SETCO • MASTER • WHITNON

SETCO

Precision Heavy Duty Linear Recirculating Ball Slides

Catalog 594-A

LBL Series

INDEX

METRIC TO IMPERIAL UNITS

1 kW	= 1.341 hp	1mm	= .0394 in.	1 kg	= 2.205 lbs
1 kg m^2	= 8.842 in. lbs sec^2	1 N/μm	= 5710 lbs/in.	1 N m	= 8.851 in. lbs
1 N	= .2248 lbs	1 cc	= .0610 cu. in.	1 bar	= 14.70 psi
1 kW	= 3412 BTU/hr	1 l/m	= .2642 gal/min		

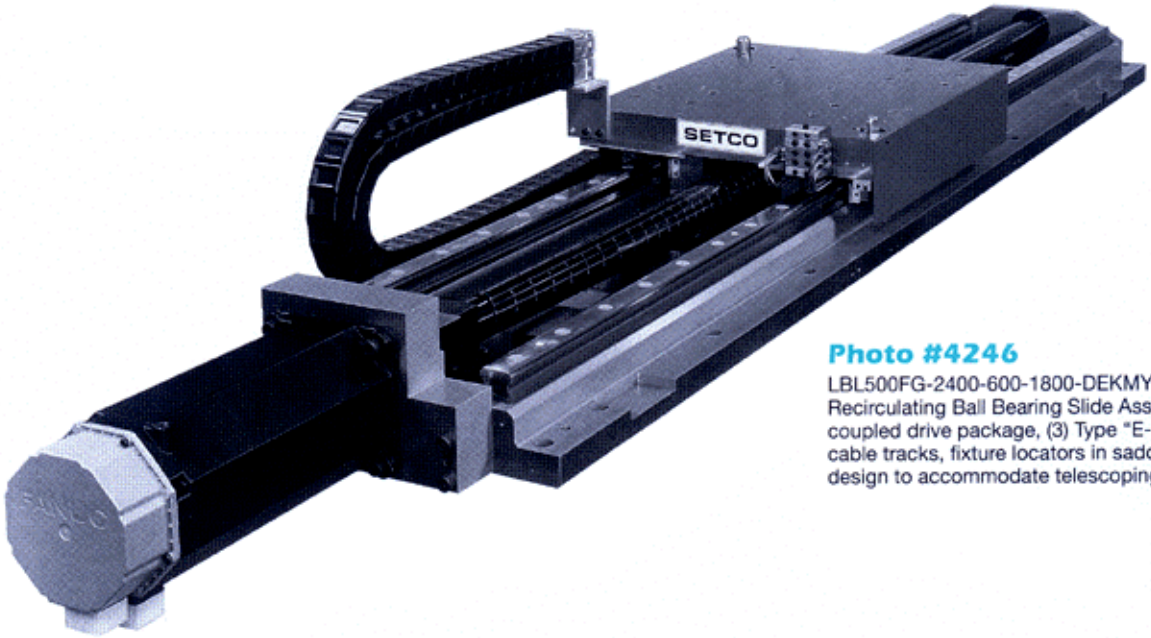


Photo #4246
LBL500FG-2400-600-1800-DEKMY Linear Type "M-1" Recirculating Ball Bearing Slide Assembly, direct coupled drive package, (3) Type "E-B" limit switches, cable tracks, fixture locators in saddle, and special design to accommodate telescoping ball screw covers.

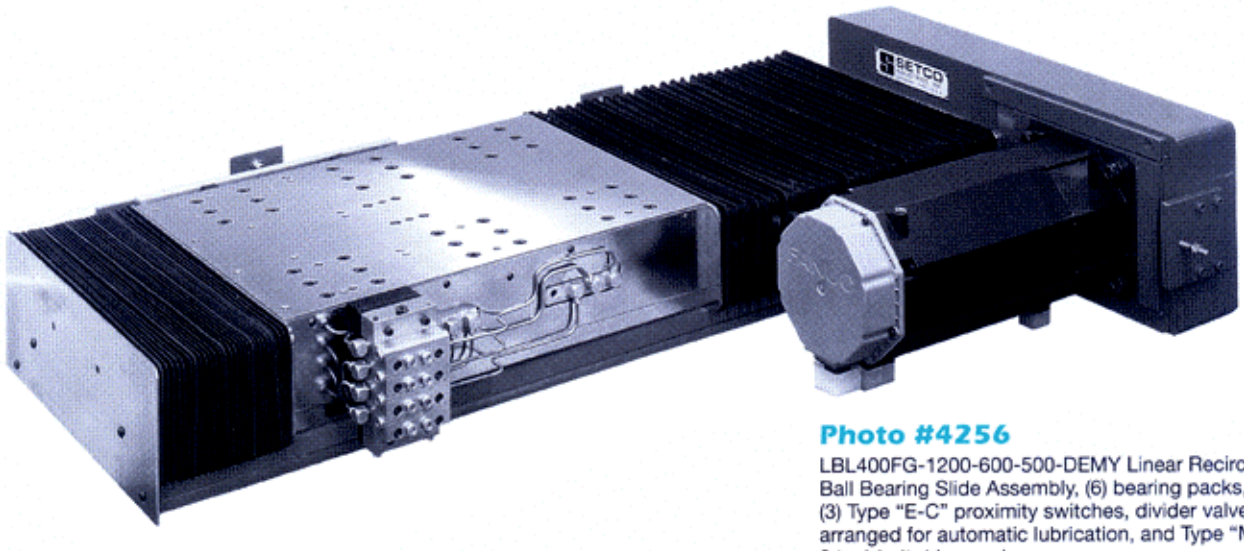


Photo #4256
LBL400FG-1200-600-500-DEMY Linear Recirculating Ball Bearing Slide Assembly, (6) bearing packs, (3) Type "E-C" proximity switches, divider valve, arranged for automatic lubrication, and Type "M-2" 2 to 1 belt drive package.

Order Information

The 'LBL' Linear Recirculating Ball Bearing Series Slide is designed for low friction linear movement of heavy loads and moments. Its unique design provides high rigidity and stability in a compact assembly. These custom slides are available in 200mm, 300mm, 400mm, 500mm, 600mm, and 800mm widths and are machined to the exact lengths you require.

The basic 'LBL' Series Slide consists of four bearing units mounted to a saddle tracking on two parallel rails which are mounted to a base. The saddle is manufactured from ground steel plate and stress relieved. The base is manufactured from 40,000 psi tensile gray iron. The 'LBL' Series slide comes standard with **accordion protectors, side protector plates, bearing seals, and basic lubrication system arrangement**. The 'LBL' Series allows you the option of supplying your own method of actuation, or using one of the feed packages offered by SETCO. Ballscrews, various motor drive packages, and cylinders are described on the following pages.

Protectors, switches, lubrication, and various accessories are offered to complete this slide. If the packages offered do not fit your exact requirements, allow us to design and supply one that will.

Slide Type Description

LBL	200	FG	600	400	150	DEMY
Linear Recirculating Ball Bearing	Slide Width		Base Length	Saddle Length	Travel	

