

Power Master

Motor Cylinders

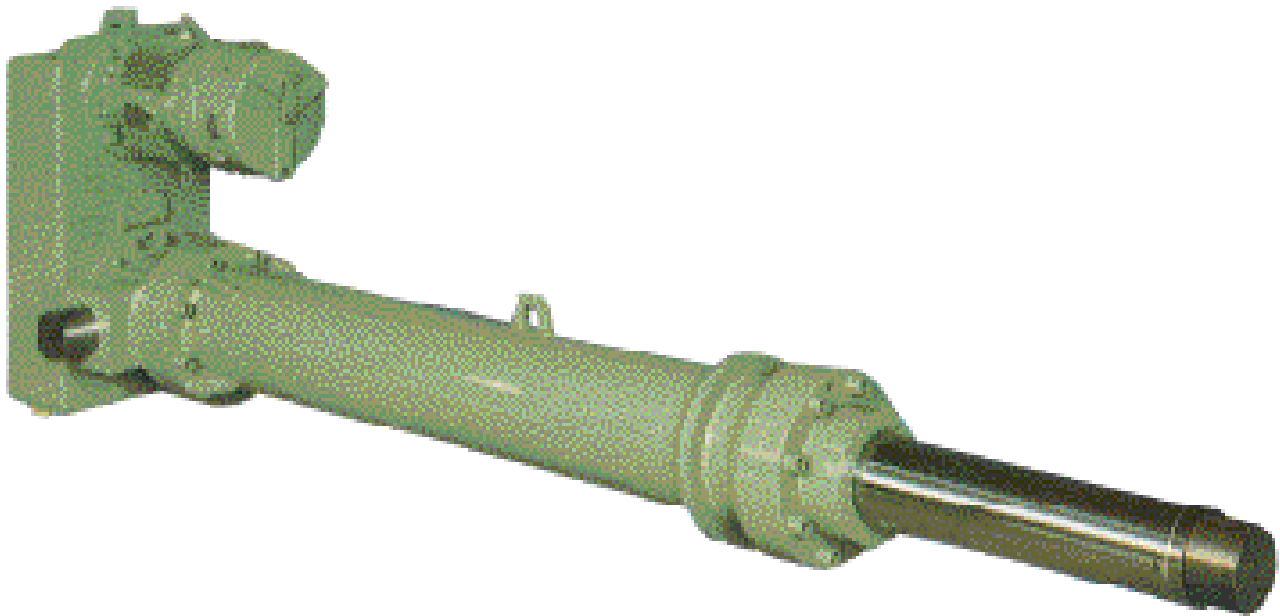
H Series

B Series

BJ Series

DG Series

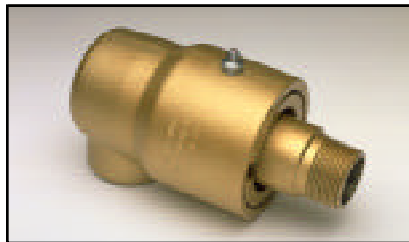
NZ Series



Since 1883, Duff-Norton has manufactured quality industrial lifting, positioning and material handling equipment. Today, the Duff-Norton continues this tradition through its dedication to the ISO 9001 standard of excellence.



Products Manufactured



Rotary Unions®



Electromechanical Actuators



Mechanical Actuators



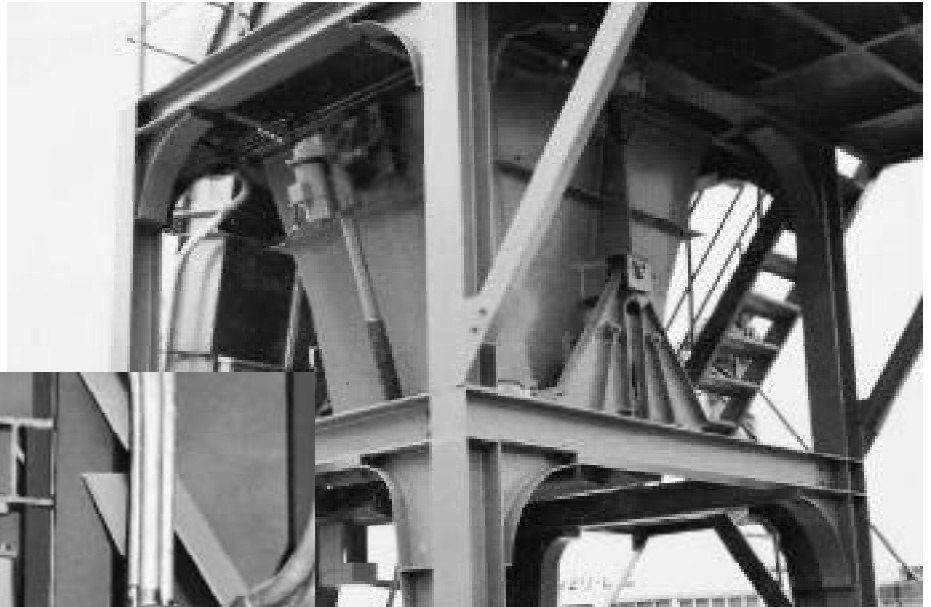
Jacks

Contents

Duff-Norton PowerMaster Motor Cylinders	6
Applications	6
Feature Comparison Chart	6
Application Analysis Form for Duff-Norton	7
PowerMaster Motor-Cylinder units.....	7
H Series	8
Features	8
Specifications	8
Construction	9
LS Unit (HP Models Only)	9
H Series Standard Models	9
Description of Model Number.....	10
Dimensions	11
Model Selection	11
Stroke Setting.....	12
Electrical Wirings	13
Maintenance	13
Linked Operation	13
Installation.....	13
Basic Circuit Diagram.....	14
Motor Terminal Box	15
Trunnion Mount (Optional).....	15
B Series.....	16
Features	16
Specifications	16
Construction	17
B Series Standard Models	18
Description of Model Number.....	18
Dimensions	19
Operating Circuit	24
Trunnion Mount (Optional).....	25
BJ Series.....	26
Features	26
Specifications	26
Construction	27
BJ Series Standard Models	27
Description of Model Number.....	28
Dimensions	28
Positioner.....	30
Setting Adjustment.....	31
Installation.....	32
Trunnion Mount (Optional).....	32
DG and NZ Series	33
Specifications DG Series.....	33
Features	33
Construction	34
Model DG Standard Types	35
Description of Model Number.....	36
Dimensions	36
NZ Model Large-Size Standard Types	41
Manual Operations.....	42
Rod Rotational Torque.....	42
Maintenance	42
Wiring	43
Trunnion Mount (Optional).....	43
Clevis Mount	43

Applications for the Duff-Norton Power Master

**Driving hopper gates at waste treatment facility.
Capacity: 44 ton
Two Interlocking Units**



**Driving stokers at a garbage incinerating plant.
Capacity: 4 ton
Twenty-four computer controlled units.**



**Marine products processing machine.
Capacity: 10 ton
Four Interlocking Units**





**Driving hopper gate at a cement plant.
Capacity: 4 ton**



**Driving casting-bed dust collection dampers at an iron works.
Capacity: 4 ton**



**Incineration plant machinery.
Capacity: 10 ton
(with positioner)**

Duff-Norton Power Master Motor Cylinders

The **H Series** Motor Cylinder is a low cost, compact, in line type electric cylinder suitable for linear reciprocating movements of lifting, lowering, pushing and pulling. Cam type limit switch is installed in HP models. Capacities (kg) 100 to 1000, Speed (mm/sec) 25 to 100, Stroke (mm) 100 to 700.

The **B Series** is a general purpose motor cylinder designed for industrial applications. A wear-resistant transmission screw mechanism and a unique thrust limiter allow constant pressure stops at any position. Capacities (kg) 100 to 2000, speed (mm/sec) 23 to 100, stroke (mm) 100 to 1200.

The **BJ Series** motor cylinder is designed exclusively to control dampers and valves. In addition to all of the functions of conventional damper and valve drives, compact size and low operating cost are additional benefits. Capacities (kg) 100 to 20,000, speed (mm/sec) 10 to 30, stroke (mm) 200 to 2,000.

The **DG Series** motor cylinder is a heavy duty model capable of developing a thrust of up to 30 tons. This is made possible through the use of a high efficiency ball screw and powerful reduction gears. In addition, a unique thrust limiter combines load carrying disk springs with limit switches, allowing constant pressure stops at any position. Capacities (ton) 2 to 30, speed (mm/sec) 7.5 to 72, stroke (mm) 200 to 2,000.

The **NZ Series** motor cylinder is a large heavy load model capable of developing a thrust up to 50 tons. Large ball screws and powerful reduction gears are used. Unique overload safety power limit switches operate instantaneously when an overload occurs. The constant pressure stop feature is not available on these models. Capacities (ton) 30 to 100, speed (mm/sec) 7.5 to 20, stroke (mm) 200 to 2,000.

Feature Comparison Chart

	H Series	B Series	BJ Series	DG Series	NZ Series
Capacity Range	100 to 1000 kg	100 to 2000 kg	100 to 4000 kg Custom 6000kg to 20,000 kg	2 ton to 30 ton	30 ton to 100 ton
Motor Configuration	Inline motor	Inline, offset, and parallel	Parallel	Parallel	Parallel
Drive	Machine screw	Machine screw	Machine screw Ball Screw	Ball screw	Ball screw
Speed Range (mm/sec)	25 to 100	23 to 100	5 to 30	7.5 to 72	7.5 to 30
Stroke Range (mm)	100 to 700	100 to 1200	200 to 2000	200 to 2000	200 to 2000
Limit Switches (internal) *	Yes-HP models only	No	Yes - 4 stage	No	No
Thrust Limiter (For constant pressure stops)	No	Yes	Yes	Yes	No
Power Limiter (For stops at high speeds)	No	No	No	No	Yes
Manual operation	Yes	Yes	Yes	Yes	Yes

* Optional external limit switches are recommended for H (except HP), B, DG, and NZ series motor cylinders

Applications

- Dampers
- Metal fabrication
- Valves
- Doors
- Positioning
- Louvers
- Gates
- Environmental
- Locking devices
- Conveyors
- Waste treatment
- Lift tables
- Transportation

**Application Analysis Form
for Duff-Norton
PowerMaster Motor-Cylinder units**

Duff-Norton engineers will be pleased to make Motor-Cylinder recommendations for your specific requirements. To obtain their recommendations, please complete this form and mail or fax it to Duff-Norton Company, P.O. Box 7010, Charlotte, North Carolina 28241. There is no obligation for this service. Fax Number (704) 588-1994

1. Required Capacity

_____ Max. kg (Compression _____ kg, Tension _____ kg)

2. Speed _____ mm/sec (_____ Hz)

3. Stroke _____ mm (Actual Use)

4. Frequency _____ Number of times extend and retract per hour.

5. Details of operation cycle (= time chart of runs and stops)

6. Atmosphere

(Indoor/Outdoor, any other points to be noted such as dust, temperature, moisture gas, etc.?)

7. Equipment

(In what equipment is the motor cylinder to be used?)

8. Condition

1) How to stop?

(Pressure stop, outside limit switches)

2) Any lateral load?

9. Mounting

(Up, Down, Horizontal) (Columns (Trunnions), Clevis, Rigid)

10. Power _____ VAC _____ Hz _____ Phase

11. Accessories (Columns (Trunnions), Clevis, LS Unit, Handle)

12. Other

Name

Title

Company

Address

City

State

Zip

Phone

FAX

Use a separate sheet to sketch your application, or send us your design drawings in complete confidence.

H Series

Economical Heavy Duty In-Line Motor Cylinder

Features

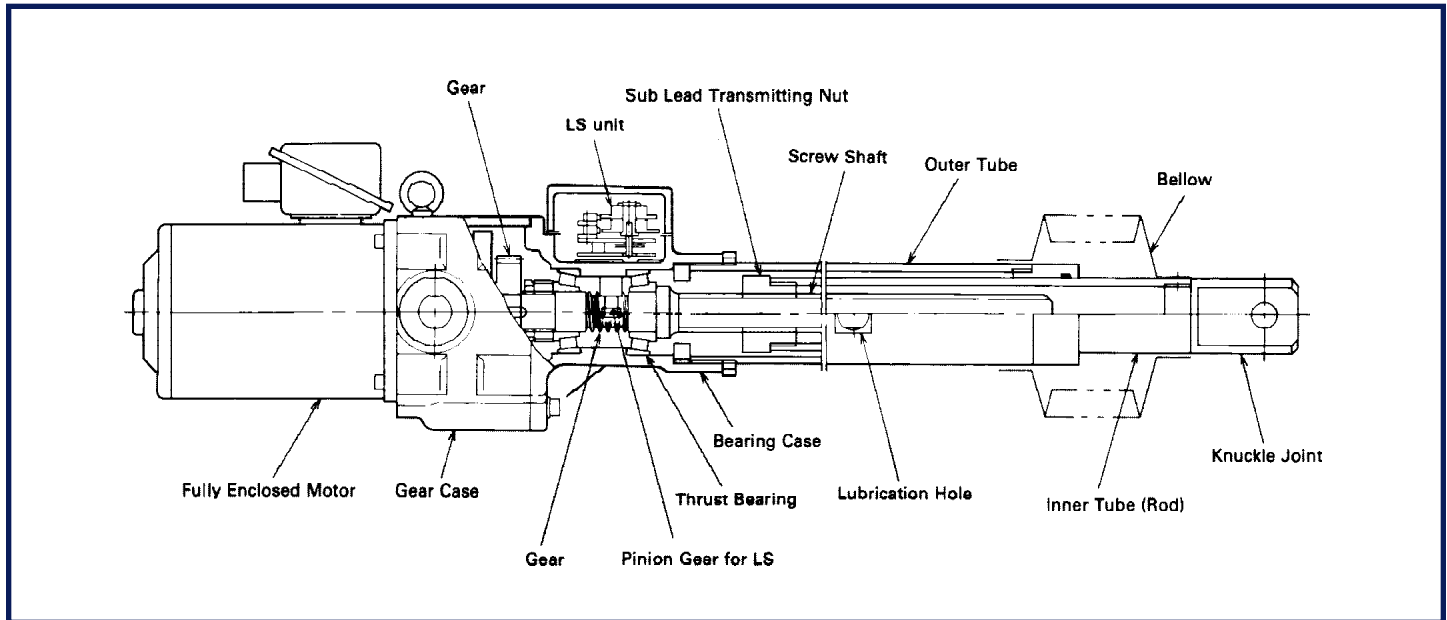
1. Electric Motor
3 Phase electric power source. Simple to use and maintain. Electric system permits accurate operation and remote control
2. Clean & Quiet operation
Electric system is free from oil leakage, noise, and environmental pollution.
3. "Power Off" Brake Installed
In case of power failure or motor stoppage, the motor cylinder automatically holds the load using a spring triggered "Power Off" brake.
4. Limit Switch Unit Included (HP models only)
HP models are equipped with a cam type limit switch for precise extend and retract stroke setting.
5. Simple Maintenance and Installation
Motor cylinder can be installed in any position Only grease lubrication is required.

Specifications

External Structure:	Fully Enclosed Structure
Voltage:	3Ph. 200V/220V 400V/440V
Frequency:	50Hz/60Hz 50Hz/60Hz
Insulation:	Class E Insulation
Ambient Temperature:	-15° C to + 50° C
Installation Place:	w/o Bellows: General plant indoor and less dusty place w/ Bellows: Outdoor and dusty place
Paint Color:	Munsel 2.5G 6/2

Custom designed units with high or low temperature tolerance, and rust proof are available.

Construction



Note: Basic construction of H Series illustrated above. Construction is slightly different depending on model.

- Speed Reduction Gear:** High precision gears and grease lubrication assure quiet, long life and maintenance free operation.
- Linear Actuating Component:** Adjusting a high efficiency trapezoidal screw converts rotational motion to reciprocal motion.
- Limit Switch Unit (LS Unit):** HP models are equipped with a cam type limit switch.

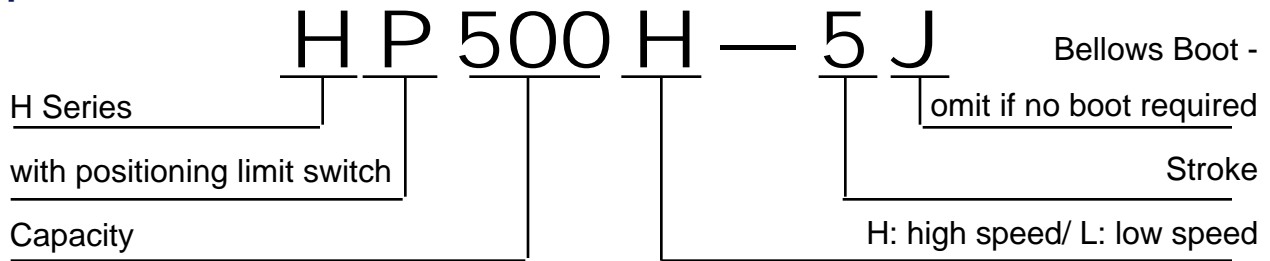
LS Unit (HP Models Only)

- A cam type limit switch is installed in HP models.
- The built-in cam type limit is dust and water resistant.
- Adjustments of LS unit is simple and easy.

H Series Standard Models

Model No.	Capacity (kg)	Speed 50/60 Hz (mm/sec)	Motor Output (kw)	Rod Rotating Torque (kg x m)	Stroke Limit (mm)
H100L, HP100L	100	25/30	0.1	0.23	100~600
H100H, HP100H		83/100	0.3		
H300L, HP300L	300	25/30	0.6	0.68	
H300H, HP300H		83/100		1.3	
H500L, HP 500L	500	25/30	0.3	2.2	200~700
H500H, HP500H		50/60	0.6		
H1T, HP1T	1000	25/30		4.5	

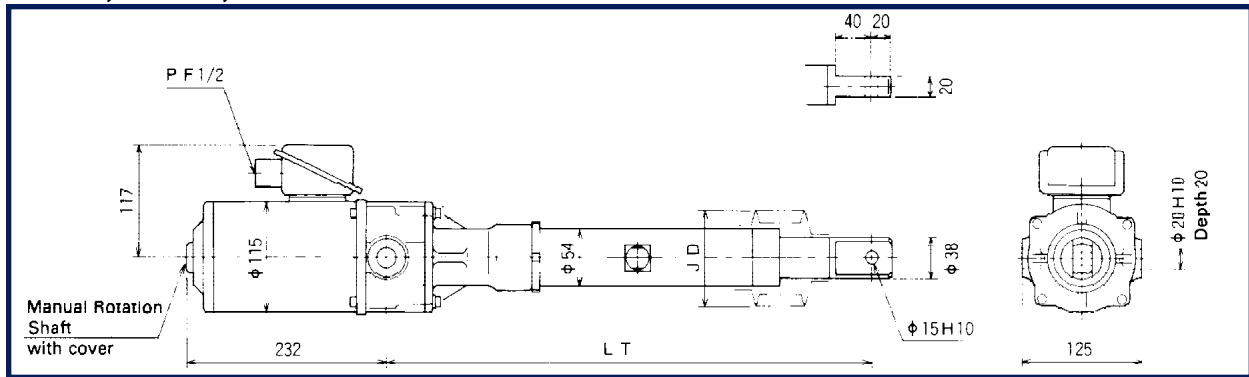
Description of Model Number



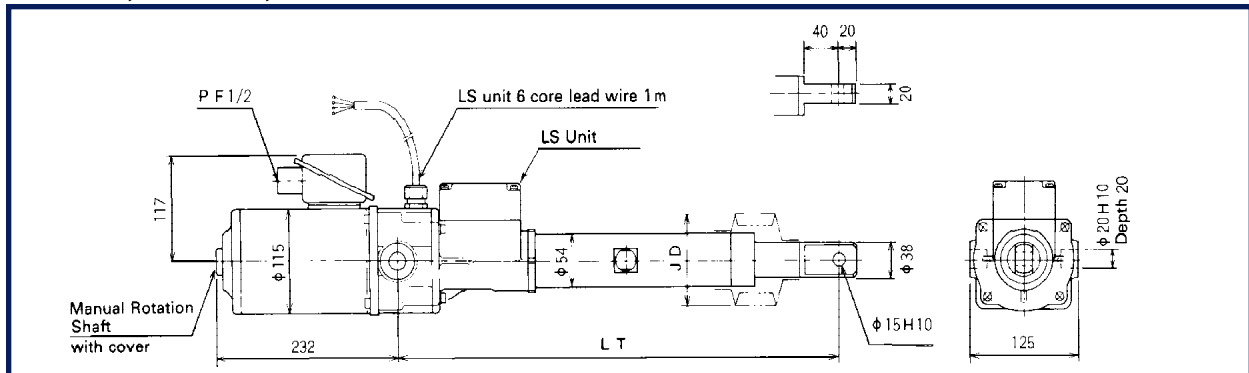
For Example: HP1T—3J indicates H Series with positioning limit switch, 1 ton capacity, 300mm stroke with bellow.

