32000H			20/24	11	324	519	263	A30B

Unit: mm

Nominal stroke	A	XA MIN	XA MAX
500	1315	1575	2075
1000	1815	2125	3125
1500	2315	2675	4175
2000	2815	3225	5225

Approximate mass of main body

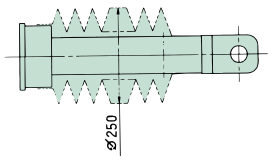
Unit: kg

Model \ Nominal stroke	500	1000	1500	2000
LPTB32000L	1215	1313	1410	1511
LPTC32000L	1305	1403	1500	1601
LPTB32000M	1225	1323	1420	1521
LPTC32000M	1315	1413	1510	1601
LPTB32000H	1294	1392	1589	1590
LPTC32000H	1384	1482	1579	1680

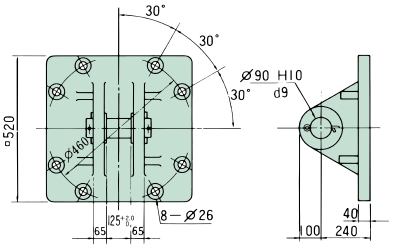
1. This diagram shows a power cylinder with an external limit switch for stroke adjustment.
2. Mechanical stroke has a margin of approximately 10m on both sides for the nominal stroke.
3. For the cylinder with bellows, the stroke will also not change.
4. For connector part dimensions of the motor terminal box, refer to page 87.

Options

■ Bellows (— J)

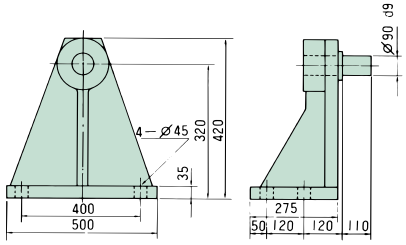


■ Clevis fitting (LPTB32000-C)



Mass : 185.0kg

■ Trunnion column (LPTB32000-T)



Mass : 149.2kg

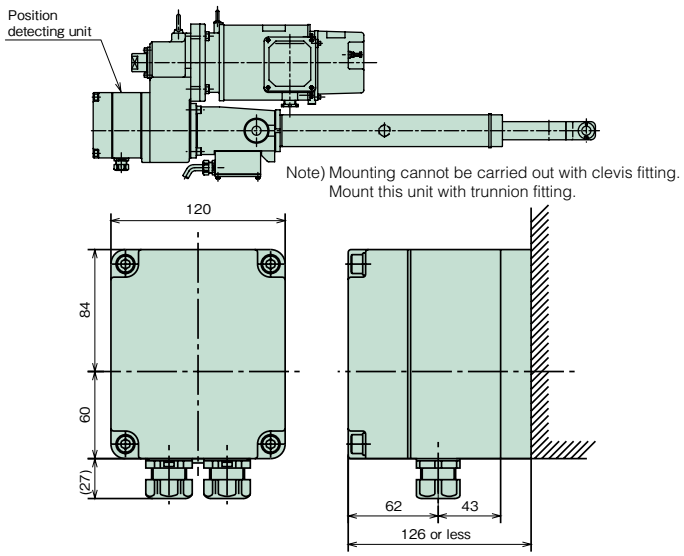
Note) Apply grease to the trunnion pin and trunnion hole before mounting.

* 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.

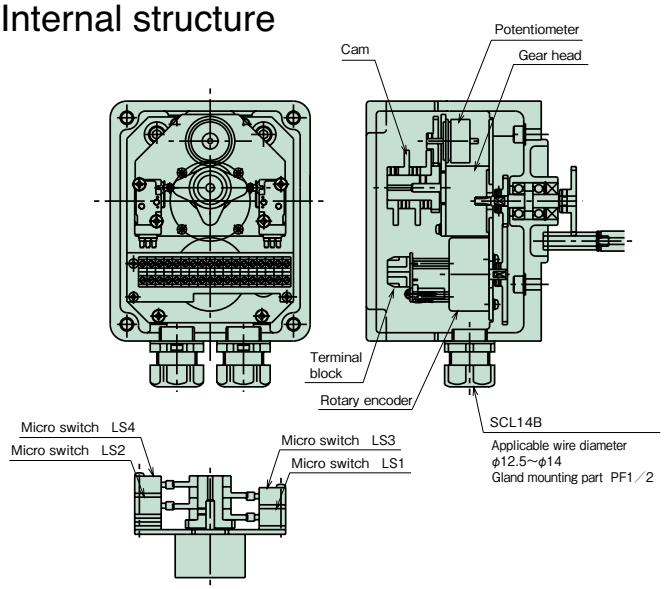
Position detecting unit

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



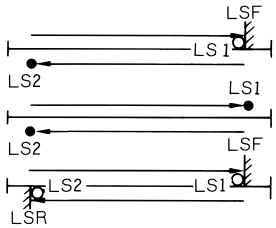
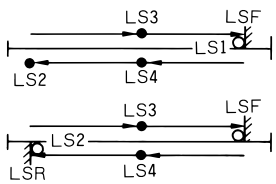
Mass of positional detecting unit Unit: kg

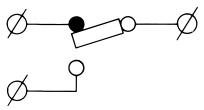
Frame no.	Mass
T500	7.3
T1000	7.6
T2000	8.0
T4000	9.0
T6000	12.2
T8000	13.3
T12000	13.3
T16000	14.5

1. Position detecting internal limit switch (with two or four switches)

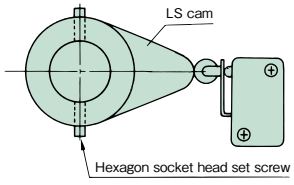
● With two switches (symbol K2) ····· Layout of micro switches LS1 and LS2 in the previous diagram

● With four switches (symbol K4) ····· Layout of micro switches LS1, LS2, LS3 and LS4 in the previous diagram

	Option symbol	Application example	
Position detecting internal LS	K2		Extend: External press stop, position detecting Retract: Determined position stop Both ends determined position stop Both ends external press stop, position detection
Position detecting internal LS	K4		Extend: Middle determined position stop, External press stop, position detection Retract: Two-determined position stop For both extend and retract: External press stop, position detection, Middle determined position stop

Micro switch specification	
Model	D2VW-5L2A-1M (OMRON) Equivalent
Electric configuration	AC250V 4A (cos=0.7)
Contact configuration	1C  For terminal No., refer to page 82.

Note) In the table at the left
- Stops with operation of the micro switch for thrust detection.
- Stops with operation of the micro switch for position detection.
- Detects position with operation of the micro switch for position detection.



<Setting of LS>

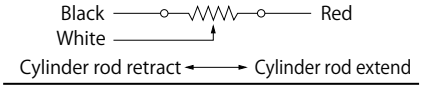
For adjustment of the operating position, operate the power cylinder to adjust the LS cam. Loosen the hexagon socket head set screws (2 pieces) on the LS cam with a hexagon bar wrench (nominal 1.5).

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	AC1000V 1min.
Effective electric degree	355°±5°
Effective mechanical degree	360°endless
Connection	Connected to terminal block in position detecting unit



3. Rotary encoder

This is optimum to control stroke by a sequencer or a programmable controller. Combination with motor speed control by an inverter allows for further accurate positioning control.

Environment condition

Rotary encoder specifications		
Model	OVW2-003-2M or equivalent	
Manufacturer	Nidec Nemicon Corporation	
Output pulse number	60P/R	
Output waveform	90°phase difference two-phase square wave + home position output	
Output voltage	H	Power voltage – 1V or more (No load)
	L	0.5V or less (at maximum lead-in current)
Power supply	DC4.5～13.2V 80mA	

① The standard products incorporate an incremental type encoder.
② The rotary encoder has been set to output one 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 the home position is output per 60 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.

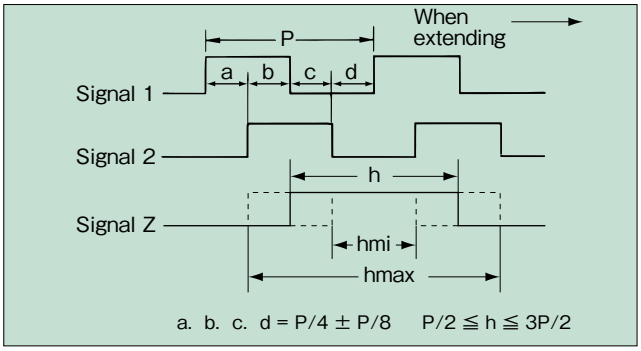
Output signal of standard specifications is of an incremental method, however, the absolute method is also applicable.
Output type of standard specifications is voltage output, however, open collector output and line driver output specifications are also applicable.

Output connection

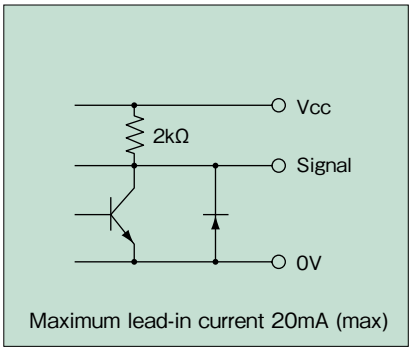
Signal 1	Signal 2	Signal Z	+5V～12V	0V	Case
Green (9)	White (10)	Yellow (11)	Red (12)	Black (13)	Shield (14)

Figures in parentheses indicate terminal No.

Output waveform



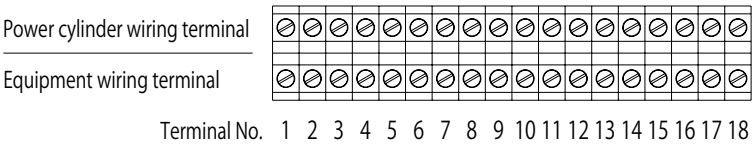
Output circuit



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.
Use shield wire for wiring to the rotary encoder.



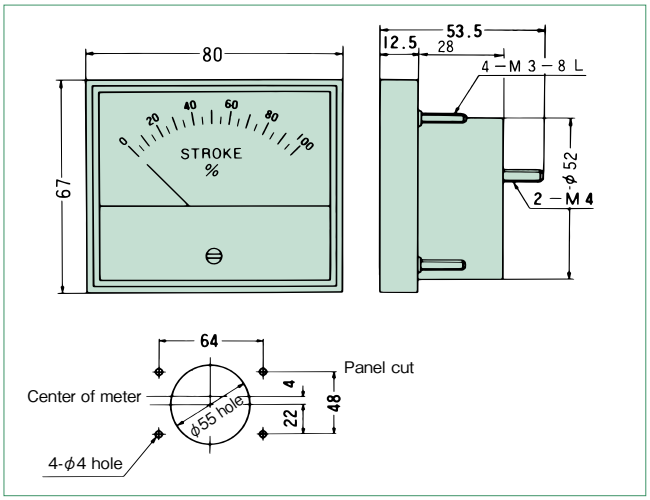
Option	Internal LS									Potentiometer			Rotary encoder					
Symbol	LS1		LS2		LS3		LS4		Common use	P			R					
Contact	a	b	a	b	a	b	a	b	c	1	2	3	1	2	Z	+5V~12V	0V	Case
Terminal No.	18	17	5	6	16	15	7	8	4	1	2	3	9	10	11	12	13	14

Control option

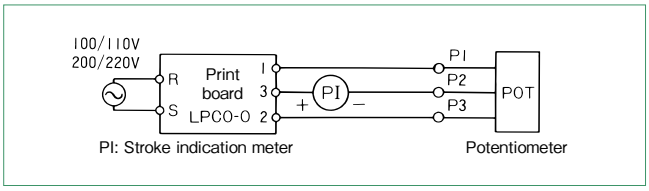
Stroke indication meter

Model	RM-80B(DC100μA) 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.

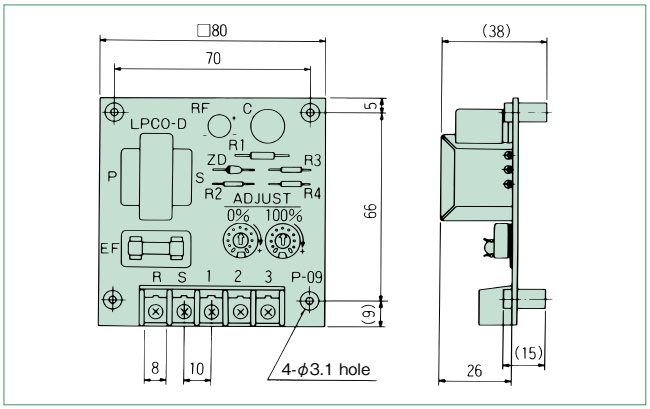


Printed board



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

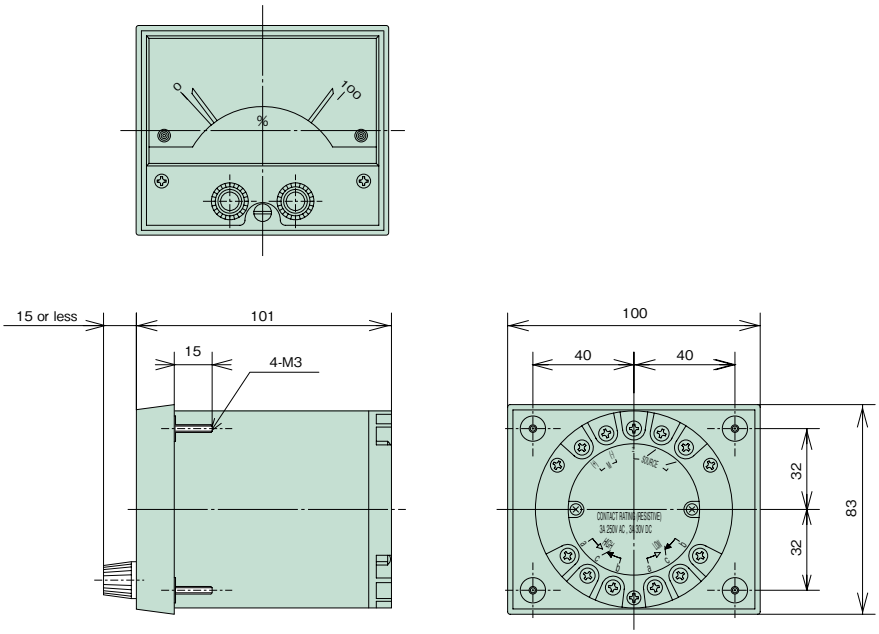
Used for simple adjustment of stroke on the operation panel.

(Iron panel installation is standard. Separately indicate to us when installing an aluminum panel.)

Note) When using the TC unit (4 to 20mA), specify a meter relay for 4 to 20mA output.

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	AC100/100, 200/220V 50/60Hz
Input	DC100μA maximum
Output contact configuration	1C for both HIGH, LOW sides (refer to the following Fig.)
Contact capacity	AC250V3A (cosφ=1)

(Described specifications and dimensions may be subject to change due to circumstances.)

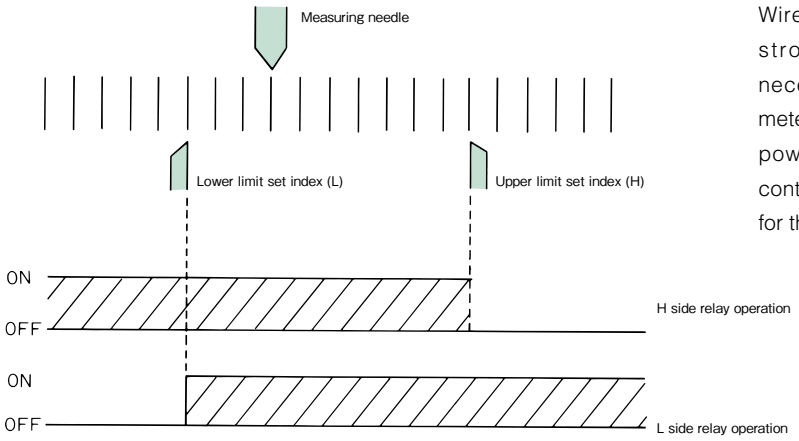


The main body of the power cylinder is provided with a potentiometer.
The phase of a stroke deviates if the rod is rotated before installation. Therefore, cylinders with a stroke adjusting limit switch are recommended.
Pre-set minimum and maximum strokes to be used with the stroke adjusting limit switch, 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 Emerson 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

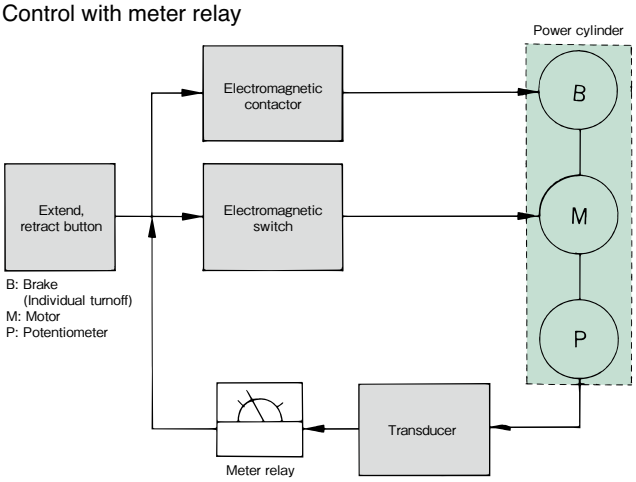
② With position detecting limit switch·····Intermediate positioning
Accuracy generally increases with lower cylinder speed.

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.

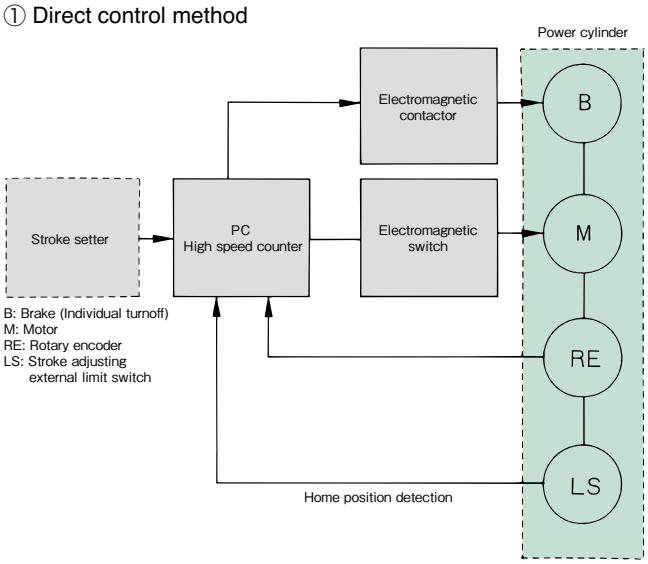
Control with meter relay



Method with rotary encoder (RE)

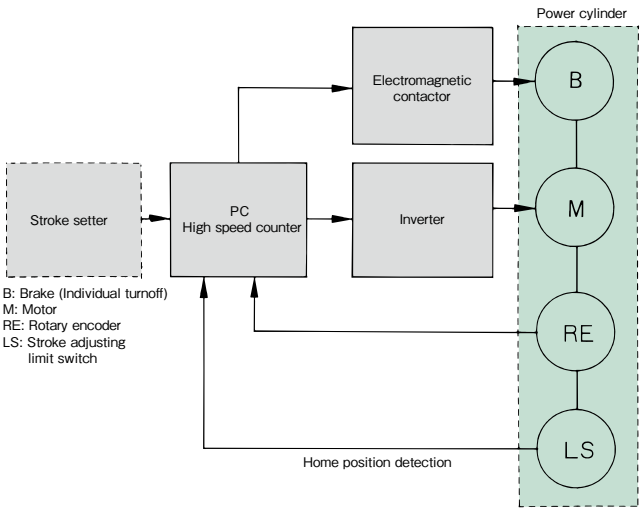
This method controls stroke by a programmable controller (PC). Use the PC with a counter. Use a limit switch to detect home position. (For the power cylinder body, the method with a stroke adjusting limit switch is recommended.)

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.

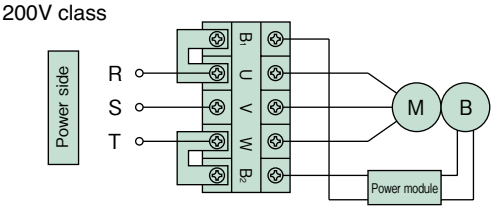
Wire connection

Wire connection for brake motor (Motor with DC brake)

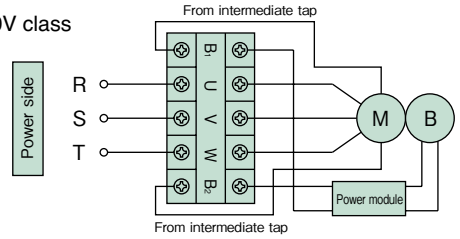
In the case of brake internal wiring

0.1～0.4kW

200V class

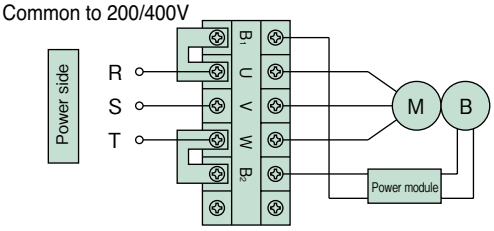


400V class



0.75～3.7kW

Common to 200/400V

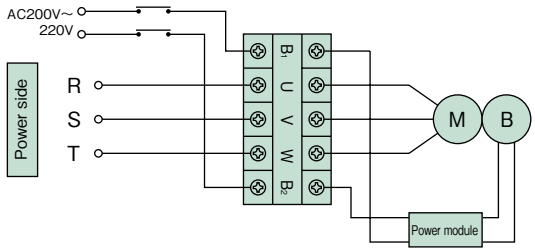


For 5.5kW or higher,
use brake external wiring.

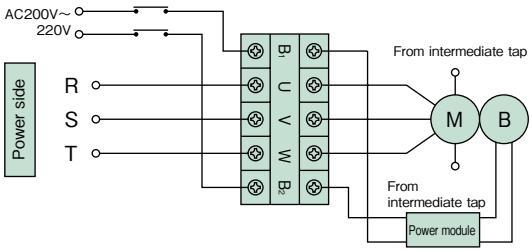
In the case of brake external wiring

0.1～0.4kW

200V class

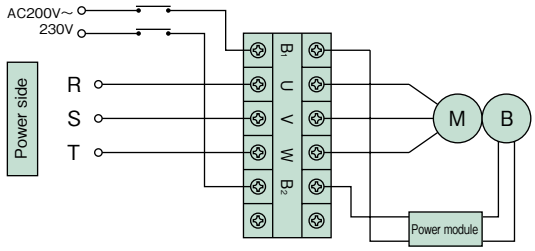


400V class

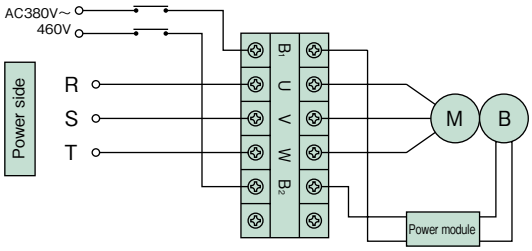


0.75～3.7kW

200V class

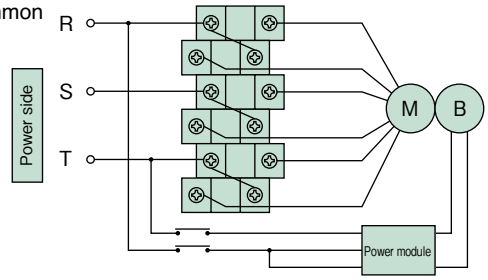


400V class



5.5kW or more

200/400V to Common



Rod operating direction (In the case of connection on upper surface)	$LPTB_{LPTC}$250～$LPTB_{LPTC}$16000	$LPTB_{LPTC}$32000
	Rod extend	Rod retract

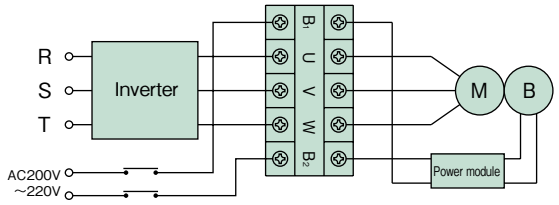
Wire connection

◎ Wire connection method when inverter is used or brake is used in individual turnoff

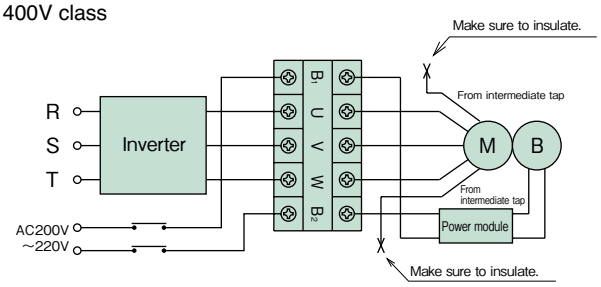
DC brake

- If the motor is operated by the inverter, it is necessary to individually turn off the brake. When individually turning off the brake, as shown in the following diagram, remove the short piece, and do not connect wire to the brake power module from the inverter output, apply a normal power voltage. Separately provide a power supply shown in the following diagram and apply power to the brake power module. If separate power cannot be provided, decrease the voltage by a transformer. Use a transformer whose the capacity is more than necessary, and check that there is no voltage drop. And if the motor voltage of 0.1 to 0.4kW is 400V class, also remove the wire from the motor intermediate tap and insulate it.
- If the motor voltage of 0.4kW or less is 400V class, remove the wire from the motor intermediate tap and insulate it, and separately provide a power supply of 200V to 220V and apply power to the brake power module. If there is no power source of 200V to 220V, decrease the voltage to 200V to 220V by a transformer. The capacity of the transformer shall be 90VA or more, and check that there is no voltage drop. Use an electromagnetic contactor for the brake of 200V class with a rated load of 250V AC, 7A or more. For the 400V class, use an electromagnetic contactor with a contact voltage of 400 to 440V AC, an induction load of 1A or more (e.g. electromagnetic contactor for AC motor 2.2kW). The power module includes a surge absorbing protection element. Add a protection element for the contact in each part if necessary.
- Do not put a relay contact on the output side of the standard power module (between the power module and brake coil). When carrying out [DC individual turnoff wiring] in which the relay contact is put into the position, contact us beforehand.

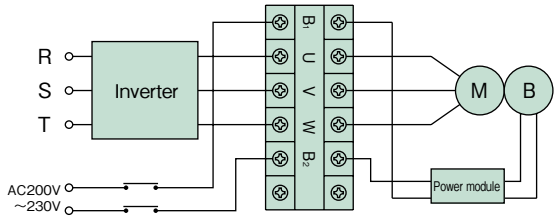
0.1～0.4kW
200V class



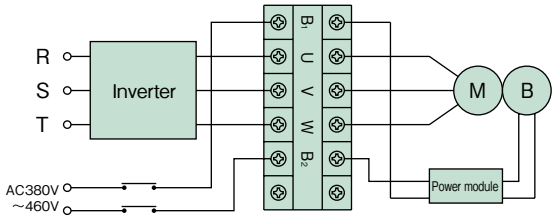
0.1～0.4kW
400V class



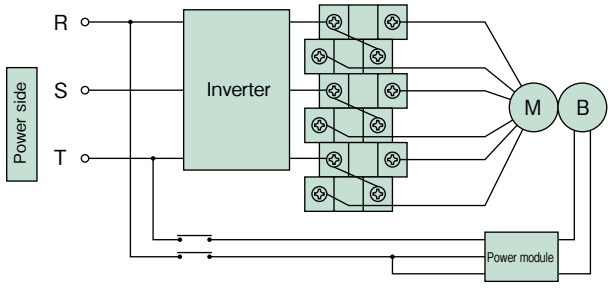
0.75～3.7kW
200V class



0.75～3.7kW
400V class

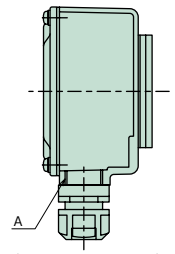
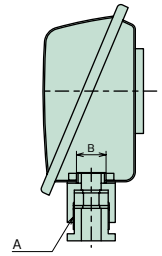


5.5kW or more
Common to 200/400V



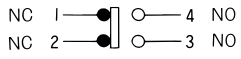
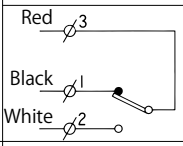
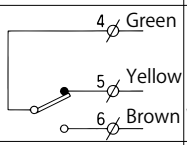
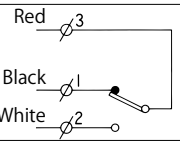
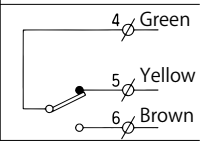
Wire connection

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
 (0.4kW or less)	0.1kW～0.4kW	SK-14L	φ11～φ13	PF 1/2	—
 (0.75kW or more)	0.75kW～1.5kW	A20C	φ14～φ15	PF 3/4	φ28
	2.2kW～7.5kW	A25C	φ19～φ20	PF 1	φ35
	11kW	A30B	φ23～φ24	PF 1•1/4	φ42

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) equivalent	V-165-1AR5(OMRON) equivalent		Z-15GW22-B(OMRON) equivalent	
Electric capacity	AC250V 10A (cosφ=0.4)	AC250V 10A (cosφ=0.4)		AC250V 10A (cosφ=0.4)	
Contact configuration	1a 1b 	For advancing 	For retreating 	For advancing 	For retreating 
Connector (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	

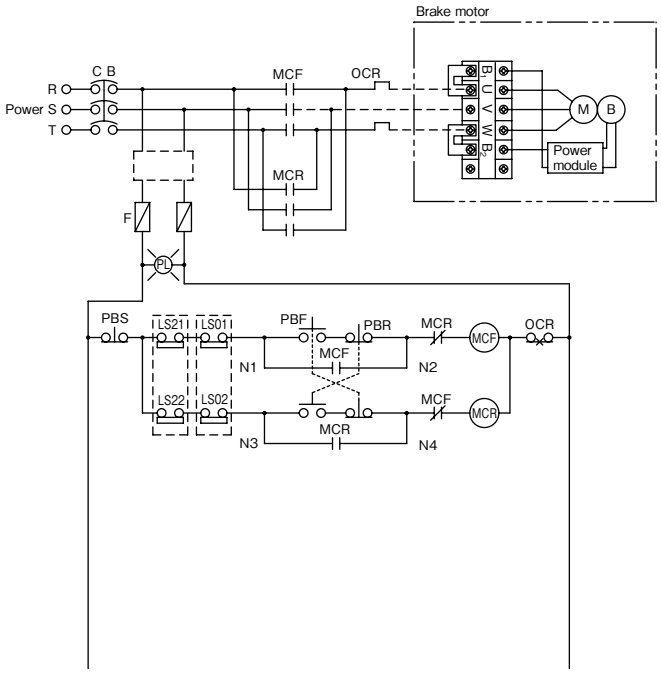
Motor current value • brake current value

Output frame No.	Motor current value (A) 200V 50Hz	200V 60Hz	220V 60Hz	400V 50Hz	400V 60Hz	440V 60Hz	Brake model No.	Brake current value (A) 200V 50Hz	200V 60Hz	220V 60Hz	400V 50Hz	400V 60Hz	440V 60Hz
4P - 0.1kW	0.73 (2.7)	0.63 (2.4)	0.65 (2.6)	0.38 (1.5)	0.33 (1.3)	0.34 (1.4)	SBH01LP	0.17 0.26	0.17 0.26	0.17 0.28	0.17 0.26	0.17 0.26	0.17 0.28
4P - 0.2 kW	1.26 (5.6)	1.1 (5.2)	1.1 (5.7)	0.63 (2.5)	0.55 (2.2)	0.55 (2.4)	SBH02LP	0.17 0.26	0.17 0.26	0.17 0.28	0.17 0.26	0.17 0.26	0.17 0.28
4P - 0.4 kW	2.2 (9.0)	2.0 (7.7)	2.0 (8.5)	1.1 (4.4)	1.0 (3.8)	1.00 (4.2)	SBH04LP	0.17 0.26	0.17 0.26	0.17 0.28	0.17 0.26	0.17 0.26	0.17 0.28
4P - 0.75 kW	3.7 (22.5)	3.4 (20.0)	3.3 (22.0)	1.8 (10.7)	1.7 (9.5)	1.64 (10.5)	TB-A0.75	0.18 0.24	0.18 0.24	0.18 0.24	0.09 0.12	0.09 0.12	0.09 0.12
4P - 1.5 kW	6.6 (49.0)	6.2 (43.4)	6.0 (47.7)	3.3 (24.7)	3.1 (21.7)	3.0 (23.9)	TB-A1.5	0.22 0.3	0.22 0.3	0.22 0.3	0.11 0.15	0.11 0.15	0.11 0.15
4P - 2.2 kW	9.6 (67.0)	9.0 (59.0)	8.6 (64.9)	4.8 (33.5)	4.5 (29.5)	4.3 (32.5)	TB-A2.2	0.25 0.34	0.25 0.34	0.25 0.34	0.13 0.17	0.13 0.17	0.13 0.17
4P - 3.7 kW	15.2 (122)	14.2 (104)	13.6 (114)	7.6 (61.0)	7.2 (51.8)	6.8 (57.0)	TB-A3.7	0.34 0.44	0.34 0.44	0.34 0.44	0.17 0.22	0.17 0.22	0.17 0.22
4P - 5.5 kW	22.4 (146)	21.0 (125)	19.8 (138)	11.2 (73.0)	10.5 (62.5)	9.9 (68.8)	TB-A7.5	1.5 2.0	1.5 2.0	1.5 2.0	3.0 4.0	3.0 4.0	3.0 4.0
4P - 7.5 kW	29.6 (215)	28.2 (185)	26.4 (204)	14.8 (108)	14.1 (92.5)	13.2 (102)	TB-A7.5	1.5 2.0	1.5 2.0	1.5 2.0	3.0 4.0	3.0 4.0	3.0 4.0
4P - 11 kW	42.5 (290)	41.0 (249)	38.0 (274)	21.5 (145)	20.5 (124)	19.0 (137)	TB-A15	1.3 1.7	1.3 1.7	1.3 1.7	2.6 3.4	2.6 3.4	2.6 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.

Reference circuit

0.75 to 3.7kW TC type reference circuit diagram

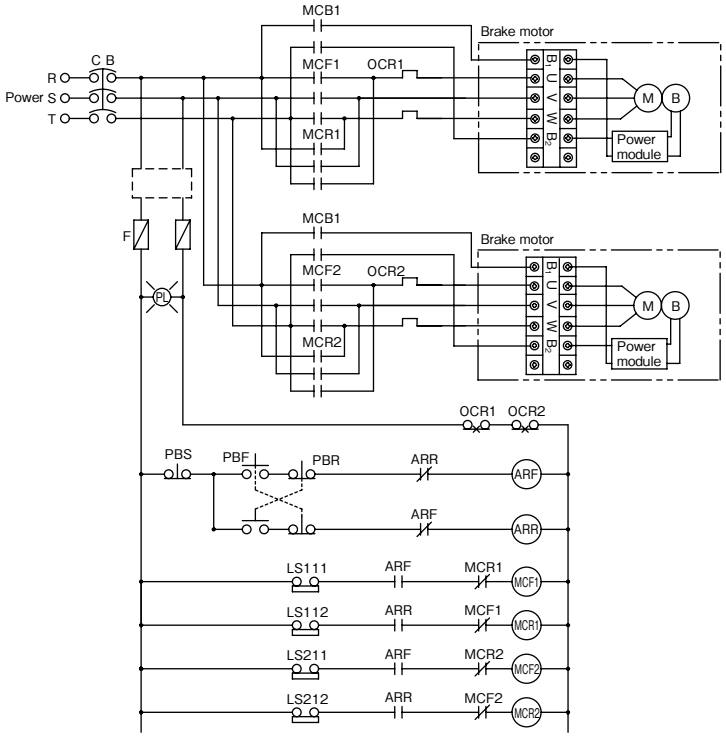


LS01: Stroke adjusting external limit switch for extending
LS21: Thrust detecting limit switch for extending
LS02: Stroke adjusting external limit switch for retracting
LS22: Thrust detecting limit switch for retracting

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 52.

Installation

Installation direction

Any of horizontal, vertical and inclined direction is allowed.

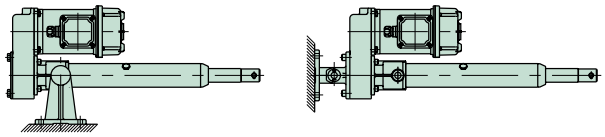
Installation method

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



Trunnion mount　　Clevis mount

* 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 59).

Anti-rod rotation

1. Anti-rod rotation is required because a rotating force is generated on the rod with thrust (refer to page 59). 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 EMERSON	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.2 IDEMITSU KOSAN

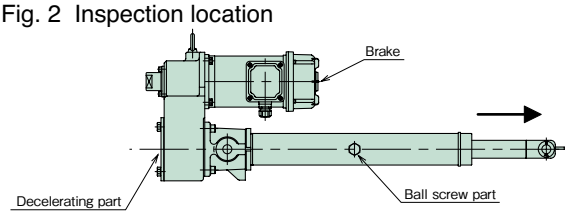
Planetary gear (straight type): Moly gear grease No. 1 SUMICO LUBRICANT CO., LTD.

Gap adjustment of brake

The electromagnet stroke (gap) of the brake has been adjusted to approximately 1.2 through 1.3mm for 0.4kW or less, and to approximately 0.2mm for 0.75kW or larger, however, re-adjust it before it becomes 0.5mm or larger.

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 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 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℃ to 40℃, although it varies depending on the use conditions. 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.
- When using a cylinder of the cabtire cable lead wire specification outdoors, carry out waterproofing treatment sufficiently.

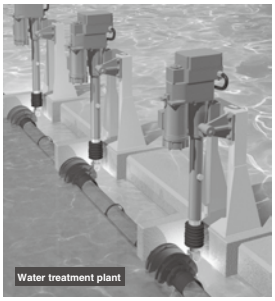
■ Cautions for use

- 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.
- 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

Expansion of models

TSUBAKI EMERSON
Power Cylinder
Scum Skimmer Specifications


Water treatment plant

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

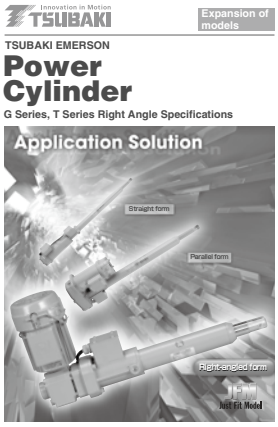
Workability increased by making position detecting unit large.
Workability has remarkably increased by sizing up the position detecting unit by 2.5 times in volume ratio in comparison with the conventional one, and structuring the unit so that there is no obstacle around the LS cam and the terminal block when the cover is removed.

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.

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.

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.

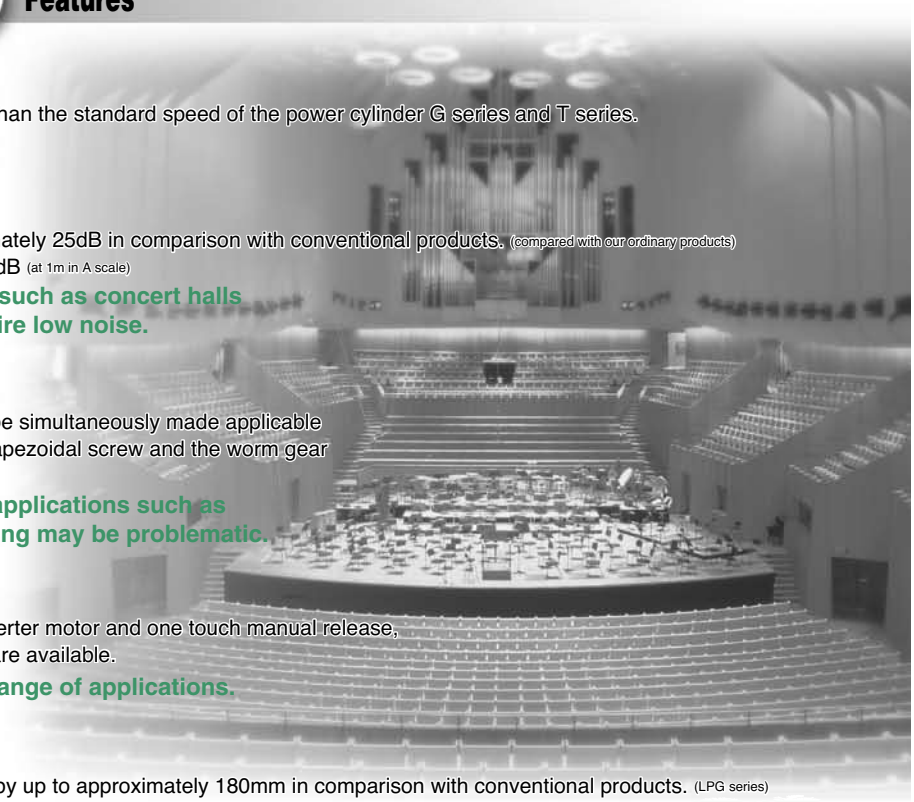
Power cylinder G series, T series Right Angle Specifications



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.

T series Intermediate stroke support

T series

Intermediate stroke type

Intermediate stroke target model

Intermediate stroke indicates a stroke which is placed between some standard strokes shown in the table at the lower right.
For example, it means strokes such as strokes of 450mm and 470mm which are placed between standard strokes of 400mm and 500mm.
Targets are all models with strokes which are placed between the standard strokes shown in the table at the lower right.
It is basically more advantageous with regard to cost to adopt standard stroke products, however, if the standard strokes are limited due to dimensions, intermediate stroke products will be manufactured. Specify your desired stroke. The longest stroke should be, however, the longest one among the standard strokes shown in the table at the lower right. Options described on the right side of the table are applicable.

Dimension A and dimension XA are as shown in the table below as they are manufactured by cutting the standard stroke products.

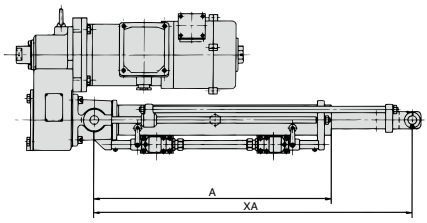
Example) For LPTB 1000L4.2, LPTB1000L5 is cut by 80mm.

(mm)

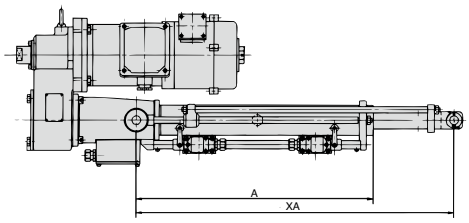
Model	A	XA	
		MIN	MAX
LPTB1000L5	660	795	1295
LPTB1000L4.2	580	715	1135

For dimension And dimension XA of the standard stroke products, refer to our “Power cylinder” catalog or general catalog.

LPTB



LPTC



LPTB1000L4.5V ☐

- Power cylinder
- T series・TB series・TC series
- Thrust 9.80kN {1000kgf}
- Speed S、L、M、H
- Stroke 4.5：450mm
  * Stroke is expressed in units of 10mm.

Options
- No symbol: Standard type
- L : With stroke adjusting external limit switch
- C : With clevis fitting
- I : With I -type end fitting
- J : With bellows
- F : Motor terminal box and external limit switch mirror-image specifications

Voltage symbol No symbol: 200V class
V: 400V class

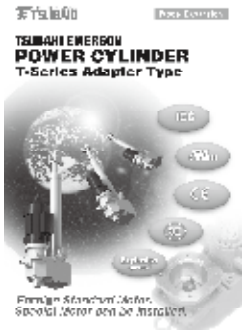
200V class：200/200/220V 50/60/60Hz
400V class：400/400/440V 50/60/60Hz

* Trunnion fitting is also available in a short delivery period. Please separately specify.

Model	Speed symbol	Rated thrust kN {kgf}	Nominal speed mm/s 50/60Hz	Standard stroke mm	Option					
					Bellows	External limit switch	I - type end fitting	400V class	Clevis fitting	Mirror-image
LPTB250 LPTC250	S	2.45 {250}	12.5/15	200、300、400 500、600	○	○	○	○	○	○
	L		25/30							
	M		50/60							
	H		100/120							
LPTB500 LPTC500	S	4.9 {500}	12.5/15	200、300、400 500、600、800	○	○	○	○	○	○
	L		25/30							
	M		50/60							
	H		100/120							
LPTB1000 LPTC1000	S	9.80 {1000}	12.5/15	200、300、400 500、600、800	○	○	○	○	○	○
	L		25/30							
	M		50/60							
	H		100/120							
LPTB2000 LPTC2000	S	19.6 {2000}	12.5/15	200、300、400 500、600、800	○	○	○	○	○	○
	L		25/30							
	M		50/60							
	H		75/90							
LPTB4000 LPTC4000	S	39.2 {4000}	9/11	200、300、400 500、600、800 1000、1200	○	○	○	○	○	○
	L		25/30							
	M		35/42							
	H		60/72							

Painting color: Munsell 5GY 6/0.5 (Olive gray)

Power Cylinder T series Adapter Type



IEC CE Explosion -proof cULus CCC

Foreign Standard Motor, Special Motor can be installed.

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)

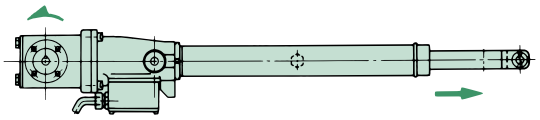
Model No. designation

LP TB 1000 BR6LIJ

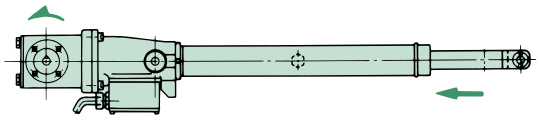
- **Power cylinder**
- **T series**
  - **LPTB**: Without thrust detecting mechanism
  - **LPTC**: With thrust detecting mechanism
- **Thrust**
  - **500**: 4.90kN {500kgf}
  - **1000**: 9.80kN {1000kgf}
  - **2000**: 19.6kN {2000kgf}
  - **4000**: 39.2kN {4000kgf}

  * The above is an indication example.
- **Options**
  - **B**: With bevel gear
  - **R**: Relationship between rotating direction of input shaft and moving direction of rod
  - **6**: stroke 6: 600mm
  - **L**: With stroke adjusting limit switch
  - **I**: I-type end fitting (The standards have no symbol.)
  - **J**: With bellows (The stroke is not changed.)

R-type



L-type



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 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 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 one turn of input shaft	mm	3	4	5	6	6	8	8	12	12
Maximum input rotation speed Note 3)	LPTB r/min	2400	1800	1080	720	500	382.5	255	180	120
	LPTC r/min	1200	900	720	420	300	270	165	120	90
Rod rotation force at rated thrust	N·m	5.29	14.7	35.3	83.3	124	222	333	666	1330
	{kgf·m}	0.54	1.5	3.6	8.5	12.7	22.7	34.0	68	136
Stroke	mm	200、300 400、500 600、800	200、300 400、500 600、800	200、300 400、500 600、800	200、300 400、500 600、800 1000、1200	500 1000 1500	500 1000 1500	500 1000 1500 2000	500 1000 1500 2000	500 1000 1500 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℃～80℃	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

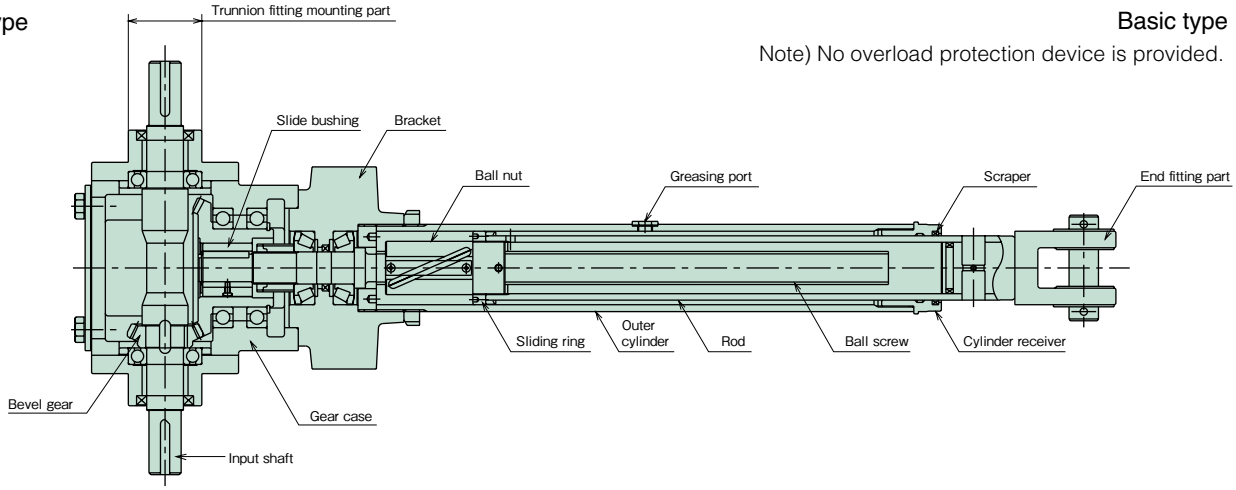
TSUBAKI olive gray (Munsell 5GY6/0.5 Approximate color)

Structure

LPTB type

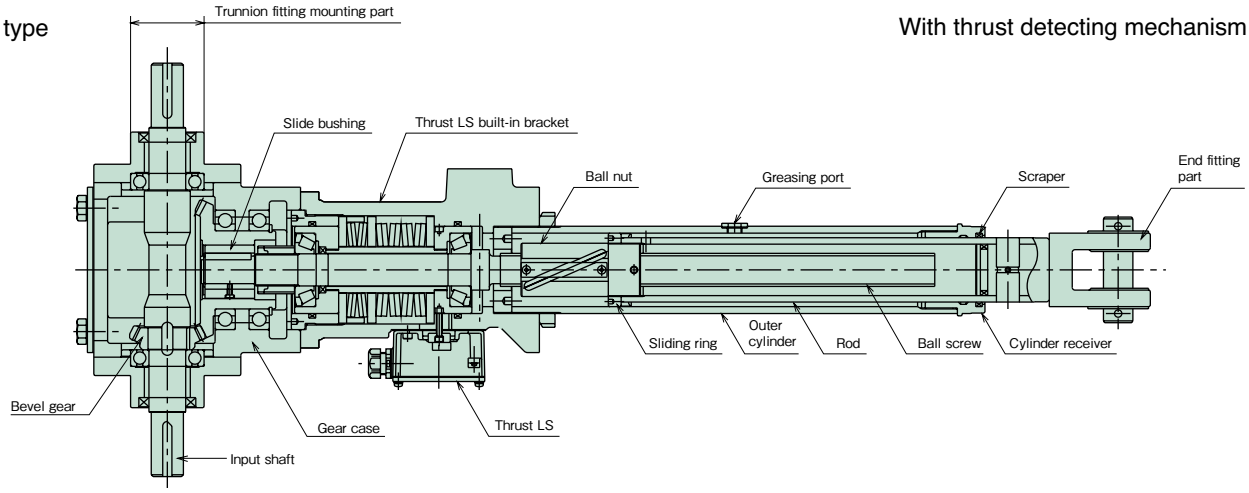
Basic type

Note) No overload protection device is provided.



LPTC type

With thrust detecting mechanism



* 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

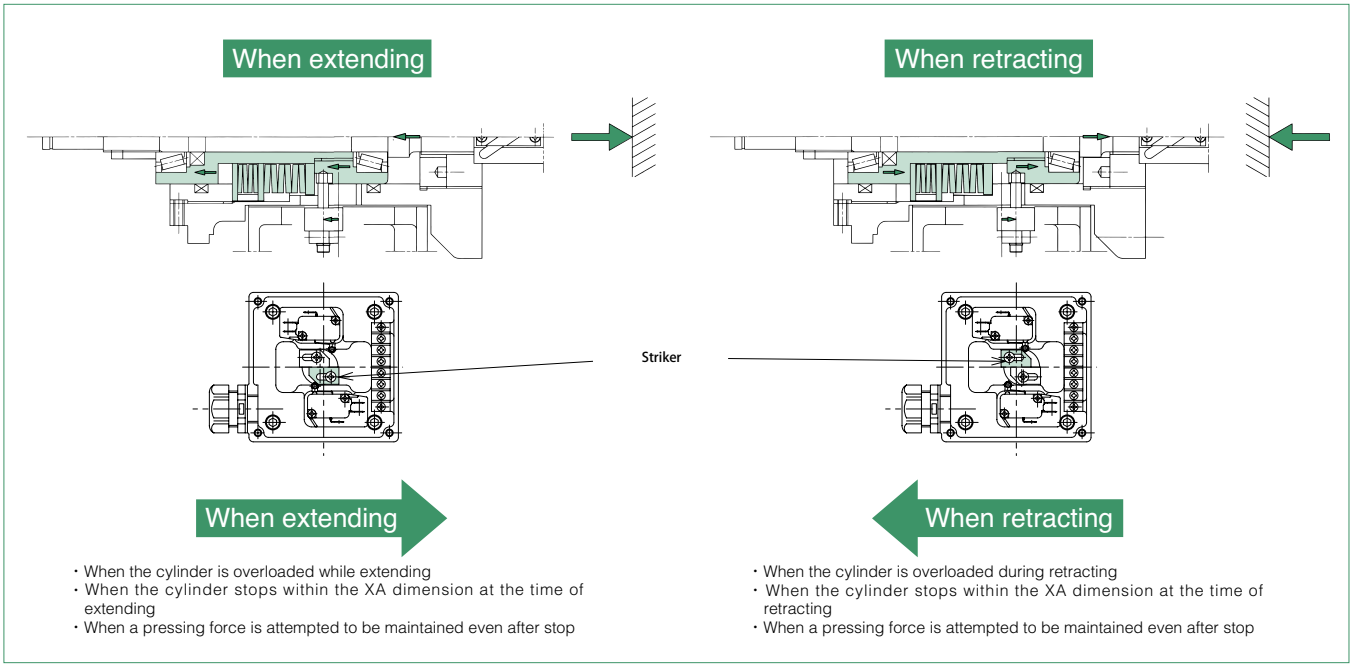
② When requiring electric signal at overload

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.)