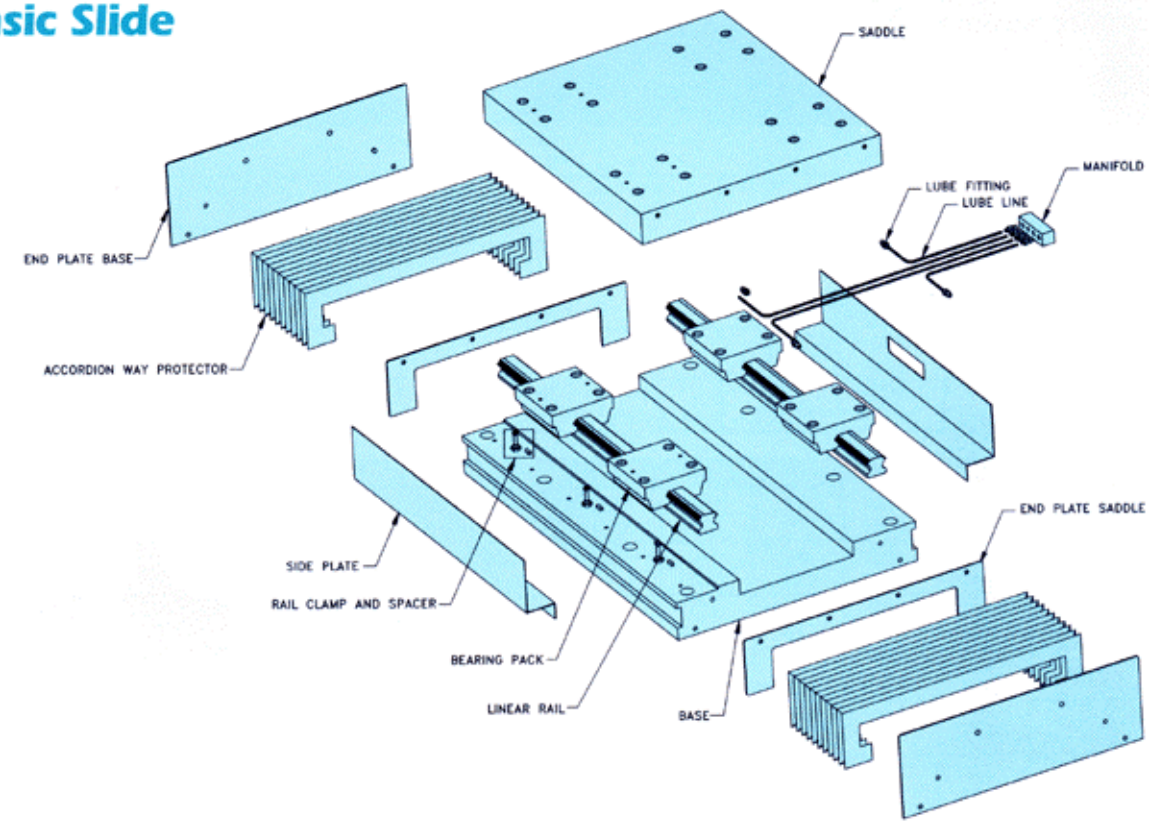
FEED MECHANISMS

A - Air Cylinder
1 - 250psi
H - Hydraulic Cylinder
1 - 500psi
2 - 3000psi
FG - Ground Ballscrew (Preloaded Nut)
(Type-1 & Type-2)

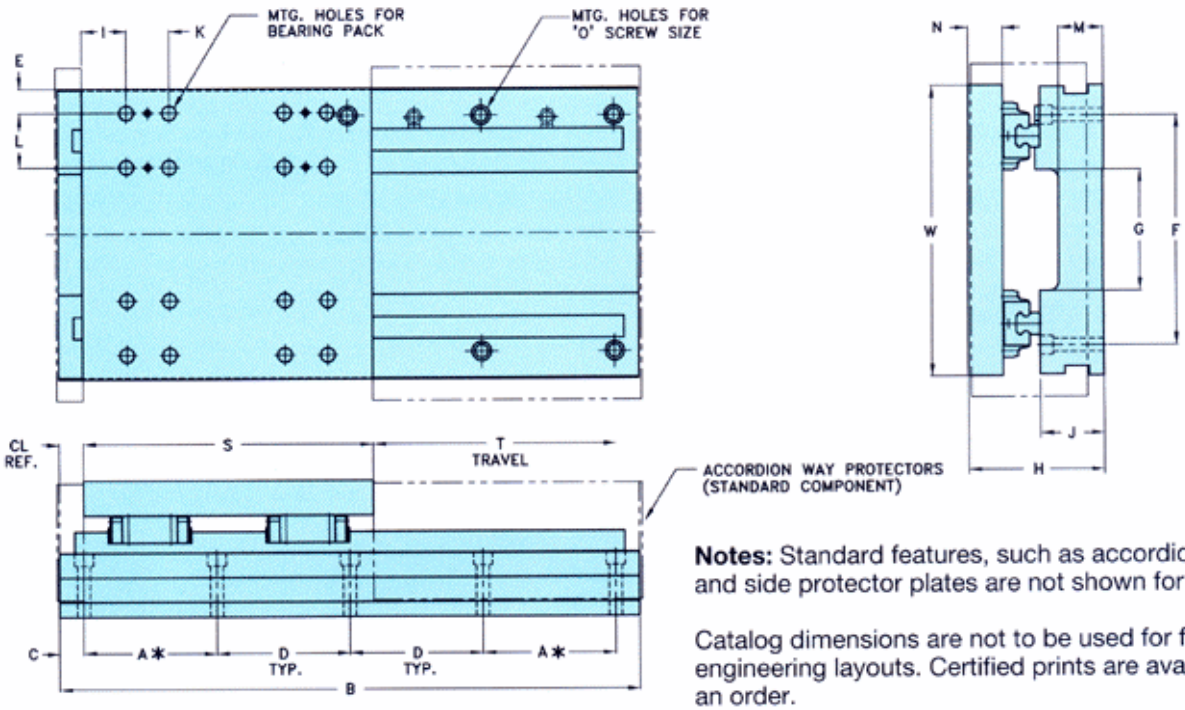
ACCESSORIES

C - Metal Way Covers
D - Drilling, Tapping, Reaming
E - Limit Switches
Type-A
Type-B
Type-C
G - Metal Clad Protectors
K - Keyway
M - Motor Drive
1 - Direct Drive
2 - Belt Drive
Q - Positive Stop
S - Divider Valve
Y - All Others and or Modification

Basic Slide



Dimensional Data



Notes: Standard features, such as accordion protectors and side protector plates are not shown for clarity.

Catalog dimensions are not to be used for final engineering layouts. Certified prints are available with an order.

Formula: A* = (B - 2C ÷ D) -1) D) - (B - 2C) ÷ 2
Example: B = 1500mm, (B - 2C ÷ D) = NEAREST INTEGER DOWN
A* = (1500 - 50 ÷ 300) = 4 - 1 x 300 = 1450 - 900 ÷ 2 = 275

TYPE	WIDTH 'W' mm inch	HEIGHT 'H' mm inch	SADDLE 'S' 50mm (2 inch) INCREMENTS mm inch MIN.	SADDLE 'S' 50mm (2 inch) INCREMENTS mm inch MAX.	BASE 'B' 25mm (1 inch) INCREMENTS mm inch MIN.	BASE 'B' 25mm (1 inch) INCREMENTS mm inch MAX.	APPROXIMATE WEIGHT PER UNIT LENGTH kg/mm lbs./inch SADDLE	APPROXIMATE WEIGHT PER UNIT LENGTH kg/mm lbs./inch BASE	6 BEARING PACK ARRANGEMENT RECOMMENDED FOR SADDLE LENGTHS LONGER THAN mm inch
LBL200	200 7.874	100 3.937	200 7.874	500 19.685	200 7.874	1525 60.039	.047 2.6	.051 2.8	300 11.811
LBL300	300 11.811	140 5.512	300 11.811	750 29.528	300 11.811	1975 77.756	.082 4.6	.13 7.2	450 17.716
LBL400	400 15.748	165 6.496	400 15.748	1000 39.370	400 15.748	2950 116.142	.14 7.9	.18 10.0	600 23.622
LBL500	500 19.685	200 7.874	500 19.685	1250 49.213	500 19.685	2950 116.142	.24 13.2	.25 13.9	700 27.559
LBL600	600 23.622	255 10.039	600 23.622	1400 55.118	600 23.622	2950 116.142	.33 18.4	.42 23.5	800 31.496
LBL800	800 31.496	280 11.024	800 31.496	1500 59.055	800 31.496	3025 119.094	.47 26.3	.68 38.3	900 35.433