Dimensions

H100L, H100H, H300L



HP100L, HP100H, HP300L

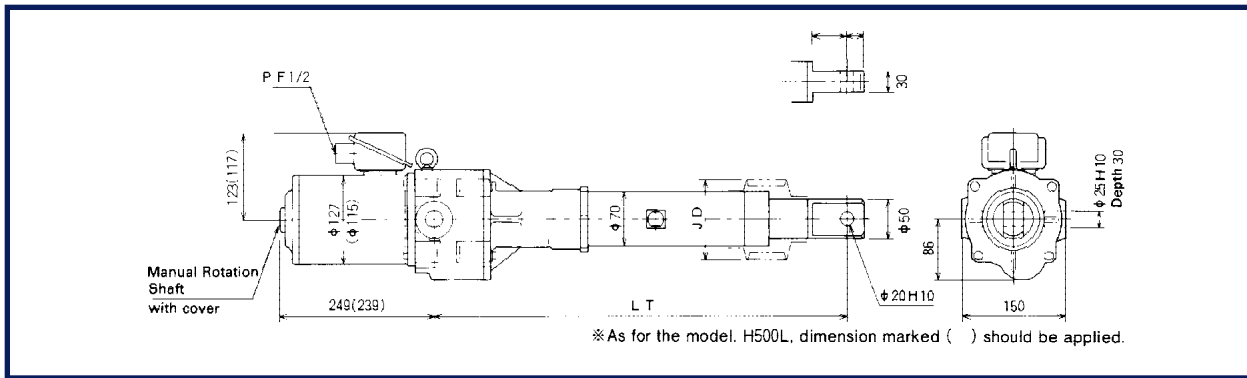


Model No.	Capacity (kg)	Speed 50/60 Hz (mm/sec)	Motor Output (kw)	Stroke Limit (mm)	w/o Bellow		w Bellow		Weight kg
					min. LT	min. LT	JD	JD	
H100L, HP100L —1	100	25/30	0.1	100	390	390	95		17
H100L, HP100L —2				200	490	490			18
H100L, HP100L —3				300	590	590			19
H100L, HP100L —5				500	790	842			21
H100L, HP100L —6				600	930	993			23
H100H, HP100H —2				200	490	490			18
H100H, HP100H —3	100	83/100	0.3	300	590	590	95		19
H100H, HP100H —5				500	790	842			21
H100H, HP100H —6				600	930	993			23
H300L, HP300L —1	300	25/30	0.3	100	390	390	95		17
H300L, HP300L —2				200	490	490			18
H300L, HP300L —3				300	590	590			19
H300L, HP300L —5				500	790	842			21
H300L, HP300L —6				600	930	993			23

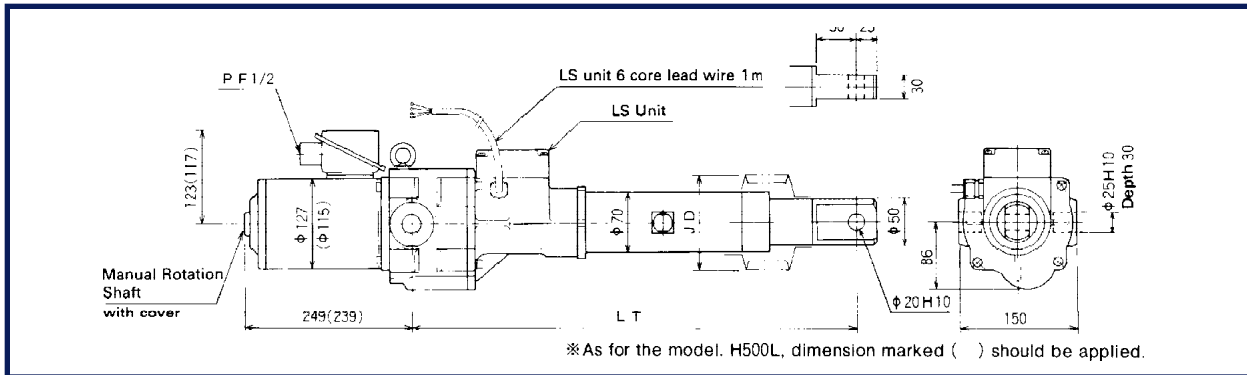
Note: The specifications including appearance and dimensions in this catalogue are subject to change without notice. For detailed specifications, contact Duff-Norton.

Dimensions

H300L, H500L, H500H, H1T



HP300L, HP500L, HP500H, HP1T



Model No.	Capacity (kg)	Speed (mm/sec)	Motor Output (kw)	Stroke Limit (mm)	w/o Bellow		w Bellow		Weight (kg)
					min. LT	min. LT	JD	JD	
H300H, HP300H —2	300	83/100	0.6	200	562	562	# #		35
H300H, HP300H —3				300	662	662			37
H300H, HP300H —5				500	862	929			40
H300H, HP300H —7				700	1097	1202			44
H500L, HP500L —2	500	25/30	0.3	200	562	562	# #		31
H500L, HP500L —3				300	662	662			33
H500L, HP500L —5				500	862	929			36
H500L, HP500L —7				700	1097	1202			40
H500H, HP500H —2	500	50/60	0.6	200	562	562	# #		35
H500H, HP500H —3				300	662	662			37
H500H, HP500H —5				500	862	929			40
H500H, HP500H —7				700	1097	1202			44
H1 T, HP 1T —2	1000	25/30	0.6	200	562	562	# #		35
H1 T, HP 1T —3				300	662	662			37
H1 T, HP 1T —5				500	862	929			40
H1 T, HP 1T —7				700	1097	1202			44

Model Selection

Application Requirements

1. Required capacity power or load (kg)
2. Stroke (mm)
3. Speed (mm/sec)
4. Voltage, frequency (V, Hz)
5. Load condition and operation frequency
6. Installation place
7. Application

Selection Procedure

1. Obtain required thrust power
 - In normal low impact operation
Max. load \leq Thrust power

Model Selection (continued)

- In operations causing severe impact and vibration
 $\text{Load} \times (1.5 \sim 2) < \text{Thrust power}$
- Obtain required speed
 - Refer to the motor cylinder model table
 - Obtain required stroke
 - The stroke value indicated in the motor cylinder table is mechanical maximum stroke. In actual use, provides a sufficient allowance for expected coasting distance after braking.
 $\text{Operation stroke} < \text{Stroke indicated in the table}$
 - Frequency of Use
 - Because of the heat capacity of the motor cylinder, operation frequency is limited. It should be used under the values specified in the following table.

Model	H100L, HP100L	H100H, HP 100H H300L, HP300L H500L, HP500L	H300H, HP300H H500H, HP500H H1T, HP1T
Starting times (times/min.)	5	5	5
Loading Time %ED)	30	20	25

Loading Time (% ED) = Running time in one cycle X 100 (%)

For continuous and high duty operation, please contact Duff-Norton.

- Brake

When the movement of the motor cylinder is stopped by power failure etc., the motor cylinder can automatically hold the load by means of the spring-triggered brake.

Stroke Setting

To set the stroke length remove the 4 screws of the LS unit cover (attached to the bearing case of the motor cylinder). Limit switch and cam for limit switch are shown in fig. 1

The Position limit switches starting from the cover side inward are numbered LS1 to LS2. Connect the motor cylinder knuckle joint with the mating machine. (During this procedure, be sure not to rotate the piston rod.)

Set the piston rod to one end of the stroke manually or by inching, and then set the position limit switches in sequence of LS1 and LS2 paying attention to the stroke direction of the piston rod and the rotation direction of the limit switch cam ring. After setting, tighten the 4 screws of LS unit cover and seal it completely.

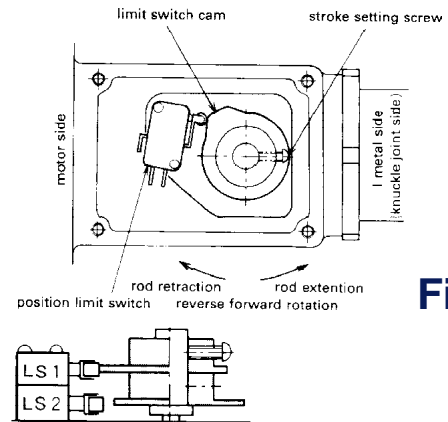


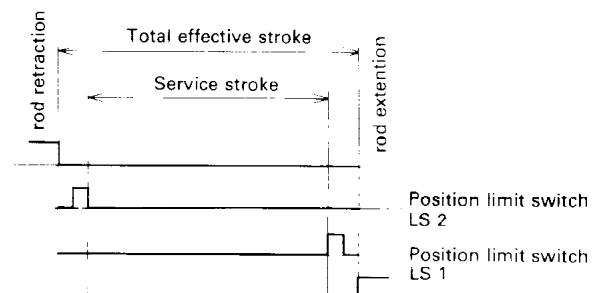
Fig 1

Sketch of a built-in limit switch

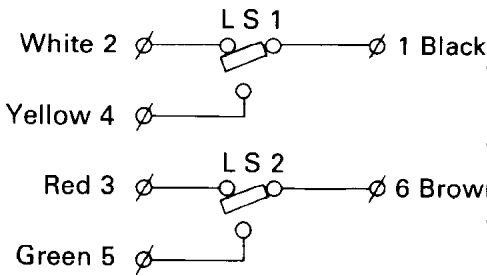
Limit Switch Specification

Contact Capacity: AC 250V 10A (resistance Load)

Note: H model motor cylinder is not equipped with a limit switch for stroke setting. External limit switches are recommended.



Electrical Wirings



- Terminal 1 — 2 Normally ON, but OFF when it reaches the stroke end while the piston rod is extending.
- Terminal 1 — 4 Contact which acts reversely compared with the above. (For signal check)
- Terminal 6 — 3 Normally ON, but OFF for when it reaches the stroke end while the piston rod is retracting.
- Terminal 6 — 5 Contact which acts reversely compared with the above. (For signal check)

Linked Operation

Linked operation is available with multiple motor cylinders.

Capacity

When determining the capacity per motor cylinder, take the linked motion factor into consideration.

Capacity per cylinder = Required Thrust

No. of Cylinders	2	3	4	5
Link factor	1	1	1	0.6

Control

A circuit can be provided that assures simultaneous starts and individual stops by using the limit switch of each motor cylinder. Avoid using one limit switch to control all motor cylinders. Refer to the circuit diagram.

Alignment

A difference of the load to each motor cylinder can cause speed errors. If synchronized operation is required, refer to SGB series catalog.

Installation

Mounting Direction

Mounting is possible in any direction, eg. Horizontal, vertical, or oblique. Recommended direction of piston rod is horizontal or downward.

Installation Method

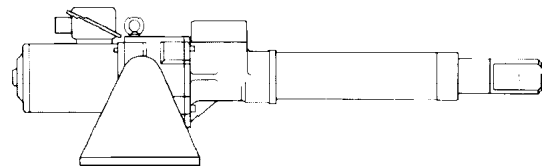
A Trunnion is recommended for installation.

Lateral Load

The piston rod should not be subject to lateral load.

Piston Rod Turning Torque

During operation the rod turning generates torque the motor cylinder should be installed to prevent turning torque, refer to the motor cylinder model table.



Maintenance

Since our motor cylinder is coated with high quality grease before shipping, no additional lubrication is required in the first year. In case of severe work conditions such as high frequency operation, grease at least once every 2 or 3 months.

Recommended Grease

Manufacturers	
Shell	Alvania No.1
Mobil	Mobilux No.1
Idemitsu kosan	Daphne Eponex No. 1

Basic Circuit Diagram

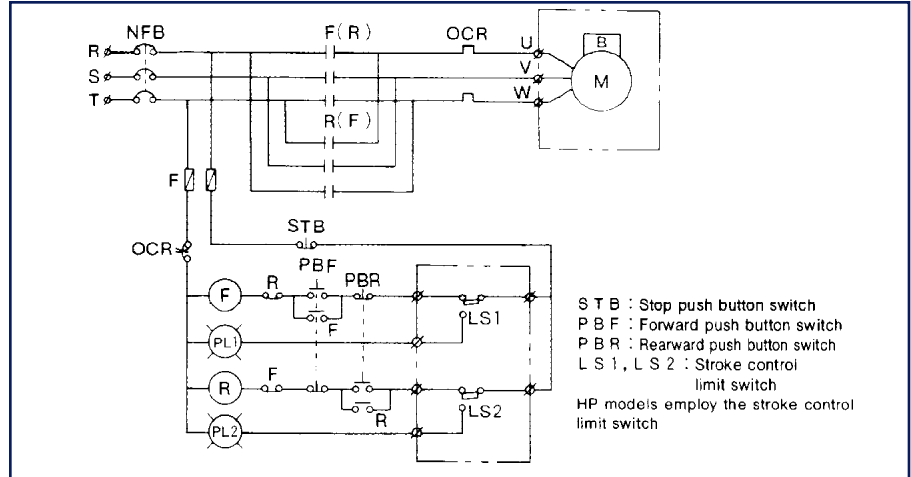
The basic circuit diagram of the cylinder is shown below. Select an appropriate circuit diagram according to desired operations.

Reference Circuit Diagram

- For single control

Brake circuit for all motor cylinder models is connected to the circuit inside the motor. For safe operation, install a stroke limit switch.

- For interlocked control (2



motor cylinders)

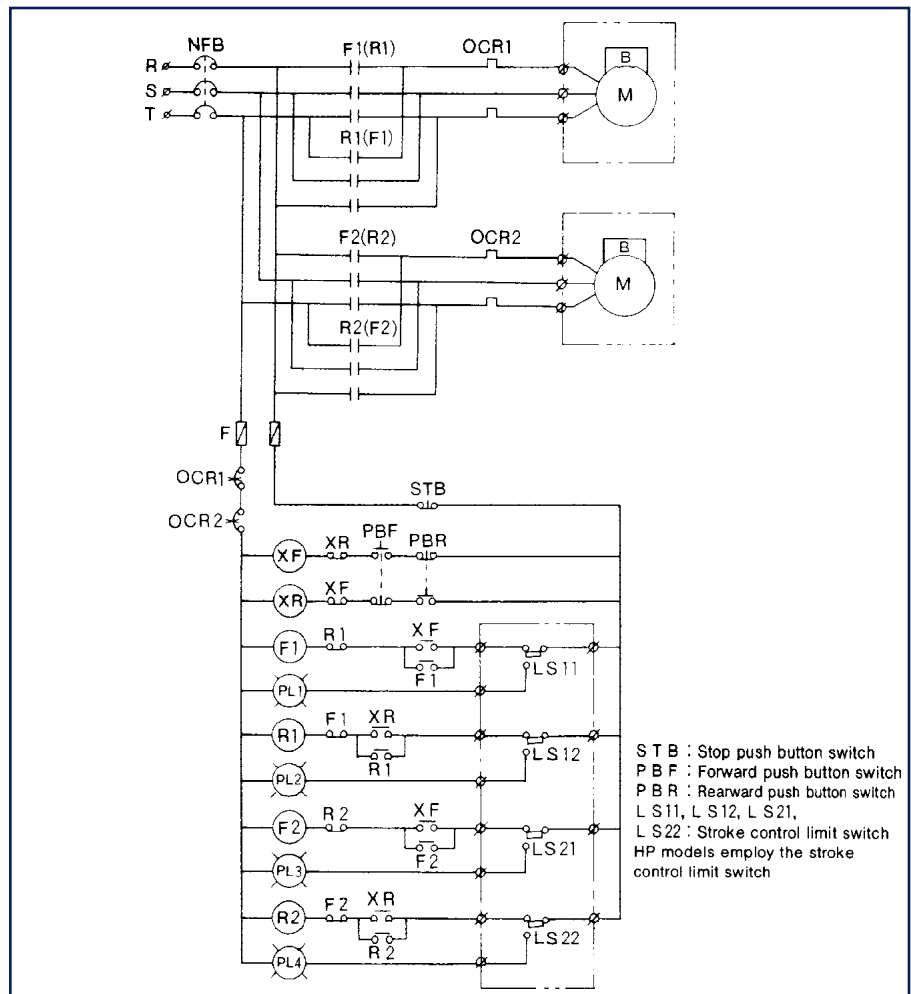
This circuit is designed to interlock two or more motor cylinders to be operated simultaneously by one push-button switch system. Since the slightest deviation of the stop position will cause problems, install a limit switch to each motor cylinder as shown in the circuit diagram. Wire the circuit so that simultaneous start and individual stop are controlled by auxiliary relay.

Note: Circuit control box avail-

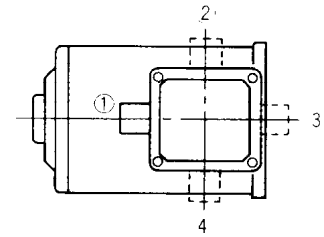
able.

When making a circuit, reduce the response delay to the minimum.

Motor Terminal Box



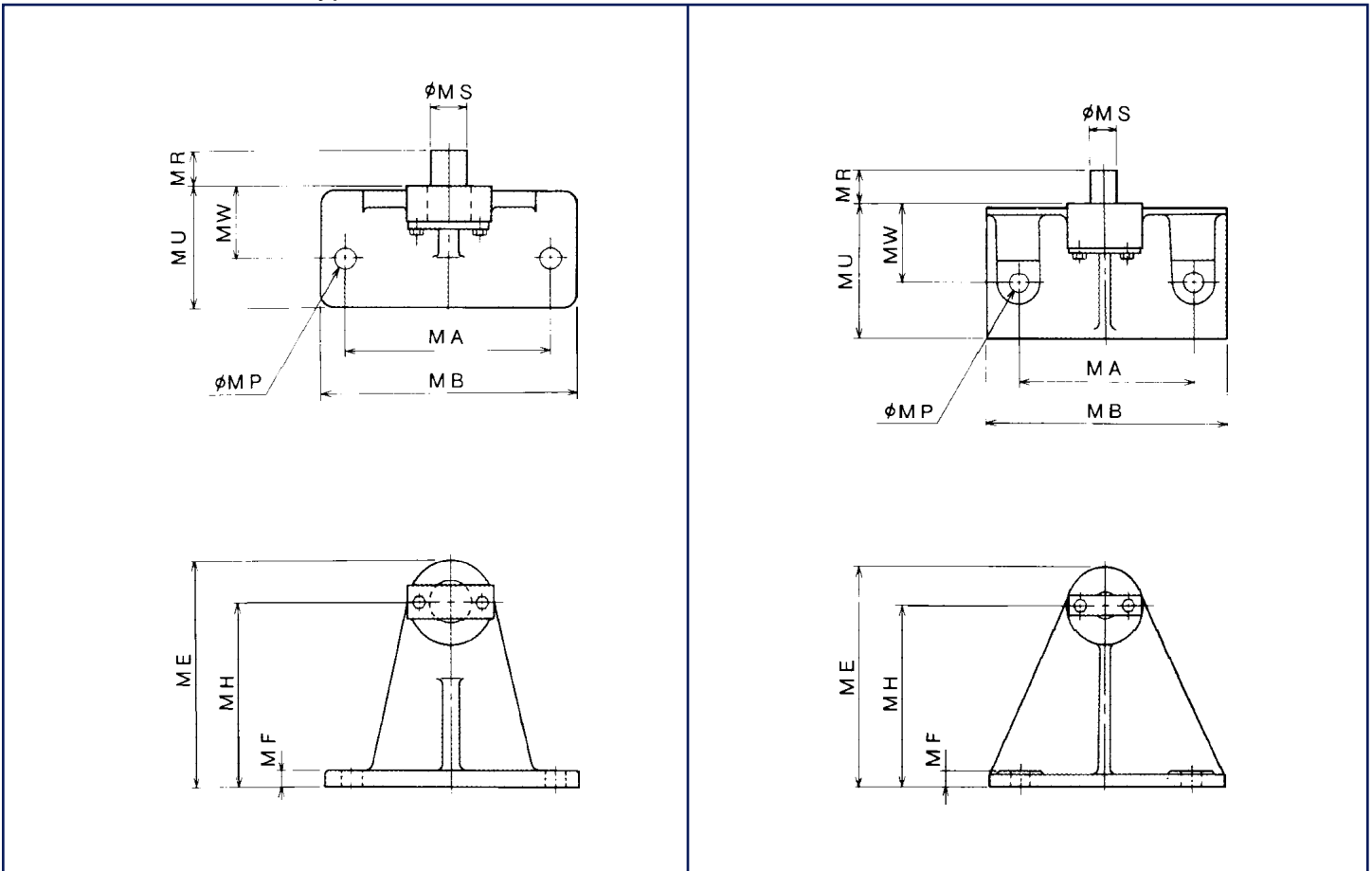
- The motor terminal box can be positioned at 90° increments. Position -3 cannot be used on some models because of the position of a lifting bolt.
- To adjust the direction of the outlet, remove the four screws from the terminal box, rotate to the desired position and reinstall the four screws.
- After wiring, water proof treatment should be applied to the outlet.



