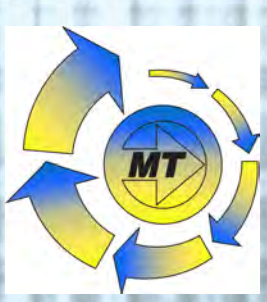
COSMIC

FULL LINE UP!

MOTOR CYLINDER



www.motiontech.com.au

Series H
Series B
Series BJ
Series DG

COSMIC INDUSTRY CO.,LTD.

SIMPLE OPERATION.
RELIABLE POSITIONING!

FULL LINE UP!

■Simply Electric and Mechanical
Motor driven, it requires electric power only.

■Brake Motor
Reliable load holding

■Economical
Totally electric. Substantially low operating cost compared with hydraulic cylinders, etc.

■Clean and Easy Maintenance
Grease lube. system allows environment-friendly use and easy maintenance.

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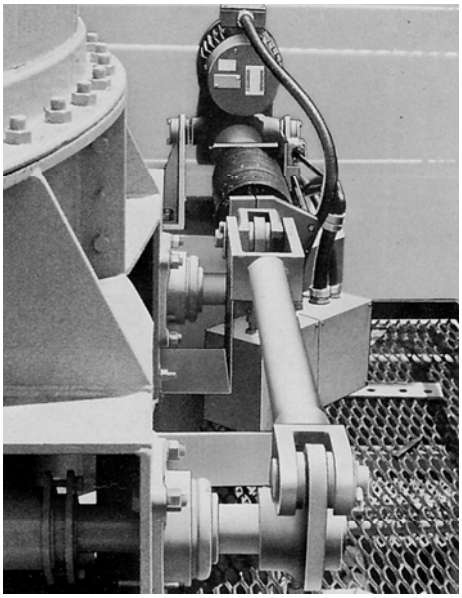
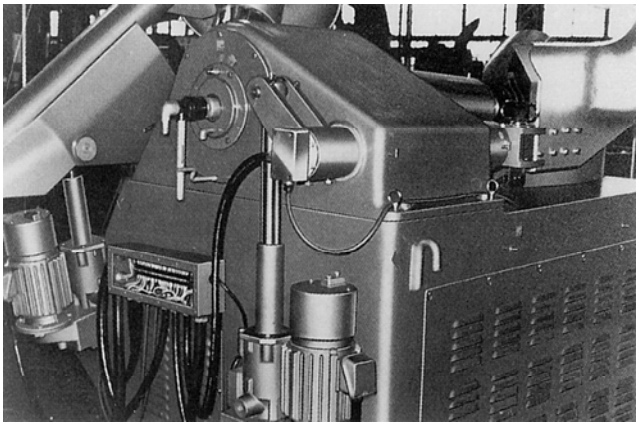
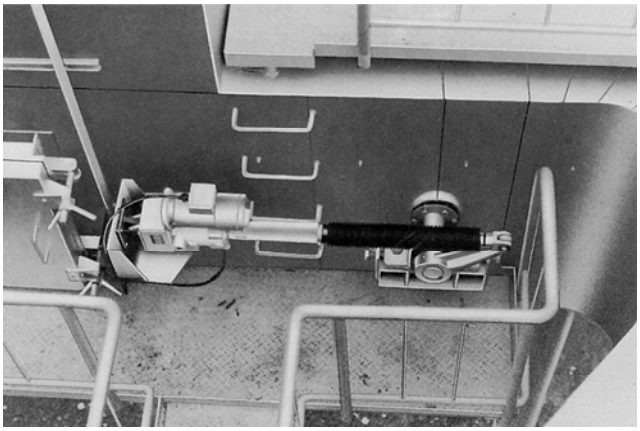
Application Examples



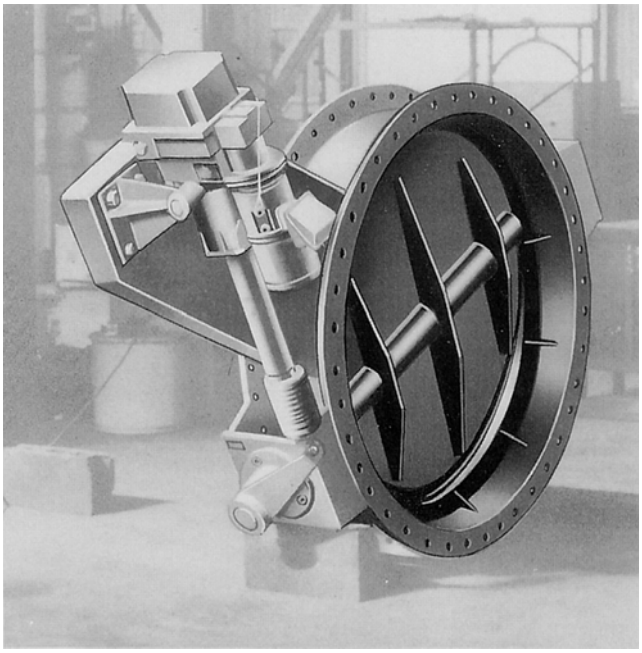
Thrust 4 TON, Stroke 500 mm,
for ϕ4000 Dust Collection
Damper at Steel Mill



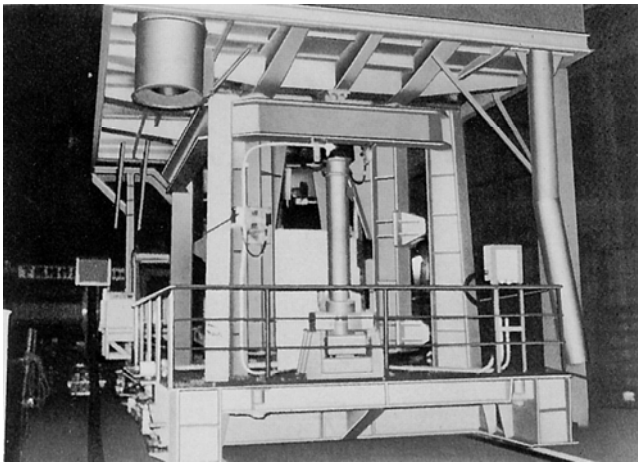
Thrust 1 TON, Stroke 300 mm, for Food Processing Machine



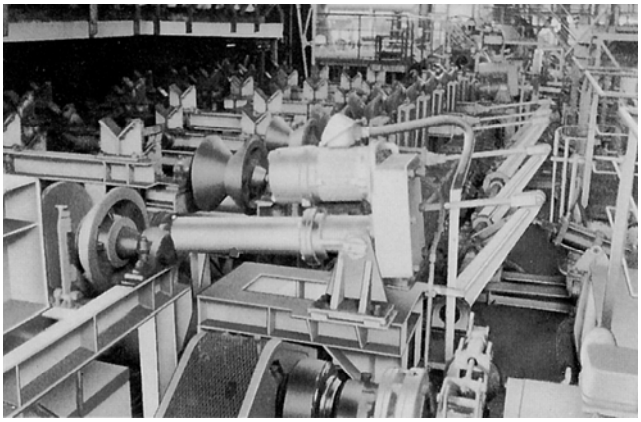
Thrust 2 TON, Stroke 500 mm, for Damper at Incineration Plant



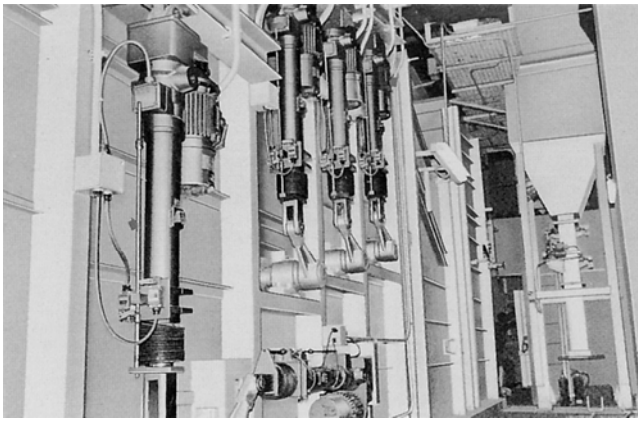
Thrust 2 TON, Stroke 500 mm, with Positioner,
for Damper at Steel Mill



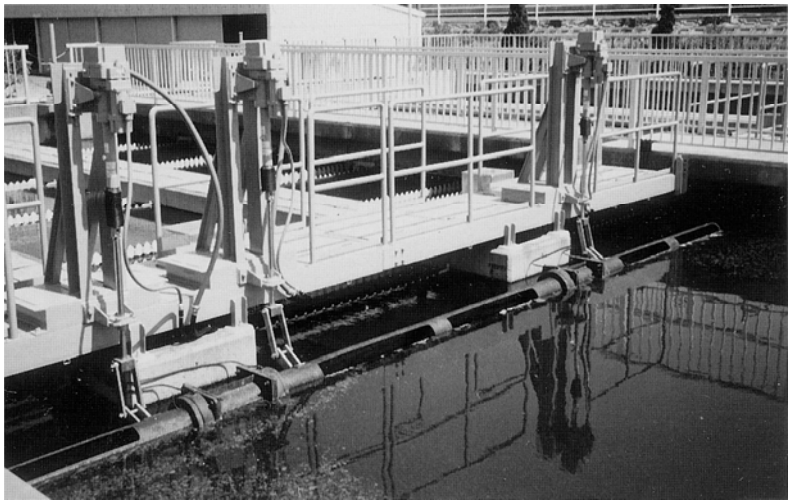
Thrust 44 TON, 2 units linked, for lifting car truck at Steel Mill



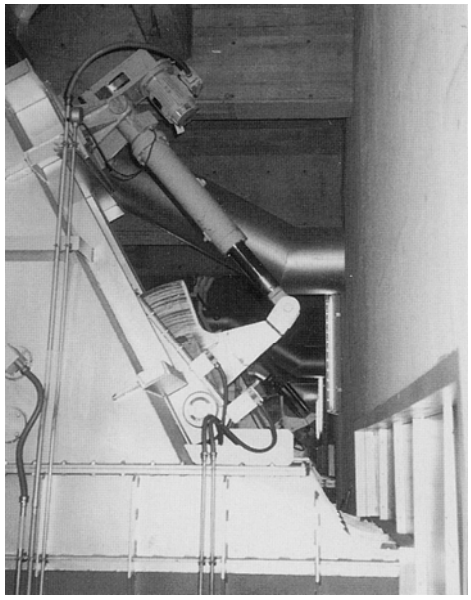
Thrust 10 TON, 4 units linked, at Steel Mill



Thrust 4 TON, 24 units controlled, for driving stoker
at Incineration Plant

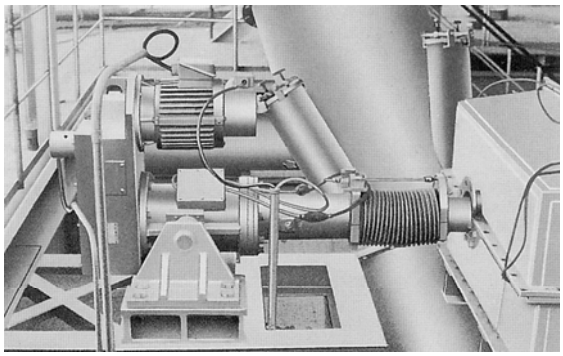


Thrust 300 KG, Stroke 300 mm, for Scum Skimmer at Sewage Plant



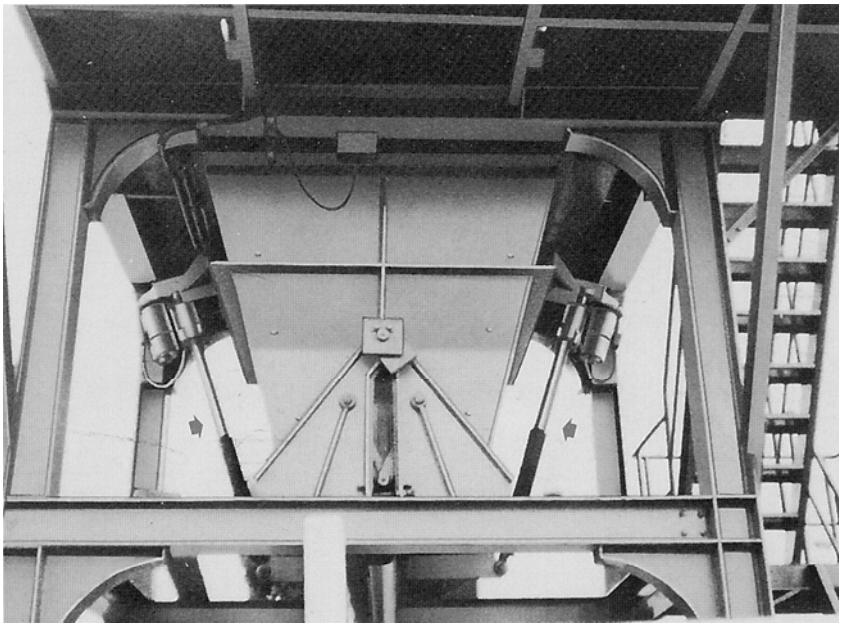
Thrust 10 TON, Stroke 500 mm, for Pusher
at Incineration Plant

Thrust 11 TON, Stroke 2000 mm, for theater stage

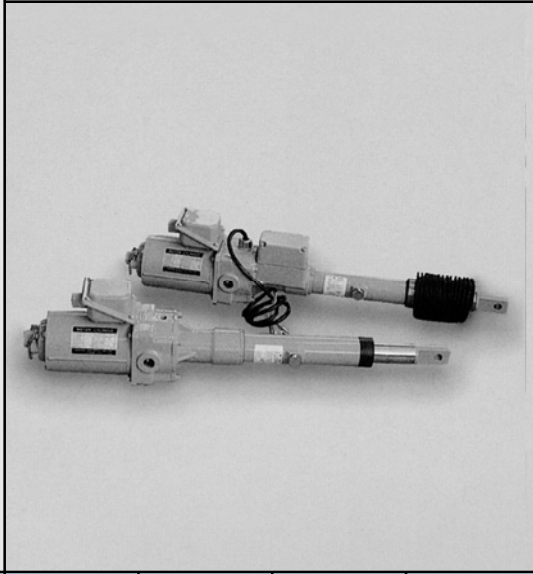
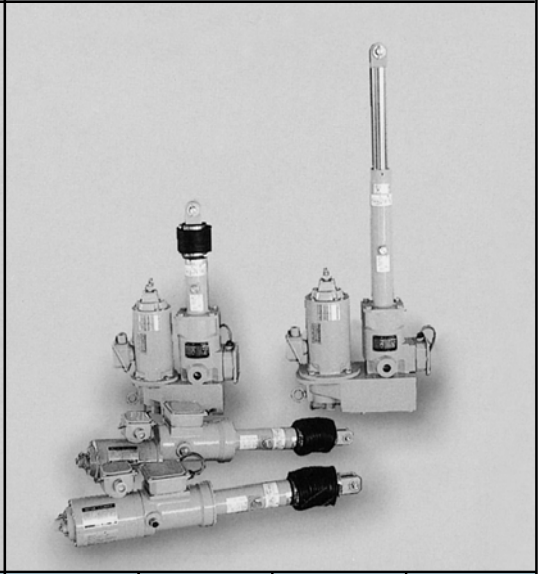


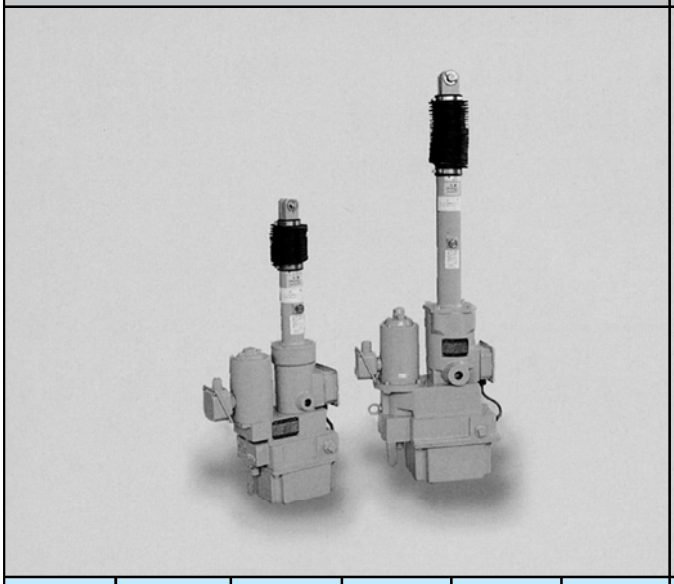
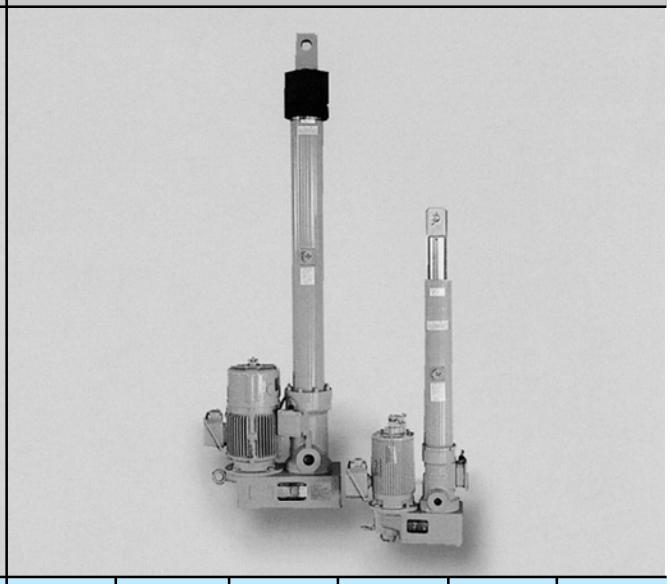
Thrust 16 TON, with Positioner, for driving venturi
at Cement Plant

Thrust 800 KG, Stroke 550 mm,
for opening/closing window



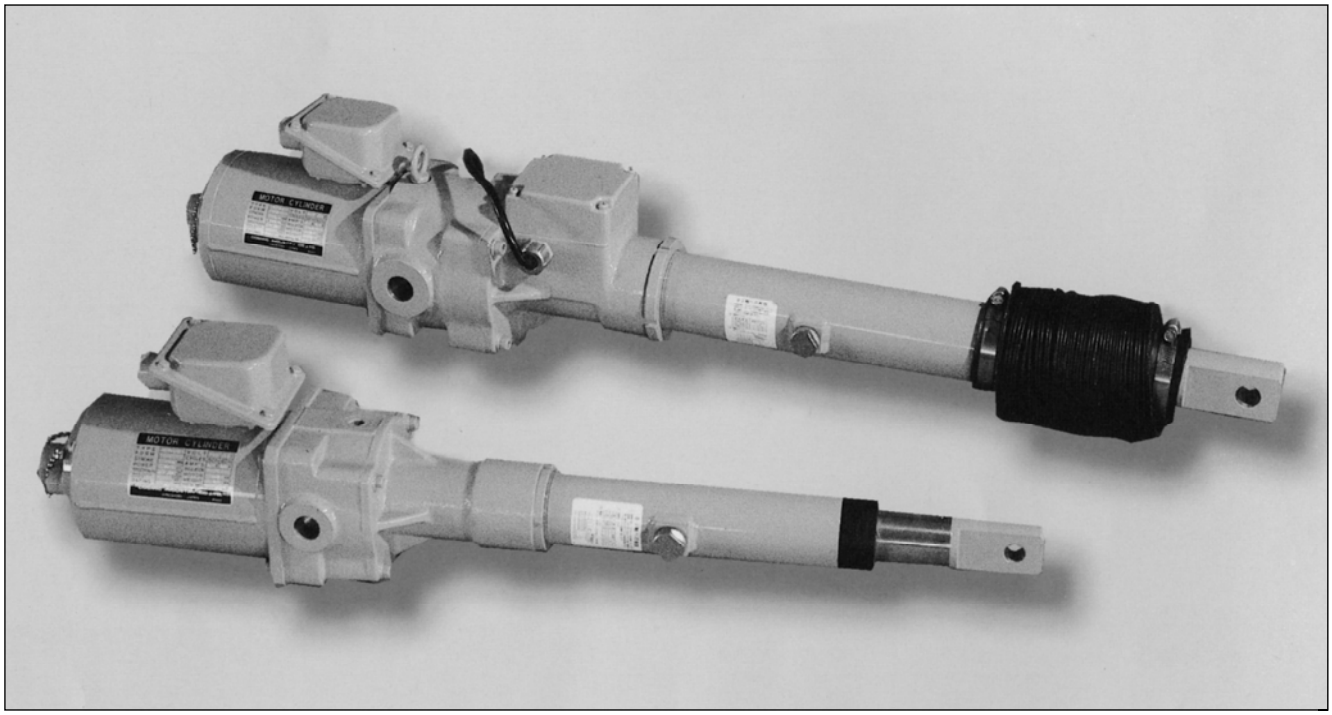
Thrust 2 TON, Stroke 700 mm, for driving dehydration cake hopper at Sewage Plant

		H Series (compact)				B Series (pressure stops available)			
APPEARANCE									
THRUST (N)		980	2.94 k	4.9 k	9.8 k	980	2.94 k	4.9 k	9.8 k
SPEED 50/60Hz (mm/s)	VERY SLOW								
	SLOW	25/30	25/30	25/30	25/30		29/35	23/28	23/28
	MEDIUM			50/60				46/56	47/56
	HIGH	83/100	83/100			75/90			
STROKE (mm)	100	●	●			●	●		
	200	●	●	●	●	●	●	●	●
	300	●	●	●	●	●	●	●	●
	500	●	●	●	●	●	●	●	●
	600	●	●						
	700		●	●	●	●	●	●	●
	1000							●	●
	1500								
	2000								
SELECTION NOTES		Small, compact and economical. Equipped with a brake. Best suited for low cost requirement. (Pressure stops not available.) HP type has built-in positioning cam switches.				Equipped with Thrust Limiter overload safety device. It allows for half-way pressure stops- a useful feature for damper gate applications. Note : When moving a large inertia object, there are cases the Thrust Limiter chatters. If it is the case, choose H series.			
MAIN APPLICATIONS		Automation equipment, conveyor line, reversing mechanism, stopper, lifter, etc. Choose either indoors or outdoors type.				For closing hopper, damper, pusher, gate valve, etc. Choose indoors or outdoors type.			
PAGES		P.7～P.15				P.16～P.25			

BJ Series (for damper use)						DG Series (for large thrust needs)					
											
980	2.94 k	4.9 k	9.8 k	19.6 k	39.2 k	19.6 k	39.2 k	58.8 k	98 k	157 k	294 k
10/12	10/12	10/12	10/12	12/14.4	12.5/15				10/12	8.3/10	8.3/10
							12.5/15	15/18	15/18	15/18	12.5/15
						25/30	25/30	25/30	25/30	25/30	16.6/20
						60/72	42/50	45/54	40/48	35/42	25/30
●	●										
●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●				
		●	●	●	●	●	●	●	●	●	●
						●	●	●	●	●	●
								●	●	●	●
Developed particularly for damper and butterfly valve control applications. Much smaller and less costly than conventional types. Equipped with Thrust Limiter, 4-position cam limit switches and potentiometer.						For high frequency, high load applications, taking the place of hydraulic cylinders. Equipped with high efficiency ball screw and exclusively developed motor. Built-in Thrust Limiter stops the cylinder immediately against overload. (It recovers quickly when overload is removed.) Pressure stops are available in 50 mm/sec or lower applications provided the mate equipment has a stopper. Note : In case the motor is 2.2 kW or over, the brake circuit must be individual cut-off type.					
Large dampers, louvre dampers, butterfly dampers, etc. Outdoors type.						Pusher in automation equipment, lifter, gate valve, hopper, etc. For various large thrust, heavy duty applications. Choose either indoors or outdoors type.					
P.26～P.35						P.36～P.46					

H Series

Small and compact straight type motor cylinder. Best for simple go/return and positioning usage. (Pressure stops not available.) HP type has built-in cam limit switches for stroke setting.