TYPE	UNIT	A	C	D	E	F	G	I	H	K	L	M	N	O
LBL200	mm inch	*	25 .984	300 11.811	19 .75	160 6.30	85 3.35	28 1.10	46 1.81	30 1.18	38 1.50	20 .79	30 1.18	M10 3/8
LBL300	mm inch	*	25 .984	300 11.811	25 .98	240 9.45	130 5.12	45 1.77	69 2.72	45 1.77	57 2.24	45 1.77	35 1.38	M12 1/2
LBL400	mm inch	*	25 .984	300 11.811	25 .98	340 13.39	190 7.48	65 2.56	72 2.83	62 2.44	82 3.23	50 1.97	45 1.77	M12 1/2
LBL500	mm inch	*	25 .984	300 11.811	35 1.38	430 16.93	240 9.45	75 2.95	80 3.15	80 3.15	100 3.94	55 2.17	60 2.36	M16 5/8
LBL600	mm inch	*	25 .984	300 11.811	35 1.38	500 19.69	290 11.42	75 2.95	125 4.92	80 3.15	100 3.94	65 2.56	70 2.76	M16 5/8
LBL800	mm inch	*	25 .984	300 11.811	47 1.85	700 27.56	215 8.46	95 3.74	135 5.31	95 3.74	116 4.57	70 2.76	75 2.95	M16 5/8

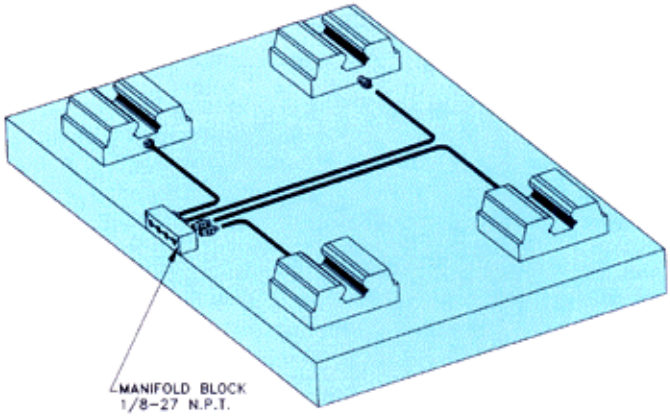
Lubrication

Lubrication Manifold and Piping (Standard)

For ease and convenience in the installation and maintenance of your lubrication system, SETCO provides a basic lubrication arrangement. This arrangement includes all fittings and piping necessary to connect to a central manifold block.

SETCO's manifold block has individual inlets for adapting to a divider valve.

SETCO engineers can design the layout of the piping and manifold in conjunction with other accessories being furnished, providing the best overall package design.



Note: SETCO recommends Mobil Vactra 2 oil or equivalent for standard "LBL" applications.
The standard arrangement or divider valve will also accept Lithium based grease with consistency of NLGI2.

Automatic Lubrication System

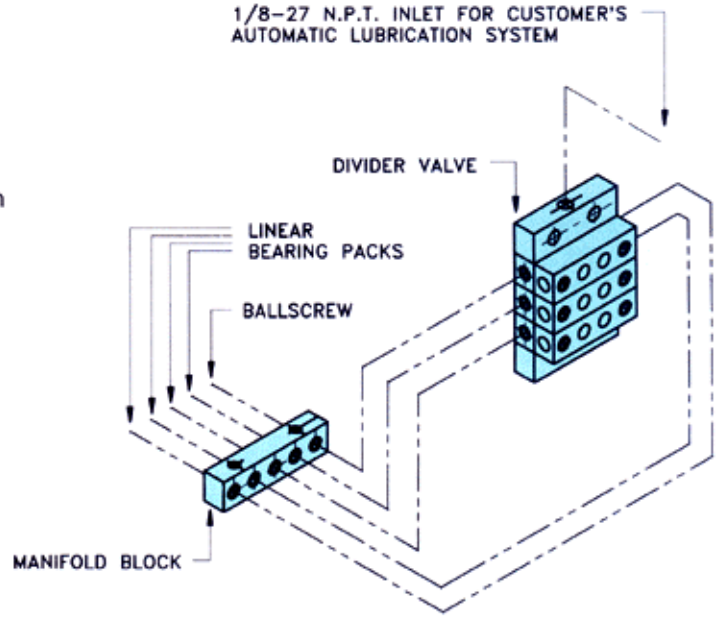
Designation "S"

For your automatic lubrication system, SETCO can provide and mount a divider valve that meters the correct amount of lubrication to each destination.

The divider valve provides you with one inlet, for convenience of connecting to your automatic lube system.

SETCO engineers can design an automatic lubrication system that includes a timer, reservoir, valves, divider valve, and necessary piping for a complete package.

LUBRICATION CHART	
LINEAR BEARING	BALLSCREW
1-3 CM^3 /HR./BRG.	1-3 CM^3 /HR.
.06-.18 IN^3/HR./BRG.	.06-.18 IN^3/HR.



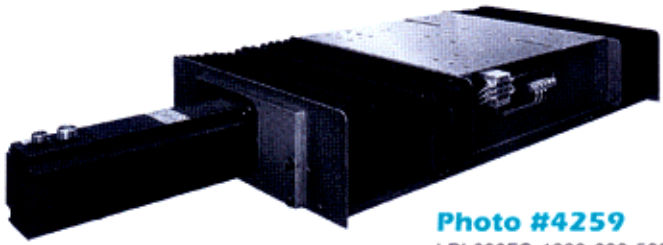


Photo #4259

LBL600FG-1200-600-500-DEKMOY Linear Slide Assembly, with "M-1" direct coupled motor drive package (3) Type "E-B" roller arm actuated limit switches, divider valve, drilling, and keyway in saddle.

Standard – Protectors

Accordion Protectors (Standard)

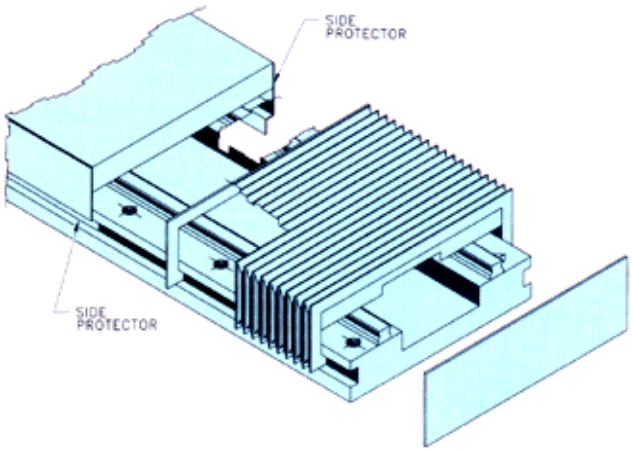
Accordion Protectors keep the bearing rails, feed mechanism and slide cavity free from abrasive material or fine chips. These covers are made of hypolon polyester and are standard for all 'LBL' Series Slides. When using accordion protectors, the travel length is reduced due to the 'stack up' of protectors at each end. As illustrated below for the 'LBL' Series Slides, the accordion protectors will extend beyond the sides of the slide ('OW' dimension), but not above the top of the saddle.

Since the 'LBL' Series Base and Saddle are available in any length you select, the actual travel with accordion protectors will vary accordingly. To determine this actual travel or the base length, use the formula:

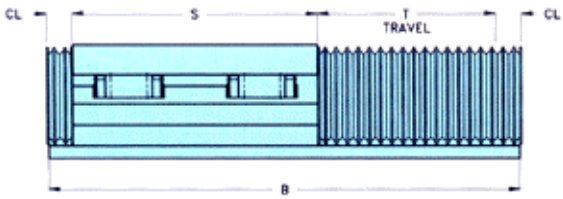
$B = (T \times MU) + 25mm + S$ Where B = Base length
S = Saddle length
T = Travel
MU = From chart

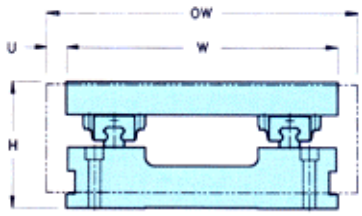
To determine the 'stack up' (CL dimension) of accordion protectors at each end of the slide, use the formula:

$$CL = \frac{B - S - T}{2}$$



The 'LBL' Series is designed to create a labyrinth between the base sides and the side plate/wrap around accordion protector combination. This provides additional protection from dirt and machining debris for the linear bearing units and ballscrew assembly.





Note: Bellows to mount to Linear bearing rails are available upon special request. Consult SETCO's Sales Team for information concerning special rail and base length.