・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 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

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 10^4 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 Small inertia	Damper, opening/closing of valve, conveyor switching device	1.0～1.3
Operation with light impact Intermediate inertia	Opening/closing of hopper gate, various transfer equipment, various lifter elevation	1.3～1.5
Operation with large impact and vibration 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.

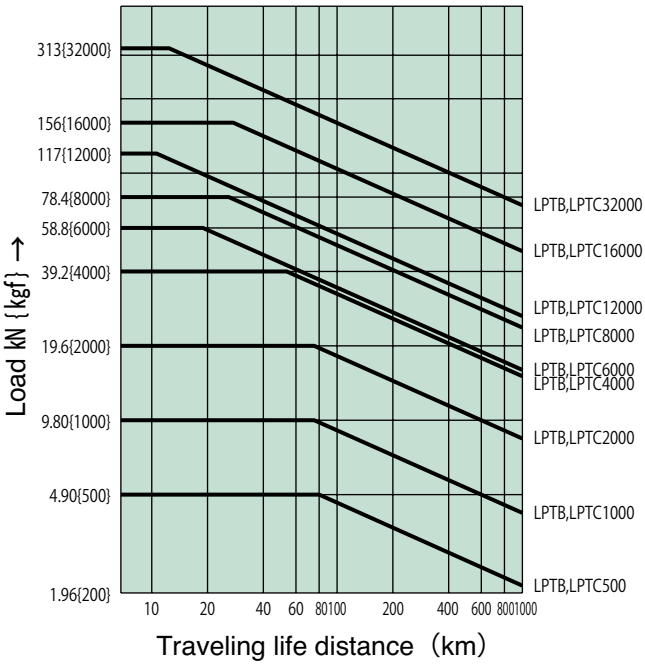
● Multiple factor

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 95.

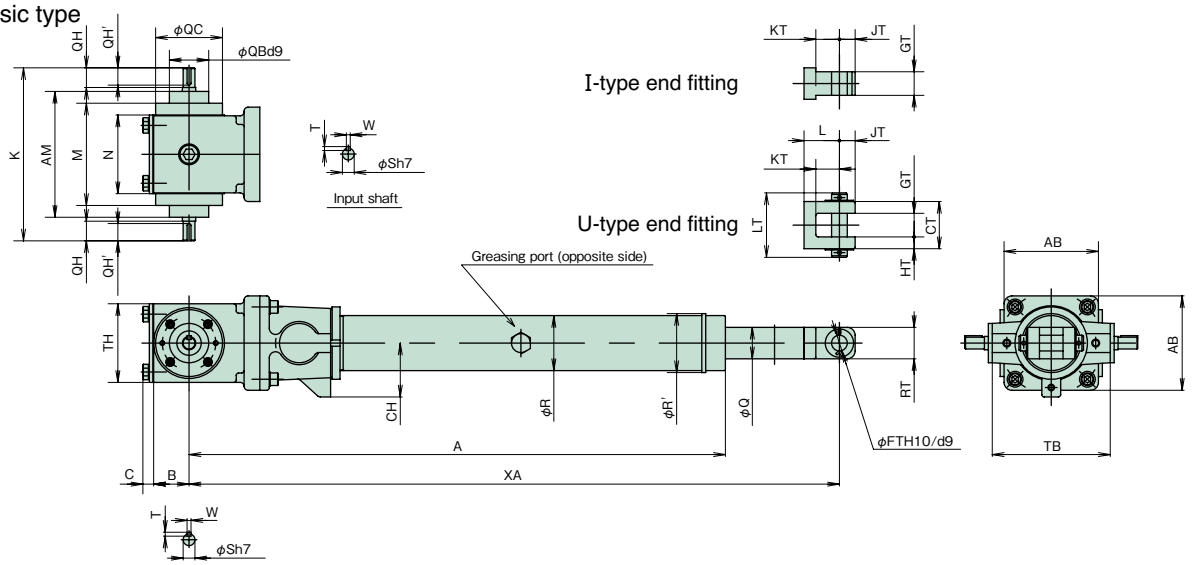
$$T = \frac{W \times \ell}{2 \times \pi \times R \times \eta \times 1000} + \frac{To}{100}$$

T : Necessary input torque N・m{k gf・m}
W : Load N{kgf}
ℓ : Screw lead mm
R : Gear speed ratio=2
η : Total efficiency=0.855
To : No-load idling torque N・cm{k gf・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

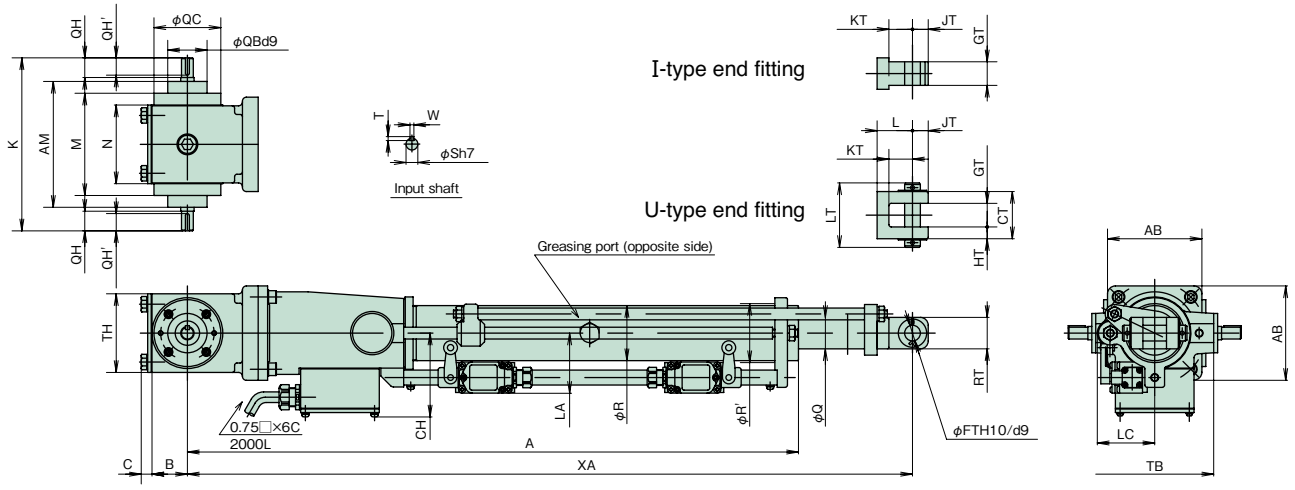


Unit: mm

Model	Stroke	Length		Input shaft						Input shaft bracket				Gear case				Bracket inner/outer cylinder						End fitting								
		A	X 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 500	200	470	565	15	5	5	25	22	220	50	85	160	130	120	100	45	15	100	68.5	130	35	58	63	36	50	25	12.5	69	25	35	18	16
	300	570	675																													
	400	670	785																													
	500	770	895																													
	600	870	1000																													
	800	1070	1220																													
1000	200	500	605	15	5	5	25	22	220	50	85	160	130	120	100	45	15	100	48	150	40	70	75	40	60	30	15	82	30	45	20	20
	300	600	715																													
	400	700	825																													
	500	800	935																													
	600	900	1040																													
	800	1100	1260																													
2000	200	560	680	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
	300	660	790																													
	400	760	900																													
	500	860	1010																													
	600	960	1115																													
	800	1160	1335																													
4000	200	645	780	35	10	8	70	60	450	80	160	300	230	190	190	80	17	190	90	220	70	95	100	70	80	40	20	115	50	75	35	32
	300	745	890																													
	400	845	1000																													
	500	945	1105																													
	600	1045	1215																													
	800	1245	1430																													
	1000	1445	1645																													
	1200	1645	1865																													
6000	500	1075	1230	35	10	8	70	60	480	80	160	330	260	220	220	80	17	220	—	260	80	115	—	80	—	45	—	—	65	—	40	40
	1000	1575	1780																													
	1500	2175	2430																													
8000	500	1145	1310	40	12	8	80	70	550	90	180	380	300	260	210	90	22	240	—	310	95	130	—	95	—	50	—	—	70	—	45	45
	1000	1645	1860																													
	1500	2145	2410																													
12000	500	1205	1390	40	12	8	80	70	550	90	180	380	300	260	210	90	22	240	—	350	110	160	—	110	—	65	—	—	90	—	55	50
	1000	1705	1940																													
	1500	2205	2490																													
	2000	2705	3040																													
16000	500	1370	1570	50	14	9	85	75	630	120	220	440	340	320	280	110	25	280	—	400	130	180	—	130	—	80	—	—	100	—	65	63
	1000	1870	2120																													
	1500	2370	2670																													
	2000	2870	3220																													
32000	500	1795	2055	60	18	11	120	100	940	200	320	680	520	500	450	175	36	450	—	540	180	240	—	180	—	125	—	—	140	—	90	90
	1000	2295	2605																													
	1500	2795	3155																													
	2000	3295	3705																													

Dimensions Table

LPTC With thrust detecting mechanism
With stroke adjusting external limit switch (option)



Unit: mm

Model	Stroke	Length		Input shaft						Input shaft bracket				Gear case				Bracket inner/outer cylinder					End fitting									limit switch	
		A	XA MIN	S	W	T	QH	QH'	K	QB	QC	AM	M	AB	TH	B	C	N	CH	TB	Q	R	FT	RT	CT	GT	HT	LT	KT	L	JT	LA	LC
LPTC 500	200	555	650	15	5	5	25	22	220	50	85	160	130	120	100	45	15	100	101	130	35	58	16	36	50	25	12.5	69	25	35	18	161	73
	300	655	760																														
	400	755	870																														
	500	855	980																													76.5	
	600	955	1085																														
	800	1155	1305																														
1000	200	595	700	15	5	5	25	22	220	50	85	160	130	120	100	45	15	100	107	150	40	70	20	40	60	30	15	82	30	45	20	161	73
	300	695	810																														
	400	795	920																														
	500	895	1030																													76.5	
	600	995	1135																														
	800	1195	1355																														
2000	200	675	795	20	6	6	30	25	270	60	110	200	160	130	130	55	17	130	110	180	50	76	25	50	70	35	17.5	99	40	60	25	164	76
	300	775	905																														
	400	875	1015																														
	500	975	1125																													79	
	600	1075	1230																														
	800	1275	1450																														
4000	200	790	925	35	10	8	70	60	450	80	160	300	230	190	190	80	17	190	127	220	70	95	32	70	80	40	20	115	50	75	35	182	85
	300	890	1035																														
	400	990	1145																														
	500	1090	1250																													97.5	
	600	1190	1360																														
	800	1390	1575																														
	1000	1590	1790																														
	1200	1790	2010																														
6000	500	1170	1325	35	10	8	70	60	480	80	160	330	260	220	220	80	17	220	139	260	80	115	40	80	—	45	—	—	65	—	40	—	—
	1000	1670	1875																														
	1500	2270	2525																														
8000	500	1245	1410	40	12	8	80	70	550	90	180	380	300	260	210	90	22	240	145	310	95	130	45	95	—	50	—	—	70	—	45	—	—
	1000	1745	1960																														
	1500	2245	2510																														
12000	500	1305	1490	40	12	8	80	70	550	90	180	380	300	260	210	90	22	240	160	350	110	160	50	110	—	65	—	—	90	—	55	—	—
	1000	1805	2040																														
	1500	2305	2590																														
	2000	2805	3140																														
16000	500	1460	1660	50	14	9	85	75	630	120	220	440	340	320	280	110	25	280	170	400	130	180	63	130	—	80	—	—	100	—	65	—	—
	1000	1960	2210																														
	1500	2460	2760																														
	2000	2960	3310																														
32000	500	1950	2210	60	18	11	120	100	940	200	320	680	520	500	450	175	36	450	238	540	180	240	90	180	—	125	—	—	140	—	90	—	—
	1000	2450	2760																														
	1500	2950	3310																														
	2000	3450	3860																														

Options

Bellows

Model No. **LPTB 500 — □ J**

- Bellows
- Stroke
- Thrust

Trunnion

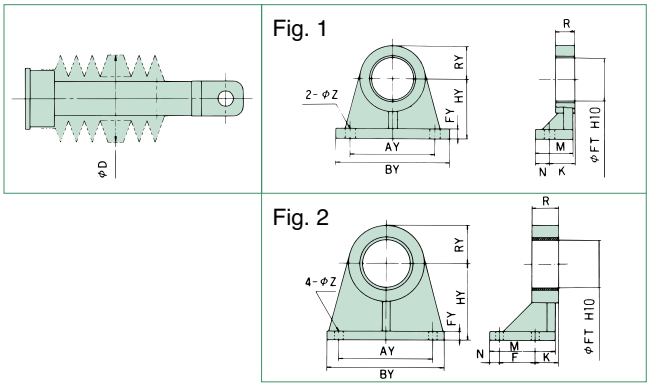
Model No. **LPTB 500 B — T**

- Trunnion
- For multi series
- Thrust

● Dimensions of bellows

Unit: mm

LPTB LPTC	500	1000	2000	4000	6000	8000	12000	16000	32000
D	90	90	90	120	135	150	180	210	250



● Multi series trunnion column

Unit: mm

Model	Applicable body model No.	AY	BY	FY	HY	RY	FT	F	K	M	N	R	Z	Form	Mass
LPTB500B-T	LPTB LPTC 500B	130	180	15	150	40	50	—	45	65	25	15	18		5.7
	LPTB LPTC 1000B														
LPTB2000B-T	LPTB LPTC 2000B	150	200	15	170	50	60	—	45	65	25	20	18	Fig. 1	9.4
LPTB4000B-T	LPTB LPTC 4000B	180	240	20	170	70	80	—	55	80	30	35	22		22.8
	LPTB LPTC 6000B														
LPTB8000B-T	LPTB LPTC 8000B	250	320	25	280	80	90	80	80	185	35	40	27		60.5
	LPTB LPTC 12000B													Fig. 2	
LPTB16000B-T	LPTB LPTC 16000B	320	400	30	320	100	120	90	90	210	40	50	33		95.7
LPTB32000B-T	LPTB LPTC 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 column installation face is on the cylinder end.

Limit switch specifications

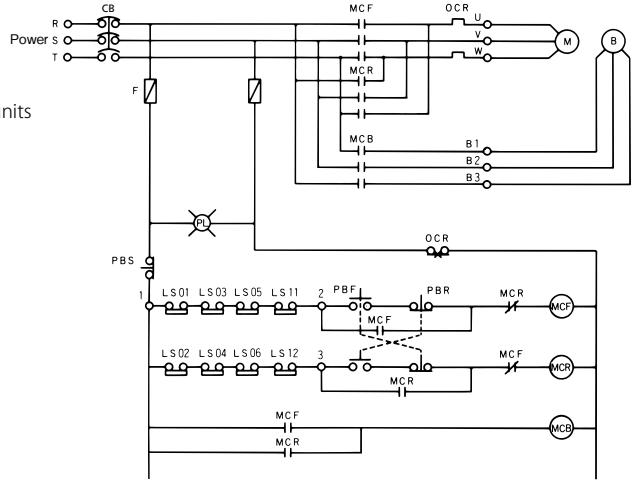
	Stroke adjusting external LS	Thrust detecting LS (LPT16000 or smaller)		Thrust detecting LS (LPT32000)	
Limit switch type	WLCA2(OMRON) or equivalent	V-165-1AR5(OMRON) or equivalent		Z-15GW22-B(OMRON) or equivalent	
Electric capacity	AC250V 10A (cosφ=0.4)	AC250V 10A (cosφ=0.4)		AC250V 10A (cosφ=0.4)	
Contact configuration	NC 1 — 4 NO NC 2 — 3 NO	Retracting side	Extending side	Retracting side	Extending side
		Red 3 Black 1 White 2	4 Green 5 Yellow 6 Brown	Red 3 Black 1 White 2	4 Green 5 Yellow 6 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	Linkage of three units
LS02, LS04, LS06	Retracting side thrust detecting limit switch	
LS11, LS12	Stroke adjusting limit switch	

● 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

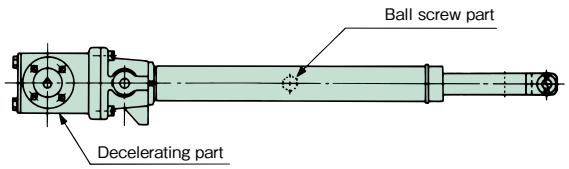
Use classification	Company name	Grease name
Ball screw	TSUBAKI EMERSON	JWGS100G
	IDEMITSU KOSAN	*DAPHNE EPONEX SRNo.2
	NIPPON GREASE	NIGULUBE EP-2K
	EXXON MOBILE	MOBILUX EPNo.2
	COSMO OIL LUBRICANTS	COSMO GREASE DINAMAX EPNo.2
	SHOWA SHELL	SHELL ALBANIA EP grease 2

* The above greases are filled before shipment.
Note) JWGS100G is separately sold in a container of 100.

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



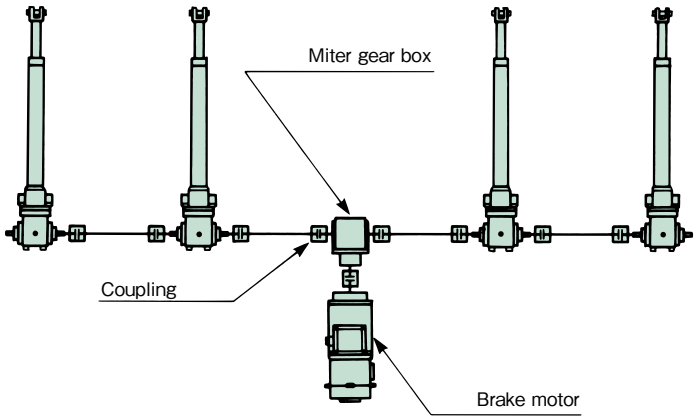
⚠ WARNING

Never insert your finger into the greasing port.
If the cylinder operates with your finger inserted, your finger may be injured.

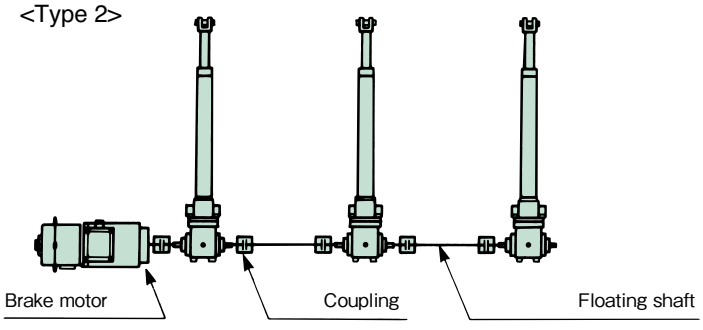
Synchronizing operation

Multi series has a feature to ensure synchronization of multiple power cylinders. Refer to the layout shown below to plan synchronizing operation.

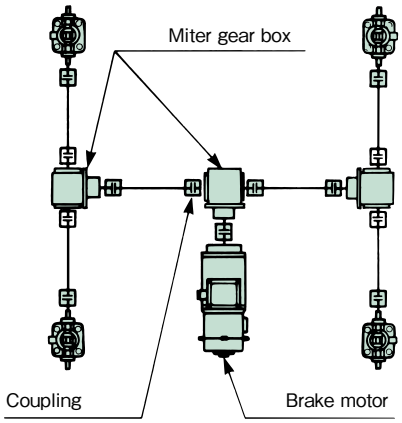
<Type 1>



<Type 2>



<Type 3>



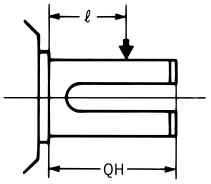
⚠ WARNING

■ 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.

$$\text{Allowable O.H.L} \geqq \frac{T \cdot f \cdot Lf}{R}$$

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

Sprocket	1.00
Gear	1.25
V belt	1.50
Flat belt	2.50

● Factor by load acting position

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 500	LPTB,TC 1000	LPTB,TC 2000	LPTB,TC 4000	LPTB,TC 6000	LPTB,TC 8000	LPTB,TC 12000	LPTB,TC 16000	LPTB,TC 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℃ to 40℃, although it varies depending on the conditions of use. 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.

■ 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.
- 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.

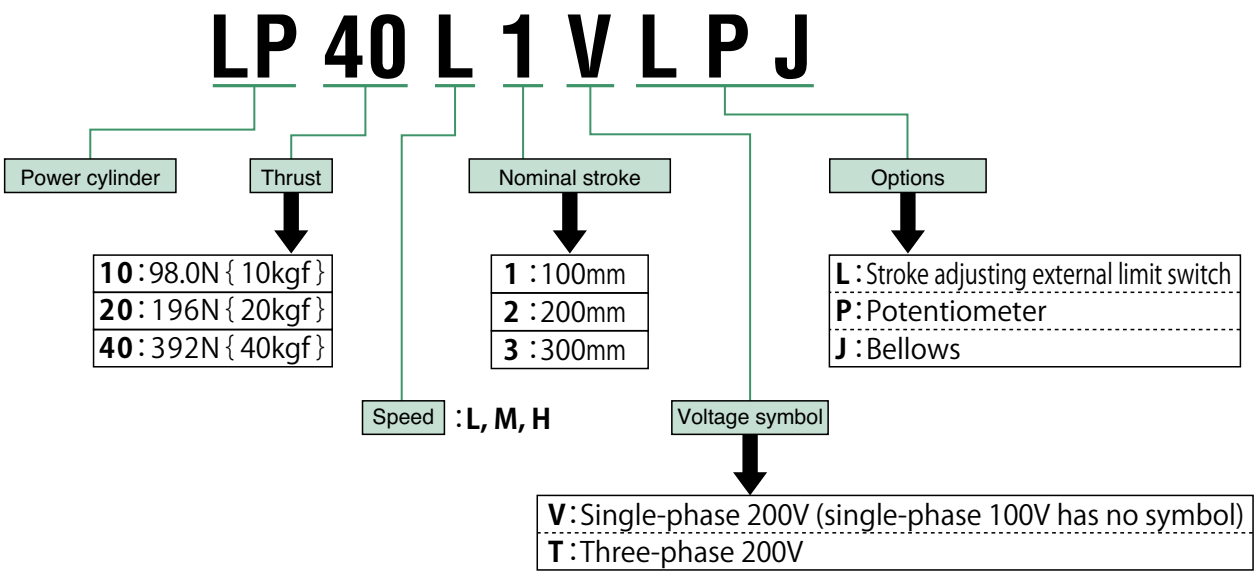
● Long life design

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 column 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 109 through 110.)

Standard model list

Model No.				Rated thrust		Rated speed mm/s 50/60Hz	Stroke mm*
Basic type	With stroke adjusting external limit switch	With potentiometer	With stroke adjusting external limit switch 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 μF (Withstand voltage 200V)		2.5 μF (Withstand voltage 400V)	
Protecting structure	Totally enclosed type (Indoor type)			

Painting color

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

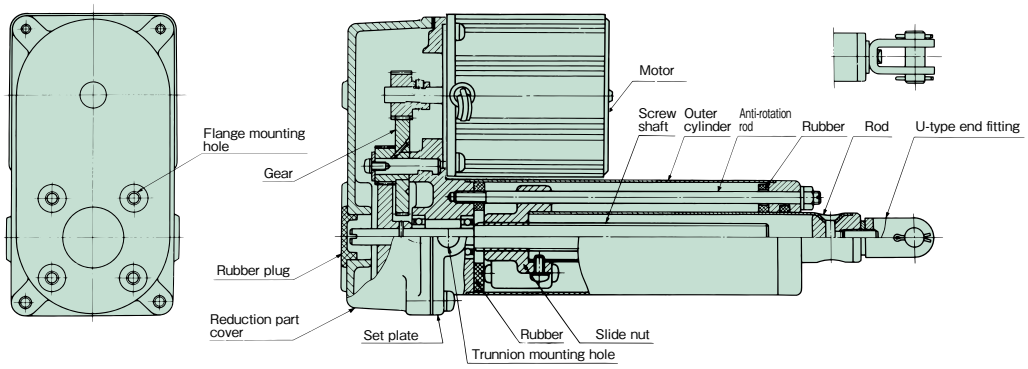
Environment use standard

Environment \ Model	Indoor type
Ambient temperature	−15℃~40℃
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/m³ or less)
Remark	Power cylinders with bellows are recommended in an excessively dusty location.

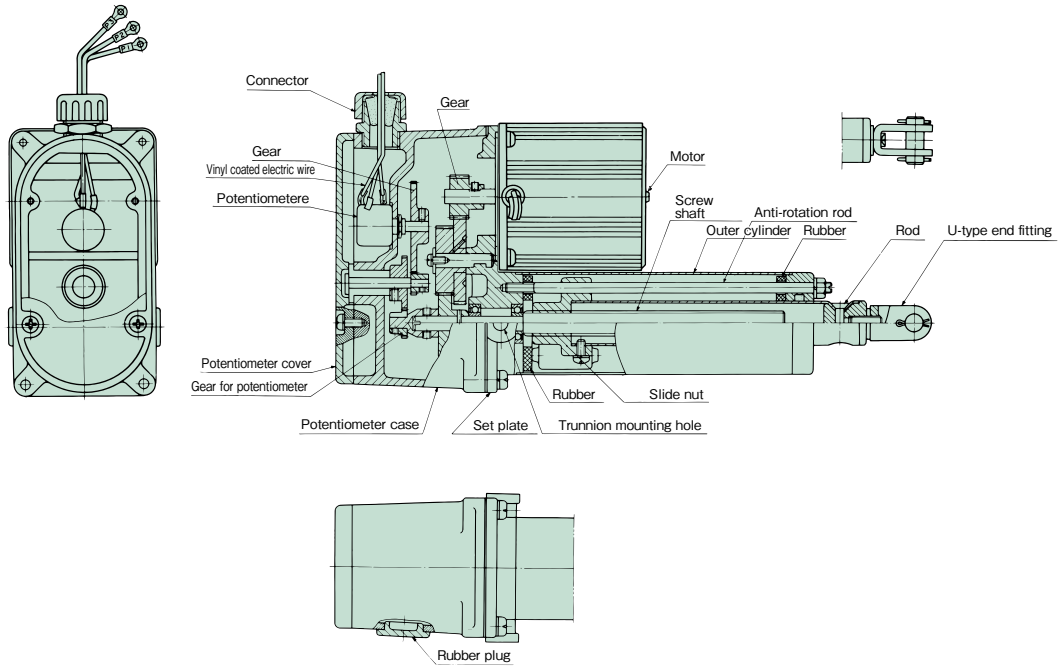
Note) This cylinder cannot be used outdoors.

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 a suitable model No. from the standard models (page 105) based on the 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

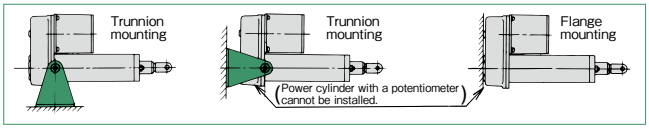
Installation

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 109)
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

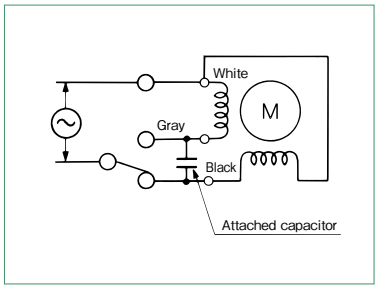
Note) Use the same grease for the screw and the reducer part.

Table 3 Lubrication cycle

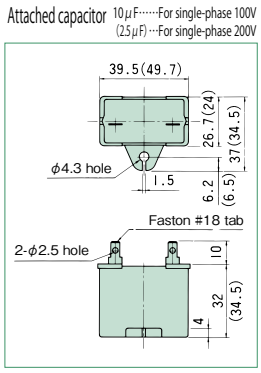
Operating frequency	Lubrication cycle
500 to 1000 times/day	Three to six months
100 to 500 times/day	Six months to one year
10 to 100 times/day	One to one and a half years

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

Wire connection



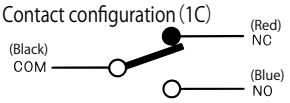
For retracting, turn the switch in reverse.



Limit switch

Model	D2VW-5L2A-1M (OMRON) or equivalent
Electric rating	AC250V 5A (cosϕ0.7)

Contact configuration (1C)



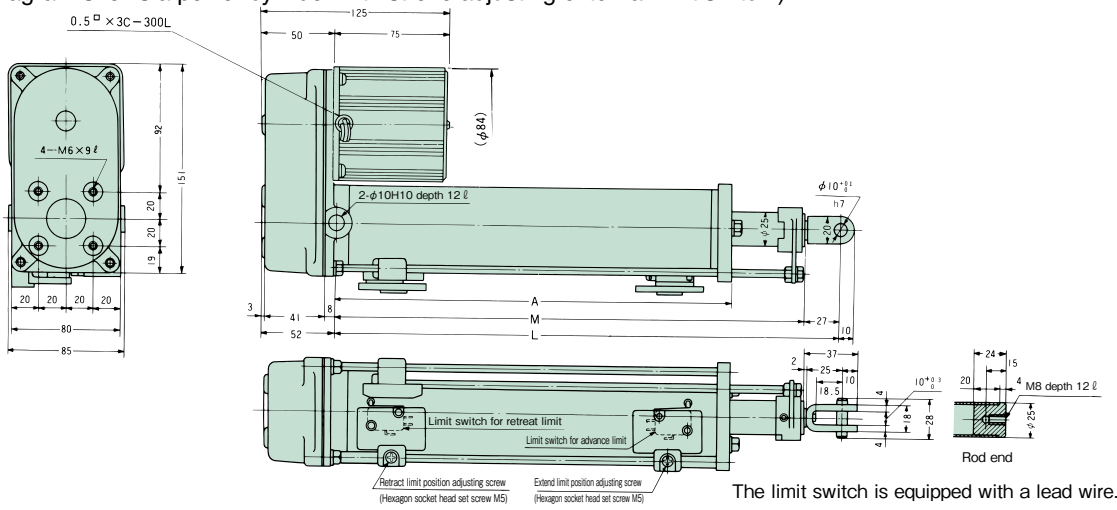
Potentiometer

Model	22-HHP-10N (SAKAE TSUSHIN KOGYO CO., LTD.) equivalent
Resistance value	1kΩ
Effective electric angle	3600°
Rated power	2W
Withstand voltage	AC1000V(1 minute)

To indicate stroke, use stroke indication meter and print board on page 82.

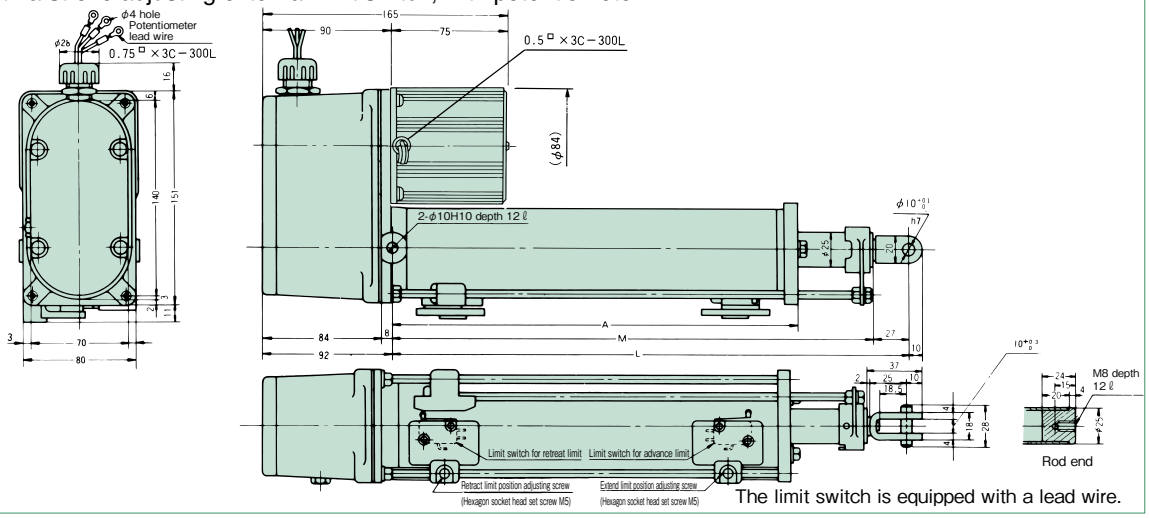
Dimensions Table

Basic type (This diagram shows a power cylinder with stroke adjusting external limit switch.)



The limit switch is equipped with a lead wire.

Power cylinder with a stroke adjusting external limit switch, with potentiometer



The limit switch is equipped with a lead wire.

Unit: mm

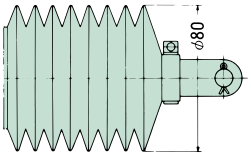
Stroke	A		M			L			Approximate mass kg			
	Basic type	With stroke adjusting external limit switch	Minimum	With bellows		Minimum		maximum	Basic type	With LS	With potentiometer	With LS, potentiometer
				Minimum	Stroke	Without bellows	With bellows					
100	176	179	205	205 (230)	100 (75)	232	232 (257)	332	4.0	4.6	5.1	5.6
200	276	279	305	319 (348)	186 (157)	332	346 (375)	532	4.5	5.1	5.6	6.1
300	376	379	405	433 (469)	272 (236)	432	460 (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

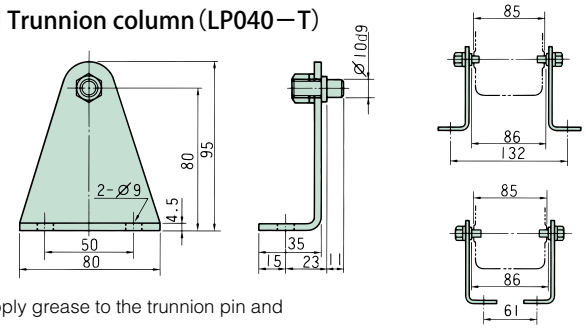
■ Bellows（　−J）

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 ϕ65 for the cylinder with a limit switch.

■ Trunnion column（LP040−T）



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

Application

With three-phase motor

1. Outline

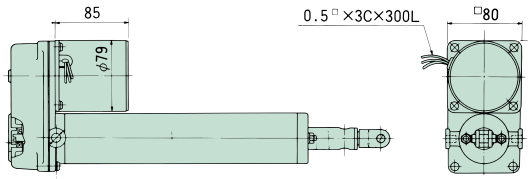
This is a model which can be used with a three-phase power source.

As this motor is of an induction type, the coasting amount slightly increases. Use this model in an application of relatively low frequency.

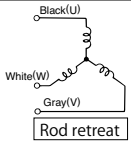
2. Specifications

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	 Rod retreat　Replace any two wires. Rod advance

3. Model No. designation

LP40L1T

Three-phase 200V

Application

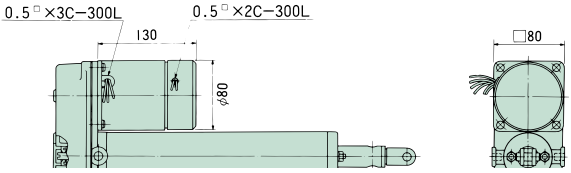
With brake motor

1. Outline

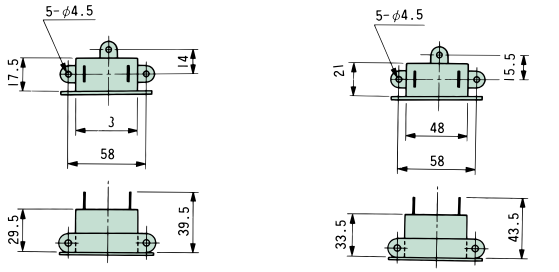
When you want to increase cylinder stop accuracy or reduce the coasting amount, power cylinders with a brake motor are optimum. Load can be securely retained in a vibration conveying location. All brakes retain a load even at power failure because they are of a deenergization type.

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

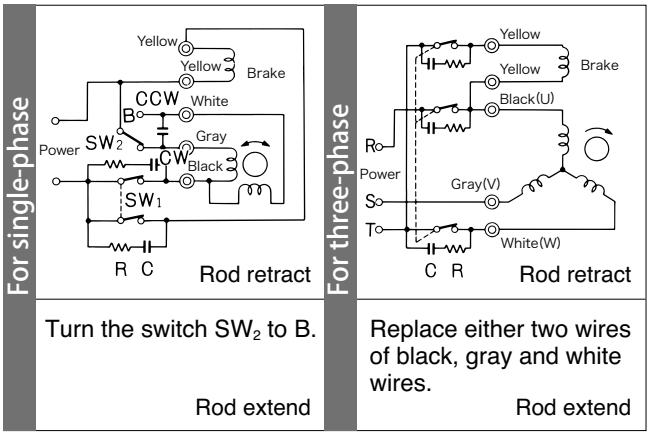


For single-phase 100V(10μF)　　For single-phase 200V(2.5μF)

<Specifications of brake motor>

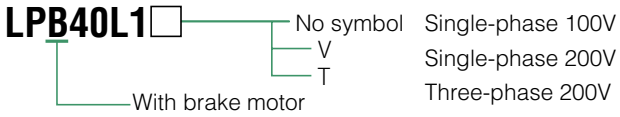
		Single-phase		Three-phase
Power source		100V 50/60Hz	200V 50/60Hz	200V 50/60Hz
Motor model		Condenser run reversible motor	Condenser run reversible motor	Induction motor
Time rating		30 minutes	30 minutes	Continuous
Output		25W	25W	25W
Rated current		0.8A	0.4A	0.25A
Specifications of brake	Power source	Single-phase 100V	Single-phase 200V	Single-phase 200V
	Input current	12W 0.15A	12W 0.1A	12W 0.1A
	Static friction torque	1kgf·cm	1kgf·cm	1kgf·cm

<Wire connetion>



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 (400WV) 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

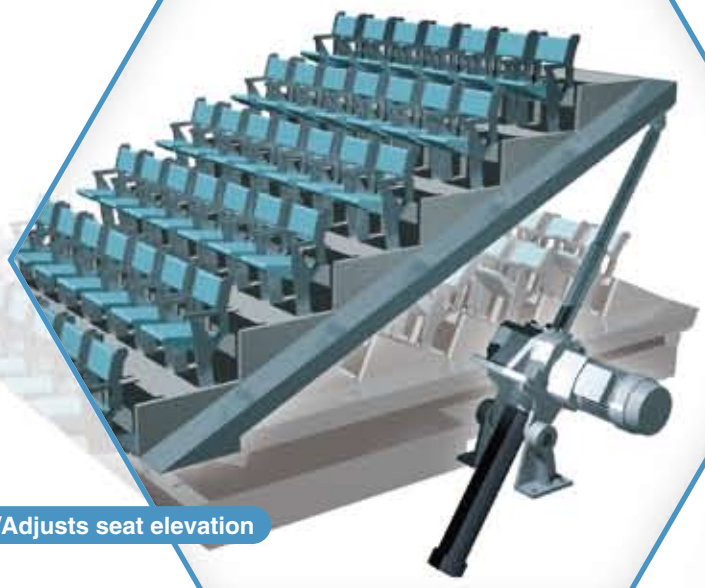
- Securely carry out centering between the center of the trunnion fitting and the center of the end fitting mount part. Prevent a lateral load from acting on the cylinder due to swing particularly when the cylinder operates.
- Apply grease to the trunnion pin and the trunnion hole for trunnion mounting.
- 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℃ to 40℃, although it varies depending on the use conditions. 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.

■ 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

Linipower Jack



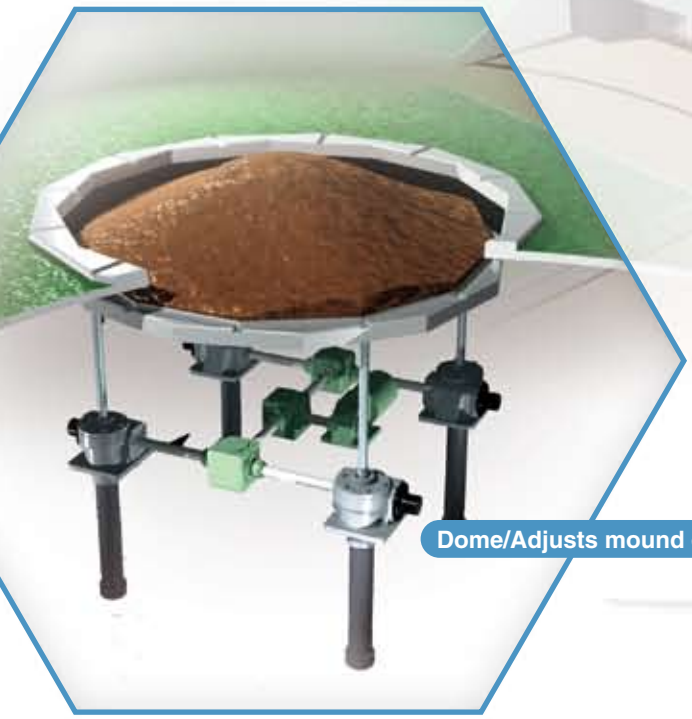
Dome/Adjusts seat elevation

Application Solution

Tsubaki Emerson 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

Aircraft/Lifts and lowers part

Parabolic Antenna/Adjusts antenna angles

Linipower Jack Basic specifications list

			JWM					
			U S (Standard Model for Lifting)		D S (Standard Model for Suspending)		U R (Travel Nut Type for Lifting)	D R (Travel Nut Type for Suspending)
								
Standard	Frame No.		002～200	300～1000	002～200	300～1000	002～200 note 1)	
	Basic Capacity*	kN	1.96～196	294～980	1.96～196	294～980	1.96～196	
		{tf}	{0.2}～{20}	{30}～{100}	{0.2}～{20}	{30}～{100}	{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					
	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 Mounting Adapter		○	△	△	△	△	△
	Trunnion Mounting Adapter		○	△	△	△	△	△

* Basic capacity means a maximum load which the jack can support (retain).

Frame No.			002	005	010	025	050	100	150	200	300	500	750	1000
Basic Capacity		kN	1.96	4.90	9.80	24.5	49.0	98.0	47	196	294	490	735	980
		{tf}	{0.2}	{0.5}	{1}	{2.5}	{5}	{10}	{15}	{20}	{30}	{50}	{75}	{100}
Stroke	100		○	○	○	○	○	○	○	○	△	△	△	△
	200		○	○	○	○	○	○	○	○	△	△	△	△
	300		○	○	○	○	○	○	○	○	△	△	△	△
	400		○	○	○	○	○	○	○	○	△	△	△	△
	500		△	○	○	○	○	○	○	○	△	△	△	△
	600		△	○	○	○	○	○	○	○	△	△	△	△
	800		–	○	○	○	○	○	○	○	△	△	△	△
	1000		–	△	○	○	○	○	○	○	△	△	△	△
	1200		–	–	△	○	○	○	○	○	△	△	△	△
	1500		–	–	–	△	○	○	○	○	△	△	△	△
	2000		–	–	–	–	△	△	△	○	△	△	△	△

○: Standard △: Requested products –: Made-to-order. Contact for details.

Note 1) Frames JWM300 and adove are available in travel nut types.

Note 2) Standard products are not always in stock.

JWB						JWH			
U S (Standard Model for Lifting)		D S (Standard Model for Suspending)		U R (Travel Nut Type for Lifting)	D R (Travel Nut Type for Suspending)	U S (Standard Model for Lifting)	D S (Standard Model for Suspending)	U R (Travel Nut Type for Lifting)	D R (Travel Nut Type for Suspending)
									
005～200	300～1000	005～200	300～1000	005～200 note 2)		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}
○	○	○	○	○	○	○	△	△	△	△	○	○	○	○	○	○
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○	○	○	○	○	○	○	△	△	△	△	○	○	○	○	○	○
○	○	○	○	○	○	○	△	△	△	△	○	○	○	○	○	○
○	○	○	○	○	○	○	△	△	△	△	○	○	○	○	○	○
○	○	○	○	○	○	○	△	△	△	△	○	○	○	○	○	○
○	○	○	○	○	○	○	△	△	△	△	○	○	○	○	○	○
△	○	○	○	○	○	○	△	△	△	△	○	○	○	○	○	○
–	△	○	○	○	○	○	△	△	△	△	△	○	○	○	○	○
–	–	△	○	○	○	○	△	△	△	△	–	△	○	○	○	○
–	–	–	△	△	△	○	△	△	△	△	–	–	△	△	△	○

Model Features

JWM [Machine Screw Type]

Low Speed, Low Frequency

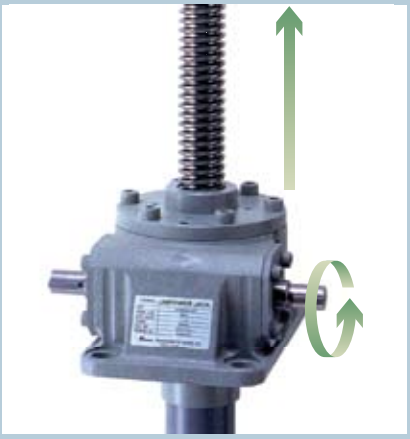
JWM (Machine Screw Type) is a standard model, suitable for low speed, low frequency operations. Major components include trapezoidal screw and high precision worm gear.

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

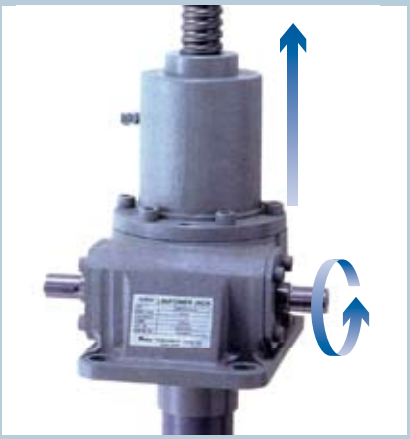
JWB (Ball Screw Type) is a highly efficient jack for high speed, high frequency operations. Major components include accurate ball screw and high precision worm gear.

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]

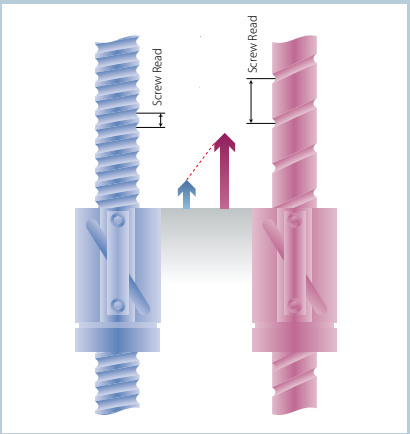
Super High Speed, High Frequency

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.

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

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.

$$\underset{N\{kgf\}}{\text{Adjusted Load Ws}} = \underset{N\{kgf\}}{\text{Maximum Load W}} \times \text{Coefficient Sf}$$

Table 1. Coefficient Sf

Load Conditions	Example Purposes	Coefficient Range
Smooth movement with no shock Light load	Opening and closing a valve Adjusting a conveyor	1.0 ~ 1.3
Light shock Medium load	Use with various kinds of transporting equipment and lifters	1.3 ~ 1.5
Severe shock and/or vibration Heavy load	Use with large transporting carriages Holding the position of 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).

$$\underset{N\{kgf\}}{\text{Load / jack W}} = \frac{\text{Adjusted Load Ws } N\{kgf\}}{\text{No. of jacks} \times \text{synchro. drive coefficient fd}}$$

Table 2. Synchronous Drive Coefficient fd

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

①Select (temporary) worm speed ratio by adjusting the screw shaft rpm. If difficult to select, inspect by H speed.
②Consider traveling space when selecting stroke.
③Select options based on your needs.

4. Verifying Buckling and Screw Shaft rpm
①Allowable Buckling Load
For a compressive load, verify that it does not exceed the allowable buckling load (See pages 128~130). If it does, increase jack size and recalculate.

②Allowable Screw Shaft rpm
If using a travel nut, verify that it does not exceed the allowable shaft rpm (See page 133). 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.

$$T = \frac{W \times \ell}{2 \times \pi \times R \times \eta} + To$$

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
To : Tare Drag Torque N・m{kgf・m}

* For screw lead, gear ratio, overall efficiency and tare drag torque, see pages 139, 165 and 189. Take caution in selecting screw units. (8mm→0.008m)

7. Verifying Input Capacity

SI Unit $P = \frac{T \times N}{9550}$

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 133) If not, increase jack size and recalculate.

9. Verifying Wear Life (JWB/JWH only)
Check if wear life is sufficient. (See page 132)
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
3. Sensor Option 4. Input Option
5. Accessory Option
(See page 198〜)

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 Tt.

<Required Torque per Jack>

$$T_{1\sim4}=\frac{T}{(\text{Gearbox efficiency})^{\text{No. of gear box}}}$$

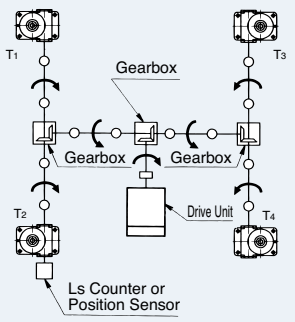
<Required Torque for the Drive Unit>

$$Tt = T_1 + T_2 + T_3 + T_4$$

$T_{1\sim4}$: Required torque for each jack on the drive unit side N・m {kgf・m }
T : Required input torque per jack N・m {kgf・m }
Gear box efficiency: Assume 0.9
Tt : Required torque for the drive-unit N・m {kgf・m }

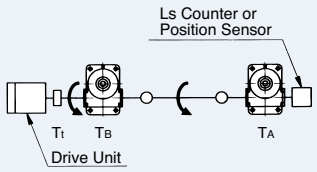
For a four unit system (Fig. 1), $T_{1\sim4}=\frac{T}{0.9^2}$

Fig. 1



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.

Fig. 2



T_A : Required input torque for Jack A
T_B : Required input torque for Jack B
Required torque at the motor $Tt=T_A+T_B<$ Allowable input shaft torque

3. Next, determine the required drive unit capacity Pt with input rpm N and 1.

SI Unit $Pt=\frac{Tt\times N}{9550}$	Pt : Total required torque at the drive unit kW Tt : Total required torque at the drive unit N・m {kgf・m} N : Input rpm for the jack r/min
Gravitational Unit $Pt=\frac{Tt\times N}{974}$	

Other Parts Options

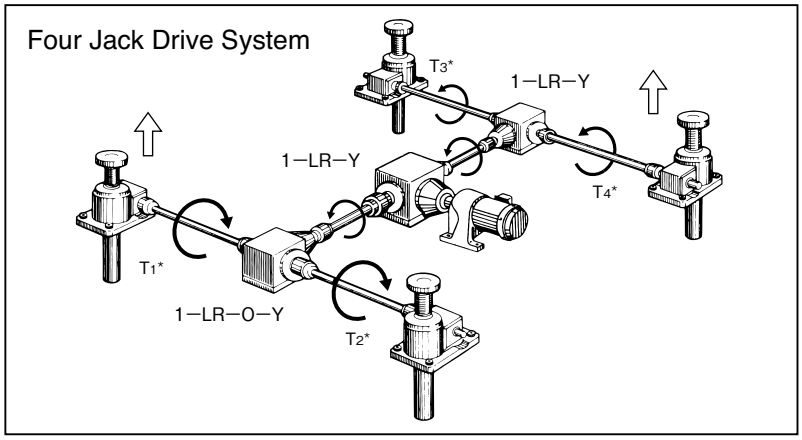
1. Gear box....Select based on input rpm and required torque.
See Tsubaki Emerson Miter Gear Box Catalog.
(Bulletin No.04001)

2. Coupling....Select based on allowable torque and maximum shaft diameter.
See Tsubaki Emerson 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



↻ Jacks lift as rotational input is applied in the direction of each arrow.

* See page 10 for $T_1 \sim T_4$

SI Unit

1. Adjusted load Ws is (coefficient Sf=1.3)
   Ws=88200×1.3=114660 N
2. Load W per jack is
   $$W=\frac{114660}{4\times0.85}=33724\ \text{N}$$
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 129～130. (Assume safety level Sf=4.) See page 130 for details on calculations.
   $$P_{CR}=20\times10^4\times\left(\frac{31.3^2}{637}\right)^2$$
   *Refer to dimensions on page 173.
   $$=473073\ \text{N}$$
   $$Sf=\frac{473073}{33724}>4\cdots\text{OK}$$
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 Ws is (coefficient Sf=1.3)
   Ws=9000×1.3=11700 kgf
2. Load W per jack is
   $$W=\frac{11700}{4\times0.85}=3442\ \text{kgf}$$
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 129～130. (Assume safety level Sf=4.) See page130 for details on calculations.
   $$P_{CR}=20\times10^3\times\left(\frac{31.3^2}{637}\right)^2$$
   *Refer to dimensions on page 173.
   $$=47307\ \text{kgf}$$
   $$Sf=\frac{47307}{3442}>4\cdots\text{OK}$$
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

$$①N=\frac{0.60}{0.010}\times 6=360\ \text{r/min}$$

$$②T=\frac{33724\times 0.010}{2\times 3.14\times 6\times 0.64}+1.37=15.4\ \text{N}\cdot\text{m}$$

$$\text{From①②}\quad P=\frac{15.4\times 360}{9550}=0.58\ \text{kW}$$

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 132)

Expected driving distance = $0.26x2x8x300x10^{-3}x3=3.74$ km

We then find that the suitable jack number is JWB050.

……OK

10. Jack Options

Possible dust————→Use with bellow

Shaft end————→Table shaft end

Finally, we conclude by selecting **JWB050USH3JM**.

{ Gravitational Unit }

7. Required Input Capacity

$$①N=\frac{0.60}{0.010}\times 6=360\ \text{r/min}$$

$$②T=\frac{3442\times 0.010}{2\times 3.14\times 6\times 0.64}+0.14=1.57\ \text{kgf}\cdot\text{m}$$

$$\text{From①②}\quad P=\frac{1.57\times 360}{974}=0.58\ \text{kW}$$

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 132)

Expected driving distance = $0.26x2x8x300x10^{-3}x3=3.74$ km

We then find that the suitable jack number is JWB050.

……OK

10. Jack Options

Possible dust————→Use with bellow

Shaft end————→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.

