Tolomatic™
EXCELLENCE *IN MOTION*

PB, PB2 ROD CYLINDER SLIDES

CONTENTS

PB POWER-BLOCK

ENDURANCE TECHNOLOGY℠

A Tolomatic Design Principle

Endurance Technology features are designed for maximum durability to provide extended service life.

The Power Block rod cylinder slide features two precision steel guide rods with composite bearings to provide positive support of the load. The Power Block withstands heavy side loads making it a great choice for conveyor line stops and load lifting applications. Built-to-order in stroke lengths up to 3 inches.

INTERNAL BUMPER

Made of urethane composite to prolong cylinder life and reduce noise

DURABLE DESIGN

Tough, lightweight extruded aluminum in a low profile package

DOVETAIL SLOTS

For easy switch mounting

NICKEL-PLATED SHAFTS

Shafts up to 0.625" diameter

MOUNTING FLEXIBILITY

Threaded holes for base or side mounting

ANODIZED ALUMINUM TOOLING PLATE

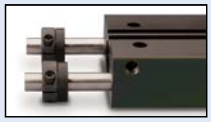
Threaded bolt thru holes for tooling plate mounting

DURABLE BEARING

COMPOSITE BEARINGS

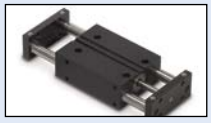
- Thin profile allows use of oversize guide rods
- Best choice for impact use or high contaminant environments

OPTIONS



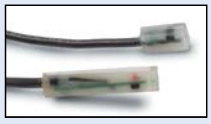
STOP COLLAR / BUMPER KIT

- Includes 2 stop collars and 1/4" thick polyurethane external bumpers to help absorb impact shock