TYPE	CL	UNIT	H	MU	OW	U	W
LBL200FG	$CL = \frac{B-S-T}{2}$	mm	100	1.35	242	21	200
		inch	3.937		9.53	.83	7.874
LBL300FG		mm	140	1.25	346	22	300
		inch	5.512		13.62	.86	11.811
LBL400FG		mm	165	1.20	454	26	400
		inch	6.496		17.87	1.02	15.748
LBL500FG		mm	200	1.13	578	37	500
		inch	7.874		22.76	1.46	19.685
LBL600FG		mm	255	1.12	692	41	600
		inch	10.039		27.24	1.61	23.622
LBL800FG		mm	280	1.12	906	46	800
		inch	11.024		35.67	1.81	31.496

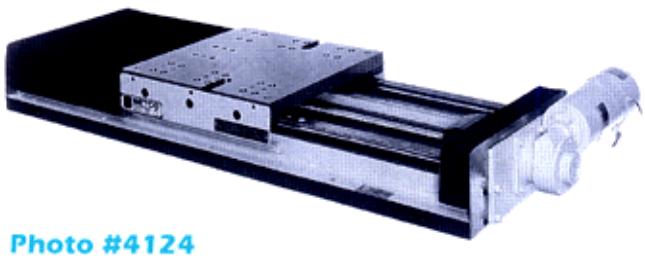


Photo #4124

LBL400FG-1200-400-700-DM-1Y Slide Assembly with three bearing packs per rail, precision ground ballscrew, driven by fractional horse-power DC gear motor. Slide equipped with accordion protectors, side plates, drilling in base and saddle.

Accessories – Covers

Metal Clad Way Covers

Designation "G"

Accordion Type covers with stainless steel plates, fastened over each convolution, protect against hot chips, weld splatter, and other abrasives.

Fixed style - Horizontal
Flexible style - Vertical

These covers are available in same widths as the standard Type "B" covers - reference "OW" dimensions on page 6.

Photo #4260

Metal Way Covers

Designation "C"

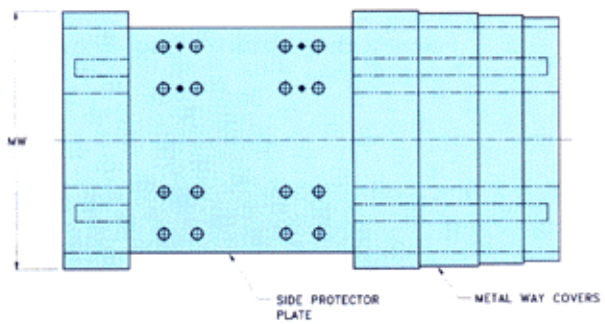
Telescoping metal way covers protect the bearing packs and feed mechanism of the slide from contaminants such as chips, dirt, glass and abrasive materials. The metal covers are manufactured of high quality steel, with molded wipers encasing each collapsible section for optimum protection.

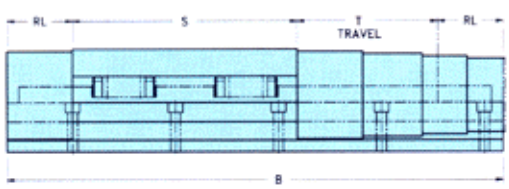
The base length of the slide must be increased to accommodate the mounting of metal way covers. To determine the required base length and allow for the desired amount of travel, use the formula:

B = S + T + (2 x RL) Where B = Base length
S = Saddle length
T = Travel
RL = From chart

Example: LBL300 requires 500mm travel and a saddle length of 350mm. To determine base length use the following formula:

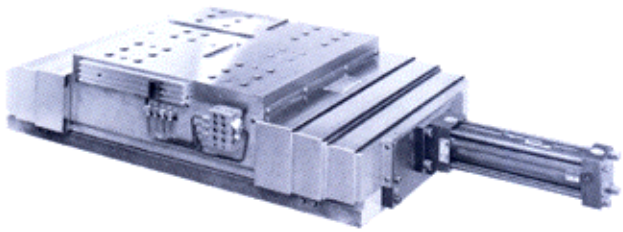
B = 500 + 350 + (2 x 140) B = 1130mm





SLIDE SIZE	TRAVEL (up to and including) mm inch	RETRACT LENGTH 'RL' mm inch	MAXIMUM WIDTH 'MW' mm inch
LBL200	500 19.69	130 5.12	290 11.42
LBL200	750 29.53	175 6.89	290 11.42
LBL200	1000 39.37	225 8.86	290 11.42
LBL300	500 19.69	130 5.12	390 15.35
LBL300	750 29.53	175 6.89	390 15.35
LBL300	1000 39.37	225 8.86	390 15.35
LBL300	1500 59.06	300 11.81	390 15.35
LBL400	675 26.57	150 5.91	515 20.28
LBL400	1125 44.29	200 7.87	515 20.28
LBL400	1575 62.0	250 9.84	515 20.28
LBL400	2250 88.58	325 12.80	515 20.28

SLIDE SIZE	TRAVEL (up to and including) mm inch	RETRACT LENGTH 'RL' mm inch	MAXIMUM WIDTH 'MW' mm inch
LBL500	675 26.57	150 5.91	625 24.61
LBL500	1125 44.29	200 7.87	625 24.61
LBL500	1575 62.0	250 9.84	625 24.61
LBL500	2250 88.58	325 12.80	625 24.61
LBL600	1000 39.37	200 7.87	715 28.15
LBL600	1400 55.12	250 9.84	715 28.15
LBL600	2000 78.74	325 12.80	715 28.15
LBL600	2800 110.24	425 16.73	715 28.15
LBL800	1000 39.37	200 7.87	925 36.42
LBL800	1400 55.12	250 9.84	925 36.42
LBL800	2000 78.74	325 12.80	925 36.42
LBL800	2800 110.24	425 16.73	925 36.42



Ballscrew Packages

Precision Ground Thread Ballscrew

Designation "FG"

This precision ground thread ballscrew with an integral preloaded ballnut is recommended for applications where positioning accuracy and repeatability are critical, backlash cannot be tolerated, and optimum stiffness and smooth linear motion are required. Most numerically controlled machines incorporate a precision ground thread ballscrew package.

The lead accuracy of the precision ground thread ballscrew is within .0127mm/300mm (.0005 in./ft.) cumulative with the integral preload ballnut providing zero backlash. The ballscrew is supported by high degree angular contact ball thrust bearings mounted in a bearing block that is inboard mounted in the cavity of the base.

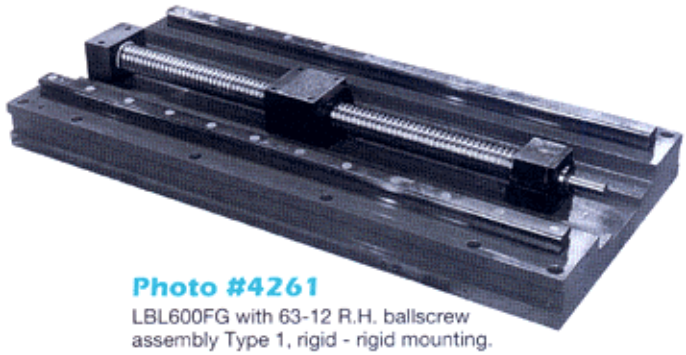
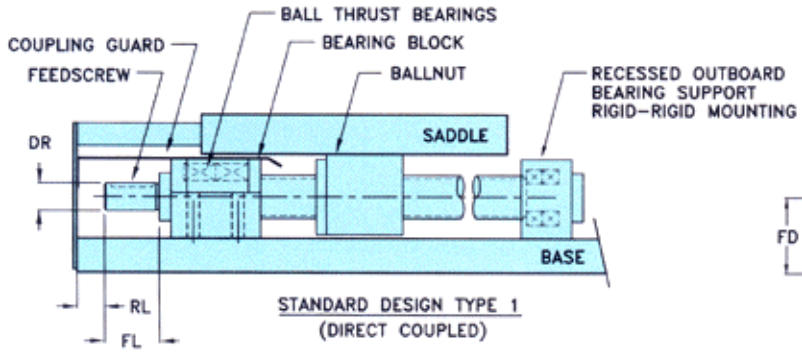
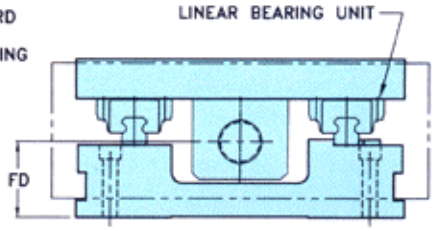
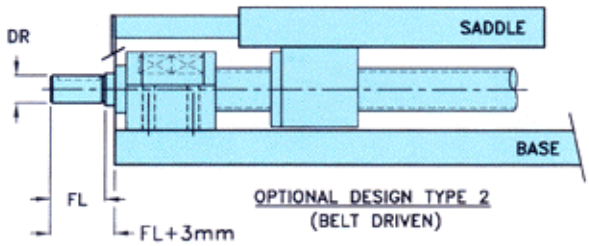


Photo #4261
LBL600FG with 63-12 R.H. ballscrew assembly Type 1, rigid - rigid mounting.