Trunnion Mount (Optional)

Type A

Type B



Model	MA	MB	MP	MU	MW	MR	MS	MH	ME	MF	Type
H_100_, H_300L	120	150	12	72	42	20	20	110	135	10	A
H_300H, H_500_, H_1T	160	220	18	120	70	30	25	160	195	12	B

B Series

General-Purpose Motor Cylinders

Features

Constant Pressure Stop

The unique thrust limiter allows constant pressure stops during the stroke. At any position, while the piston rod is being extended or retracted, a constant pressure stop is assured by an internal spring.

Overload Protection

If an overload occurs the thrust limiter instantaneously stops the cylinder until the overload is corrected. The internal spring absorbs any external shocks.

Powerful Holding

The B Series motor cylinder employs a spring loaded OFF brake, which holds the load as soon as the motor stops. Smaller models use the self-locking action of the trapezoidal threads to hold the load. (When using the motor cylinder where it will be subject to vibration it is recommended that a model with a brake be used.)

Simple Maintenance and Positive Actuation

The B series is a type of gearmotor that is powered electrically, assuring positive actuation. Only regular grease lubrication is required.

Low Cost

The B series does not require auxiliary equipment and piping as is required for hydraulic cylinders, thereby reducing the total cost.

Manual Operation

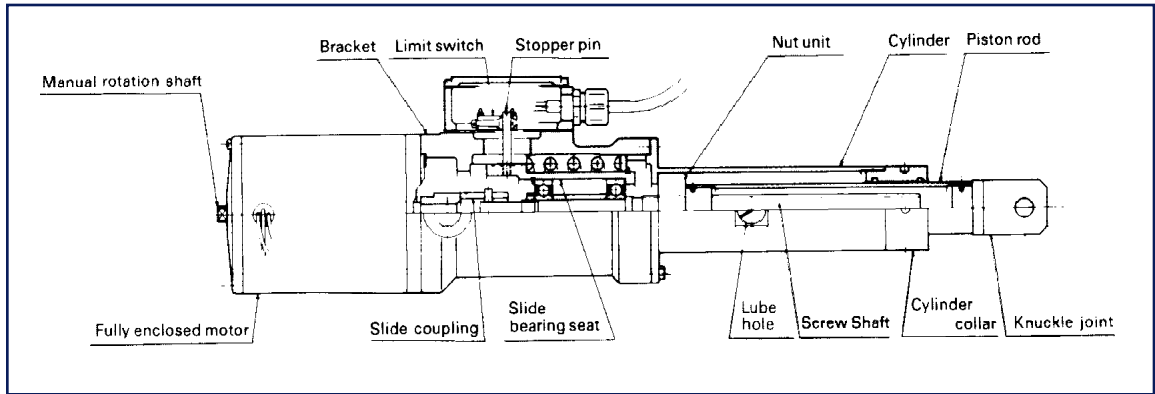
In case of a power failure or emergency, the motor cylinder can be operated manually.

Specifications

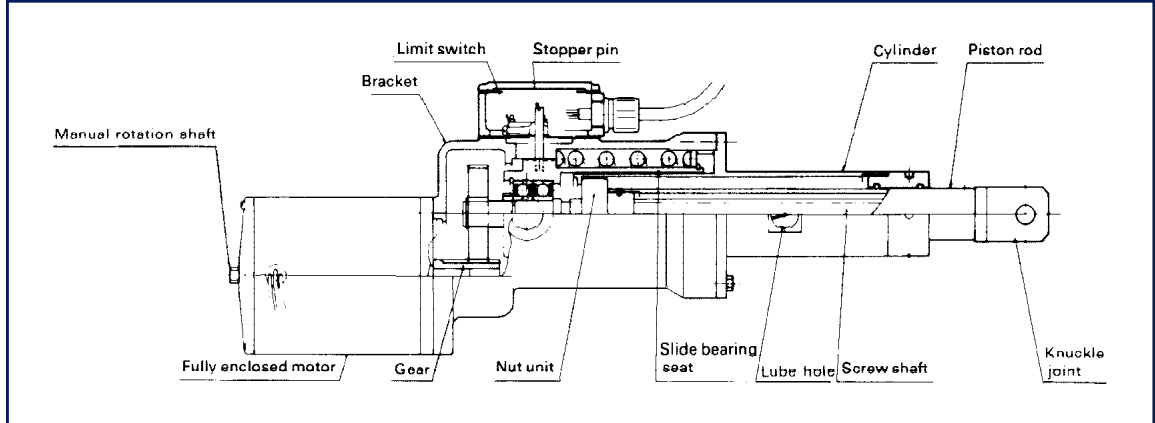
Cylinder Housing Construction:	Fully enclosed indoor type or fully enclosed outdoor type
Power Source:	Three-phase 50/60Hz, 200/220V or 400/440V
Insulation:	Class E insulation
Motor:	Fully enclosed self-cooling type, four-pole, three-phase induction motor rated for thirty minutes.
Painted color:	Munsell 2.5G 6/2

Construction

B100K

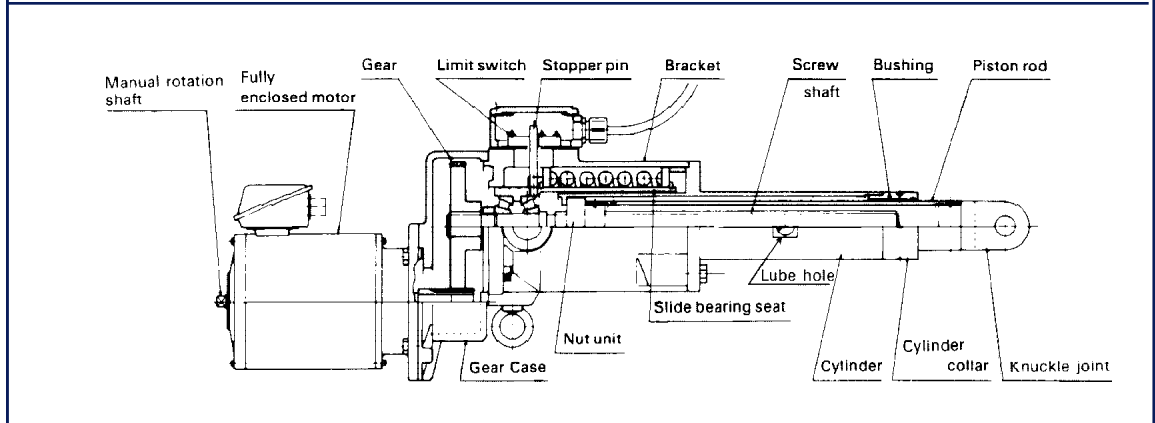


BG300K



BG500K

BG1T



BK500K

BL500K

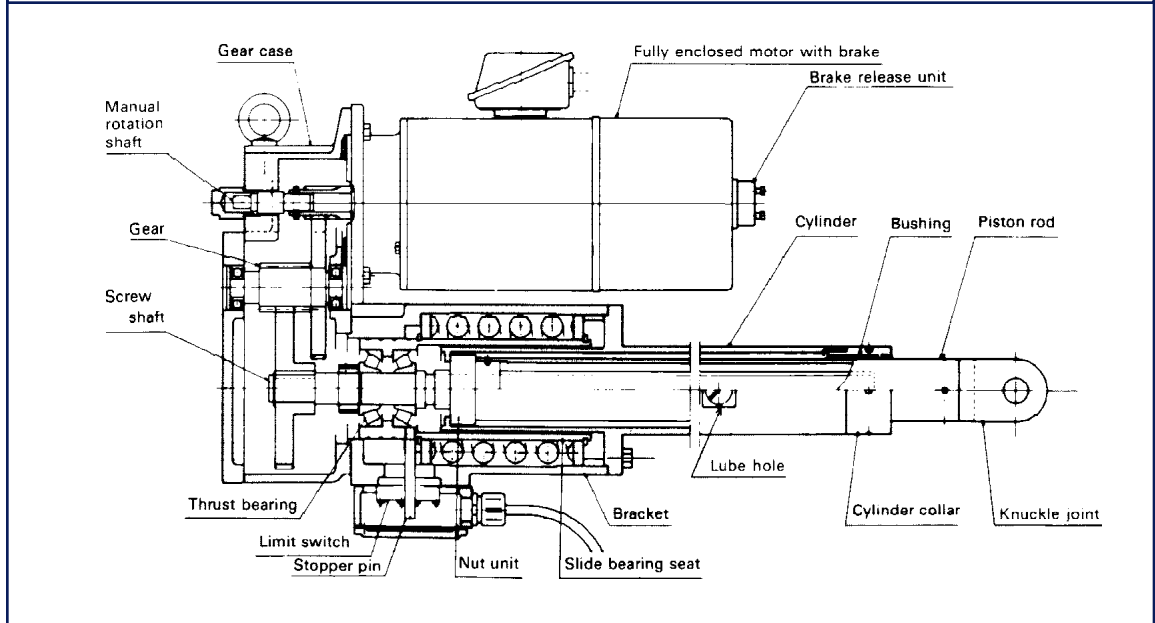
BL1T

BM1T

BM2T

BN1T

BN2T

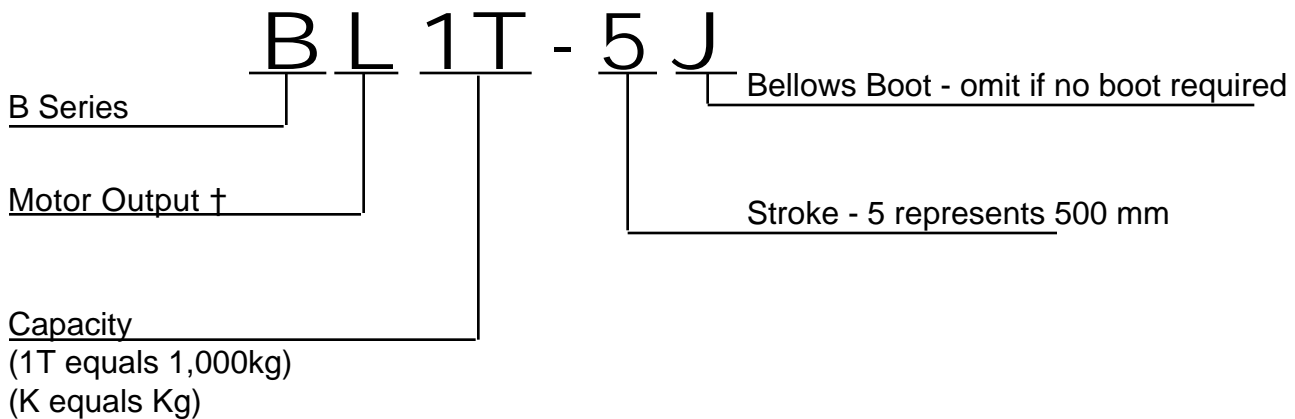


B Series Standard Models

Model Number	Capacity (kg)	Nominal Speed 50/60/ Hz mm/sec	Motor Output (kw)	Brake	Piston Rod Rotational Torque (kg•m)
B100K-	100	75/90	0.2	—	0.3
BB100K-	100	75/90	0.2	Included	0.3
BG300K-	300	29/35	0.2	—	0.85
BGB300K-	300	29/35	0.2	Included	0.85
BG500K-	500	28/33.5	0.4	—	1.4
BG1T-	1000	28/33.5	0.75	—	2.7
BK500K-	500	23/28	0.2	Included	2
BL500K-	500	46/56	0.4	Included	2
BL1T-	1000	23/28	0.4	Included	4
BM1T-	1000	47/56	0.75	Included	4
BM2T-	2000	24/29	0.75	Included	8
BN1T-	1000	83/100	1.5	Included	4
BN2T-	2000	42/50	1.5	Included	8

- When the piston rod travels forward or reverse it generates rotational torque. Set a device to prevent rotational torque from occurring on the mating machine side.
- If the letter J follows the number indicating the stroke, it means that this is an outdoor type. The outdoor types have bellows and conduit type motor terminal boxes. The motor and the shaft are separated by oil seals. The connection points of the motor cylinder are coated with gasket sealer to make it 100% waterproof.

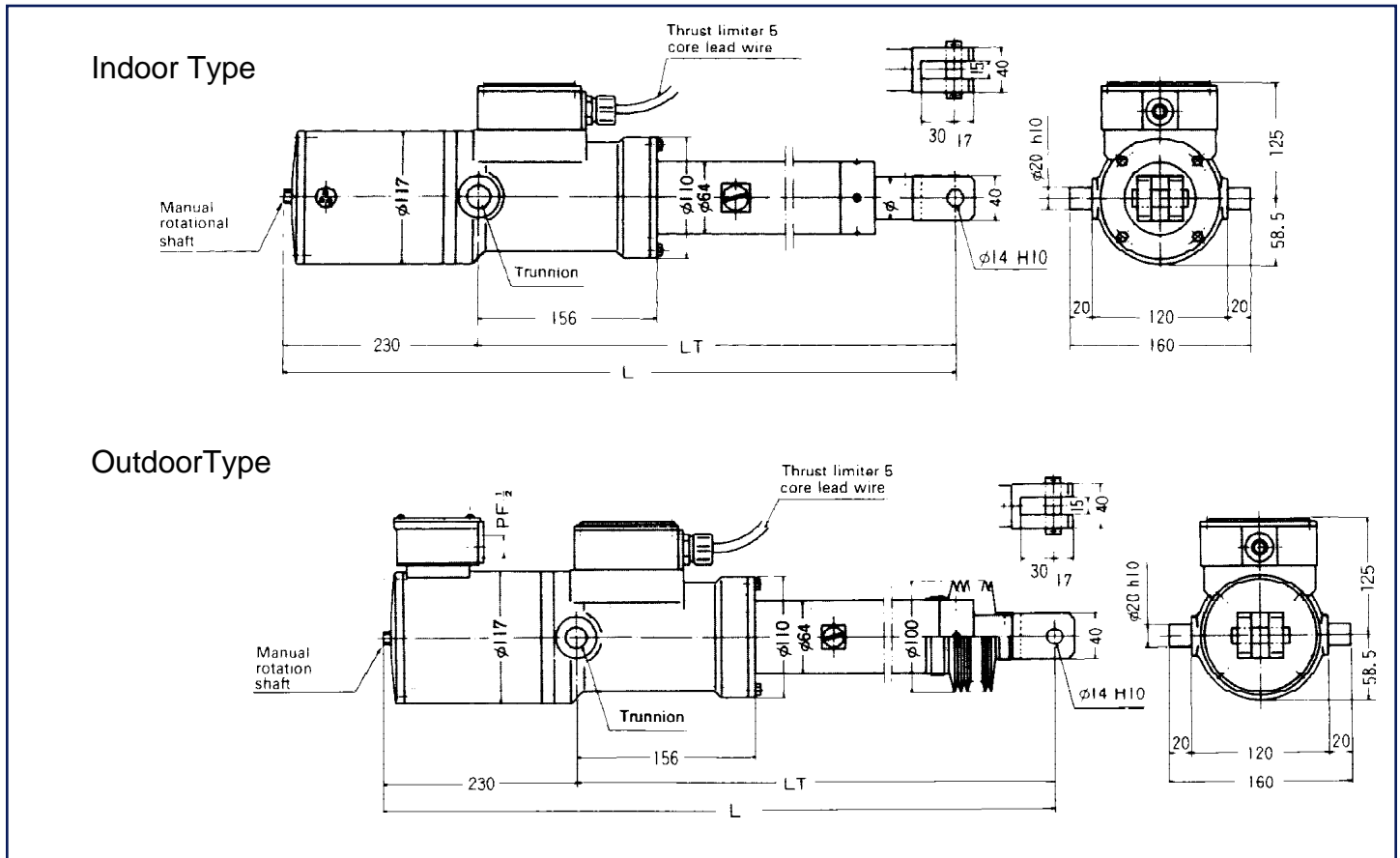
Description of Model Number



† K-0.2Kw, L-0.4Kw, M-0.75Kw, N-1.5Kw, O-2.2Kw
No symbol is given for B100K - BG1T

Dimensions

B100K



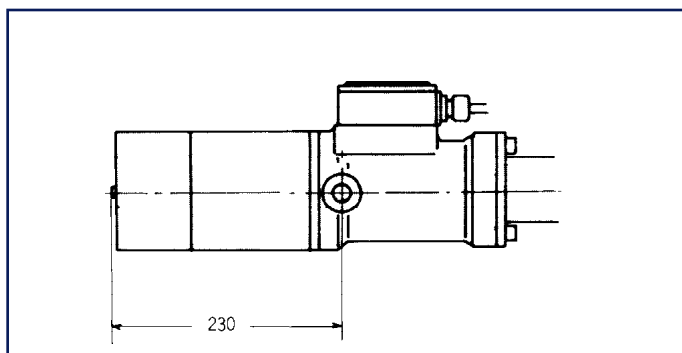
Indoor type

Model Number	Stroke (mm)	Dimension (mm)		Weight (kg)
		L	LT	
B100K-1	100	624	394	22
B100K-2	200	724	494	23
B100K-3	300	824	594	24
B100K-5	500	1024	794	25
B100K-7	700	1264	1034	26

Outdoor Type

Model Number	Stroke (mm)	Dimension (mm)		Weight (kg)
		L	LT	
B100K-1J	100	624	394	23
B100K-2J	200	724	494	24
B100K-3J	300	824	594	25
B100K-5J	500	1076	846	27
B100K-7J	700	1356	1126	28

BB100K With Brake (Indoor Type & Outdoor Type)



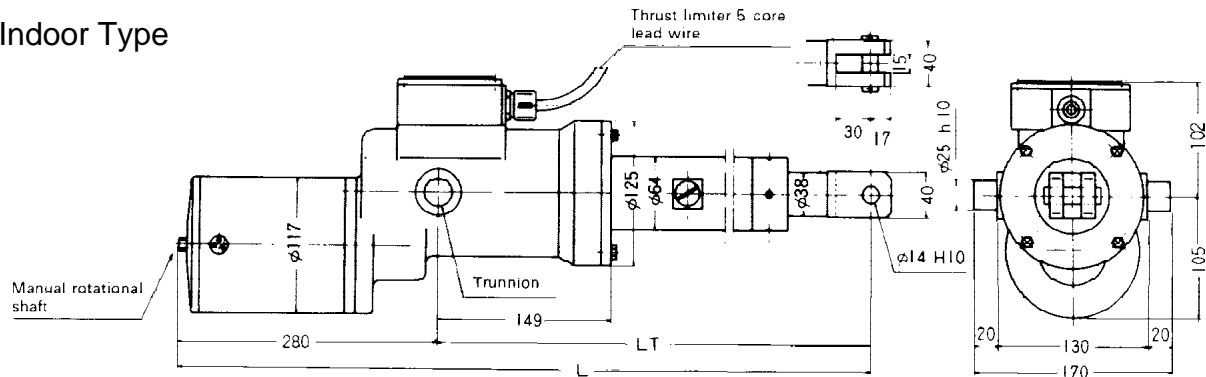
Standard Model

- When intermediate stops are required, a motor cylinder with a brake system assures positive stops.
- When stopping only at the fully extended and fully retracted position (only ON/OFF operation), constant pressure stop is assured by using stoppers. The use of stoppers eliminates the need for brake system.
- The length of only the motor is given on the left.