SI Unit $\quad T_1=\frac{15.4}{0.9^2}=19.0\ \text{N}\cdot\text{m}$

{Gravitational Unit $\quad T_1=\frac{1.57}{0.9^2}=1.94\ \text{kgf}\cdot\text{m}$}

Since 4 jacks follow the same route

SI Unit $\quad Tt=T_1\times 4=76.0\ \text{N}\cdot\text{m}$

{ Gravitational Unit $\quad Tt=T_1\times 4=7.76\ \text{kgf}\cdot\text{m}$ }

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 Pt

SI Unit $\quad Pt=\frac{76.0\times 360}{9550}=2.87\ \text{kW}$

{Gravitational Unit $\quad Pt=\frac{7.76\times 360}{974}=2.87\ \text{kW}$}

from the input rpm 360r/min we find

$$\frac{1800}{360}=5$$

Based on this data we select GMTA370-50L5B, Tsubaki Emerson 3.7kW gearmotor with a brake unit.

For details, see Tsubaki Emerson 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

$$\frac{15.4\times 4}{0.9^2}=76.1\ \text{N}\cdot\text{m}\quad\left\{\frac{1.57\times 4}{0.9^2}=7.76\ \text{of}\cdot\text{m}\right\}$$

From this, we find that the gear box ED6M is most suitable.

Gear box by the jack Left————→ED4M 1-LR-O-Y

Right————→ED4M 1-LR-Y

Gear box by the gearmotor————→ED6M 1-LR-Y

(For details see Tsubaki Emerson Miter Gear Box Catalog).

B.2. Select couplings based on your requirements.

(See Tsubaki Emerson 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 (ϕ20 for JWB050USH), and the gear box shaft diameter (ϕ19 for ED4M).

Required number is 2x2x2=8.

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 (ϕ19 for ED4M), and the other by the gearmotor (ϕ25 ED6M). Required number is 2×2=4.

2-3. Select couplings used between each gear box and the gearmotor based on the total required torque for the four jacks,

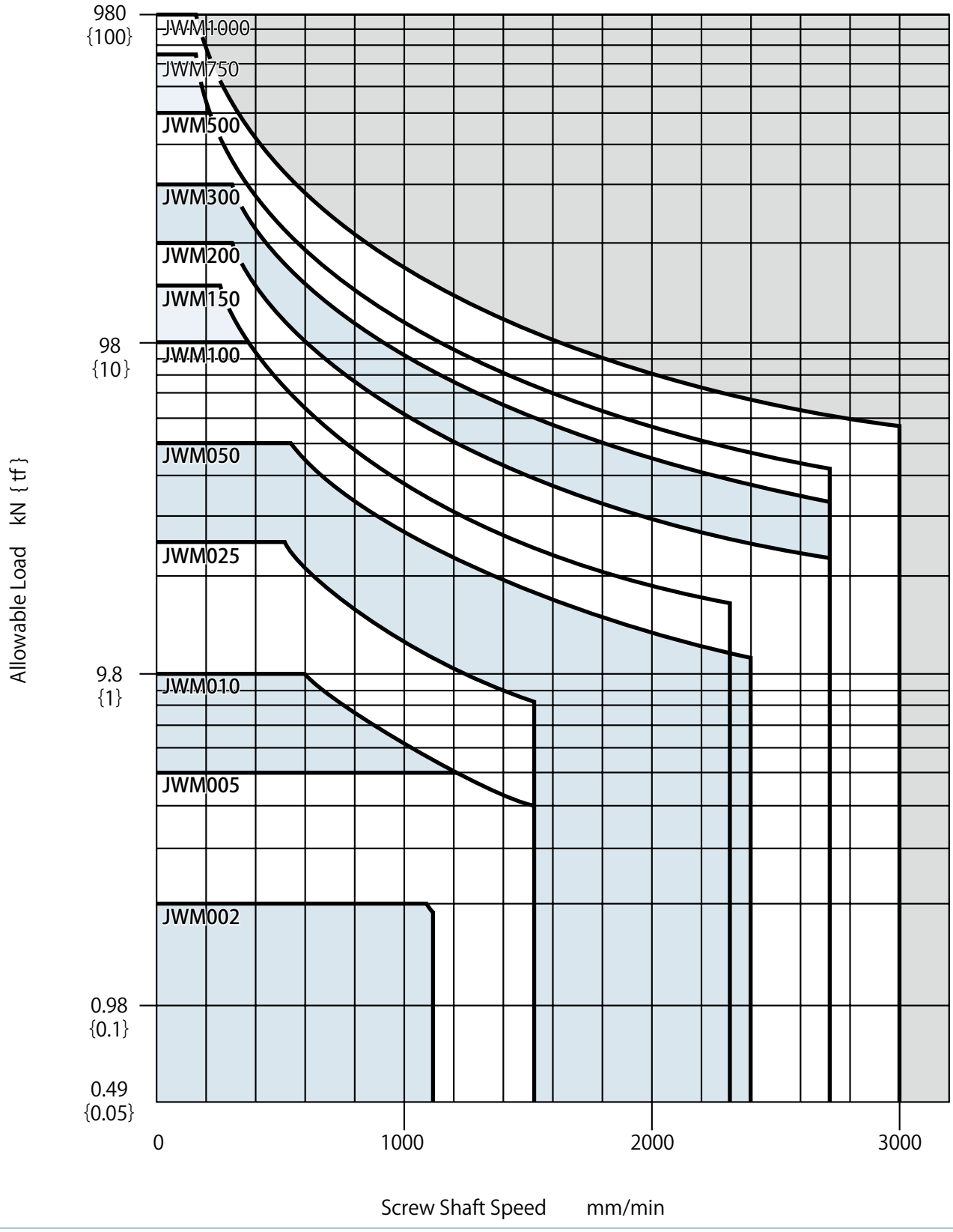
$$\frac{15.4\times 4}{0.9^2}=76.1\ \text{N}\cdot\text{m}\quad\left\{\frac{1.57\times 4}{0.9^2}=7.76\ \text{kgf}\cdot\text{m}\right\}$$

and the diameters of the gear box (ϕ25 for ED6M) and the output shafts (ϕ50 for GMTA370-50L5B).

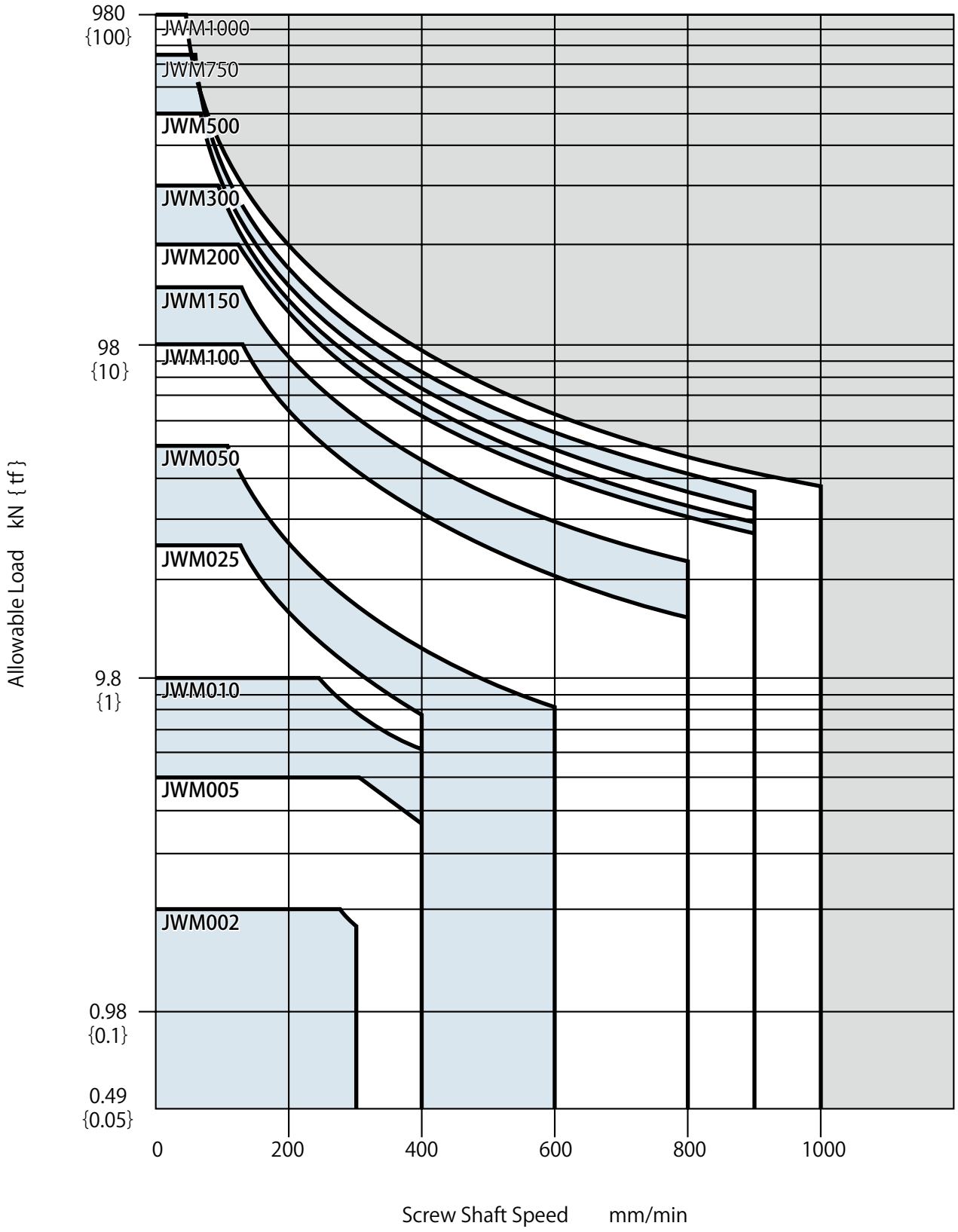
Screw Shaft Speed (Lifting) and Allowable Load for JWM (Machine Screw Type)

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 119 for calculation details.

■H Speed



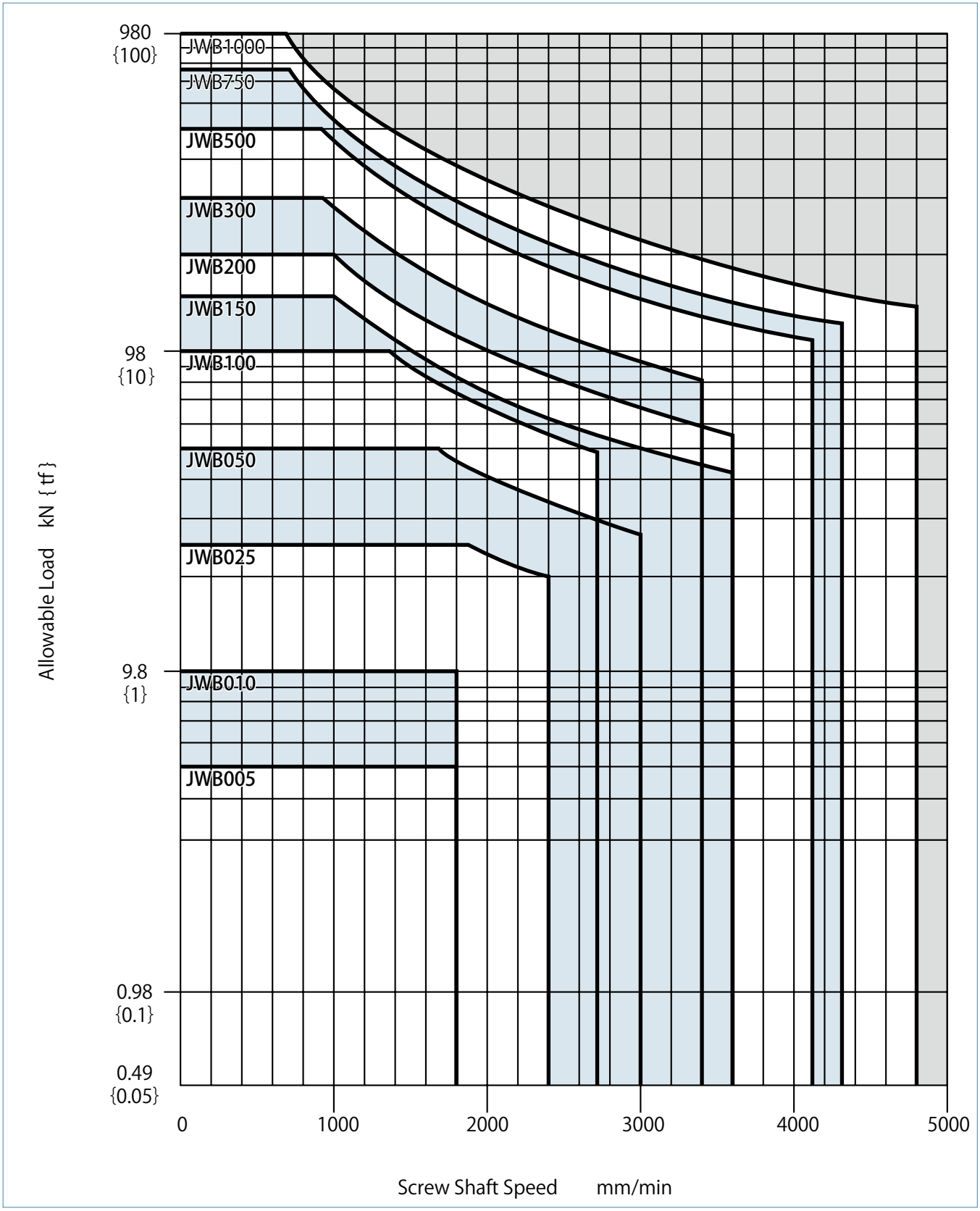
■L Speed


980
{100}
98
{10}
9.8
{1}
0.98
{0.1}
0.49
{0.05}
JWM1000
JWM750
JWM500
JWM300
JWM200
JWM150
JWM100
JWM050
JWM025
JWM010
JWM005
JWM002
Allowable Load kN {tf}
0
200
400
600
800
1000
Screw Shaft Speed mm/min

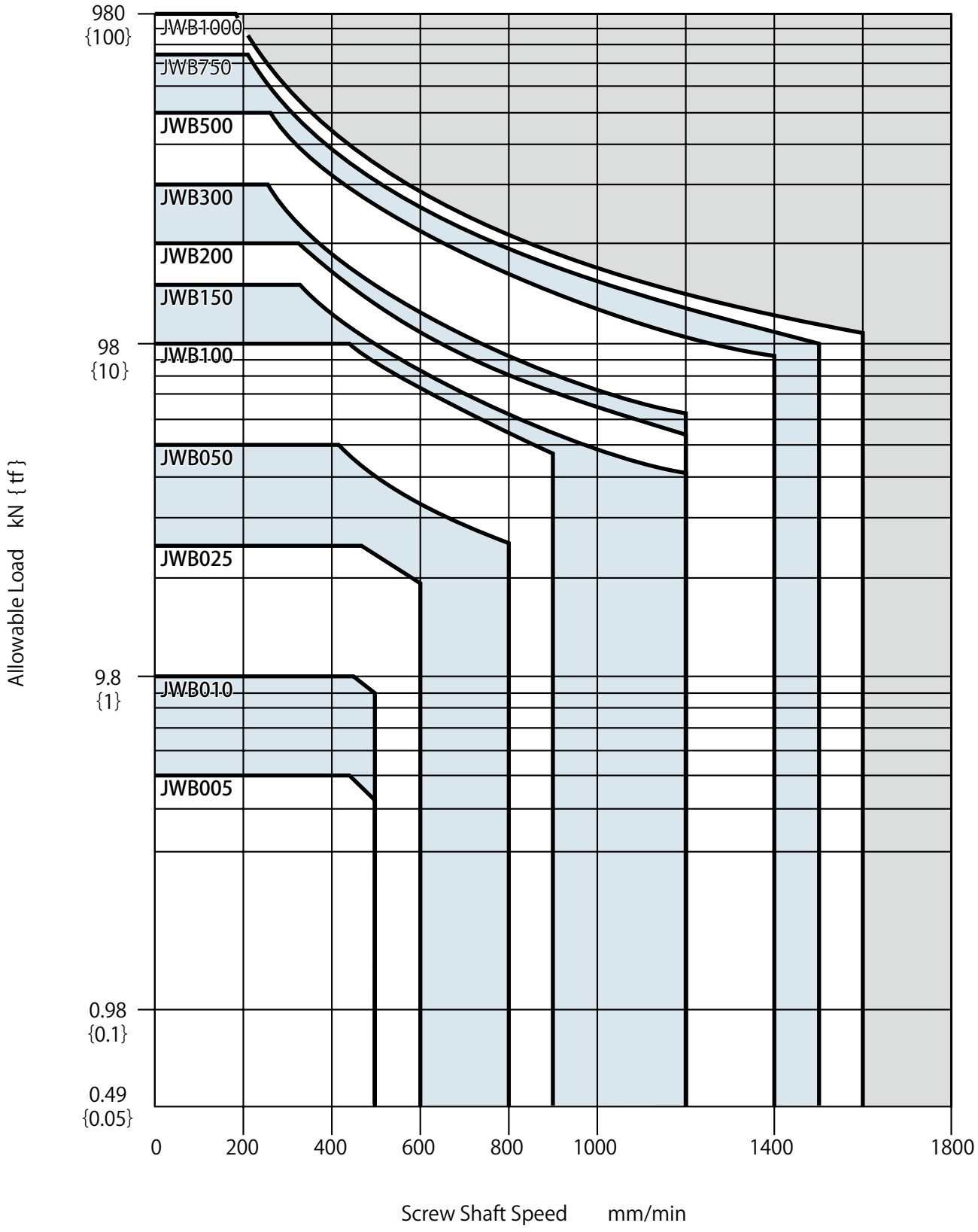
Screw Shaft Speed (Lifting) and Allowable Load for JWB (Ball Screw Type)

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 119 for calculation details.

■H Speed



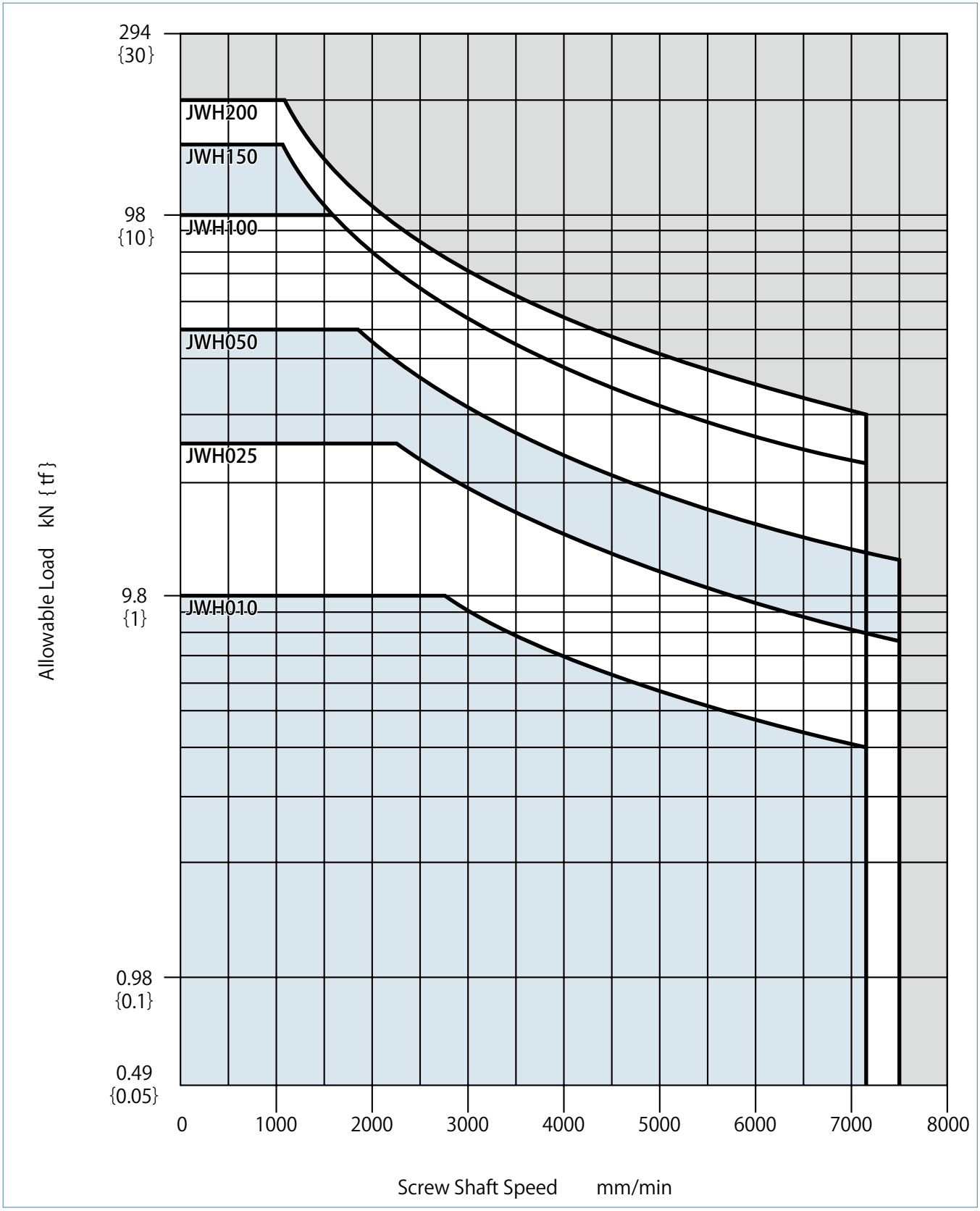
■L Speed


980
{100}
98
{10}
9.8
{1}
0.98
{0.1}
0.49
{0.05}
JWB1000
JWB750
JWB500
JWB300
JWB200
JWB150
JWB100
JWB050
JWB025
JWB010
JWB005
Allowable Load kN {tf}
0
200
400
600
800
1000
1400
1800
Screw Shaft Speed mm/min

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 119 for calculation details.

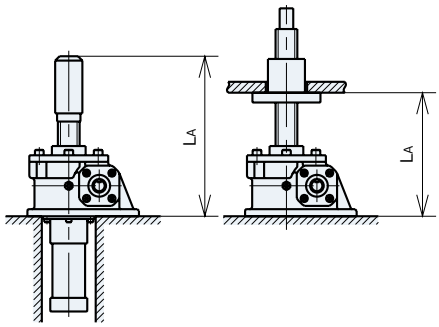
■H Speed

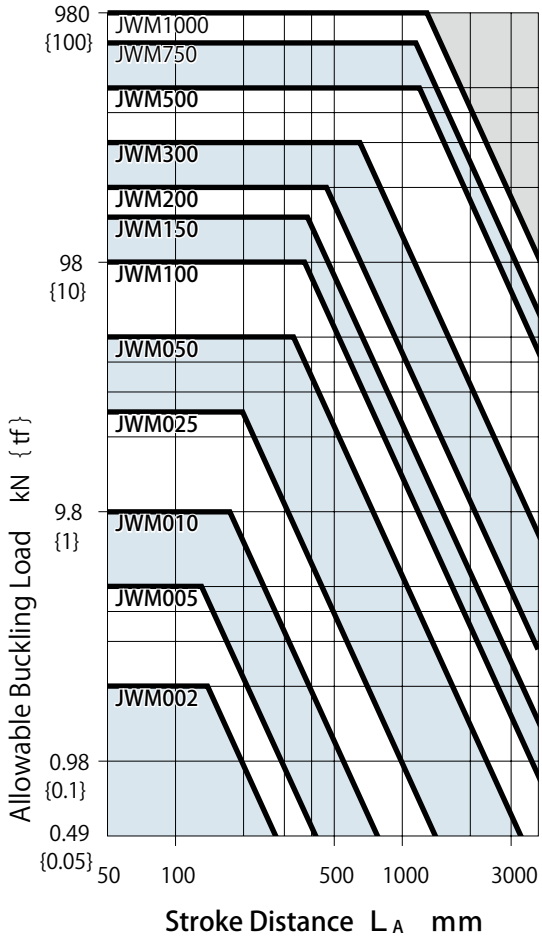


Allowable Buckling Load for JWM (Machine Screw Type)

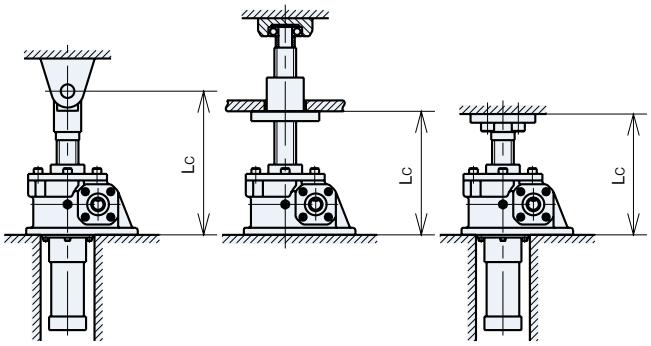
●Use this graph to select the correct frame number based on a specific buckling load, for compression loads.
The graph for Allowable Buckling Load assumes a load safety rate of Sf = 4.
①From the installation conditions shown in A and C below, determine the correct distance for LA and LC.
(For other installation conditions, see page 130)
②The graphs allow you to select the correct frame number based on a specific load W (vertical axis) and stroke distance LA (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.

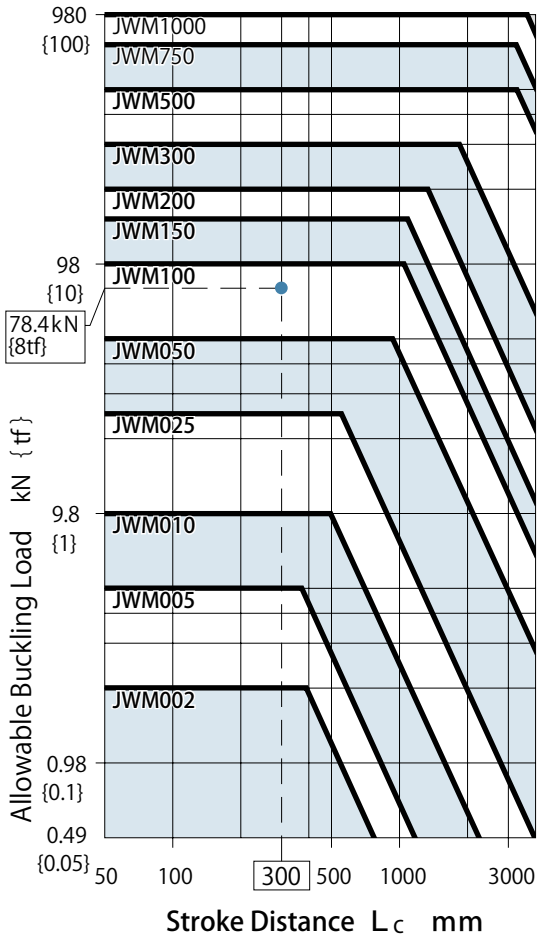
A Fixed base - Shaft end free





C Fixed base - Guided shaft end/Fixed shaft end



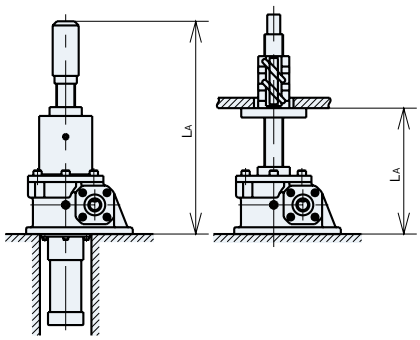


Notes)1. The dotted line on the graph represents an example based on W78.4kN {8tf} load (buckling safety rate of Sf =4) and installation condition C with a distance of 300mm. From this graph, JWM100 is selected as the suitable frame number for these conditions.
2. If full inspection is required, see page 130 for calculation details.

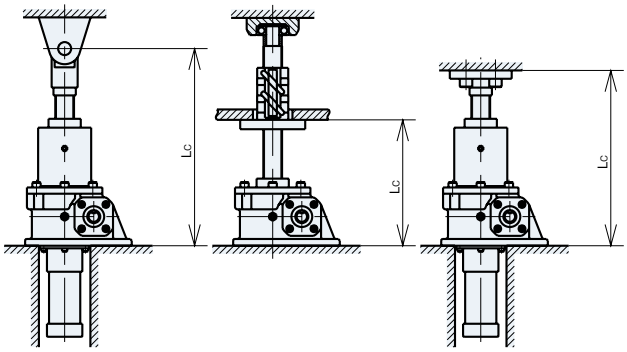
Allowable Buckling Load for JWB (Ball Screw Type)

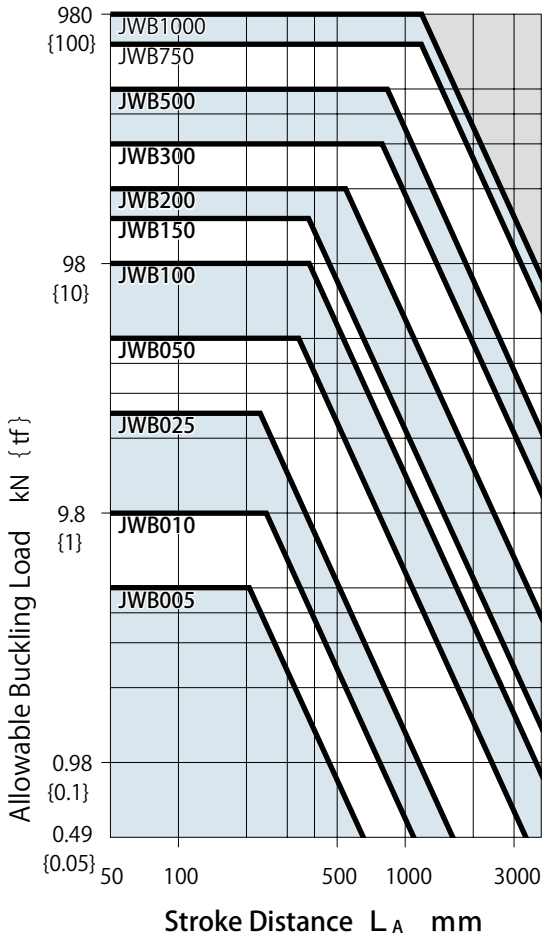
●Use this graph to select the correct frame number based on a specific buckling load, for compression loads.
The graph for Allowable Buckling Load assumes a buckling load safety rate of Sf = 4.
①From the installation conditions shown in A and C below, determine the correct distance for L_A and L_C.
(For other installation conditions, see page 130)
②The 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.

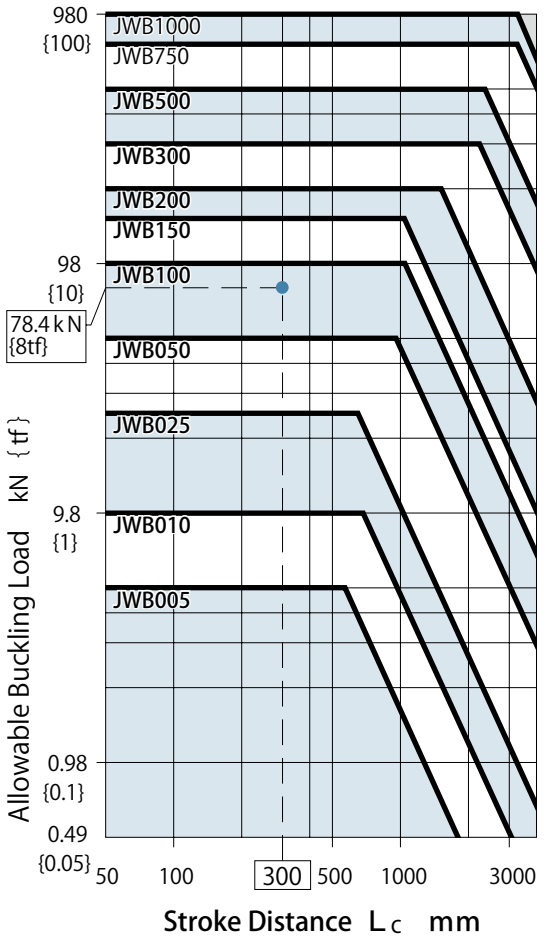
A Fixed base - Shaft end free



C Fixed base - Guided shaft end/Fixed shaft end



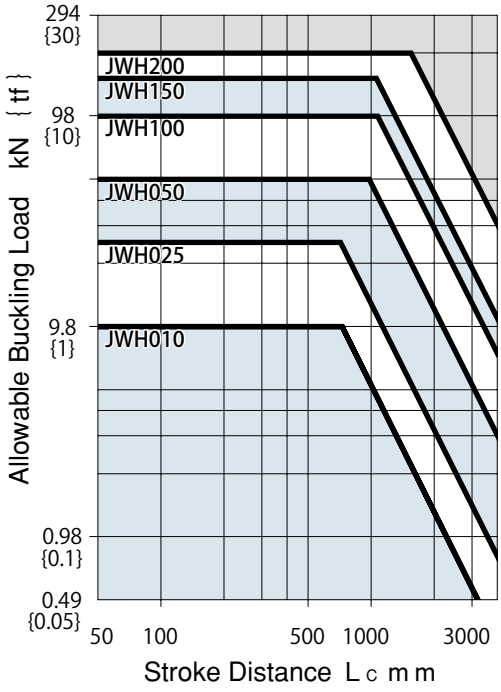




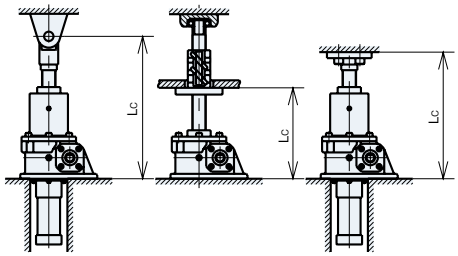
Notes)1. The dotted line on the graph represents an example based on W78.4kN {8tf} load (buckling safety rate of Sf =4) and installation condition C with a distance of 300mm. From this graph, JWM100 is selected as the suitable frame number for these conditions.
2. If full inspection is required, see page 130 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 Sf = 4.
①From the installation condition shown in C below, determine the correct distance for Lc. (For other installation conditions, see technical data).
②The graph allows you to select the correct frame number based on a specific load W (vertical axis) and stroke distance Lc (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

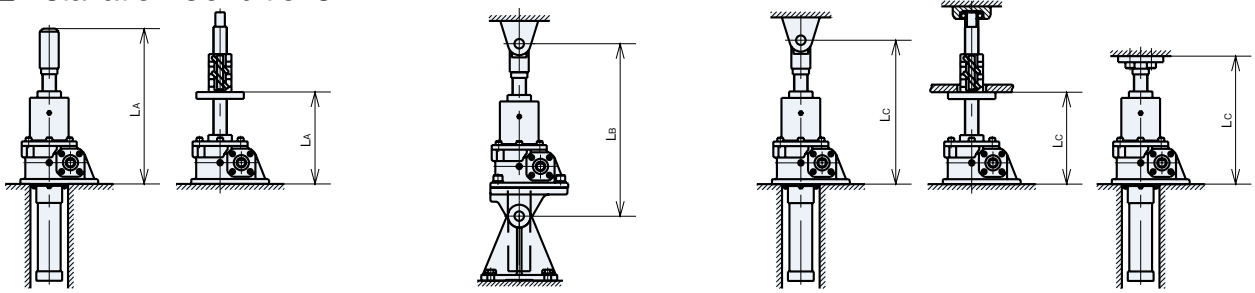
Formula used to calculate allowable buckling load.

$$PCR = m \times \left(\frac{d^2}{L} \right)^2$$

Make sure $P_{CR} > W \times Sf$

P_{CR} : Allowable buckling load N{kgf}
d : Screw shaft root diameter mm (Refer to pages 139・140 for JWM, pages 165・166 for JWB and pages 189・190 for JWH)
m : Support coefficient
(Select installation condition from the figures below)
L : Screw shaft projection distance mm
(See dimensions in each frame number.)
W : Load per jack N{kgf}
Sf : Buckling safety rate (Assume 4)

■Installation Conditions



A Fixed base-Shaft end free

	m
SI Unit	2.5×10^4
Gravitational Unit	2.5×10^3

B Base and shaft end with clevis

	m
SI Unit	10×10^4
Gravitational Unit	10×10^3

C Fixed base-Guided shaft end/Fixed shaft end

	m
SI Unit	20×10^4
Gravitational Unit	20×10^3

SI Unit

We calculate the P_{CR} of JWM100USH5JI, based on 4900N load and installation condition C (Fixed base and guided shaft end/Fixed shaft end.)

$$P_{CR} = 20 \times 10^4 \times \left(\frac{38.4^2}{791} \right)^2 \quad (SF=4)$$

$= 695027$ N
$W \times SF = 49000 \times 4$
$= 196000$ N
$P_{CR} > W \times Sf$
$695027 > 196000 \cdots$OK

* See dimensions on page 151

{ Gravitational Unit }

We calculate the P_{CR} of JWM100USH5JI, based on 4900N load and installation condition C (Fixed base and guided shaft end/Fixed shaft end.)

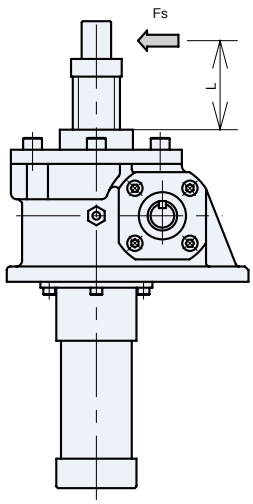
$$P_{CR} = 20 \times 10^3 \times \left(\frac{38.4^2}{791} \right)^2 \quad (SF=4)$$

$= 69502$ kgf
$W \times SF = 5000 \times 4$
$= 20000$ kgf
$P_{CR} > W \times Sf$
$69502 > 20000 \cdots$OK

* See dimensions on page 151

Allowable Side Load for JWM (Machine Screw Type)

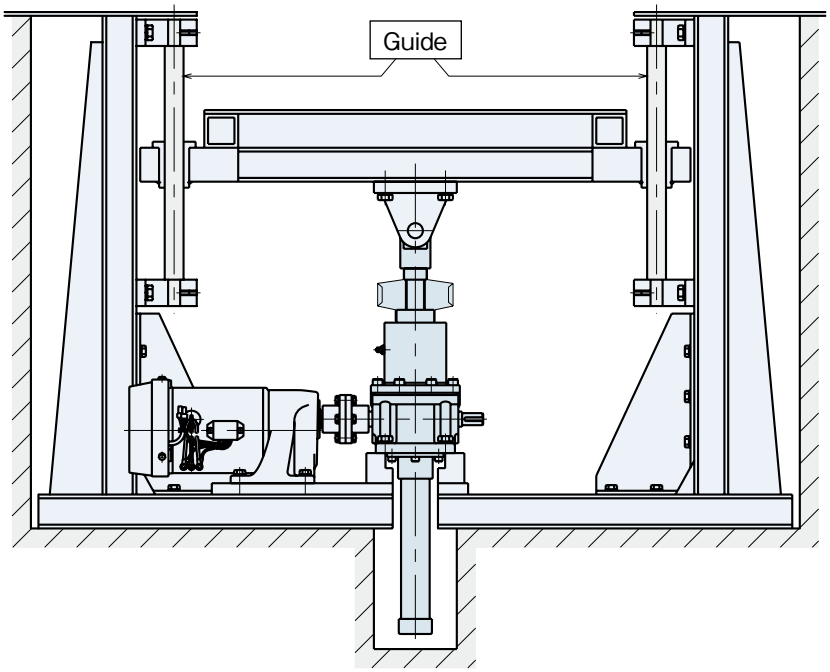
Guides are typically used for Machine Screw Types as shown in the diagram below. However, if the shaft projection distance (L) beyond the housing surface is relatively short, a certain amount of side load is acceptable.
Note) L represents the distance of screw shaft projection that affects side load. It does not refer to stroke distance.



Screw Shaft Projection Distance L mm \ Frame Number	Allowable Side Load N {kgf}											
	002	005	010	025	050	100	150	200	300	500	750	1000
100	83	128	318	570	2,500	4,010	4,610	8,210	21,700	85,300	73,500	159,700
	{9}	{13}	{32}	{59}	{255}	{409}	{470}	{838}	{2,210}	{8,700}	{7,500}	{16,300}
200	42	64	159	290	1,250	2,010	2,300	4,110	10,800	50,400	56,700	79,900
	{4}	{7}	{16}	{29}	{128}	{205}	{235}	{419}	{1,110}	{5,150}	{5,780}	{8,150}
300	28	43	106	190	830	1,340	1,540	2,740	7,200	33,600	37,800	53,200
	{3}	{4}	{11}	{20}	{85}	{136}	{157}	{279}	{740}	{3,430}	{3,860}	{5,430}
400	21	32	79	140	620	1,000	1,150	2,050	5,400	25,200	28,300	39,900
	{2}	{3}	{8}	{15}	{64}	{102}	{118}	{210}	{550}	{2,570}	{2,890}	{4,080}
500	—	27	64	110	500	800	920	1,640	4,300	20,200	22,700	31,900
	—	{3}	{6}	{12}	{51}	{82}	{94}	{168}	{440}	{2,060}	{2,310}	{3,260}
600	—	25	53	100	420	670	770	1,370	3,600	16,800	18,900	26,600
	—	{3}	{5}	{10}	{43}	{68}	{78}	{140}	{370}	{1,720}	{1,930}	{2,720}
700	—	23	51	90	360	570	660	1,170	3,100	14,400	16,200	22,800
	—	{2}	{5}	{9}	{36}	{58}	{67}	{120}	{320}	{1,470}	{1,650}	{2,330}
800	—	21	48	90	310	500	580	1,030	2,700	12,600	14,200	20,000
	—	{2}	{5}	{9}	{32}	{51}	{59}	{105}	{280}	{1,290}	{1,450}	{2,040}
900	—	—	45	90	280	450	510	910	2,400	11,200	12,600	17,700
	—	—	{5}	{9}	{28}	{45}	{52}	{93}	{250}	{1,140}	{1,290}	{1,810}
1000	—	—	42	90	250	400	460	820	2,200	10,100	11,300	16,000
	—	—	{4}	{9}	{26}	{41}	{47}	{84}	{220}	{1,030}	{1,160}	{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.

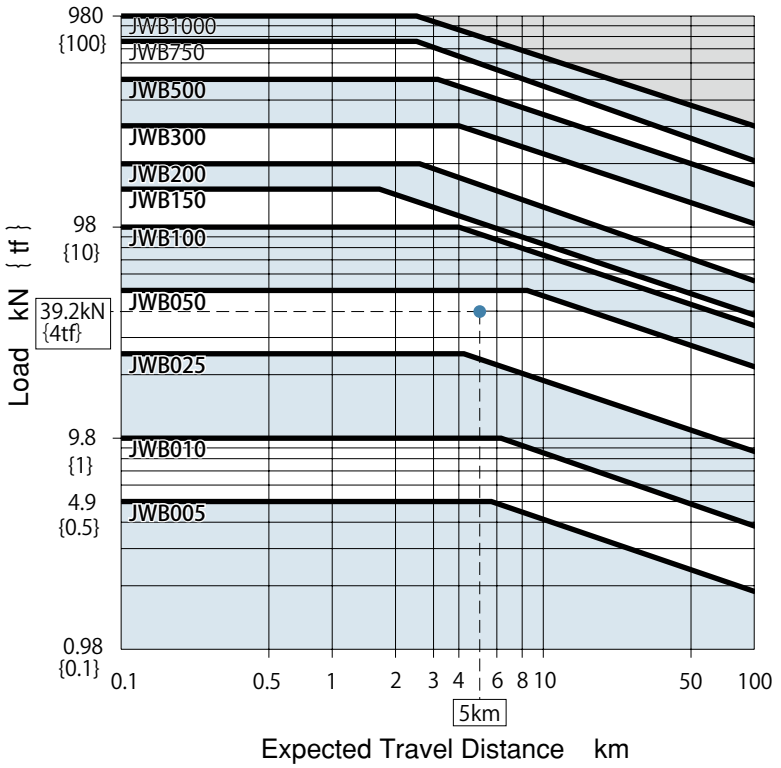
$$PM = \frac{PMIN + 2 \times PMAX}{3}$$

PM : Equivalent load kN {kgf}
PMIN : Minimum load kN {kgf}
PMAX : Maximum load kN {kgf}

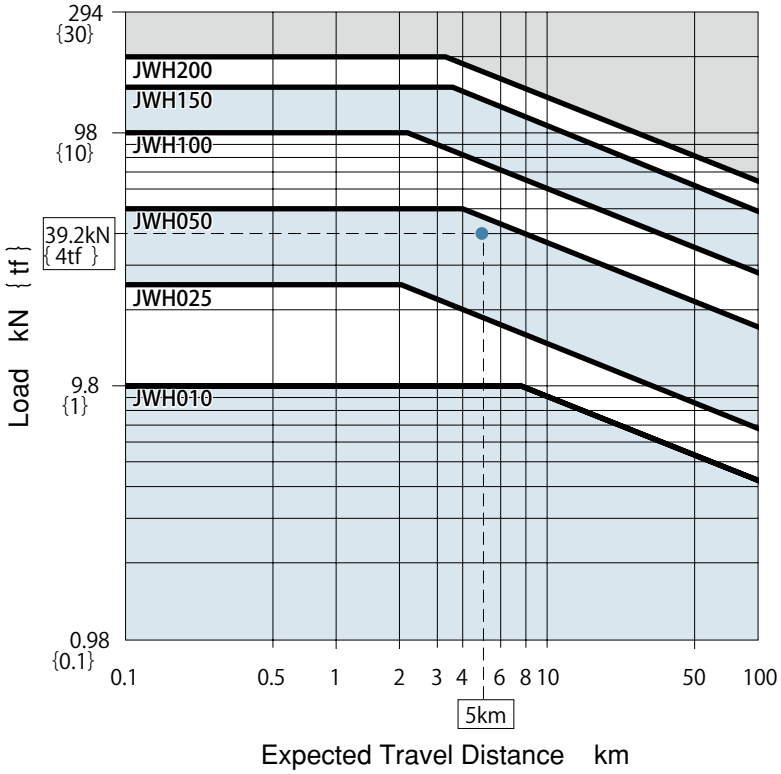
<JWM (Machine Screw Type) Expected Travel Distance>
Machine screw life cannot be determined by the formula used to calculate a ball screw wear life. Use the information below as a reference.

JWM050 and below---5km (Average expected life)
JWM100 and above---1km (Average expected life)

JWB



JWH



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).

$$\text{Allowable O. H. L.} \geqq \frac{T \times f \times Lf}{R}$$

O.H.L. : Overhang load N {kgf}
T : Input torque N • m {kgf • m}
f : Coefficient - power transmission element
Lf : Coefficient-Load position
R : Sprocket, Gear, V pulley or Pitch diameter m

Table 2. Coefficient- Power Transmission Element (f)

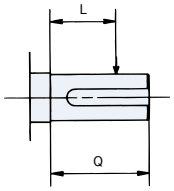
Chain	1.00
Gear	1.25
V Belt	1.50
Flat Belt	2.50

Table 3. Coefficient (Lf) - Load Position

L/Q	Below 0.5	0.75	1
Lf	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) H Speed	N	99	200	380	710	1500	2270	3160	4320	6110	10100	13900	18000
	{kgf}	{10}	{21}	{39}	{73}	{153}	{232}	{323}	{441}	{624}	{1030}	{1420}	{1840}
JWM (Machine Screw Type) L Speed	N	63	120	220	420	820	1430	1950	2800	4400	6650	9390	13200
	{kgf}	{6}	{13}	{23}	{44}	{85}	{146}	{200}	{286}	{449}	{678}	{958}	{1350}
JWB (Ball Screw Type) H Speed	N	—	130	220	480	870	1290	2030	2490	3450	5240	7200	9790
	{kgf}	—	{14}	{23}	{50}	{89}	{132}	{208}	{255}	{352}	{535}	{735}	{998}
JWB (Ball Screw Type) L Speed	N	—	82	140	290	500	840	1300	1610	2400	3560	4940	6970
	{kgf}	—	{8}	{15}	{31}	{52}	{86}	{133}	{165}	{245}	{363}	{504}	{711}
JWH (High Lead Ball Screw Type) H Speed	N	—	—	530	980	1510	2390	3130	3840	—	—	—	—
	{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.)

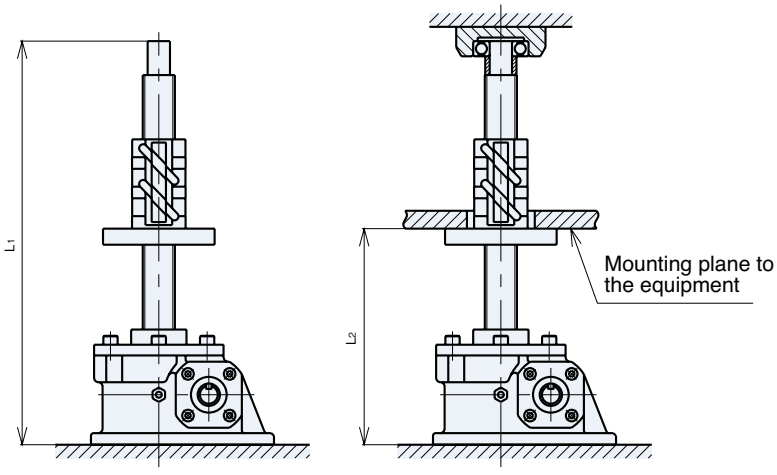
$$NC = \frac{96 \times n \times d \times 10^6}{L^2}$$

NC : Allowable screw shaft rpm r/min
d : Screw shaft root diameter mm
(See pages 139 • 140 for JWM, pages 165 • 166 for JWB and pages 189 • 190 for JWH.)
n : Shaft end support coefficient
①Shaft end free: n=0.36
②Fixed 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



① Shaft end free ② Shaft end guided

(Calculation Example)

Assume JWM200URH20D with input rpm of 1200r/min with fixed shaft end.