Notes: The standard type of bearing support arrangement for LBL Slides is rigid - rigid. This rigid - rigid arrangement provides for optimum speed, stiffness, and load capacity of the ballscrew.

For ballscrew lubrication specification see Page 5.

Notes: For vertical mounting of ballscrews, let our Engineers determine if a counter balance system is required.

Telescoping ballscrew covers are available by special request. Consult SETCO's Sales Team for application assistance.

TYPE	DR mm in	FD mm in	FL mm in	RL mm in	BALLSCREW (DIA. - LEAD) mm	MAXIMUM COUPLING DIAMETER
LBL200FG	12 .47	45 1.77	35 1.38	15 .59	25-5RH –	45 –
LBL300FG	12 .47	70 2.76	35 1.38	15 .59	25-5RH –	50 –
LBL400FG	25 .98	80 3.15	50 1.97	25 .98	40-10RH –	70 –
LBL500FG	25 .98	90 3.54	50 1.97	25 .98	40-10RH –	75 –
LBL600FG	35 1.38	115 4.53	70 2.76	25 .98	63-12RH –	80 –
LBL800FG	35 1.38	135 5.31	70 2.76	25 .98	63-12RH –	115 –

Motor Drive Packages

The 'LBL' Series Recirculating Ball Slide is available with two different drive packages to interface either a SETCO supplied or customer supplied motor to the ballscrew package. A 2:1 drive package is available to adapt 'C-face' mounted motors. A direct couple package to adapt either foot mounted or 'C-face' mounted motors.

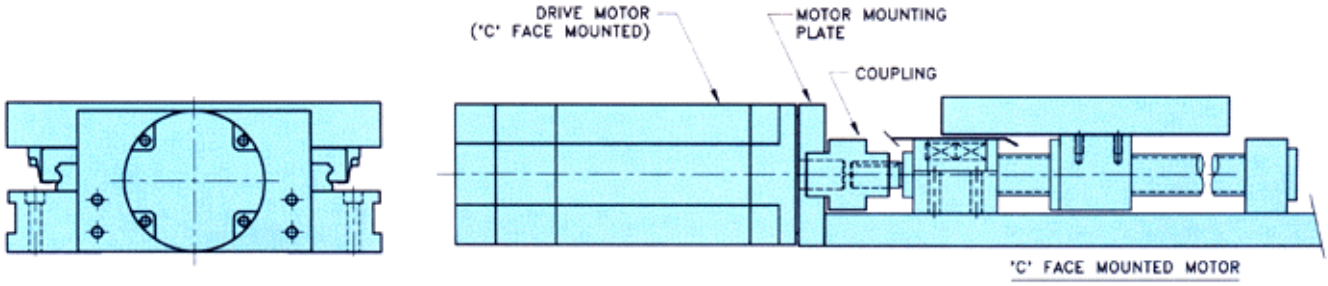
These packages are available to interface any standard drive package, servo motor drive, stepping motor drive, and single or variable speed AC/DC motor drives, or we can custom design for specific applications. Submit your specifications to assure proper slide and motor drive package selection.

Direct Coupled Package

Designation "M-1"

The direct coupled drive package is available to adapt 'C-face' mounted or foot mounted motors. This package allows for higher traverse rates and offers compactness in design. The package consists of a 'zero' backlash coupling and motor mounting plate.

Note: Since motor drives will vary per application, complete dimensions of drive package can only be supplied at final design.



Belt Drive Package

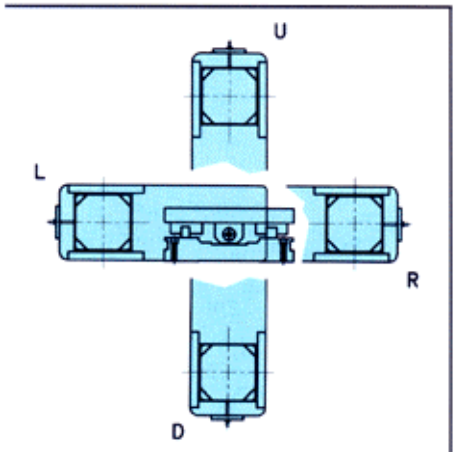
Designation "M-2"

The 2:1 belt drive package is available to adapt 'C-face' mounted motors. This package allows for the use of smaller, lower torque, and more economical motors. The package consists of a 2:1 timing belt drive, combination motor mounting plate for belt tensioning, and mounting of customers motor, if required.

Special timing belt ratios are available, consult factory.

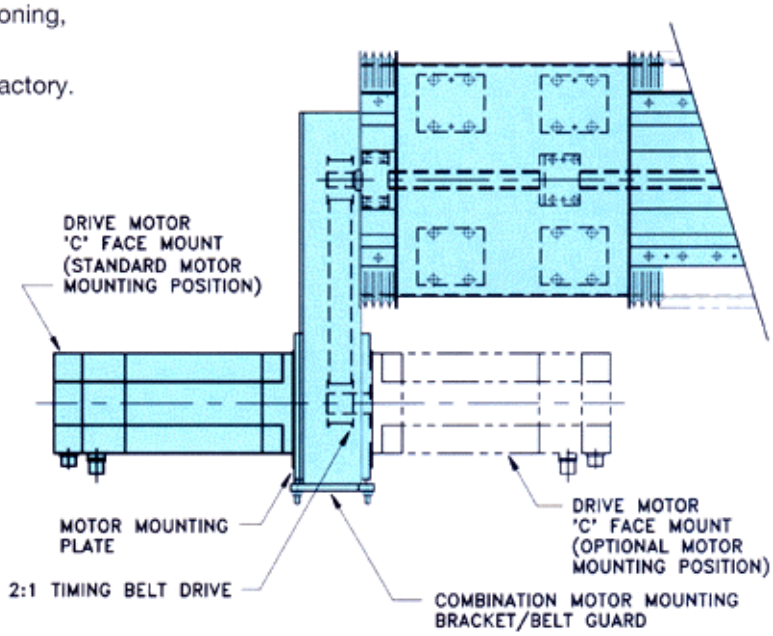
Page 9

Note: Belt drive package requires 'optional' Type #2 ballscrew design. (Ref. Page 8)



Motor can be mounted in any of the positions shown, viewing from drive end.

Designate "standard" or "optional" location.



Cylinder Packages

External Mounted Cylinders

Designation "H" (Hydraulic)

Designation "A" (Air)

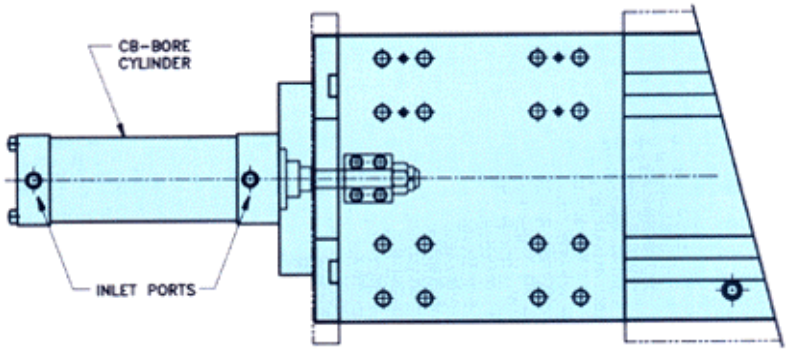
Note: Unless specified, inlet and outlet ports will be located at Position #1, and cushion adjustments will be at Position #4.