FEATURES

1. Simply Electric
Requires 3 phase power only. Easy operation and maintenance.

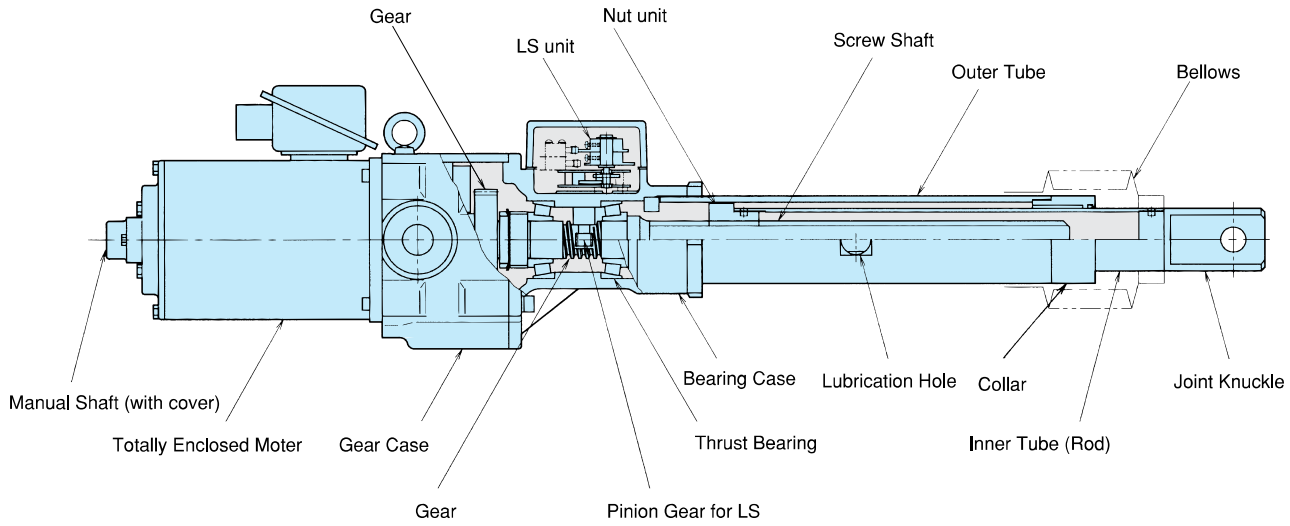
2. Clean and Quiet
Unlike hydraulic cylinders, no compressor or hydraulic units are required, no oil leakage. Ideal for environment friendly.

3. Cost Effective
Simple design and mass production achieves quite reasonable cost.

4. Brake Motor
Exclusively designed pull-roter, spring-triggered "OFF"-brake motor. Requires no individual brake circuit. Motor stoppage or power failure activates brake instantly and holds load.

5. Built-in Positioning LS Unit (HP type only)
The enclosed cam limit switches permit free stroke setting.
Note : Without Thrust Limiter, H (or HP) type cannot be used for pressure stops. When pressure stops are desired (such as for damper and gate), choose B series model.

CONSTRUCTION



Note : This is a general drawing ; details differ slightly on models.

No LS unit on "H" models.

Reduction Part : High precision gears and grease lubrication ensure quiet, long-life and easy maintenance operation.

Linear Actuating Part : Motor rotation is converted to linear motion by high efficiency, high lead trapezoidal screw.

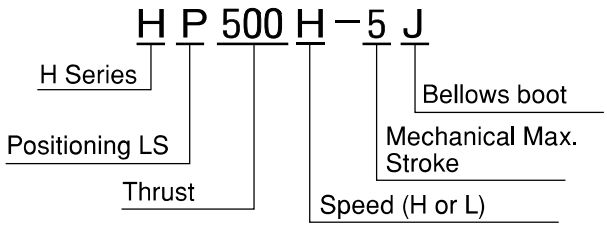
LS Unit : HP type is equipped with a compact, totally enclosed cam limit switches, which permit free stroke setting. Easy adjustment, reliable protection against dust and rain water. (Its mechanism is that screw's rotation, ie. cylinder's stroke, is translated via high reduction gear unit into less-than-one-turn of LS cam.)
No LS unit on H models.

SPECIFICATIONS

Structure	Totally enclosed
Power	3ph, 200/220 (400/440) VAC
Frequency	50/60Hz
Thermal class	E
Time rating	20~30%ED
Ambient temp	−15℃~+50℃
Atmosphere	Without bellows : indoors and less dusty places
	With bellows : Outdoors weather, dusty indoors
Paint color	Munsell 2.5G 6/2

Note : Bellows type is recommended in dusty places even indoors.

MODEL NUMBER



・Model number does not show voltage or optional parts. Specify when ordering.

Example : HP1T-3J shows a "HP" Series 9.8 kN thrust, positioning LS, 300 mm stroke and bellows boot.

MODEL LIST

Model	Thrust (N)	Speed 50/60Hz (mm/s)	Mechanical max. stroke (mm)	Motor output (kW)	Rated current 200V/220V (400V/440V) (A)	Rod turning torque (Nm)	Rod travel per turn of manual shaft (mm)	Brake
H100L, HP100L	980	25/30	100 200 300 500 600	0.1	1.18/1.04 (0.60/0.52)	2.25	1.0	Pull-roter, spring-triggered, off-brake, simultaneous cut-off
H100H, HP100H		83/100		0.3	3.8/3.3 (1.9/1.7)		3.4	
H300L, HP300L	2.94 k	25/30				6.66	1.0	
H300H, HP300H		83/100	200 300 500 700	0.6	4.7/3.9 (2.4/2.0)	12.7	3.3	
H500L, HP500L	4.9 k	25/30		0.3	3.8/3.3 (1.9/1.7)	21.6	1.0	
H500H, HP500H		50/60		0.6	4.7/3.9 (2.4/2.0)		2.0	
H1T, HP1T	9.8 k	25/30				44.1	1.0	

Note : Speed figures are subject to the motor on synchronous rotation.
Motors are exclusively designed. Current values may be slightly different from general purpose motors on market.
Give considerations when selecting a thermal relay.

SELECTION

●Points to be considered

1. Required thrust (or load) in kg
2. Stroke (mm)
3. Speed (mm/sec)
4. Power (VAC, Hz)
5. Load condition, operation cycle
6. Atmosphere
7. Application

●Selection

1. Decide on thrust.

- With small inertia, no impact :
  Max load ≦ Rated thrust
- With impact, vibration :
  Load × (1.5~2) < Rated thrust

2. Decide on speed.

Choose appropriate model from MODEL LIST.

3. Decide on stroke.

The stroke figures shown in MODEL LIST are the mechanical max. stroke. In actual use, allow for enough margin considering inertia of the loads being moved.

4. Frequency

- Frequency of operation is limited by the motor's heat capacity. The following must be satisfied.

Model	H100L, HP100L	H100H, HP100H H300L, HP300L H500L, HP500L	H300H, HP300H H500H, HP500H H1T, HP1T
Starting times (times/min)	5	5	5
Load time (%ED)	30	20	25

Note : The above aims solely at motor's heat capacity ; the cylinder mechanism does not matter.

$$\text{Load time}(\%\text{ED}) = \frac{\text{Running time in one cycle}}{\text{Running time in one cycle + Rest time}} \times 100(\%)$$

Consult us for continuous 10 min. or high frequency operation needs.

LINKED OPERATION

●Control

When more than one cylinders are linked, they may be started together (with a single command) but must be stopped individually with limit switches provided on each cylinder. Refer to the "Reference" wiring diagram on page 13.

●Synchronism

From an exact viewpoint, each cylinder could produce a small difference in speed/travel due to the difference in load (applied to each cylinder). If they are stopped with a common set of limit switches, such differences could accumulate in the course of operation, which necessitates the above-mentioned simultaneous start, individual stop. Make sure that all the cylinders reach the stopping point in every cycle of operation.

INSTALLATION

●Place

With a totally enclosed construction, the cylinder can be used wherever ordinary totally enclosed type motors can be operated. Note the following points.

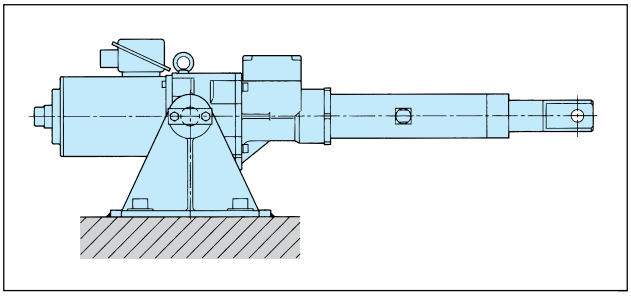
Without bellows type : Indoors and less dusty and no water-exposed place

With bellows type : Outdoors weather, dusty and/or water-exposed or vapor-filled indoors

- Where cylinders are exposed to direct sunlight, water, vapor, oil, etc., on a continuous basis, protect them with a cover.
- Bellows type is recommended in dusty places even indoors.

●Mounting Method

- Mechanically, the cylinders can operate in any angle of installation, eg. horizontal, vertical or oblique. Mount with a set of trunnion columns. Make sure the cylinder is not subjected to lateral load.



- Where cylinders are exposed to rain water, the rod facing up is the last recommended form of installation even if it is the bellows type.
- Make sure the joint knuckle and the connected member do not interfere with each other while they pivot.

●Turn Stop

- The rod generates a turning torque (ref. Page 9). In most cases, connecting the joint knuckle with the mating member makes a turn stop.
- However, where the cylinder is operated by itself, ie. without being connected to anything, or they are connected to a chain, wire, etc., a turn stop device must be provided.

●Lateral Load

- Make sure the cylinder is not subjected to lateral load.
- Where lateral or biased load applies, make such provisions as a guide roller along the rod or balance weight.

●Manual Operation

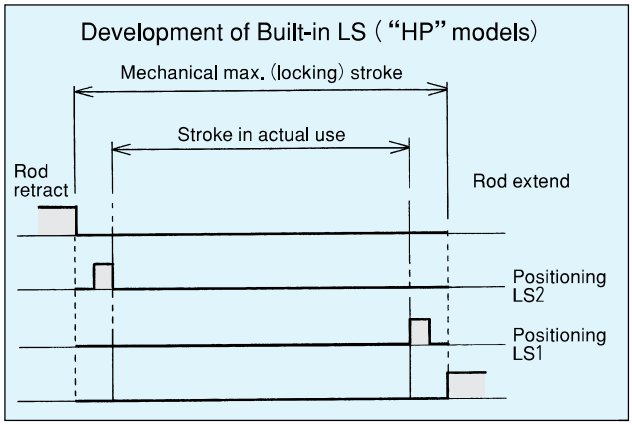
- Cut off power first. Operate with the manual handle (optional) or spanner. (Cylinders are not equipped with a break release mechanism.)
- After manual operation, be sure to restore the shaft cover cap.
- Refer to page 9 for rod travel amount per turn of the shaft.

WARNING : ※Before manual operation, make 100% sure that the power is cut off. If power connects during manual operation, serious accidents could be caused.

※Before manual operation, remove any load on the cylinder. Such load could cause an unexpected/sudden turn of the screw in the cylinder, leading to serious accidents.

STROKE SETTING

Pressure stops are not available on "H" and "HP" models; they must be stopped by limit switches well within the mechanical stroke range. Possible overrunning caused by the momentum must be taken into account. ("HP" models are equipped with 2-position LS while "H" models are not. When using "H" models, be sure to provide LS on the mating equipment.)



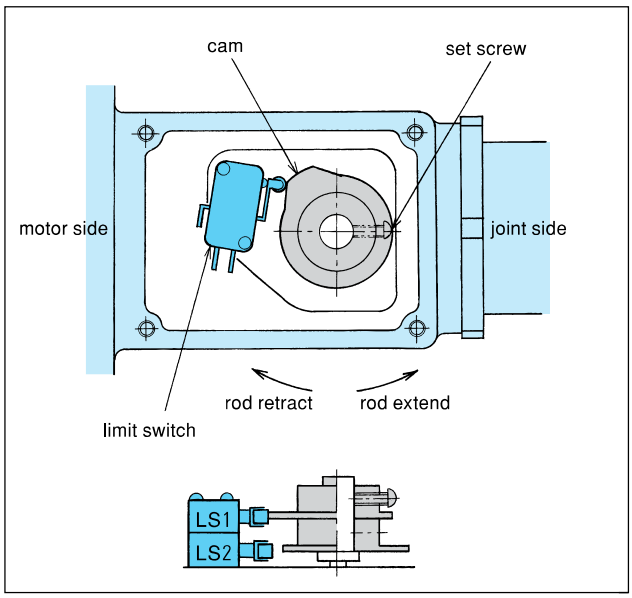
Note : Letting the rod strike the end of the mechanical stroke range may damage the inside mechanism.

●Cam Setting (“HP” models)

Remove the LS unit cover (on the bearing case) by loosening the 4 screws.

LS1 is on the upper side while LS2 is underneath.

- Connect the cylinder with the mating equipment to secure turn stop.
  Operate the cylinder slowly by manual operation or by inching operation unitil it comes to a desired position. There, set the cam properly. Do the same for the other end. (Factory setting is about 20 mm from either stroke end.)
  Be sure to tighten the setscrews after the setting.
- When setting the cam, make sure the direction of the rod movement (= extend or retract) matches direction of the cam’s rotation.



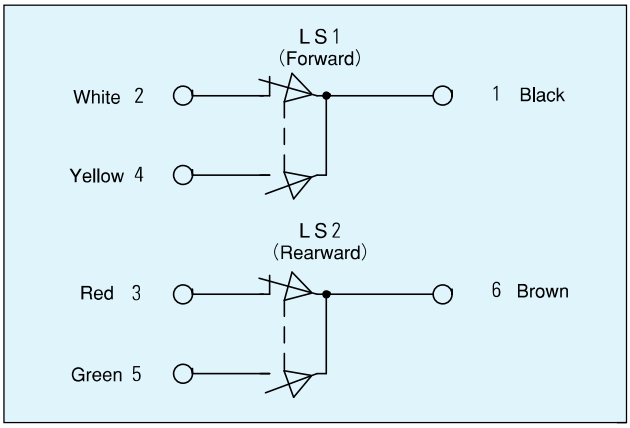
View of Built-in LS

●Wiring of Cam LS

“HP” models are equipped with built-in LS. Be sure to use them in the operation circuit.

LS1 Terminal 1-2 : Normally ON. Goes OFF when the rod reaches the set position as it extends.
1-4 : Reversal contacts (for signal confirmation)

LS2 Terminal 6-3 : Normally ON. Goes OFF when the rod reaches the set position as it retracts.
6-5 : Reversal contacts (for signal confirmation)



●Specifications of Limit Switch

Rated Volt	AC250V
Capacity	10A (Resistance Load)
Contact Arrangement	C
Model	V-105-1A4 (OMRON)

Standard cable length is 1 m.

Refer to the “Reference” wiring diagram on page 13.

Note : SW types and models are subject to change without notice.

MAINTENANCE

The cylinder is shipped with quality grease applied, and can be used as it is upon arrival at customers. Refer to the table below for maintenance lubrication. (Refer to the "CONSTRUCTION" drawing on page 8, too.)

Points	Lub. Amount (g)	Method
Screw	10～20 per 100 mm stroke	Lubricate through Lub. Hole using grease gun.
Gears & Bearings	100～150	Once every 2 years or after 100,000 operations.

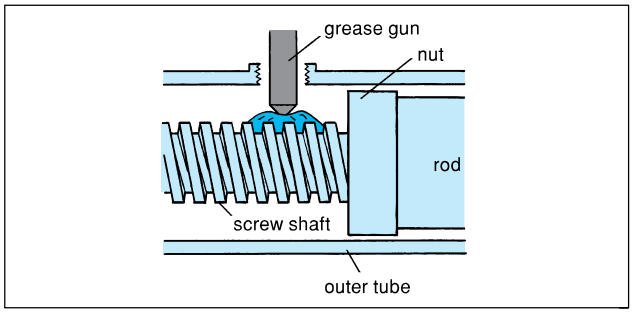
●Lub. Cycle to Screw

Lub. condition depends on ambient temperature, operating conditions, etc. Determine lub. cycle according to actual lub. conditions.

Operation Frequency	Lub. Cycle
50～100 times/day	1 ～ 3 months
10～50 times/day	3 ～ 6 months
Less than 10 times/day	6 ～ 12 months
Over 100 times/day	Consult us

●Lub. to Screw

With the rod fully extend, apply small amount of grease using grease gun or spatula and move the rod several times. Repeat this a few times.

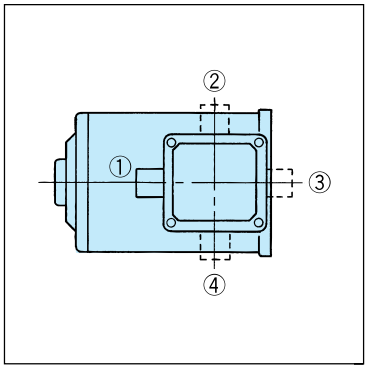


●Recommended Grease

Manufacturer	Grease
IDEMITSU KOSAN	DAPHNE EPONEX SR No.1
SHELL	ALVANIA GREASE 1
COSMO	DYNAMAX No.1

WIRING

- The cylinder tilts as it pivots on the trunnion axis. For wiring, use flexible cables such as cabtyre cable.
- In outdoors environments, make the cable entry (to the motor terminal box) face downward or horizontal, and use a waterproof connector. (The terminal box can be rotated by loosening 4 screws. Provide ground connections using the screw. In certain cases, ③ may not be available due to a lifting hook provided on cylinders.)



●Wiring Diagram (for reference)

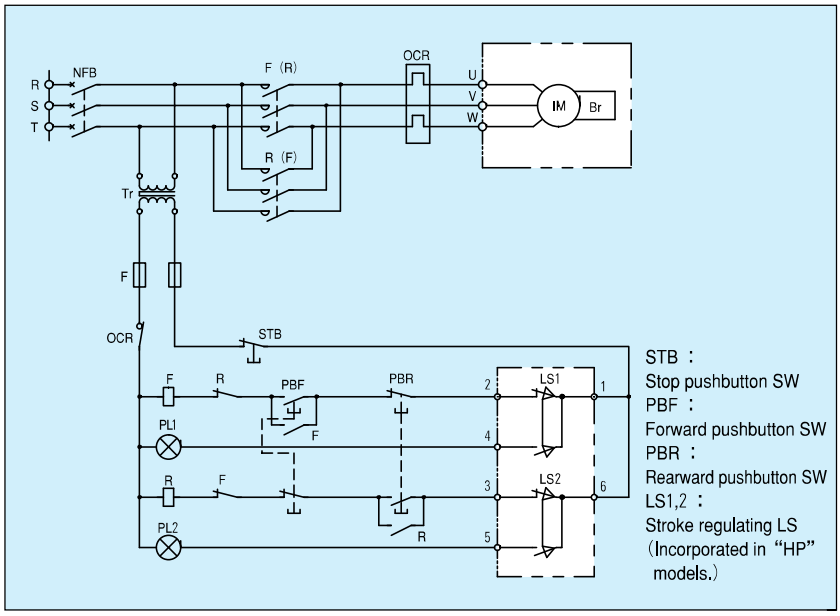
Varied patterns of wiring are possible. A typical circuit is as shown below just for your reference. Make circuits depending on your own needs. Consult COSMIC for inverter drive or any other special requirements.

・Single unit operation

This is a reference circuit for operating a single unit.

All H/HP models have a brake motor, of a pull-rotor type, where the brake is an integral part of the motor.

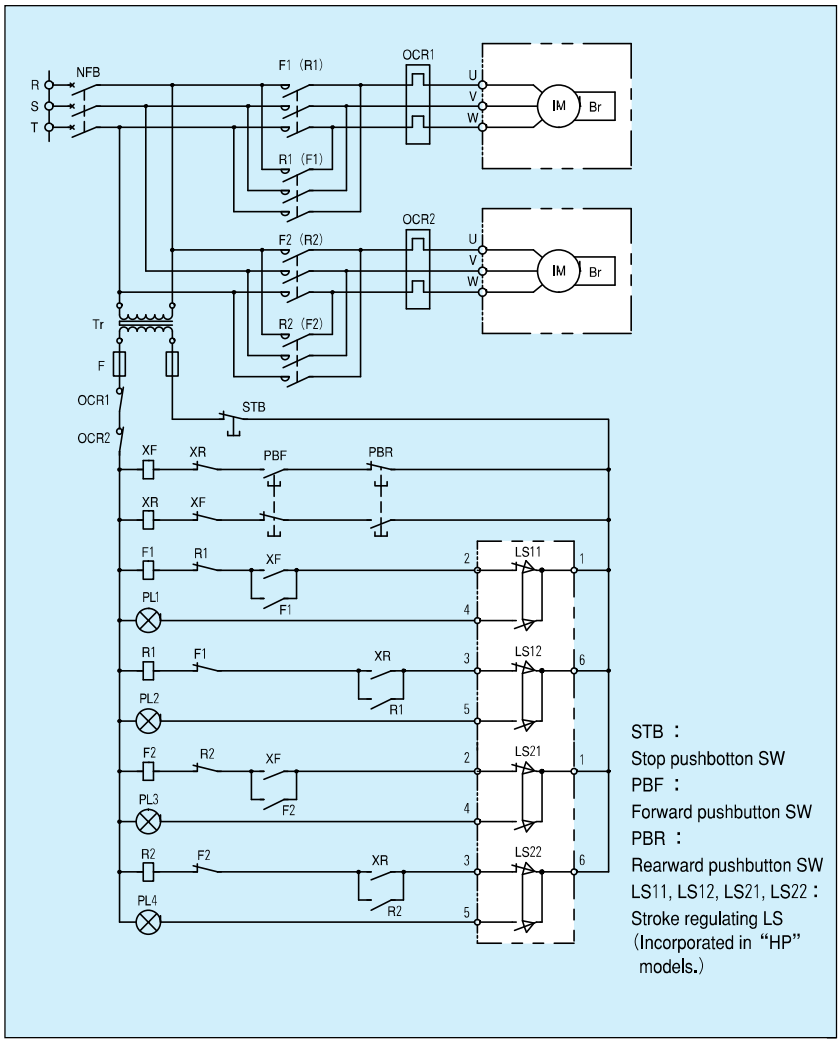
Cylinder stroke must be regulated by the built-in limit switches or external LS to be provided by user.



・Linked operation

This is a reference circuit for starting two cylinders by a common pushbutton. (The same can apply to more-than-two linked cylinders.) As shown, the stroke regulating LS must be provided on individual cylinders to stop them independently.

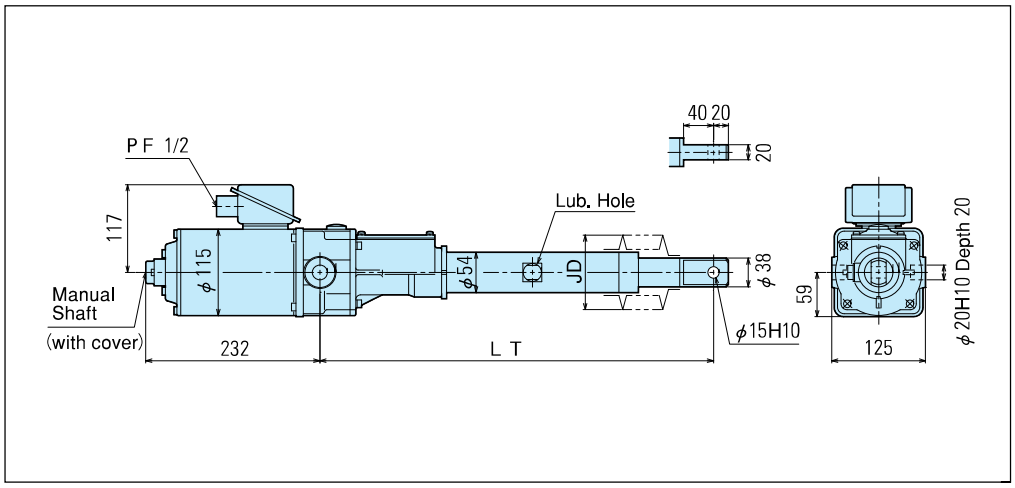
Stopping them with a common LS could cause accumulated travel differences.