DUAL TOOLING PLATE

- Added flexibility for many applications

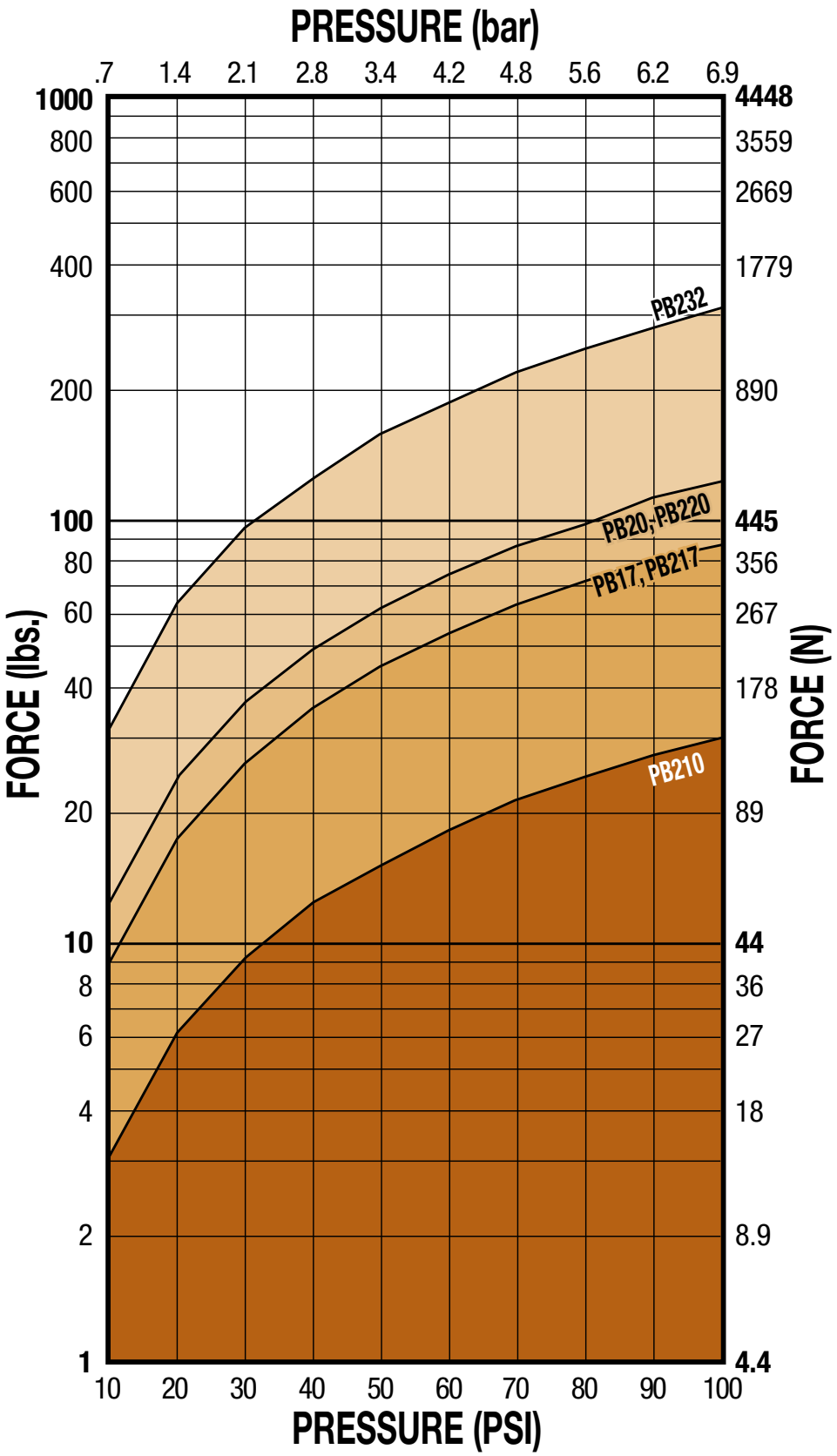


SWITCHES

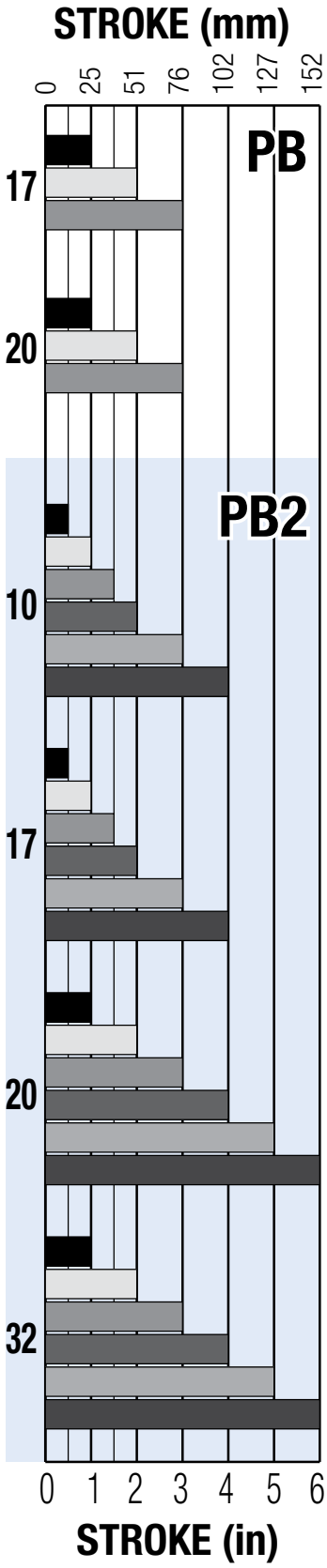
- Available in Reed, Hall-effect and Triac
- 15ft. cable with flying leads; available with quick-disconnect couplers