Screw shaft rpm Ns is:

$$NS = \frac{1200}{8} = 150 \text{r/min}$$

* See dimensions on page 156

$$NC = \frac{96 \times 1.56 \times 51.3 \times 10^6}{2237^2}$$

$$= 1535 \text{r/min}$$

NC=1535r/min＞NS=150r/min…OK

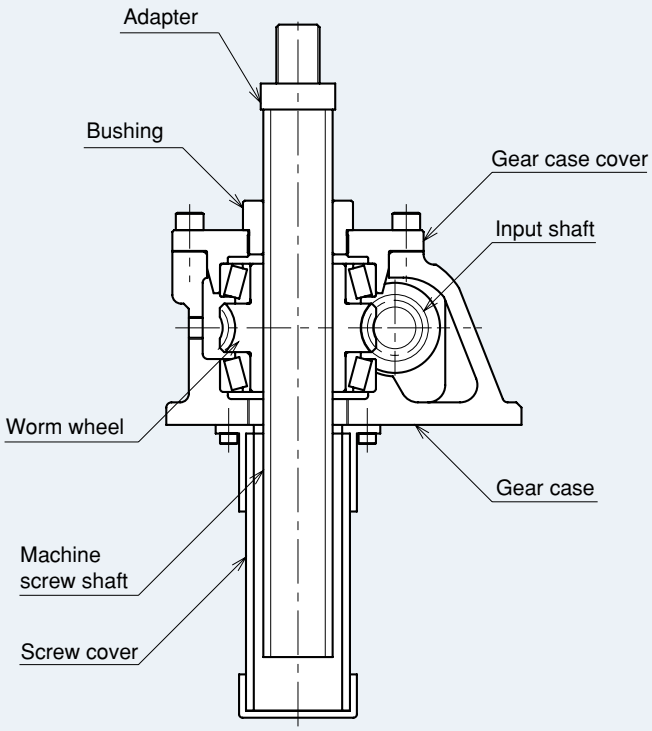
Linipower Jack

JWM (Machine Screw Type)

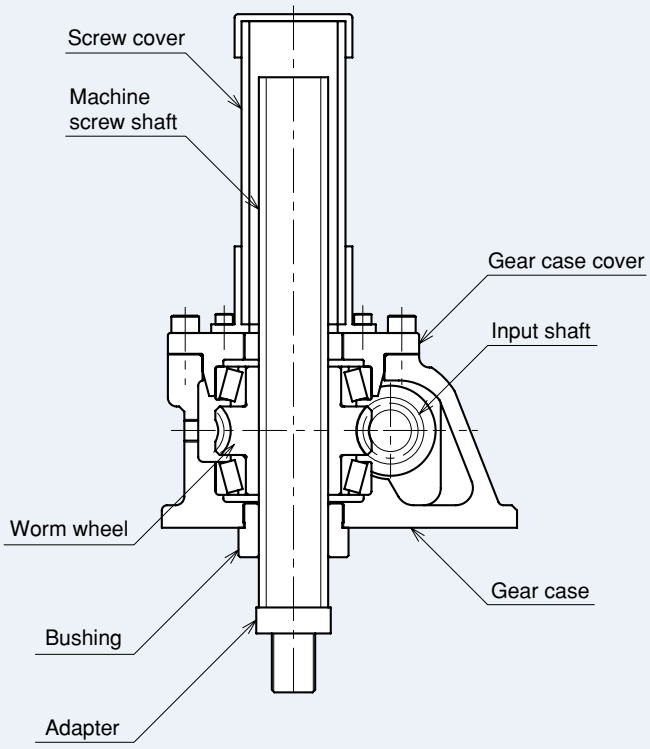
Drawings

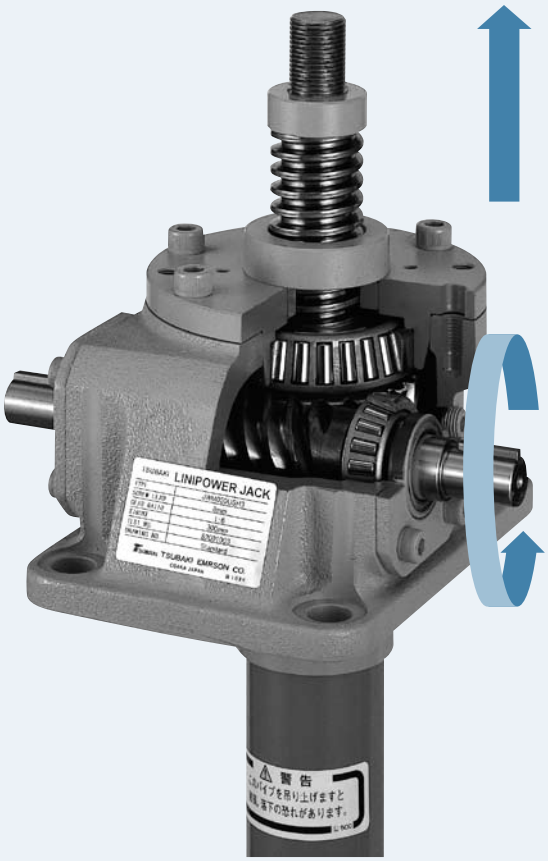
JWM (Machine Screw Type) Standard Model

JWM Standard Model for Lifting



JWM Standard Model for Suspending

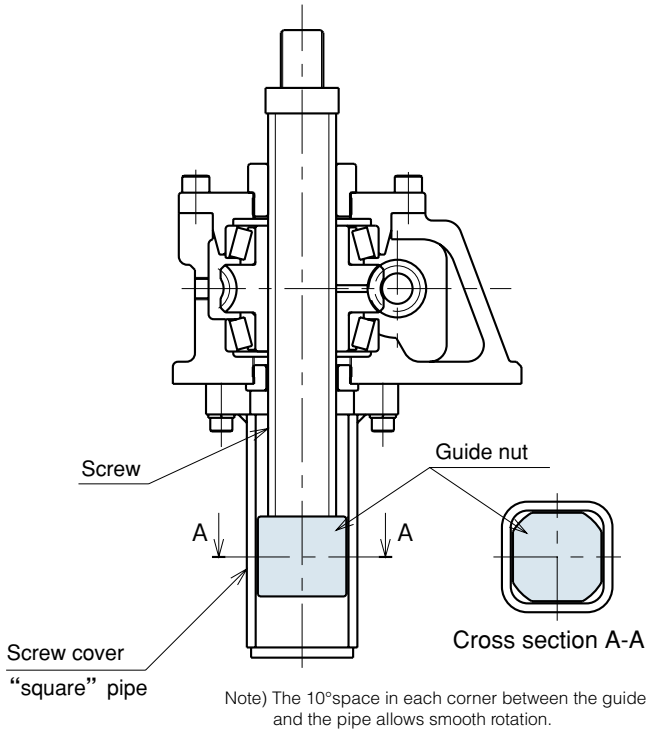




JWM (Machine Screw Type) Rotation Prevention Type

JWM002～050

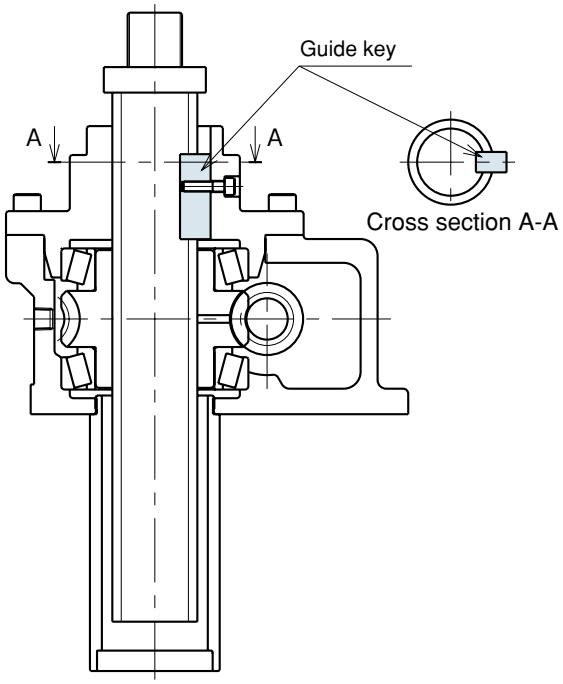
〈Rotation Prevention Type with Guide Nut〉



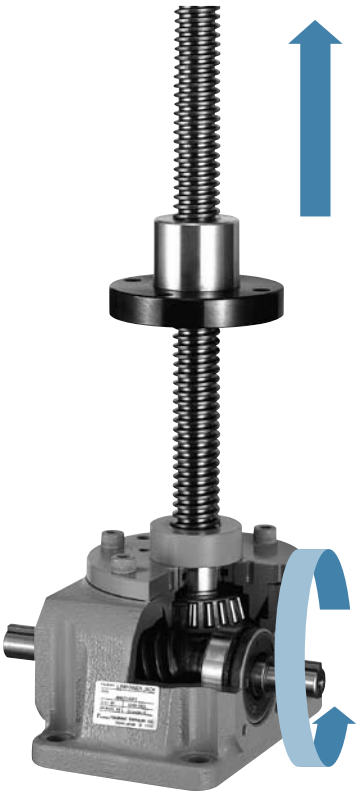
Note) The 10°space in each corner between the guide and the pipe allows smooth rotation.

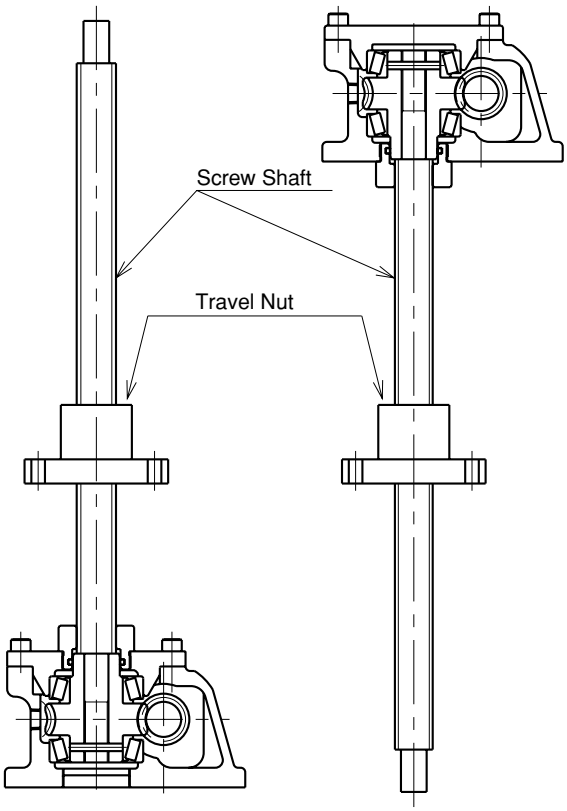
JWM100・150・200

〈Rotation Prevention Type with Guide Key〉



JWM (Machine Screw Type) Travel Nut Type





JWM (Machine Screw Type)

JW	M	050	US	H	10	U	JM	C	K4P	G2

Linipower Jack

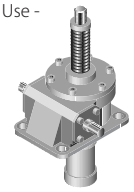
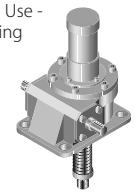
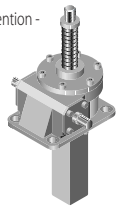
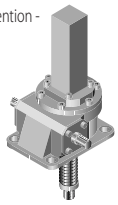
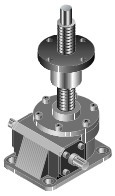
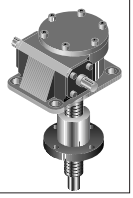
Jack Type
M : Machine screw

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}

*JWM750 and 1000 are manufactured upon inspecting specific needs.

Installation Type

US	Standard Use - Lifting 
DS	Standard Use - Suspending 
UM	Rotation Prevention - Lifting 
DM	Rotation Prevention - Suspending 
UR	Travel Nut - Lifting 
DR	Travel Nut - Suspending 

*Be sure to use the flange installation method U or D with travel nuts.

Stroke mm

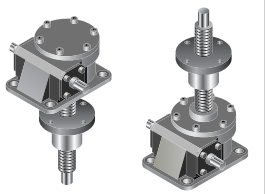
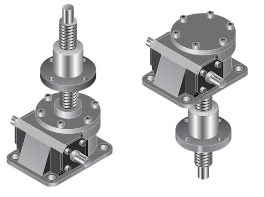
1	100
3	300
6	600
10	1000

*The above values are examples. For actual stroke used, refer to the Model comparison Table for JWM on page 115.

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	$10\frac{2}{3}$	32
500	$10\frac{2}{3}$	32
750	$10\frac{2}{3}$	32
1000	12	36

Flange Installation

U	
D	

*Above are only necessary with travel nuts.

Examples)

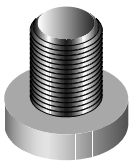
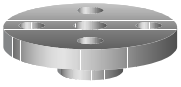
JWM100UMH3

• Machine Screw Type • 98.0kN {10tf} • Rotation prevention (for lifting) • Gear ratio H (1/8) • Stroke 300mm

JWM050USH10JMK4PG2

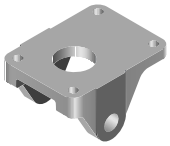
• Machine Screw Type • 49.0kN {5tf} • Standard use (for lifting) • Gear ratio H (1/6) • Stroke 1000mm
• Bellows / Table Type End Fitting • 4 Internal LS • Potentiometer
• 3 Phase motor with brake and gear; reducer ratio of 1/10

Output Option

No symbol	Screw Shaft End (standard) 
J	Bellows 
B	Rod Type End Fitting 
I	I Type End Fitting 
M	Table Type End Fitting 

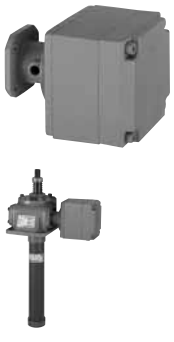
Note) To request the above parts, provide their letter symbols in the order given. When travel nuts are used, B, I and M are not required.
Note) Travel nut type with bellows is estimated for each order. Enter necessary information in the inquiry form on page 219 to contact Tsubaki Emerson.

Installation Option

C	Clevis Mounting Adapter  (See page 215)

Note) For standard lifting only.

Sensor Option

Y	LS Counter  (See page 209)
K2 K4 P R	Position Sensor K2・・・2 Internal LS K4・・・4 Internal LS P・・・・Potentiometer R・・・・Rotary Encoder  (See page 211)

Note) To request the above parts, provide their letter symbols in the order given.

Input Option

E EV	3 phase brake and motor E・・・・200V 50Hz 200/220V 60Hz EV・・・400 50Hz 400/440V 60Hz  (See page 199～)
G1 G2	3 phase brake and gear-motor G1・・・Gear ratio 1/5 200V 50Hz 200/220V 60Hz G2・・・Reducer ratio  (See page 199～)

Accessories

Hand Wheel

(See page 216)

Control Options

Stroke Meter and PCB 

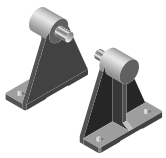
Meter Relay and PCB 

R Controller 

Pulse Counter 

(See page 212～)

Others

Trunnion Mounting Adapter 

* Use as a set with clevis mounting adapter.

(See page 215)

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 nput 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 for Basic Capacity *Note 2 N・m {kgf・m}	H Speed	0.83 {0.08}	2.5 {0.26}	6.2 {0.64}	16.1 {1.6}	48.7 {5.0}
	L Speed	0.42 {0.04}	1.1 {0.12}	2.9 {0.30}	7.4 {0.75}	20.0 {2.0}
Screw Movement/ 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 for Basic Capacity r/min	H Speed	1800	1500	750	600	400
	L Speed	1800	1500	1200	600	300
Screw Shaft Rotational 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		−15～80℃ (Precautions #2)				
Environment: Relative Humidity		85% or less (no dew condensation)				
Environment: 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 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.

JWM100	JWM150	JWM200	JWM300	JWM500	JWM750	JWM1000
98.0 {10}	147 {15}	196 {20}	294 {30}	490 {50}	735 {75}	980 {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 {0.2}	2.6 {0.27}	3.9 {0.4}	9.8 {1}	19.6 {2}	29.4 {3}	39.2 {4}
292 {29.8}	292.0 {29.8}	292.0 {29.8}	735.0 {75}	1372.0 {140}	1764.0 {180}	2450.0 {250}
90.7 {9.2}	149 {15.2}	238.1 {24.3}	400.1 {40.8}	856.0 {87.3}	1380.5 {140.7}	2040.9 {208.0}
45.3 {4.6}	72.3 {7.4}	124.0 {12.6}	244.0 {24.9}	453.3 {46.2}	761.3 {77.6}	1278.3 {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 {51.3}	813.2 {82.9}	1287.7 {131.3}	2531.9 {258.1}	5551.3 {565.9}	8921.8 {909.5}	13878.3 {1414.7}
Steel Pipe						
Screw: Grease Reducer Unit: Grease Bath						
Tsubaki Olive Grey (Munsell 5GY6/0.5)						
−15～80℃ (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						

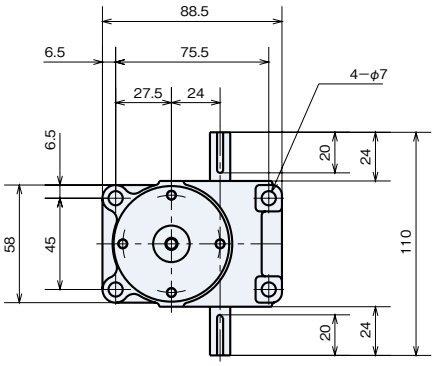
7. Although JWM (Machine Screw Type) comes with a self-locking device, it may not be effective with vibration or shock. Use a brake under such conditions.

⚠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.

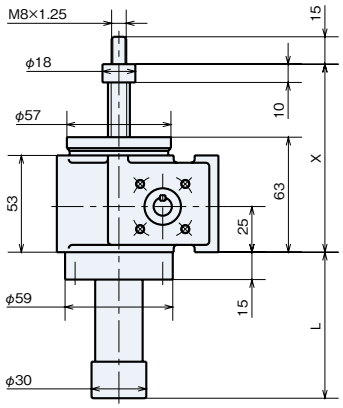
10. Input shaft key is provided with each unit.
(Key complies with JIS B 1301-1996 standards.)

JWM002 Dimensions - Standard Model

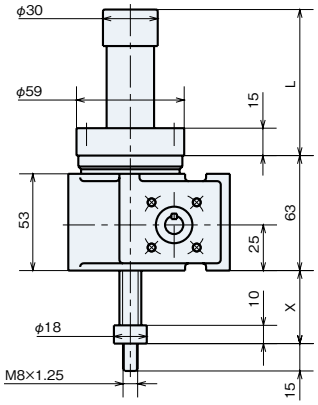


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	73	173	127	227	184	20	120	65	165	184	2.3
200	73	273	127	327	284	20	220	65	265	284	2.4
300	73	373	167	467	424	20	320	105	405	424	2.6
400	73	473	167	567	524	20	420	105	505	524	2.7

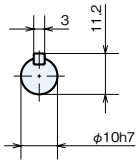
Lift (JWM002US)



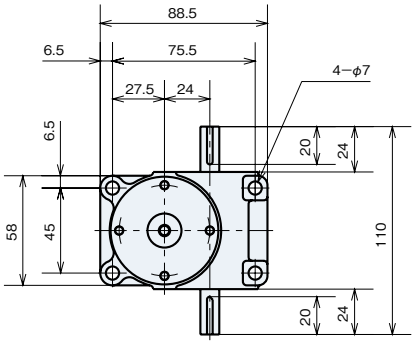
Suspend (JWM002DS)



●Input Shaft

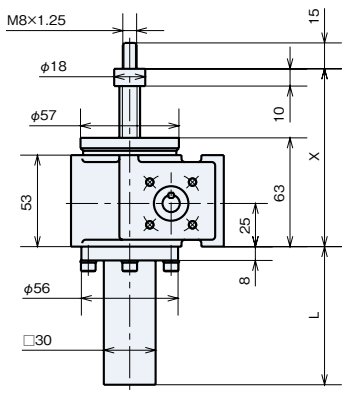


JWM002 Dimensions - Rotation Prevention Type

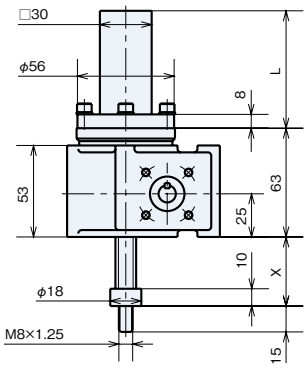


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	73	173	127	227	202	20	120	65	165	202	3.0
200	73	273	127	327	302	20	220	65	265	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

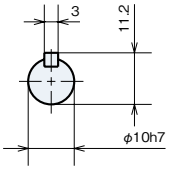
Lift (JWM002UM)



Suspend (JWM002DM)

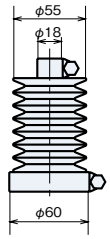


●Input Shaft

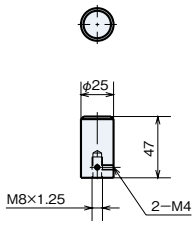


Output Options

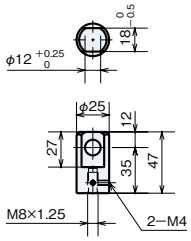
■Bellows (- J)



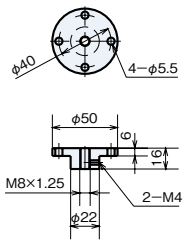
■Rod Type End Fitting (-B)



■I Type End Fitting (-I)

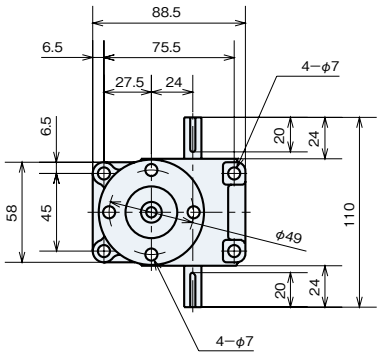


■Table Type End Fitting (-M)



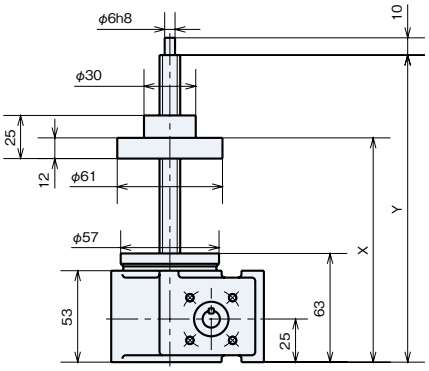
Note) For detailed measurements on units with bellows, see page 218.

JWM002 Dimensions - Travel Nut Type

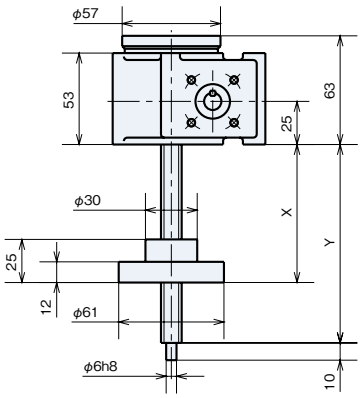


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	84	184	207	35	135	145	2.6
200	84	284	307	35	235	245	2.6
300	84	384	407	35	335	345	2.7
400	84	484	507	35	435	445	2.8

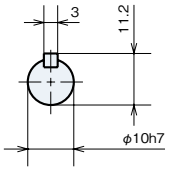
Lift (JWM002UR)



Suspend (JWM002DR)

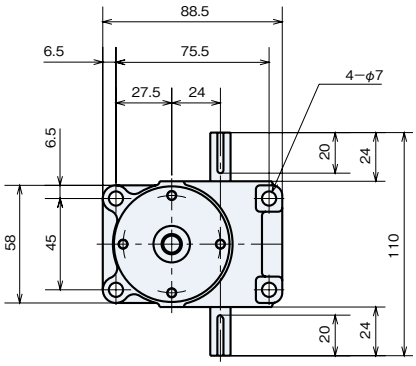


●Input Shaft



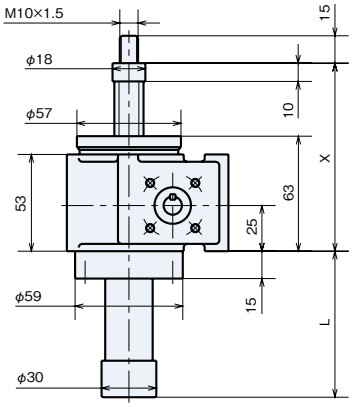
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWM005 Dimensions - Standard Model

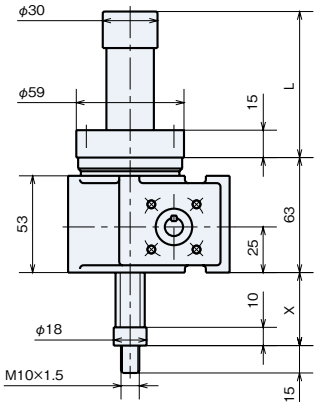


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	73	173	127	227	188	20	120	65	165	188	2.5
200	73	273	127	327	288	20	220	65	265	288	2.6
300	73	373	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

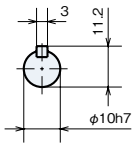
Lift (JWM005US)



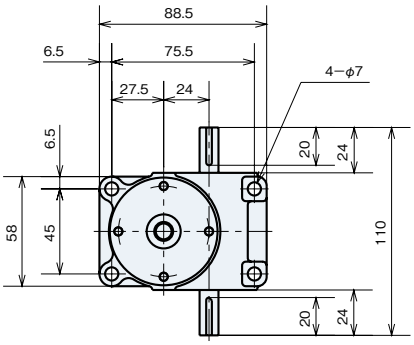
Suspend (JWM005DS)



●Input Shaft

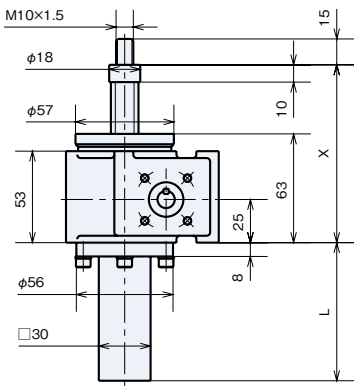


JWM005 Dimensions - Rotation Prevention Type

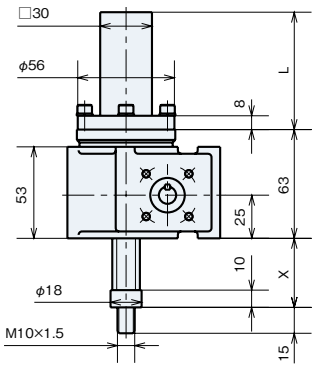


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	73	173	127	227	202	20	120	65	165	202	3.1
200	73	273	127	327	302	20	220	65	265	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

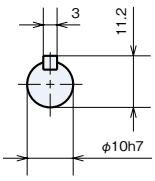
Lift (JWM005UM)



Suspend (JWM005DM)

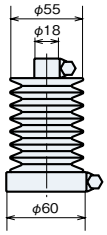


●Input Shaft

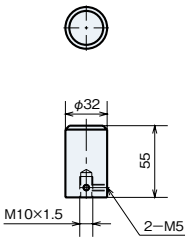


Output Options

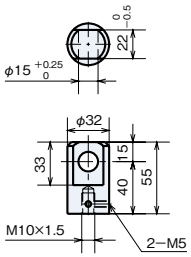
■Bellows (- J)



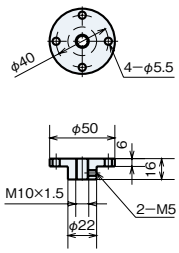
■Rod Type End Fitting (-B)



■I Type End Fitting (-I)

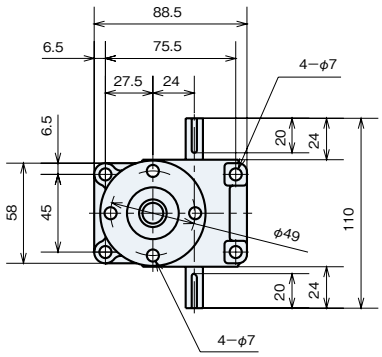


■Table Type End Fitting (-M)



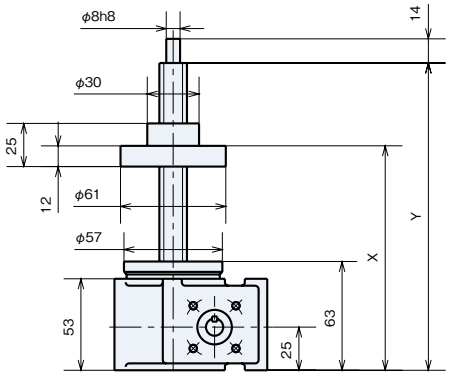
Note) For detailed measurements on units with bellows, see page 218.

JWM002 Dimensions - Travel Nut Type

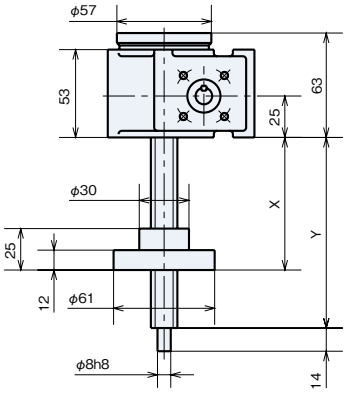


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	84	184	207	35	135	145	2.6
200	84	284	307	35	235	245	2.8
300	84	384	407	35	335	345	2.9
400	84	484	507	35	435	445	3.0
500	84	584	607	35	535	545	3.1
600	84	684	707	35	635	645	3.2
800	84	884	907	35	835	845	3.5

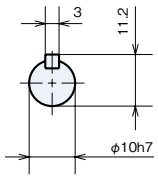
Lift (JWM002UR)



Suspend (JWM002DR)

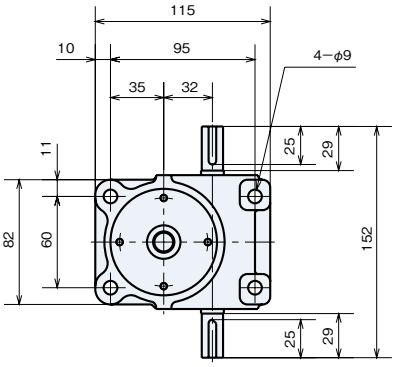


●Input Shaft



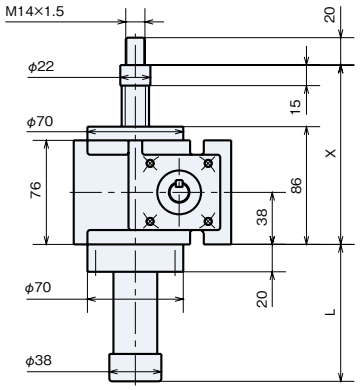
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWM010 Dimensions - Standard Model

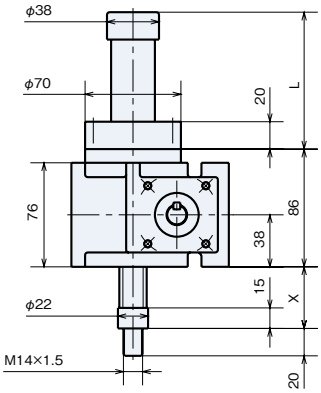


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	101	201	161	261	194	25	125	75	175	194	5.5
200	101	301	161	361	294	25	225	75	275	294	5.7
300	101	401	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

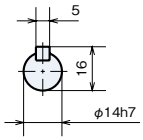
Lift (JWM010US)



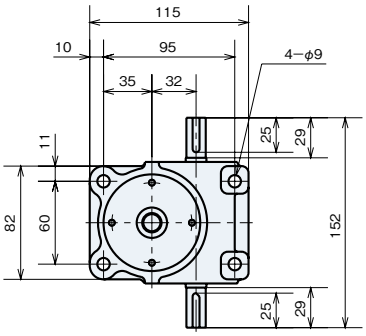
Suspend (JWM010DS)



●Input Shaft

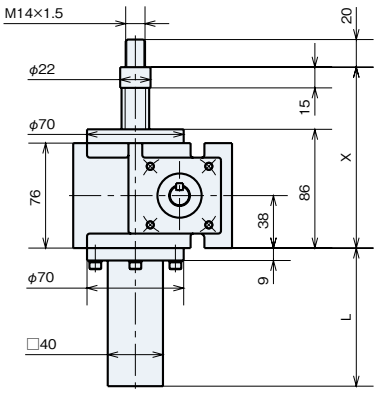


JWM010 Dimensions - Rotation Prevention Type

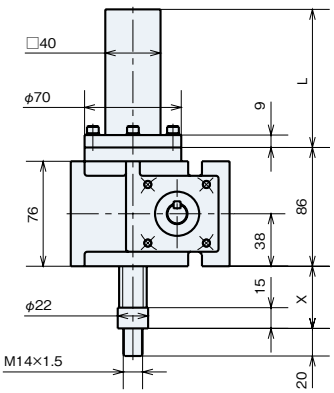


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	101	201	161	261	213	25	125	75	175	213	6.6
200	101	301	161	361	313	25	225	75	275	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

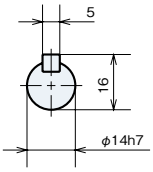
Lift (JWM010UM)



Suspend (JWM010DM)

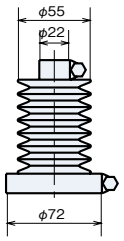


●Input Shaft

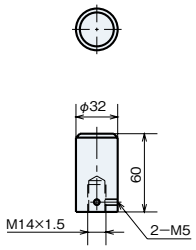


Output Options

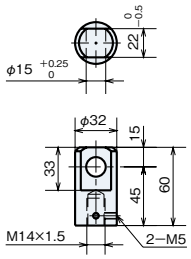
■Bellows (- J)



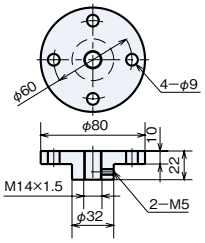
■Rod Type End Fitting (-B)



■I Type End Fitting (-I)

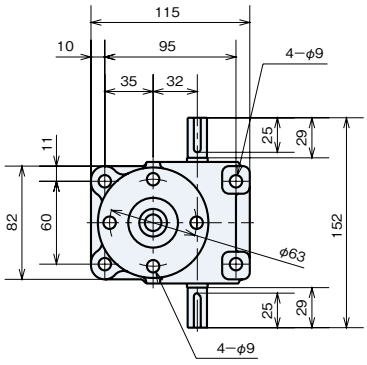


■Table Type End Fitting (-M)



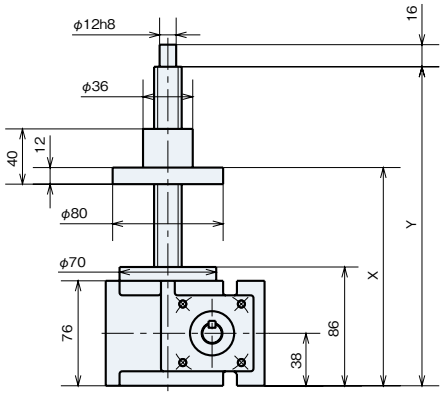
Note) For detailed measurements on units with bellows, see page 218.

JWM010 Dimensions - Travel Nut Type

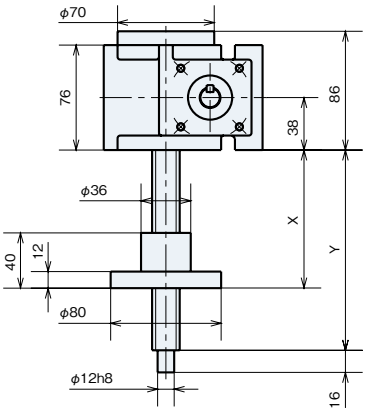


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	108	208	246	50	150	160	5.9
200	108	308	346	50	250	260	6.1
300	108	408	446	50	350	360	6.2
400	108	508	546	50	450	460	6.4
500	108	608	646	50	550	560	6.6
600	108	708	746	50	650	660	6.8
800	108	908	946	50	850	860	7.2
1000	108	1108	1146	50	1050	1060	7.6

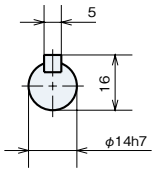
Lift (JWM010UR)



Suspend (JWM010DR)

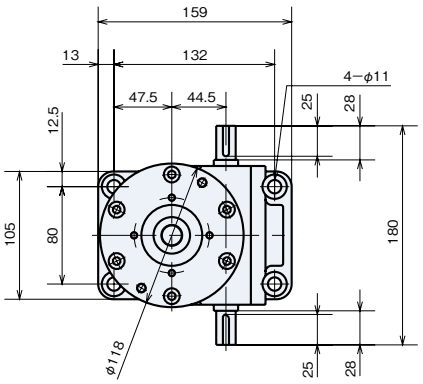


●Input Shaft



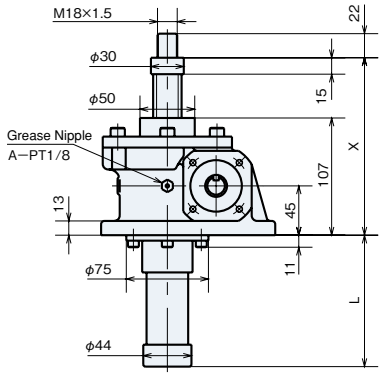
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWM025 Dimensions - Standard Model

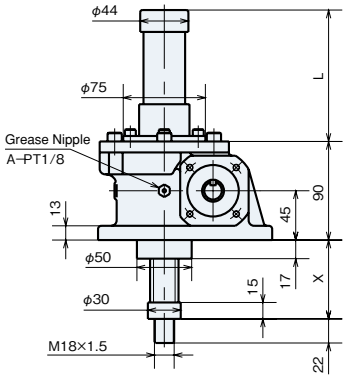


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	132	232	147	247	149	42	142	57	157	149	7.7
200	132	332	147	347	249	42	242	57	257	249	8.1
300	132	432	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

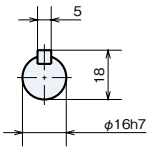
Lift (JWM025US)



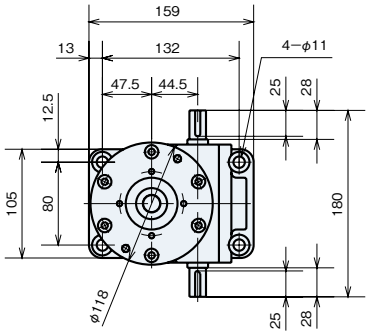
Suspend (JWM025DS)



●Input Shaft

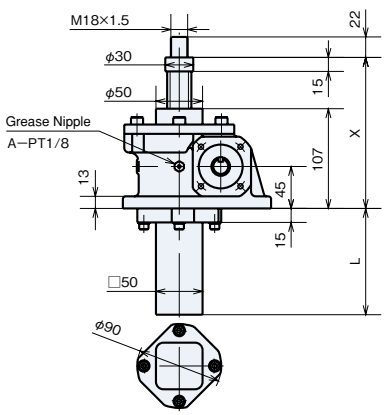


JWM025 Dimensions - Rotation Prevention Type

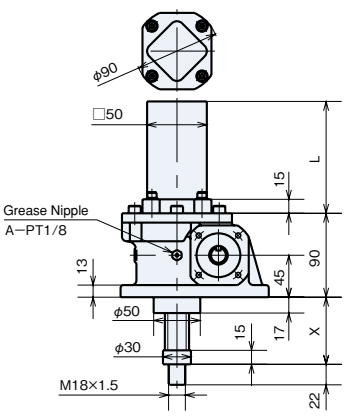


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	132	232	147	247	181	42	142	57	157	181	10
200	132	332	147	347	281	42	242	57	257	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

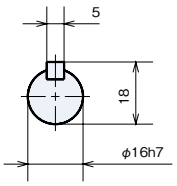
Lift (JWM025UM)



Suspend (JWM025DM)

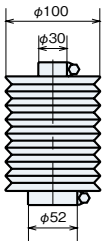


●Input Shaft

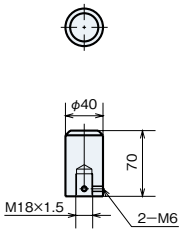


Output Options

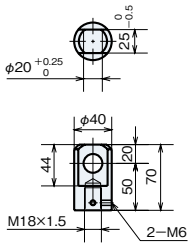
■Bellows (- J)



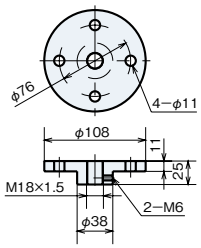
■Rod Type End Fitting (-B)



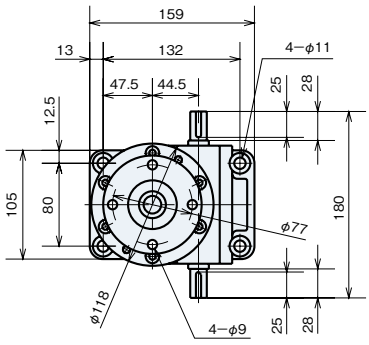
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

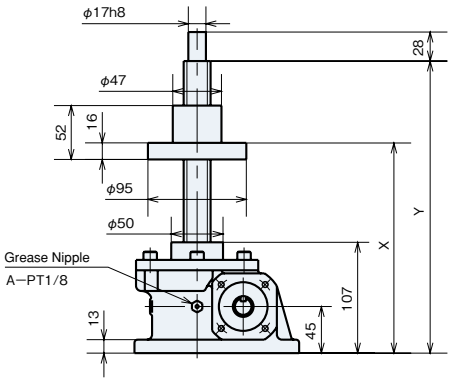


JWM025 Dimensions - Travel Nut Type

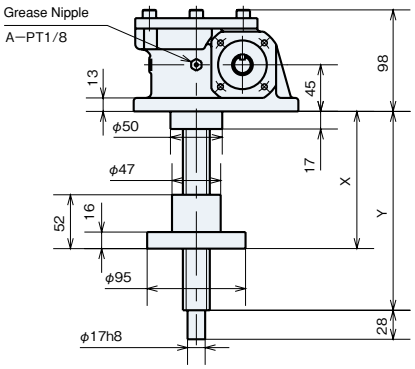


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	133	233	279	79	179	189	9.2
200	133	333	379	79	279	289	9.5
300	133	433	479	79	379	389	9.9
400	133	533	579	79	479	489	11
500	133	633	679	79	579	589	11
600	133	733	779	79	679	689	11
800	133	933	979	79	879	889	12
1000	133	1133	1179	79	1079	1089	13
1200	133	1333	1379	79	1279	1289	13

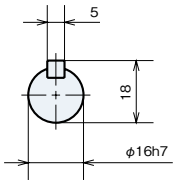
Lift (JWM025UR)



Suspend (JWM025DR)

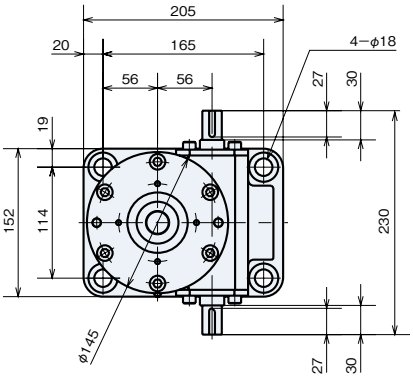


●Input Shaft



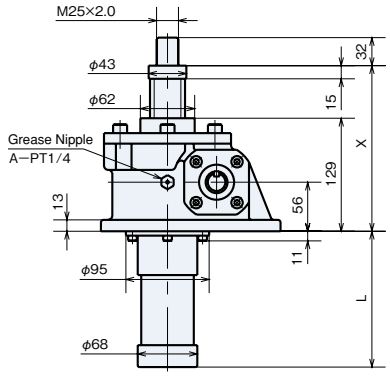
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWM050 Dimensions - Standard Model

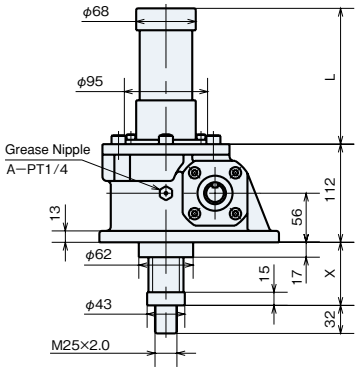


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	154	254	169	269	147	42	142	57	157	147	18
200	154	354	169	369	247	42	242	57	257	247	19
300	154	454	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

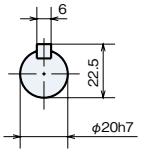
Lift (JWM050US)



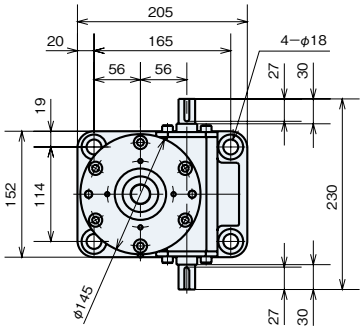
Suspend (JWM050DS)



●Input Shaft

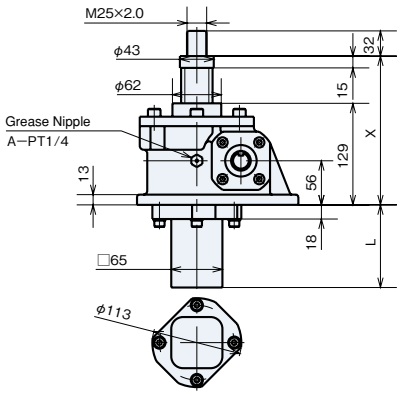


JWM050 Dimensions - Rotation Prevention Type

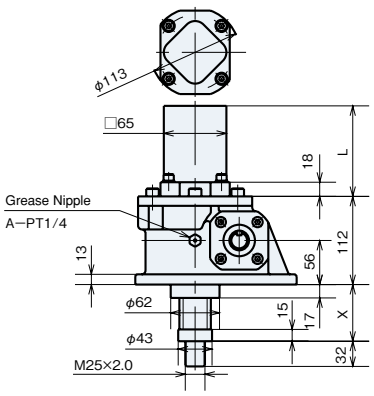


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	154	254	169	269	196	42	142	57	157	196	22
200	154	354	169	369	296	42	242	57	257	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

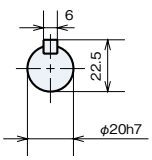
Lift (JWM050UM)



Suspend (JWM050DM)

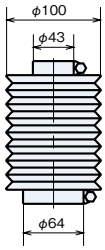


●Input Shaft

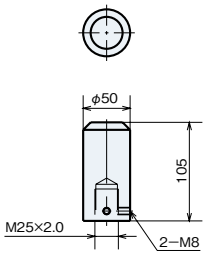


Output Options

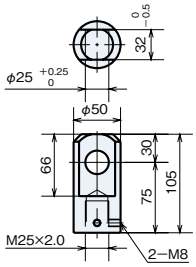
■Bellows (- J)



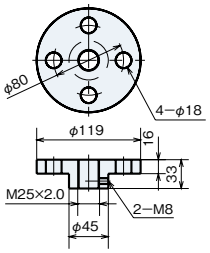
■Rod Type End Fitting (-B)



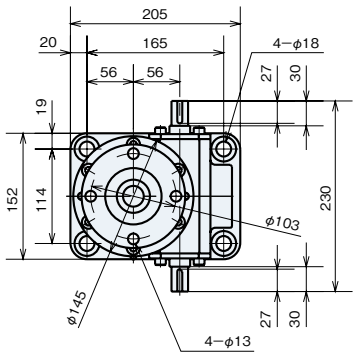
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

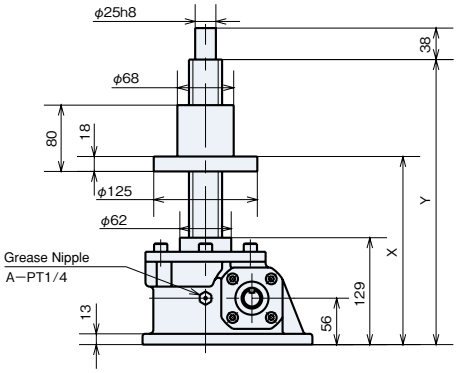


JWM050 Dimensions - Travel Nut Type

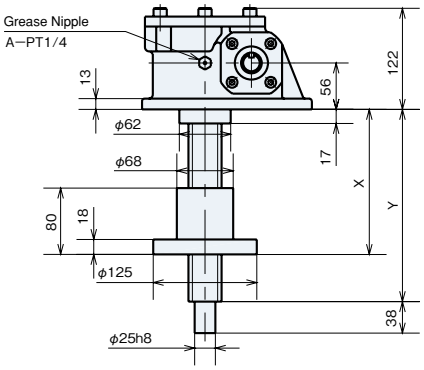


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	157	257	330	107	207	218	22
200	157	357	430	107	307	318	22
300	157	457	530	107	407	418	23
400	157	557	630	107	507	518	24
500	157	657	730	107	607	618	25
600	157	757	830	107	707	718	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

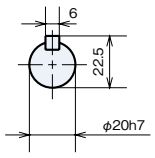
Lift (JWM050UR)



Suspend (JWM050DR)

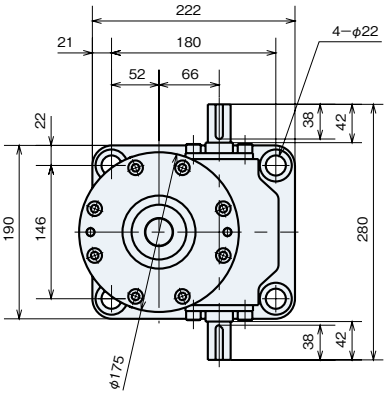


●Input Shaft



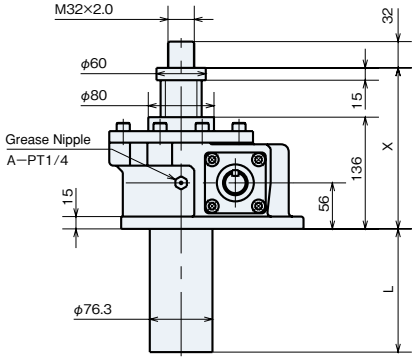
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWM100 Dimensions - Standard Model

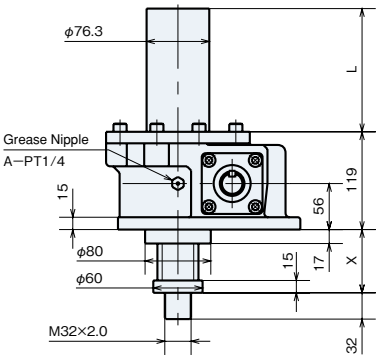


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	161	261	171	271	151	42	142	52	152	151	27
200	161	361	171	371	252	42	242	52	252	252	29
300	161	461	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

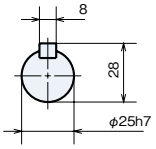
Lift (JWM100US)



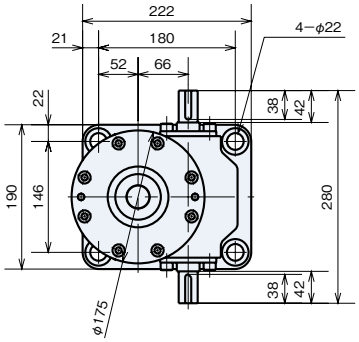
Suspend (JWM100DS)



●Input Shaft

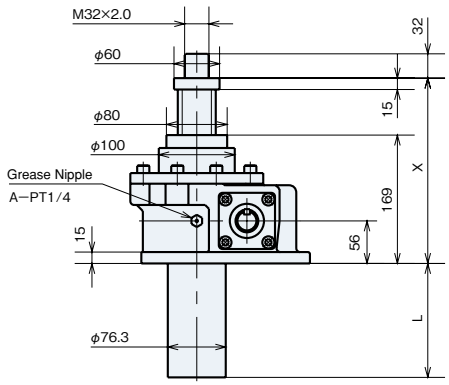


JWM100 Dimensions - Rotation Prevention Type

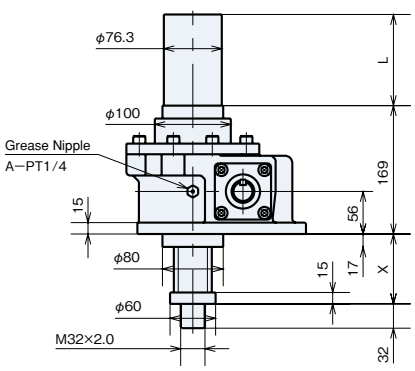


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	194	294	204	304	151	42	142	52	152	151	30
200	194	394	204	404	252	42	242	52	252	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

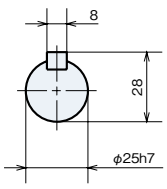
Lift (JWM100UM)



Suspend (JWM100DM)

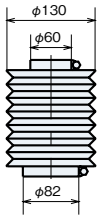


●Input Shaft

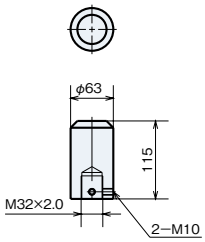


Output Options

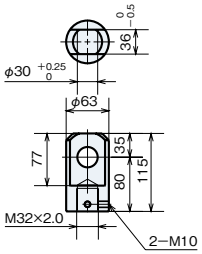
■Bellows (- J)



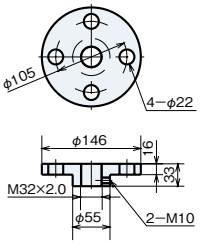
■Rod Type End Fitting (-B)



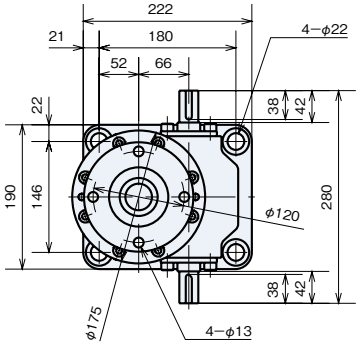
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

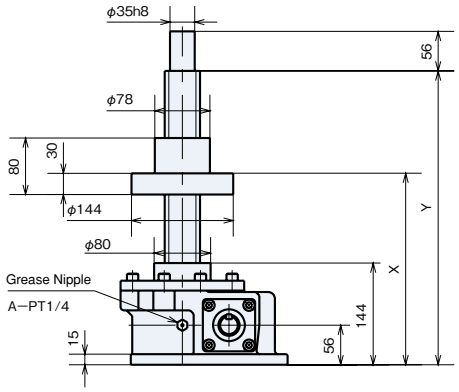


JWM100 Dimensions - Travel Nut Type

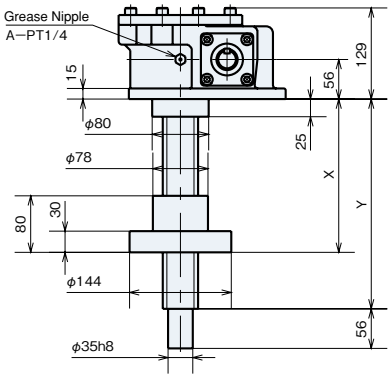


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	184	284	344	115	215	225	32
200	184	384	444	115	315	325	33
300	184	484	544	115	415	425	34
400	184	584	644	115	515	525	36
500	184	684	744	115	615	625	37
600	184	784	844	115	715	725	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

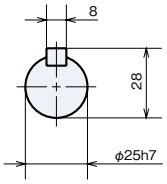
Lift (JWM100UR)



Suspend (JWM100DR)

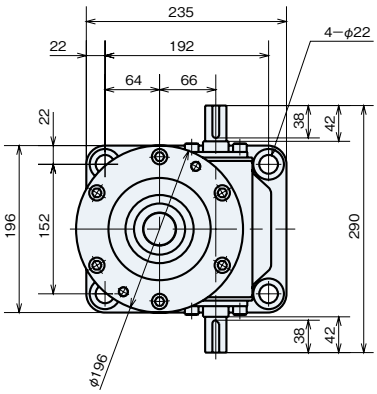


●Input Shaft



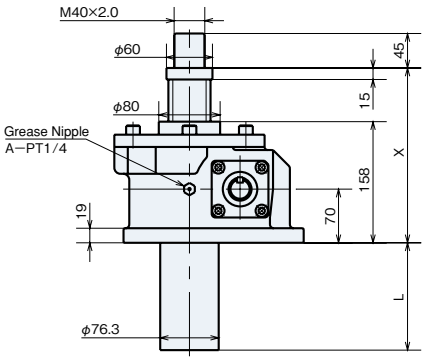
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWM150 Dimensions - Standard Model

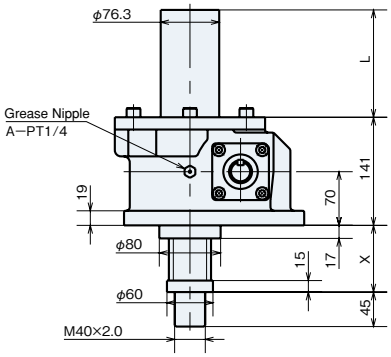


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	183	283	193	293	151	42	142	52	152	151	33
200	183	383	193	393	252	42	242	52	252	252	35
300	183	483	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

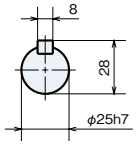
Lift (JWM150US)



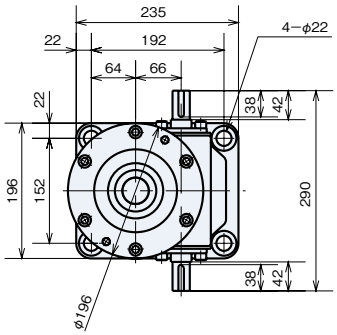
Suspend (JWM150DS)



●Input Shaft

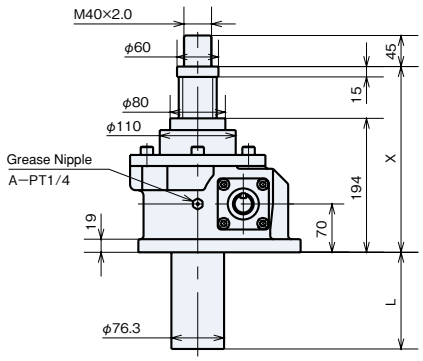


JWM150 Dimensions - Rotation Prevention Type

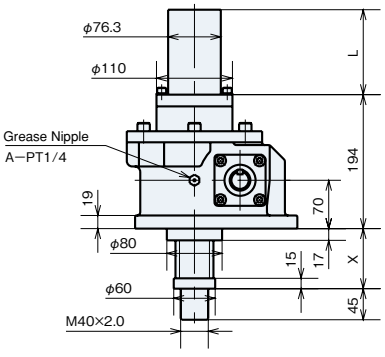


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	219	319	229	329	151	42	142	52	152	151	37
200	219	419	229	429	252	42	242	52	252	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