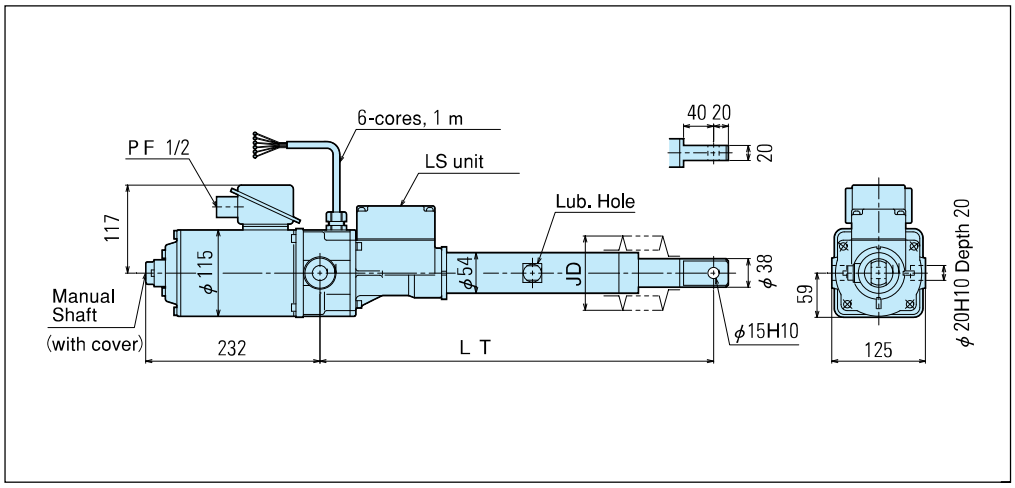
Note : In making circuits, make sure the transmission lag is minimized. Excessive lag could cause overrunning, leading to damage to the unit.

DIMENSIONS

H100L
H100H
H300L



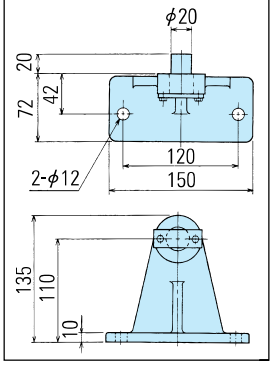
HP100L
HP100H
HP300L



Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	Mechanical max. stroke (mm)	Without bellows		With bellows			Approx. weight (kg)
					MIN.LT (mm)	MAX.LT (mm)	MIN.LT (mm)	MAX.LT (mm)	JD (mm)	
H100L, HP100L-1 (J)	980	25/30	0.1	100	390	490	390	490	φ95	17
H100L, HP100L-2 (J)				200	490	690	490	690		18
H100L, HP100L-3 (J)				300	590	890	590	890		19
H100L, HP100L-5 (J)				500	790	1290	842	1342		21
H100L, HP100L-6 (J)				600	930	1530	993	1593		23
H100H, HP100H-2 (J)	980	83/100	0.3	200	490	690	490	690	φ95	18
H100H, HP100H-3 (J)				300	590	890	590	890		19
H100H, HP100H-5 (J)				500	790	1290	842	1342		21
H100H, HP100H-6 (J)				600	930	1530	993	1593		23
H300L, HP300L-1 (J)	2.94 k	25/30	0.3	100	390	490	390	490	φ95	17
H300L, HP300L-2 (J)				200	490	690	490	690		18
H300L, HP300L-3 (J)				300	590	890	590	890		19
H300L, HP300L-5 (J)				500	790	1290	842	1342		21
H300L, HP300L-6 (J)				600	930	1530	993	1593		23

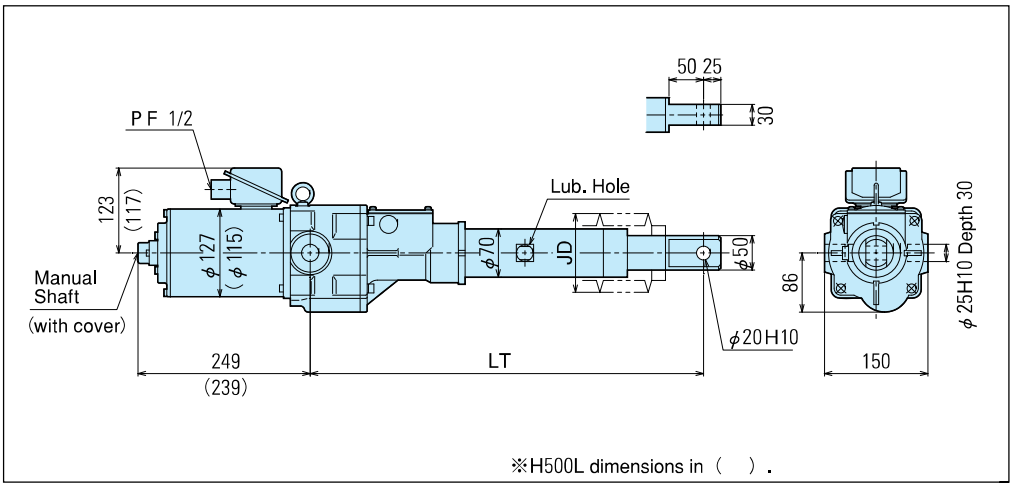
● Option
(H100L・H100H・H300L
HP100L・HP100H・HP300L)

Trunnion columns



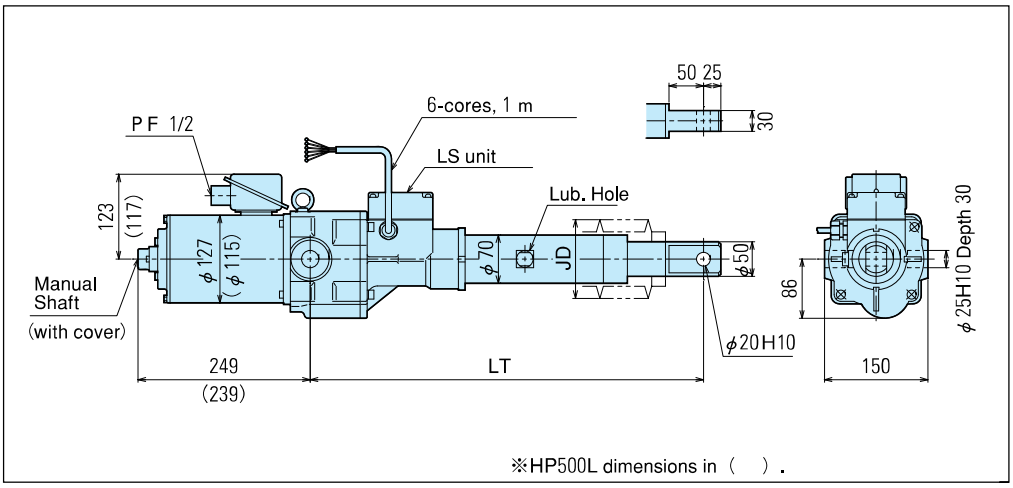
DIMENSIONS

H300H
H500L
H500H
H1T



※H500L dimensions in （ ）.

HP300H
HP500L
HP500H
HP1T

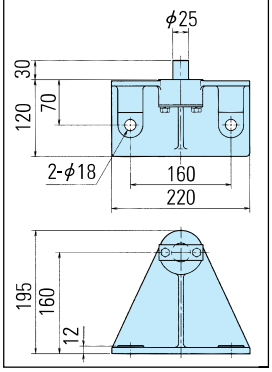


※HP500L dimensions in （ ）.

Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	Mechanical max. stroke (mm)	Without bellows		With bellows			Approx. weight (kg)
					MIN.LT (mm)	MAX.LT (mm)	MIN.LT (mm)	MAX.LT (mm)	JD (mm)	
H300H, HP300H-2(J)	2.94 k	83/100	0.6	200	562	762	562	762	φ110	35
H300H, HP300H-3(J)				300	662	962	662	962		37
H300H, HP300H-5(J)				500	862	1362	929	1429		40
H300H, HP300H-7(J)				700	1097	1797	1202	1902		44
H500L, HP500L-2 (J)	4.9 k	25/30	0.3	200	562	762	562	762	φ110	31
H500L, HP500L-3 (J)				300	662	962	662	962		33
H500L, HP500L-5 (J)				500	862	1362	929	1429		36
H500L, HP500L-7 (J)				700	1097	1797	1202	1902		40
H500H, HP500H-2(J)	4.9 k	50/60	0.6	200	562	762	562	762	φ110	35
H500H, HP500H-3(J)				300	662	962	662	962		37
H500H, HP500H-5(J)				500	862	1362	929	1429		40
H500H, HP500H-7(J)				700	1097	1797	1202	1902		44
H1T, HP1T-2(J)	9.8 k	25/30	0.6	200	562	762	562	762	φ110	35
H1T, HP1T-3(J)				300	662	962	662	962		37
H1T, HP1T-5(J)				500	862	1362	929	1429		40
H1T, HP1T-7(J)				700	1097	1797	1202	1902		44

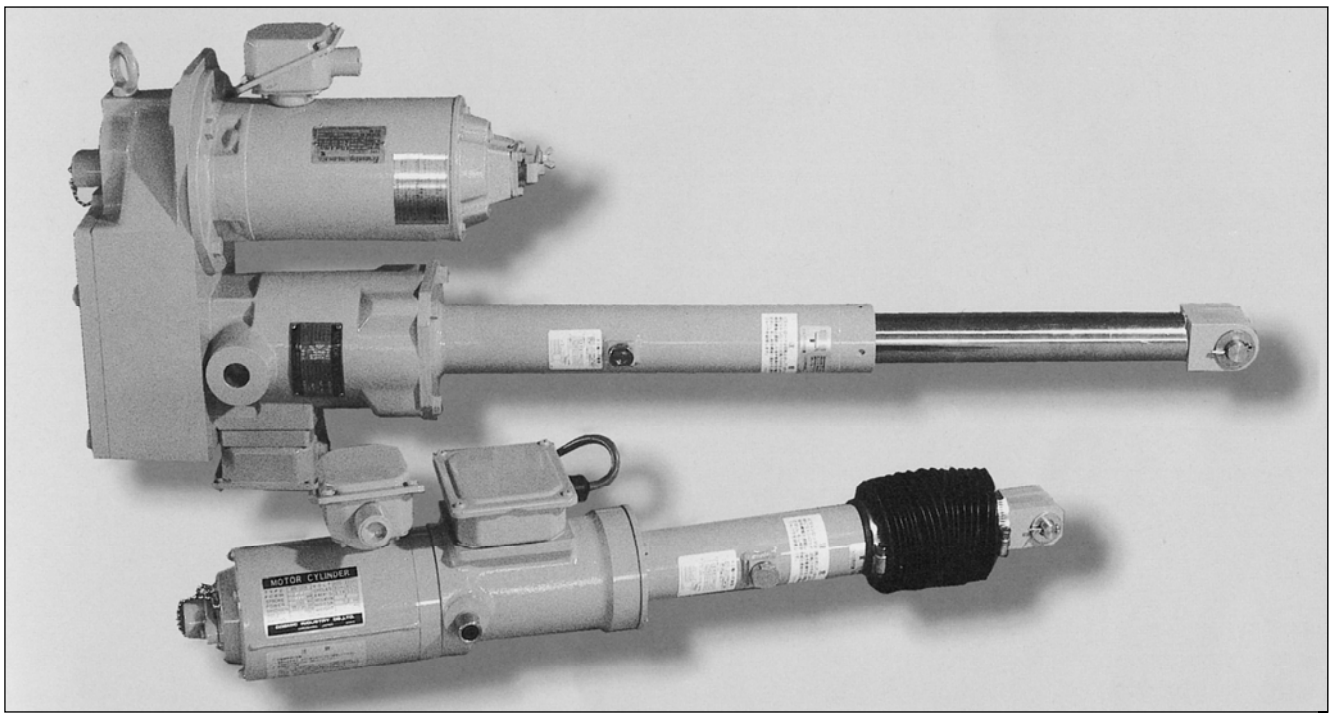
● Option
(H300H・H500L・H500H・H1T
HP300H・HP500L・HP500H・HP1T)

Trunnion columns



B Series

Standard and versatile. With the Thrust Limiter overload safety device, it allows for half-way pressure stops - a useful feature for damper gate applications.



B

FEATURES

1. Pressure Stops
The unique Thrust Limiter overload safety mechanism allows for half-way pressure stops. Motor is stopped while the inside spring continues to hold the load. When moving a large inertia object, there are cases the Thrust Limiter chatters. If it is the case, use "H" or "HP" models.

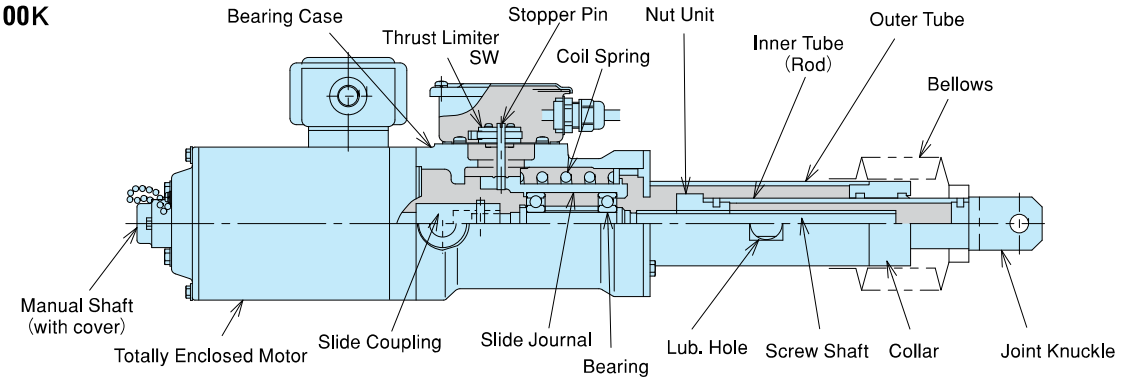
2. Compact and Economical
Employs an exclusively-designed pull-roter compact "OFF"-brake motor.

3. Load Holding
Motor stoppage or power failure activates brake instantly to hold the load.

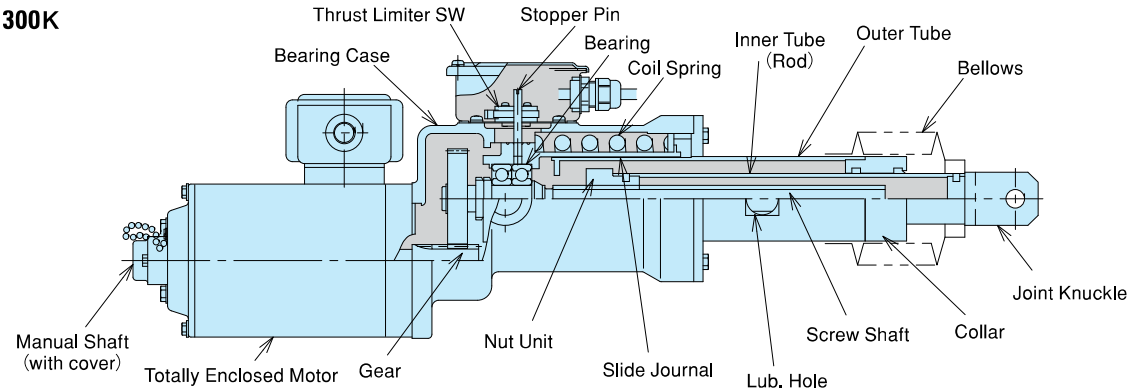
4. Simple & Reliable
All electric and mechanical, reliable operation, easy maintenance with simply grease lubrication.

CONSTRUCTION

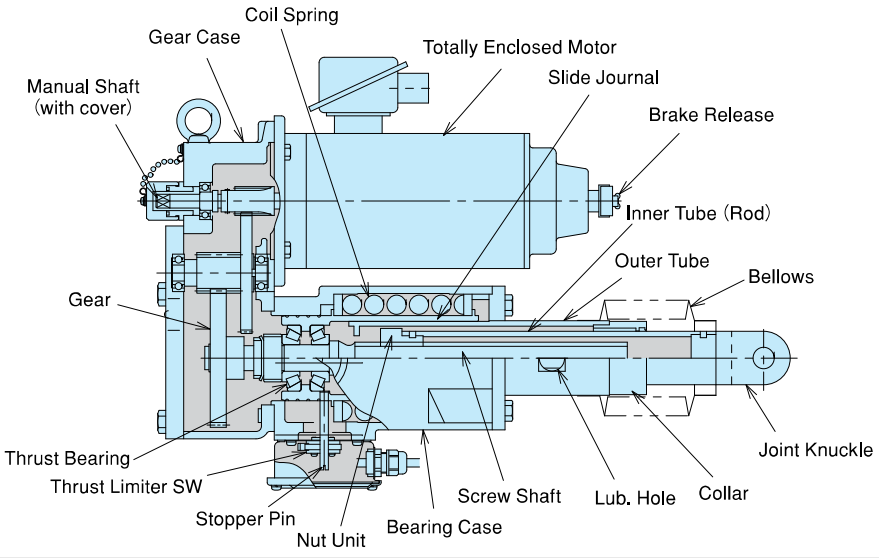
● **BB100K**



● **BGB300K**



● **BK500K**
● **BL500K**
● **BL1T**
● **BM1T**



Reduction Part : With coupling and spur gear, allows quiet and long-life operation.
Easy maintenance with simply grease lubrication.

Thrust Limiter : Spring-and-LS-combined Thrust Limiter allows for half-way pressure stops.

Linear Actuating Part : Motor rotation is converted to linear motion by a trapezoidal screw.
Long life with simple lub. maintenance.

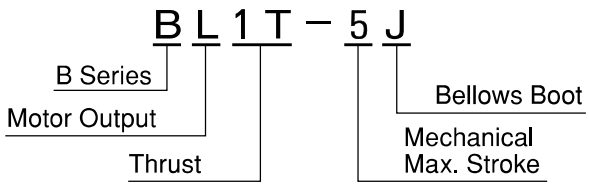
Note : BB100K, BGB300K, and BK500K are not equipped with brake release.

SPECIFICATIONS

Structure	Totally enclosed
Power	3ph, 200/220 (400/440) VAC
Frequency	50/60Hz
Thermal class	E
Time rating	20~30%ED
Ambient temp	−15℃~+50℃
Atmosphere	Without bellows : indoors and less dusty places
	With bellows : Outdoors weather, dusty indoors
Paint color	Munsell 2.5G 6/2

Notes : 1. Dew condensation not permitted.
2. Bellows type recommended in dusty places even indoors.

MODEL NUMBER



- Motor capacity
  K···0.4kW, L···0.6kW, M···1.1kW
  BB100K and BGB300K do not contain motor capacity symbol.
- Model number does not show voltage or optional parts. Specify when ordering.

Example : BL500K-3J shows a "B" series 0.6kW motor, 4.9kN thrust, 300 mm stroke and bellows boot.

B

MODEL LIST

Model	Thrust (N)	Speed 50/60Hz (mm/s)	Mechanical max. Stroke (mm)	Motor output (kW)	Rated current 200V/220V (400V/440V) (A)	Rod turning torque (Nm)	Rod travel per turn of manual shaft (mm)	Brake
BB100K	980	75/90	100 200 300 500 700	0.4 4-pole	4.0/3.3 (2.0/1.6)	2.94	3.0	Pull-roter spring-triggered off-brake simultaneous cut-off
BGB300K	2.94 k	29/35	100 200 300 500 700	0.4 4-pole	4.0/3.3 (2.0/1.6)	8.33	1.17	Pull-roter spring-triggered off-brake simultaneous cut-off
BK500K	4.9 k	23/28	200 300 500 700 1000	0.4 4-pole	4.0/3.3 (2.0/1.6)	19.6	0.93	Pull-roter spring-triggered off-brake simultaneous cut-off
BL500K	4.9 k	46/56	200 300 500 700 1000	0.6 4-pole	3.9/3.3 (2.0/1.7)	19.6	1.85	Pull-roter spring-triggered off-brake simultaneous cut-off
BL1T	9.8 k	23/28	200 300 500 700 1000	0.6 4-pole	3.9/3.3 (2.0/1.7)	39.2	0.93	Pull-roter spring-triggered off-brake simultaneous cut-off
BM1T	9.8 k	47/56	200 300 500 700 1000	1.1 4-pole	6.1/5.3 (3.1/2.7)	39.2	1.85	Pull-roter spring-triggered off-brake simultaneous cut-off

Note : Speed figures are subject to the motor on synchronous rotation.
Motors are exclusively designed. Current values may be slightly different from general purpose motors on market.
Give considerations when selecting a thermal relay.
BB100K is not available for pressure stoppage applications.

SELECTION

●Points to be considered

1. Required thrust (or load) in kg
2. Stroke (mm)
3. Speed (mm/s)
4. Power (VAC, Hz)
5. Load condition, operation cycle
6. Atmosphere
7. Application

●Selection

1. Decide on thrust allowing for some margin.

In some cases where large inertia objects are to be moved, the Thrust Limiter may activate instantly upon movement. Select cylinders of larger thrust ratings than below-calculated. (The Thrust Limiter is factory set to activate at about 110% of the rated thrust.)

Vertical Transfer

$F = W + K \cdot W$

Horizontal Transfer of Heavy Load

$F = U \cdot W + K \cdot W$

F…Necessary thrust (N)
W…Load weight (N)
U…Friction factor
K…Accelerate factor

Speed (mm/s)	K
~30	0.1
30~70	0.1~0.25
70~120	0.25~0.4

There is no need to consider acceleration factor where loads to be moved have only a small inertia.

2. Decide on speed.

- Choose appropriate model from MODEL LIST.

3. Decide on stroke

- The stroke figures shown in MODEL LIST are the mechanical max. stroke. The cylinder may be stopped with external limit switches or by pressure against external objects (= stopper). In either case, it must be stopped with some allowance at both stroke ends; letting the piston rod strike the mechanical stroke end could cause damage to the inside mechanism.

4. Frequency

- Frequency of operation is limited be the motor's heat capacity. The following must be satisfied.

Model	BB100K, BGB300K	BK500K	BL500K, BL1T	BM1T
Starting times (times/min)	5	3	4	4
Load time (%ED)	30	20	25	25

Note : The above aims solely at motor's heat capacity ; it does not have a relation with the mechanism of the motor cylinder.

$$\text{Load time (\%ED)} = \frac{\text{Running time in one cycle}}{\text{Running time in one cycle + Rest time}} \times 100(\%)$$

Consult us for continuous 10 min. or high frequency operation needs.

LINKED OPERATION

●Control

When more than one cylinders are linked, they may be started together (with a single command) but must be stopped individually with limit switches provided on each cylinder. Refer to the "Reference" wiring diagram on page 22.

●Synchronism

From an exact viewpoint, each cylinder could produce a small difference in speed/travel due to the difference in load (applied to each cylinder). If they are stopped with a common set of limit switches, such differences could accumulate in the course of operation, which necessitates the above-mentioned simultaneous start, individual stop. Make sure that all the cylinders reach the stopping point in every cycle of operation.

INSTALLATION

●Place

With a totally enclosed construction, the cylinder can be used wherever ordinary totally enclosed type motors can be operated. Note the following points.