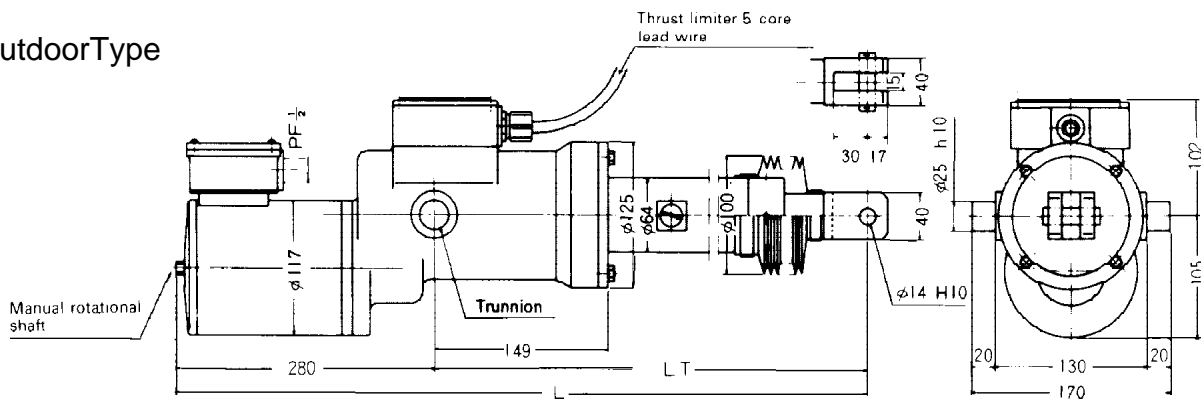
Dimensions

BG300K

Indoor Type



Outdoor Type



Thrust 300kg Nominal Speed 29/35mm/sec

Indoor type

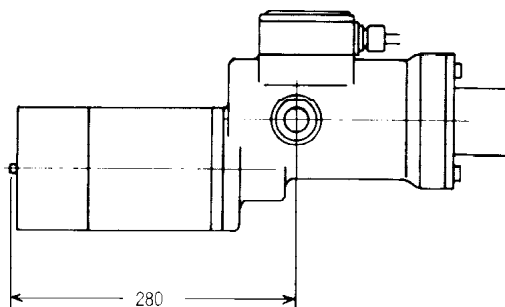
Model Number	Stroke (mm)	Dimension (mm)		Weight (kg)
		L	LT	
BG300K-1	100	559	279	20
BG300K-2	200	659	379	21
BG300K-3	300	759	479	22
BG300K-5	500	959	679	24
BG300K-7	700	1199	919	26
BG300K-10	1000	1499	1219	29

Outdoor Type

Model Number	Stroke (mm)	Dimension (mm)		Weight (kg)
		L	LT	
BG300K-1J	100	559	279	21
BG300K-21J	200	659	379	22
BG300K-3J	300	759	479	23
BG300K-5J	500	1011	731	25
BG300K-7J	700	1291	1011	28
BG300K-10J	1000	1651	1371	31

BGB300K With Brake (Indoor Type & Outdoor Type)

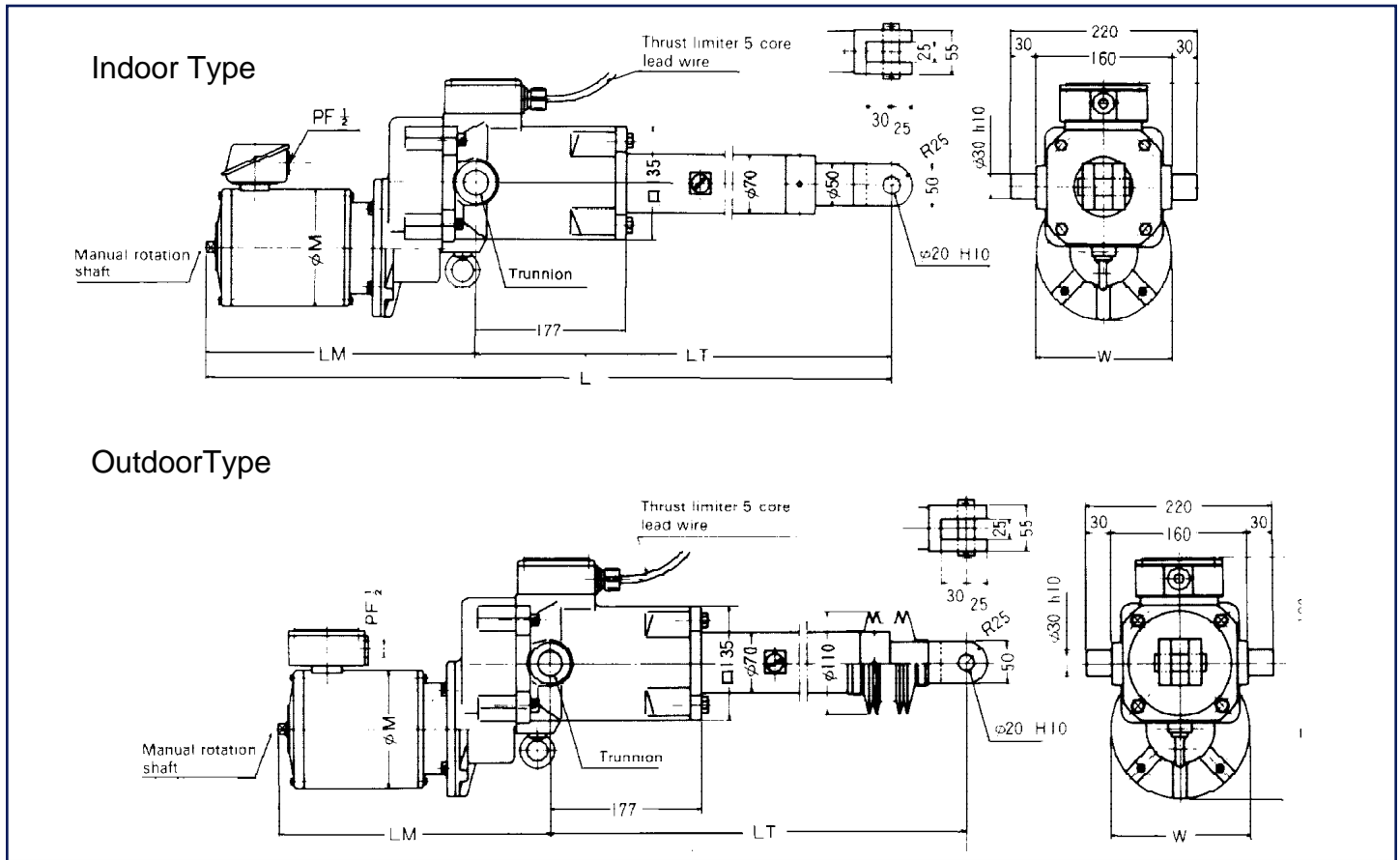
Standard Model



- When intermediate stops are required, a motor cylinder with a brake system assures positive stops.
- When stopping only at the fully extended and fully retracted position (only ON/OFF operation), constant pressure stop is assured by using stoppers. The use of stoppers eliminates the need for brake system.
- The length of only the motor is given on the left.

Dimensions

BG500K, BG 1T



BG500K

Thrust 500kg Nominal Speed 28/33.5mm/sec

Indoor type

Model Number	Stroke (mm)	Dimension (mm)					
		L	LT	LM	M	W	E
BG500K-2	200	744	400	344	127	160	157
BG500K-3	300	844	500	344	127	160	157
BG500K-5	500	1044	700	344	127	160	157
BG500K-7	700	1279	935	344	127	160	157
BG500K-10	1000	1579	1235	344	127	160	157

Outdoor Type (with bellows)

Model Number	Stroke (mm)	Dimension (mm)		Weight (kg)
		L	LT	
BG500K-2J	200	744	400	40
BG500K-3J	300	844	500	42
BG500K-5J	500	1111	767	46
BG500K-7J	700	1384	1040	50
BG500K-10J	1000	1767	1423	56

* The dimensions LM, M, E, and W, are the same for both the indoor and the outdoor types.

BG1T

Thrust 1 Ton Nominal Speed 32/38.5mm/sec

Indoor type

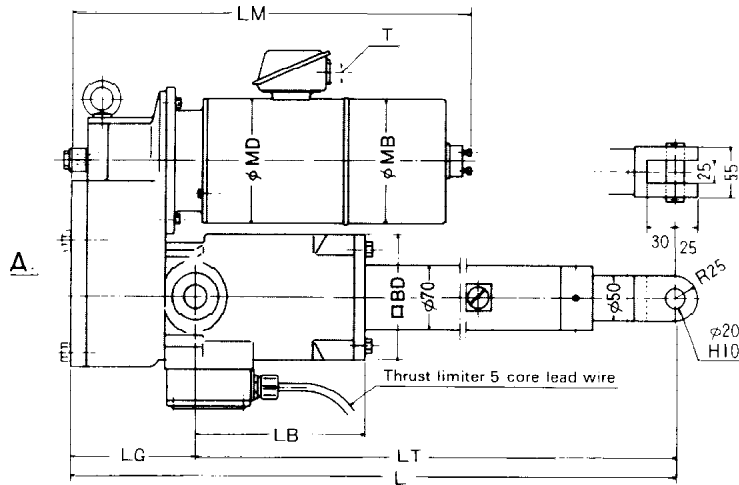
Model Number	Stroke (mm)	Dimension (mm)					
		L	LT	LM	M	W	E
BG1T-2	200	767	400	367	141	200	177
BG1T-3	300	867	500	367	141	200	177
BG1T-5	500	1067	700	367	141	200	177
BG1T-7	700	1302	935	367	141	200	177
BG1T-10	1000	1602	1235	367	141	200	177

Outdoor Type (with bellows)

Model Number	Stroke (mm)	Dimension (mm)		Weight (kg)
		L	LT	
BG1T-2J	200	767	400	43
BG1T-3J	300	867	500	45
BG1T-5J	500	1134	767	49
BG1T-7J	700	1407	1040	53
BG1T-10J	1000	1790	1423	59

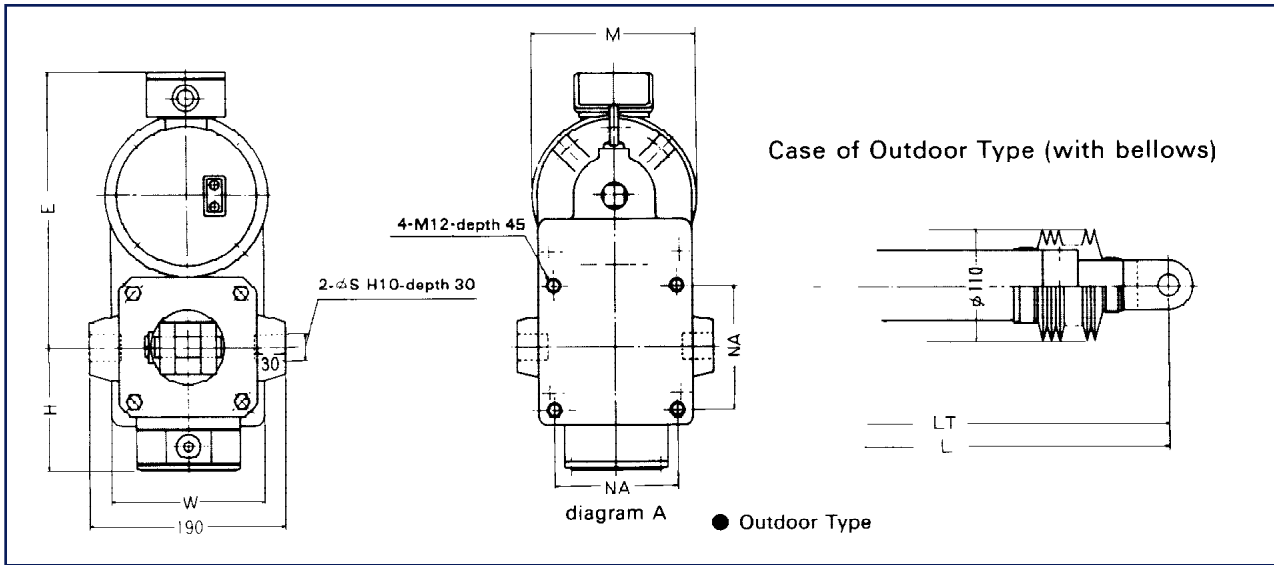
* The dimensions LM, M, E, and W, are the same for both the indoor and the outdoor types.

BK500K
BL500K, BL1T
BM1T, BM2T
BN1T, BN2T



	Model Number	Capacity (kg)	Stroke (mm)	Nominal Speed (mm/sec)	Dimension				
					L	LT	LG	LB	BD
BK500K	BK500K- 2	500	200	23/28	542	407	135	184	135
	BK500K- 3		300		642	507			
	BK500K- 5		500		842	707			
	BK500K- 7		700		1077	942			
	BK500K- 10		1000		1377	1242			
	BK600K- 12		1200		1577	1442			
BL500K	BL500K- 2	500	200	46/56	542	407	135	184	135
	BL500K- 3		300		642	507			
	BL500K- 5		500		842	707			
	BL500K- 7		700		1077	942			
	BL500K- 10		1000		1377	1242			
	BL600K- 12		1200		1577	1442			
BL 1T	BL 1T- 2	1000	200	23/28	542	407	135	184	135
	BL 1T- 3		300		642	507			
	BL 1T- 5		500		842	707			
	BL 1T- 7		700		1077	942			
	BL 1T- 10		1000		1377	1242			
	BL 1T- 12		1200		1577	1442			
BM 1T	BM 1T- 2	1000	200	47/56	552	407	145	184	135
	BM 1T- 3		300		652	507			
	BM 1T- 5		500		852	707			
	BM 1T- 7		700		1087	942			
	BM 1T- 10		1000		1387	1242			
	BM 1T- 12		1200		1587	1442			
BM 2T	BM 2T- 2	2000	200	24/29	598	453	145	245	160
	BM 2T- 3		300		698	553			
	BM 2T- 5		500		898	753			
	BM 2T- 7		700		1133	988			
	BM 2T- 10		1000		1433	1288			
BN 1T	BN 1T- 2	1000	200	83/100	552	407	145	184	135
	BN 1T- 3		300		652	507			
	BN 1T- 5		500		852	707			
	BN 1T- 7		700		1087	942			
	BN 1T- 10		1000		1387	1242			
	BN 1T- 12		1200		1587	1442			
BN 2T	BNM 2T- 2	2000	200	42/50	598	453	145	245	160
	BN 2T- 3		300		698	553			
	BN 2T- 5		500		898	753			
	BN 2T- 7		700		1133	988			
	BN 2T- 10		1000		1433	1288			

- For a thrust of 4,000 kg or over, please refer to the DG series
- Models with longer strokes are available.
- The dimensions L and LT for the indoor type with bellows are the same as the outdoor type with bellows.



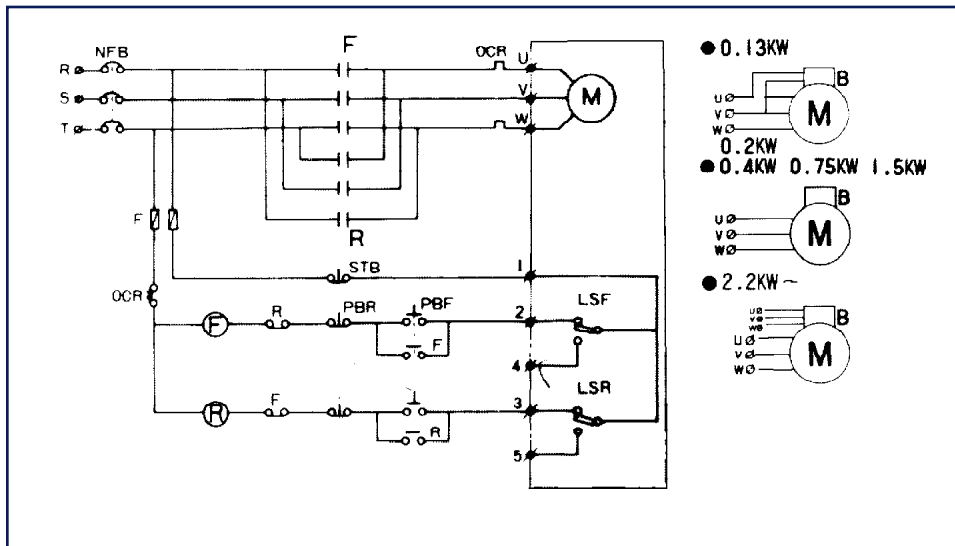
Outdoor Type

Dimension										Model Number	Stroke (mm)	Dimension (mm)		Weight (kg)
MD	MB	LM	M	E	H	S	W	NA	T			L	LT	
115	115	319	150	272.5	122	25	150	120	PF 1/2	BK500K- 2J	200	542	407	43
										BK500K- 3J	300	642	507	46
										BK500K- 5J	500	909	774	50
										BK500K- 7J	700	1182	1047	54
										BK500K- 10J	1000	1565	1430	60
										BK600K- 12J	1200	1802	1667	65
127	127	421	160	285	122	25	150	120	PF 1/2	BL500K- 2J	200	542	407	48
										BL500K- 3J	300	642	507	51
										BL500K- 5J	500	909	774	55
										BL500K- 7J	700	1182	1047	59
										BL500K- 10J	1000	1565	1430	65.5
										BL600K- 12J	1200	1802	1667	70
127	127	421	160	285	122	25	150	120	PF 1/2	BL 1T- 2J	200	542	407	48
										BL 1T- 3J	300	642	507	51
										BL 1T- 5J	500	909	774	55
										BL 1T- 7J	700	1182	1047	59
										BL 1T- 10J	1000	1565	1430	65.5
										BL 1T- 12J	1200	1802	1667	70
142	142	452	200	316	142	25	185	150	PF 1/2	BM 1T- 2J	200	552	407	68
										BM 1T- 3J	300	652	507	70
										BM 1T- 5J	500	919	774	75
										BM 1T- 7J	700	1192	1047	80
										BM 1T- 10J	1000	1575	1430	85
										BM 1T- 12J	1200	1812	1667	88
142	142	452	200	316	141	30	185	150	PF 1/2	BM 2T- 2J	200	598	453	70
										BM 2T- 3J	300	698	553	72
										BM 2T- 5J	500	965	820	77
										BM 2T- 7J	700	1238	1093	80
										BM 2T- 10J	1000	1621	1476	86
										BM 2T- 12J	1200	1812	1667	92
172	172	487	200	381	142	25	185	150	PF 3/4	BN 1T- 2J	200	552	407	75
										BN 1T- 3J	300	652	507	78
										BN 1T- 5J	500	919	774	83
										BN 1T- 7J	700	1192	1047	87
										BN 1T- 10J	1000	1575	1430	92
										BN 1T- 12J	1200	1812	1667	96
172	172	487	200	381	141	30	185	150	PF 3/4	BN 2T- 2J	200	598	453	76
										BN 2T- 3J	300	698	553	80
										BN 2T- 5J	500	965	820	85
										BN 2T- 7J	700	1238	1093	88
										BN 2T- 10J	1000	1621	1476	93
										BN 2T- 12J	1200	1812	1667	99

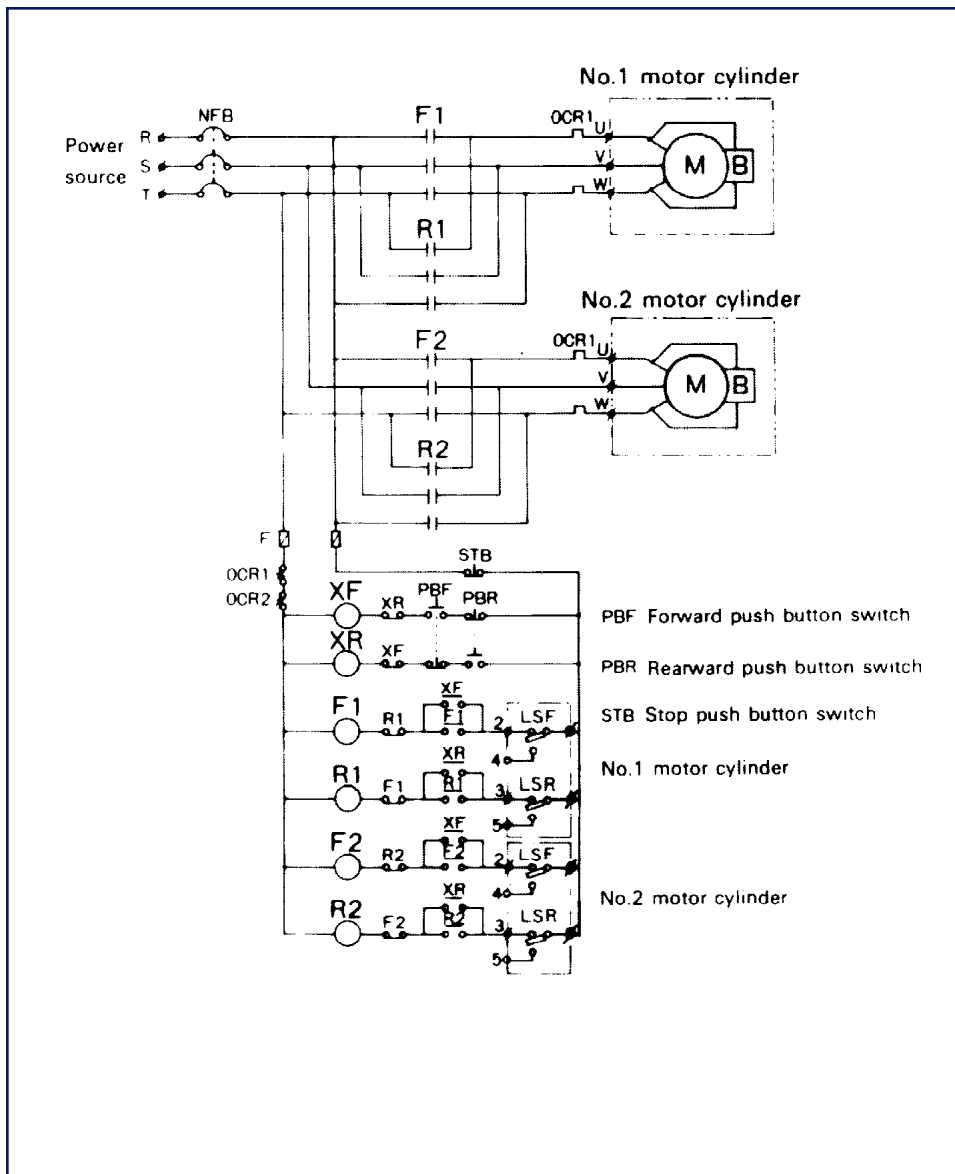
Standard Type Others Custom Made

Operating Circuit

Please follow these diagrams in accordance with your service requirements.