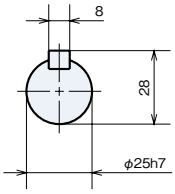
Lift (JWM150UM)



Suspend (JWM150DM)

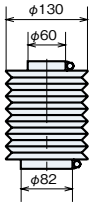


●Input Shaft

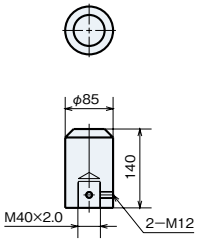


Output Options

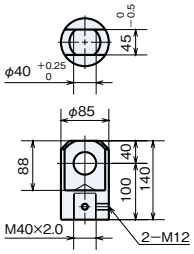
■Bellows (- J)



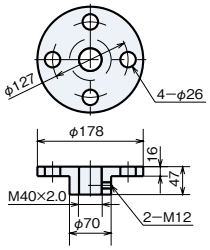
■Rod Type End Fitting (-B)



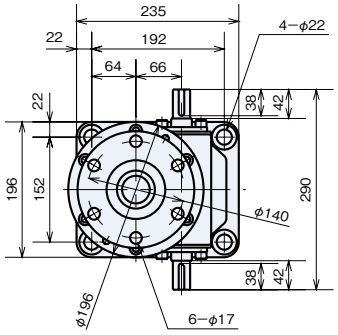
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

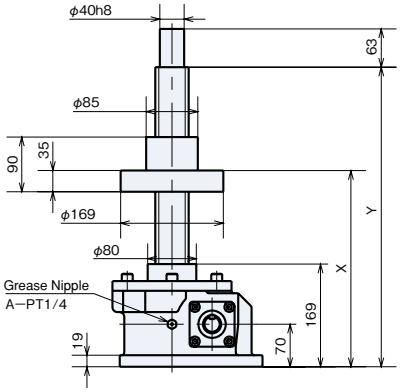


JWM150 Dimensions - Travel Nut Type

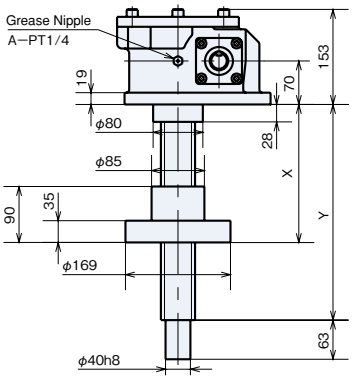


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	214	314	379	128	228	239	40
200	214	414	479	128	328	339	42
300	214	514	579	128	428	439	43
400	214	614	679	128	528	539	45
500	214	714	779	128	628	639	46
600	214	814	879	128	728	739	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

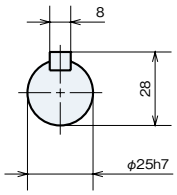
Lift (JWM150UR)



Suspend (JWM150DR)

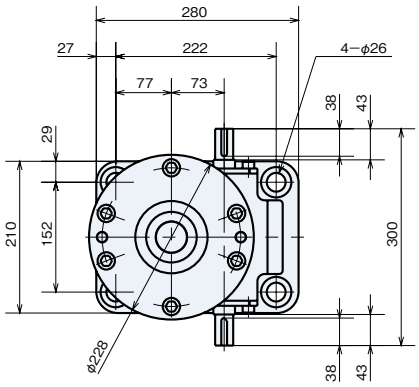


●Input Shaft



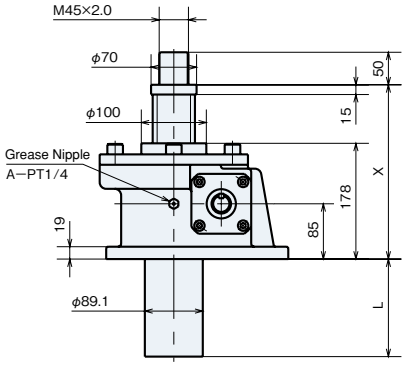
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWM200 Dimensions - Standard Model

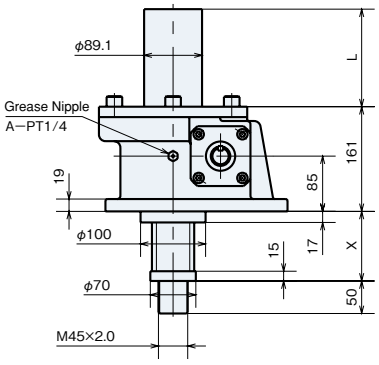


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	203	303	213	313	136	42	142	52	152	136	42
200	203	403	213	413	236	42	242	52	252	236	45
300	203	503	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

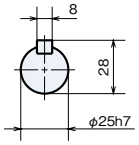
Lift (JWM200US)



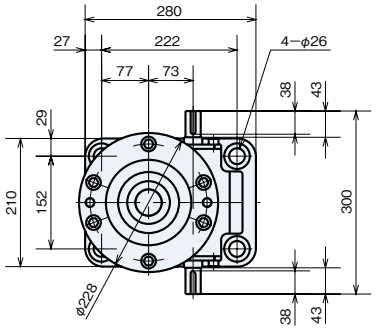
Suspend (JWM200DS)



●Input Shaft

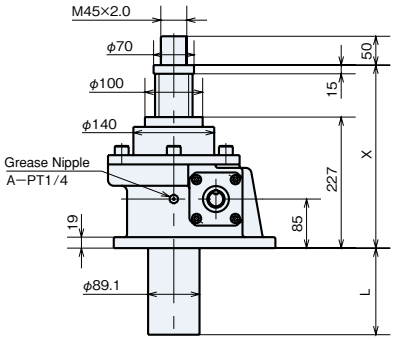


JWM200 Dimensions - Rotation Prevention Type

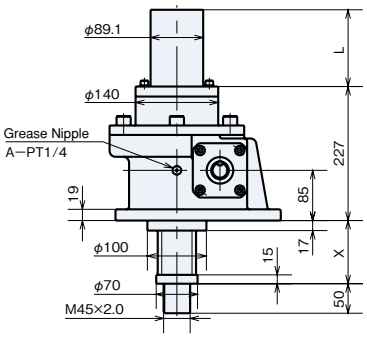


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	252	352	262	362	136	42	142	52	152	136	51
200	252	452	262	462	236	42	242	52	252	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

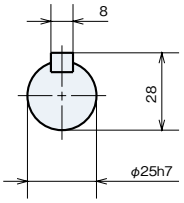
Lift (JWM200UM)



Suspend (JWM200DM)

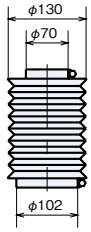


●Input Shaft

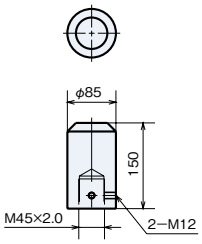


Output Options

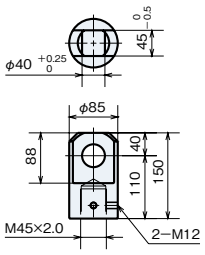
■Bellows (- J)



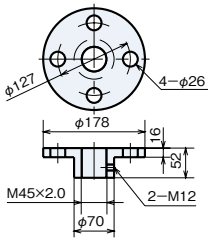
■Rod Type End Fitting (-B)



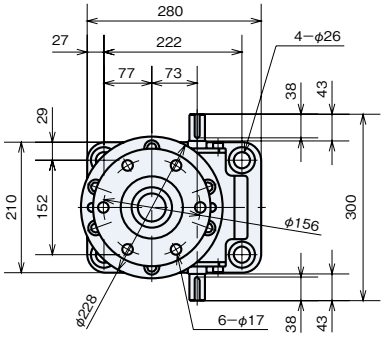
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

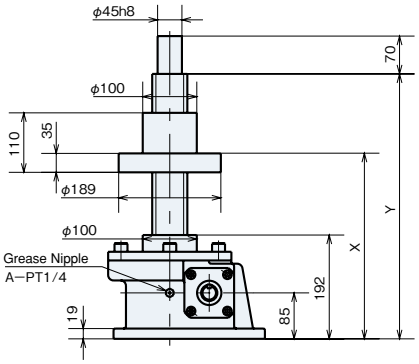


JWM200 Dimensions - Travel Nut Type

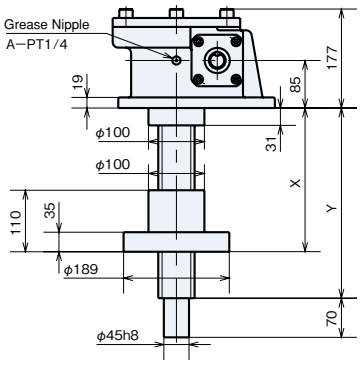


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	237	337	422	151	251	261	56
200	237	437	522	151	351	361	58
300	237	537	622	151	451	461	60
400	237	637	722	151	551	561	62
500	237	737	822	151	651	661	64
600	237	837	922	151	751	761	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

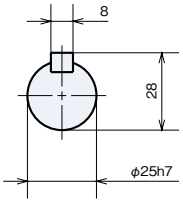
Lift (JWM200UR)



Suspend (JWM200DR)



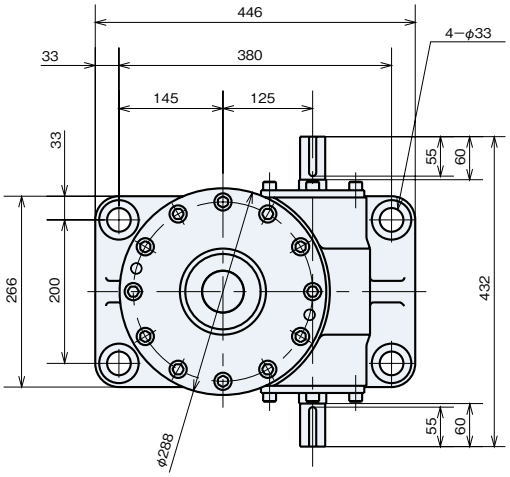
●Input Shaft



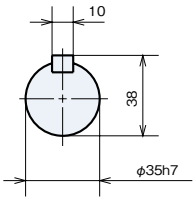
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWM300 Dimensions - Standard Model

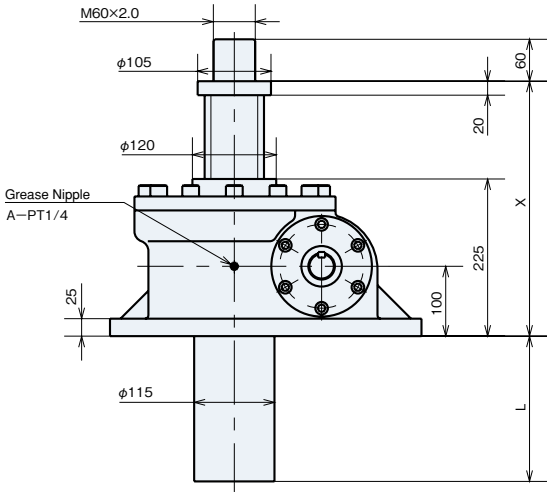
Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	255	355	265	365	135	55	155	65	165	135	118
200	255	455	265	465	235	55	255	65	265	235	123
300	255	555	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



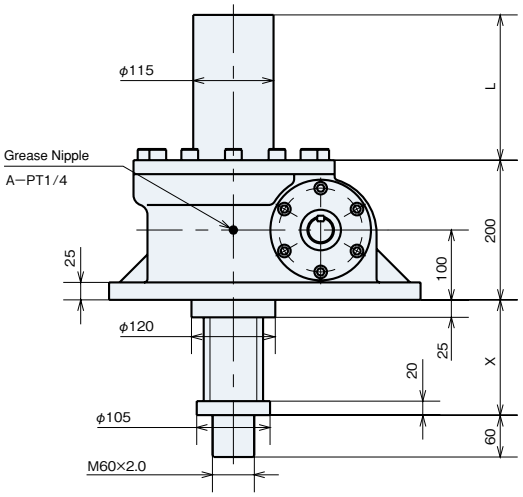
●Input Shaft



Lift (JWM300US)

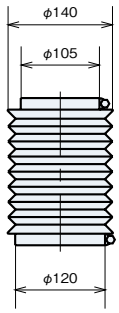


Suspend (JWM300DS)

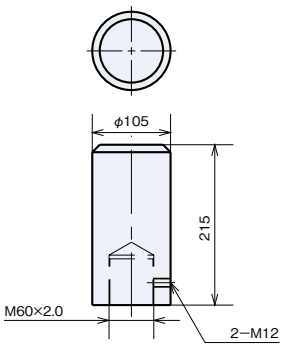


Output Options

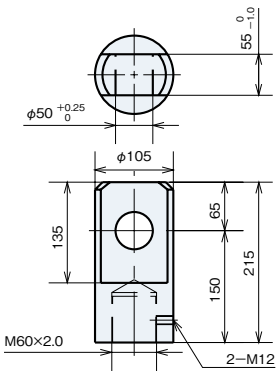
■Bellows (- J)



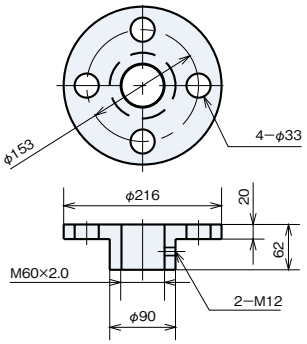
■Rod Type End Fitting (-B)



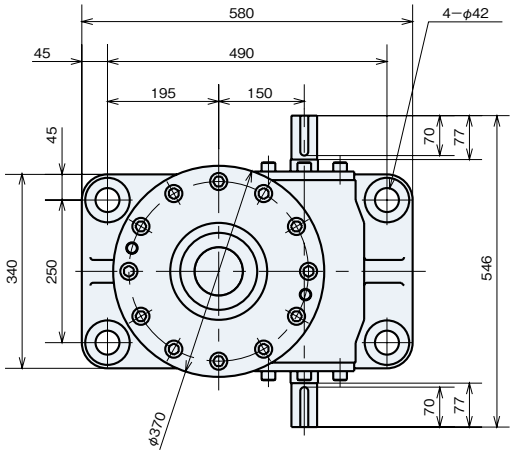
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

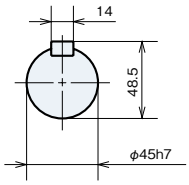


JWM500 Dimensions - Standard Model

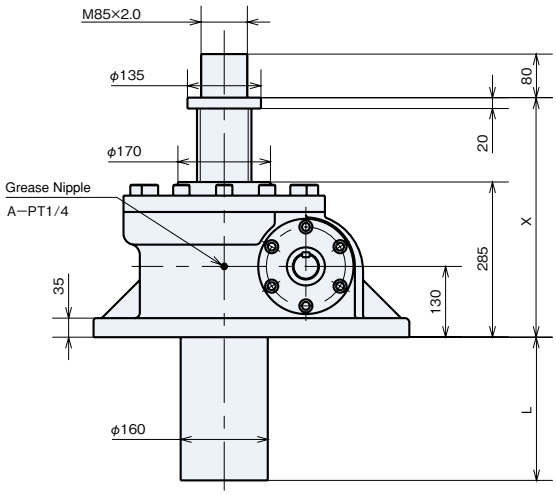


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	315	415	320	420	137	55	155	60	160	137	248
200	315	515	320	520	237	55	255	60	260	237	260
300	315	615	340	640	357	55	355	80	380	357	273
400	315	715	340	740	457	55	455	80	480	457	284
500	315	815	350	850	567	55	555	90	590	567	297
600	315	915	350	950	667	55	655	90	690	667	308
800	315	1115	365	1165	882	55	855	105	905	882	332
1000	315	1315	380	1380	1097	55	1055	120	1120	1097	357
1200	315	1515	390	1590	1307	55	1255	130	1330	1307	380
1500	315	1815	410	1910	1627	55	1555	150	1650	1627	417
2000	315	2315	445	2445	2162	55	2055	185	2185	2162	477

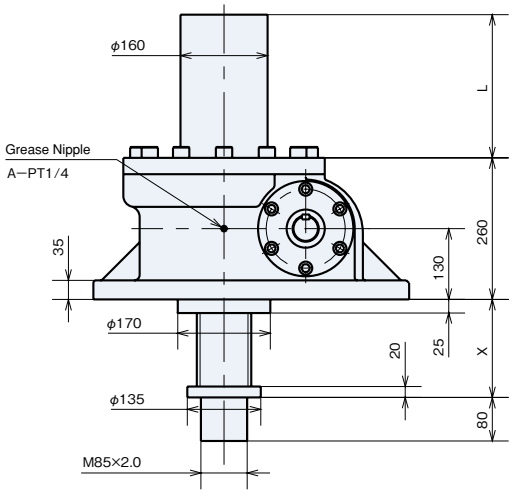
●Input Shaft



Lift (JWM500US)

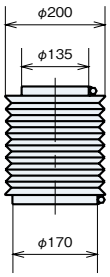


Suspend (JWM500DS)

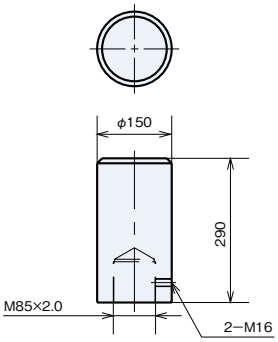


Output Options

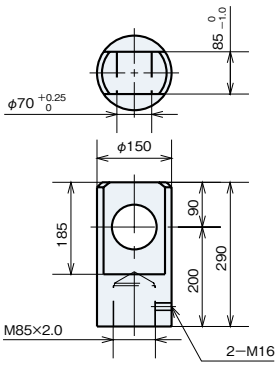
■Bellows (- J)



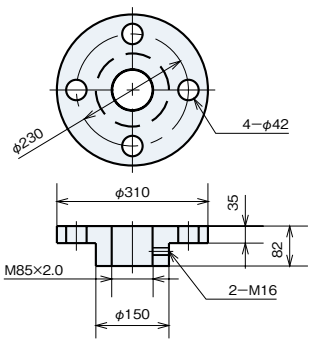
■Rod Type End Fitting (-B)



■I Type End Fitting (-I)



■Table Type End Fitting (-M)



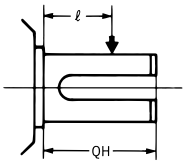
⚠ Warning

■ 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 123.
- ● 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.

$$\text{Allowable O. H. L.} \geqq \frac{T \times f \times Lf}{R}$$

O.H.L. : Overhang load N {kgf}
T : Input torque N・m {kgf・m}
f : Coefficient - power transmission element
Lf : 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 (Lf) – Load Position

ℓ /QH	0.25	0.38	0.5	0.75	1
Lf	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) H Speed	N	99	200	380	710	1500	2270	3160	4320	6110	10100	13900	18000
	{kgf}	{10}	{21}	{39}	{73}	{153}	{232}	{323}	{441}	{624}	{1030}	{1420}	{1840}
JWM (Machine Screw Type) L Speed	N	63	120	220	420	820	1430	1950	2800	4400	6650	9390	13200
	{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	−15～80℃ (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 223.
- ● 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.

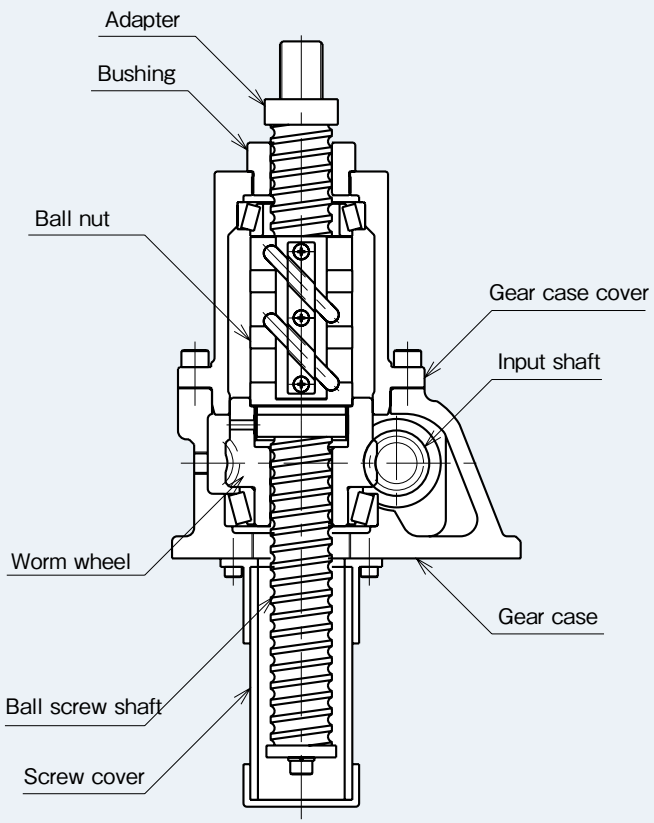
Linipower Jack

JWB (Ball Screw Type)

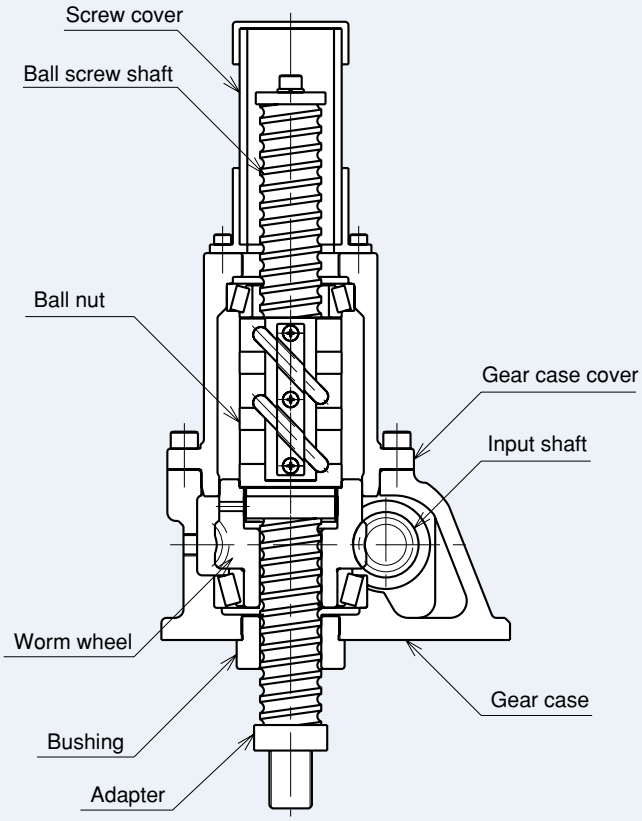
Drawings

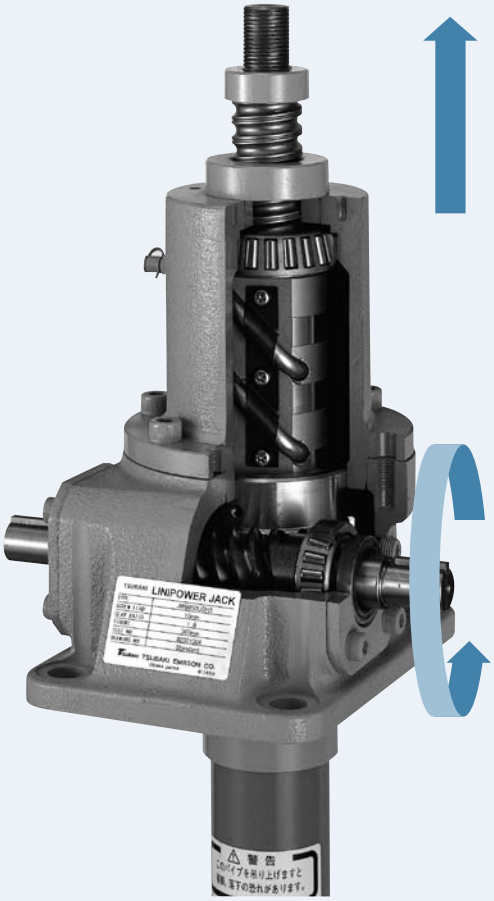
JWB (Ball Screw Type) Standard Model

Standard Use for Lifting



Standard Use for Suspending

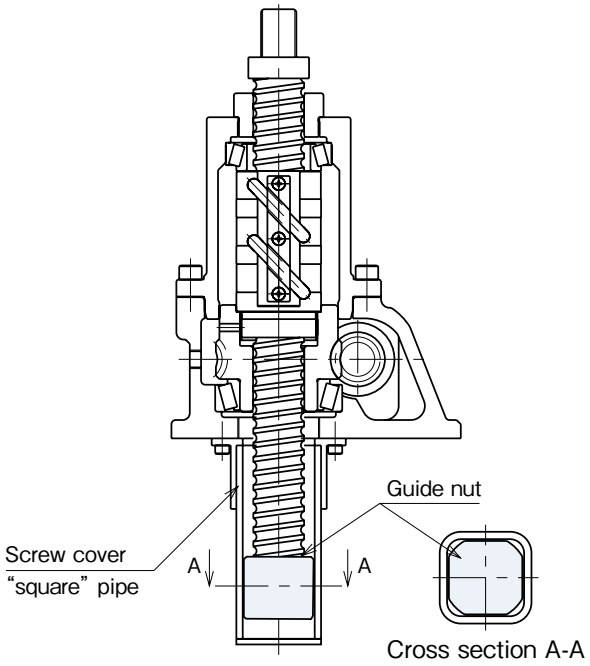




JWB (Ball Screw Type) Rotation Prevention Type

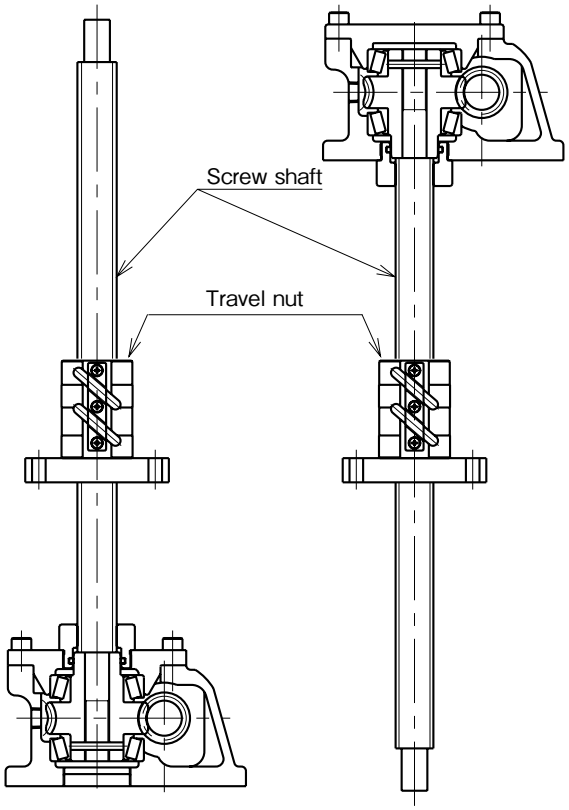
JWB005～200

〈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)

JW	B	050	US	H	10	U	JM	C	K4P	G2

Linipower Jack

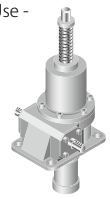
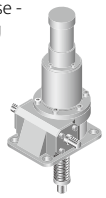
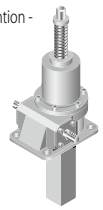
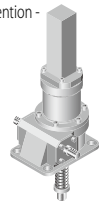
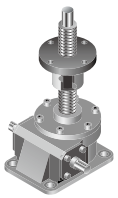
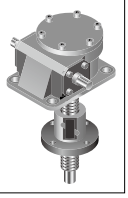
Jack Type
B : Ball screw

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}

*JWB750 and 1000 are manufactured upon inspecting specific needs.

Installation Type

US	Standard Use - Lifting	
DS	Standard Use - Suspending	
UM	Rotation Prevention - Lifting	
DM	Rotation Prevention - Suspending	
UR	Travel Nut - Lifting	
DR	Travel Nut - Suspending	

*Be sure to use the flange installation method U or D with travel nuts.

Stroke mm

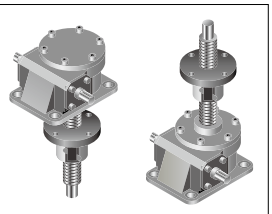
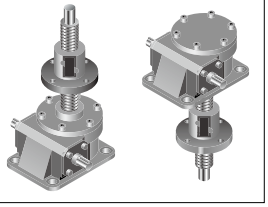
1	100
3	300
6	600
10	1000

*The above values are examples. For actual stroke used, refer to the Model comparison Table for JWB on page 115.

Gear Ratio

Symbol / 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	$10\frac{2}{3}$	32
500	$10\frac{2}{3}$	32
750	$10\frac{2}{3}$	32
1000	12	36

Flange Installation

U	
D	

*Above are only necessary with travel nuts.

Examples)

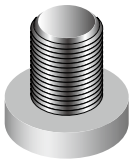
JWB100UMH3

• Machine Screw Type • 98.0kN {10tf} • Rotation prevention (for lifting) • Gear ratio H (1/8) • Stroke 300mm

JWB050USH10JMK4PG2

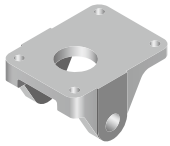
• Machine Screw Type • 49.0kN {5tf} • Standard use (for lifting) • Gear ratio H (1/6) • Stroke 1000mm
• Bellows • Table Type End Fitting • 4 Internal LS • Potentiometer
• 3 Phase motor with brake and gear; reducer ratio of 1/10

Output Option

No symbol	Screw Shaft End (standard) 
J	Bellows 
B	Rod Type End Fitting 
I	I Type End Fitting 
M	Table Type End Fitting 

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 219 to contact Tsubaki Emerson.

Installation Option

C	Clevis Mounting Adapter  (See page 215)

Note) For standard lifting only.

Sensor Option

Y	LS Counter  (See page 209)
K2 K4 P R	Position Sensor K2・・・2 Internal LS K4・・・4 Internal LS P・・・・Potentiometer R・・・・Rotary Encoder  (See page 211)

Note) To request the above parts, provide their letter symbols in the order given.

Input Option

E EV	3 phase brake and motor E・・・・200V 50Hz 200/220V 60Hz EV・・・400 50Hz 400/440V 60Hz  (See page 199～)
G1 G2	3 phase brake and gear-motor G1・・・Gear ratio 1/5 200V 50Hz 200/220V 60Hz G2・・・Reducer ratio 200V 50Hz 200/220V 60Hz  (See page 199～)

Accessories

Control Options

Stroke Meter and PCB 

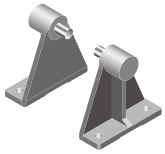
Meter Relay and PCB 

R Controller 

Pulse Counter 

(See page 212～)

Others

Trunnion Mounting Adapter 

* Use as a set with clevis mounting adapter.

(See page 215)

Reference Table for Standard Use JWB (Ball Screw Type)

Frame No.		JWB005	JWB010	JWB025	JWB050	JWB100
Basic Capacity	kN {tf}	4.90 {0.5}	9.80 {1}	24.5 {2.5}	49.0 {5}	98.0 {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 nput Capacity kW	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 {kg·m}	0.11 {0.011}	0.29 {0.03}	0.62 {0.063}	1.37 {0.14}	1.96 {0.2}
Holding Torque N·m {kgf·m}	H Speed	0.69 {0.07}	1.27 {0.13}	4.31 {0.44}	10.78 {1.1}	19.6 {2.0}
	L Speed	0.14 {0.014}	0.26 {0.027}	0.91 {0.093}	2.4 {0.24}	5.8 {0.59}
Allowable Input Torque *Note 1	N·m {kg·m}	9.8 {1}	19.6 {2}	49.0 {5}	153.9 {15.7}	292.0 {29.8}
Required Input Torque for Basic Capacity *Note 2 N・m {kgf・m}	H Speed	1.3 {0.14}	2.8 {0.29}	9.0 {0.92}	21.5 {2.2}	39.1 {4.0}
	L Speed	0.62 {0.06}	1.4 {0.15}	4.3 {0.44}	9.6 {0.98}	20.4 {2.1}
Screw Movement/ per Revolution of Input Shaft mm	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 r/min	H Speed	1800	1800	1800	1800	1800
	L Speed	1800	1800	1800	1800	1800
Max. Input rpm for Basic Capacity r/min	H Speed	1800	1800	1400	1000	890
	L Speed	1800	1800	1400	1000	890
Screw Shaft Rotational Torque for Basic Capacity	N・m {kgf・m}	4.3 {0.44}	8.7 {0.88}	34.7 {3.5}	86.7 {8.8}	208.2 {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	−15～80℃ (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 {15}	196 {20}	294 {30}	490 {50}	735 {75}	980 {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 {0.27}	3.92 {0.4}	9.81 {1}	19.6 {2}	29.4 {3}	39.2 {4}
39.2 {4.0}	51.0 {5.2}	68.6 {7.0}	140.1 {14.3}	210.7 {21.5}	362.6 {37}
11.8 {1.2}	15.0 {1.53}	19.5 {1.99}	41.2 {4.2}	59.8 {6.1}	99.0 {10.1}
292.0 {29.8}	292.0 {29.8}	735.0 {75}	1372.0 {140}	1764.0 {180}	2450.0 {250}
77.0 {7.8}	104.5 {10.7}	169.6 {17.3}	317.5 {32.4}	511.2 {52.1}	810.2 {82.6}
39.6 {4.0}	54.2 {5.5}	98.5 {10.0}	177.9 {18.1}	290.8 {29.6}	486.9 {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 {42.4}	555.1 {56.6}	1040.9 {106.1}	2081.7 {212.2}	3252.7 {331.6}	5551.3 {565.9}
Steel Pipe					
Screw: Grease　Reducer Unit: Grease Bath					
Tsubaki Olive Grey (Munsell 5GY6/0.5)					
−15～80℃ (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					

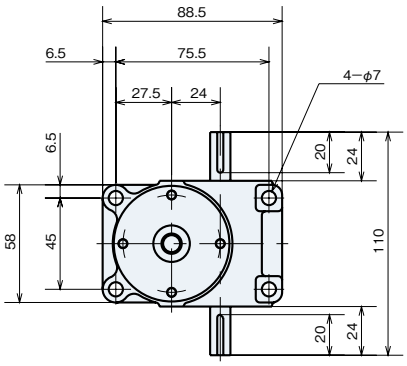
7. Since JWB (Ball Screw Type) is highly efficient, sufficient brake that over powers the "holding torque" is required to sustain its shaft.

⚠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.

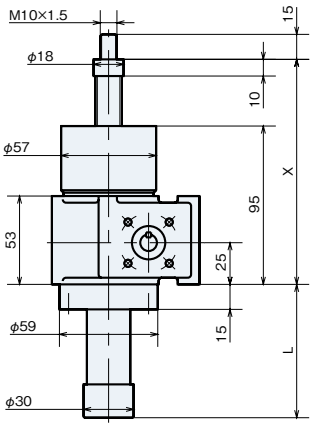
10. Input shaft key is provided with each unit.
(Key complies with JIS B 1301-1996 standards.)

JWB005 Dimensions - Standard Model

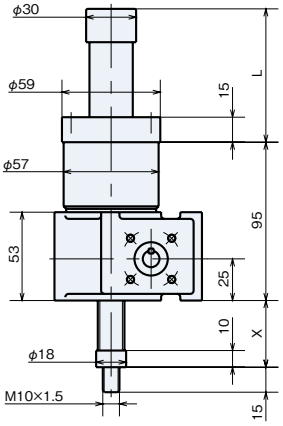


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	115	215	160	260	188	20	120	65	165	188	3.0
200	115	315	160	360	288	20	220	65	265	288	3.2
300	115	415	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

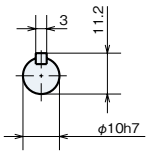
Lift (JWB005US)



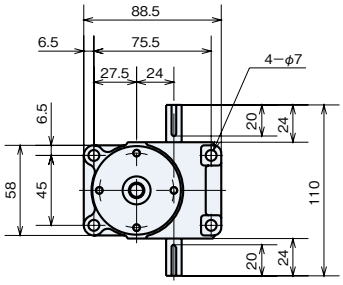
Suspend (JWB005DS)



●Input Shaft

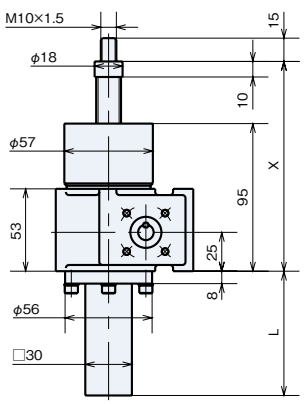


JWB005 Dimensions - Rotation Prevention Type

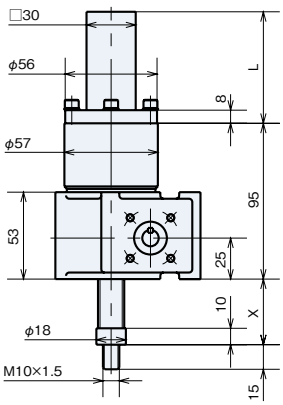


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	115	215	160	260	202	20	120	65	165	202	3.5
200	115	315	160	360	302	20	220	65	265	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

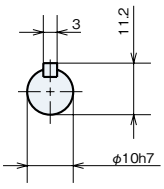
Lift (JWB005UM)



Suspend (JWB005DM)

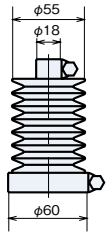


●Input Shaft

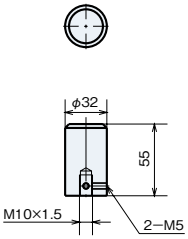


Output Options

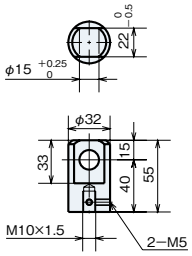
■Bellows (- J)



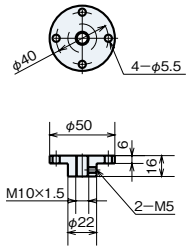
■Rod Type End Fitting (-B)



■I Type End Fitting (-I)

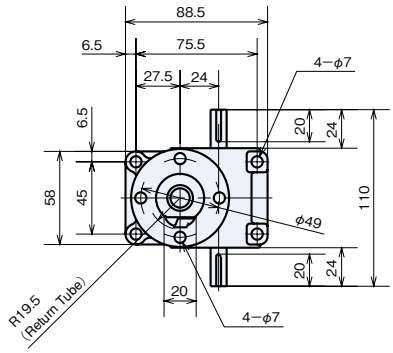


■Table Type End Fitting (-M)



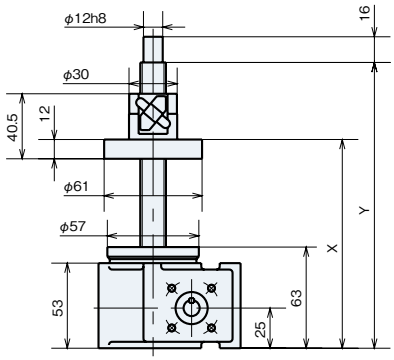
Note) For detailed measurements on units with bellows, see page 218.

JWB005 Dimensions - Travel Nut Type

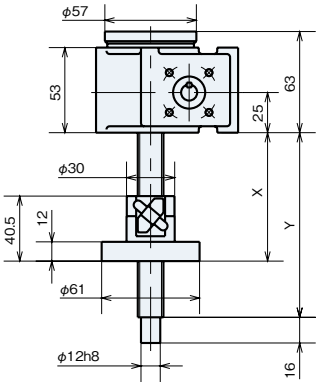


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	84	184	224	51	151	162	2.7
200	84	284	324	51	251	262	2.8
300	84	384	424	51	351	362	2.9
400	84	484	524	51	451	462	3.1
500	84	584	624	51	551	562	3.2
600	84	684	724	51	651	662	3.3
800	84	884	924	51	851	862	3.6

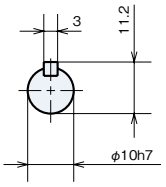
Lift (JWB005UR)



Suspend (JWB005DR)



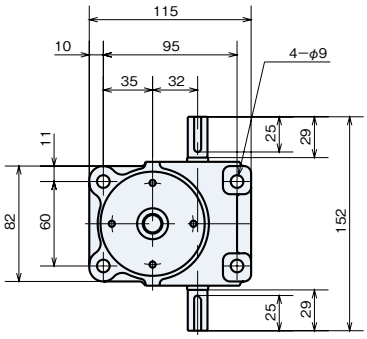
●Input Shaft



Note) Ball nut return tube and travel flange openings may vary from this drawing.
Note the return tube measurements when installing to equipment.

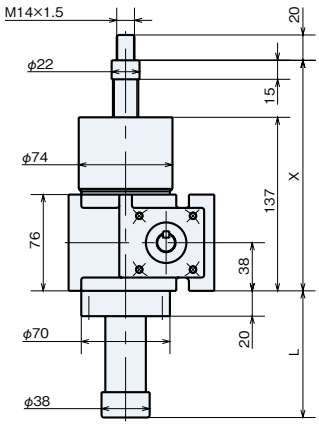
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWB010 Dimensions - Standard Model

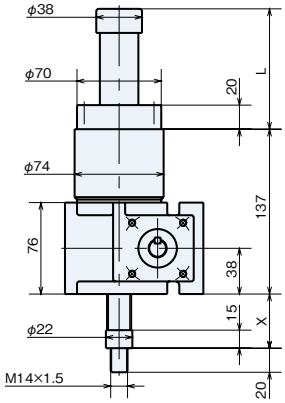


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	162	262	212	312	194	25	125	75	175	194	6.7
200	162	362	212	412	294	25	225	75	275	294	7.0
300	162	462	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

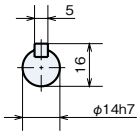
Lift (JWB010US)



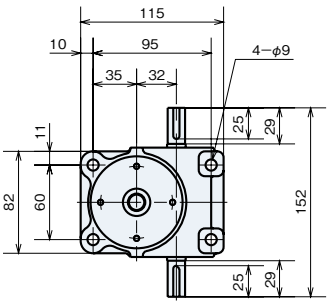
Suspend (JWB010DS)



●Input Shaft

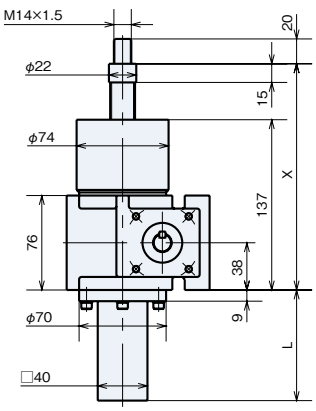


JWB010 Dimensions - Rotation Prevention Type

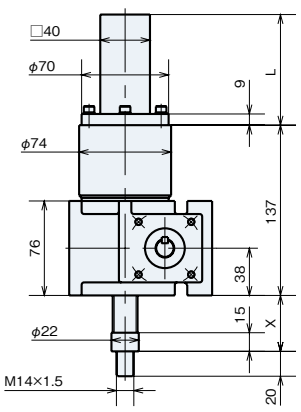


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	162	262	212	312	213	25	125	75	175	213	7.5
200	162	362	212	412	313	25	225	75	275	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

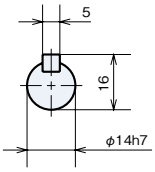
Lift (JWB010UM)



Suspend (JWB010DM)

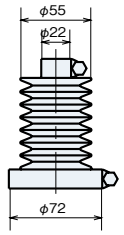


●Input Shaft

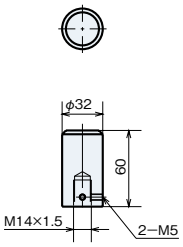


Output Options

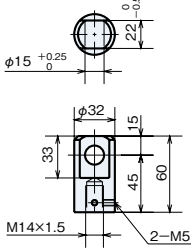
■Bellows (- J)



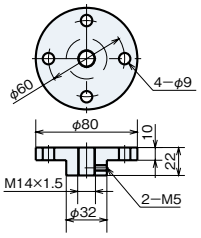
■Rod Type End Fitting (-B)



■I Type End Fitting (-I)

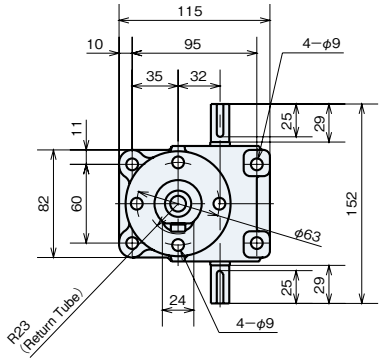


■Table Type End Fitting (-M)



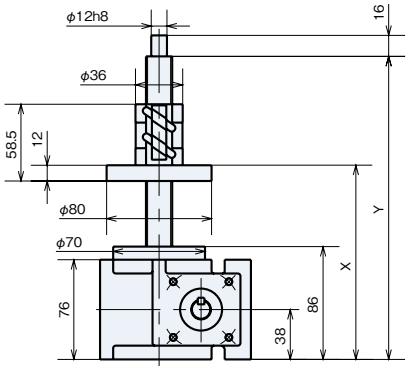
Note) For detailed measurements on units with bellows, seepage 218.

JWB010 Dimensions - Travel Nut Type

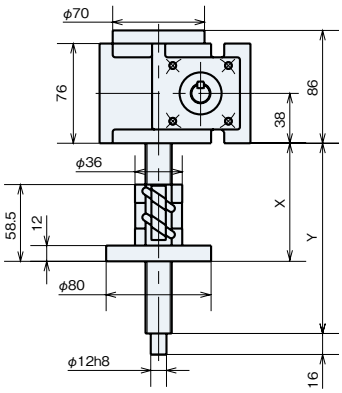


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	108	208	265	69	169	179	5.9
200	108	308	365	69	269	279	6.1
300	108	408	465	69	369	379	6.4
400	108	508	565	69	469	479	6.6
500	108	608	665	69	569	579	6.8
600	108	708	765	69	669	679	7.0
800	108	908	965	69	869	879	7.4
1000	108	1108	1165	69	1069	1079	7.9

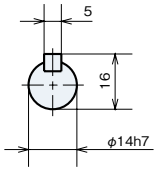
Lift (JWB010UR)



Suspend (JWB010DR)



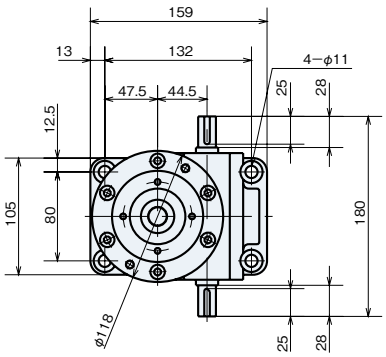
●Input Shaft



Note) Ball nut return tube and travel flange openings may vary from this drawing.
Note the return tube measurements when installing to equipment.

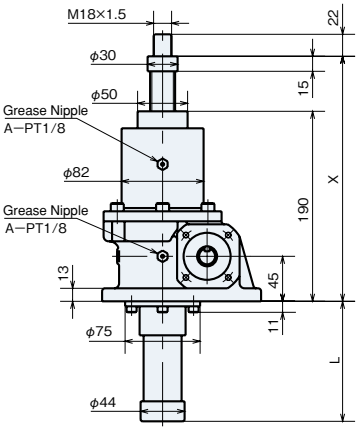
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWB025 Dimensions - Standard Model

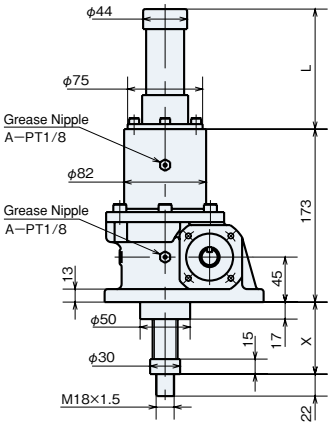


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	215	315	230	330	149	42	142	57	157	149	11
200	215	415	230	430	249	42	242	57	257	249	11
300	215	515	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

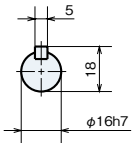
Lift (JWB025US)



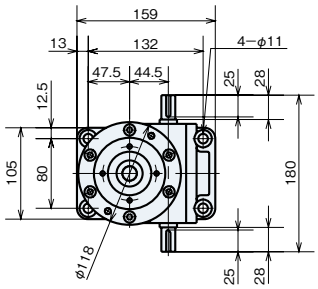
Suspend (JWB025DS)



●Input Shaft

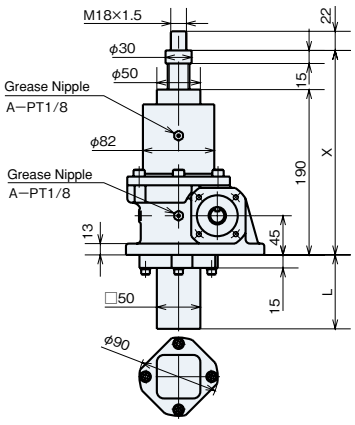


JWB025 Dimensions - Rotation Prevention Type

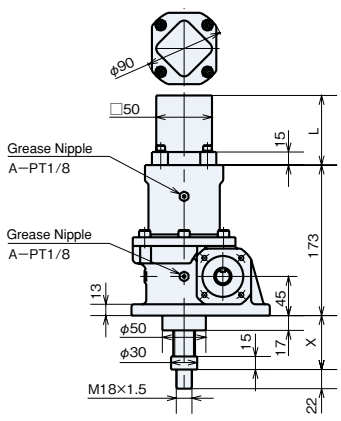


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	215	315	230	330	181	42	142	57	157	181	12
200	215	415	230	430	281	42	242	57	257	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

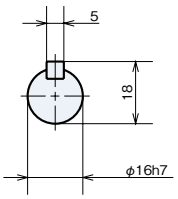
Lift (JWB025UM)



Suspend (JWB025DM)

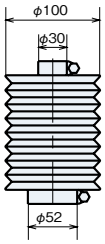


●Input Shaft

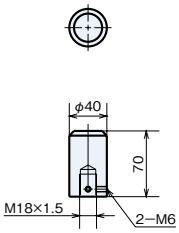


Output Options

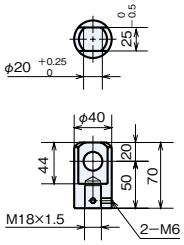
■Bellows (- J)



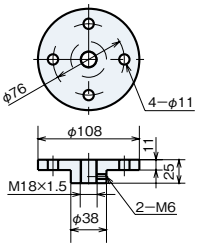
■Rod Type End Fitting (-B)



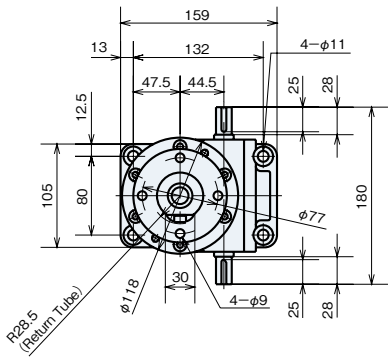
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

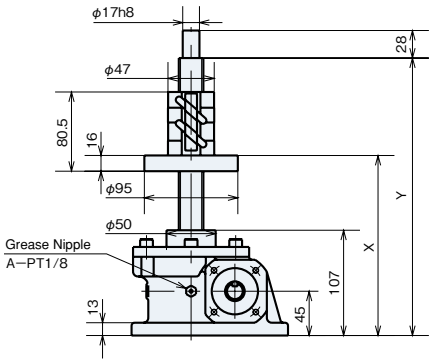


JWB025 Dimensions - Travel Nut Type

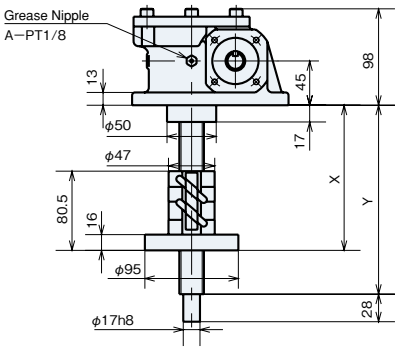


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	133	233	309	108	208	219	9.2
200	133	333	409	108	308	319	9.5
300	133	433	509	108	408	419	9.8
400	133	533	609	108	508	519	11
500	133	633	709	108	608	619	11
600	133	733	809	108	708	719	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

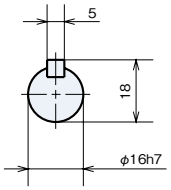
Lift (JWB025UR)



Suspend (JWB025DR)



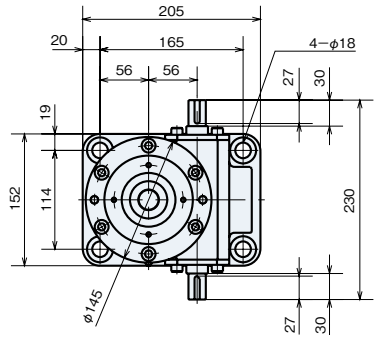
●Input Shaft



Note) Ball nut return tube and travel flange openings may vary from this drawing.
Note the return tube measurements when installing to equipment.