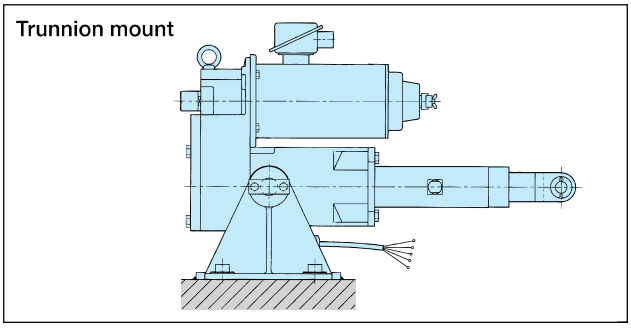
Without bellows type : Indoors and less dusty and no water-exposed place

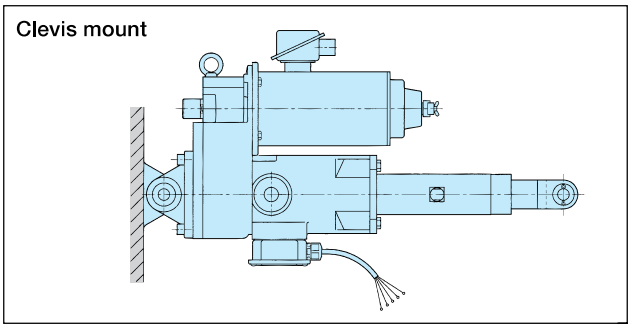
With bellows type : Outdoors weather, dusty and/or water-exposed or vapor-filled indoors

- Where cylinders are exposed to direct sunlight, water, vapor, oil, etc., on a continuous basis, protect them with a cover.
- Bellows type is recommended in dusty places even indoors.

●Mounting Method

- Mechanically, the cylinders can operate in any angle of installation, eg. horizontal, vertical or oblique. Mount with a set of trunnion columns. Make sure the cylinder is not subjected to lateral load.





Note : BB100K and BGB300K are not available for clevis mounting.

- Where cylinders are exposed to rain water, the rod facing up is the last recommended from of installation even if it is the bellows type.
- Make sure the joint knuckle and the connected member do not interfere with each other while they pivot.

●Turn Stop

- The rod generates a turning torque (ref. Page 18). In most cases, connecting the joint knuckle with the mating member makes turn stop.
- However, where the cylinder is operated by itself, ie. without being connecting to anything, or they are connected to a chain, wire, etc., a turn stop device must be provided.

●Lateral Load

- Make sure the cylinder is not subjected to lateral load.
- Where lateral or biased load applies, make such provisions as a guide roller along the rod or balance weight.

●Manual Operation

- Cut off power first. On models equipped with a brake release device, release brake and operate with the manual handle (optional) or spanner.
- After manual operation, be sure to restore the brake release. Restore manual shaft cover cap, too. (Models without a brake release may be manual-operated as well since they have only a small brake torque.)
- Refer to page 18 for rod travel amount per turn of the shaft.

WARNING : ※Before manual operation, make 100% sure that the power is cut off. If power connects during manual operation, serious accidents could be caused.

※Before releasing brake, remove any load on the cylinder.
Such load could cause an unexpected/ sudden turn of the screw in the cylinder, leading to serious accidents.

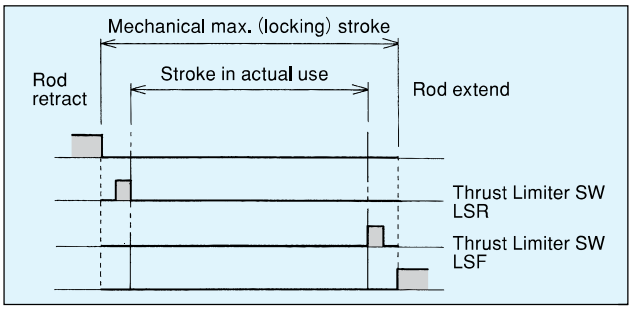
STROKRE STTING

- **ON/OFF Operation**

The built-in Thrust Limiter enables the cylinder to make pressure stops. When used for damper/hopper gates, it permits the gate to close completely. (In this case, the mating stopper shall have the strength comparable to three times the rated thrust.)

- **External LS**

When stopping the cylinder with the external LS, refer to page 22.



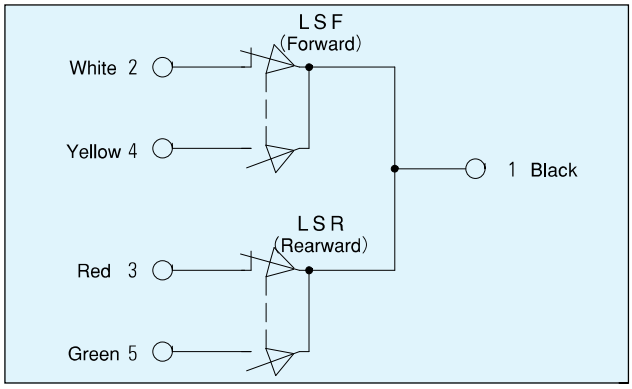
Note : Don't let the piston rod strike the mechanical stroke end; it could damage the inside mechanism.

Thrust Limiter

LSF Terminal 1-2 : Normally ON. Goes OFF when overloaded as the rod extends. (pressure stops)
1-4 : Reversal contacts (for signal confirmation)

LSR Terminal 1-3 : Normally ON. Goes OFF when overloaded as the rod retracts. (pressure stops)
1-5 : Reversal contacts (for signal confirmation)

B



●Specifications of Limit Switch

Rated Volt	AC250V
Capacity	10A （Resistance Load）
Contact Arrangement	C
Model	V-10-1E5（OMRON）

Standard cable length is 1 m. Refer to the "Reference" wiring diagram on page 22.

Make correct wiring; LSF must correspond to forward, and LSR to rearward rod travel. Thrust Limiter does not work if LSF/LSR are not used for right travel directions.

Note : SW types and models are subject to change without notice.

MAINTENANCE

The cylinder is shipped with quality grease applied, and can be used as it is upon arrival at customers. Refer to the table below for maintenance lubrication. (Refer to the "CONSTRUCTION" drawing on page 17, too.)

Points	Lub. Amount (g)	Method
Screw	10～20 per 100 mm stroke	Lubricate through Lub. Hole using grease gun.
Gears & Bearings	100～150	Once every 2 years or after 100,000 operations.
Slide Journal	50～100	

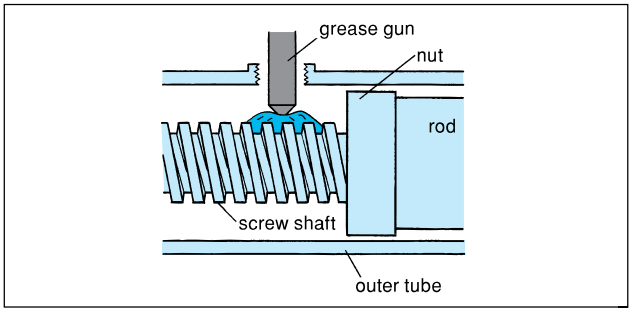
●Lub. Cycle to Screw

Lub. condition depends on ambient temperature, operating conditions, etc. Determine lub. cycle according to actual lub. conditions.

Operation Frequency	Lub. Cycle
50～100 times/day	1 ～ 3 months
10～50 times/day	3 ～ 6 months
Less than 10 times/day	6 ～ 12 months
Over 100 times/day	Consult us

●Lub. to Screw

With the rod fully extended, apply small amount of grease using grease gun or spatula and move the rod several times. Repeat this a few times.

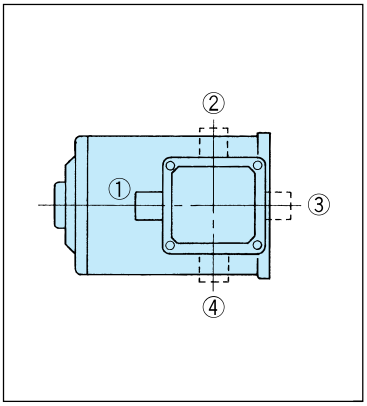


●Recommended Grease

Manufacturer	Grease
IDEMITSU KOSAN	DAPHNE EPONEX SR No.1
SHELL	ALVANIA GREASE 1
COSMO	DYNAMAX No.1

WIRING

- The cylinder tilts as it pivots on the trunnion axis. For wiring, use flexible cables such as cabtyre cable.
- In outdoors environments, make the cable entry (to the motor terminal box) face downward or horizontal, and use a water-proof connector.
  (The terminal box can be rotated by loosening 4 screws. Provide ground connections using the screw. In certain cases, ③ may not be available due to a lifting hook provided on some cylinders.)
- The "B" series cylinders are equipped with the Thrust Limiter overload safety device. Be sure to make use of it in your operating circuit.
  (Negligence can cause motor burn-out and/or serious damage to inside mechanism.)



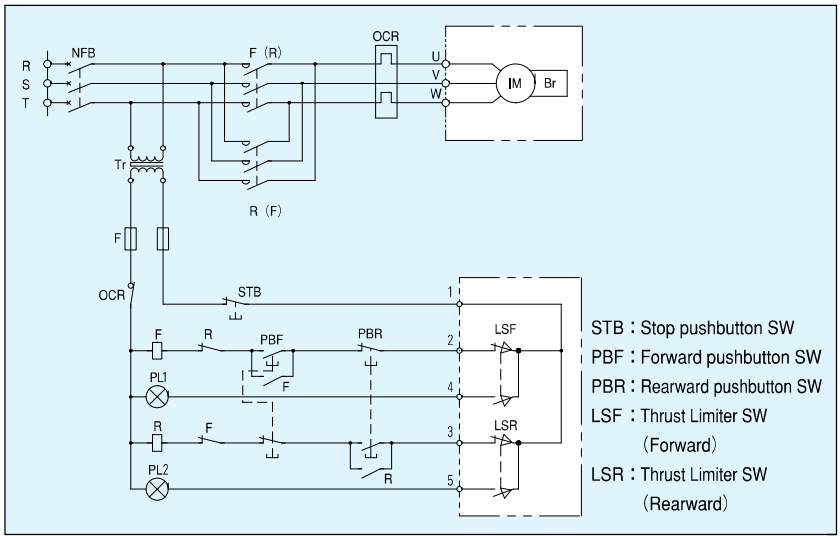
●Wiring Diagram (for reference)

Varied patterns of wiring are possible. A typical circuit is as shown below just for your reference. Make circuits depending on your own needs. Consult COSMIC for inverter drive or any other special requirements.

・Single unit operation

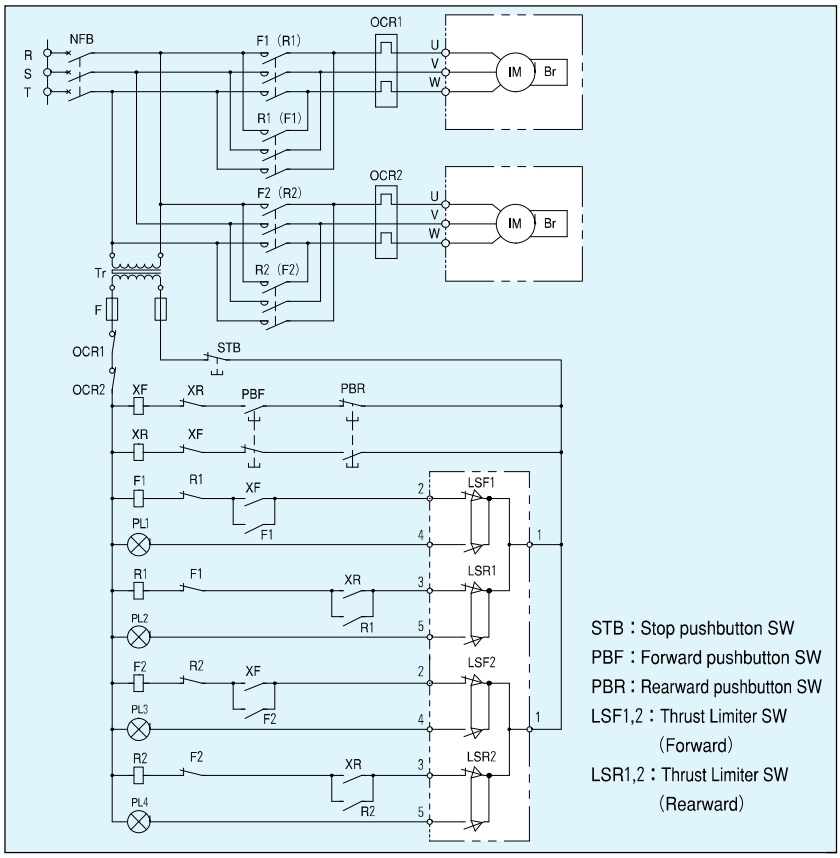
This is a reference circuit for operating a single unit.

All B series models have a brake motor, of a pull-rotor type, where the brake is an integral part of the motor. Cylinder stroke must be regulated by the external LS. (To be provided by user or available from COSMIC.)



・Linked operation

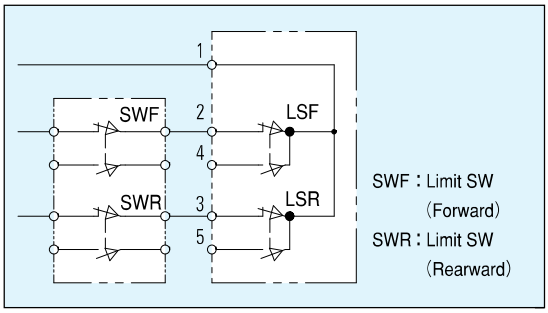
This is a reference circuit for starting two cylinders by a common pushbutton. (The same can apply to more-than-two linked cylinders.) As shown, the stroke regulating LS must be provided on individual cylinders to stop them independently. Stopping them with a common LS could cause accumulated travel differences.



Note : In making circuits, make sure the transmission lag is minimized. Excessive lag could cause overrunning, leading to damage to the unit.

・External Limit Switches

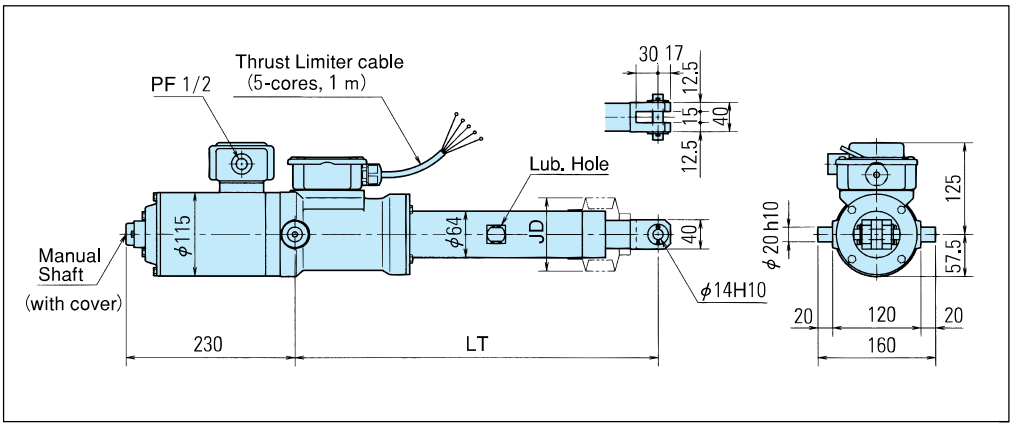
When external limit switches are used to regulate the cylinder stroke, wire them in series with the Thrust Limiter limit switches. (See right. Cylinder stroke is regulated by SWF and SWR while LSF and LSR protect the cylinder against overload.) Take signals from the "a" contact of SWF and SWR.



B

DIMENSIONS

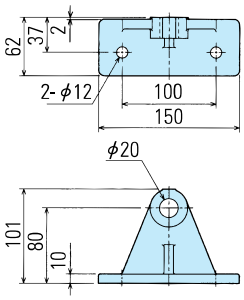
BB100K



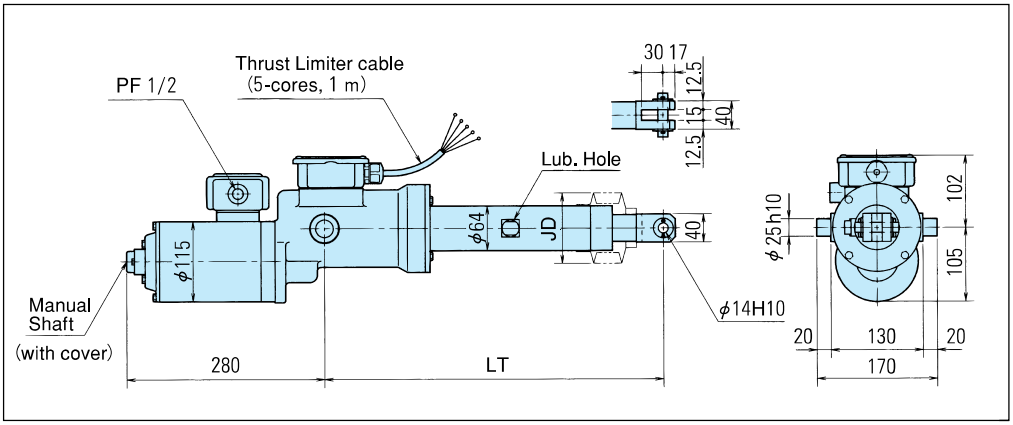
Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	Mechanical max. stroke (mm)	Without bellows		With bellows			Approx. weight (kg)
					MIN.LT (mm)	MAX.LT (mm)	MIN.LT (mm)	MAX.LT (mm)	JD (mm)	
BB100K-1(J)	980	75/90	0.4	100	394	494	394	494	φ 100	23
BB100K-2(J)				200	494	694	494	694		24
BB100K-3(J)				300	594	894	594	894		25
BB100K-5(J)				500	794	1294	846	1346		27
BB100K-7(J)				700	1034	1734	1126	1826		30

● Option

Trunnion columns



BGB300K

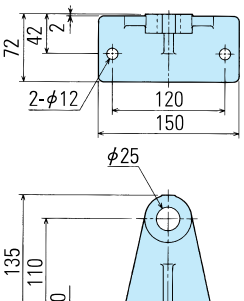


Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	Mechanical max. stroke (mm)	Without bellows		With bellows			Approx. weight (kg)
					MIN.LT (mm)	MAX.LT (mm)	MIN.LT (mm)	MAX.LT (mm)	JD (mm)	
BGB300K-1(J)	2.94 k	29/35	0.4	100	279	379	279	379	φ 100	25
BGB300K-2(J)				200	379	579	379	579		26
BGB300K-3(J)				300	479	779	479	779		27
BGB300K-5(J)				500	679	1179	731	1231		29
BGB300K-7(J)				700	919	1619	1011	1711		32

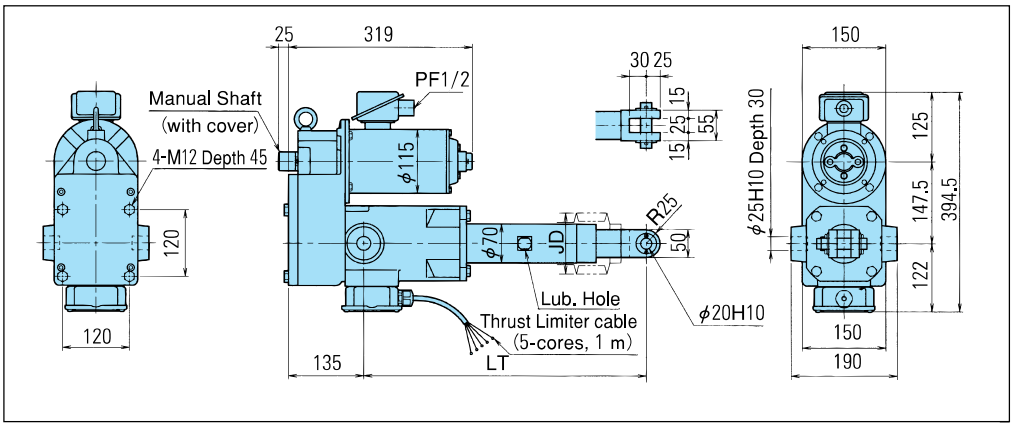
Note : Lub. Hole is not provided on 100mm - stroke model.

● Option

Trunnion columns



DIMENSIONS

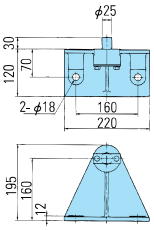


BK500K

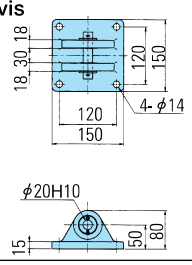
Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	Mechanical max. stroke (mm)	Without bellows MIN.LT (mm)	Without bellows MAX.LT (mm)	With bellows MIN.LT (mm)	With bellows MAX.LT (mm)	With bellows JD (mm)	Approx. weight (kg)
BK500K- 2(J)	4.9 k	23/28	0.4	200	407	607	407	607	φ110	47
BK500K- 3(J)				300	507	807	507	807		50
BK500K- 5(J)				500	707	1207	774	1274		54
BK500K- 7(J)				700	942	1642	1047	1747		58
BK500K-10(J)				1000	1242	2242	1430	2430		65

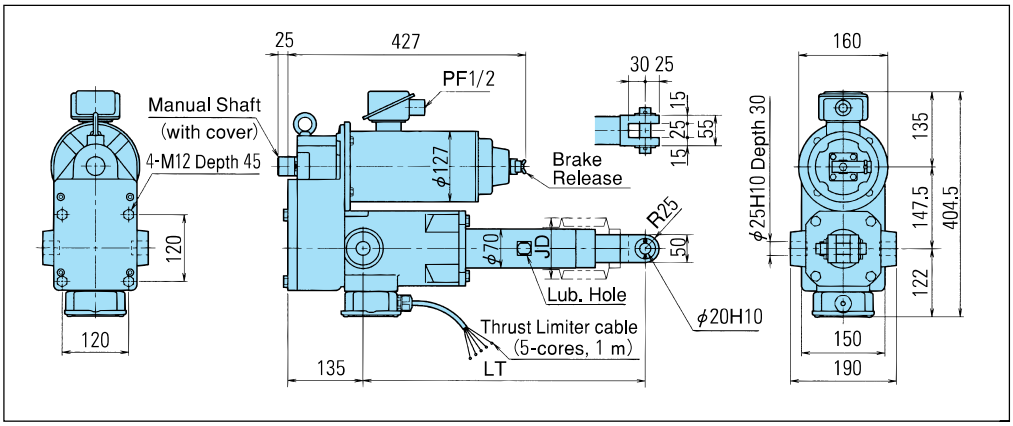
● Option

Trunnion columns



Clevis



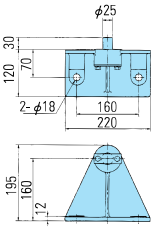


BL500K
BL1T

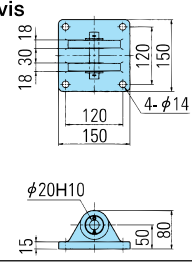
Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	Mechanical max. stroke (mm)	Without bellows MIN.LT (mm)	Without bellows MAX.LT (mm)	With bellows MIN.LT (mm)	With bellows MAX.LT (mm)	With bellows JD (mm)	Approx. weight (kg)
BL500K- 2(J)	4.9 k	46/56	0.6	200	407	607	407	607	φ110	48
BL500K- 3(J)				300	507	807	507	807		51
BL500K- 5(J)				500	707	1207	774	1274		55
BL500K- 7(J)				700	942	1642	1047	1747		59
BL500K-10(J)				1000	1242	2242	1430	2430		66
BL1T- 2(J)	9.8 k	23/28	0.6	200	407	607	407	607	φ110	48
BL1T- 3(J)				300	507	807	507	807		51
BL1T- 5(J)				500	707	1207	774	1274		55
BL1T- 7(J)				700	942	1642	1047	1747		59
BL1T-10(J)				1000	1242	2242	1430	2430		66