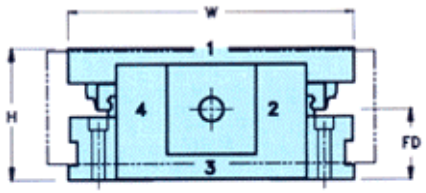
These slides are designed with either a hydraulic or air, medium pressure cylinder, arranged with cushioned cap end as standard.

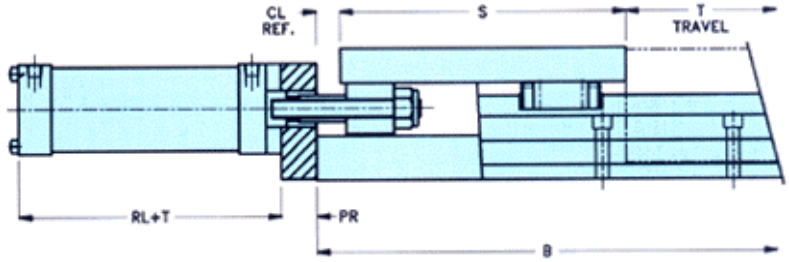
LBLH-1 Series = Externally mounted hydraulic cylinder rated at 500 psi.

LBLA-1 Series = Externally mounted air cylinder rated at 250 psi.

LBLH-2 Series = Externally mounted hydraulic cylinder rated at 3000 psi (optional).







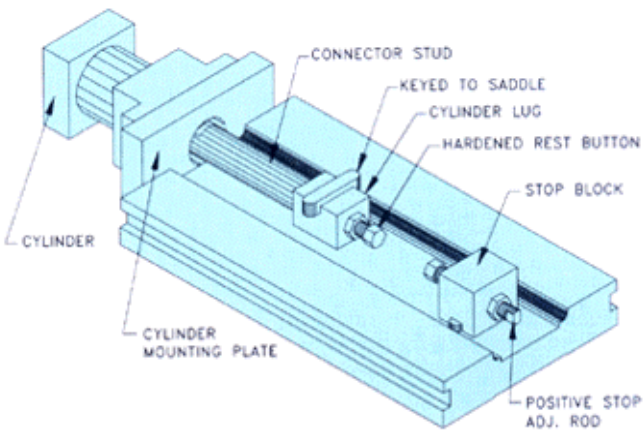
SLIDE TYPE	WIDTH 'W' mm inch	HEIGHT 'H' mm inch	SADDLE 'S' mm inch		BASE 'B' mm inch		CYLINDER mm inch			
			MIN.	MAX.	MIN.	MAX.	CB	FD	PR	RL
LBL200	200 7.874	100 3.937	200 7.874	500 19.685	200 7.874	1525 60.039	64 2.52	45 1.77	32 1.26	95 3.74
LBL300	300 11.811	140 5.512	300 11.811	750 29.528	300 11.811	1975 77.756	83 3.27	70 2.76	38 1.50	108 4.25
LBL400	400 15.748	165 6.496	400 15.748	1000 39.370	400 15.748	2950 116.142	102 4.02	80 3.15	44 1.73	108 4.25
LBL500	500 19.685	200 7.874	500 19.685	1250 49.213	500 19.685	2950 116.142	127 5.00	100 3.94	50 1.97	114 4.49
LBL600	600 23.622	255 10.039	600 23.622	1400 55.118	600 23.622	2950 116.142	152 5.98	115 4.53	50 1.97	127 5.00
LBL800	800 31.496	280 11.024	800 31.496	1500 59.055	800 31.496	3025 119.094	152 5.98	135 5.31	50 1.97	127 5.00

Positive Stop

Inline-Recessed Mounted

Designation "Q"

This positive stop is mounted in the cavity of the base between the linear rails and provides accurate stopping of the saddle in the forward direction only. Since the reaction force of this positive stop is colinear with that induced by the feed mechanism, the stop provides optimum positioning accuracy and repeatability.



Accessories – Sensing

Limit Switches

Available in 1-2-3-4 Limit Switch packages.

Designation "E-A"

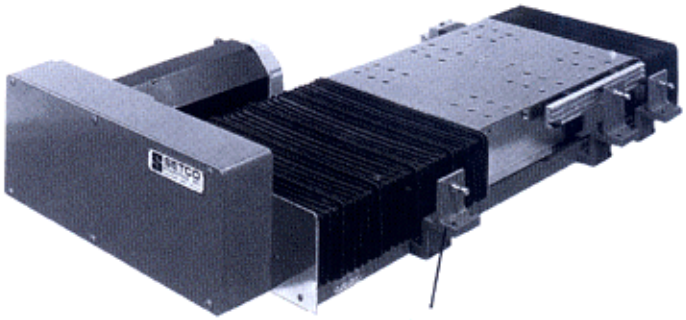
Plunger actuated Electro-Mechanical Type A with adjustable trip pawls 240 volt AC - N.O./N.C. contacts NEMA 4-13 oil and water tight rating 1/2 N.P.T. for O-ring conduit connection.

Designation "E-B"

Roller arm actuated Electro-Mechanical Type B with adjustable trip pawls 240 volt AC - N.O./N.C. contacts NEMA-13 oil and water tight rating 1/2 N.P.T. for O-ring conduit connection.

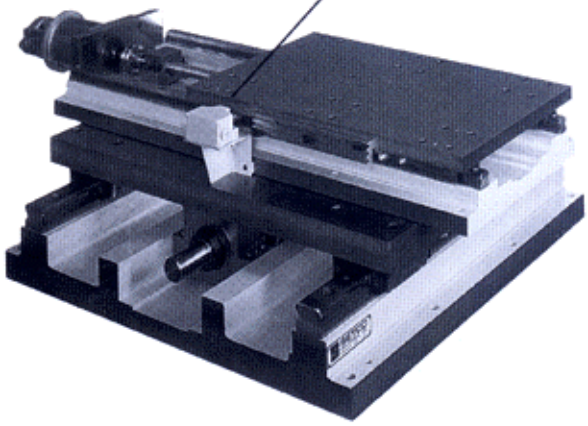
Designation "E-C"

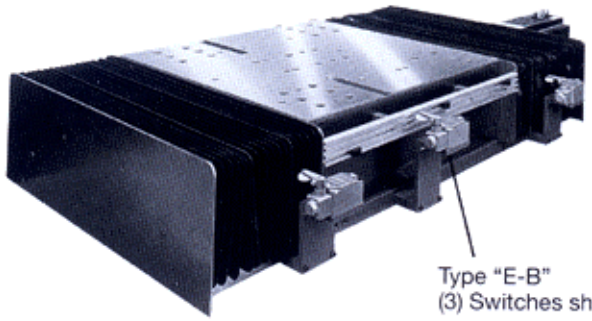
2 wire AC shielded Proximity Switch Type C 20-250 volt N.O. contacts.



Type "E-C"
(3) Switches shown

Type "E-A"
(3) Switches shown



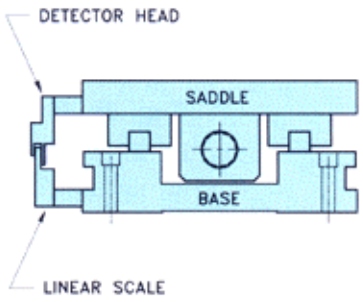


Type "E-B"
(3) Switches shown

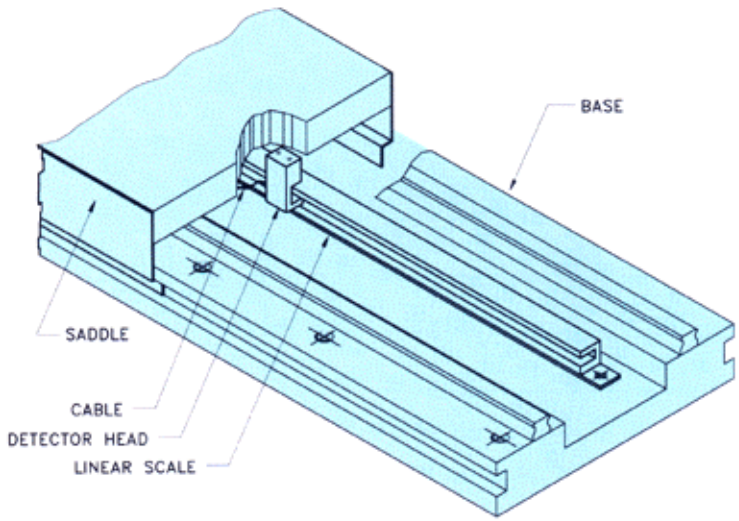
Linear Scales

There are many linear measurement products on the market today, each performing the same function, whether it be photo-optical or magnetic.