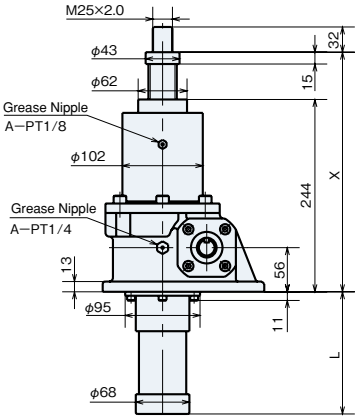
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWB050 Dimensions - Standard Model

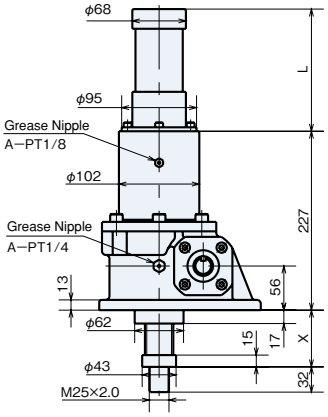


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	269	369	284	384	147	42	142	57	157	147	23
200	269	469	284	484	247	42	242	57	257	247	23
300	269	569	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

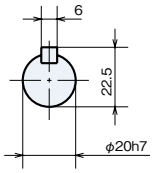
Lift (JWB050US)



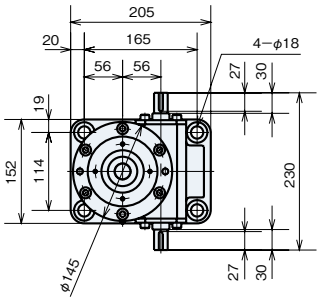
Suspend (JWB050DS)



●Input Shaft

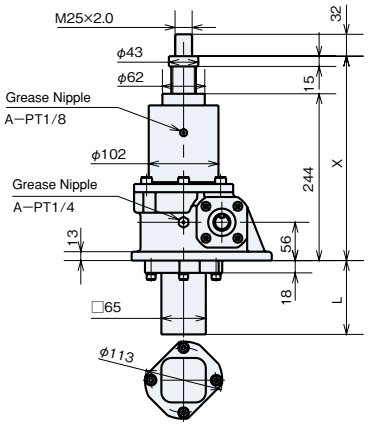


JWB050 Dimensions - Rotation Prevention Type

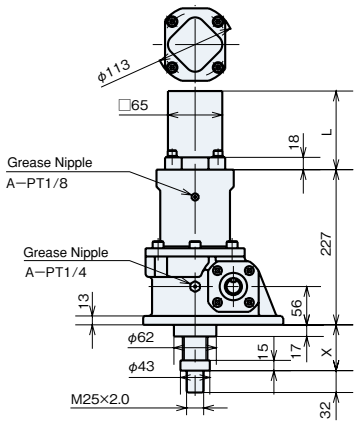


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	269	369	284	384	196	42	142	57	157	196	25
200	269	469	284	484	296	42	242	57	257	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

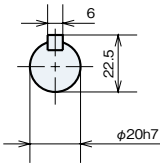
Lift (JWB050UM)



Suspend (JWB050DM)

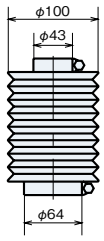


●Input Shaft

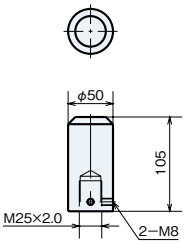


Output Options

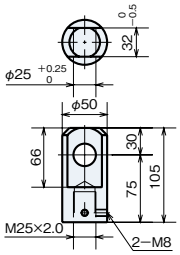
■Bellows (- J)



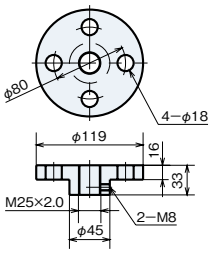
■Rod Type End Fitting (-B)



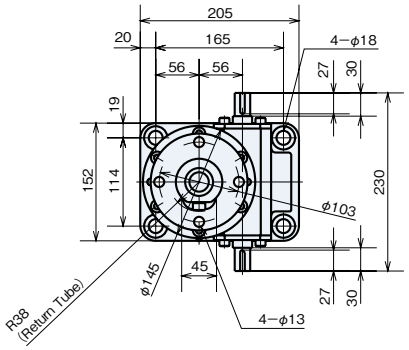
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

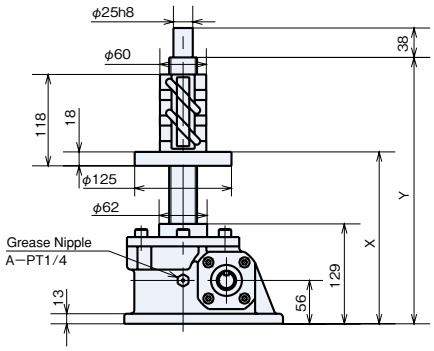


JWB050 Dimensions - Travel Nut Type

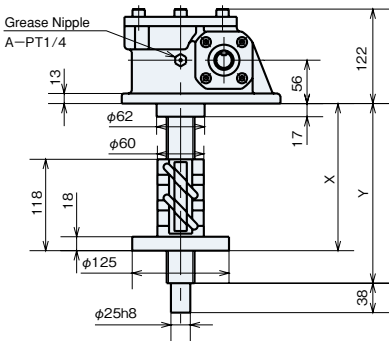


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	157	257	369	145	245	257	21
200	157	357	469	145	345	357	22
300	157	457	569	145	445	457	22
400	157	557	669	145	545	557	23
500	157	657	769	145	645	657	24
600	157	757	869	145	745	757	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

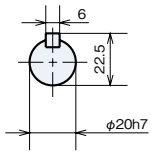
Lift (JWB050UR)



Suspend (JWB050DR)



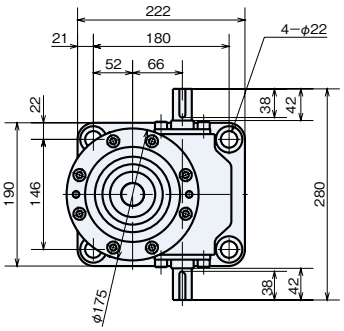
●Input Shaft



Note) Ball nut return tube and travel flange openings may vary from this drawing.
Note the return tube measurements when installing to equipment.

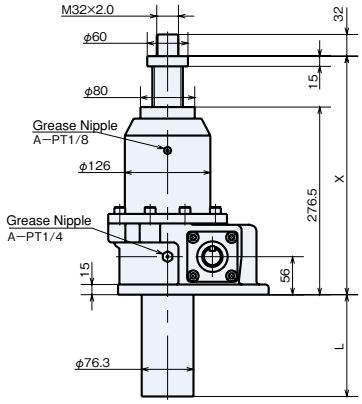
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWB100 Dimensions - Standard Model

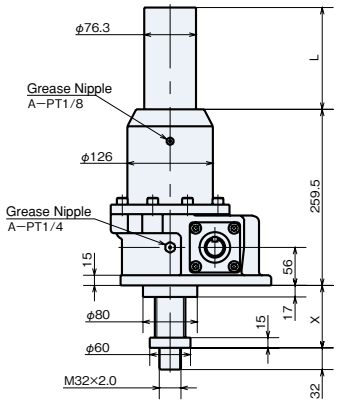


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	302	402	312	412	151	42	142	52	152	151	36
200	302	502	312	512	252	42	242	52	252	252	38
300	302	602	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

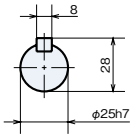
Lift (JWB100US)



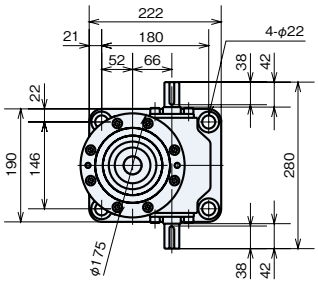
Suspend (JWB100DS)



●Input Shaft

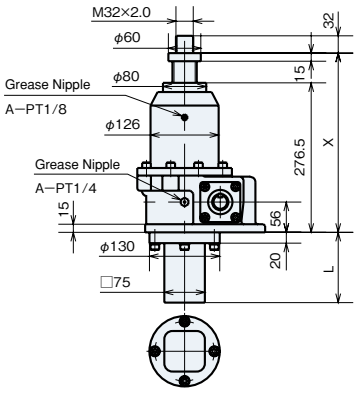


JWB100 Dimensions - Rotation Prevention Type

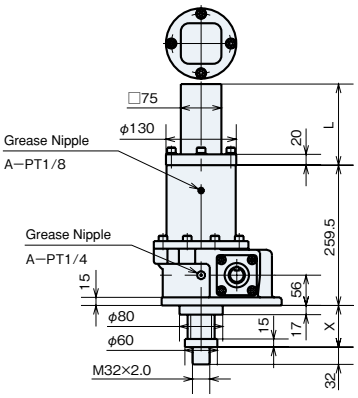


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	302	402	312	412	192	42	142	52	152	192	39
200	302	502	312	512	292	42	242	52	252	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

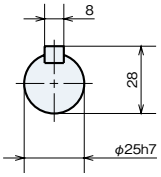
Lift (JWB100UM)



Suspend (JWB100DM)

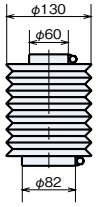


●Input Shaft

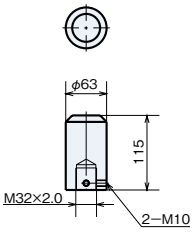


Output Options

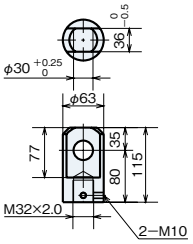
■Bellows (- J)



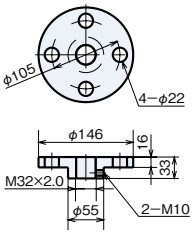
■Rod Type End Fitting (-B)



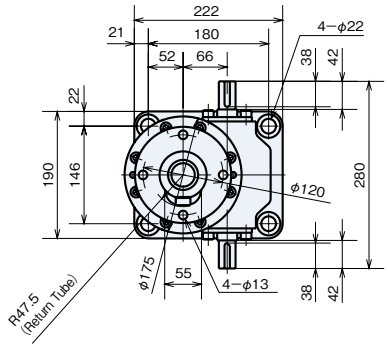
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

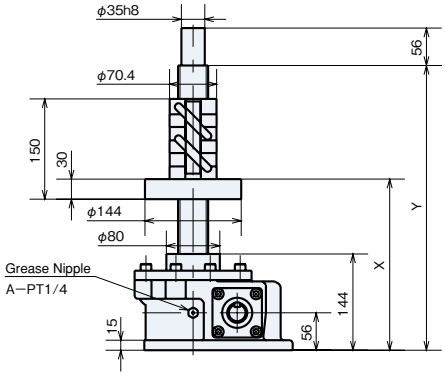


JWB100 Dimensions - Travel Nut Type

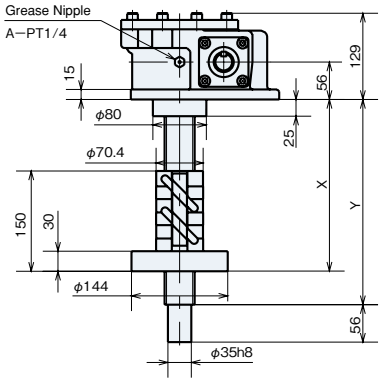


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	184	284	414	185	285	295	31
200	184	384	514	185	385	395	32
300	184	484	614	185	485	495	33
400	184	584	714	185	585	595	34
500	184	684	814	185	685	695	35
600	184	784	914	185	785	795	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

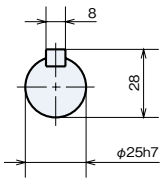
Lift (JWB100UR)



Suspend (JWB100DR)



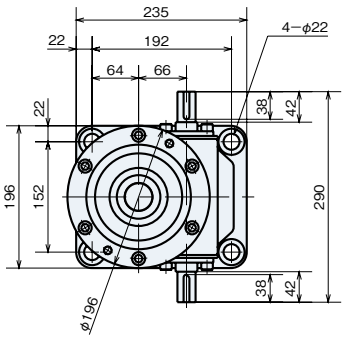
●Input Shaft



Note) Ball nut return tube and travel flange openings may vary from this drawing.
Note the return tube measurements when installing to equipment.

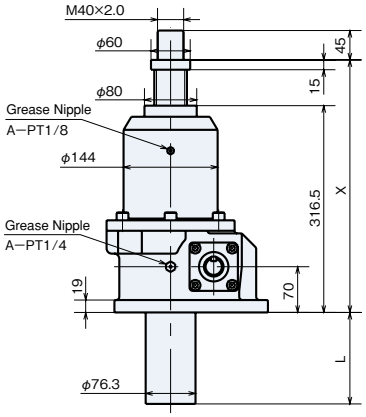
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWB150 Dimensions - Standard Model

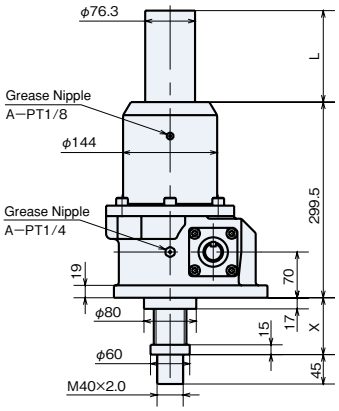


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	342	442	352	452	151	42	142	52	152	151	46
200	342	542	352	552	252	42	242	52	252	252	48
300	342	642	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

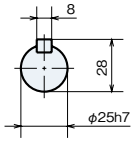
Lift (JWB150US)



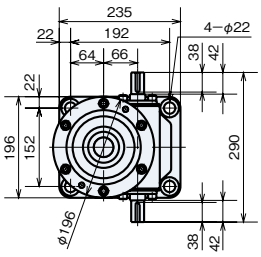
Suspend (JWB150DS)



●Input Shaft

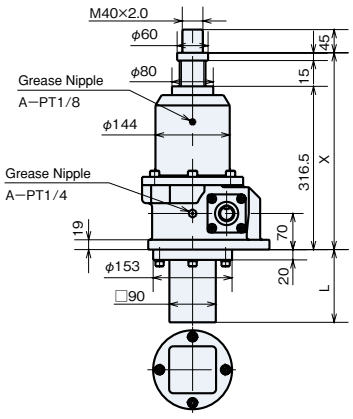


JWB150 Dimensions - Rotation Prevention Type

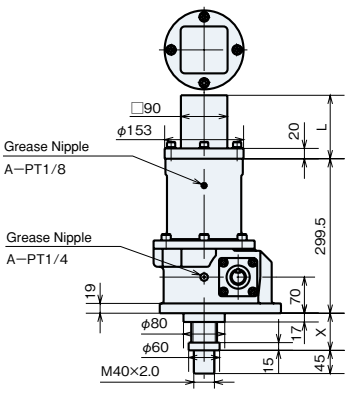


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	342	442	352	452	221	42	142	52	152	221	52
200	342	542	352	552	321	42	242	52	252	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

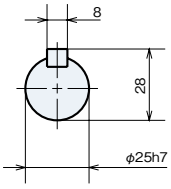
Lift (JWB150UM)



Suspend (JWB150DM)

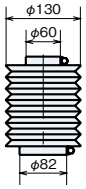


●Input Shaft

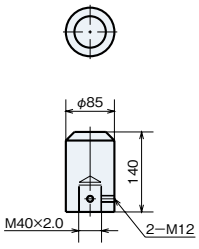


Output Options

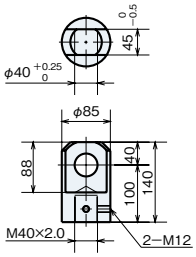
■Bellows (- J)



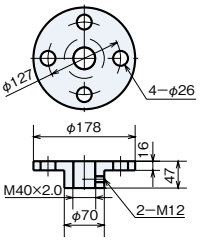
■Rod Type End Fitting (-B)



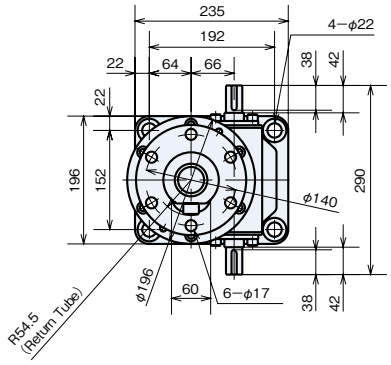
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

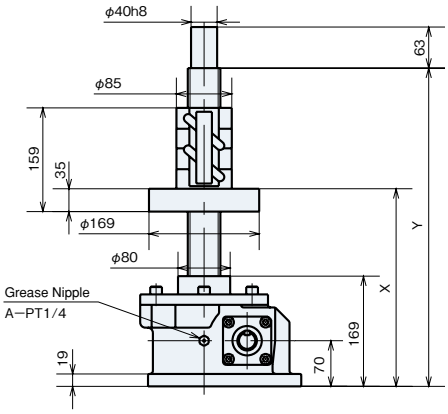


JWB150 Dimensions - Travel Nut Type

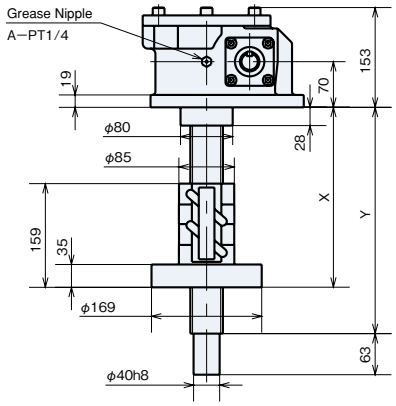


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	214	314	448	197	297	308	41
200	214	414	548	197	397	408	42
300	214	514	648	197	497	508	43
400	214	614	748	197	597	608	45
500	214	714	848	197	697	708	46
600	214	814	948	197	797	808	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

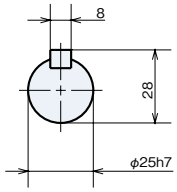
Lift (JWB150UR)



Suspend (JWB150DR)



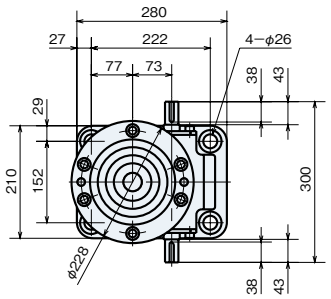
●Input Shaft



Note) Ball nut return tube and travel flange openings may vary from this drawing.
Note the return tube measurements when installing to equipment.

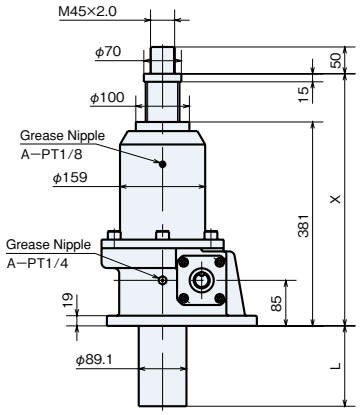
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWB200 Dimensions - Standard Model

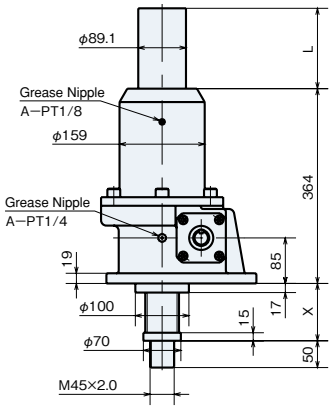


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	406	506	416	516	136	42	142	52	152	136	65
200	406	606	416	616	236	42	242	52	252	236	68
300	406	706	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

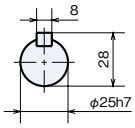
Lift (JWB200US)



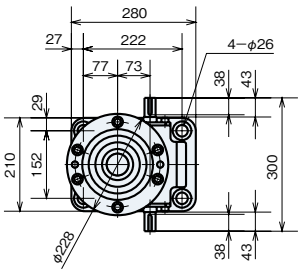
Suspend (JWB200DS)



●Input Shaft

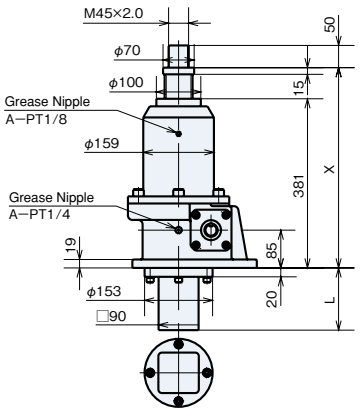


JWB200 Dimensions - Rotation Prevention Type

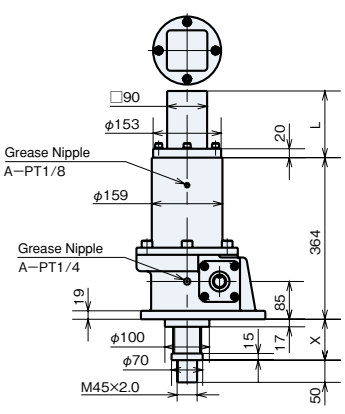


Stroke	UM Rotation Prevention Type for Lifting					DM Rotation Prevention Type for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	406	506	416	516	230	42	142	52	152	230	72
200	406	606	416	616	330	42	242	52	252	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

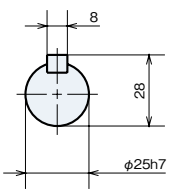
Lift (JWB200UM)



Suspend (JWB200DM)

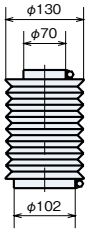


●Input Shaft

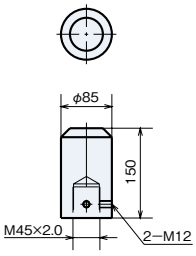


Output Options

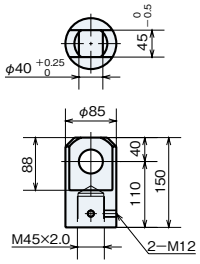
■Bellows (- J)



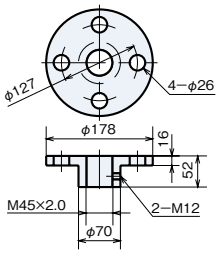
■Rod Type End Fitting (-B)



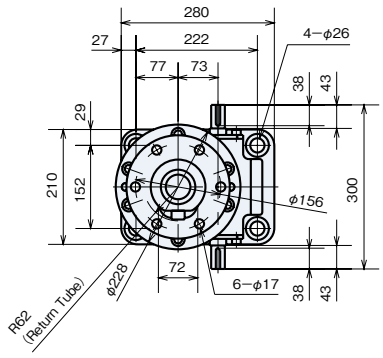
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

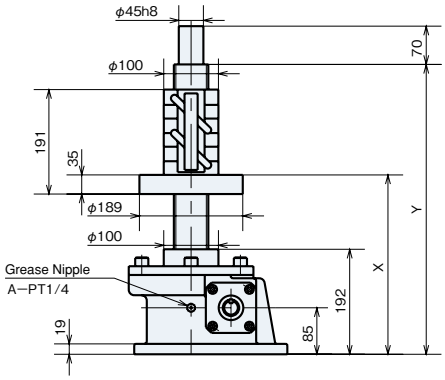


JWB200 Dimensions - Travel Nut Type

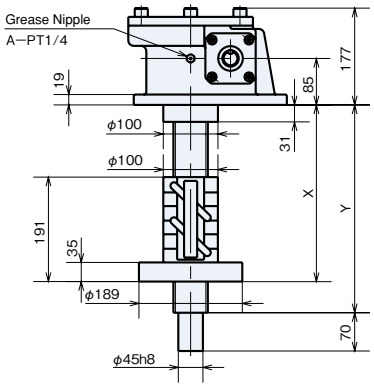


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	237	337	503	232	332	342	56
200	237	437	603	232	432	442	58
300	237	537	703	232	532	542	60
400	237	637	803	232	632	642	62
500	237	737	903	232	732	742	65
600	237	837	1003	232	832	842	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

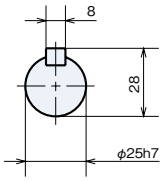
Lift (JWB200UR)



Suspend (JWB200DR)



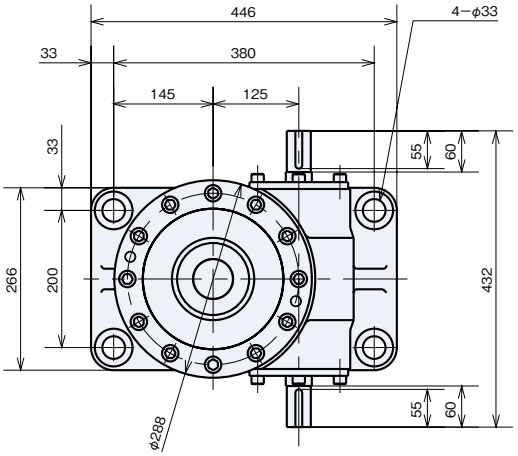
●Input Shaft



Note) Ball nut return tube and travel flange openings may vary from this drawing.
Note the return tube measurements when installing to equipment.

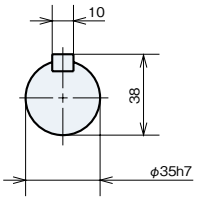
Travel nut type cannot be equipped with optional end fitting (B.I.M).
For types with bellows, refer to page 219.

JWB300 Dimensions - Standard Model

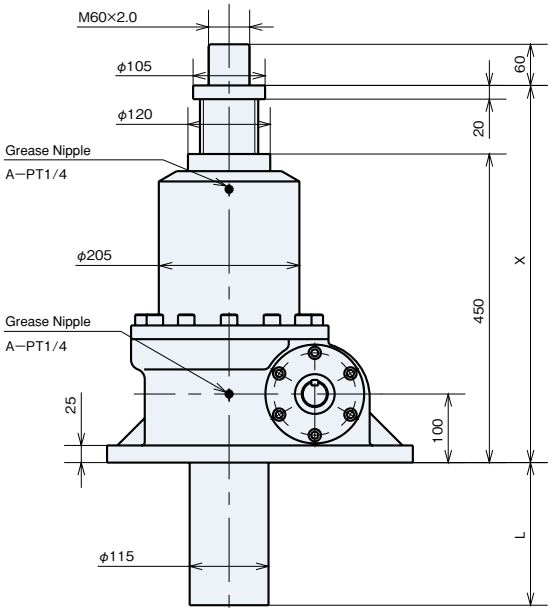


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	480	580	490	590	135	55	155	65	165	135	153
200	480	680	490	690	235	55	255	65	265	235	159
300	480	780	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

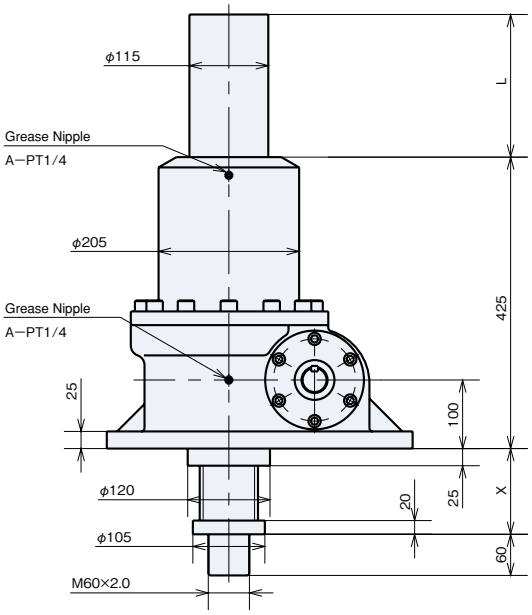
●Input Shaft



Lift (JWB300US)

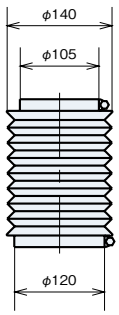


Suspend (JWB300DS)

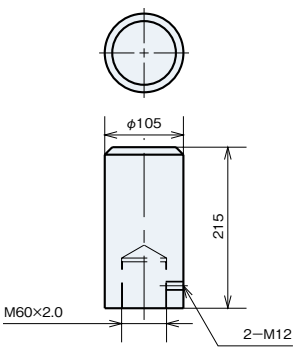


Output Options

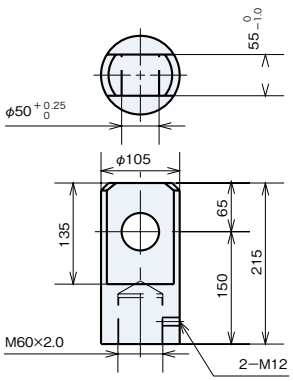
■Bellows (- J)



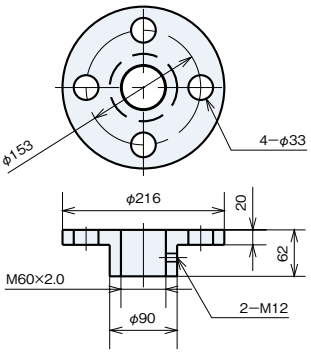
■Rod Type End Fitting (-B)



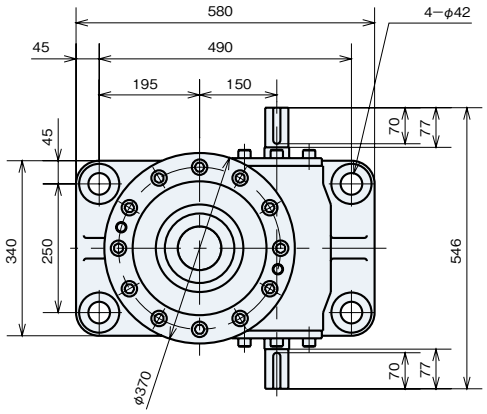
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

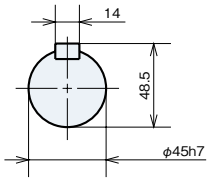


JWB500 Dimensions - Standard Model

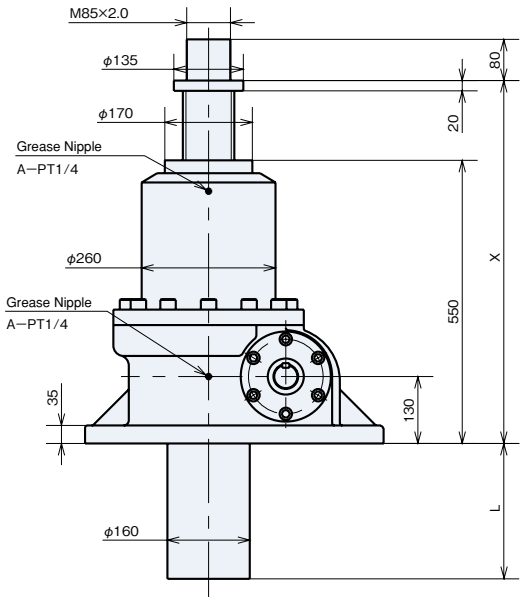


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	580	680	585	685	137	55	155	60	160	137	310
200	580	780	585	785	237	55	255	60	260	237	320
300	580	880	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

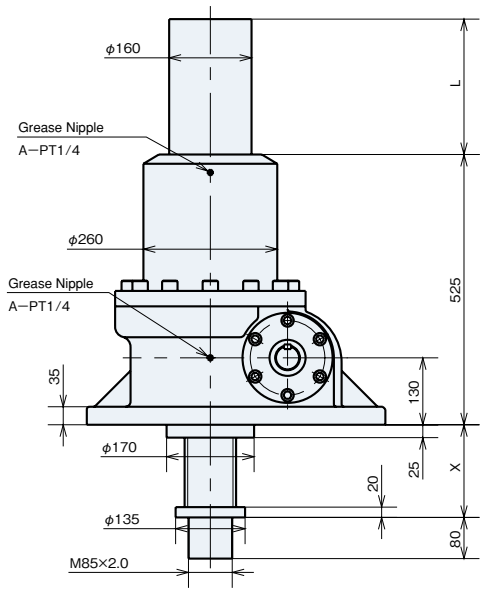
●Input Shaft



Lift (JWB500US)

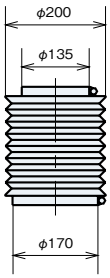


Suspend (JWB500DS)

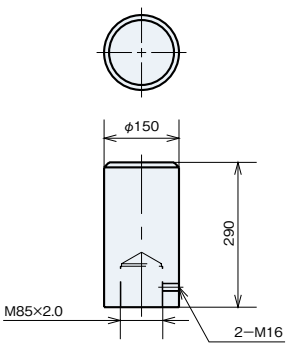


Output Options

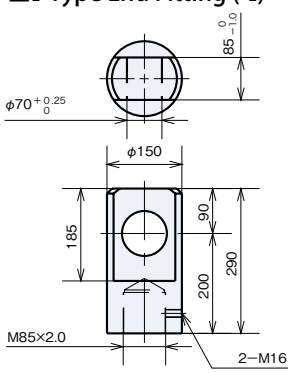
■Bellows (- J)



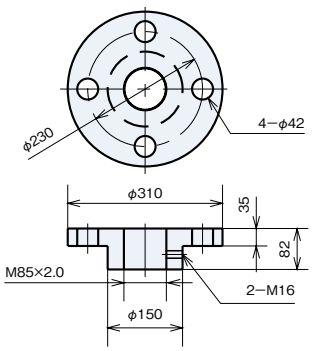
■Rod Type End Fitting (-B)



■I Type End Fitting (-I)



■Table Type End Fitting (-M)



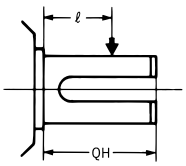
⚠ Warning

■ 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 125.
- 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.

$$\text{Allowable O. H. L.} \geqq \frac{T \times f \times Lf}{R}$$

O.H.L. : Overhang load N {kgf}
T : Input torque N・m {kgf・m}
f : Coefficient - power transmission element
Lf : 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 (Lf) – Load Position

ℓ /QH	0.25	0.38	0.5	0.75	1
Lf	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) H Speed	N	–	130	220	480	870	1290	2030	2490	3450	5240	7200	9790
	{kgf}	–	{14}	{23}	{50}	{89}	{132}	{208}	{255}	{352}	{535}	{735}	{998}
JWB (Ball Screw Type) L Speed	N	–	82	140	290	500	840	1300	1610	2400	3560	4940	6970
	{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	−15～80℃ (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 223.
- 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.

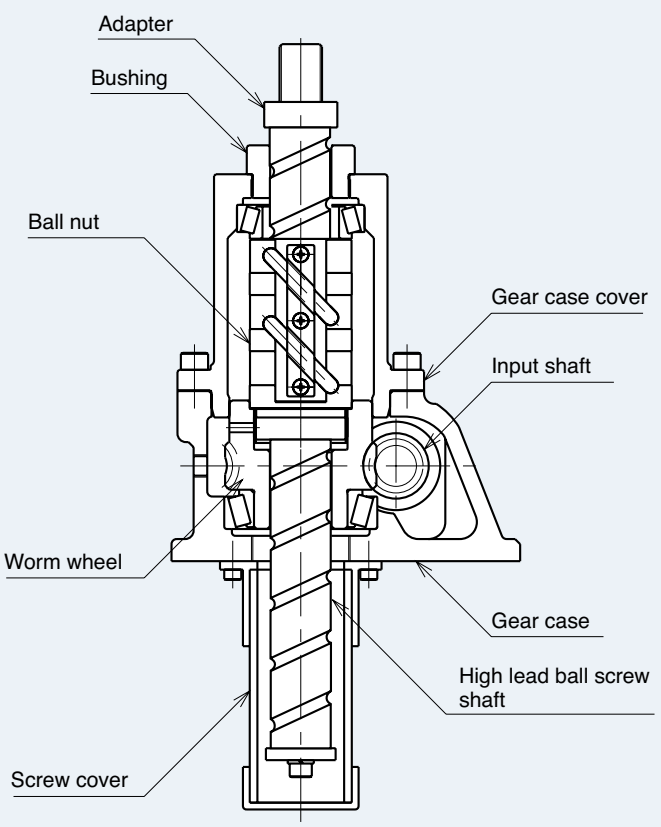
Linipower Jack

JWH (High Lead Ball Screw Type)

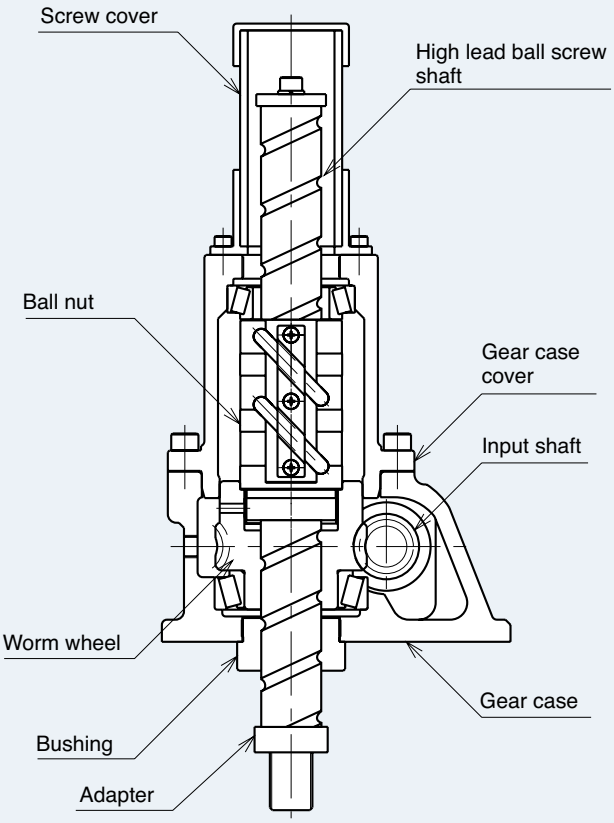
Drawings

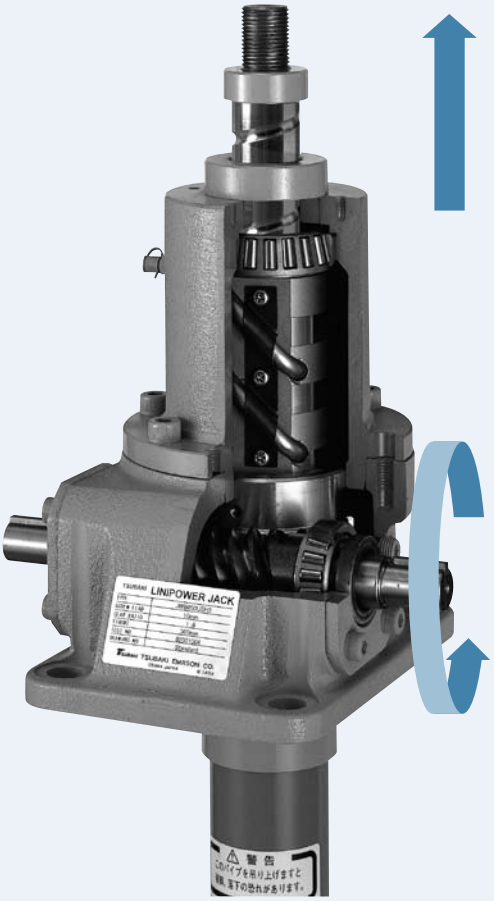
JWH (High Lead Ball Screw Type) Standard Model

JWH Standard Use for Lifting



JWH Standard Use for Suspending

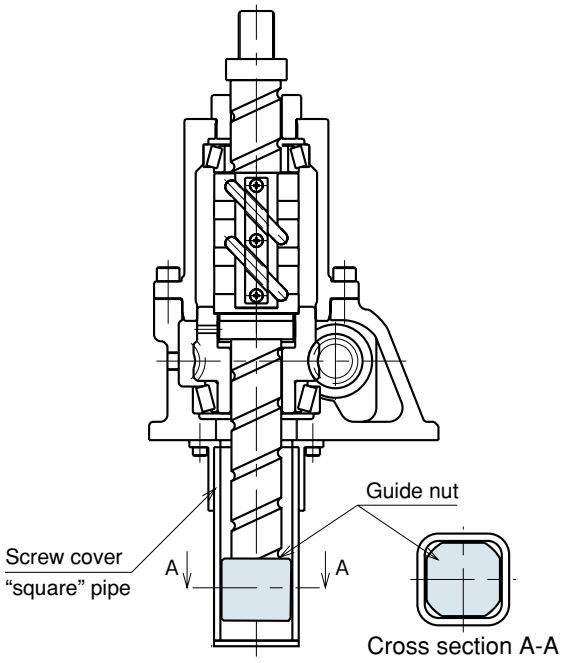




JWH (High Lead Ball Screw Type) Rotation Prevention Type

JWH010～200

〈With Rotation Prevention and Guide Nut〉

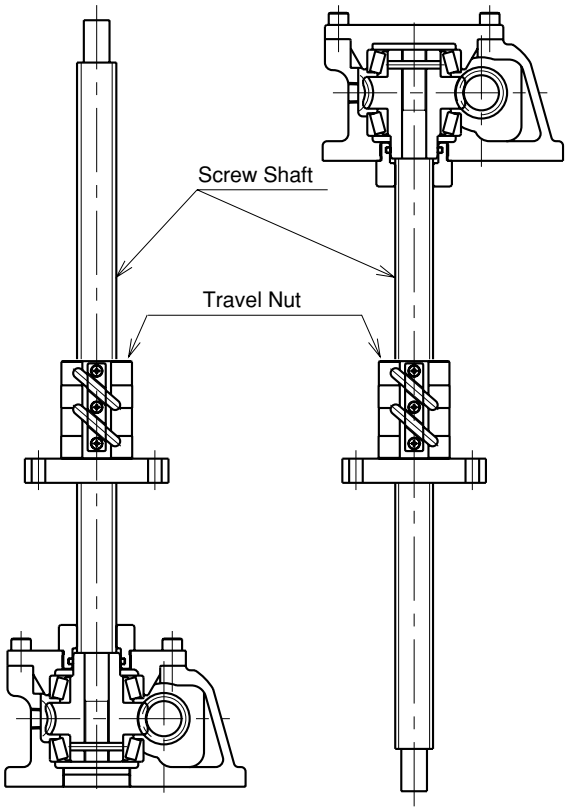


Note) The 10°space in each corner between the guide and the pipe allows smooth rotation.

Caution

Each High Lead Ball Screw Jack with rotation prevention is made-to-order based.
Inform Tsubaki Emerson 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)

JW	H	050	US	H	10	U	JM	C	K4P	G2

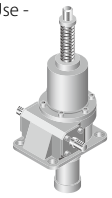
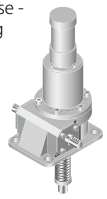
Linipower Jack

Jack Type
H：High Lead Ball Screw

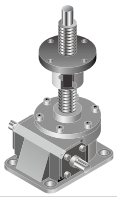
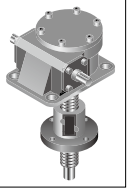
Basic Capacity

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 
DS	Standard Use - Suspending 

* Rotation prevention for JWH are available upon request. To request, provide Tsubaki Emerson with information on your operation conditions.

UR	Travel Nut - Lifting 
DR	Travel Nut - Suspending 

* Be sure to use the flange installation method U or D with travel nuts.
* Contact Tsubaki Emerson if rotation prevention is required.

Stroke mm

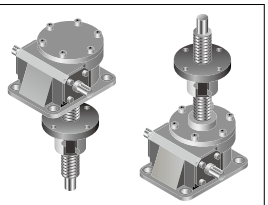
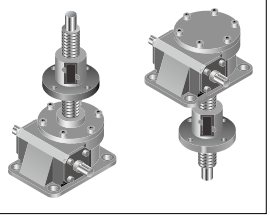
1	100
3	300
6	600
10	1000

*The above values are examples. For actual stroke used, refer to the Model Comparison Table for JWH on page 115.

Gear Ratio

Frame No. \ symbol	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)

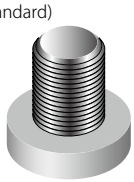
JWH100UMH3

• High Lead Ball Screw Type • 98.0kN {10tf} • Rotation prevention (for lifting) • Gear ratio H (1/8) • Stroke 300mm

JWH050USH10JMK4P

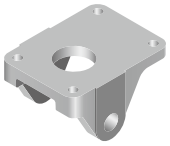
• High Lead Ball Screw Type • 49.0kN {5tf} • Standard use (for lifting) • Gear ratio H (1/6) • Stroke 1000mm
• Bellows / Table Type End Fitting • 4 Internal LS / Potentiometer

Output Option

No symbol	Screw shaft end (standard) 
J	Bellows 
B	Rod Type End Fitting 
I	I Type End Fitting 
M	Table Type End Fitting 

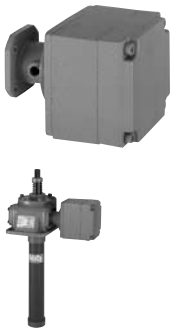
Note) To request the above parts, provide their letter symbols in the order given. When travel nuts are used, B, I and M are not required.
Note) Bellows is of special specification, therefore contact Tsubaki Emerson.
Note) Travel nut type with bellows is estimated for each order. Enter necessary information in the inquiry form on page 219 to contact Tsubaki Emerson.

Installation Option

C	Clevis Mounting Adapter  (See page 215)

Note) For standard lifting only.

Sensor Option

Y	LS Counter  (See page 209)
K2 K4 P R	Position Sensor K2・・・2 Internal LS K4・・・4 Internal LS P・・・Potentiometer R・・・Rotary Encoder  (See page 211)

Note) To request the above parts, provide their letter symbols in the order given.

Input Option

3 phase brake and motor  (Page 199〜)

3 phase brake and gear- motor  (Page 199〜)

Accessories

Control Options

Stroke Meter and PCB 

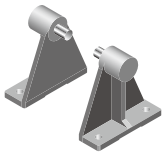
Meter Relay and PCB 

R Controller 

Pulse Counter 

(Page 212〜)

Others

Trunnion Mounting Adapter 

*Use as a set with clevis mounting adapter.
(See page 215)

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 Allowable Input Torque	N•m	19.6	49.0	153.9
	{kgf•m}	{2}	{5}	{15.7}
Required Input Torque for Basic Capacity *Note 2	N•m	10.2	25.6	49.2
	{kgf•m}	{1.0}	{2.6}	{5.0}
Screw Movement/ 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. for Basic Capacity	r/min	700	550	450
Screw Shaft Rotational 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	−15～80℃ (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 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. Allowable input rpm is 1800/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.

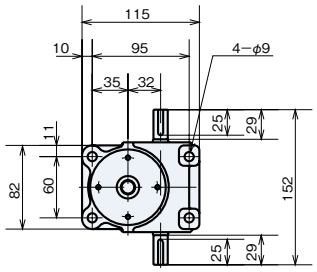
JWH100	JWH150	JWH200
98.0 {10}	147 {15}	196 {20}
45	50	63
38.9	42.7	55.7
32	32	32
8	8	8
65	65	64
4.1	4.1	5.6
1.96 {0.2}	2.65 {0.27}	3.92 {0.4}
52.8 {5.4}	79.2 {8.1}	105.6 {10.8}
292.0 {29.8}	292.0 {29.8}	292.0 {29.8}
98.0 {10.0}	146.8 {15.0}	199.1 {20.3}
4	4	4
1800	1800	1800
400	270	270
531.5 {54.2}	797.3 {81.3}	1063.0 {108.4}
Steel Pipe		
Screw: Grease Reducer Unit: Grease Bath		
Tsubaki Olive Grey (Munsell 5GY6/0.5)		
−15～80℃ (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.)

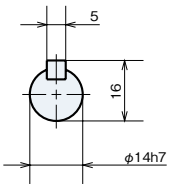
⚠9.Do not use mechanical stops under any circumstances. This will cause major internal damage.

10.Input shaft key is provided with each unit.
(Key complies with JIS B-1301-1996 standards.)

JWH010 Dimensions - Standard Model

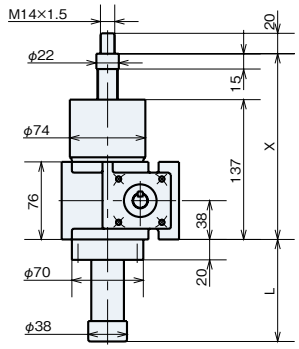


●Input Shaft

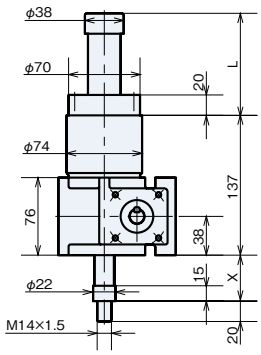


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	162	262	212	312	194	25	125	75	175	194	6.7
200	162	362	212	412	294	25	225	75	275	294	7.0
300	162	462	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 (JWH010US)

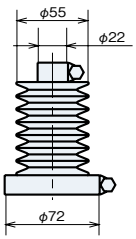


Suspend (JWH010DS)

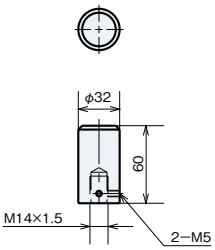


Output Option

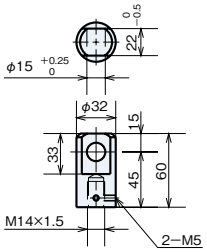
■Bellows (- J)



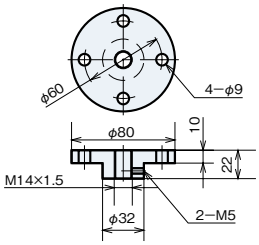
■Rod Type End Fitting (-B)



■I Type End Fitting (-I)

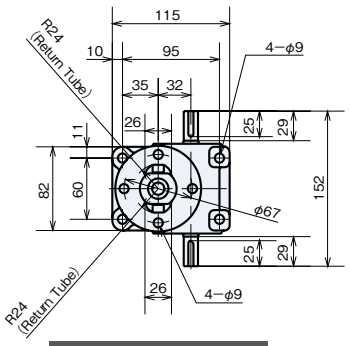


■Table Type End Fitting (-M)

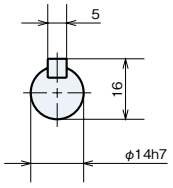


Note) For detailed measurements on units with bellows, see page 218.

JWH010 Dimensions - Travel Nut Type

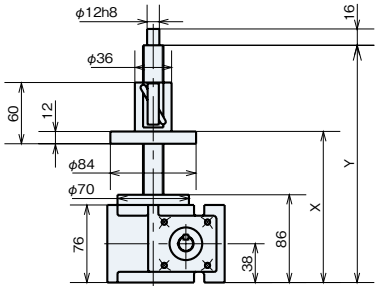


●Input Shaft

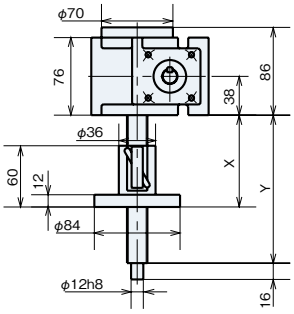


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	108	208	265	69	169	179	5.9
200	108	308	365	69	269	279	6.1
300	108	408	465	69	369	379	6.4
400	108	508	565	69	469	479	6.6
500	108	608	665	69	569	579	6.8
600	108	708	765	69	669	679	7.0
800	108	908	965	69	869	879	7.4
1000	108	1108	1165	69	1069	1079	7.9

Lift (JWH010UR)



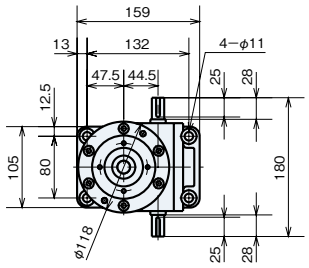
Suspend (JWH010DR)



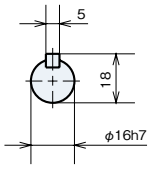
Note) Ball nut return tube and travel flange openings may vary from this drawing. Note the return tube measurements when installing to equipment.

Travel nut type cannot be equipped with optional end fitting (B.I.M). For types with bellows, refer to page 219.

JWH025 Dimensions - Standard Model

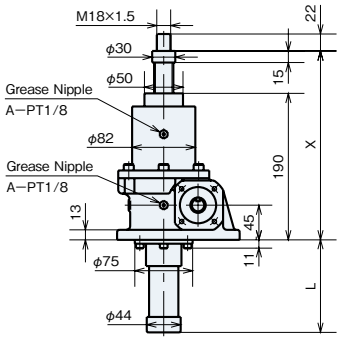


●Input Shaft

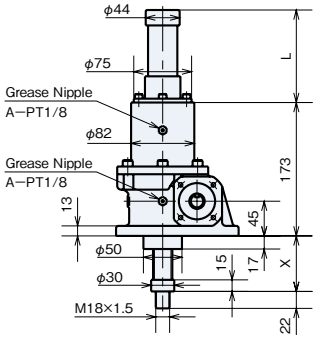


Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	215	315	230	330	149	42	142	57	157	149	11
200	215	415	230	430	249	42	242	57	257	249	11
300	215	515	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 (JWH025US)

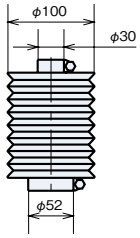


Suspend (JWH025DS)

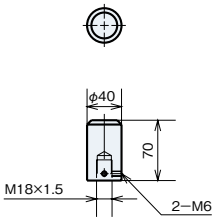


Output Option

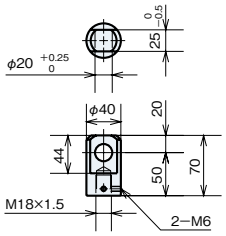
■Bellows (- J)



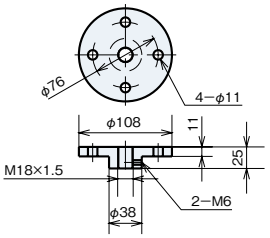
■Rod Type End Fitting (-B)



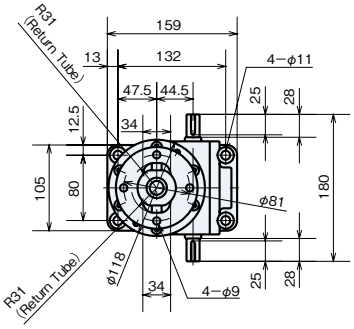
■I Type End Fitting (-I)



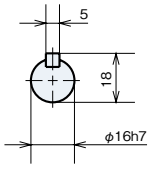
■Table Type End Fitting (-M)



JWH025 Dimensions - Travel Nut Type

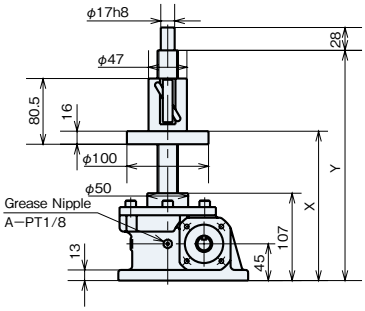


●Input Shaft

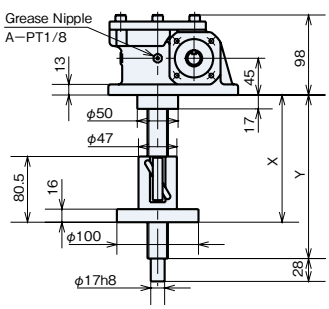


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	133	233	309	108	208	219	9.2
200	133	333	409	108	308	319	9.5
300	133	433	509	108	408	419	9.8
400	133	533	609	108	508	519	11
500	133	633	709	108	608	619	11
600	133	733	809	108	708	719	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

Lift (JWH025UR)



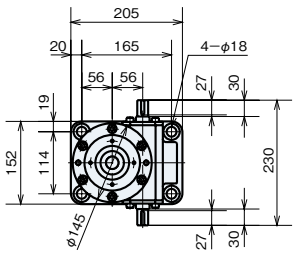
Suspend (JWH025DR)



Note) Ball nut return tube and travel flange openings may vary from this drawing. Note the return tube measurements when installing to equipment.