● Option

Trunnion columns

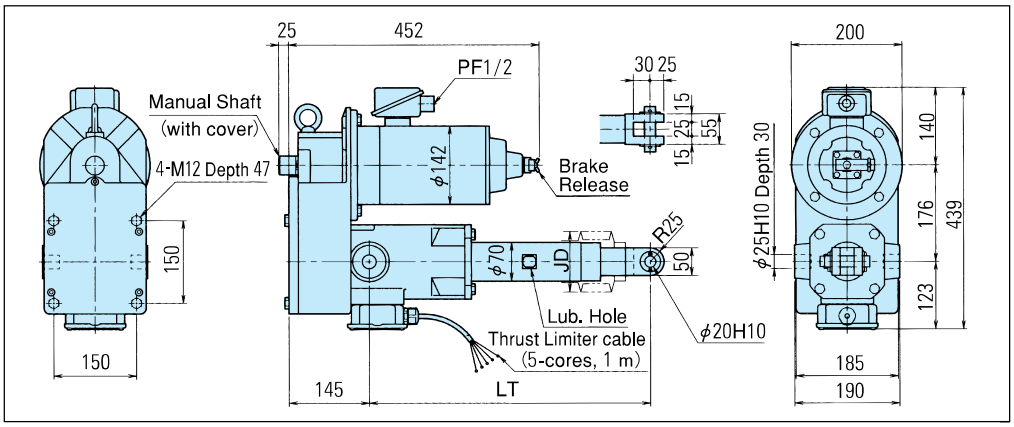


Clevis



B

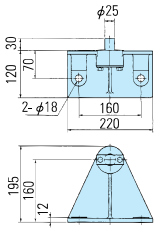
DIMENSIONS



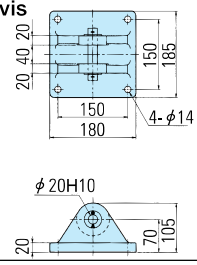
BM1T

● Option

Trunnion columns



Clevis

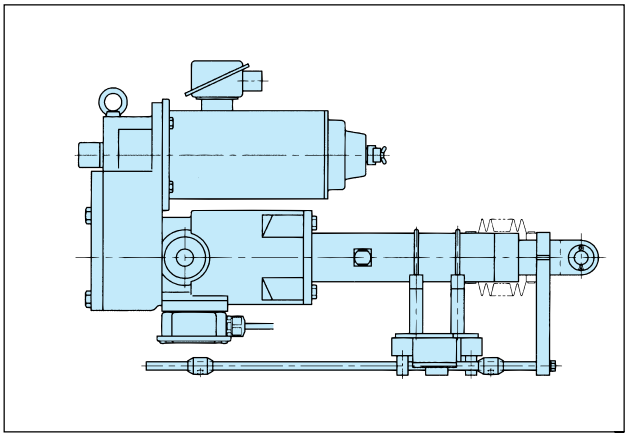


Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	Mechanical max. stroke (mm)	Without bellows		With bellows			Approx. weight (kg)
					MIN.LT (mm)	MAX.LT (mm)	MIN.LT (mm)	MAX.LT (mm)	JD (mm)	
BM1T- 2(J)	9.8 k	47/56	1.1	200	407	607	407	607	φ110	64
BM1T- 3(J)				300	507	807	507	807		66
BM1T- 5(J)				500	707	1207	774	1274		70
BM1T- 7(J)				700	942	1642	1047	1747		74
BM1T-10(J)				1000	1242	2242	1430	2430		81

OPTION

●External LS

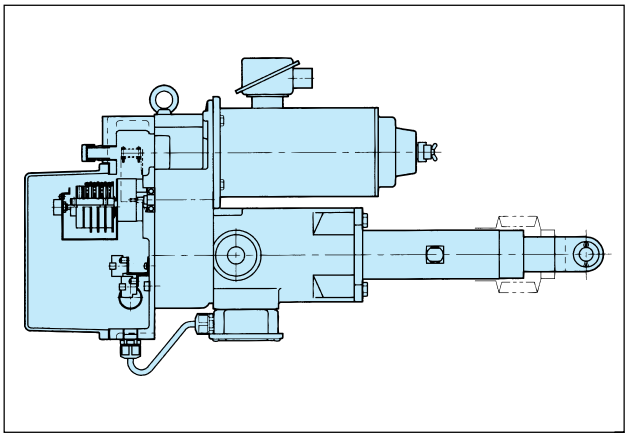
For regulating the cylinder stroke. Wire the LS in series with the Thrust Limiter so that the Thrust Limiter works to protect the cylinder from overload.



●Positioner Cam LS

Allows for halfway stops at desired positions. Potentiometer can be incorporated for display of the cylinder stroke. For more details, refer to descriptions in the "BJ" series section.

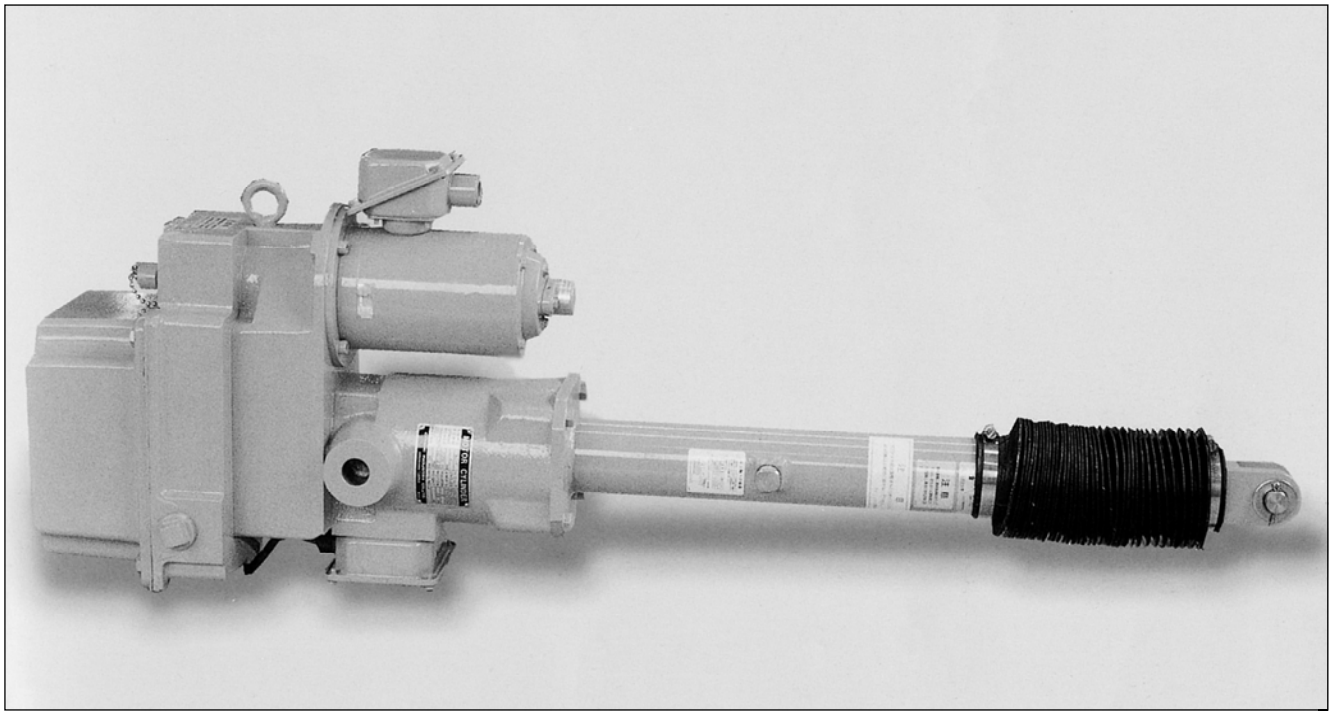
Note : Positioner is not available on BB100K and BGB300K.



• Make sure External LS, cables, etc., will not interfere with equipment or structures during operation.

BJ Series

Developed particularly for damper and butterfly valve control applications. Much smaller and less costly than conventional types. Available from small to large model line-ups.



FEATURES

1. Compact and Economical
2/3～1/2 the size of the conventional rotary damper drive, with substantially lower cost.

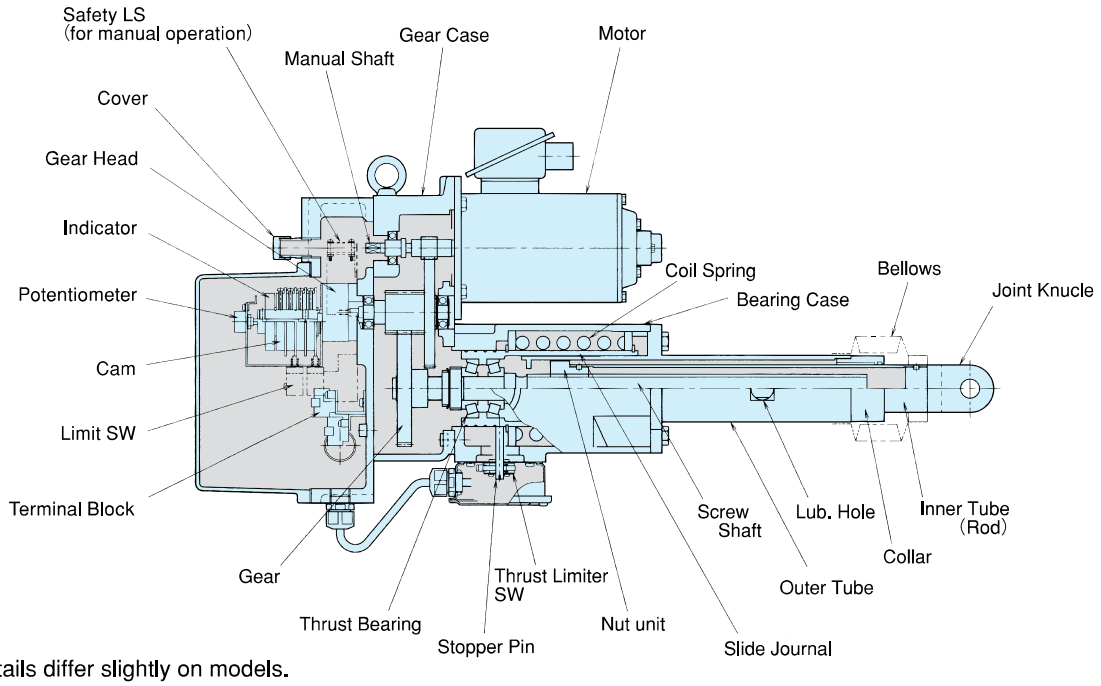
2. Positioner Cam LS
4 sets of built-in cam LS to provide signals at desired positions. Potentiometer also available.

3. Pressure Stops
The Thrust Limiter overload safety device allows for half-way pressure stops to close dampers to "zero" leak.

4. Weather Protected
Allows use in outdoors, bad atmosphere, in any angle of mounting.

5. Simple Construction
A simple body combines functions, allows easy maintenance.

CONSTRUCTION



Note : Details differ slightly on models.

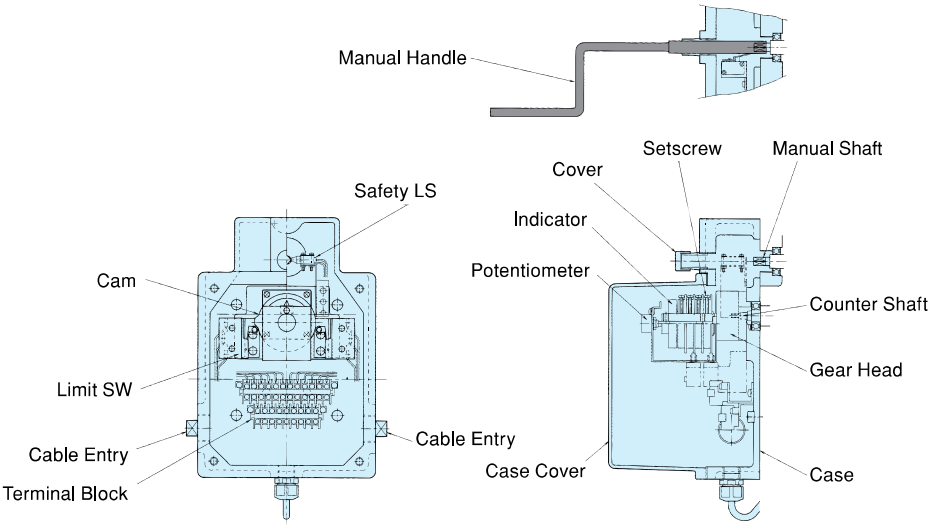
Reduction part : High precision spur gears, quiet and long-life. Easy maintenance with simply grease lubrication.

Thrust Limiter : Spring-and-LS-combined Thrust Limiter allows for half-way pressure stops.

Linear Actuating Part : Motor rotation is converted to linear motion by a trapezoidal screw. Long life with simple lub. maintenance.

Positioner Part : Contains 4 sets of cam LS and a potentiometer to provide signals for cylinder stroke. Standard feature aimed at damper use applications.

●Positioner (PL unit)



One reciprocation of cylinder stroke is translated into one turn of LS cam via high reduction gear unit.

SPECIFICATIONS

Structure	Totally enclosed
Power	3ph, 200/220 (400/440) VAC
Frequency	50/60Hz
Thermal class	E
Time rating	10%ED
Ambient temp	−15℃～+50℃
Atmosphere	Outdoors weather, dusty atmosphere
Positioner	4-position cam LS, Potentiometer (1kΩ)
Accessories	Bellows boot, Manual handle
Paint color	Munsell 2.5G 6/2

Note : Model number does not show voltage or optional parts.
Specify when ordering.

- BJ models employ an exclusively designed pull-roter type, spring-activated 3ph AC brake motor.
- Brake is released as the roter is sucked electrically. Simple construction requires no daily maintenance.

MODEL LIST

Model	Thrust (N)	Speed 50/60Hz (mm/s)	Mechanical max. Stroke (mm)	Motor output (kW)	Rated current 200V/220V (400V/440V) (A)	Stop accuracy (mm)	Rod turning torque (Nm)	Rod travel per turn of manual shaft (mm)	Brake
BJ100K	980	10/12	200 300 500 700	0.13	1.16/1.02 (0.58/0.51)	1.1	2.94	0.4	Pull-roter spring-triggered off-brake simultaneous cut-off
BJ300K	2.94 k	10/12	200 300 500 700	0.13	1.16/1.02 (0.58/0.51)	1.1	9.8	0.4	Pull-roter spring-triggered off-brake simultaneous cut-off
BJ500K	4.9 k	10/12	300 500 700 1000	0.4	4.0/3.3 (2.0/1.6)	1.08	16.7	0.4	Pull-roter spring-triggered off-brake simultaneous cut-off
BJ1T	9.8 k	10/12	300 500 700 1000	0.4	4.0/3.3 (2.0/1.6)	1.08	33.3	0.4	Pull-roter spring-triggered off-brake simultaneous cut-off
BJ2T	19.6 k	12/14.4	300 500 700 1000	1.1	6.1/5.3 (3.1/2.7)	1.62	65.7	0.48	Pull-roter spring-triggered off-brake simultaneous cut-off
BJ4T	39.2 k	12.5/15	300 500 700 1000	2.0	10.4/9.0 (5.2/4.5)	2.2	108	0.52	Pull-roter spring-triggered off-brake simultaneous cut-off

Note : Speed figures are subject to the motor on synchronous rotation.
Thrust Limiter is factory set to activate at about 110% of the rated thrust.
Motors are exclusively designed. Current values may be slightly different from general purpose motors on market.
Give considerations when selecting a thermal relay.

INSTALLATION

●Place

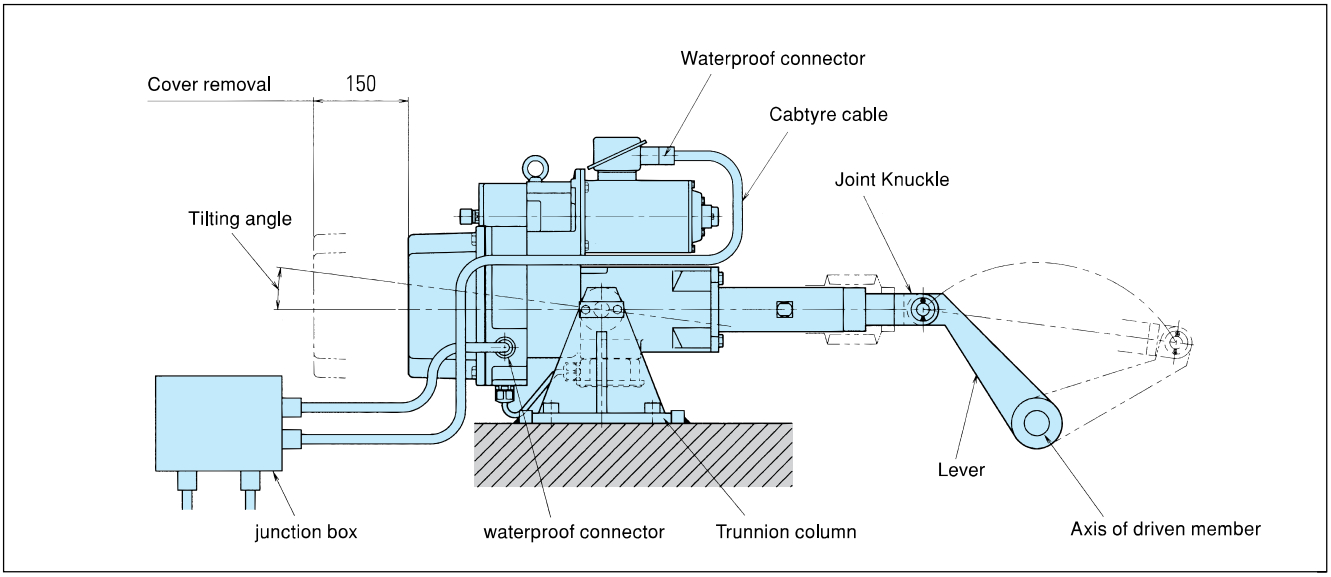
With a totally enclosed construction, the cylinder can be used in most areas of indoors and outdoors. However, where it is exposed to water, vapor, oil, etc, on a regular basis, the cylinder should preferably be protected with a proper cover.

Where cylinders are exposed to rain water, the piston rod facing up is the last recommended from of installation even if they have a bellows boot.

When cylinders are used beyond −15～+50℃ range, protect with a proper heat shielding cover. Similarly, if it's exposed to direct sunlight, provide a proper shade.

●Mounting Method

- Mechanically, the cylinders can operate in any angle of installation, eg. horizontal, vertical or oblique. Mount with a set of trunnion columns. Make sure the cylinder is not subjected to lateral load.
- The cylinder tilts as it pivots on the trunnion axis. Make sure the joint knuckle and the connected member do not interfere with each other while they pivot. Also, use flexible cables for wiring.



Note : Avoid using cable-protecting tubes;they are not much of a waterproof.

●Turn Stop

- The rod generates a turning torque (ref. Page 28). In most cases, connecting the joint knuckle with the mating member makes a turn stop.
- However, where the cylinder is operated by itself, ie. without connecting to anything, or they are connected to a chain, wire, etc., a turn stop device must be provided.

●Lateral Load

- Make sure the cylinder is not subjected to lateral load.
- Where lateral or biased load applies, make such provisions as a guide roller along the rod or balance weight.

●Manual Operation

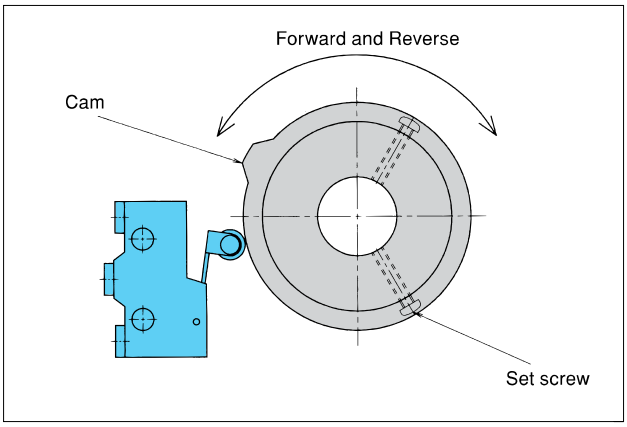
- Cut off power first. On models equipped with a brake release device, release brake and operate with the manual handle (optional). Don't operate with too much force; a shear pin could break to protect the inside gears.
- After manual operation, be sure to restore the brake release. Restore manual shaft cover cap, too. (Models without a brake release may be manual-operated as well since they have only a small brake torque.)
- Refer to page 28 for rod travel amount per turn of the shaft.

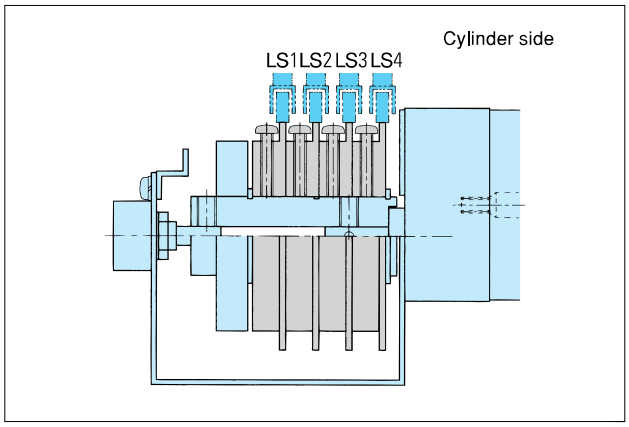
WARNING : ※Before manual operation, make 100% sure that the power is cut off. If power connects during manual operation, serious accidents could be caused.

※Before releasing brake, remove any load on the cylinder. Such load could cause an unexpected/sudden turn of the screw in the cylinder, leading to serious accidents.

STROKE SETTING

Set the built-in Positioner cam LS to stop the cylinder at desired positions.
The also built-in Thrust Limiter enables the cylinder to make pressure stops.
In this case, the mating member shall have the strength comparable to three times the rated thrust.





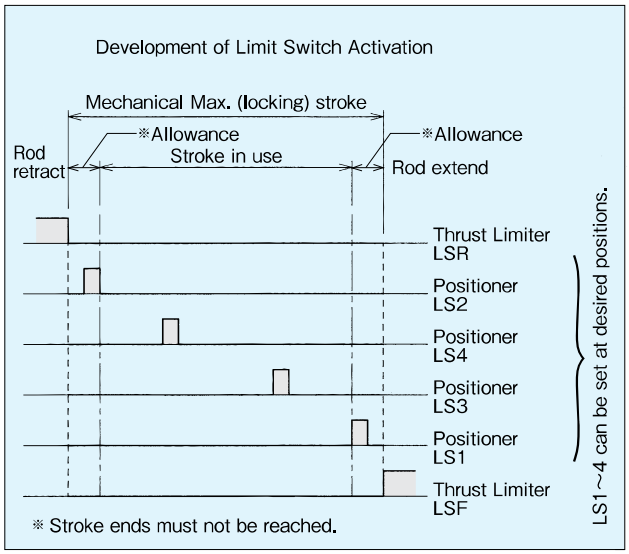
Four cams LS1 to LS 4 are arranged as shown above. Connect the cylinder with the mate machine. While operating the cylinder by inching or manually, set the cams to activate at each desired position.

Note : ※ When operating manually, make 100% sure the power supply is cut off. Negligence can cause serious accidents.

※ When setting the cam, make sure the direction of the rod movement (= extend or retract) matches direction of the cam's rotation.

※ Cylinders are shipped with LS1 and LS2 tentatively set at about 20 mm from each stroke end. Potentiometer is also factory set for about 100 ohm at "zero" stroke. These settings (= relationship between cams/ potentiometer and rod) will go wrong if the rod is turned. Be careful not to turn the rod when connecting with the mate machine.

※ Pressure stops are also available. But don't let the rod strike the mechanical stroke end; it could damage the inside mechanism.