PERFORMANCE

THEORETICAL FORCE vs PRESSURE



STROKE LENGTHS



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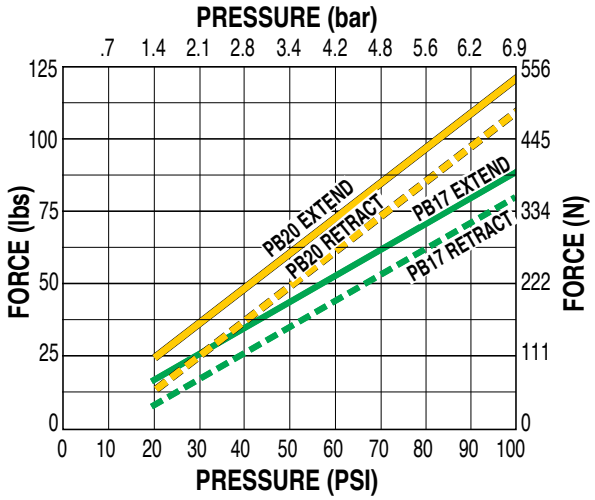
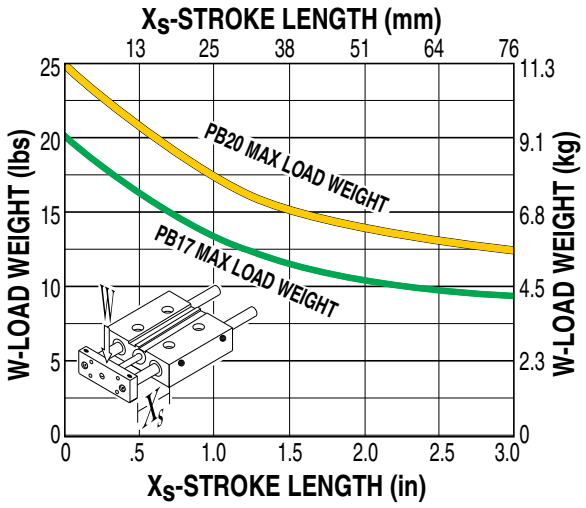
PERFORMANCE

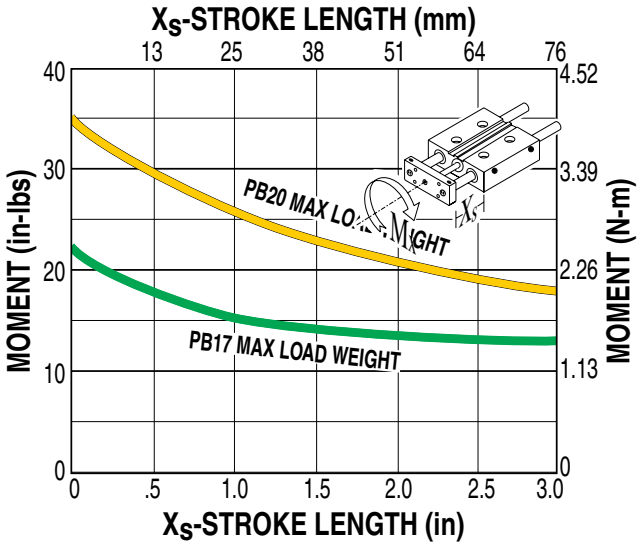
THEORETICAL FORCE vs PRESSURE



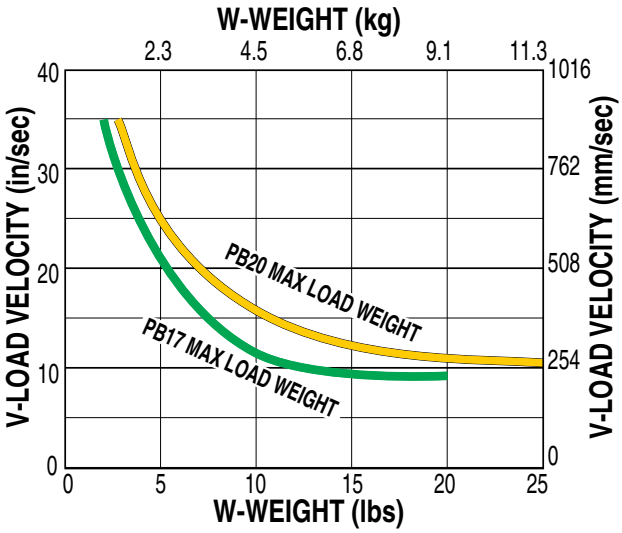
MAX. LOAD WEIGHT vs STROKE LENGTH



BENDING MOMENTS



LOAD WEIGHT vs VELOCITY (USING INTERNAL BUMPERS)



FORCE VS. PRESSURE
Force vs Pressure performance data applies to models with composite bearings.

MAX. LOAD WEIGHT vs STROKE LENGTH
Do not exceed Max. Load curve. Max. Load for composite bearings is based on 200 million linear inches of travel.