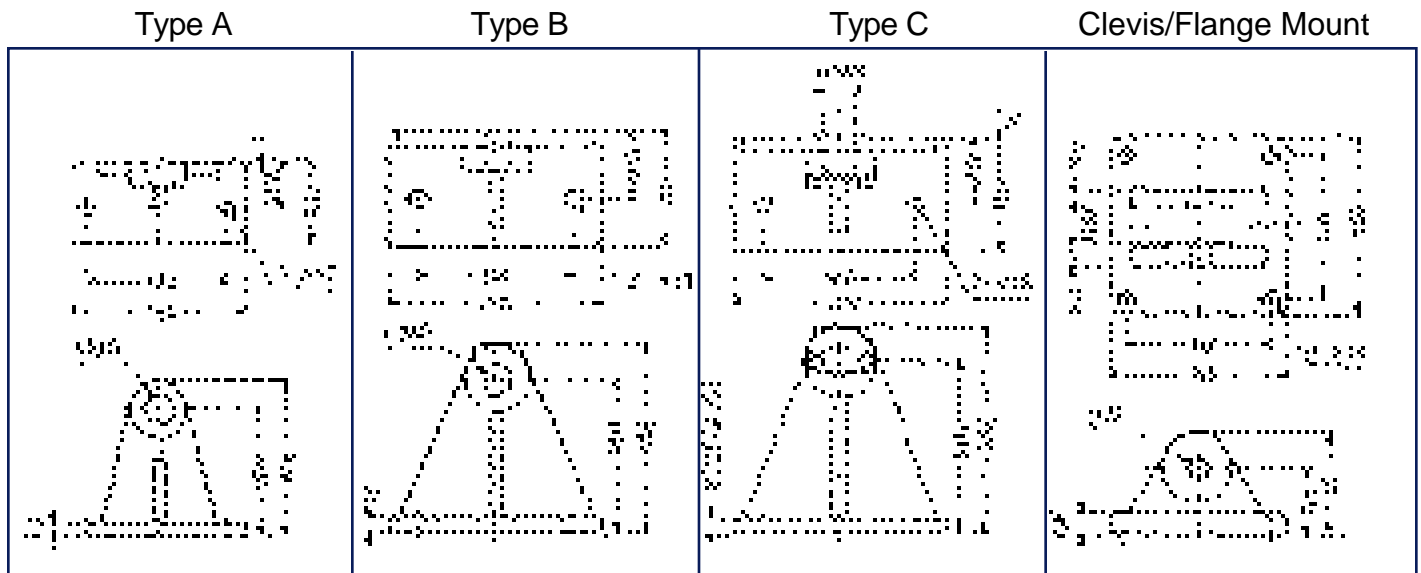


- 0.13Kw or more
PBF Forward push button switch
- PBR Rearward push button switch
- STB Stop push button switch



- For Interlocked Control
This circuit is designed to interlock two or more motor cylinders to be operated simultaneously by control of one push button switch system.
Since the slightest deviation of the stop position will cause problems, wire the circuit so that simultaneous start and individual stop is controlled by an auxiliary relay.

Trunnion Mount (Optional)



Model	Trunnions							Clevis/Flange Mount						
	MA	MU	MW	MS	MH	ME	Type	NA	NB	NH	NW	NU	NE	NF
B100K, BB100K	100	62	37	20	80	101	A							
BG300K, BGB300K	120	72	42	25	110	135								
BG500K, BG1T	160	120	70	30	160	195	B							
BK500K, BL500K, BL1T	160	20	70	25	160	195	C	120	150	50	30	18	80	15
BM1T, BN1T								150	185	70	40	20	105	20
BM2T, BN2T								160	120	70	30	180	215	

BJ Series

Damper and Valve Motor Cylinder

Features

1. Compact and Low Cost

Compared with conventional damper drives, the BJ series has been reduced in size 1/2 to 2/3 the size of competitor's units.

2. Design

Low speed, high accuracy positioning for dampers and valves.

3. Positioner

The positioner with a potentiometer, opening angle gauge, and four cam type limit switches allow the selection of four stage opening signals.

4. Constant Pressure Stop

The thrust limiter, used in all models, allows constant pressure stop at any position of the stroke, reducing the possibility of damper or valve leakage.

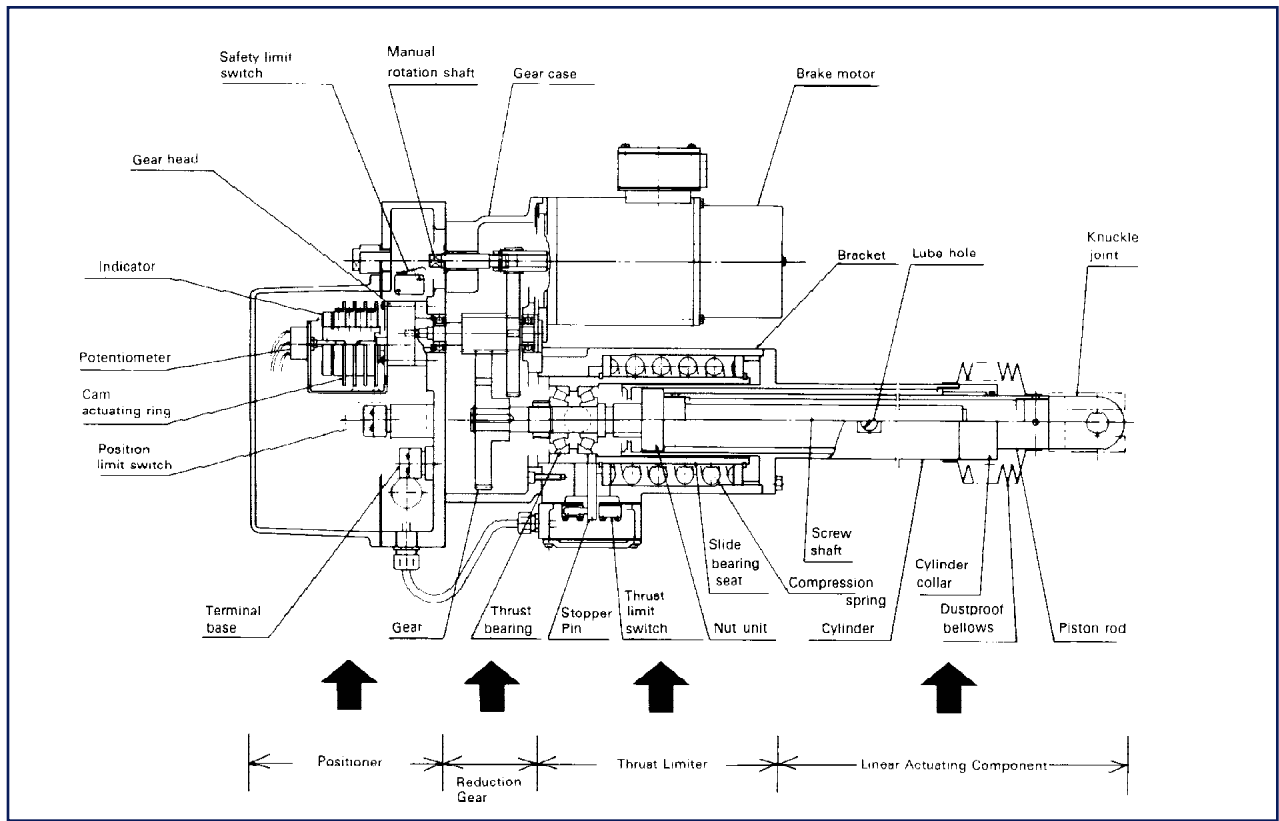
5. All -Weather Type

The BJ series, with bellows, is designed for outdoor use. The motor cylinder can be installed in any desired direction and used in severe weather environments.

Specifications

Power Source:	Three-phase 50/60Hz, 200/220V, 400/440V
Insulation:	Class E insulation
Rating:	30 minutes
Ambient Temperature:	-15°C to +50° C Environment: Locations subjected to wind, rain, and indoor dusty areas. (The specifications must be partially changed if the location is in the presence of special corrosive gas.)
Positioner:	Designed with four cam type limit switches and a potentiometer.
Accessories:	Manual operation handle and bellows Note: For special orders, a synchro-type opening angle gauge can be ordered. When the piston rod travels forward or reverse, it generates rotational torque. Set a device to prevent rotational torque on the mating machine side.

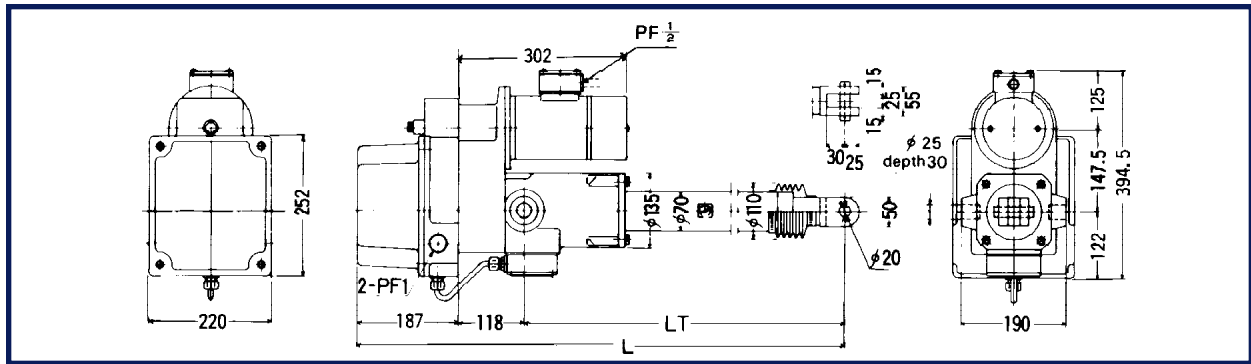
Construction



BJ Series Standard Models

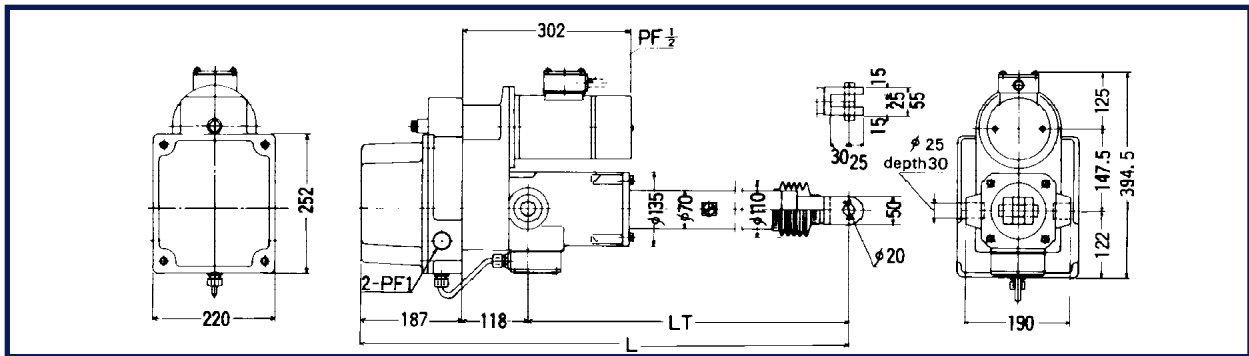
Model Number	Capacity (kg)	Nominal Speed 50/60/ Hz mm/sec	Stroke mm	Motor Output	Stop Accuracy mm	Rod Rotational Torque kg-m	Brake System	Approx. Weight kg
BJ 100K	100	10/12	200	130W 4P	1.1	Approx. 0.3	Spring OFF brake	32
			300					33
			500					36
			700					38
BJ 300K	300	10/12	200	130W 4P	1.1	Approx. 1.0	Spring OFF brake	32
			300					33
			500					36
			700					38
BJ 500K	500	10/12	300	0.2kw 4P	1.08	Approx. 1.7	Spring OFF brake	56
			500					60
			700					64
			1000					70
BJ 1T	1000	10/12	300	0.2kw 4P	1.08	Approx. 3.4	Spring OFF brake	56
			500					60
			700					64
			1000					70
BJ 2T	2000	12/14.4	300	0.75kw 4P	1.62	Approx. 6.7	Spring OFF brake	90
			500					94
			700					97
			1000					103
BJ 4T	4000	12.5/15	300	1.5kw 4P	2.2	Approx. 11	Spring OFF brake	116
			500					125
			700					134
			1000					147
			1500					157
Custom Design	6000 to 20000	5/6 to 25/30	300 to 2000	0.75 to 7.5kw	0.5 to 3.0	Approx. 17 to 70	Spring OFF brake	

BJ500K



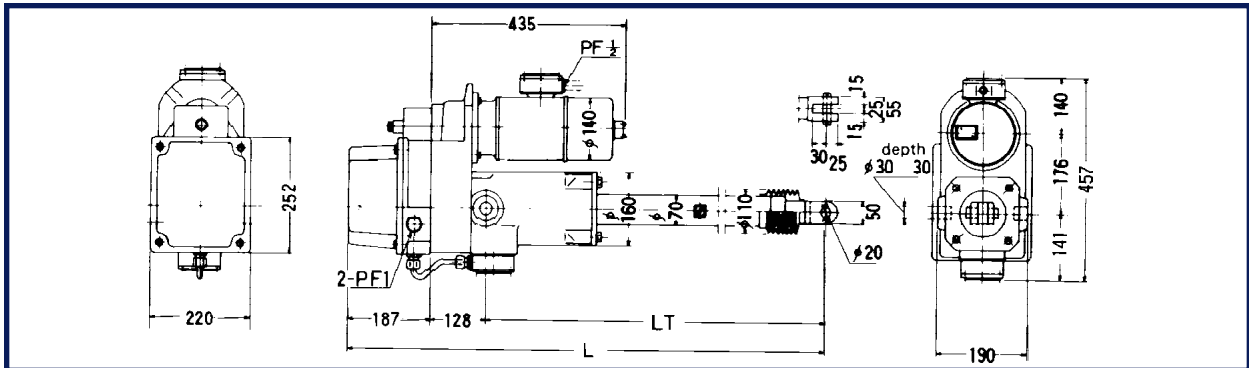
Model Number	Stroke mm	Speed 50/60 Hz mm/sec	L-Dimension		LT-Dimension	
			Min.	Max	Min.	Max.
BJ500K-3JPL	300	10/12	812	1112	507	807
BJ500K-5JPL	500	10/12	1079	1579	774	1274
BJ500K-7JPL	700	10/12	1352	2052	1047	1747
BJ500K-10JPL	1000	10/12	1735	2735	1430	2430

BJ 1T



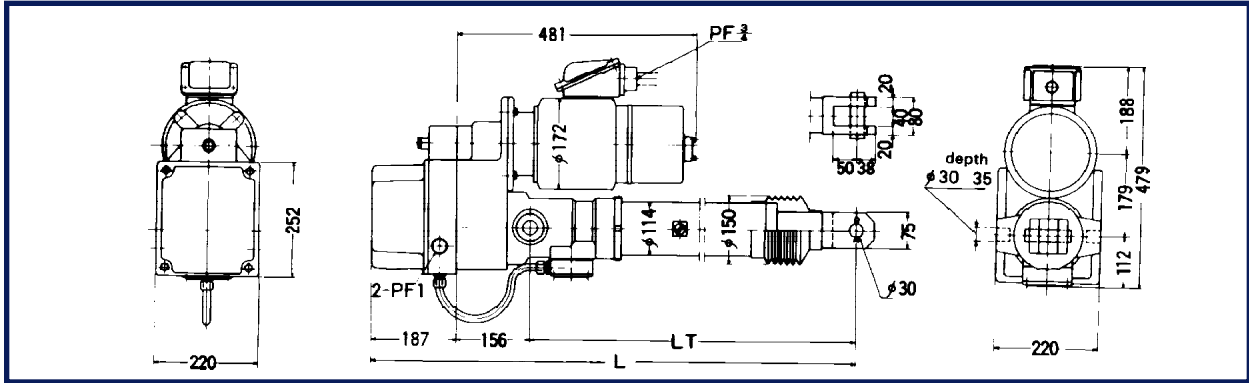
Model Number	Stroke mm	Speed 50/60 Hz mm/sec	L-Dimension		LT-Dimension	
			Min.	Max	Min.	Max.
BJ 1T - 3JPL	300	10/12	812	1112	507	807
BJ 1T - 5JPL	500	10/12	1079	1579	774	1274
BJ 1T - 7JPL	700	10/12	1352	2052	1047	1747
BJ 1T - 10JPL	1000	10/12	1735	2735	1430	2430

BJ 2T



Model Number	Stroke mm	Speed 50/60 Hz mm/sec	L-Dimension		LT-Dimension	
			Min.	Max	Min.	Max.
BJ 2T - 3JPL	300	12/14.4	868	1168	553	853
BJ 2T - 5JPL	500	12/14.4	1135	1635	820	1320
BJ 2T - 7JPL	700	12/14.4	1408	2108	1093	1793
BJ 2T - 10JPL	1000	12/14.4	1791	2791	1476	2476

BJ 2T



Model Number	Stroke mm	Speed 50/60 Hz mm/sec	L-Dimension		LT-Dimension	
			Min.	Max	Min.	Max.
BJ 4T - 3JPL	300	12.5/15	1103	1403	760	1060
BJ 4T - 5JPL	500	12.5/15	1370	1870	1027	1527
BJ 4T - 7JPL	700	12.5/15	1646	2346	1303	2003
BJ 4T - 15JPL	1000	12.5/15	2029	3029	1686	2686
BJ 4T - 10JPL	1500	12.5/15	2648	4148	2305	3805

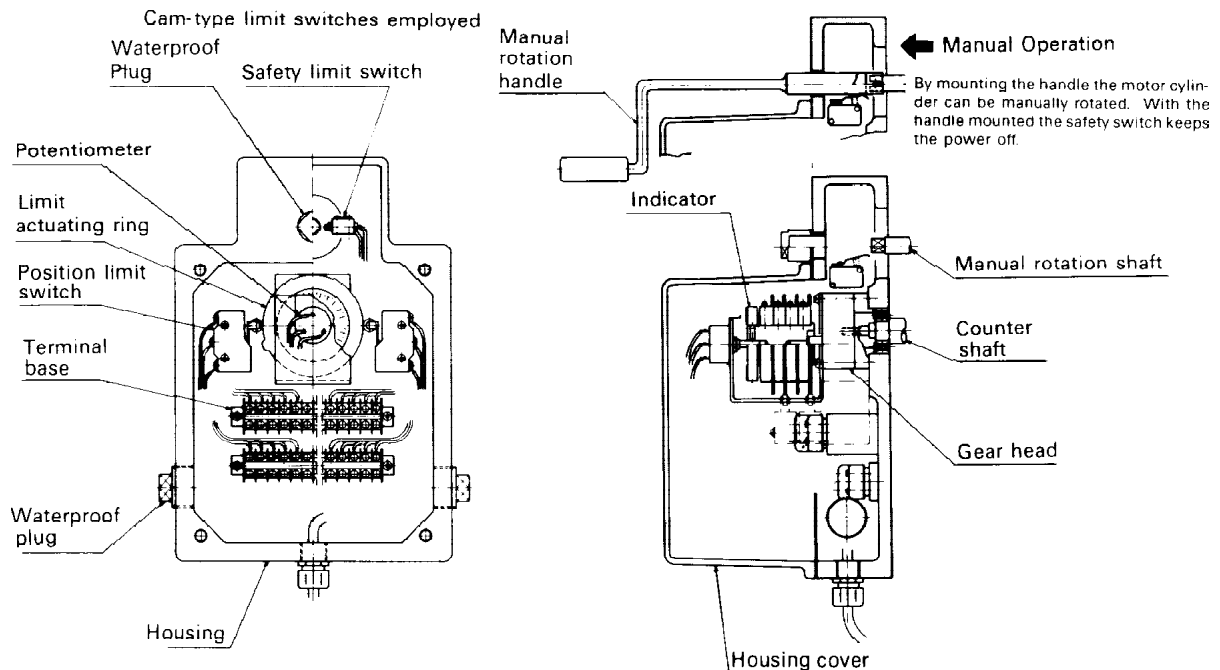
Note: When the motor cylinders are used for dampers, select the torque and the operation time with the shaft rotating a quarter turn by referring to the following table.