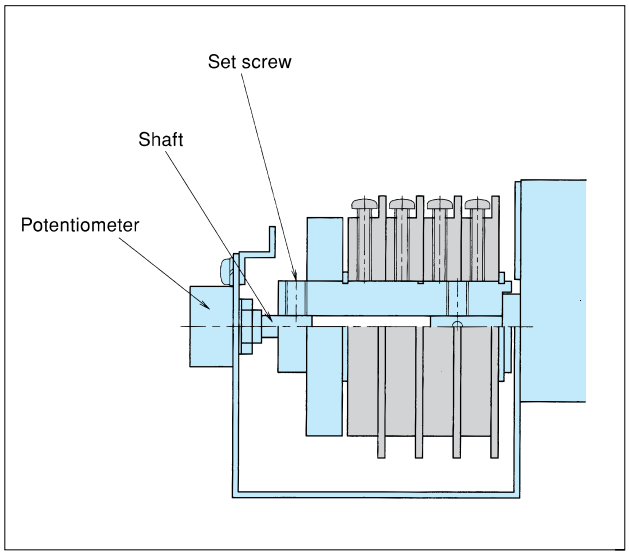
●Potentiometer

Potentiometer is factory set to cover a full stroke length within its effective working angle. (About 100 ohm on terminals 11-12 with the rod fully retracted)

The relationship between the potentiometer and the rod is broken if the rod is turned.

After the cylinder is connected with the mate machine, check if the potentiometer works properly.

If required, adjust it by loosening the setscrew and rotating the shaft. Refer to page 31 for specifications.

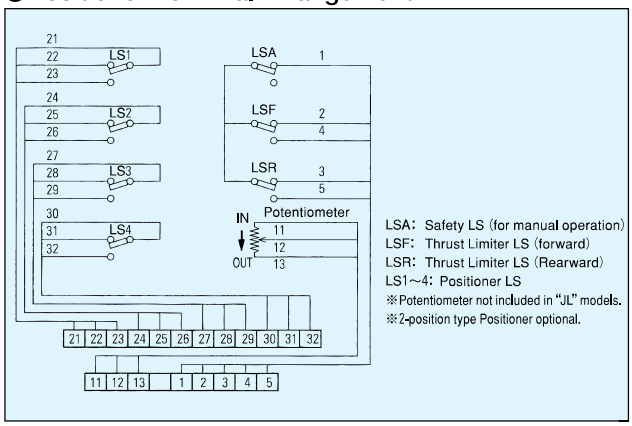


ELECTRICAL SW & PARTS

●Specifications

Item		BJ100K, BJ300K	BJ500K, BJ1T BJ2T, BJ4T
Positioner LS	Rated Volt	AC250V	AC250V
	Capacity	10A (Resistance Load)	15A (Resistance Load)
	Contact Arrangement	C	C
	Model	V-105-1A5 (OMRON)	Z-15GW22-B (OMRON)
Thrust Limiter LS Safety LS (for manual operation)	Rated Volt	AC250V	AC250V
	Capacity	10A (Resistance Load)	10A (Resistance Load)
	Contact Arrangement	C	C
	Model	V-10-1E5 (OMRON)	V-10-1E5 (OMRON)
Potentiometer	Resistance	1 K Ω	1K Ω
	Electric Angle	355°±5°	355° ±5°
	Accuracy	0.5%	0.5%
	Rated Power	0.5W	0.5W
	Model	CP22E (SAKAE)	CP22E (SAKAE)

●Positioner Terminal Arrangement



●Thrust Limiter

LSF Terminal 1-2 : Normally ON. Goes OFF when overloaded as the rod extends. (pressure stops)
1-4 : Reversal contacts (for signal confirmation)

LSR Terminal 1-3 : Normally ON. Goes OFF when overloaded as the rod retracts. (pressure stops)
1-5 : Reversal contacts (for signal confirmation)

MAINTENANCE

The cylinder is shipped with quality grease applied, and can be used as it is upon arrival at customers. Refer to the table below for maintenance lubrication. (Refer to the "CONSTRUCTION" drawing on page 27, too.)

Points	Lub. Amount (g)	Method
Screw	per 100 mm stroke 10~20	Lubricate through Lub. Hole using grease gun.
Gears & Bearings	100~150	Once every 2 years or after 100,000 operations.
Slide Journal	50~100	

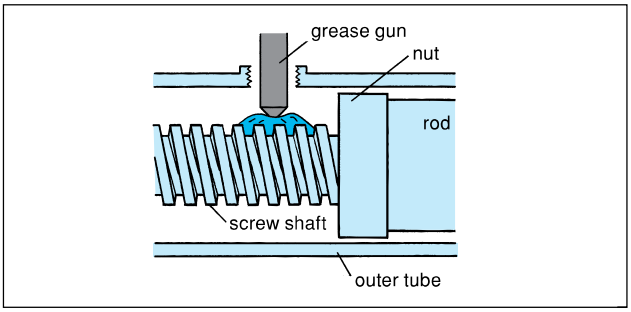
●Lub. Cycle to Screw

Lub. condition depends on ambient temperature, operating conditions, etc. Determine lub. cycle according to actual lub. conditions.

Operation Frequency	Lub. Cycle
500~100 times/day	1 month
100~50 times/day	1 ~ 6 months
50~10 times/day	6 ~ 12 months
Over 500 times/day	Consult us

●Lub.to Screw

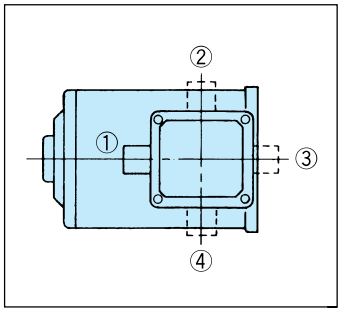
With the rod fully extend, apply small amount of grease and move the rod several times. Repeat this a few times.



●Recommended Grease

Manufacturer	Grease
IDEMITSU KOSAN	DAPHNE EPONEX SR No.1
SHELL	ALVANIA GREASE 1
COSMO	DYNAMAX No.1

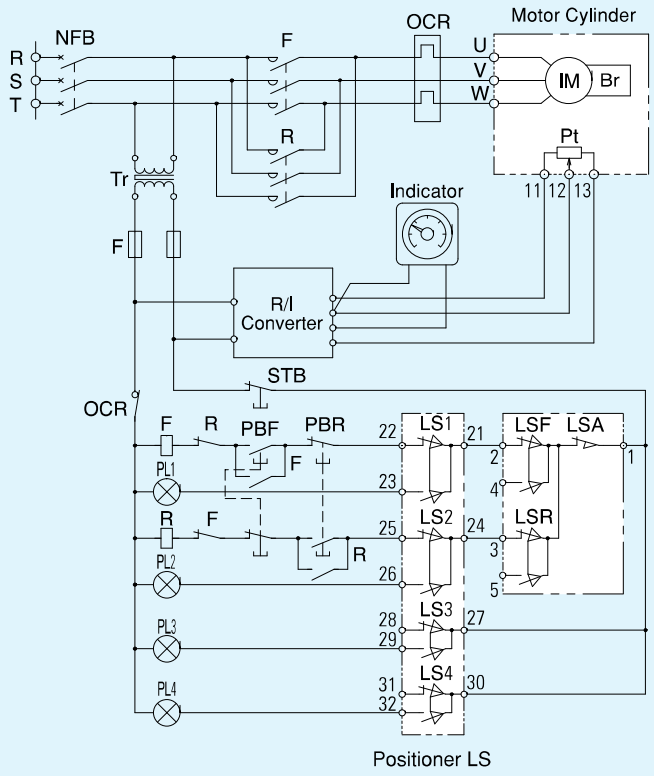
WIRING



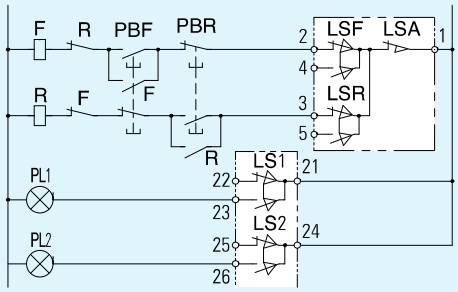
- The cylinder tilts as it pivots on the trunnion axis. For wiring, use flexible cables such as cabtyre cable.
- In outdoors environments, make the cable entry (to the motor terminal box) face downward or horizontal, and use a water-proof connector.
  (The terminal box can be rotated by loosening 4 screws. Provide ground connections using the screw.)
- Make circuits depending on your own needs, referring to ELECTRICAL PARTS specifications shown on page 31.
- Cylinders are shipped with LS1 and LS2 tentatively set at about 20 mm from each stroke end.
- Be sure to make use of the Thrust Limiter overload safety LSF and LSR in your circuits. (Negligence can cause motor burn-out and/or serious damage to inside mechanism.)
- LSF and LSR can be used for pressure stops in damper applications.In this case, the Positioner LS is supposed to be used to indicate/confirm the fully closed position.
- Using all the 6 limit switches (= LSF, LSR, LS1～4), a total of 6 positions can be set.

●Wiring Diagram (for reference)

Varied patterns of wiring are possible. A typical circuit is as shown below just for your reference. Make circuits depending on your own needs. Consult COSMIC for inverter drive or any other special requirements.



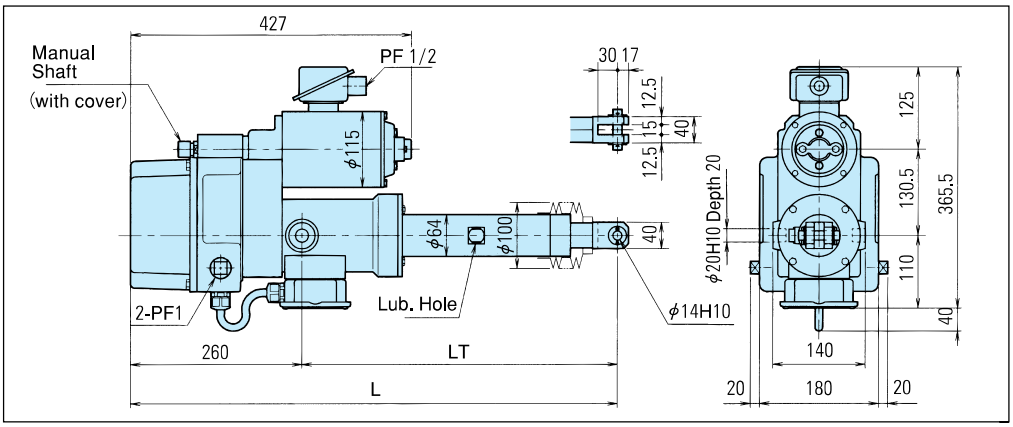
Note : LSA is a safety limit switch which activates to cut off circuit when manual handle is inserted.



STB : Stop pushbutton SW
PBF : Forward pushbutton SW
PBR : Rearward pushbutton SW
LSF : Thrust Limiter SW (Forward)
LSR : Thrust Limiter SW (Rearward)
LSA : Safety LS (for manual operation)
LS1, LS2, LS3, LS4 : Positioner LS

BJ

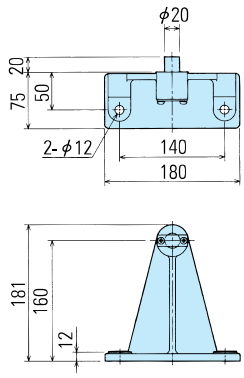
DIMENSIONS



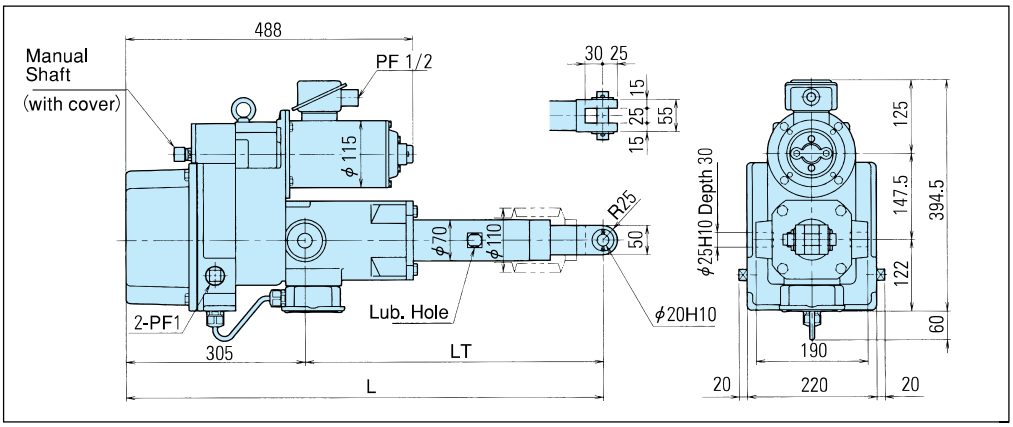
BJ100K
BJ300K

● Option

Trunnion columns



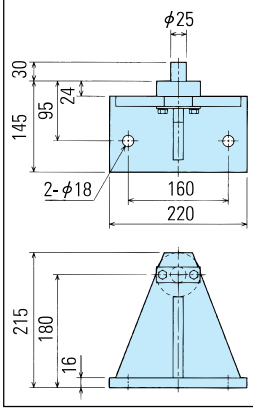
Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	Mechanical max. stroke (mm)	L size (mm)		LT size (mm)		Approx. weight (kg)
					MIN	MAX	MIN	MAX	
BJ100K-2JPL	980	10/12	0.13	200	643	843	383	583	37
BJ100K-3JPL				300	743	1043	483	783	38
BJ100K-5JPL				500	995	1495	735	1235	40
BJ100K-7JPL				700	1275	1975	1015	1715	43
BJ300K-2JPL	2.94 k	10/12	0.13	200	643	843	383	583	37
BJ300K-3JPL				300	743	1043	483	783	38
BJ300K-5JPL				500	995	1495	735	1235	40
BJ300K-7JPL				700	1275	1975	1015	1715	43



BJ500K
BJ1T

● Option

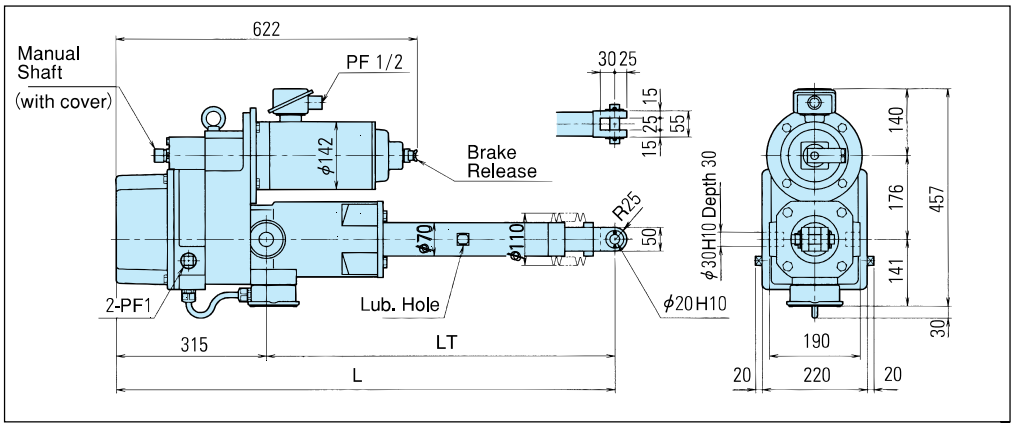
Trunnion columns



Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	Mechanical max. stroke (mm)	L size (mm)		LT size (mm)		Approx. weight (kg)
					MIN	MAX	MIN	MAX	
BJ500K- 3JPL	4.9 k	10/12	0.4	300	812	1112	507	807	64
BJ500K- 5JPL				500	1079	1579	774	1274	68
BJ500K- 7JPL				700	1352	2052	1047	1747	72
BJ500K-10JPL				1000	1735	2735	1430	2430	79
BJ1T- 3JPL	9.8 k	10/12	0.4	300	812	1112	507	807	64
BJ1T- 5JPL				500	1079	1579	774	1274	68
BJ1T- 7JPL				700	1352	2052	1047	1747	72
BJ1T-10JPL				1000	1735	2735	1430	2430	79

DIMENSIONS

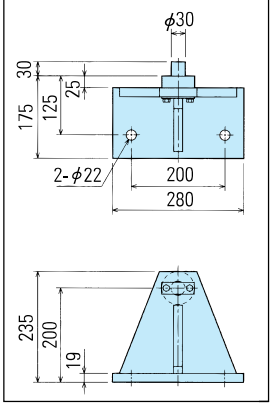
BJ2T



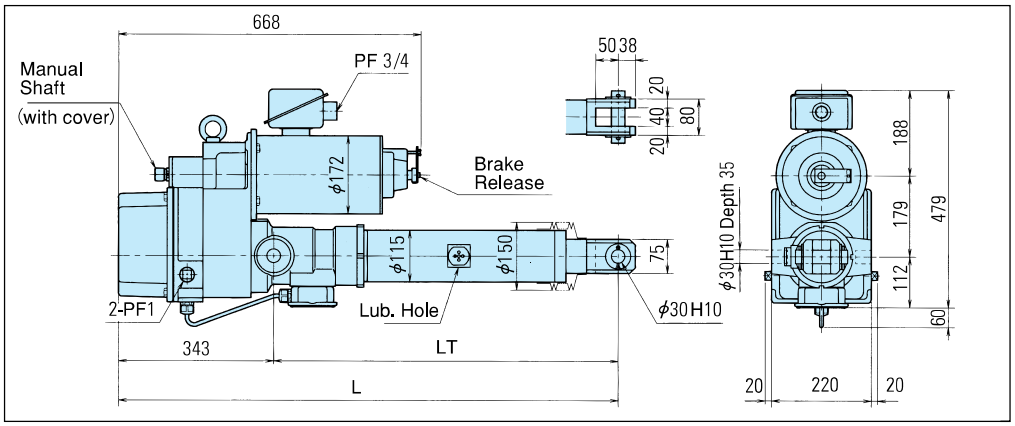
Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	Mechanical max. stroke (mm)	L size (mm)		LT size (mm)		Approx. weight (kg)
					MIN	MAX	MIN	MAX	
BJ2T - 3JPL	19.6 k	12/14.4	1.1	300	868	1168	553	853	90
BJ2T - 5JPL				500	1135	1635	820	1320	94
BJ2T - 7JPL				700	1408	2108	1093	1793	97
BJ2T -10JPL				1000	1791	2791	1476	2476	103

● Option

Trunnion columns



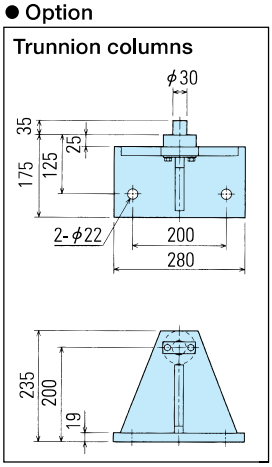
BJ4T



Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	Mechanical max. stroke (mm)	L size (mm)		LT size (mm)		Approx. weight (kg)
					MIN	MAX	MIN	MAX	
BJ4T - 3JPL	39.2 k	12.5/15	2.0	300	1103	1403	760	1060	116
BJ4T - 5JPL				500	1370	1870	1027	1527	125
BJ4T - 7JPL				700	1646	2346	1303	2003	134
BJ4T -10JPL				1000	2029	3029	1686	2686	147

● Option

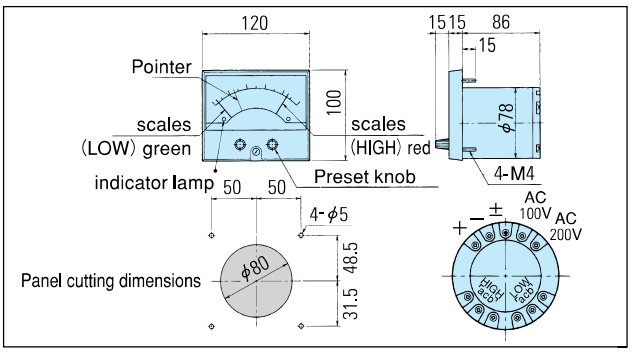
Trunnion columns



BJ

OPTION

●Preset Indicator (% scale)



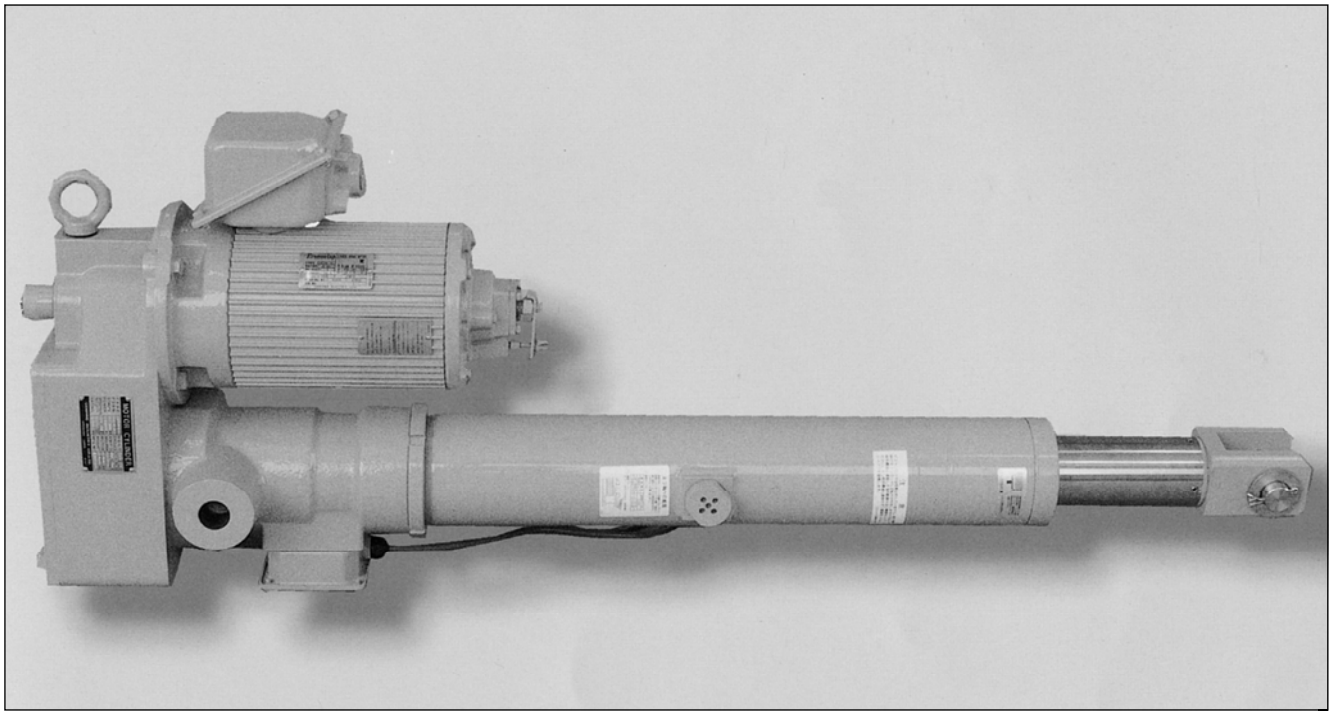
Item	Specifications
Model	NRC120-HL (TSURUGA)
Class	JIS C 1102 Class 2.5
Input	0～1mA DC
Scales	0～100%
Minimum setting width	5%
Setting position	Upper and lower limits
Ambient Temperature	0～+40℃
Paint Color	Black

Preset Indicator permits remote setting and/or confirmation of the stroke. If the pointer, as it moves by the current from the circuit, reaches a preset position, the indicator lamp lights up and the built-in relay activates. (The relay holds its status.)

Potentiometer Converter (or R/I converter) is necessary when displaying the cylinder stroke on the indicator or utilizing various output signals. Consult COSMIC.

DG Series

Particularly suited for heavy load applications with standard line up for up to **30TON** thrust and specials available for larger thrust requirements, featuring high efficiency ball screws, heavy duty power transmission construction, large capacity dish-spring-and-LS-combined Thrust Limiter.



FEATURES

1. Thrust Limiter
The unique Thrust Limiter overload safety mechanism permits pressure stops against external objects. (both directions) The Thrust Limiter activates to cut off power while holding the load.

2. Load Holding
The spring-triggered off-brake motor reliably holds the load while in stoppage. Also dependable in case of power failure.