Let our Design Team determine the best mounting arrangement for your choice of linear scale.



External Mounting



Internal Mounting

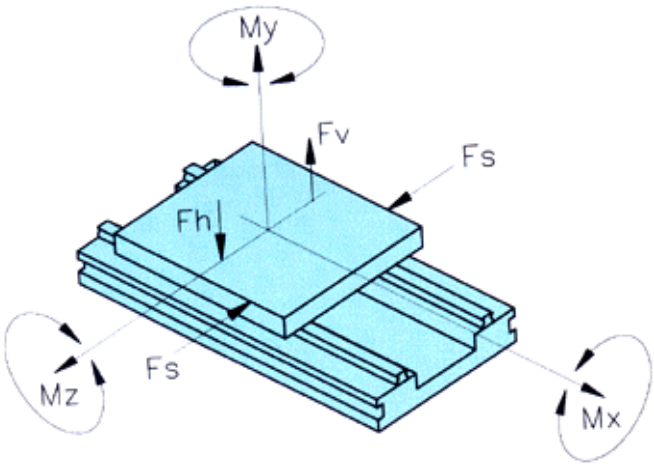
Design Data

Saddle Tracking Accuracy

Flatness of base bottom ..... .025mm in 300mm (.001" in 12 inches)
Flatness of saddle top ..... .025mm in 300mm (.001" in 12 inches)
Parallelism of saddle top to base bottom ..... .0127mm in 300mm (.0005" in 12 inches accumulative)
Tracking accuracy (side to side/up and down) ..... .0127mm in 300mm (.0005" in 12 inches accumulative)
Slide overall height tolerance .....-.000mm/+.381mm (-.000/+.015)
Perpendicularity of base ends to base bottom and base reference edge ..... .025mm (.001")
Perpendicularity of saddle ends to saddle top and saddle reference edge ..... .025mm (.001")
Squareness in each plane of compound slide (assembled by SETCO)..... .025mm in 300mm (.001" in 12 inches)

Note: Design Data Formulas are stated in Imperial Units - see Page 2 for Conversion Table.

Slide Load Capacity



Definitions

Slide Load Capacity

Fh = Applied load perpendicular and into plane of saddle top (lbs.)
Fv = Applied load perpendicular and away from plane of saddle top (lbs.)
F = Applied external load (lbs.)
Fs = Applied load perpendicular and into or away from plane of saddle side (lbs.)
Mx = Moment about saddle width (inch-lbs.)
My = Moment about plane of saddle top (inch-lbs.)
Mz = Moment about saddle length (inch-lbs.)

Slide Load Capacity Chart

(With standard 4 bearing arrangement)

S = Saddle Length

TYPE	Fh, Fv, Fs (kg) (LBS.)	Mx, My (Nm) (IN-LBS)	Mz (Nm) (IN-LBS)
LBL200	735 1620	486 4300	56 S 495 S
LBL300	1633 3600	1808 16,000	126 S 1115 S
LBL400	3429 7560	4567 40,425	231 S 2045 S

TYPE	Fh, Fv, Fs (kg) (LBS.)	Mx, My (Nm) (IN-LBS)	Mz (Nm) (IN-LBS)
LBL500	4762 10,500	9106 80,600	378 S 3350 S
LBL600	5878 12,960	10928 96,720	435 S 3850 S
LBL800	8707 19,200	24215 214,325	760 S 6723 S

Design Data

Thrust Capacities

The maximum thrust capacity for the various ballscrew drive packages is shown in the following chart. For proper selection of slide, compare this value with the slide capacity calculations to determine the limiting factor.

Notes: The chart values are based on the mechanical thrust limitations of the drive package.

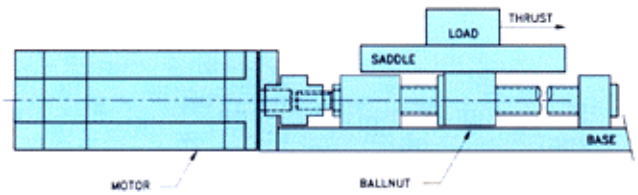
For extremely long travels consult factory for limitations due to column loading.

For static applications, consult factory for limitations due to back-driving force.

Ballscrew Drive Packages Thrust Capacity (lbs.)

SLIDE TYPE	UNIT	'FG' BALLSCREW STATIC	'FG' BALLSCREW DYNAMIC
LBL200FG	kg. lb.	430 950	340 750
LBL300FG	kg. lb.	9250 20,400	1270 2800
LBL400FG	kg. lb.	9250 20,400	1270 2800
LBL500FG	kg. lb.	9250 20,400	1270 2800
LBL600FG	kg. lb.	9250 20,400	2335 5150
LBL800FG	kg. lb.	9250 20,400	2335 5150

Force and Torque Requirements



Torque Calculations:

$$T_1 = (^{w\mu\ell}/_{2\pi f1}) + (^{z\ell}/_{2\pi f1}) + (^{z\ell\mu}/_{2\pi f1}) + T_M$$

$$T_2 = T_1/Rf_2$$

$$T_3 = J_t\,\alpha + T_2$$

$$J_t = [(^{w}/_{386})\,(^{\ell}/_{2\pi})^2 + Jb]\,(^{1}/_{R^2}) + Jr + Jm$$

$$J_b = (D^4\,L\,(0.028))/386$$

$$J_r = (^{PW1}/_{386})\,(^{PR1}/_{1.41})^2 + [(^{PW2}/_{386})\,(^{PR2}/_{1.41})^2]\,(^{1}/_{R2})$$
- timing belt

J_r = inertia of coupling - direct couple

Definitions

Force and Thrust Requirements

T_1 = constant torque @ ballscrew - in lbs

T_2 = constant torque @ motor - in lbs

T_3 = acceleration torque @ motor - in lbs

T_M = miscellaneous torque = 10 in lbs

W = load - lbs

α = acceleration - radians/sec^2

μ = coefficient of friction (use = 1 on vertical slides)

ℓ = ballscrew lead - in

f_1 = efficiency of ballscrew

Z = thrust - lbs

R = reduction

f_2 = efficiency of reduction

D = diameter of ballscrew - in

L = length of ballscrew - in

J_t = total inertia @ motor - in-lb-s^2

Jb = intertia of ballscrew - in-lb-s^2

Jr = intertia of reduction @ motor - in-lb-s^2

Jm = intertia of motor - in-lb-s^2

PW_1 = Pulley weight - motor - lb

PR_1 = Pulley radius - motor - in

PW_2 = Pulley radius - ballscrew - lb

PW_2 = Pulley radius - ballscrew - in

Design Data

Cylinder Push and Pull Forces

The theoretical push and pull forces for hydraulic and air cylinders are derived from the formula:

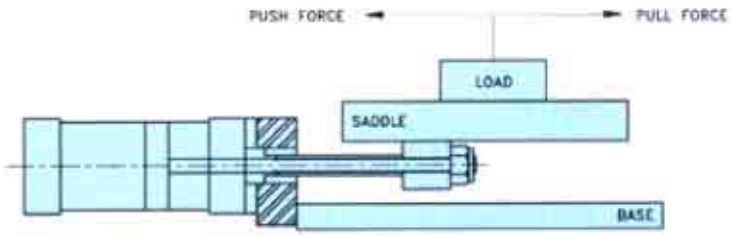
$$F = P \times A$$

Where F = force in pounds
P = pressure at the cylinder in psi, gauge
A = effective area of cylinder piston in square inches