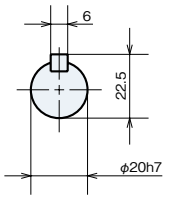
Travel nut type cannot be equipped with optional end fitting (B.I.M). For types with bellows, refer to page 219.

JWH050 Dimensions - Standard Model

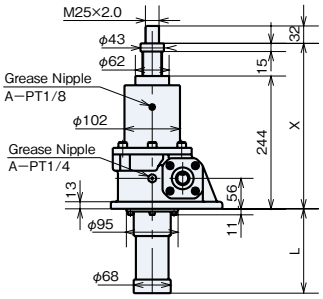


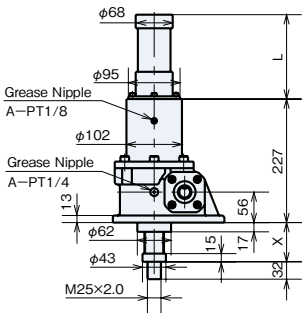
Lift (JWH050US)

●Input Shaft



Suspend (JWH050DS)

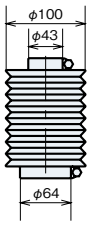




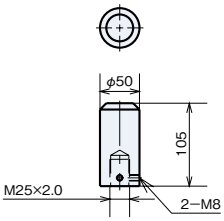
Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	269	369	284	384	147	42	142	57	157	147	23
200	269	469	284	484	247	42	242	57	257	247	23
300	269	569	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

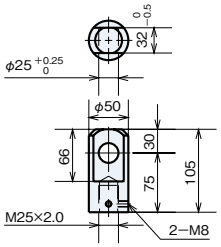
■Bellows (- J)



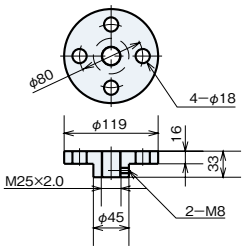
■Rod Type End Fitting (-B)



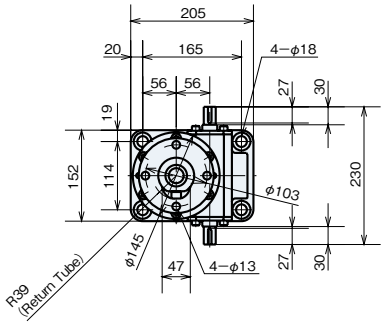
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

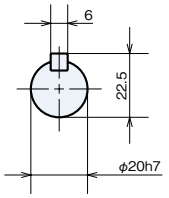


JWH050 Dimensions - Travel Nut Type

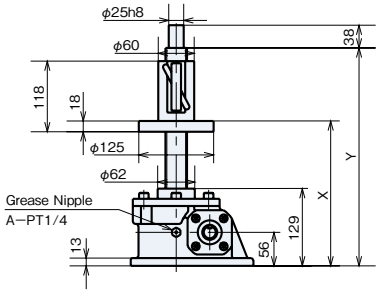


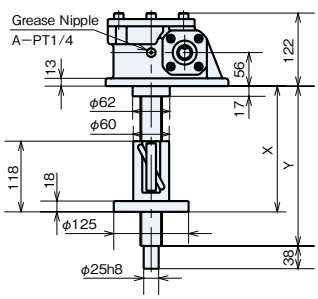
Lift (JWH050UR)

●Input Shaft



Suspend (JWH050DR)



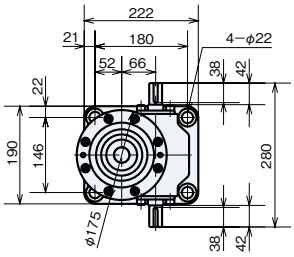


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	157	257	369	145	245	257	21
200	157	357	469	145	345	357	22
300	157	457	569	145	445	457	22
400	157	557	669	145	545	557	23
500	157	657	769	145	645	657	24
600	157	757	869	145	745	757	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.

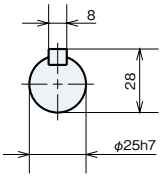
Travel nut type cannot be equipped with optional end fitting (B.I.M). For types with bellows, refer to page 219.

JWH100 Dimensions - Standard Model



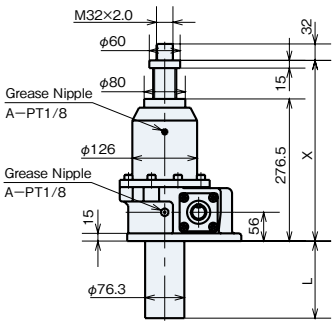
Lift (JWH100US)

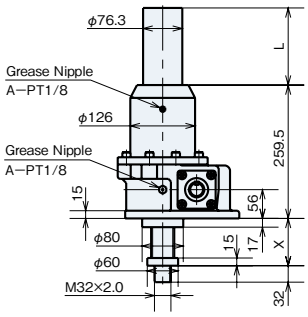
●Input Shaft



Suspend (JWH100DS)

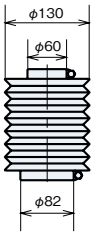
Stroke	US Standard Model for Lifting X Without Bellows MIN	X Without Bellows MAX	X With Bellows MIN	X With Bellows MAX	L	DS Standard Model for Suspending X Without Bellows MIN	X Without Bellows MAX	X With Bellows MIN	X With Bellows MAX	L	Weight kg
100	302	402	312	412	151	42	142	52	152	151	36
200	302	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



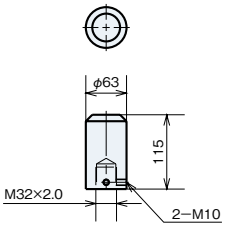


Output Option

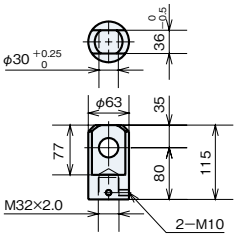
■Bellows (- J)



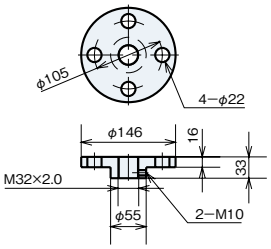
■Rod Type End Fitting (-B)



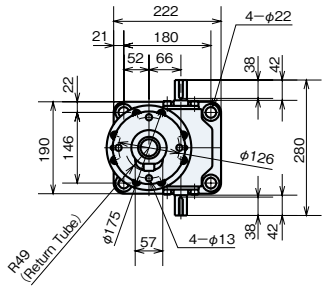
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

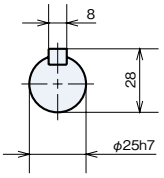


JWH100 Dimensions - Travel Nut Type



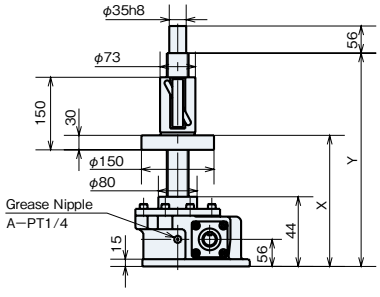
Lift (JWH100UR)

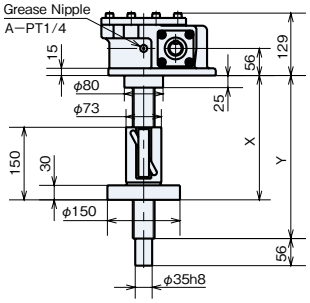
●Input Shaft



Suspend (JWH100DR)

Stroke	UR Travel Nut Type for Lifting X MIN	X MAX	Y	DR Travel Nut Type for Suspending X MIN	X MAX	Y	Weight kg
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

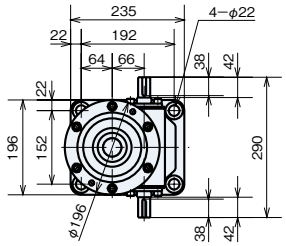




Note) Ball nut return tube and travel flange openings may vary from this drawing. Note the return tube measurements when installing to equipment.

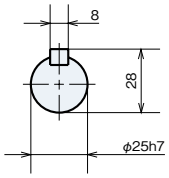
Travel nut type cannot be equipped with optional end fitting (B.I.M). For types with bellows, refer to page 219.

JWH150 Dimensions - Standard Model

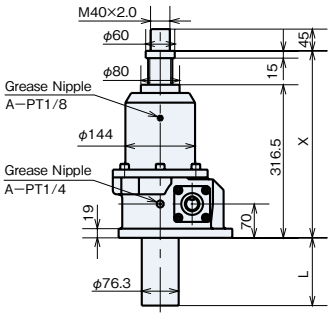


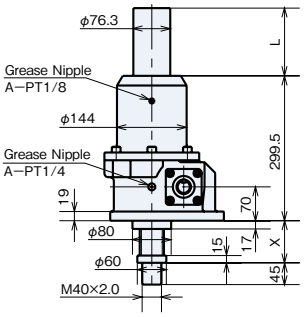
Lift (JWH150US)

●Input Shaft



Suspend (JWH150DS)

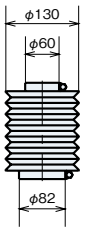




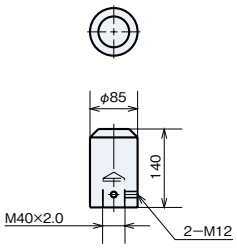
Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	342	442	352	452	151	42	142	52	152	151	46
200	342	542	352	552	252	42	242	52	252	252	48
300	342	642	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

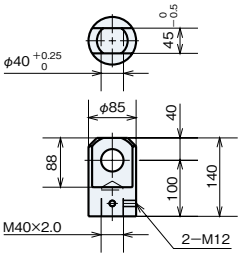
■Bellows (- J)



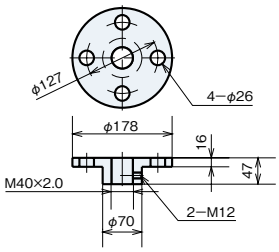
■Rod Type End Fitting (-B)



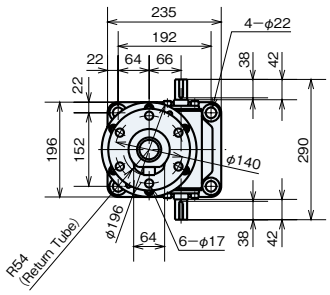
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

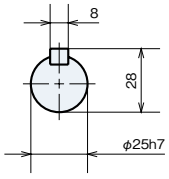


JWH150 Dimensions - Travel Nut Type

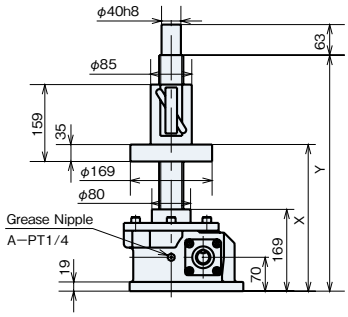


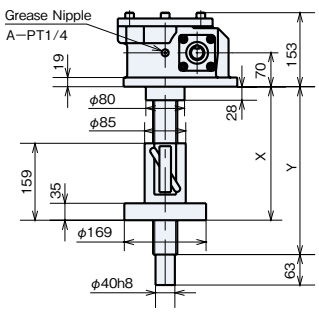
Lift (JWH150UR)

●Input Shaft



Suspend (JWH150DR)



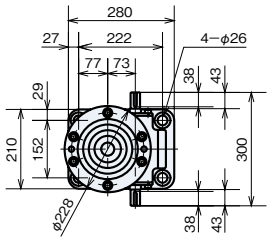


Stroke	UR Travel Nut Type for Lifting			DR Travel Nut Type for Suspending			Weight kg
	X		Y	X		Y	
	MIN	MAX		MIN	MAX		
100	214	314	448	197	297	308	41
200	214	414	548	197	397	408	42
300	214	514	648	197	497	508	43
400	214	614	748	197	597	608	45
500	214	714	848	197	697	708	46
600	214	814	948	197	797	808	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.

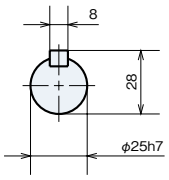
Travel nut type cannot be equipped with optional end fitting (B.I.M). For types with bellows, refer to page 219.

JWH200 Dimensions - Standard Model



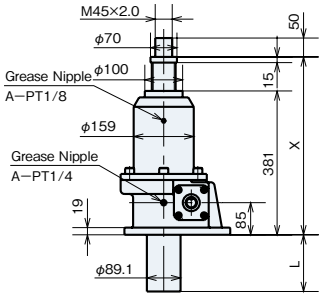
Lift (JWH200US)

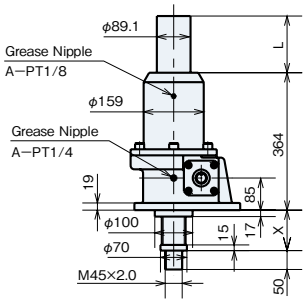
●Input Shaft



Suspend (JWH200DS)

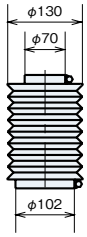
Stroke	US Standard Model for Lifting					DS Standard Model for Suspending					Weight kg
	X Without Bellows		X With Bellows		L	X Without Bellows		X With Bellows		L	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX		
100	406	506	416	516	136	42	142	52	152	136	65
200	406	606	416	616	236	42	242	52	252	236	68
300	406	706	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



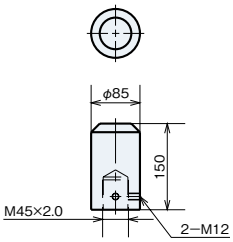


Output Option

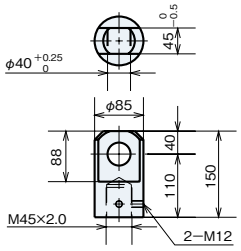
■Bellows (- J)



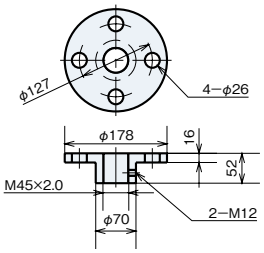
■Rod Type End Fitting (-B)



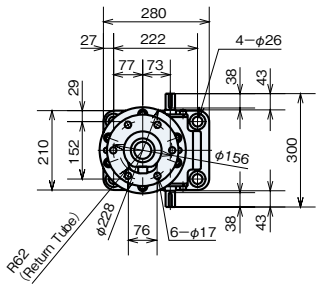
■I Type End Fitting (-I)



■Table Type End Fitting (-M)

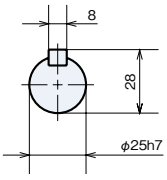


JWH200 Dimensions - Travel Nut Type



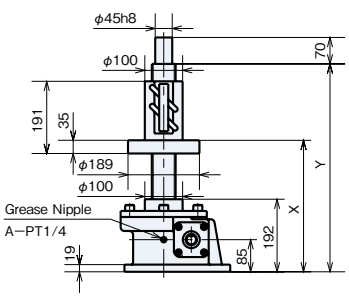
Lift (JWH200UR)

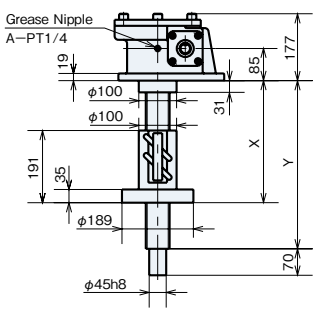
●Input Shaft



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 219.

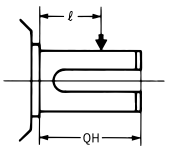
⚠ Warning

■ 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 127.
- 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 Emerson.
  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 Emerson.
- 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.

$$\text{Allowable O. H. L.} \geqq \frac{T \times f \times Lf}{R}$$

O.H.L. : Overhang load N {kgf}
T : Input torque N・m {kgf・m}
f : Coefficient - power transmission element
Lf : 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 (Lf) – Load Position

ℓ /QH	0.25	0.38	0.5	0.75	1
Lf	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) H Speed	N	—	—	530	980	1510	2390	3130	3840	—	—	—	—
	{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	−15～80℃ (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 223.
- 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

With Gearmotor JWM (Machine Screw Type)

Model No.	Motor Weight	Gear Ratio	Jack Gear Ratio			
			50Hz (1500r/min)		60Hz (1800r/min)	
			Shaft Speed mm/min (mm/s)	Thrust kN {kgf}	Shaft Speed mm/min (mm/s)	Thrust 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}
		1/25	78 (1.3)	29.4 {3000}	96 (1.6)	24.3 {2480}
	0.4kW	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}
		1/20	102 (1.7)	49.0 {5000}	120 (2.0)	41.7 {4250}
JWM100	0.4kW	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}
		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}
	0.75kW	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}
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}
		1/30	60 (1.0)	69.9 {7130}	78 (1.3)	61.1 {6230}
	0.75kW	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}
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}

: 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			
			50Hz (1500r/min)		60Hz (1800r/min)	
			Shaft Speed mm/min (mm/s)	Thrust kN {kgf}	Shaft Speed mm/min (mm/s)	Thrust 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)	26.3 {2690}	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}
		1/15	198 (3.3)	134 {13650}	240 (4.0)	112 {11470}
JWB200	0.75KW	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}
		1/20	150 (2.5)	177 {18110}	180 (3.0)	147 {14990}
	1.5KW	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)

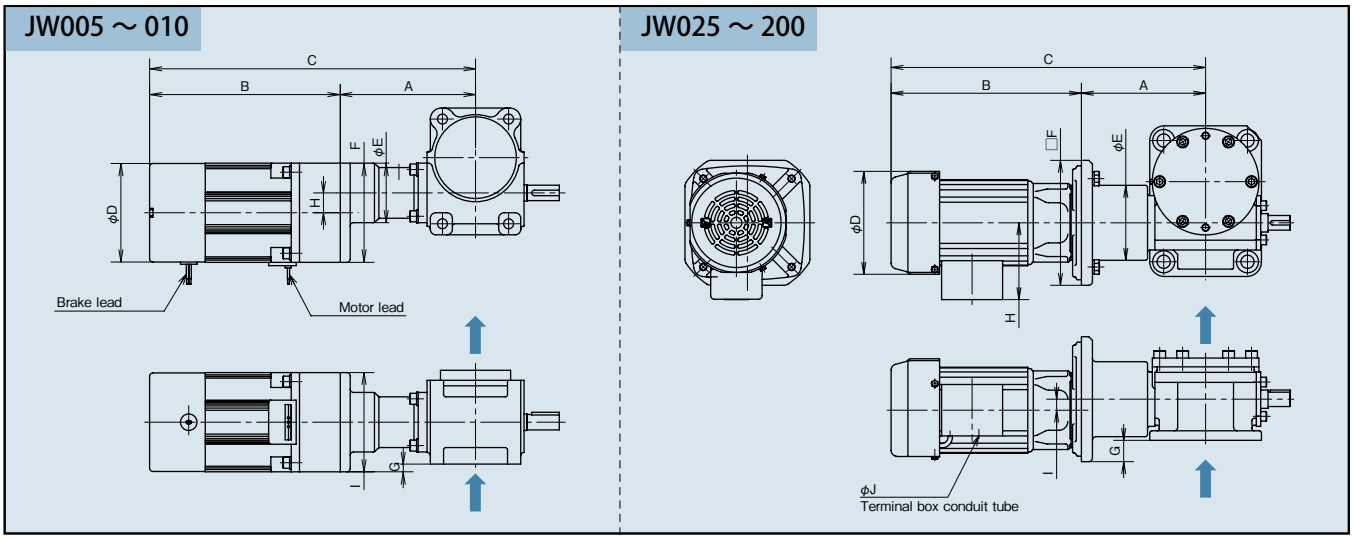
Model No.	Motor Weight	Gear Ratio	Jack Gear Ratio			
			50Hz (1500r/min)		60Hz (1800r/min)	
			Shaft Speed mm/min (mm/s)	Thrust kN {kgf}	Shaft Speed mm/min (mm/s)	Thrust kN {kgf}
JWH010	40W	1/5	1200 (20)	0.98 {100}	1440 (24)	0.88 {90}
		1/10	600 (10)	2.16 {220}	720 (12)	1.67 {170}
JWH025	0.1KW	1/5	1260 (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.

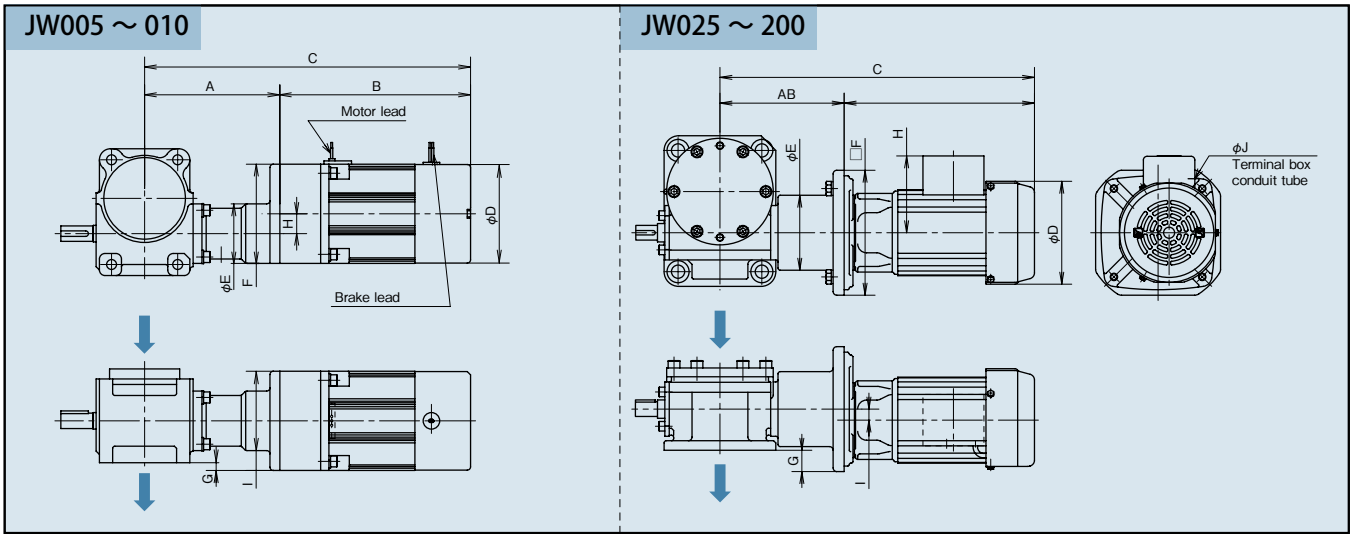
Outline Drawings for Motored Jacks

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.

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	562	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

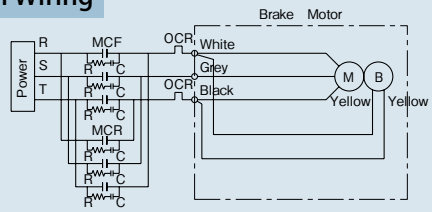
Specifications	25W ~ 40W	0.1kW ~ 1.5kW	1.5kW
Single Phase 100V 50/60Hz	○	○(100W,200W only)	—
Inverter Motor	—	○	○
Out door Use (IP55)	—	○	○
400V Class Voltage	△*	○	○
Special Voltage	—	○	○
Global Use (CCC,CE,UL)	△*	○	—
One touch brake manual release	—	○	○
Manual shaft	—	○	○
Rotary encoder	—	○	○

* Consult TEM

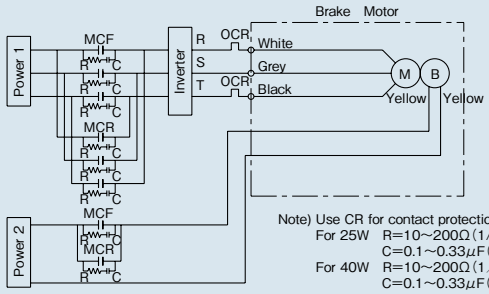
Circuit Diagrams

Circuit Diagrams for 25~40W

Internal Wiring



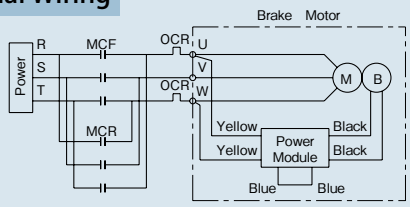
External Wiring (With Inverter)



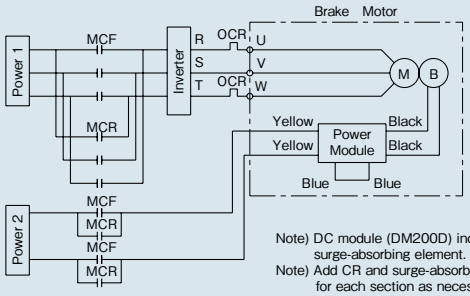
Note) Use CR for contact protection.
For 25W R=10~200Ω(1/4W or more)
C=0.1~0.33μF(AC125WV or more)
For 40W R=10~200Ω(1/4W or more)
C=0.1~0.33μF(AC250WV or more)

Circuit Diagrams for 0.1~1.5kW

Internal Wiring



External Wiring (With Inverter)



Note) DC module (DM200D) includes surge-absorbing element.
Note) Add CR and surge-absorber for each section as necessary.

With Motor JWM (Machine Screw Type)

Model No.	Motor Weight	Jack Gear Ratio			
		50Hz (1500r/min)		60Hz (1800r/min)	
		Shaft Speed mm/min (mm/s)	Thrust kN {kgf}	Shaft Speed mm/min (mm/s)	Thrust 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			
		50Hz (1500r/min)		60Hz (1800r/min)	
		Shaft Speed mm/min (mm/s)	Thrust kN {kgf}	Shaft Speed mm/min (mm/s)	Thrust 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			
		50Hz (1500r/min)		60Hz (1800r/min)	
		Shaft Speed mm/min (mm/s)	Thrust kN {kgf}	Shaft Speed mm/min (mm/s)	Thrust 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}

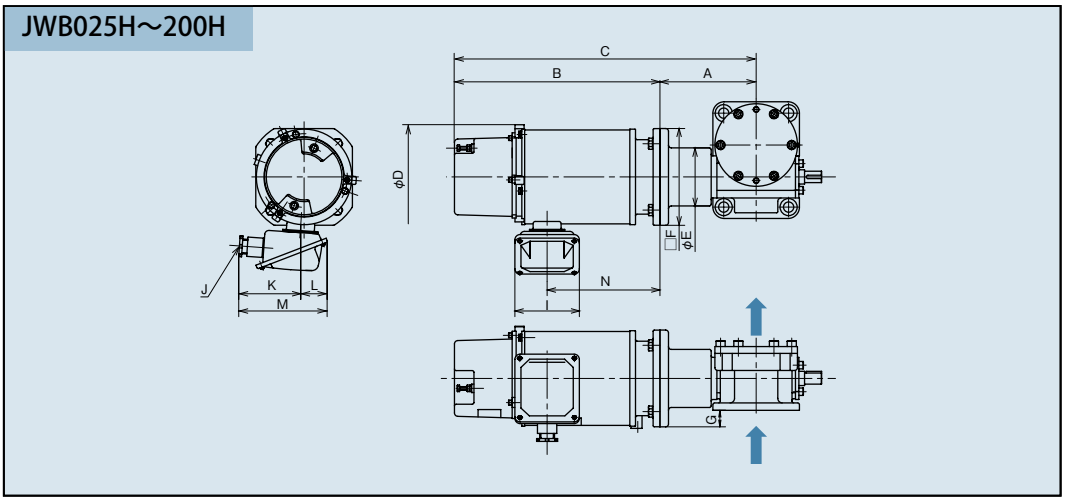
: Standard
: Rush Order
: Made-to-Order

* 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

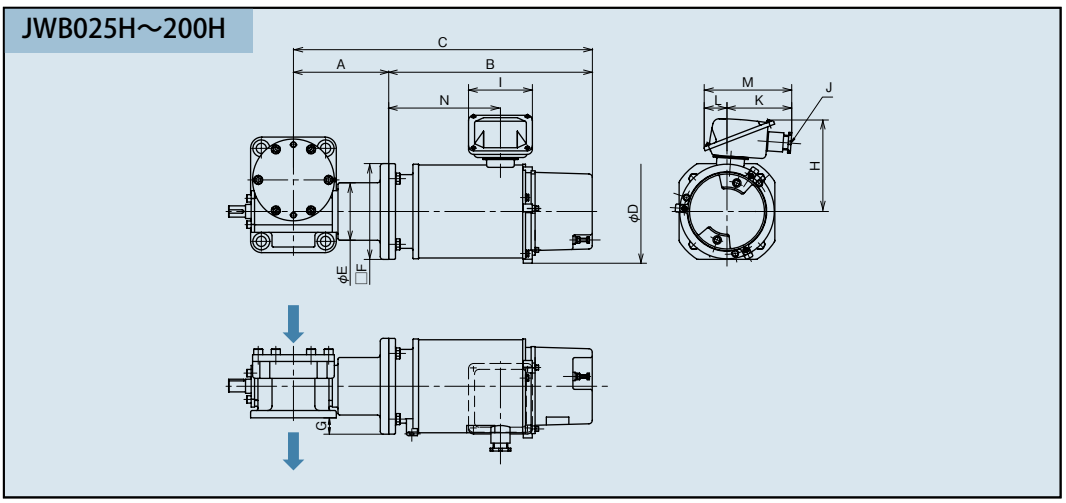
JWB025H～200H



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

JWB025H～200H



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.

mm

Frame No.	Motor Weight	A	B	C	D	E	F	G	H	I	J	K	L	M	N
JW025	0.4kW	139	253	392	132	95	120	15	123	84	SK-14L(PF1/2)	79	45	124	134
	0.75kW	146	300	446	162	93	170	40	153	114	A20C(PF3/4)	106	49	155	144
	1.5kW	146	362	508	184	102	170	40	165	114	A20C(PF3/4)	106	49	155	199
JW050	0.75kW	169	300	369	162	93	170	29	153	114	A20C(PF3/4)	106	49	155	144
	1.5kW	169	362	531	184	102	170	29	165	114	A20C(PF3/4)	106	49	155	199
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

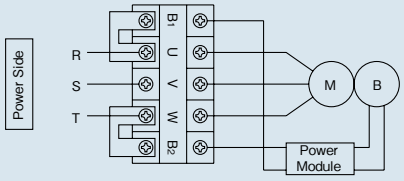
Motor Specifications

Output	0.2kW~0.4kW	0.75kW~3.7kW
Power Source	200/200/220V	
	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)	

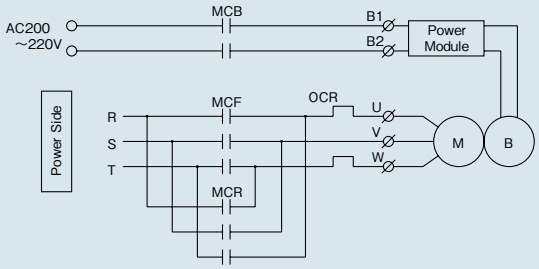
Circuit Diagrams

Circuit Diagrams for 0.2~0.4kW(200V)

Brake Internal Wiring

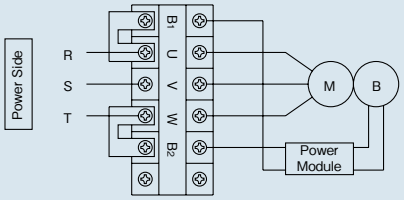


Brake External Wiring

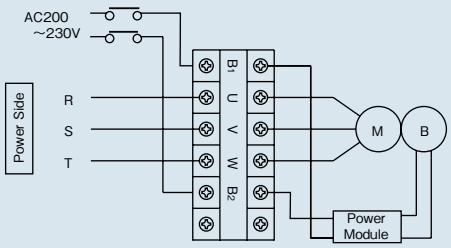


Circuit Diagrams for 0.75~3.7kW(200V)

Brake Internal Wiring

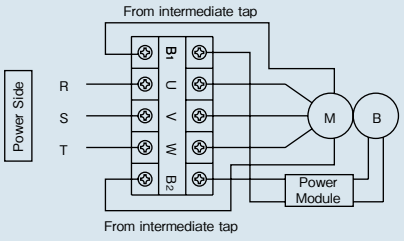


Brake External Wiring

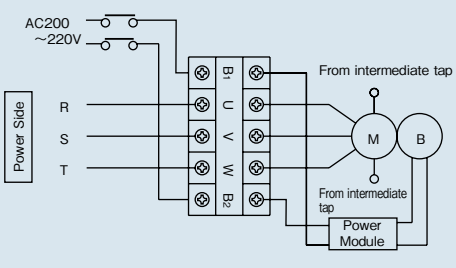


Circuit Diagrams for 0.2~0.4kW(400V)

Brake Internal Wiring

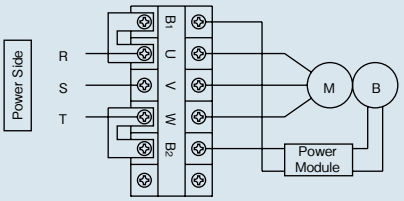


Brake External Wiring

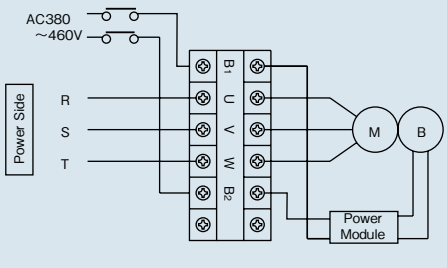


Circuit Diagrams for 0.75~3.7kW(400V)

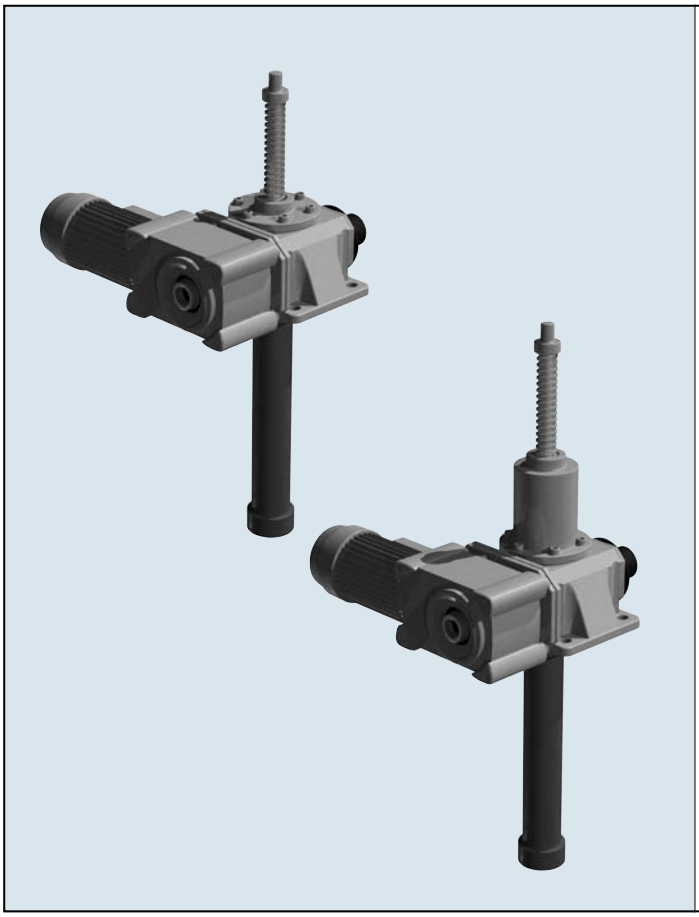
Brake Internal Wiring



Brake External Wiring



Hypoid Motor Type

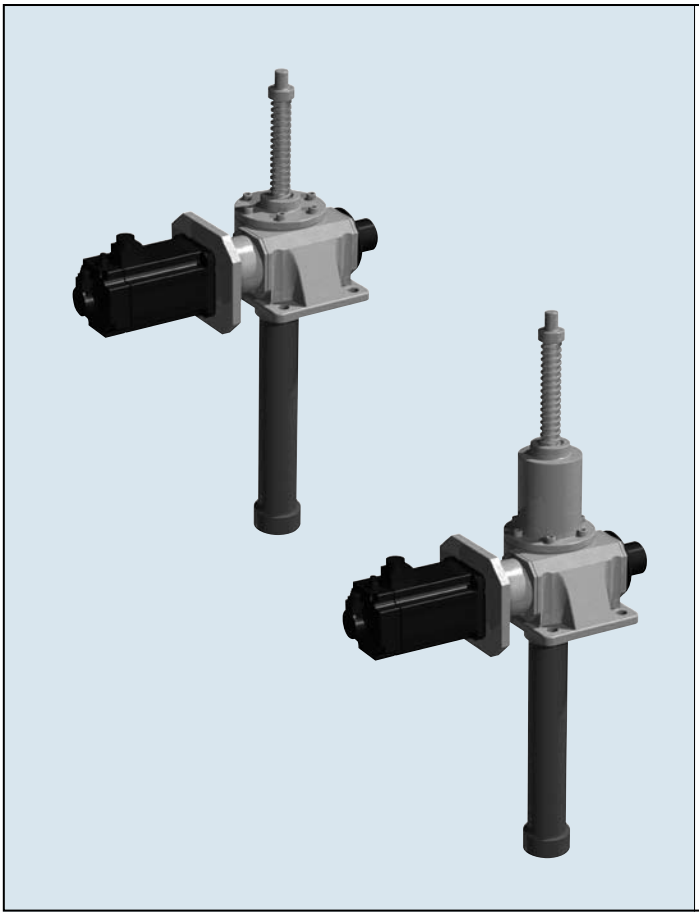


Notes

1. Tsubaki Emerson's 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 Emerson product)

Servo Motor Type

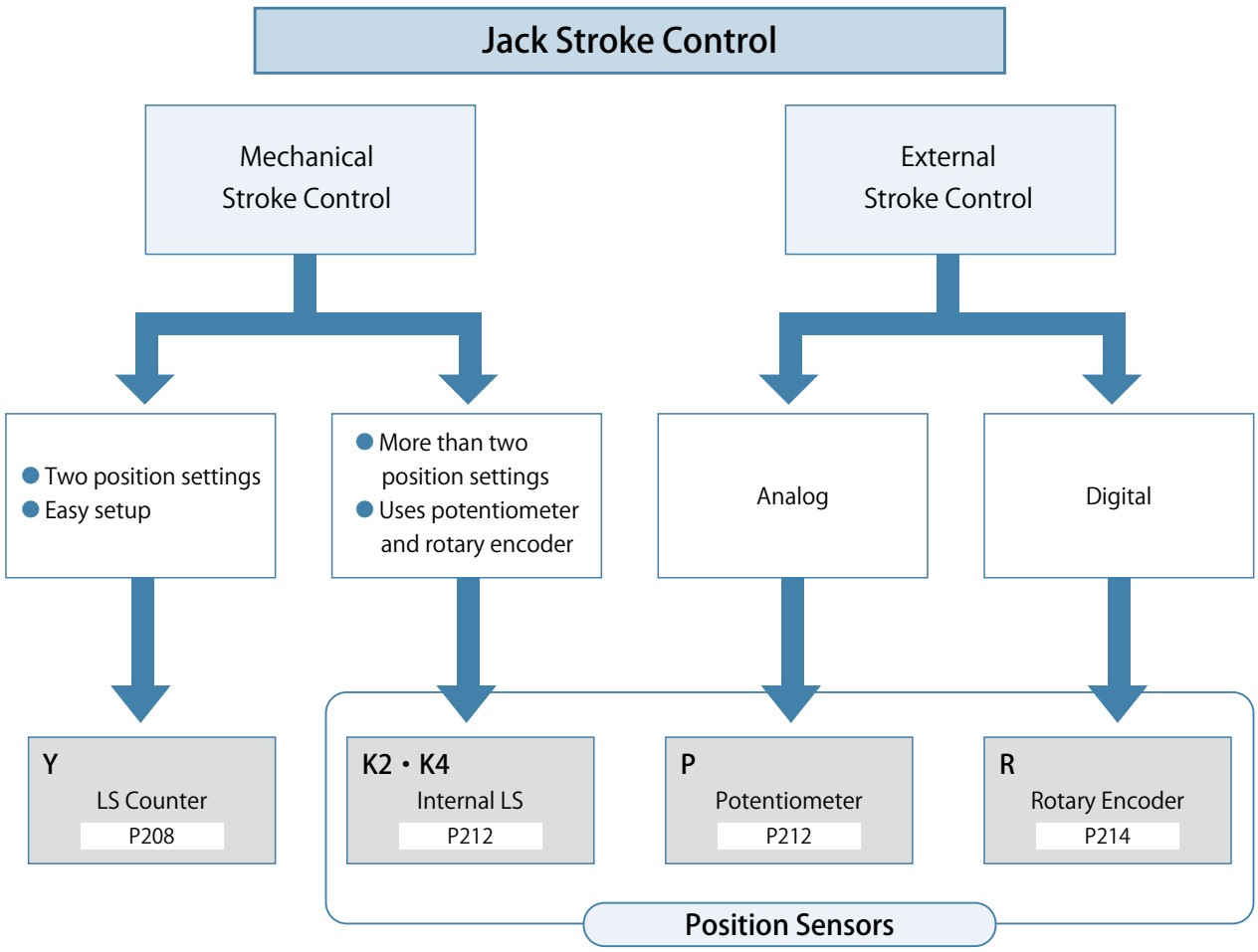


Notes

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.

Position Sensor

(1) Internal LS
(2) Potentiometer
(3) Rotary Encoder

3 options are available based on specific needs.
A combination of all 3 is also available.

(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)
- ●R controller

(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.

- ●Pulse counter

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.

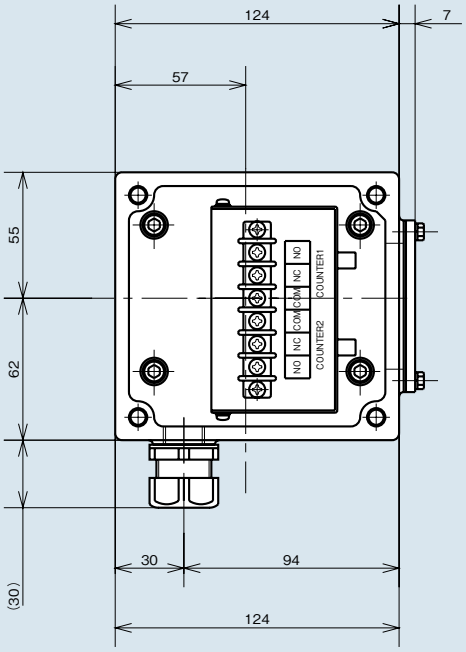
Note) LS Counters cannot be used with a rotary encoder or potentiometer. Rotary encoders and potentiometers must be used with a position detection unit (with internal LS).

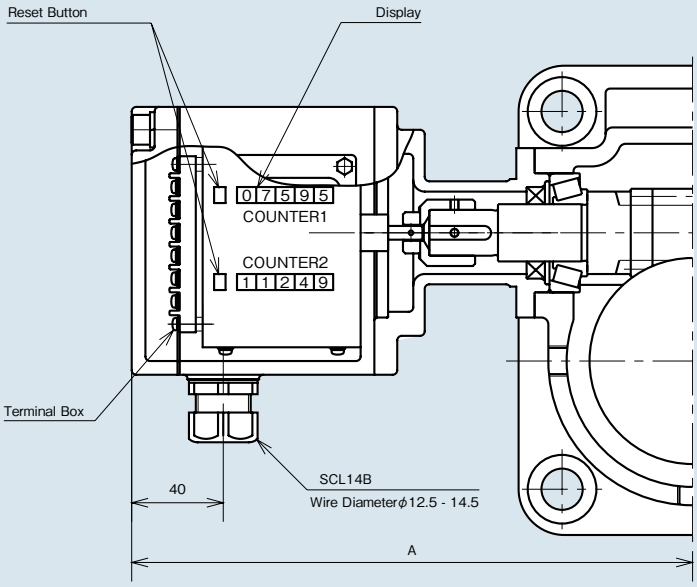
Form	Mechanical Counter
No. of Counter Digits	5 (1 Count/Input Shaft Revolution)
Allowable Max. Input Rotation	1800r/min
Limit Switch Used	AVT3254 (Matsushita Electronics)
Contact Composition	1 C (Max. and Min. 1 pt. each)
Power Voltage	AC250V 3A
Ambient Temperature	−5〜40℃

* 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.

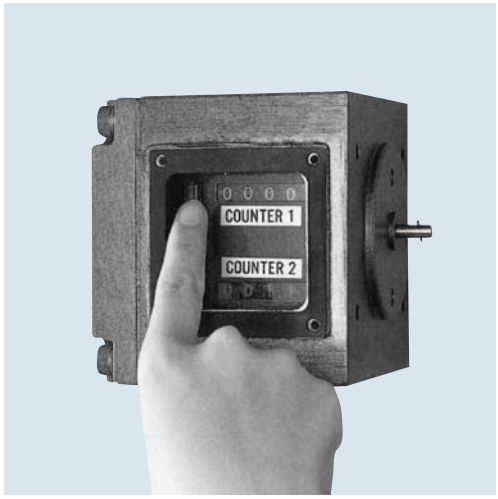
mm

Frame No.	002	005	010	025	050	100	150	200
A	187	187	211	220	245	271	275	280

Setting the LS Counter

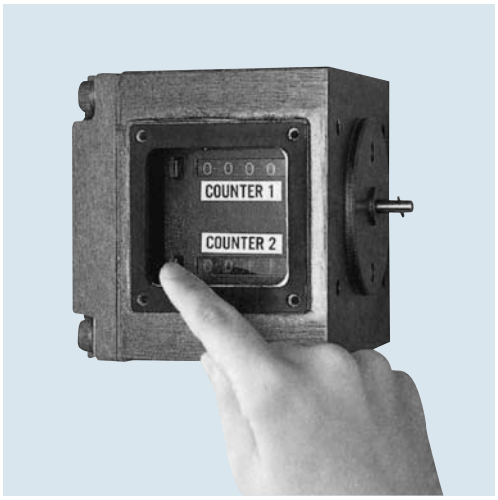
Setting the limit switch is as easy as 1 ~ 6 below.

1. Remove cover.

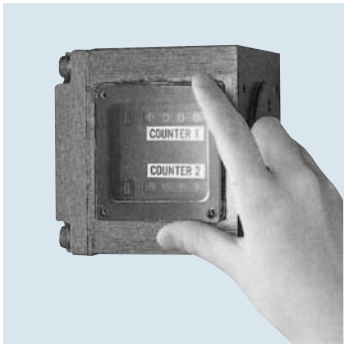


2. Set jack at desired maximum and minimum positions manually or by inching.
3. Press the counter reset button.
   (The display will show 00000 and measure from this position.)
4. Confirm by moving the jack and then returning it to the set position. Limit switch is now activated.

5. Next, set the jack at another position and confirm in the same manner.



6. Replace cover.



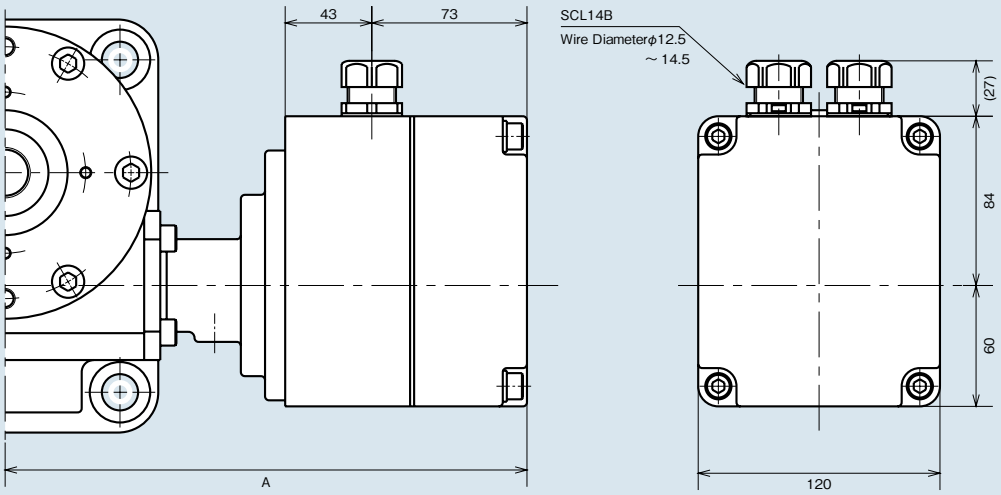
Note) Turning the shaft or travel nut after adjustment will change the setting.

Position Sensors

3 kinds of position sensors are available.

① Internal LS (2 or 4)
② Potentiometer
③ Rotary encoder

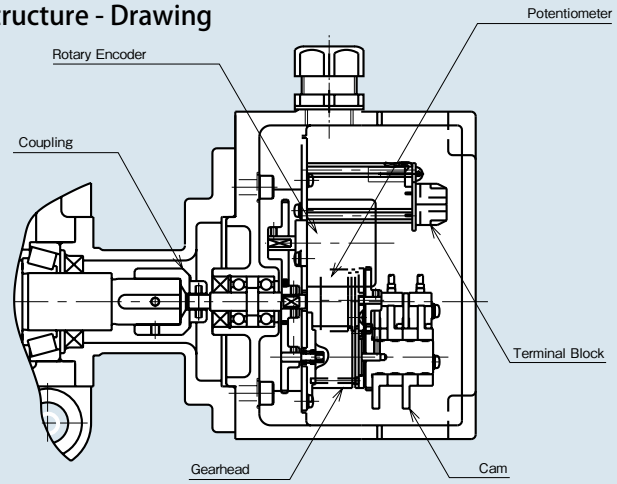
■Dimensions

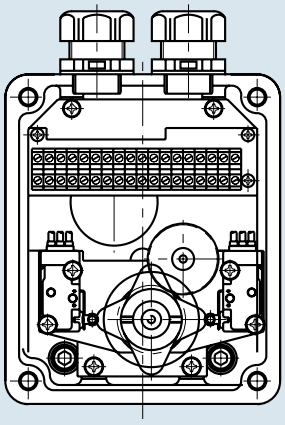


mm

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

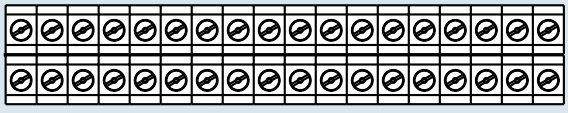
■Internal Structure - Drawing



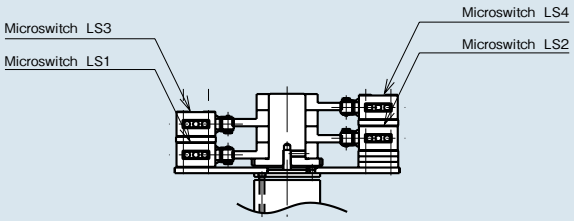


Position detection unit wiring

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

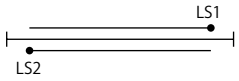
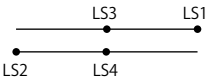


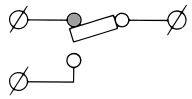
Option	Internal LS (K2,K4)									Potentiometer			Rotary Encoder					
Symbol	LS1		LS2		LS3		LS4		Common	P			R					
Contact	a	b	a	b	a	b	a	b	c	1	2	3	1	2	Z	+5~12V	0V	Case
Terminal No.	18	17	5	6	16	15	7	8	4	1	2	3	9	10	11	12	13	14

①Internal 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: Fixed at midway position. Fixed end. Return: Fixed at midway position Fixed end.

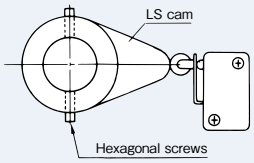
Model No.	D2VW-5L2A-1M Equivalent
Electric Composition	AC250V 4A（cosφ0.7）
Contact Composition	1C 

〈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.



②Potentiometer

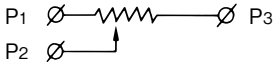
Potentiometers are programmed to activate within effective angles.

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 Kougyou
Maximum Resistance	1.0kΩ
Rated Power	0.75W
Dielectric Strength Voltage	AC1000V（1min）
Effective Electrical Angle	355°
Effective Mechanical Angle	360° Endless



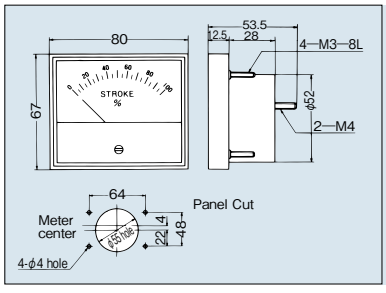
Potentiometer Control Option 1

■Stroke Display Meter

Displays stroke in % by receiving signals from the Printed Circuit Board.

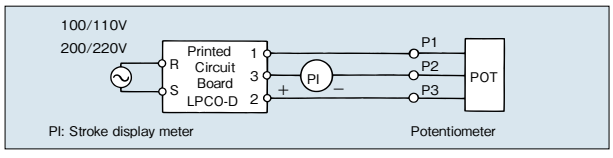
Jack models with a potentiometer should be used.

Model No.	RM-80B（DC100μA） Equivalent
Class	JIS C 1102.25
Exterior	Black Frame
Scale Used	Maximum Stroke 100%



■Printed Circuit Board

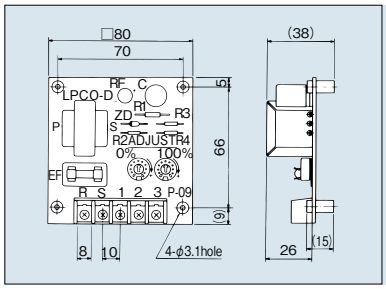
Converts power signals from potentiometer into currents.

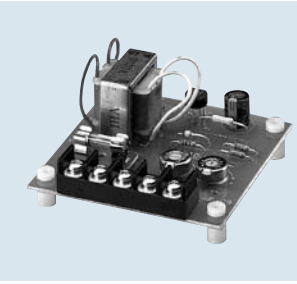


In order to adjust the meter, adjust the volume on the printed circuit board. Do not confuse - and +. When adjusting the meter to 100% while stroke is at MIN, replace the terminal 1.2 of the printed circuit board.