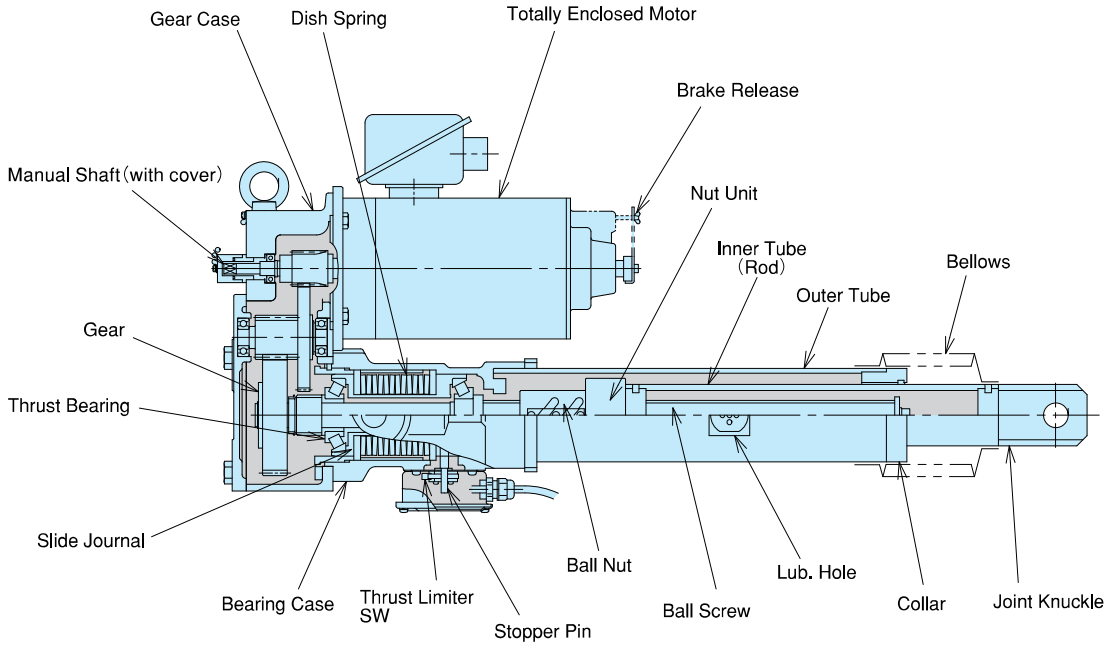
3. Easy but Reliable
Simply electric configuration allows easy applications to automatic or your own operating needs.

4. Economical
Unlike hydraulic cylinders, no auxiliary equipment is needed.And low running cost. (No energy required while in stoppage.)

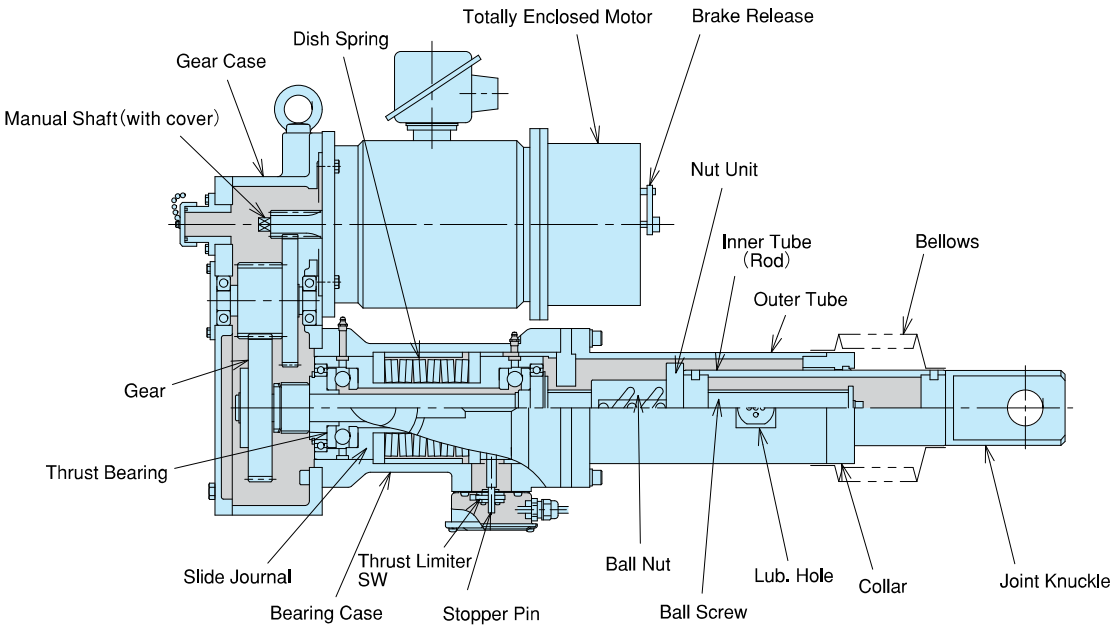
5. Easy installation and Maintenance
All electric and mechanical, reliable and easy, with simply grease lubrication.

CONSTRUCTION

● DG2T
● DG4T



● DG6T
● DG10T
● DG16T
● DG30T



Note : Details differ slightly on models.

Reduction Part : 2-or 3-stage reduction with high precision gears, quiet and long-life.
Easy maintenance with simply grease lubrication.

Thrust Limiter : Dish-spring-and-LS-combined Thrust Limiter allows for half-way pressure stops.

Linear Actuating Part : Motor rotation is translated into linear motion by a ball screw. High rigidity and long life.

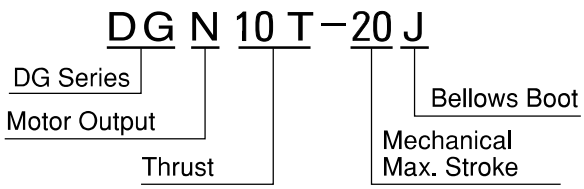
DG

SPECIFICATIONS

Structure	Totally enclosed
Power	3ph, 200/220 (400/440) VAC
Frequency	50/60Hz
Thermal class	E
Time rating	25%ED
Ambient. Temp.	−15℃～+50℃
Atmosphere	Without bellows : indoors and less dusty places
	With bellows : Outdoors weather, dusty indoors
Paint color	Munsell 2.5G 6/2

Notes : 1. Dew condensation not permitted.
2. Bellows type recommended in dusty places even indoors.

MODEL NUMBER



- Motor capacity
  M···0.75kW, N···1.5kW, O···2.2kW, P···3.7kW,
  Q···5.5kW, R···7.5kW, S···11kW
- Model number does not show voltage or optional parts. Specify when ordering.

Example : DGN4T-10J shows a "DG" series 1.5kW motor, 39.2 kN thrust, 1000 mm stroke and bellows boot.

MODEL LIST

Model	Thrust (N)	Speed 50/60Hz (mm/s)	Mechanical max. Stroke (mm)	Motor output (kW)	Rated current 200V/220V (400V/440V) (A)	Rod turning torque (Nm)	Rod travel per turn of manual shaft (mm)	Brake type & current 200V/220V (400V/440V) (A)	
DGM 2T	19.6 k	25/30	300 500 700 1000	0.75	4.8/4.1 (2.4/2.1)	39.2	1.0	Pull-roter spring-triggered off-brake simultaneous cut-off	
DGN 2T		60/72		1.5	8.2/7.2 (4.1/3.6)		2.4		
DGM 4T	39.2 k	12.5/15	300 500 700 1000 1500	0.75	4.8/4.1 (2.4/2.1)	78.4	0.5	Pull-roter spring-triggered off-brake simultaneous cut-off	
DGN 4T		25/30		1.5	8.2/7.2 (4.1/3.6)		1.0		
DGO 4T		42/50		2.2	9.0/7.9 (4.5/4.0)		1.7	DC individual cut-off	0.30 (DC90V)
DGN 6T	58.8 k	15/18	300 500 1000 1500 2000	1.5	8.2/7.2 (4.1/3.6)	118	0.6	Pull-roter spring-triggered off-brake simultaneous cut-off	
DGO 6T		25/30		2.2	9.0/7.9 (4.5/4.0)		1.0	DC individual cut-off	0.30 (DC90V)
DGP 6T		45/54		3.7	14.5/12.9 (7.3/6.5)		1.8		0.37 (DC90V)
DGN10T	98 k	10/12	300 500 1000 1500 2000	1.5	8.2/7.2 (4.1/3.6)	216	0.4	Pull-roter spring-triggered off-brake simultaneous cut-off	
DGO10T		15/18		2.2	9.0/7.9 (4.5/4.0)		0.6	DC individual cut-off	0.30 (DC90V)
DGP10T		25/30		3.7	14.5/12.9 (7.3/6.5)		1.0		0.37 (DC90V)
DGQ10T		40/48		5.5	20.3/18.1 (10.2/9.1)		1.6	AC individual cut-off	1.41/1.0 (0.71/0.5)
DGO16T	157 k	8.3/10	300 500 1000 1500 2000	2.2	9.0/7.9 (4.5/4.0)	441	0.3	DC individual cut-off	0.30 (DC90V)
DGP16T		15/18		3.7	14.5/12.9 (7.3/6.5)		0.6		0.37 (DC90V)
DGQ16T		25/30		5.5	20.3/18.1 (10.2/9.1)		1.0	AC individual cut-off	1.41/1.0 (0.71/0.5)
DGR16T		35/42		7.5	29.0/25.2 (14.5/12.6)		1.4		1.44/1.12 (0.72/0.56)
DGP30T	294 k	8.3/10	300 500 1000 1500 2000	3.7	14.5/12.9 (7.3/6.5)	1.18 k	0.3	DC individual cut-off	0.37 (DC90V)
DGQ30T		12.5/15		5.5	20.3/18.1 (10.2/9.1)		0.5	AC individual cut-off	0.83/0.61 (0.42/0.31)
DGR30T		16.6/20		7.5	29.0/25.2 (14.5/12.6)		0.7		1.41/1.0 (0.71/0.5)
DGS30T		25/30		11	41.9/36.9 (21.0/18.4)		1.0		1.44/1.12 (0.72/0.56)

Note : Speed figures are subject to the motor on synchronous rotation.
Motors are exclusively designed. Current values may be slightly different from general purpose motors on market. Give considerations when selecting a thermal relay.
Models of speed 60 mm/sec or higher are not available for pressure stoppage because of stopping shock.
Rated currents shown are representative figures; they can be slightly different on actual product.
Ampere shown for DC brake is that flowing into brake coil. For more details, contact us.
As a contact for individual brake cut-off, electromagnetic type of contact is recommended.

SELECTION

●Points to be considered

1. Required thrust (or load) in kg
2. Stroke (mm)
3. Speed (mm/s)
4. Power (VAC, Hz)
5. Load condition, operation cycle
6. Atmosphere
7. Application

●Selection

1. Decide on thrust allowing for some margin.

In some cases where large inertia objects are to be moved at rather high speed, the Thrust Limiter may activate instantly upon movement. Select cylinder of lager thrust ratings than below-calculated. (The Thrust Limiter is factory set to activate at 110～148% of the rated thrust.)

・**Vertical Transfer**

$$F = W + K \cdot W$$

・**Horizontal Transfer of Heavy Loads**

$$F = U \cdot W + K \cdot W$$

F …Necessary thrust (N)
W…Load weight (N)
U…Friction factor
K…Accelerate factor

There is no need to consider acceleration factor where loads to be moved have only a small inertia.

Speed (mm/s)	K
～30	0.1
30～70	0.1～0.25
70～120	0.25～0.4
120～240	0.4～1.0

2.Decide on speed.

・Choose appropriate model from MODEL LIST.

3.Decide on stroke

・The stroke figures shown in MODEL LIST are the mechanical max stroke. The cylinder may be stopped with external limit switches or by pressure against external objects(=stopper). In either case, it must be stopped with some allowance at both stroke ends; letting the piston rod strike the mechanical stroke end could cause damage to the inside mechanism.

4.Frequency

・Frequency of operation is limited by the motor's heat capacity. In the following formula, the Load Time (% ED) must be 25% or less. (It aims solely at motor's heat capacity; it does not have a relation with the mechanism of the motor cylinder.)

$$\text{Load time}(\%\text{ED}) = \frac{\text{Running time in one cycle}}{\text{Running time in one cycle + Rest time}} \times 100(\%)$$

Consult us for continuous 10 min. or high frequency operation needs.

LINKED OPERATION

●Control

When more than one cylinders are linked, they may be started together (with a single command) but must be stopped individually with limit switches provided on each cylinder. Refer to the "Reference" wiring diagram on page 42.

●Synchronism

From an exact viewpoint, each cylinder could produce a small difference in speed/travel due to the difference in load (applied to each cylinder). If they are stopped with a common set of limit switches, such differences could accumulate in the course of operation, which necessitates the above-mentioned simultaneous start, individual stop. Make sure that all the cylinders reach the stopping point in every cycle of operation.

INSTALLATION

●Place

With a totally enclosed construction, the cylinder can be used wherever ordinary totally enclosed motors can be operated. Note the following points.

Without bellows : Indoors and less dusty and no water-exposed places

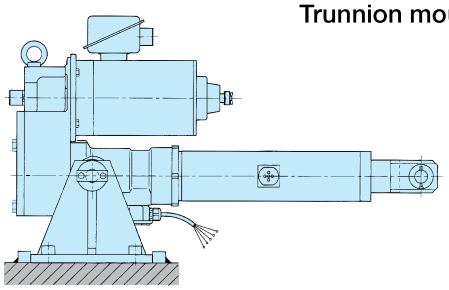
With bellows : Outdoors, dusty and/or water-exposed or vapor-filled indoors

Where cylinders are exposed to direct sunlight, water, vapor, oil, etc., on a regular basis, they should preferably be protected with a proper cover.

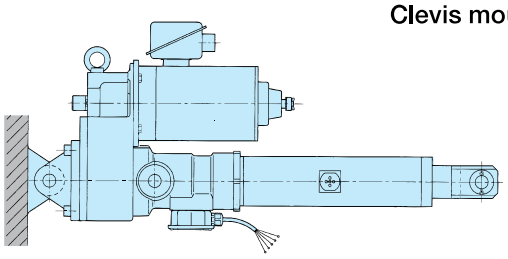
●Mounting Method

・Mechanically, the cylinders can operate in any angle of installation, eg. horizontal, vertical or oblique. Mount with a set of trunnion columns. Make sure the cylinder is not subjected to lateral load.

Trunnion mount



Clevis mount



・Where cylinders are exposed to rain water, the rod facing up is the last recommended form of installation even if they have a bellows boot.
・The cylinder tilts as it pivots on the trunnion axis. Make sure the joint knuckle and the connected member do not interfere with each other while they pivot. Also, use flexible cables for wiring.

●Turn Stop

・The rod generates a turning torque (ref. Page 38). In most cases, connecting the joint knuckle with the mating member makes a turn stop.
・However, where the cylinder is operated by itself, ie. without being connecting to anything, or they are connected to a chain, wire, etc., a turn stop device must be provided.

●Lateral Load

・Make sure the cylinder is not subjected to lateral load.
・Where lateral or biased load applies, make such provisions as a guide roller along the rod or balance weight.

●Manual Operation

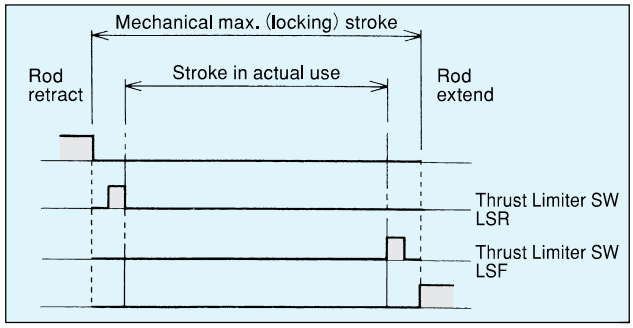
・Cut off power first. Release brake and operate with the optional manual handle or spanner.
・After manual operation, be sure to restore the brake release. Restore manual shaft cover cap, too.
・Refer to page 38 for rod travel amount per turn of the shaft.

WARNING : ※Before manual operation, make 100% sure that the power is cut off. If power connects during manual operation, serious accidents could be caused.
※Before releasing brake, remove any load on the cylinder. Such load could cause an unexpected/sudden turn of the screw in the cylinder, leading to serious accidents.

STROKE SETTING

・**ON/OFF Operation**

The built-in Thrust Limiter enables the cylinder to make pressure stops. When used for damper/hopper gates, it permits the gate to close completely. (In this case, the mating stopper shall have the strength comparable to three times the rated thrust.)



Note : Don't let the piston rod strike the mechanical stroke end; it could damage the inside mechanism.

●External LS

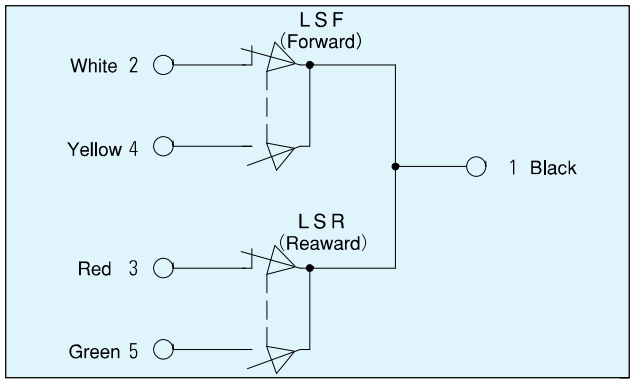
When stopping the cylinder with the external LS, refer to page 42.

Thrust Limiter

Motor Cylinder incorporates below-described limit SW for Thrust Limiter.

LSF Terminal 1-2 : Normally ON. Goes OFF when overloaded as the rod extends. (pressure stops)
1-4 : Reversal contacts (for signal confirmation)

LSR Terminal 1-3 : Normally ON. Goes OFF when overloaded as the rod retracts. (pressure stops)
1-5 : Reversal contacts (for signal confirmation)



●Specifications of Limit Switch

Rated Volt	AC250V
Capacity	10A (Resistance Load)
Contact Arrangement	C
Model	V-10-1E5 (OMRON)

Standard cable length is 1m. Refer to the Wiring Diagram on page 42.

Note : Make correct wiring; LSF must correspond to forward, and LSR to rearward rod travel. Thrust Limiter does not work if LSF/LSR are not used for right travel directions.

Note : SW types and models are subject to change without notice.

MAINTENANCE

The cylinder is shipped with quality grease applied, and can be used as it is upon arrival at customers. Refer to the table below for maintenance lubrication. (Refer to the "CONSTRUCTION" drawing on page 37, too.)

Points	Lub. Amount (g)	Method
Screw	per 100 mm stroke 5~10	Lubricate through Lub. Hole using grease gun.
Gears & Bearings	Regular lub : 20~30 Overhaul : 100~150	For models with an inspection/lub. hole, lubricate regularly.
Slide Journal	Regular lub : 5~10 Overhaul : 50~150	For models with a grease nipple, lubricate regularly with a gun.

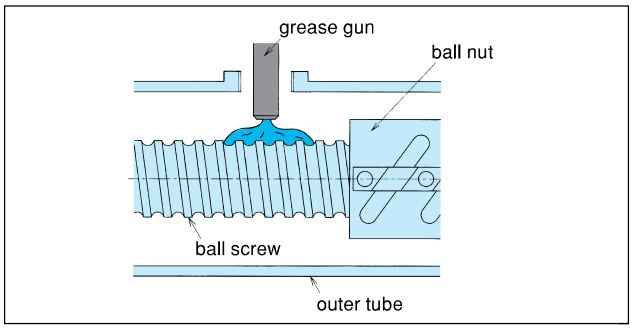
●Lub. Cycle to Screw

Lub. condition depends on ambient temperature, operating conditions, etc. Determine lub. cycle according to actual lub. conditions.

Operation Frequency	Lub. Cycle
500~100 times/day	1 month
100~50 times/day	1 ~ 6 months
50~10 times/day	6 ~ 12 months
Over 500 times/day	Consult us.

●Lub. to Screw

With the rod fully extend, apply small amount of grease and move the rod several times. Repeat this a few times.

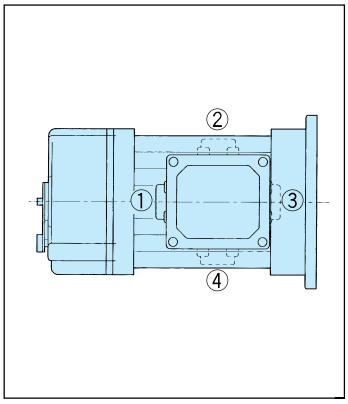


●Recommended Grease

Manufacturer	Grease
IDEMITSU KOSAN	DAPHNE EPONEX SR No.1
SHELL	ALVANIA GREASE 1
COSMO	DYNAMAX No.1

WIRING

- The cylinder tilts as it pivots on the trunnion axis. For wiring, use flexible cables such as cabtyre cable.
- In outdoors environments, make the cable entry (to the motor terminal box) face downward or horizontal, and use a water-proof connector.
  (The terminal box can be rotated by loosening 4 screws. Provide ground connections using the screw. In certain cases, ③ may not be available due to a lifting hook provided on some cylinders.)
- The "DG" series cylinders are equipped with the Thrust Limiter overload safety device. Be sure to make use of it in your operating circuit.
  (Negligence can cause motor burn-out and/or serious damage to inside mechanism.)



DG

●Wiring Diagram (for reference)

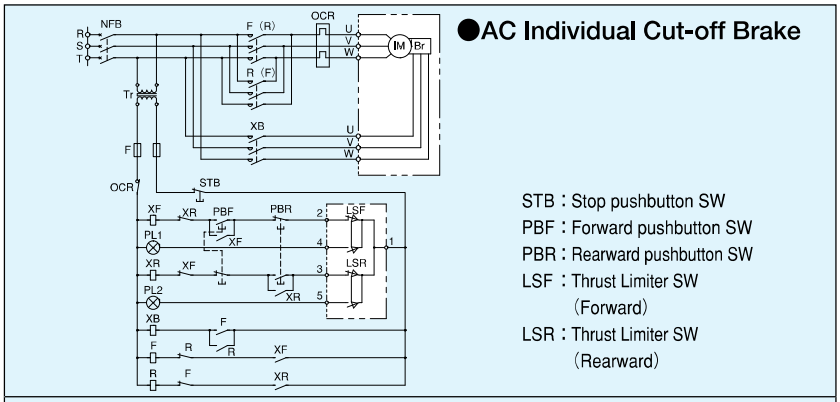
Varied patterns of wiring are possible. A typical circuit is as shown below just for your reference. Make circuits depending on your own needs. Consult COSMIC for inverter drive or any other special requirements.

・Single unit operation

This is a reference circuit for operating a single unit.

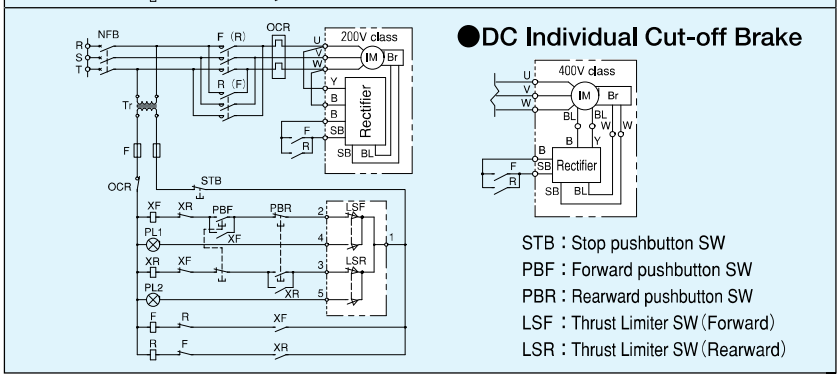
On models with AC individual cut-off brake, the brake is of a pull-rotor type and is an integral part of the motor.

Cylinder stroke must be regulated by the external LS. (To be provided by user or available from COSMIC.)



・Cylinders with a 2.2kW motor power or over must have the DC individual cut-off brake circuit. (See right.)