Note: Standard Cylinder Pressure Ratings:
Hydraulic 500 psi maximum
Air 250 psi maximum

Theoretical Push and Pull Forces for Hydraulic and Air Cylinders at Various Pressures

CYL. BORE SIZE mm IN.	PISTON AREA mm sq. SQ. IN.	PISTON ROD DIA. mm IN.	PISTON ROD AREA mm sq. SQ. IN.	PUSH FORCE (N and LBS) AT VARIOUS PRESSURES (BAR and PSI)				PULL FORCE (N and LBS) VARIOUS PRESSURES (BAR and PSI)			
				5.44 80	6.80 100	13.60 200	34.01 500	5.44 80	6.80 100	13.60 200	34.01 500
63.50 2.5	3167.74 4.91	15.88 5/8	198.06 .307	1748.22 393	2184.16 491	4368.33 982	10,920.08 2455	1637.01 368	2046.26 460	4096.98 921	10,231.32 2300
82.55 3.25	5354.84 8.30	25.4 1	506.45 .785	2953.74 664	3692.17 830	7379.89 1659	18,460.85 4150	2664.59 599	3327.40 748	6681.49 1502	16,637.01 3740
101.60 4	8109.66 12.57	25.4 1	506.45 .785	4475.09 1006	5591.64 1257	11,178.83 2513	27,958.19 6285	4185.94 941	5231.32 1176	10,480.43 2356	26,156.58 5880
127.00 5	12,670.94 19.64	25.4 1	506.45 .785	6988.43 1571	8736.65 1964	17,468.86 3927	43,683.27 9820	6699.29 1506	8371.89 1882	16,770.46 3770	41,859.43 9410
152.40 6	18,236.67 28.27	34.92 1 3/8	961.29 1.49	10,062.28 2262	12,575.62 2827	25,155.69 5655	62,878.11 14135	9532.92 2143	11,912.81 2678	23,834.52 5358	59,564.06 13390



Note: Push and pull forces are to be compared to the load capacity of slide (Mz) for proper selection. For extremely long travels consult SETCO Proposal Engineering for limitations to charted values due to column loading.

Slide Mounting Attitude

SETCO slides can be mounted at any attitude, with the most common shown below. The attitude of mounting affects power requirements as well as load capacity.

Horizontal Mount (1)
Sidewall Mount (2)
Ceiling Mount (3)
Vertical Mount (4)
Angular Mount (5)

Slide Speeds

SETCO LBL Slide speeds are based on loads, type of drive package, and cycle time (acceleration/deceleration).

Specify Maximum/Minimum speeds to help determine best slide and drive packages for your application.

Photo #4108

Application Photos

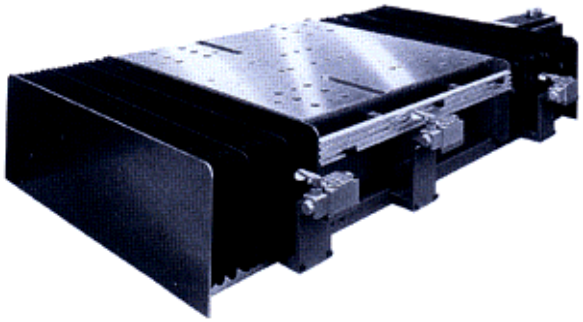


Photo #4262

LBL600FG-1200-600-500-DEKMOY Linear Slide Assembly, with "M-1" direct coupled motor drive package (3) Type "E-B" roller arm actuated limit switches, divider valve, drilling, and keyway in saddle.

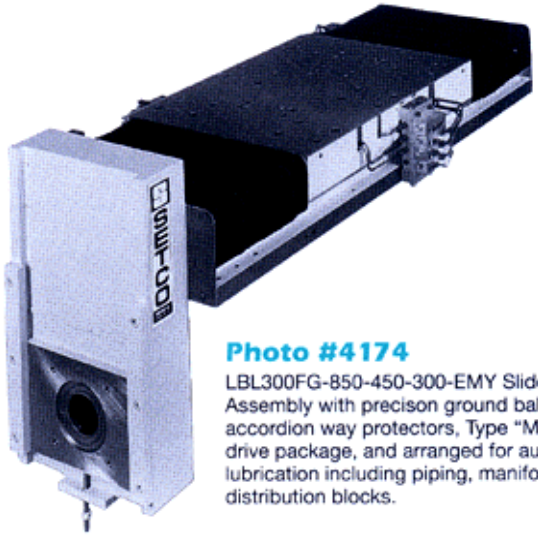
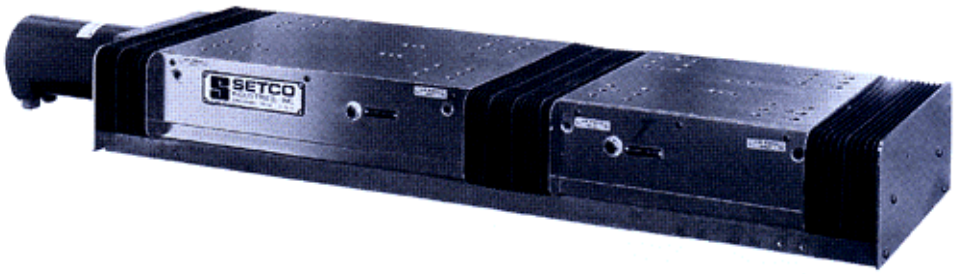


Photo #4174

LBL300FG-850-450-300-EMY Slide Assembly with precison ground ballscrew, accordion way protectors, Type "M-2" belt drive package, and arranged for auto lubrication including piping, manifold, and distribution blocks.

Photo #4265

LBL300FG-1050-450/300-75/75 Linear Bearing Slide Assembly, R.H. and L.H. integral ballscrew, "M-1"- direct coupled motor package, ballscrew and rails dicronite coated and protectors with air purge



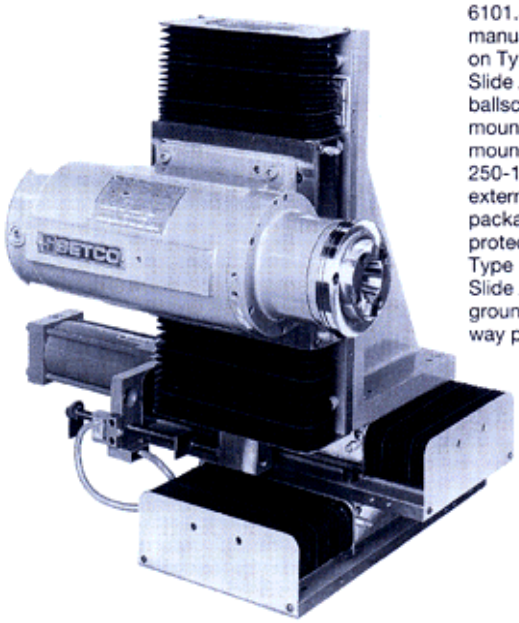


Photo #4132

6101.5.18MY Milling Spindle with manual draw bar, side wall mounted on Type LBL300FG-500-250-200-DY Slide Assembly with precison ground ballscrew and accordion protectors, mounted on Type P4 angle plate, mounted on a Type LBL300A-1-450-250-150-DEY Slide Assembly with externally mounted air cylinder package and accordion way protectors, mounted on a Type LBL300FG-500-250-200-DY Slide Assembly with precision ground ballscrew and accordion way protectors.

Photo #4208

LBL200FG-1050-300-600 Linear Bearing, special width slide assembly with "M-2" belt drive package (3) Type "E-C" proximity switches, divider valve, drilling and locating keys in saddle.

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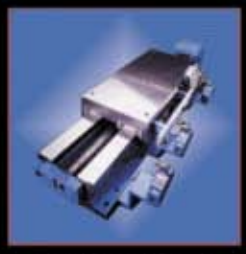
Dovetail Slides


Linear Recirculating Bearing Slides


Hardened Steel Way Slides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