BENDING MOMENTS
Max. Moment for composite bearings is based on 200 million linear inches of travel.

LOAD VS VELOCITY
Do not exceed Max. Load curve. Max. Load for Power-Block is based on 200 million linear inches of travel.

PB Power-Block Rod Cylinder Slide - All Sizes

SPECIFICATIONS

	BORE SIZE		WEIGHT				STROKE LENGTH		MAX. PRESSURE		TEMPERATURE RANGE	
			BASE		PER UNIT OF STOKE							
	in	mm	lbs	kg	lbs	kg	in	mm	PSI	bar	°F	°C
17	1.062	27.0	1.08	0.5	0.57	0.26	1.0, 2.0, 3.0	25, 51, 76	100	6.895	20 to 140	-7 to 60
20	1.250	31.8	1.56	0.7	0.88	0.40						

PB

ORDER CODES

PB17, PB20
inch (U.S. Standard)

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Dual Tooling Plate	PB_6
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Application Guidelines	PB_6
Ordering	PB_20
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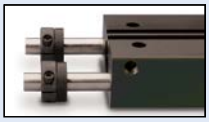
OPTIONS



STOP COLLAR / BUMPER KIT

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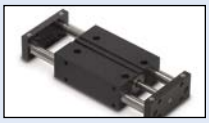
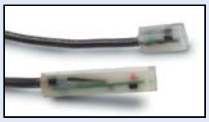


DUAL TOOLING PLATE

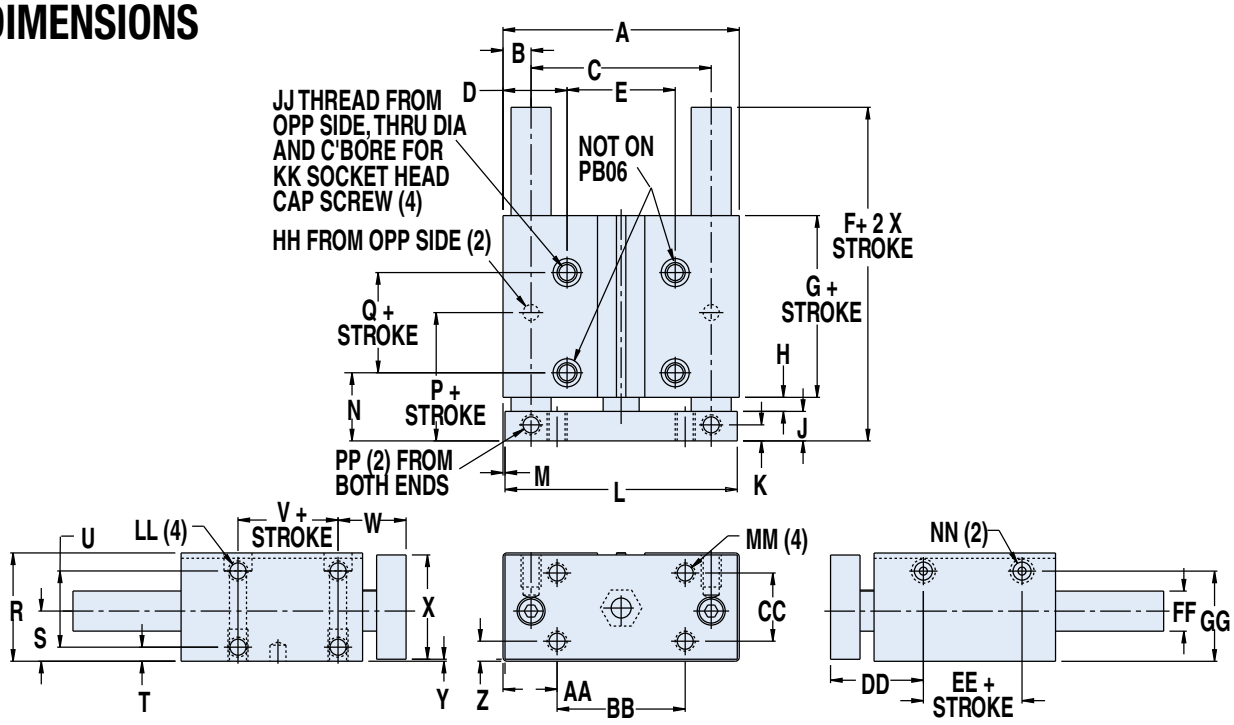
- Added flexibility for many applications