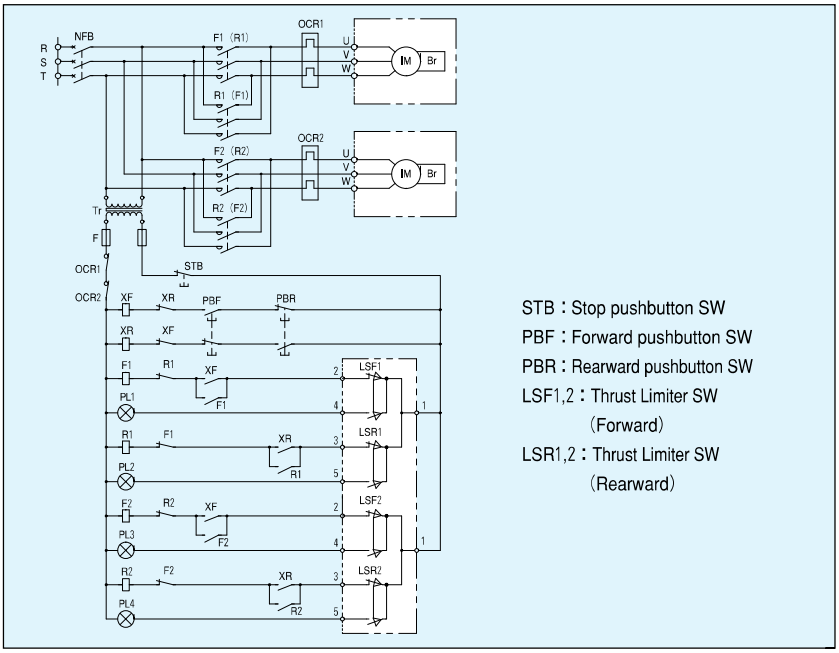
Otherwise, a brake delay could cause serious damage to the cylinder. Models with the AC individual cut-off brake also require in the individual cut-off circuit.



・Linked operation

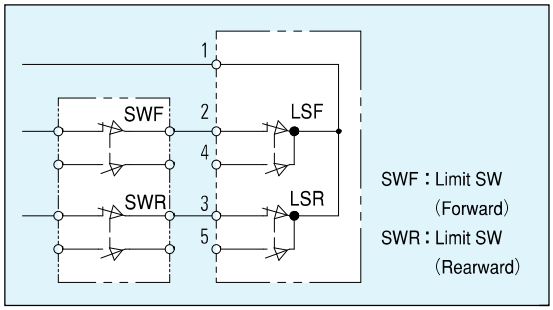
This is a reference circuit for starting two cylinders by a common pushbutton. (The same can apply to more-than-two linked cylinders.) As shown, the stroke regulating LS must be provided on individual cylinders to stop them independently. Stopping them with a common LS could cause accumulated travel differences.

Note : In making circuits, make sure the transmission lag is minimized. Excessive lag could cause overrunning, leading to damage to the unit.

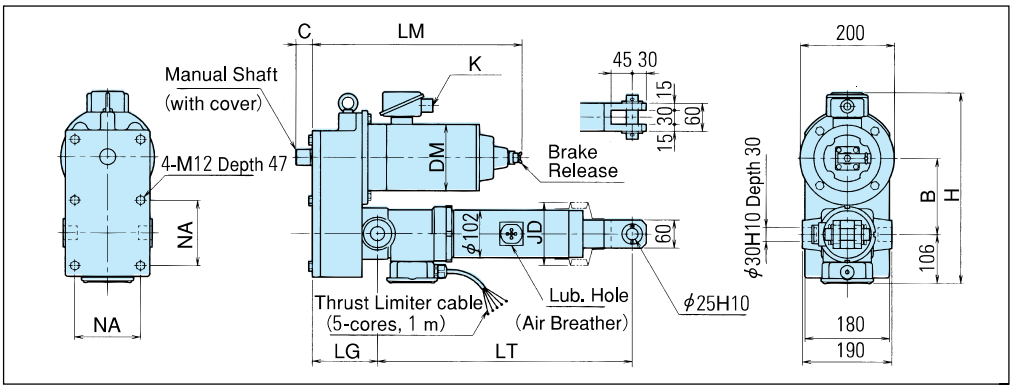


・External Limit Switches

When external limit switches are used to regulate the cylinder stroke, wire them in series with the Thrust Limiter limit switches. (See right. Cylinder stroke is regulated by SWF and SWR while LSF and LSR protect the cylinder against overload.) Take signals from the "a" contact of SWF and SWR.



DIMENSIONS



DG2T

●Basic Dimensions

Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	B	DM	LM	C	NA	LG	H	K
DGM2T	19.6 k	25/30	0.75	163	ϕ142	446	45	140	139	409	PF1/2
DGN2T		60/72	1.5	163	ϕ172	481	45	140	139	457	PF3/4

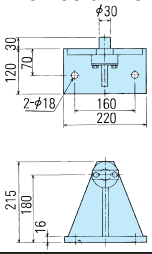
●Stroke-related Dimensions

Stroke (mm)	Without bellows			With bellows				Approx. weight (kg)	
	Model	MIN.LT	MAX.LT	Model	MIN.LT	MAX.LT	JD	DGM2T	DGN2T
300	− 3	690	990	− 3J	690	990	ϕ135	70	82
500	− 5	890	1390	− 5J	957	1457		75	87
700	− 7	1120	1820	− 7J	1223	1923		80	92
1000	−10	1420	2420	−10J	1606	2606		92	104
*) 1500	−15	1920	3420	−15J	2225	3725		98	110

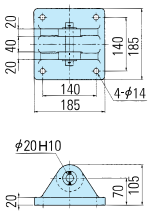
*) Applications are limited. Contact us.

● Option

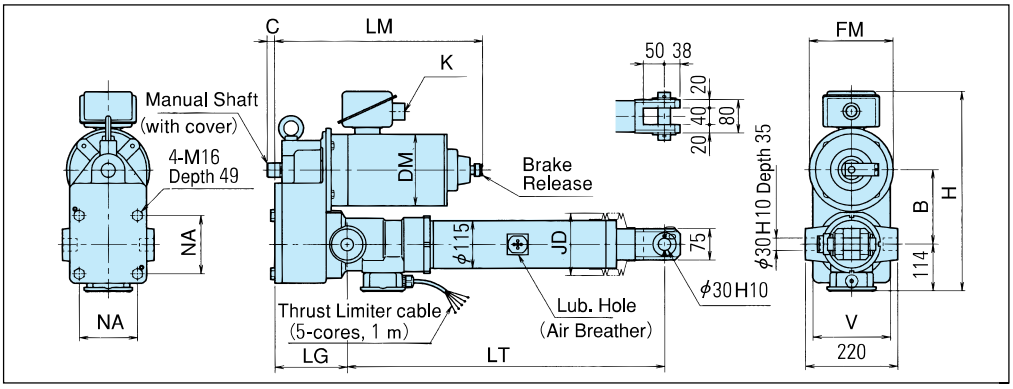
Trunnion columns



Clevis



DG4T



●Basic Dimensions

Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	V	B	DM	LM	FM	C	NA	LG	H	K
DGM4T	39.2 k	12.5/15	0.75	185(210)	179(286)	ϕ142	463(485)	200	25	140(160)	173(195)	433(560)	PF1/2
DGN4T		25/30	1.5	185	179	ϕ172	498	200	25	140	173	481	PF3/4
DGO4T		42/50	2.2	210	209	ϕ222	460	250	50	160	175	520	PF1

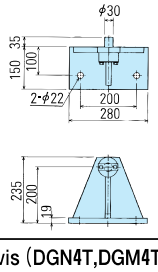
※Dimension in ( ) shows a 1500mm stroke model

●Stroke-related Dimensions

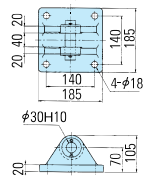
Stroke (mm)	Without bellows			With bellows				Approx. weight (kg)		
	Model	MIN.LT	MAX.LT	Model	MIN.LT	MAX.LT	JD	DGM4T	DGN4T	DGO4T
300	− 3	760	1060	− 3J	760	1060	ϕ150	90	109	125
500	− 5	960	1460	− 5J	1027	1527		98	117	133
700	− 7	1200	1900	− 7J	1303	2003		108	127	143
1000	−10	1500	2500	−10J	1686	2686		119	138	154
1500	−15	2000	3500	−15J	2305	3805		138	157	173

● Option

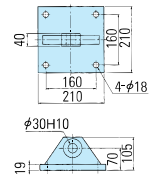
Trunnion columns



Clevis (DGN4T,DGM4T Type)

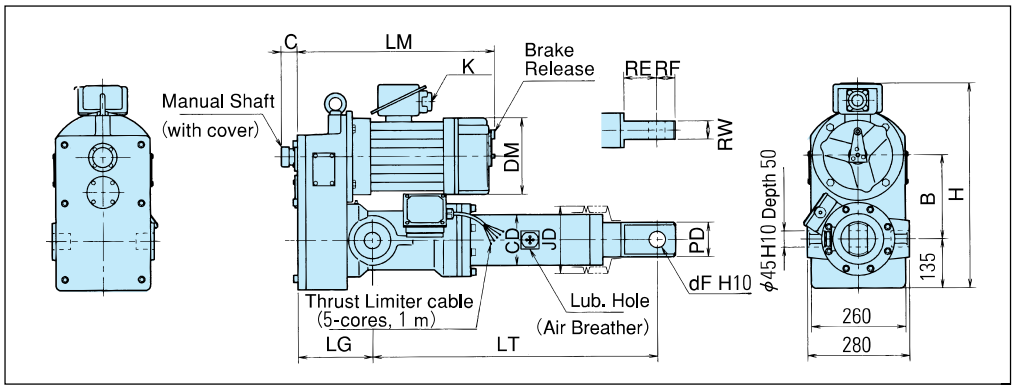


Clevis (DGZM4T,DGO4T Type)

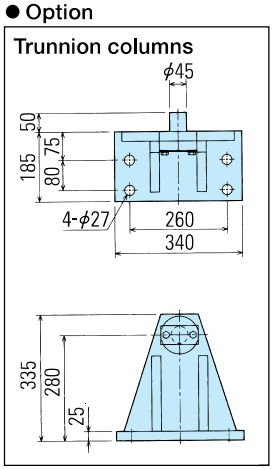


DIMENSIONS

DG6T



● Option



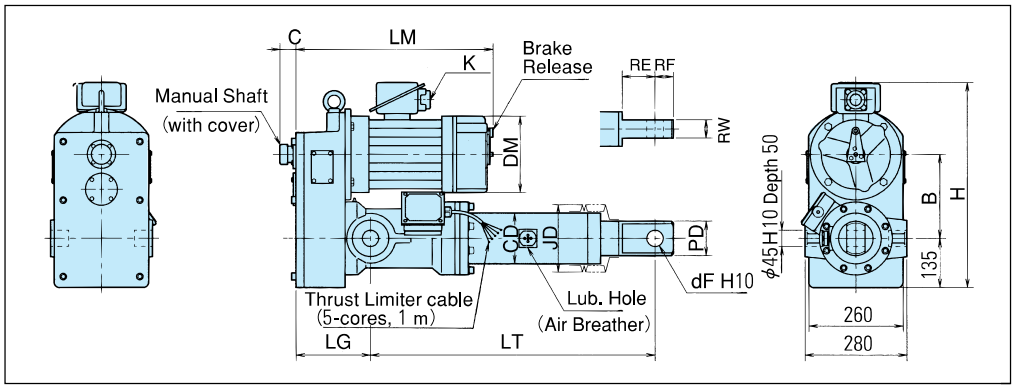
●Basic Dimensions

Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	B	DM	LM	C	LG	H	K
DGN6T	58.8 k	15/18	1.5	291	φ172	530	50	225	614	PF3/4
DGO6T		25/30	2.2	231	φ222	470	50	205	563	PF1
DGP6T		45/54	3.7	231	φ261	515	50	205	578	PF1

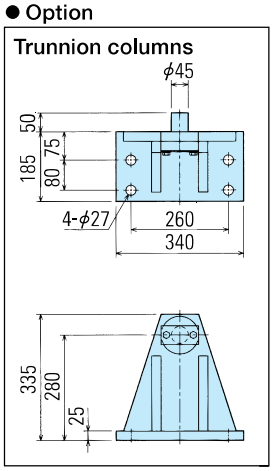
●Stroke-related Dimensions

Stroke (mm)	Without bellows			With bellows			JD	CD	PD	dF	RW	RE	RF	Approx. weight (kg)		
	Model	MIN.LT	MAX.LT	Model	MIN.LT	MAX.LT								DGN6T	DGO6T	DGP6T
300	− 3	860	1160	− 3J	860	1160	φ150	φ115	φ75	φ35	40	65	38	192	194	219
500	− 5	1060	1560	− 5J	1127	1627								199	202	227
1000	−10	1600	2600	−10J	1786	2786								221	223	248
1500	−15	2295	3795	−15J	2595	4095	φ230	φ180	φ110	φ50	70	120	55	265	267	292
2000	−20	2795	4795	−20J	3195	5195								294	296	321

DG10T



● Option



●Basic Dimensions

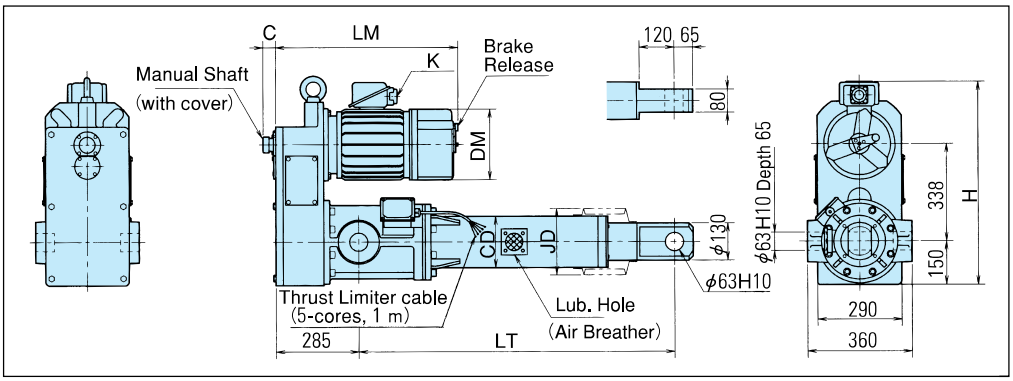
Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	B	DM	LM	C	LG	H		K	
									Indoor	Outdoor	Indoor	Outdoor
DGN10T	98 k	10/12	1.5	291	φ172	530	50	225	614	614	PF3/4	PF3/4
DGO10T		15/18	2.2	231	φ222	470	50	205	563	563	PF1	PF1
DGP10T		25/30	3.7	231	φ261	515	50	205	578	578	PF1	PF1
DGQ10T		40/48	5.5	291	φ310	714	50	225	620	706	φ33	PF1¼

●Stroke-related Dimensions

Stroke (mm)	Without bellows			With bellows			JD	CD	PD	dF	RW	RE	RF	Approx. weight (kg)			
	Model	MIN.LT	MAX.LT	Model	MIN.LT	MAX.LT								DGN10T	DGO10T	DGP10T	DGQ10T
300	− 3	880	1180	− 3J	880	1180	φ185	φ140	φ95	φ45	50	90	50	200	216	227	249
500	− 5	1080	1580	− 5J	1142	1642								210	226	237	259
1000	−10	1620	2620	−10J	1801	2801								238	254	265	287
1500	−15	2295	3795	−15J	2595	4095	φ230	φ180	φ110	φ50	70	120	55	265	281	292	314
2000	−20	2795	4795	−20J	3195	5195								406	422	433	455

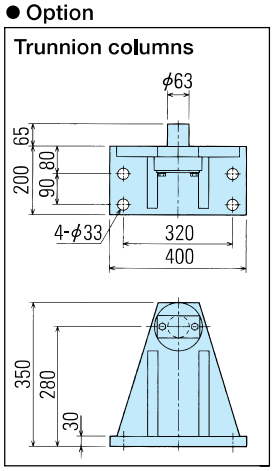
DG

DG16T



● Option

Trunnion columns



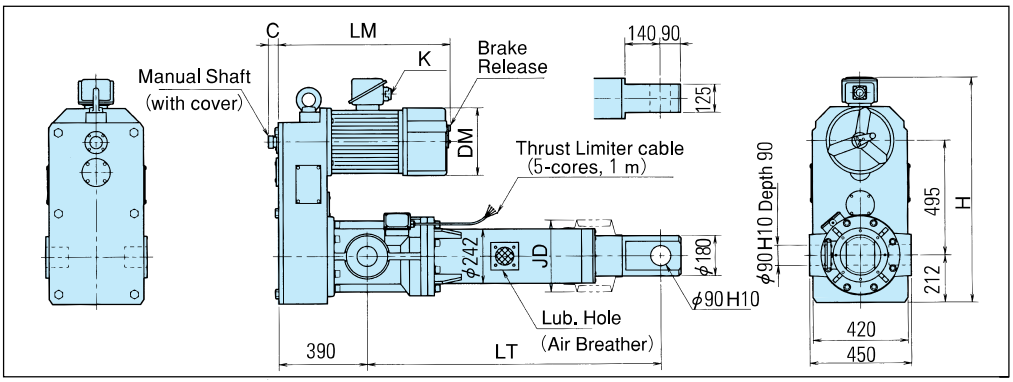
●Basic Dimensions

Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	DM	LM	C	H		K	
							Indoor	Outdoor	Indoor	Outdoor
DGO16T	157 k	8.3/10	2.2	φ222	500	55	685	685	PF1	PF1
DGP16T		15/18	3.7	φ261	545	55	700	700	PF1	PF1
DGQ16T		25/30	5.5	φ310	712	60	682	768	φ33	PF1¼
DGR16T		35/42	7.5	φ310	712	60	682	768	φ33	PF1¼

●Stroke-related Dimensions

Stroke (mm)	Without bellows			With bellows			JD	CD	Approx. weight (kg)			
	Model	MIN.LT	MAX.LT	Model	MIN.LT	MAX.LT			DGO16T	DGP16T	DGQ16T	DGR16T
300	− 3	1005	1305	− 3J	1005	1305	φ230	180	379	404	412	415
500	− 5	1205	1705	− 5J	1267	1767		180	399	424	432	435
1000	−10	1745	2745	−10J	1926	2926		180	452	477	485	488
1500	−15	2270	3770	−15J	2570	4070		180	504	529	537	540
2000	−20	2843	4843	−20J	3243	5243		190	559	584	592	595

DG30T



●Basic Dimensions

Model	Thrust (N)	Speed 50/60Hz (mm/s)	Motor output (kW)	DM	LM	C	H		K	
							Indoor	Outdoor	Indoor	Outdoor
DGP30T	294 k	8.3/10	3.7	φ245	680	60	922	922	PF1	PF1
DGQ30T		12.5/15	5.5	φ310	762	60	901	987	φ33	PF1¼
DGR30T		16.6/20	7.5	φ310	762	60	901	987	φ33	PF1¼
DGS30T		25/30	11	φ360	864	60	937	1007	φ33	PF1¼

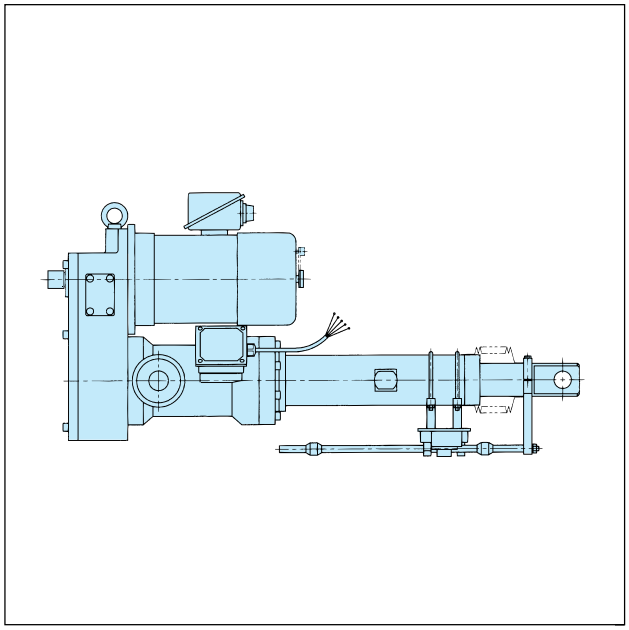
●Stroke-related Dimensions

Stroke (mm)	Without bellows			With bellows			JD	Approx. weight (kg)			
	Model	MIN.LT	MAX.LT	Model	MIN.LT	MAX.LT		DGP30T	DGQ30T	DGR30T	DGS30T
300	− 3	1275	1575	− 3J	1275	1575	φ320	1016	1024	1027	1076
500	− 5	1475	1975	− 5J	1537	2037		1059	1067	1070	1119
1000	−10	2015	3015	−10J	2196	3196		1164	1172	1175	1224
1500	−15	2540	4040	−15J	2840	4340		1265	1273	1276	1325
2000	−20	3090	5090	−20J	3490	5490		1387	1395	1398	1447

OPTION

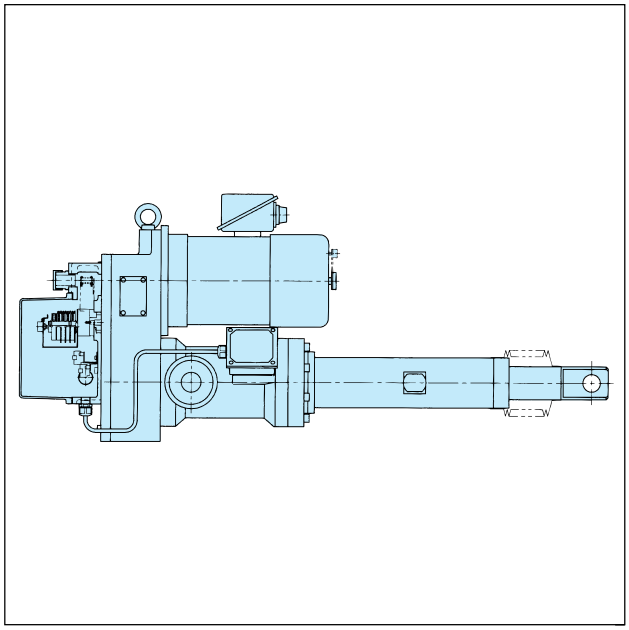
●External LS

For regulating the cylinder stroke. Wire the LS in series with the Thrust Limiter so that the Thrust Limiter works to protect the cylinder from overload.



●Positioner Cam LS

Allows for halfway stops at desired positions. Potentiometer can be incorporated for display of the cylinder stroke. For more details, refer to descriptions in the "BJ" series section.



・Make sure External LS, cables, etc., will not interfere with equipment or structures during operation.

NOTES FOR OPERATION

1.Instruction Manual

- All our assembled products are shipped with instruction manuals. Befor operation, read them thoroughly for correct operation and performance.
- Make sure that instruction manuals are delivered to the ultimate user so the products are operated correctly. Also, if you guide them to follow the manual, it will be very helpful.
- If you don't find the instruction manual, contact the dealer or COSMIC along with the product name, model number, etc.

2.For Safe Operation

- If any danger could be involved or anticipated in connection with the use of our products, take appropriate precautions to avoid such danger.
- If any danger could be anticipated as the result of our products malfunctioning, take appropriate precautions to avoid such danger.

3.In Maintenance & Inspection

- Wear proper clothes (such as safety glasses, gloves and sturdy working shoes) to ensure safety.
- Make safe and neat environments to prevent accidents.
- Disconnect power to stop the equipment in a safe condition. If power connects during work, serious accidents could be caused.

4.Moving People

- The products shown in this catalog are intended for industrial use only and should not be used to lift, support or transport people unless you have a written authorization from COSMIC.

・Products' appearance, specifications or dimensions are subject to change without notice.
Contact COSMIC for further information before relying on any information contained in this catalog.

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