Model no. LPCO-D1 (voltage 100/110V 50/60Hz)

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





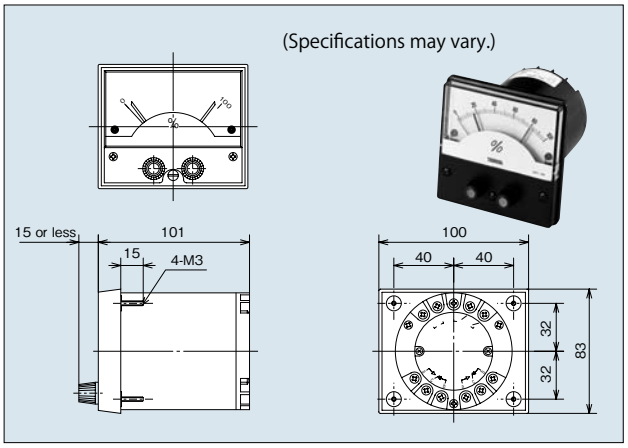
Potentiometer Control Option 2

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) When requesting TC unit (4～20mA output), specify as 4～20mA output.

Model No.	NRC-100HL (TSURUGA) or Equivalent
Class	JIS C1102 2.5
Exterior	Black Frame
Scale	Maximum Stroke 100%
Power	AC 100/100.200/220V 50/60 Hz
Input	Maximum DC100μA
Output Contact Composition	High, Low both 1C (see graph below)
Contact Capacity	AC250V 3A (cosφ=1)

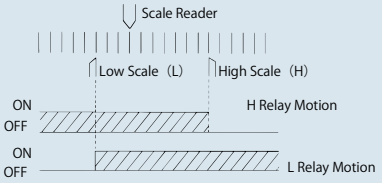


Use Linipower Jack models with a potentiometer. Take caution so that the input shaft does not rotate while the shaft and the potentiometer are not fully connected. This can shift the phase of the stroke.

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.



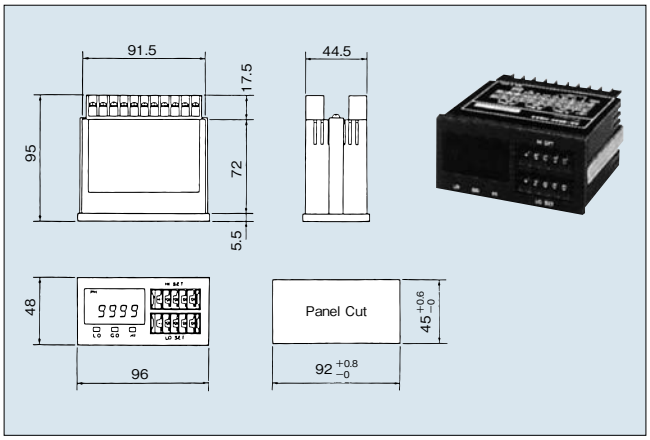
Potentiometer Control Option 3

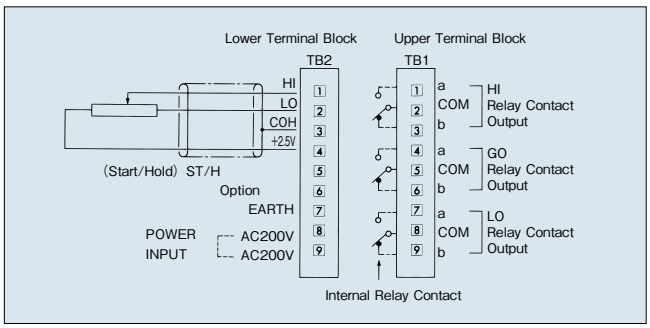
R Controller

Converts signals received from the potentiometer in the position detection unit into a digital display, and allows precise stroke control. Its scaling device displays actual stroke and distance in %. Direct connection of R Controller and Potentiometer is possible.

Use Linipower Jack models with a potentiometer.

Model No.	RX-5455-NBAS (BURRUF) Equivalent
Input Potentiometer Maximum Resistance	0.8kΩ～12kΩ
Display	4 Rows 7 Segment LED
Exterior	Black
Relative Output	HI, LO, GO (Relay output)
Relative Position	0±9999
Relative Output Contact Capacity	DC30V/1A AC250V/0.2A
Output Contact Structure	1C (HI, GO, LO)
Power	200V AC±10% 50/60Hz





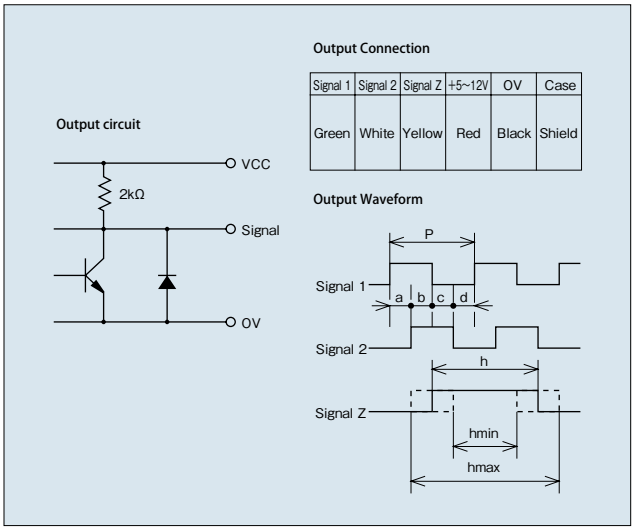
③ Rotary Encoder

Excellent for controlling stroke by sequencer and programmable controller.

* Encoder is set at 30 pulses per input rpm in the position detection unit.

Note)Standard encoders produce voltage output. Take caution in the output mode when directly connecting to a sequencer.
Open collector, line driver and other output sourses are also available.

Model No.	OVW2-006-2M-050 Equivalent
Maker	Nihon Densan Nemikon Co.
Output	Incremental



1. Set starter with the limit switch.
2. External load must not exceed allowable loss P.

<Encoder>

Output Pulse	60P/R
Output Waveform	AB90°Phase different signal + original signal
Power	DC4.5～13.2V (Insert)
Max. response frequency	200kHZ

Operating Temperature	−10℃～+70℃
Storage Temperature	−30℃～+80℃
Humidity	RH85% or below. No condensation
Vibration	10～55HZ/1.5mm 2hr
Shock	490m/s2/11ms (XYZ Directions 3 times each)
Protection	IP50

Note) Above reference is for encoders only.

Rotary Encoder Control Option

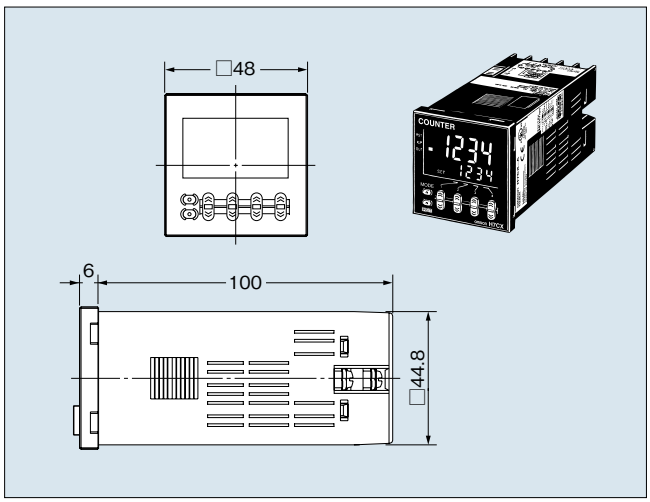
■Pulse Counter

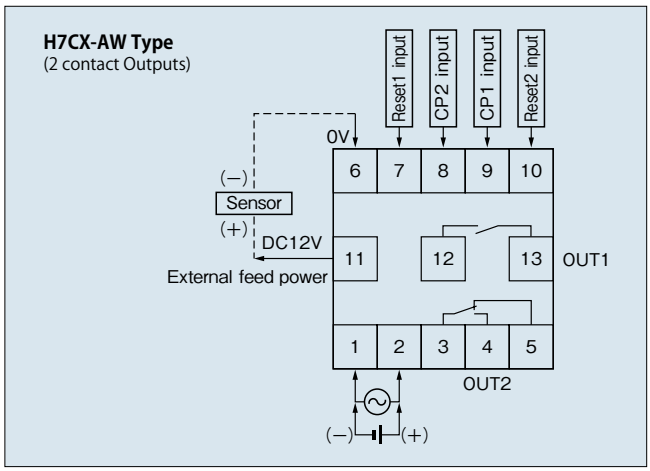
Counts and displays pulse from rotary encoder. This counter can also produce relay outputs and its pre-scale function displays actual movement. Connect to self-holding circuit when using to control stroke. Display and counter are backed up by internal battery to avoid mechanical damage in times of power outage.

Note) Standard counters produce voltage output. Take caution in the output mode when directly connecting to a sequencer.

Use Linipower Jack models with a Rotary Encoder.

Model No.	OMRON H7CX-AW (±Area Type) Equivalent
Type	Pre-set Counter
Protection	IP54F (Panel Surface)
Pre-Scale Function	Yes (0.0001～99.999)
Display Type	7 Segment LCD Calculation, Back light
Rated Power	AC100～240V (50/60Hz)
Power Consumption	Approx. 6.6VA (at AC 240V 50Hz)
Control Output	Contact point: AC250V 3A (cos φ=0.8～1)
Common Power Source	DC12V±10% 100mA (Ripple 5% <)
Ambient Temperature	−10～55℃ (Do not freeze)
Storage Temperature	−25～65℃ (Do not freeze)
Ambient Humidity	35～80% RH



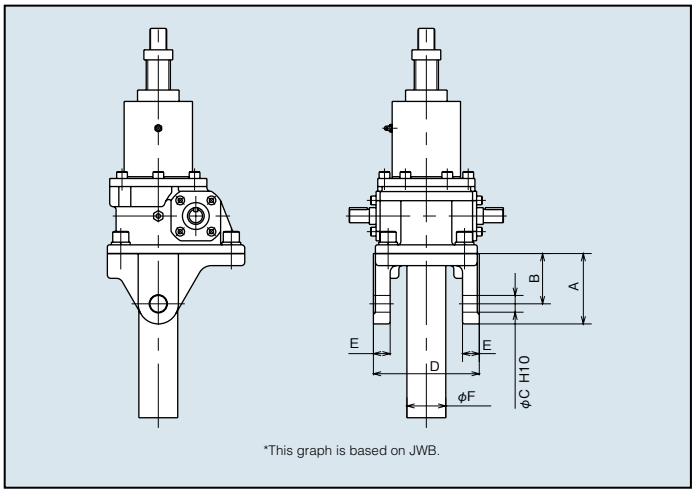


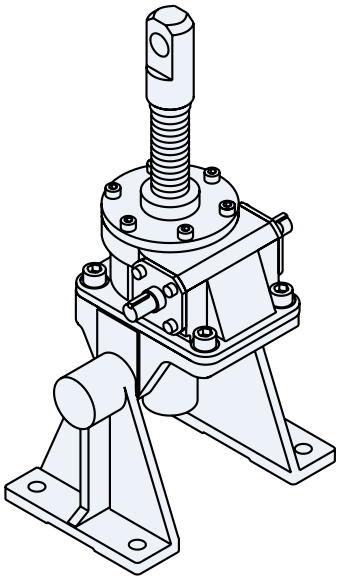
Pulse counter of OMRON can be used. For the pulse counter, refer to the catalog of OMRON. Use the Linipower Jack model with a Rotary Encoder.

Clevis and Trunnion Mounting Adapters

1. Clevis Mounting Adapter

Convenient for use with opening/closing or tilting devices.





Clevis Measurements

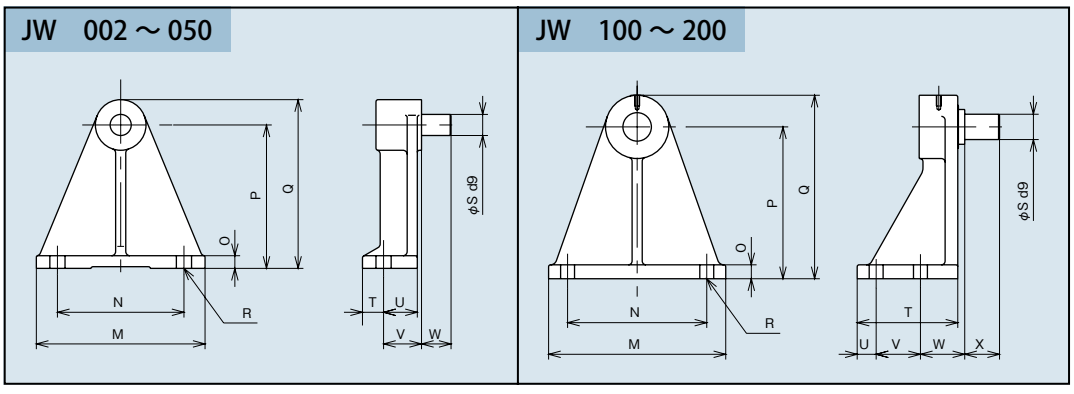
mm

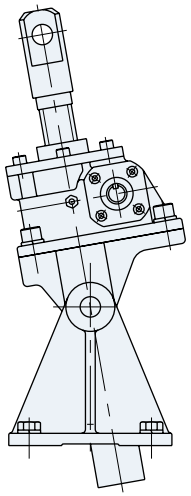
Frame No.	A	B	C	D	E	φF
002	75	60	15	64	12	25
005	75	60	15	64	12	25
010	77.5	60	15	86	15	35
025	100	75	20	115	20	45
050	105	75	25	158	25	58
100	145	100	40	201	30	76.3
150	155	105	50	224	44	76.3
200	173	110	63	244	50	89.1

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

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

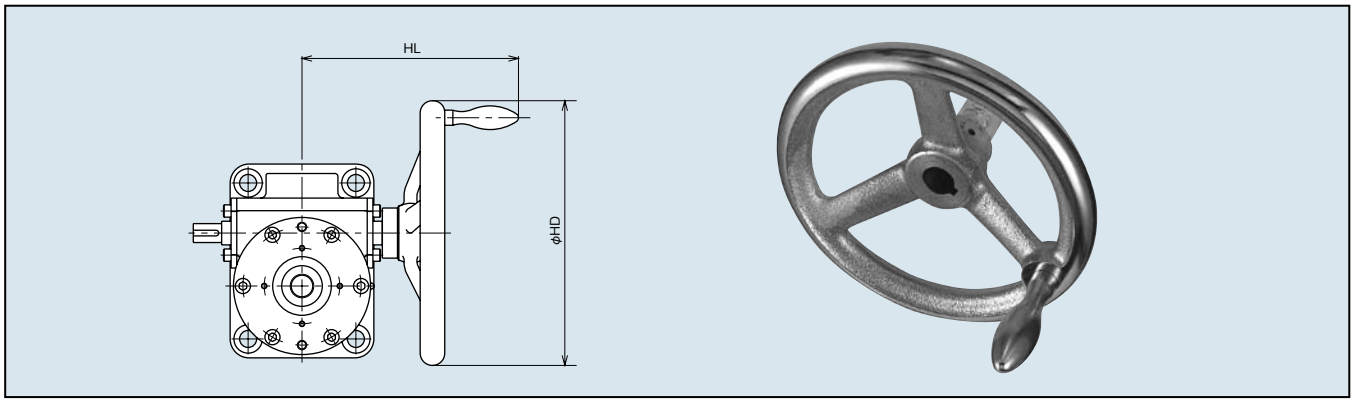
Hand Wheel and Column

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 JWMs (Machine Screw Type) only.
Because JWBs (Ball Screw Type) and JWHs (High Lead Screw Type) are not equipped with a self-lock, the input shaft may be reversed by a load, therefore, 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

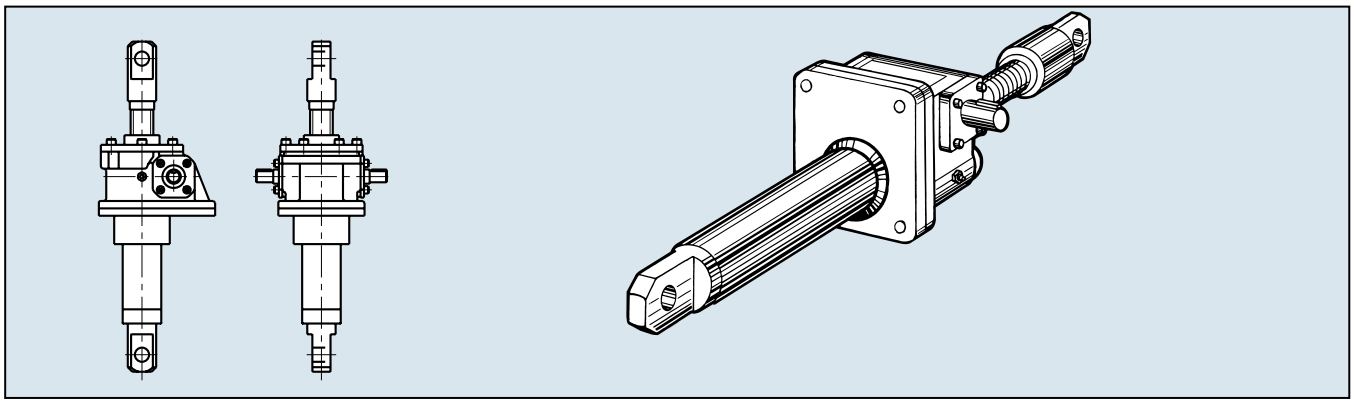
mm

Handle Size / Frame No.	NV80		NV100		NV200		NV280*		NV450*	
	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 Emerson.

2. Column

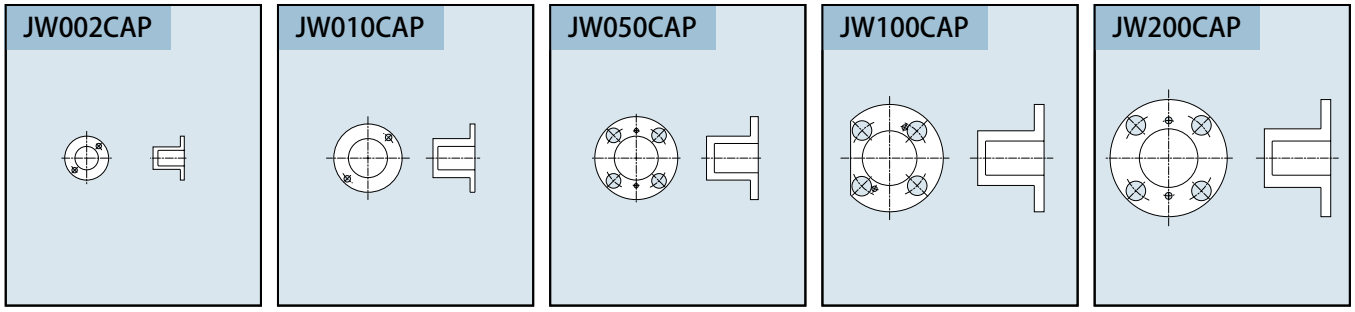
This can be used with Open/Close, Reverse Rotation, Positioning and other devices.



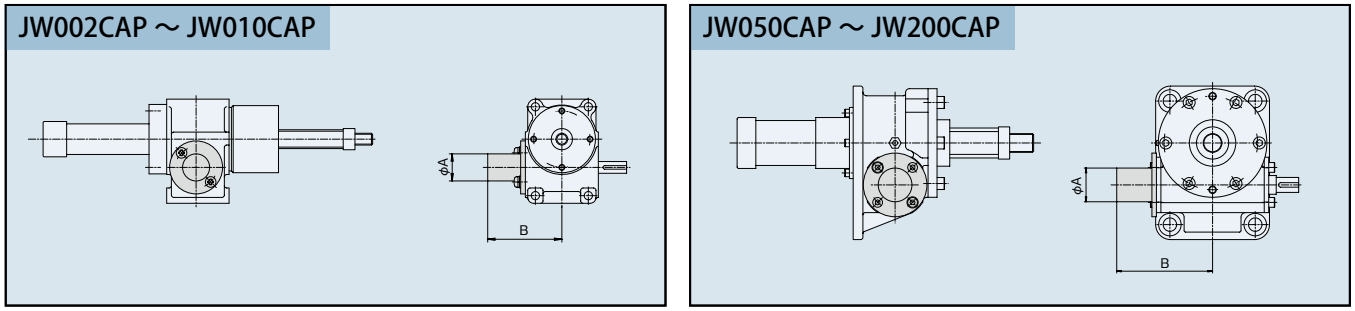
Safety Cap

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



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

Fig.1 Lifting

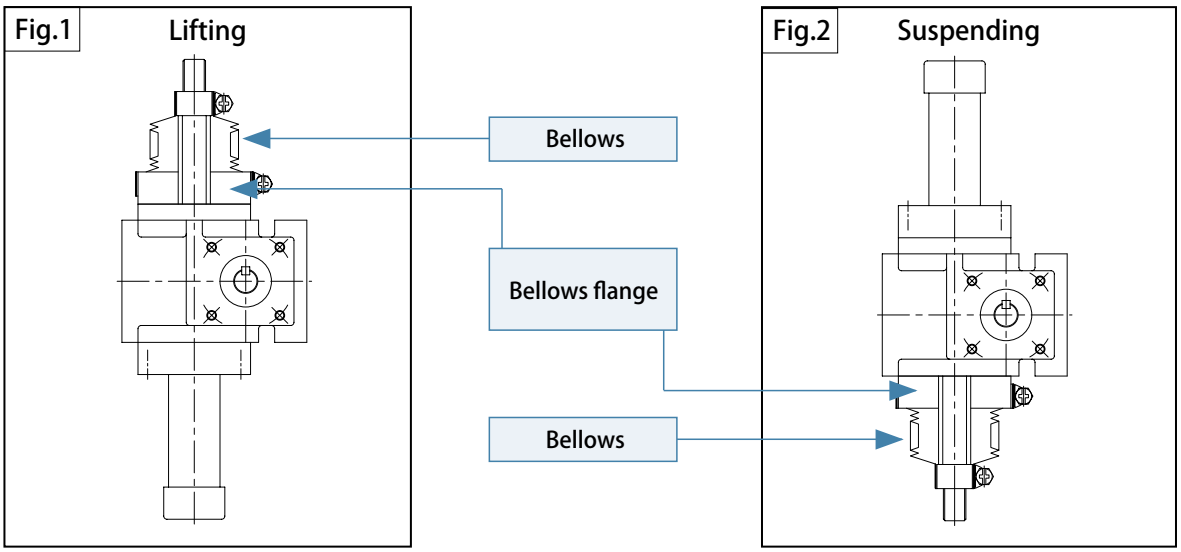
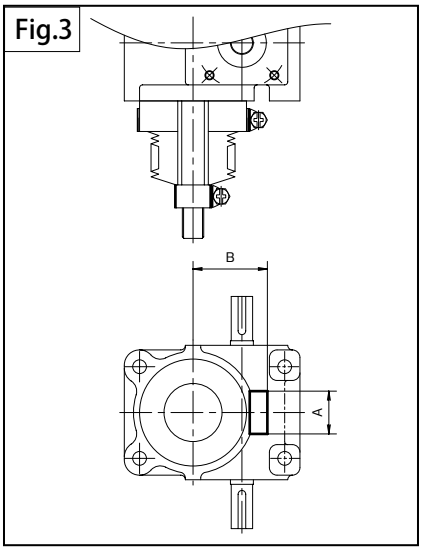


Fig.2 Suspending

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.

Frame No.	A	B
JW002	28	42
JW005	28	42
JW010	28	47

Fig.3

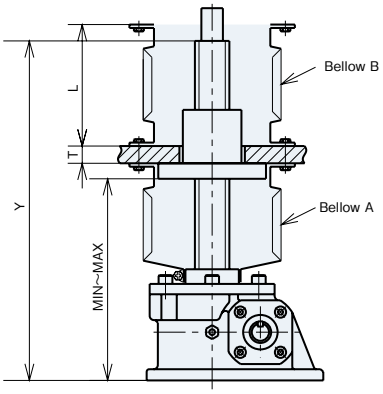


High Lead Ball Screw

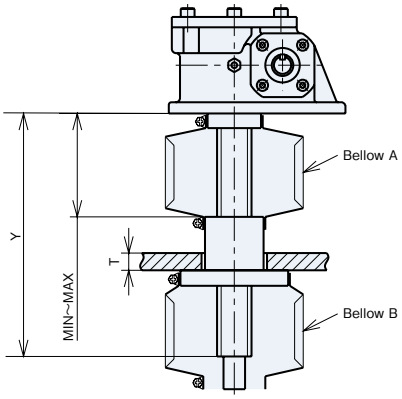
Bellows for High Lead Ball Screw Types are specially designed for specific shaft rpm.
Contact Tsubaki Emerson to select the most suitable bellows for your High Lead Ball Screw.

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.



(Lifting)



(Suspending)

①Jack model No. _____

②Actual stroke_____mm
MIN_____mm ～ MAX_____mm

③Type of bellows
Bellows A Band-band, band-flange, flange-flange
Bellows B Band-band, band-flange, flange-flange

④Jack screw shaft length limited yes / no
Y=_____mm

⑤Base measurements
T=_____mm

⑥Maximum outer diameter of bellow ϕJ
No Limit, ϕJA=_____mm ϕJB=_____mm

⑦Flange type and structure (Record only if flange type was selected in ③).

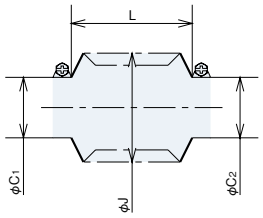
ϕD_{A1}=_____mm	ϕd_{A1}=_____mm	bolt mounting part	M_1=_____Pcs	ϕN_1=_____mm	(bellows A)
ϕD_{A2}=_____mm	ϕd_{A2}=_____mm	bolt mounting part	M_2=_____Pcs	ϕN_2=_____mm	
ϕD_{B1}=_____mm	ϕd_{B1}=_____mm	bolt mounting part	M_1=_____Pcs	ϕN_1=_____mm	(bellows B)
ϕD_{B2}=_____mm	ϕd_{B2}=_____mm	bolt mounting part	M_2=_____Pcs	ϕN_2=_____mm	

⑧Bellows L measurements L
$L_{A\,MIN}$_____mm ～ $L_{A\,MAX}$=_____mm (bellows A)
$L_{B\,MIN}$_____mm ～ $L_{B\,MAX}$=_____mm (bellows B)

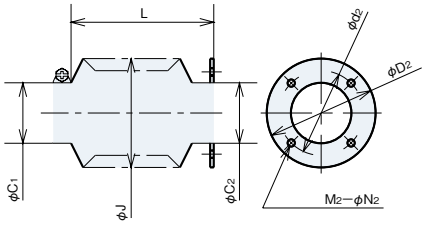
⑨Bellows attachment opening ϕC
ϕC_{A1}=_____mm ϕC_{A2}=_____mm (bellows A)
ϕC_{B1}=_____mm ϕC_{B2}=_____mm (bellows B)

●Bellows Types

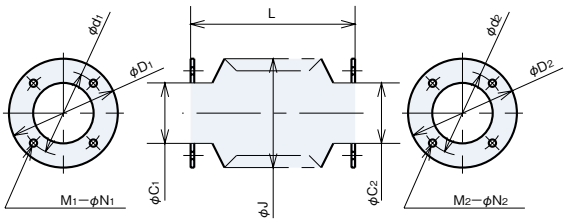
Band - Band Type



Band - Flange Type



Flange - Flange Type



Linipower Jack

Notes on Installation

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.
When using a jack for suspending, prepare oil pans because grease may run down through the screw shaft.

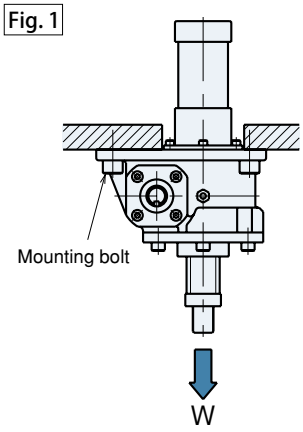
2. Installation Method

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-φ7	M6
JW005	4-φ7	M6
JW010	4-φ9	M8
JW025	4-φ11	M10
JW050	4-φ18	M16
JW100	4-φ22	M20
JW150	4-φ22	M20
JW200	4-φ26	M24
JW300	4-φ33	M30
JW500	4-φ42	M39
JW750	4-φ42	M39
JW1000	6-φ42	M39

Fig. 1

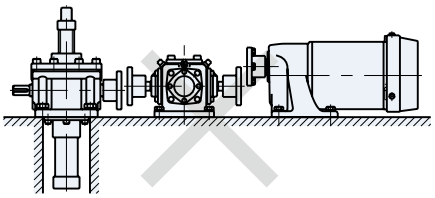


* A suspending load together with a self weight of the jack are applied on the mounting bolt as a tension load.

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 Emerson.

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.

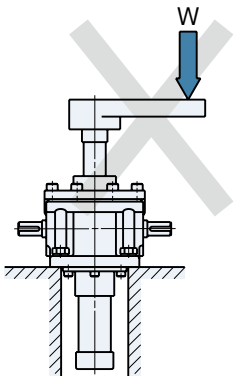
⚠ (4) Do not use mechanical stops. This will cause major internal damage.

(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 Emerson.

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 Reducer Unit	Tsubaki Emerson	JWGS100G
	Idemitsu	* Daphne Eponex Grease SR No.1
	Nippon Grease	Niglube EP-1K
	Exson Mobil	Mobilux EP
	Cosmo Lubricants	Cosmo Grease Dynamax EP
	Showa Shell	Shell Alvania EP Grease

* Factory filled with this grease.
Note) JWGS100G is separately sold in a 100g container.

Table 2. Lubrication Intervals

Operation Frequency	Lubrication Intervals		
	JWM	JWB	JWH
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. Reducer units for jacks JW025 and above are provided with grease nipples and plugs (hexagonal holes). Remove the plugs and pour grease through the nipples until it seeps from the openings. Then, firmly seal the openings with tape.

5. 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.

6. 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.

7. 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 (See page 114, No. 1).

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 −15～80℃. 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.

$$\text{Duty cycle (\%ED)} = \frac{\text{1 Duty cycle}}{\text{1 Duty cycle + 1 Rest cycle}} \times 100\%$$

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℃～80℃ (See General Notes No.3)
Relative Humidity	85% or less (no dew condensation)

11. When dust level is high, protect shaft with a bellows.
(For outdoor use, place a cover to protect jack from factors such as rain and wind).

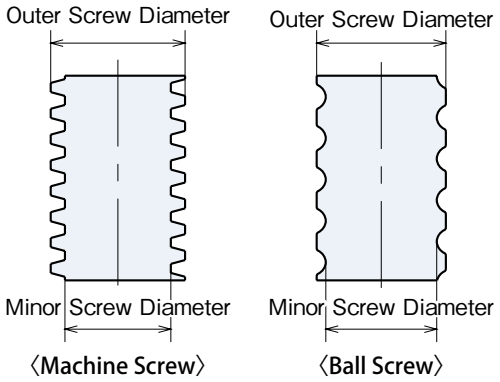
Glossary

①Basic Capacity :

The maximum possible load sustained or lifted by a jack.
Must be calculated by using the safety rate Sf.

②Outer Screw Diameter / Minor Screw Diameter:

As illustrated below.



③Screw Lead :

Distance the shaft (or nut, if used) advances in one revolution of worm wheel.

④Stroke :

Possible distance traveled by screw shaft (or nut). Derived from $X_{MAX}-X_{MIN}$.

⑤Worm 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.

⑦Maximum 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℃).

⑧Tare Drag Torque :

Torque required to rotate the input shaft of an unloaded jack.

⑨Holding Torque :

Input torque required for sustaining basic load capacity.

⑩Allowable 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.

⑪Required Input Torque of Basic Capacity :

Input torque required at the input shaft to lift load of basic capacity.

⑫Screw Movement Per Revolution of Input Shaft :

Distance the screw shaft (or nut) advances in one revolution of the input shaft.

⑬Maximum Input rpm for Basic Capacity :

Maximum possible rpm applied to the input shaft to lift load of basic capacity.

⑭Screw 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.

⑮Rated Load :

Load derived from the maximum allowable input capacity once the input screw shaft rpm is determined.

⑯Buckling :

Buckling is produced when the jack rapidly bends from excessive thrusts. Buckling load varies depending on installation condition and/or position.

⑰Rated 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.

⑱Coasting 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.

⑲Stopping Accuracy :

Range of positions where the screw shaft stops after each operation.

⑳Self-lock :

The ability to maintain load with no brake unit. Self-lock applies to all frame numbers for JWM (Machine Screw Type) 002～1000.

㉑Duty Cycle :

The ratio of run time to total cycle time.

$$\text{Duty cycle (\%ED)} = \frac{\text{1 Duty cycle}}{\text{1 Duty cycle + 1 Rest cycle}} \times 100\,(\%)$$

㉒Thrust :

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.

㉓Ball 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.

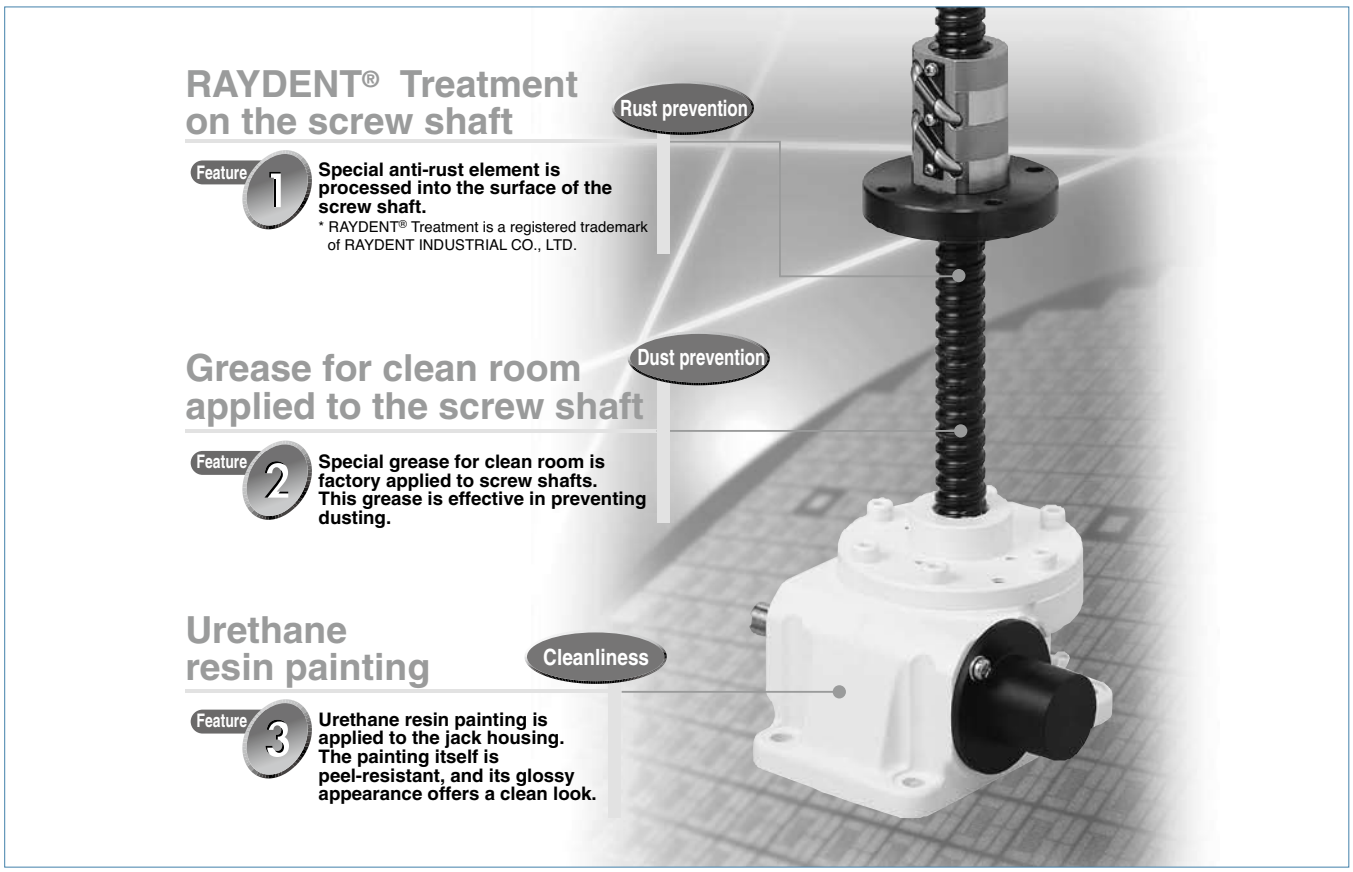
Linipower Jack

Product Information

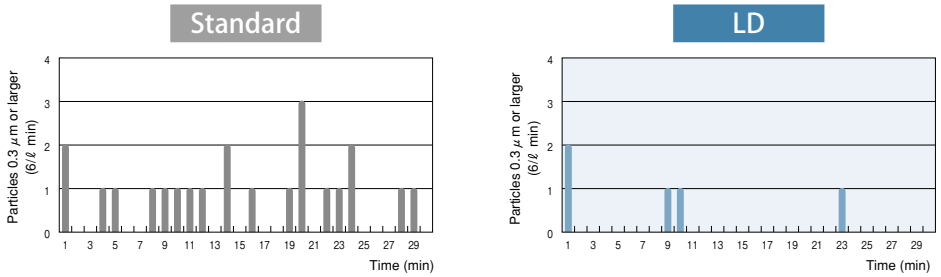
Linipower Jack LD Type

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



2. Dust Emission Comparison Graphs (Our test results)



[Test Conditions]

Heading	Contents
Frame no.	JWBO25URH5D (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)

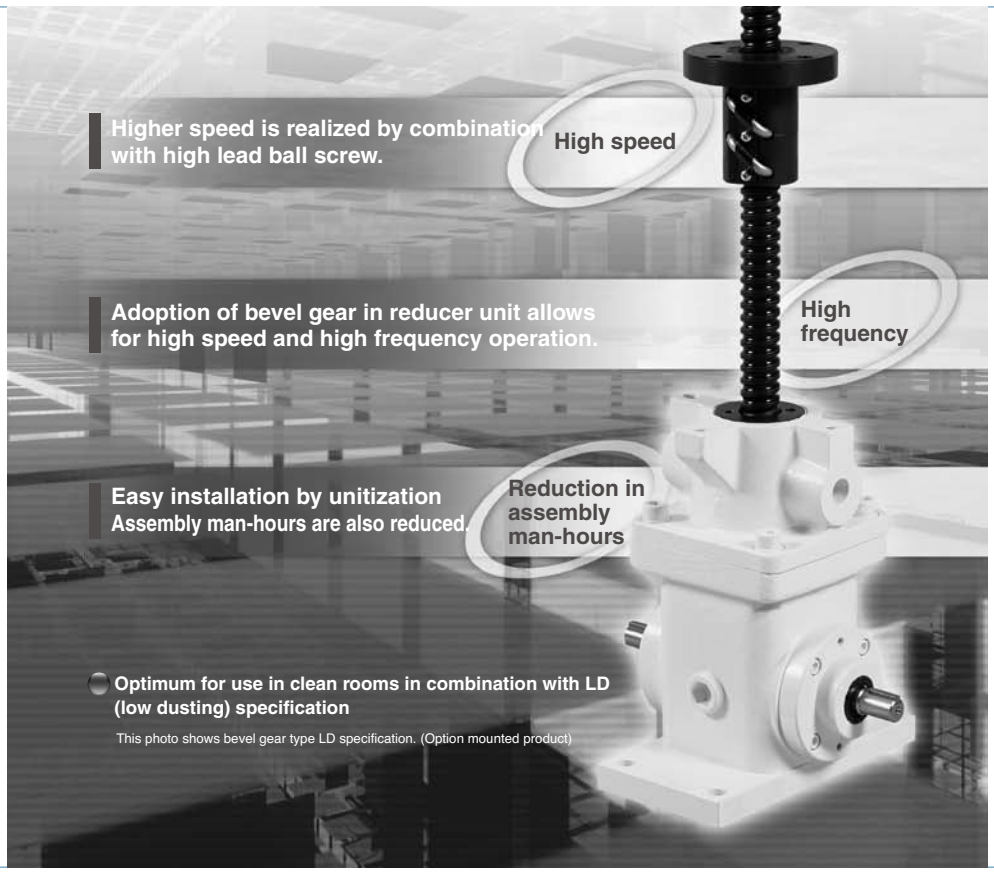
Input shaft.....Electroless nickel plating
Shaft end.....Electroless nickel plating
Steel pipe.....Metallic screw cover
Safety cap.....Plastic

*See page 217 for details

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 Emerson Low dusting grease for screw shaft LD grease

Effective for use in clean rooms!

Tsubaki Emerson screw shaft lubrication grease

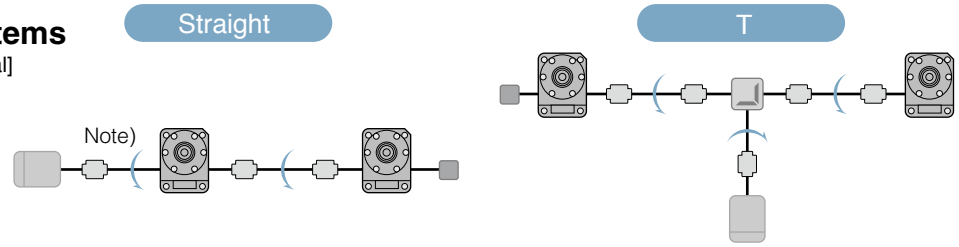
Effective for use in clean rooms!

Mechatro Center

The Mechatro Center is engaged in the selection service of power transmission products of Tsubaki Emerson.
The Mechatro Center flexibly responds to your demands including selection of drive parts and peripheral equipment and preparation of layout drawings.
Please leave it to our Mechatro Center.

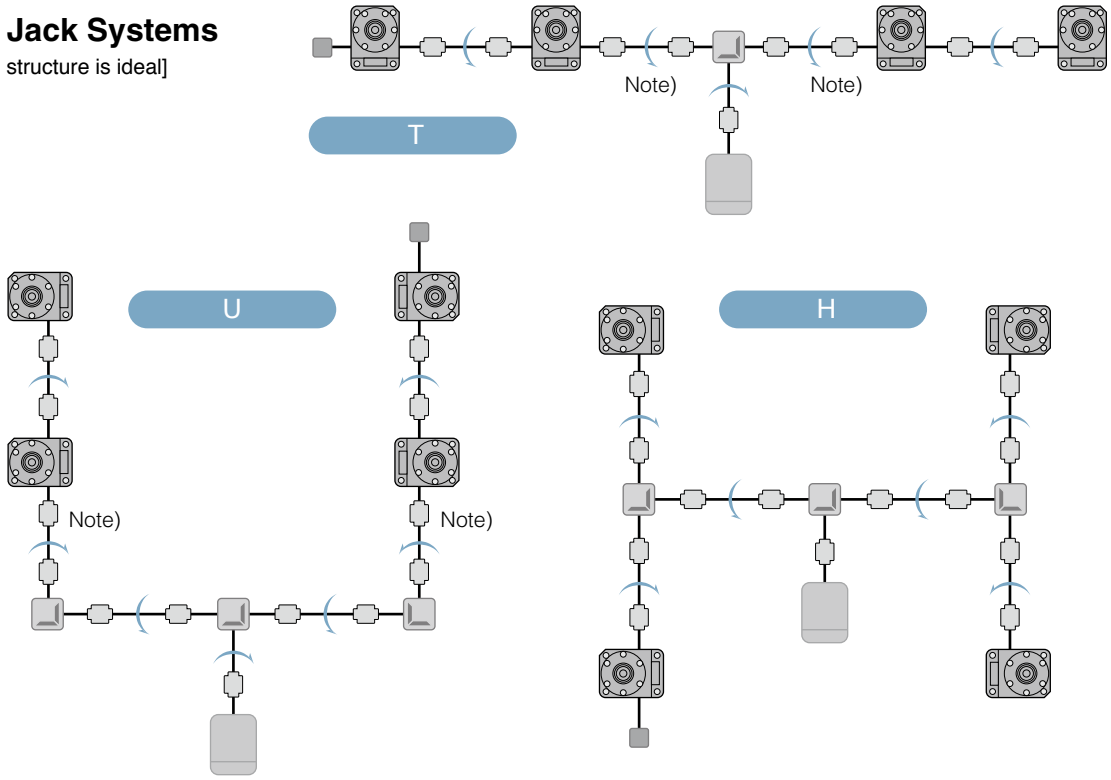
2 Jack Systems

[T structure is ideal]



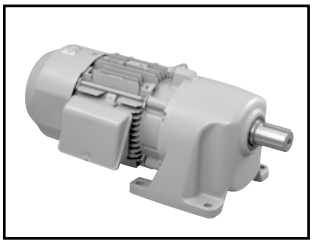
4 Jack Systems

[H structure is ideal]



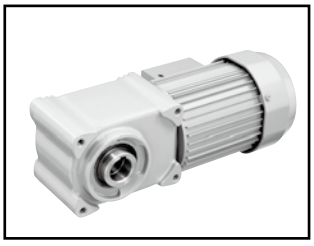
[Reducers]

Gearmotor



- Low noise, compact, light
- 0.1～5.5 kW
  Gear ratio 1/5～1/1200
- Unique face mount (standard)
- Quiet, high performance brake.

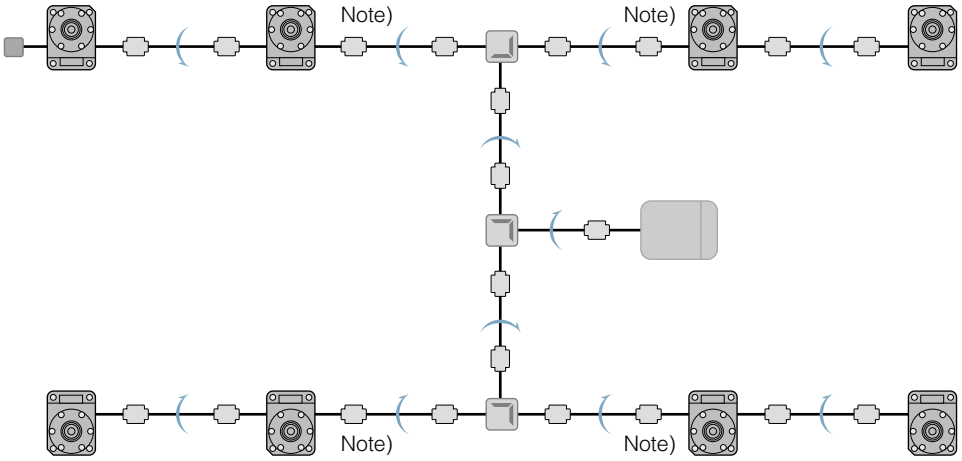
Hypoid Motor



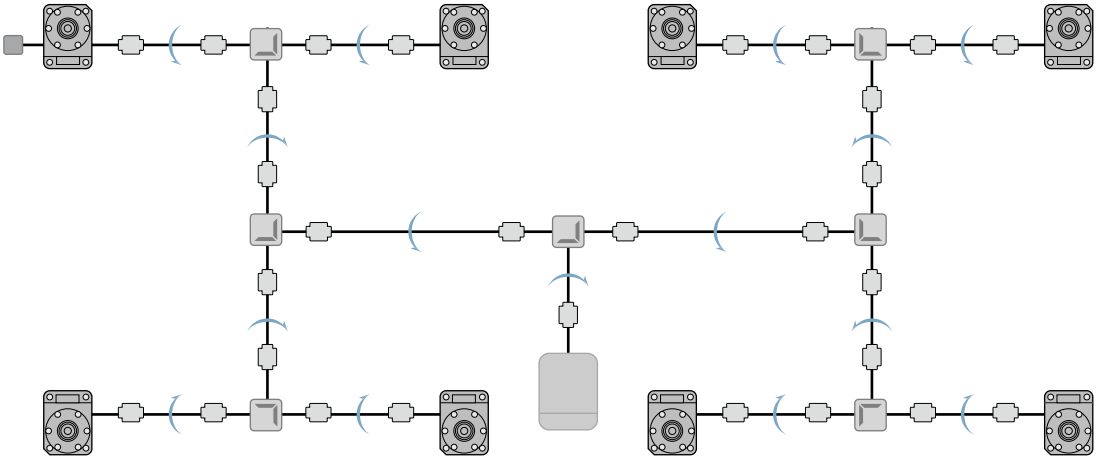
- Space saver
- 0.1～5.5kW
  Gear ratio 1/5～1/1200
- Face or foot mounting
  and hollow shaft (all standard).
- Quiet, high performance brake.

8 Jack Systems [2H structure is ideal]

H



2H

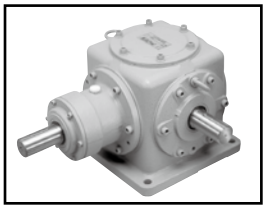


…Linipower Jack … Drive Source ···Coupling …LS Counter Position Sensor ···Gear Box

Note) Jacks lift as rotational input is applied in the direction of each arrow. Consider allowable input torque when driving in series.

[Gear Boxes]

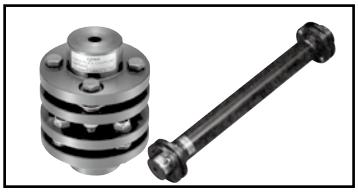
Miter Gear Box



- Gear ratio 1 : 1 10 sizes
  Gear ratio 1.5 : 1 5 sizes
  Gear ratio 2 : 1 9 sizes
  Gear ratio 2.5 : 1 5 sizes
  Gear ratio 3 : 1 5 sizes
- Enhanced performance by new AGMA standards.
- Wide variation of models.
- High reliability

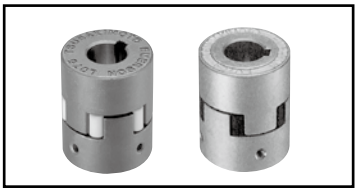
[Couplings]

Emer 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 and no lubrication.
- Long life.
- Long Spacer Types requiring no bearings available.

Jaw Flex Coupling



- Compact, light
- Simple structure
- Easy to install/remove

Ask Tsubaki Emerson for other protecting devices such as shock relays, torque limiters, and torque guards.

Response to high speed and high frequency demands!

Response to quick delivery demands!

Tsubaki Emerson is proud of the level of trust and achievement it has earned and its ability to respond to various market demands with quick delivery.

Quickly deliverable model

Type	Frame No.	Mounting geometry	Speed ratio kN{tf}	Standard stroke mm	
JWH	010	USH DSH URH DRH	9.80 {1}	100 200 300 400	500 600 800 1000
	025	USH DSH URH DRH	24.5 {2.5}	100 200 300 400	500 600 800 1000 1200

* Ten units or less are available in one unit.
* For models and options other than the above, separately contact Tsubaki Emerson.

Inquiry Form

Power Cylinder Inquiry Form

Inform Tsubaki Emerson of the following items when making an inquiry.

Company name: Your name:

TEL : FAX :

(〒 –)

Address: Email:

Standar 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 3-phase 400V/50Hz、400V/60Hz、440V/60Hz 〔Others〕
	5. Special Specification	Brake, Outdoors, Explosion-proof 〔Others〕
Operating Environment	6. Operation	times/min x min/hrs. x hrs./day x days/yr. (Back and forth count as 2)
	7. Ambient Temperature	℃
	8. Mounting Location	Indoor, Outdoors, Explosion-proof 〔Others〕
	9. Dust	Average, High
	10. Control Device	Stroke adjustment external LS, Thrust detection LS, Internal LS, Potentiometer, Rotary Encoder 〔Others〕
	11. Others	Trunnion fitting, crevice fitting, I-shape end fitting 〔Others〕

Layout Other information

Servo Type Inquiry Form

Inform Tsubaki Emerson of the following items when making an inquiry.

Company name: Your name:

TEL : FAX :

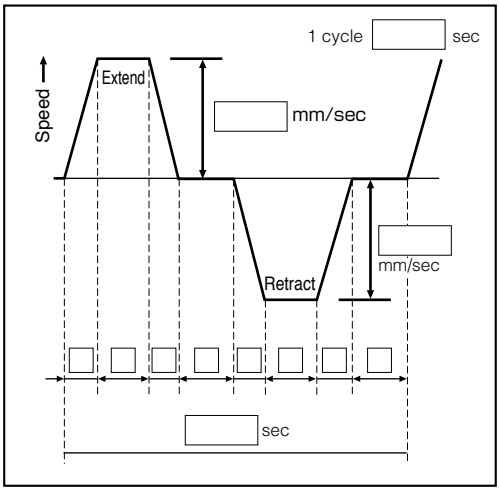
(〒 –)

Address: Email:

【Equipment standard condition】 Description of equipment used

Type and property of load	☐ Horizontal ☐ lift ☐ suspension ☐ tilt ☐ others Degree of shock, inertia and vibration ☐ Small ☐ Middle ☐ 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	Operating schedule ( ) years	

【Power cylinder operation cycle】



【Servomotor used】

Servomotor manufacturer		Servomotor model No.	

【Other conditions】

Operating Environment	Ambient temperature	℃
	Installing place	☐ Indoor ☐ Others ( )
	Dust	☐ Nearly average in plant ☐ Others ( )
	Power source	☐ 3-phase 200/200 220V AC 50/60/60Hz ☐ Others ( )
	Others	☐ Trunnion adapter ☐ U-type end fitting ☐ Magnetic sensor ☐ Bellows ☐ Others ( )

Layout Other information

Linipower Jack Inquiry Form

Inform Tsubaki Emerson of the following items when making an inquiry.

Company name: Your name:

TEL : FAX :

(〒 –)

Address: Email:

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 (Buckling Safety Rate Sf)	A. Fixed Base Shaft end free B. Crevice-Both End C. Fixed Base Fixed Shaft End (Sf=) Leave open if no buckling load applies to screw shaft.
	Screw Type	Machine Screw Type Ball Screw Type High Lead Screw Type

Three pecifications	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. (Back and forth count as 2)
	Reducer Unit Power Input R.P.M	Motor with brake (Gearmotor with brake) kW (1/) Others V Hz r/min
	Ambient Temperature	℃
	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 Emerson 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 Emerson or your Tsubaki Emerson 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.
11) 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.

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