Comparison Table between Damper Motor Cylinders and Shaft Rotational Torques

Model Number	Capacity (kg)	200 Stroke			300 Stroke			500 Stroke			700 Stroke			1000 Stroke		
		Torque (kg-m)	Switching Time (sec)		Torque (kg-m)	Switching Time (sec)		Torque (kg-m)	Switching Time (sec)		Torque (kg-m)	Switching Time (sec)		Torque (kg-m)	Switching Time (sec)	
			50 Hz	60 Hz		50 Hz	60 Hz		50 Hz	60 Hz		50 Hz	60 Hz		50 Hz	60 Hz
BJ00K	100	9.5	20	17	14.5	30	25	24.5	50	42	35	70	58	-	-	-
BJ300K	300	29	20	17	44	30	25	73.5	50	42	105	70	58	-	-	-
BJ500K	500	-	-	-	78.5	30	25	122.5	50	42	175	70	58	245	100	83
BJ 1T	1000	-	-	-	147	30	25	245	50	42	350	70	58	490	100	83
BJ 2T	2000	-	-	-	294	25	21	490	42	35	700	58	49	980	83	69
BJ 4T	4000	-	-	-	588	24	20	980	40	34	140	56	47	1960	80	67

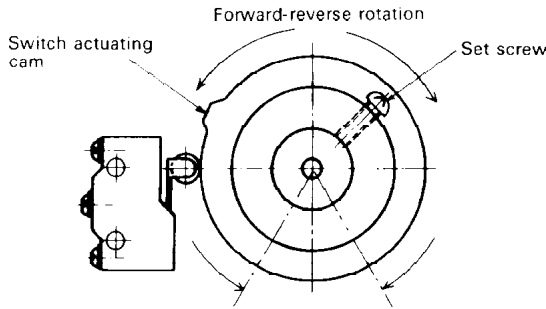
Positioner

(PL Unit)



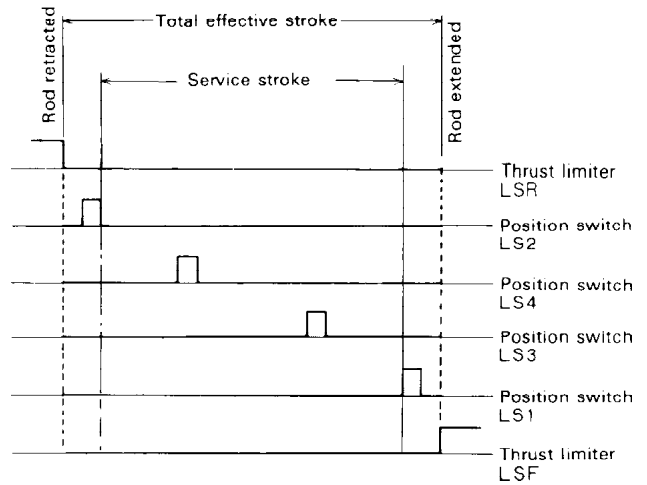
Setting Adjustment

How to set the position limit switches

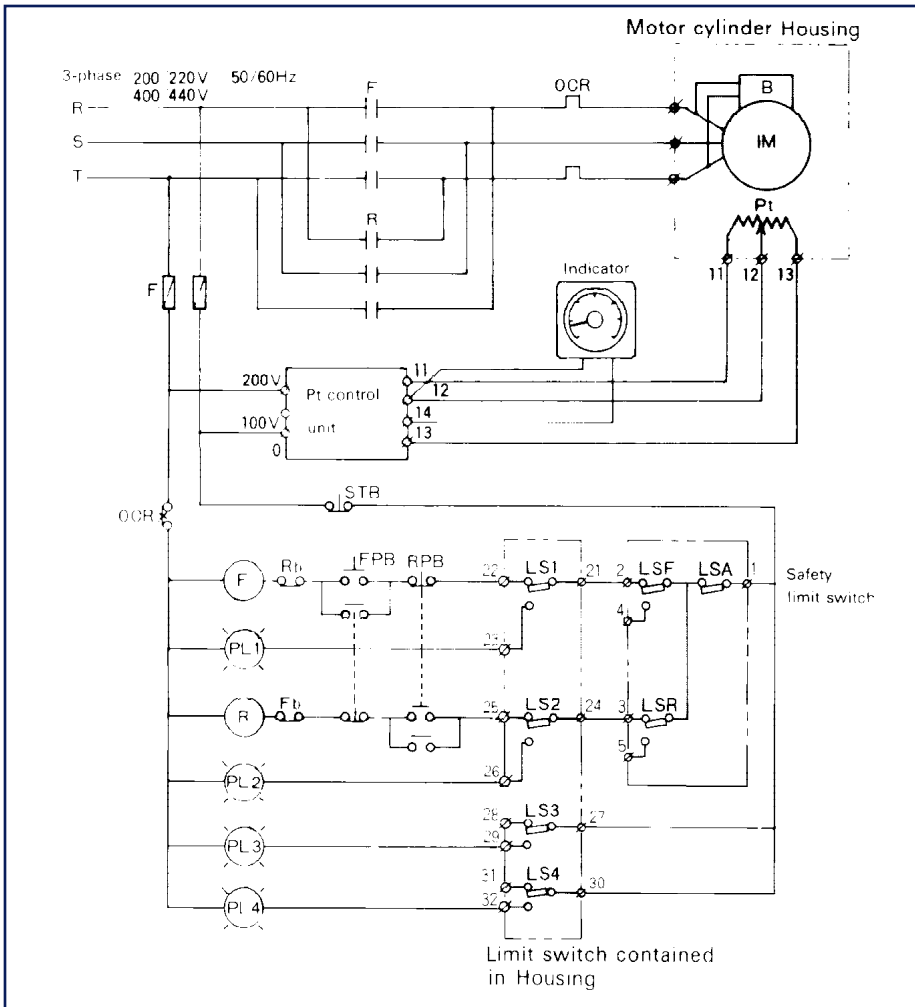


The position limit switches, starting from the cover side inward, are numbered from one to four. First connect the motor cylinder knuckle joint with the mating machine, (Be sure never to turn the piston rod when connecting them). Set the piston rod to one end (retracted or extended) of the stroke and then set the position limit switches in the sequence of No.1, No. 2, No. 3, and No. 4 paying close attention to the stroke direction of the piston rod and the rotating direction of the limit switch cam ring.

Development of Contained Limit Switch



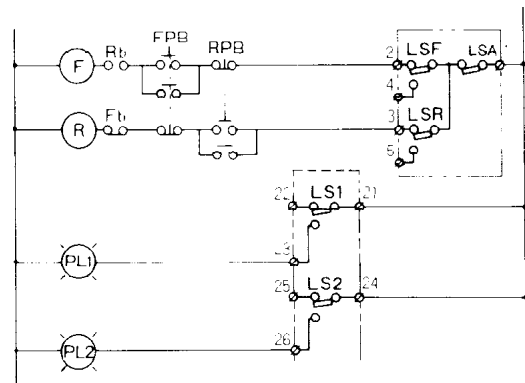
Circuit



Specifications

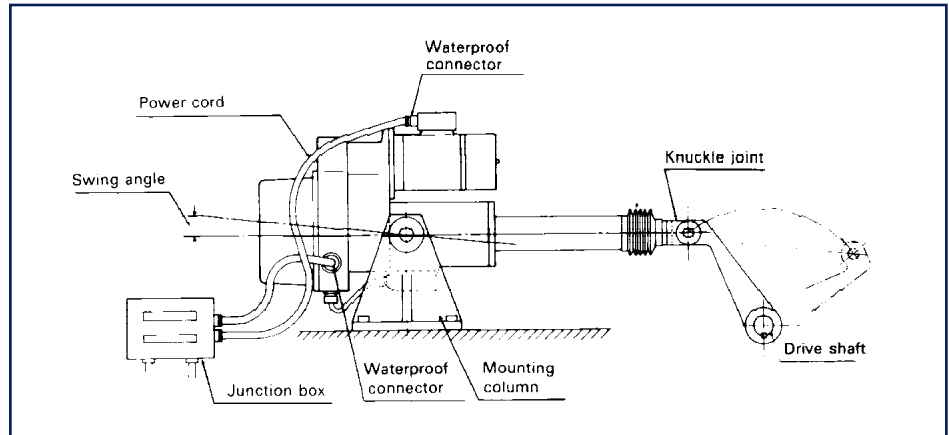
- Potentiometer
Resistance 1K ohm
Electric angle 350°
Accuracy 0.5%
Maximum applied voltage 150V
- Position Limit Switch x4
Micro Switch
Contact Capacity 15A 250V AC
- Thrust Limit Switch x2
Micro Switch
Contact Capacity 10A 250V AC
- All of the terminals of the limit switches and the positioner are set on the terminal base within the positioner case.

- The position limit switches No.1 and No.2 are usually used as the position controls for full closing and opening. The No.3 and No.4 switches are used as the intermediate opening signals. The thrust limiters LSR and LSF are the safety limit switches. During the stroke if an overload occurs they instantaneously cut the power.
- For the operations of closed dampers requiring constant pressure stops, use the thrust limiters LSF and LSR.
- Using all of the limit switches will allow positioning at both ends of the stroke and four other points for a total of six positions.

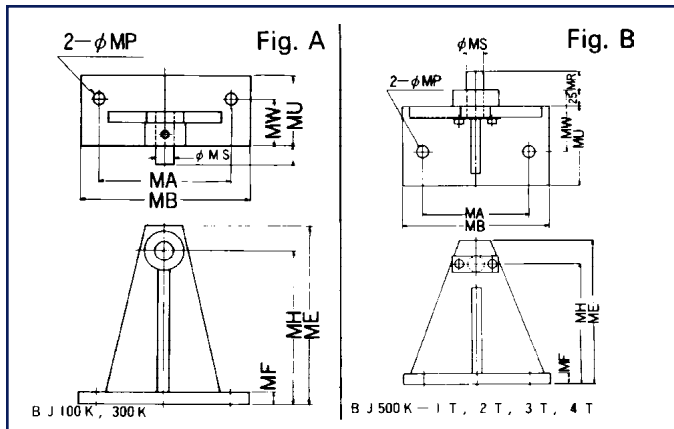


Installation

- When installing the motor cylinder outdoors be sure to use flexible double sealed cord and 100% waterproof connectors for wiring to the motor cylinder.
- The motor cylinder swings during operation. Be sure it does not contact anything.



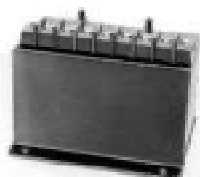
Trunnion Mount (Optional)



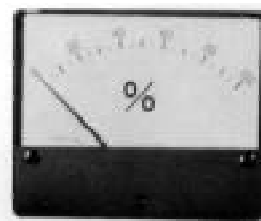
Model	MA	MB	MR	MU	MW	MS	MH	ME	MP	MF	Geometry
BJ100K, BJ300K	140	180	20	75	50	20	160	187	12	12	A
BJ500K, BJ 1T	160	220	30	120	95	25	180	215	17	16	
BJ 2T	200	280	30	150	125	30	200	235	22	19	B
BJ 4T	200	280	35	150	125	30	200	235	22	19	



• Preset Indicator (% indication)



• Control Unit



• Indicator (% indication)

The desired stop positions can be preset using the dial. There are two indicator needles. One to mark the preset position and one that indicates the present position of the piston rod.

DG and NZ Series

Heavy Duty Motor Cylinders Taking the Place of Hydraulic Cylinders.

Features

1. DG Series equipped with a thrust limiter.

This unique thrust limiter allows forward or reverse stop at each end of the stroke by means of an external stopper. When an overload occurs, even during the stroke, the power is cut off instantaneously stopping the unit.

2. NZ Series equipped with a power limiter.

The reduction gears include a pair of helical gears. When an overload occurs the movement of the disk spring is detected by a limit switch. This limit switch is capable of accurately detecting an overload even when the screw shaft is rotating at high speed.

3. Powerful Holding

Both the DG and the NZ series employ a spring loaded OFF brake which engages the instant the motor stop. The holding power is 150% or more. The brake operates positively even in the case of a power failure.

4. Positive and Quiet Operation

Both the DG and the NZ are powered electrically. Therefore a wide range of movements and positive automatic controls can be performed with the actuation of only one switch.

5. Low Cost

The DG and the NZ series do not require the auxiliary equipment and piping required for hydraulic cylinders. The operation cost after installation is very inexpensive because no power is required during constant pressure stops.

6. Simple Installation and Maintenance

No special tools or techniques are required for installation and only regular grease lubrication for maintenance is required.

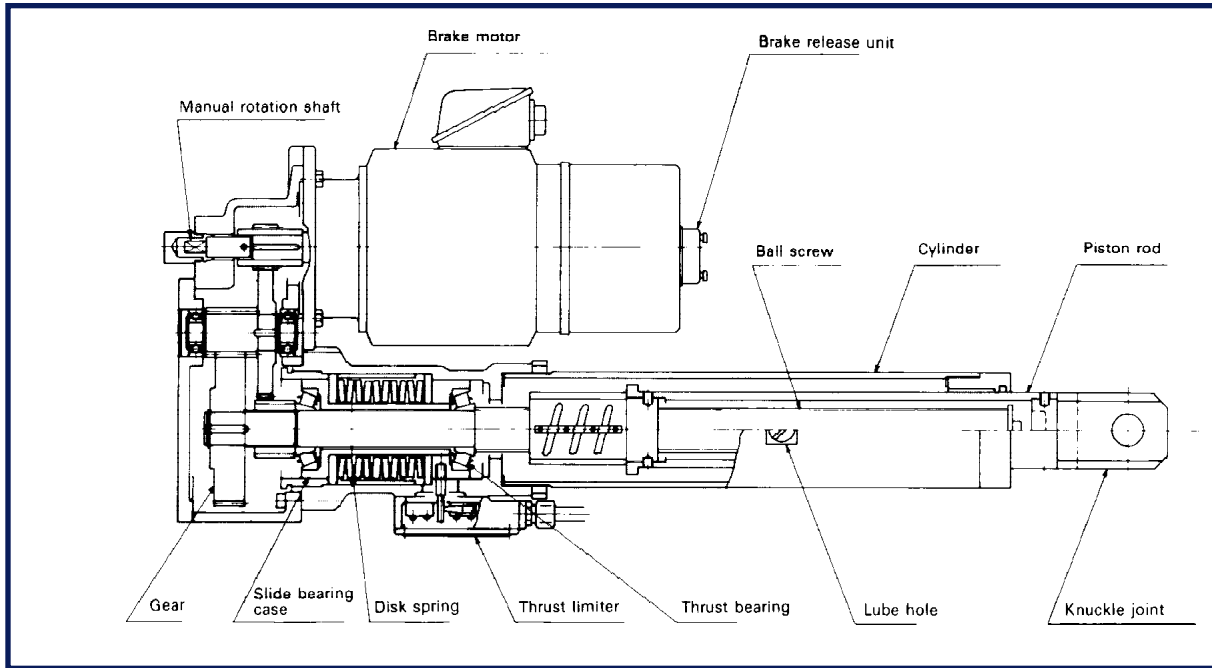
Specifications DG Series

Housing Structure:	Fully enclosed, Indoors or Outdoors type
Voltage:	3 Phase, 50/60 Hz, 200/220 VAC or 400/440 VAC
Insulation:	Class "E"
Amb. Temperature:	-15° to 50° C
Motor Rating:	30 minutes
Environment:	Indoors type less dusty indoors place Outdoors type Outdoors, places subjected to rain/snow, dusty indoors. Preferably, cylinders should be installed horizontally or with piston rod extending downward to avoid possible rain penetration.
Paint color:	Munsell 2.5G 6/2

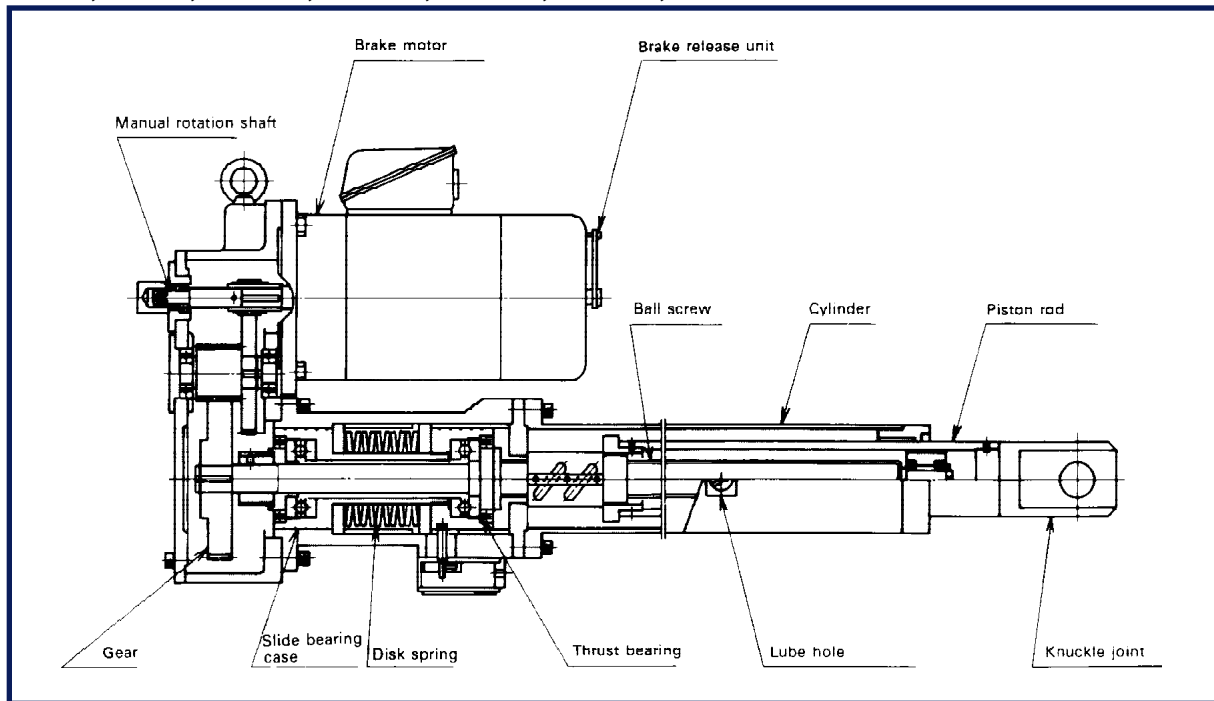
Contact Duff-Norton for assistance with NZ Model Selection

Construction

DG2T, DG4T



DG6T, DG8T, DG10T, DG13T, DG16T, DG20T, DG30T



Reduction Gear:

A two or three stage reduction system is standard. High precision spur gears are used to assure quiet maintenance-free operation.

Thrust Limiter:

Designed with a pre-loaded disk spring and a limit switch. The linear actuating component is constantly supported by the spring permitting constant pressure stops at any position.

Linear Actuating Component: It converts rotational motion to reciprocal motion by means of a ball screw. High rigidity and high transmission efficiency assure trouble free operation.

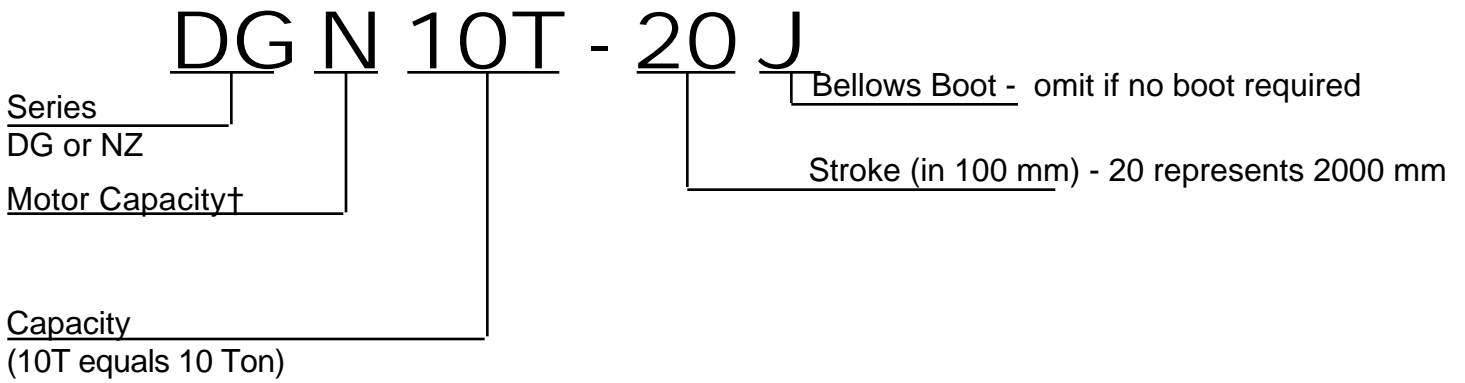
Model DG Standard Types

Model Number	Capacity (ton)	Nominal Speed 50/60/ Hz mm/sec	Motor Output kw	Rod Rotational Torque kg-m	Brake System	Standard Stroke
DG M2T- DG N2T-	2	25/30 60/72*	0.75 1.5	4	Simultaneous Cutoff	200 to 1500
DG M4T- DG N4T- DG O4T- DG P4T-	4	12.5/15 25/30 42/50 60/72*	0.75 1.5 2.2 3.7	8	Simultaneous Cutoff Individual Cutoff	200 to 1500
DG N6T- DG O6T- DG P6T-	6	15/18 25/30 45/54	1.5 2.2 3.7	12	Simultaneous Cutoff Individual Cutoff	200 to 2000
DG N8T- DG O8T- DG P8T- DG Q8T-	8	12.5/15 20/24 30/36 50/60	1.5 2.2 3.7 5.5	22	Simultaneous Cutoff Individual Cutoff	200 to 2000
DG N10T- DG O10T- DG P10T- DG Q10T-	10	10/12 15/18 25/30 40/48	1.5 2.2 3.7 5.5	27	Simultaneous Cutoff Individual Cutoff	200 to 2000
DG O13T- DG P13T- DG Q13T- DG R13T-	13	10/12 20/24 30/36 40/48	2.2 3.7 5.5 7.5	35	Individual Cutoff	200 to 2000
DG O16T- DG P16T- DG Q16T- DG R16T-	16	8.3/10 15/18 25/30 35/42	2.2 3.7 5.5 7.5	44	Individual Cutoff	200 to 2000
DG O20T- DG P20T- DG Q20T- DG R20T-	20	7.5/9 12.5/15 19/23 25/30	2.2 3.7 5.5 7.5	54	Individual Cutoff	200 to 2000
DG P30T- DG Q30T- DG R30T- DG S30T-	30	8.3/10 12.5/15 16.6/20 25/30	3.7 5.5 7.5 11	120	Individual Cutoff	200 to 2000

Note 1: For the types with the * mark, the constant pressure stop feature is not recommended because it will cause shocks. At travel rates above 60 mm/sec. the constant pressure stop feature requires shock dampers to be installed. For more information contact Duff-Norton.

Note 2: For a motor cylinder, with low frequency service, with a thrust of 2 tons or less required, our B series models are the most economical.

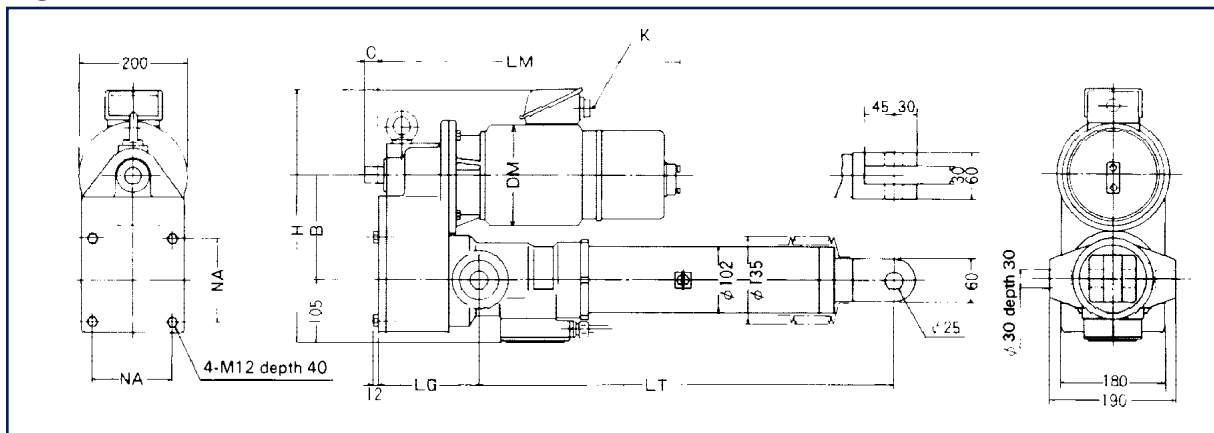
Description of Model Number



† M-0.75Kw, N-1.5Kw, O-2.2Kw, P-3.7Kw, Q-5.5Kw, R-7.5Kw, S-11Kw, T-15Kw

Dimensions

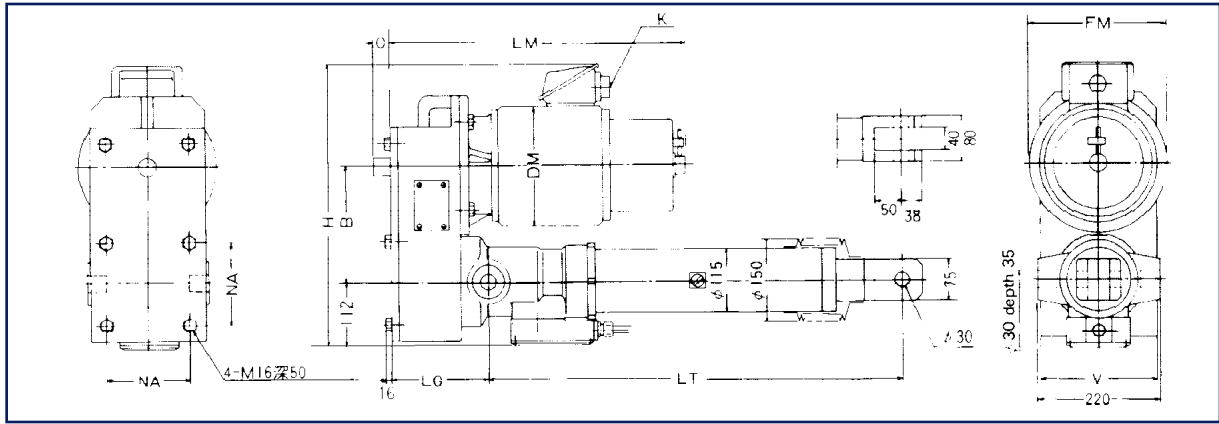
DG2T



Model Number	Speed mm/sec 50/60 Hz	Motor kw	B	DM	LM	C	NA	LG	H	K
DGM2T	25/30	0.75	163	142	446	45	140	139	408	PF 1/2
DGN2T	60/72	1.5	163	172	481	45	140	139	456	PF 3/4

Stroke mm	Without Bellows		With Bellows		Approx. Weight (kg)	
	Type	LT	Type	LT	DGM2T	DGN2T
300	—3	690	—3J	690	70	82
500	—5	890	—5J	957	75	87
700	—7	1120	—7J	1223	80	92
1000	—10	1420	—10J	1606	92	104
1500	—15	1920	—15J	2225	98	110

DG4T



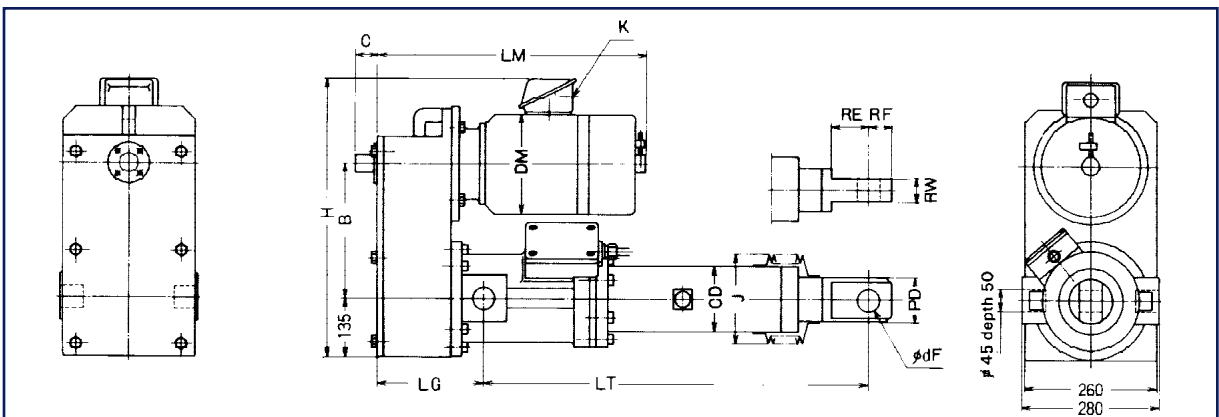
Basic Dimensions

Model Number	Speed mm/sec 50/60 Hz	Motor kw	V	B	DM	LM	FM	C	NA	LG	H	K
DGM4T	12.5/15	0.75	185	179	142	463	200	25	140	173	431	PF 1/2
DGN4T	25/30	1.5	185	179	172	498	200	25	140	173	479	PF 3/4
DGO4T	42/50	2.2	210	209	210	530	250	50	160	175	518	PF 1
DGP4T	60/72	3.7	210	209	245	590	250	50	160	175	536	PF 1

Stroke Dimensions

Stroke mm	Without Bellows		With Bellows		Approx. Weight (kg)			
	Type	LT	Type	LT	DGM4T	DGN4T	DGO4T	DGP4T
300	—3	760	—3J	760	90	109	125	136
500	—5	960	—5J	1027	98	117	133	144
700	—7	1200	—7J	1303	108	127	143	154
1000	—10	1500	—10J	1686	119	138	154	165
1500	—15	2000	—15J	2305	138	157	173	184

DG6T



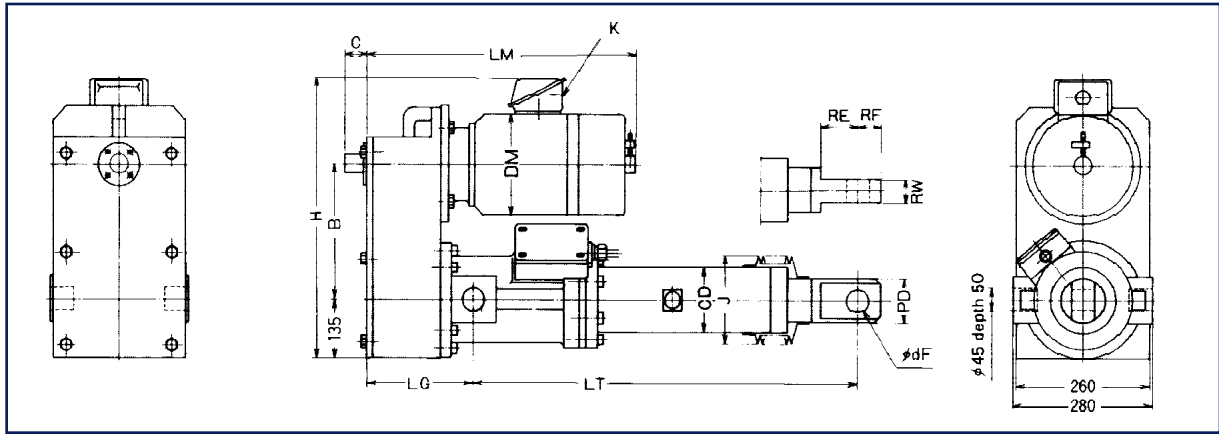
Basic Dimensions

Model Number	Speed mm/sec 50/60 Hz	Motor kw	B	DM	LM	C	LG	H	K
DGN6T	15/18	1.5	291	172	530	50	225	614	PF 3/4
DGO6T	25/30	2.2	231	210	540	50	205	563	PF 1
DGP6T	45/54	3.7	231	245	600	50	205	581	PF 1

Stroke Dimensions

Stroke mm	Without Bellows		With Bellows			CD	PD	dF	RW	RE	RF	Approx. Weight (kg)		
	Type	LT	Type	LT	J							DGN6T	DGO6T	DGP6T
300	—3	860	—3J	860	150	115	75	35	40	65	38	192	194	219
500	—5	1060	—5J	1127								199	202	27
1000	—10	1600	—10J	1786								221	223	248
1500	—15	2295	—15J	2595	230	180	110	50	70	120	55	265	267	292
2000	—20	2795	—20J	3195								294	296	321

DG8T



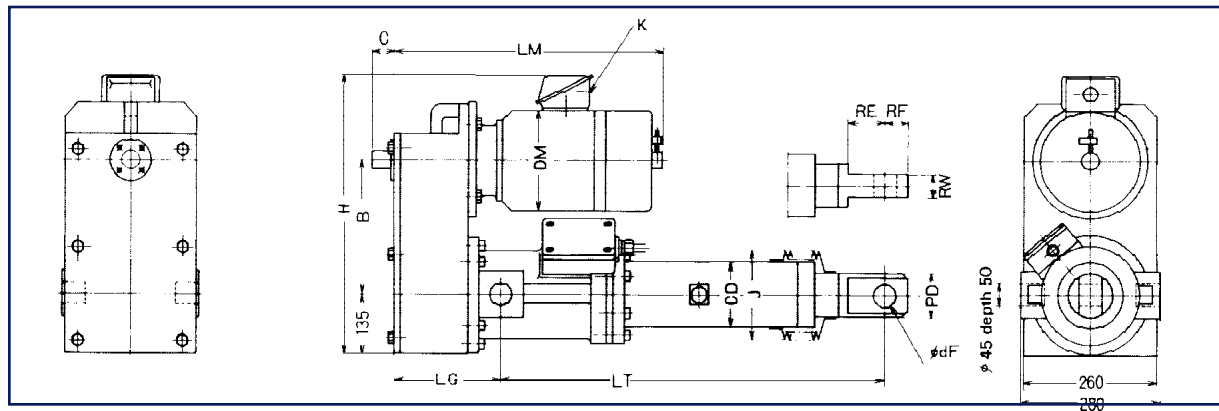
Basic Dimensions

Model Number	Speed mm/sec 50/60 Hz	Motor kw	B	DM	LM	C	LG	H		K	
								Indoors	Outdoors	Indoors	Outdoors
DGN8T	12.5/15	1.5	291	172	530	50	225	614	614	PF 3/4	PF 3/4
DGO8T	20/24	2.2	231	210	540	50	205	563	563	PF 1	PF 1
DGP8T	30/36	3.7	231	245	600	50	205	581	581	PF 1	PF 1
DGQ8T	50/60	5.5	291	310	702	50	225	686	686	33	PF 1 1/4

Stroke Dimensions

Stroke mm	Without Bellows		With Bellows			CD	PD	dF	RW	RE	RF	Approx. Weight (kg)			
	Type	LT	Type	LT	J							DGN8T	DGO8T	DGP8T	DGQ8T
300	-3	880	-3J	880	185	140	95	45	50	90	50	200	202	227	249
500	-5	1080	-5J	1142								210	212	237	259
1000	-10	1620	-10J	1801								238	240	265	287
1500	-15	2295	-15J	2595	230	180	110	50	70	120	55	265	267	292	314
2000	-20	2795	-20J	3195								406	408	433	455

DG10T



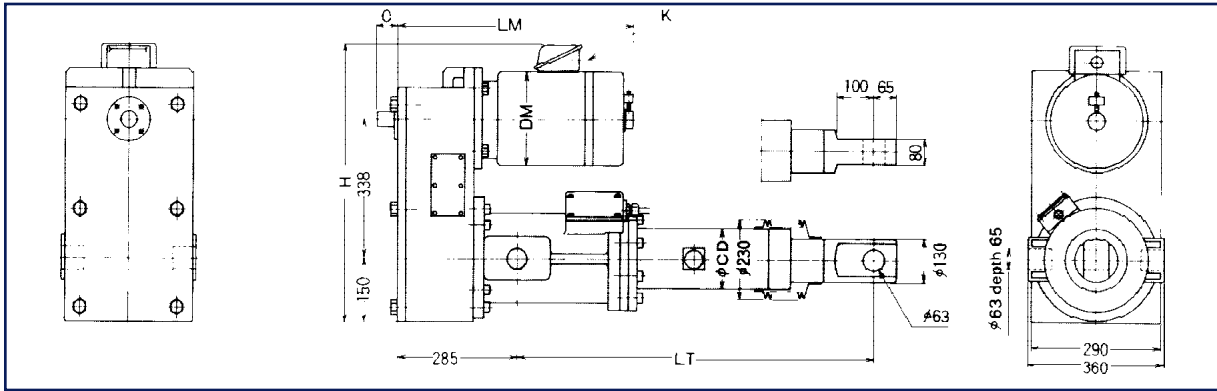
Basic Dimensions

Model Number	Speed mm/sec 50/60 Hz	Motor kw	B	DM	LM	C	LG	H		K	
								Indoors	Outdoors	Indoors	Outdoors
DGN10T	10/12	1.5	291	172	530	50	225	614	614	PF 3/4	PF 3/4
DGO10T	15/18	2.2	231	210	540	50	205	563	563	PF 1	PF 1
DGP10T	25/30	3.7	231	245	600	50	205	581	581	PF 1	PF 1
DGQ10T	40/48	5.5	291	310	702	50	225	625	625	33	PF 1 1/4

Stroke Dimensions

Stroke mm	Without Bellows		With Bellows			CD	PD	dF	RW	RE	RF	Approx. Weight (kg)			
	Type	LT	Type	LT	J							DGN10T	DGO10T	DGP10T	DGQ10T
300	-3	880	-3J	880	185	140	95	45	50	90	50	200	216	227	249
500	-5	1080	-5J	1142								210	226	237	259
1000	-10	1620	-10J	1801								238	254	265	287
1500	-15	2295	-15J	2595	230	180	110	50	70	120	55	265	281	292	314
2000	-20	2795	-20J	3195								406	422	433	455

DG13T



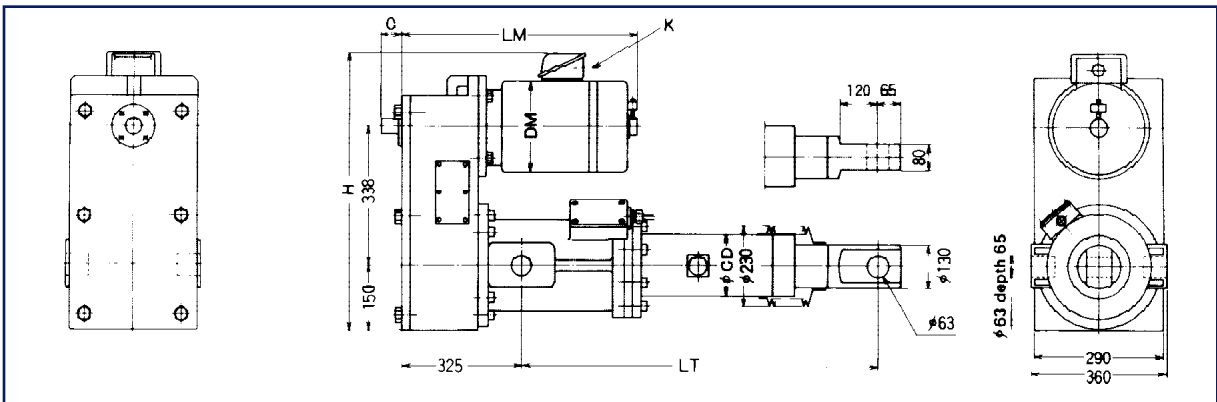
Basic Dimensions

Model Number	Speed mm/sec 50/60 Hz	Motor kw	DM	LM	C	H		K	
						Indoors	Outdoors	Indoors	Outdoors
DGO13T	10/12	2.2	210	570	55	685	685	PF 1	PF 1
DGP13T	20/24	3.7	245	630	55	703	703	PF 1	PF 1
DGQ13T	30/36	5.5	310	712	55	682	768	33	PF 1 1/4
DGR13T	40/48	7.5	310	725	55	682	768	33	PF 1 1/4

Stroke Dimensions

Stroke mm	Without Bellows		With Bellows		CD	Approx. Weight (kg)			
	Type	LT	Type	LT		DGO13T	DGP13T	DGQ13T	DGR13T
300	—3	1005	—3J	1005	180	379	404	412	415
500	—5	1205	—5J	1267		399	424	432	435
1000	—10	1745	—10J	1926		452	477	485	488
1500	—15	2270	—15J	2570		504	529	537	540
2000	—20	2843	—20J	3243	190	559	584	592	595

DG16T



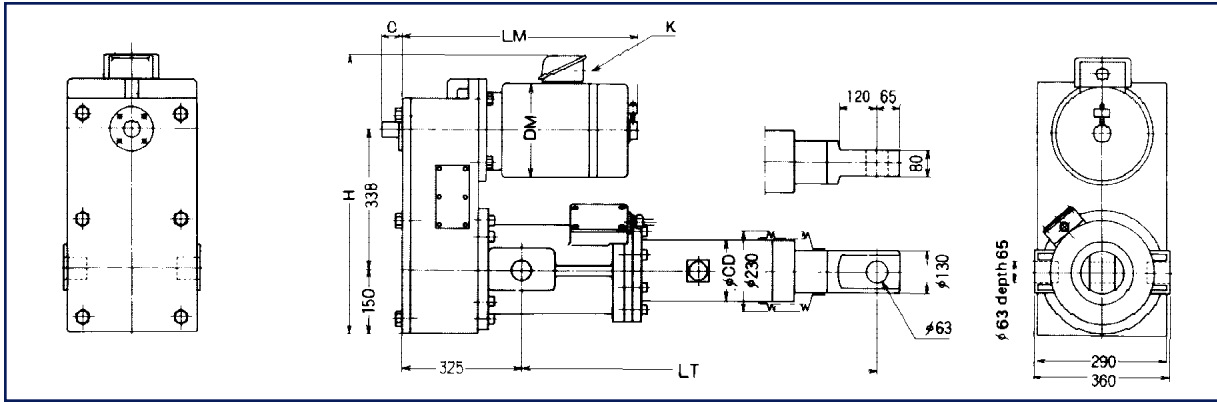
Basic Dimensions

Model Number	Speed mm/sec 50/60 Hz	Motor kw	DM	LM	C	H		K	
						Indoors	Outdoors	Indoors	Outdoors
DGO16T	8.3/10	2.2	210	570	55	685	685	PF 1	PF 1
DGP16T	15/18	3.7	245	630	55	703	703	PF 1	PF 1
DGQ16T	25/30	5.5	310	712	55	682	768	33	PF 1 1/4
DGR16T	35/42	7.5	310	725	55	682	768	33	PF 1 1/4

Stroke Dimensions

Stroke mm	Without Bellows		With Bellows		CD	Approx. Weight (kg)			
	Type	LT	Type	LT		DGO16T	DGP16T	DGQ16T	DGR16T
300	—3	1005	—3J	1005	180	379	404	412	415
500	—5	1205	—5J	1267		399	424	432	435
1000	—10	1745	—10J	1926		452	477	485	488
1500	—15	2270	—15J	2570		504	529	537	540
2000	—20	2843	—20J	3243	190	559	584	592	595

DG20T



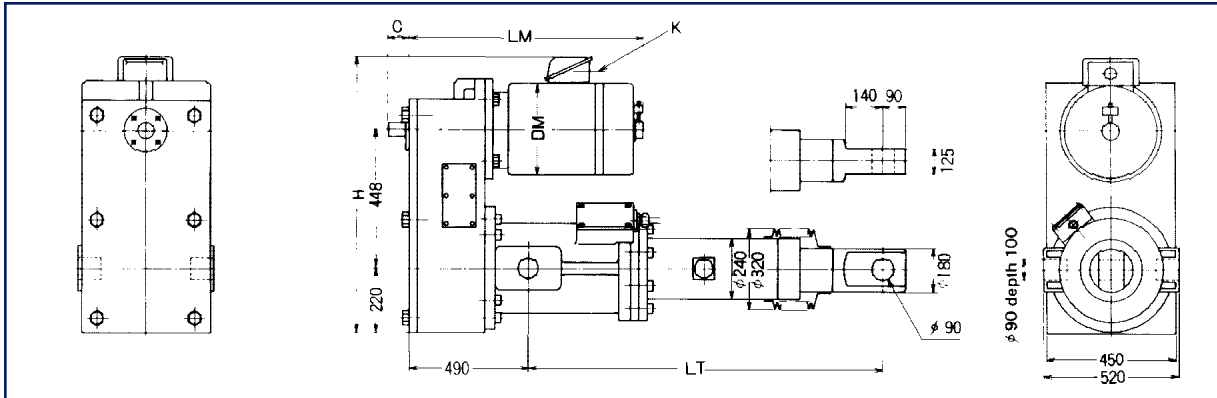
Basic Dimensions

Model Number	Speed mm/sec 50/60 Hz	Motor kw	DM	LM	C	H		K	
						Indoors	Outdoors	Indoors	Outdoors
DGO20T	7.5/9	2.2	210	570	60	685	685	PF 1	PF 1
DGP20T	12.5/15	3.7	245	630	60	703	703	PF 1	PF 1
DGQ20T	19/23	5.5	310	712	60	682	768	33	PF 1 1/4
DGR20T	25/30	7.5	310	725	60	682	768	33	PF 1 1/4

Stroke Dimensions

Stroke mm	Without Bellows		With Bellows		CD	Approx. Weight (kg)			
	Type	LT	Type	LT		DGO20T	DGP20T	DGQ20T	DGR20T
300	-3	1102	-3J	1102	180	554	579	587	590
500	-5	1302	-5J	1364		574	599	607	610
1000	-10	1842	-10J	2023		628	653	660	663
1500	-15	2355	-15J	2665	190	692	717	725	728
2000	-20	2855	-20J	3255		750	775	783	786

DG30T



Basic Dimensions

Model Number	Speed mm/sec 50/60 Hz	Motor kw	DM	LM	C	H		K	
						Indoors	Outdoors	Indoors	Outdoors
DGP30T	8.3/10	3.7	245	705	60	837	883	PF 1	PF 1
DGQ30T	12.5/15	5.5	310	745	60	867	928	33	PF 1 1/4
DGR30T	16.6/20	7.5	310	785	60	867	928	33	PF 1 1/4
DGS30T	25/30	11	320	855	60	913	948	33	PF 1 1/4

Stroke Dimensions

Stroke mm	Without Bellows		With Bellows		DGP30T	DGQ30T	DGR30T	DGS30T
	Type	LT	Type	LT				
300	-3	1275	-3J	1275	1016	1024	1027	1076
500	-5	1475	-5J	1537	1059	1067	1070	1119
1000	-10	2015	-10J	2196	1164	1172	1175	1224
1500	-15	2540	-15J	2840	1265	1273	1276	1325
2000	-20	3090	-20J	3490	1387	1395	1398	1447

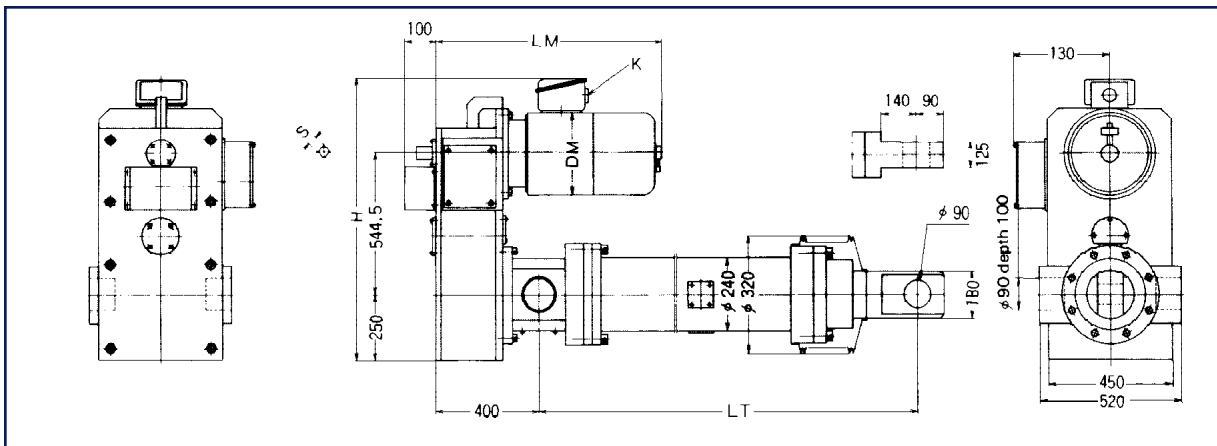
NZ Model Large-Size Standard Types

This series has a power limiter as a safety device which was specially developed for large size motor cylinders. Ball screws allow for greater thrust and special thrust bearings assure high reliability.

Model Number	Capacity (ton)	Nominal Speed 50/60/ Hz mm/sec	Motor Output kw	Rod Rotational Torque kg-m	Brake System	Standard Stroke
NZO30T NZP30T NQ30T NZR30T	30	8.3/10 12.5/15 16.6/20 25/30	2.2 3.7 5.5 7.5	120	Individual Cutoff	200 to 2000
NZQ50T NZR50T NS50T NZT50T	50	7.5/9 10/12 15/18 22/25	5.5 7.5 11 15	280	Individual Cutoff	200 to 2000

Note 1: All the models in this series require shock dampers for the constant pressure stop feature.

NZ30T



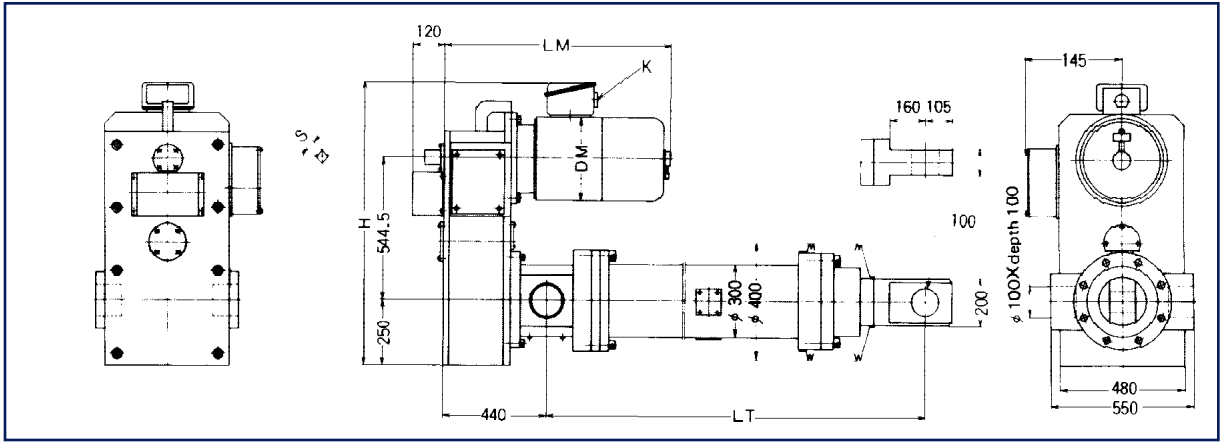
Basic Dimensions

Model Number	Speed mm/sec 50/60 Hz	Motor kw	DM	LM	S	H		K	
						Indoors	Outdoors	Indoors	Outdoors
NZP30T	8.3/10	3.7	245	725	14	964	1010	PF 1	PF 1
NZQ30T	12.5/15	5.5	280	765	14	96	1055	33	PF 1 1/4
NZR30T	16.6/20	7.5	280	805	19	964	1055	33	PF 1 1/4
NZS30T	25/30	11	320	875	19	1040	1075	33	PF 1 1/4

Stroke Dimensions

Stroke mm	Without Bellows		With Bellows		Approx. Weight (kg)			
	Type	LT	Type	LT	NZP30T	NZQ30T	NZR30T	NZS30T
300	—3	1085	—3J	1085	916	924	927	976
500	—5	1285	—5J	1347	959	967	970	1019
1000	—10	1785	—10J	1966	1066	1074	1077	1126
1500	—15	2335	—15J	2635	1184	1192	1195	1244
2000	—20	2835	—20J	3235	1290	1298	1301	1350

NZ50T



Basic Dimensions

Model Number	Speed mm/sec 50/60 Hz	Motor kw	DM	LM	S	H		K	
						Indoors	Outdoors	Indoors	Outdoors
						NZQ50T	7.5/9	5.5	280
NZR50T	10/12	7.5	280	825	19	994	1055	33	PF 1 1/4
NZS50T	15/18	11	320	895	19	1040	1075	33	PF 1 1/4
NZT50T	22/25	15	320	935	19	1040	1075	33	PF 1 1/4

Stroke Dimensions

Stroke mm	Without Bellows		With Bellows		Approx. Weight (kg)			
	Type	LT	Type	LT	NZQ50T	NZR50T	NZS50T	NZT50T
300	—3	1275	—3J	1275	1159	1162	1211	1261
500	—5	1475	—5J	1537	1207	1210	1249	1299
1000	—10	1975	—10J	2156	1327	1330	1379	1429
1500	—15	2525	—15J	2825	1465	1468	1517	1567
2000	—20	3025	—20J	3425	1584	1587	1637	1686

Manual Operations

To manually operate the motor cylinder, release the motor brake and turn the manual rotation shaft of the reduction gear using an adjustable wrench or socket wrench. Be sure to remove any load before releasing the brake.

Rod Rotational Torque

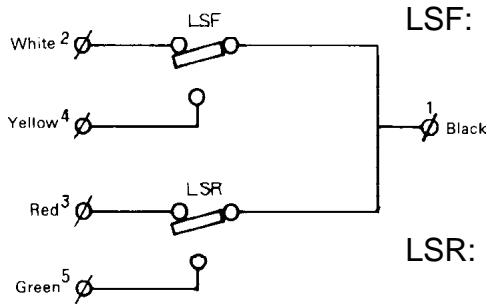
When the piston rod travels forward or reverse it generates rotational torque. Install a device to prevent rotational torque on the mating machine side. The rotational torque for each model number is listed in the model table.

Maintenance

The motor cylinders have been lubricated with grease at the factory so under normal operation no lubrication is required for the first year. In case of high frequency use, lubricate with grease every two to three months.

Wiring

For DG models be sure to wire the limit switch for the thrust limiter into the operating circuit. For the NZ models be sure to wire the limit switch for the power limiter into the operating circuit.



LSF: Terminals 1-2

Normally ON, but goes OFF if an overload occurs when the piston rod is being extended. (When the piston rod is continuously pushed at the fully extended position of the stroke.)

Terminals 1-4

The function is the opposite of the one explained above. (Used to confirm the signals)

LSR: Terminals 1-3

Normally ON, but goes OFF if an overload is being retracted. (When the piston rod is continuously pulled at the fully retracted position of the stroke.)

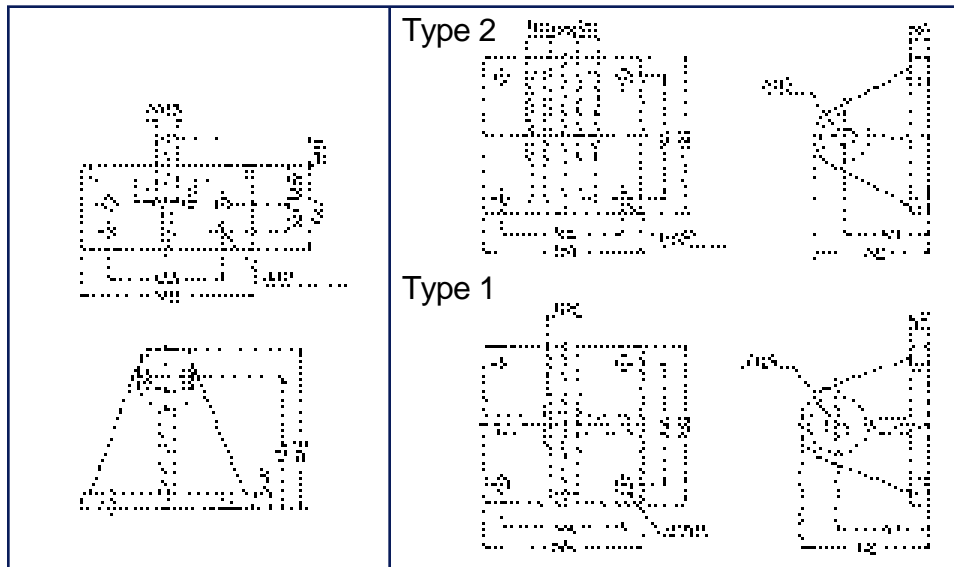
Terminals 1-5

The functioning is the opposite of the one explained above. (Used to confirm the signals.)

Trunnion Mount (Optional)

Trunnion Mount

Clevis Mount



Model	Trunnion											Clevis									Type
	MA	MB	MP	MU	MWMV	MR	MS	MH	ME	MF	NA	NB	NP	NU	NE	NS	NH	NE	NF		
MG M 2T	160	220	18	120	70	/	30	30	180	215	15	140	185	14	20	40	20	70	105	20	2
DG N 2T	160	220	18	120	70	/	30	30	180	215	15	140	185	14	20	40	20	70	105	20	
*DG M.N 4T	200	280	22	150	100	/	35	30	200	235	19	140	185	18	20	40	30	70	105	20	
DG O.P 4T	200	280	22	150	100	/	35	30	200	235	19	160	215	18	/	40	30	70	105	20	1
DG 6T	260	340	27	185	75	80	50	45	280	335	25										
DG 8T	260	340	27	185	75	80	50	45	280	335	25										
DG 10T	260	340	27	185	75	80	50	45	280	335	25										
DG 13T	320	400	33	200	80	90	65	63	280	350	30										
DG 16T	320	400	33	200	80	90	65	63	280	350	30										

* DGM 4T=15

For NZ Series trunnion mount contact Duff-Norton for information depending on selected model.

PowerMaster

Motor Cylinders



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