SWITCHES

- Available in Reed, Hall-effect and Triac
- 15ft. cable with flying leads; available with quick-disconnect couplers

DIMENSIONS



	PB17		PB20	
	in	*mm*	in	*mm*
BORE	1.013	*27.0*	1.25	*31.8*
A	3.125	*79.4*	3.688	*93.7*
B	0.375	*9.5*	0.438	*11.1*
C	2.375	*60.3*	2.813	*71.5*
D	0.844	*21.4*	1.000	*25.4*
E	1.438	*36.5*	1.688	*42.9*
F	3.070	*78.0*	3.198	*81.2*
G	1.781	*45.2*	1.833	*46.6*
H	0.188	*4.8*	0.219	*5.6*
J	0.460	*11.7*	0.460	*11.7*
K	0.250	*6.4*	0.250	*6.4*
L	3.063	*77.8*	3.625	*92.1*
M	0.031	*0.8*	0.031	*0.8*
N	1.063	*27.0*	1.063	*27.0*
P	0.656	*16.7*	1.000	*25.4*
Q	0.563	*14.3*	0.563	*14.3*
R	1.484	*37.7*	1.688	*42.9*
S	0.609	*15.5*	0.781	*19.8*
T	0.156	*4.0*	0.219	*5.6*
U	1.125	*28.6*	1.188	*30.2*
V	0.563	*14.3*	0.563	*14.3*
W	1.063	*27.0*	1.063	*27.0*

	PB17		PB20	
	in	*mm*	in	*mm*
BORE	1.013	*27.0*	1.25	*31.8*
X	1.422	*36.1*	1.623	*41.2*
Y	0.031	*0.8*	0.031	*0.8*
Z	0.219	*5.6*	0.313	*8.0*
AA	0.688	*17.5*	0.844	*21.4*
BB	1.750	*44.5*	2.000	*50.8*
CC	1.000	*25.4*	1.063	*27.0*
DD	1.429	*36.3*	1.449	*36.8*
EE	0.500	*12.7*	0.540	*13.7*
FF	0.500	*12.7*	0.625	*15.9*
GG	1.203	*30.6*	1.406	*35.7*
HH*	.2500/.2490 x .25 DP	*6.4/6.3 x 6.4 DP*	2500/.2490 x .25 DP	*6.4/6.3 x 6.4 DP*
JJ	1/4-20 X .25" *(6.4)* DP		5/16-18UNC X .50 *(12.7)*" DP	
KK	#10		1/4	
LL	10-24 X .44" *(11.2)* DP		5/16-18 X .50" *(12.7)* DP	
MM	10-24 THRU		5/16-18 THRU	
NN	1/8-27 NPT		1/8-27 NPT	
PP	10-24UNC X .34" *(8.6)* DP		5/16-18UNC X .38" *(9.7)* DP	

*Dowel Pins

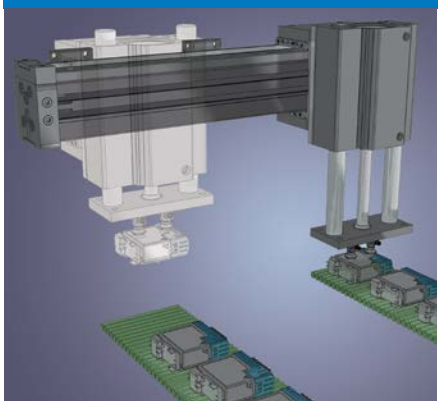
⌖ Ø.002 Ⓜ

⌖ *Ø.051* Ⓜ

PB & PB2 Rod Cylinder Slides - All Sizes

APPLICATIONS

Material Handling



A pick and place application for moving product between conveyors.

Customer Challenge:

A manufacturer of consumer electronic equipment needed a method to move finished product from one conveyor to another quickly without damage or waste.

Application Requirements:

- Fast response, throughput of 20 products per minute
- Consistent positioning
- End-of-stroke adjustment to accommodate varying product lines

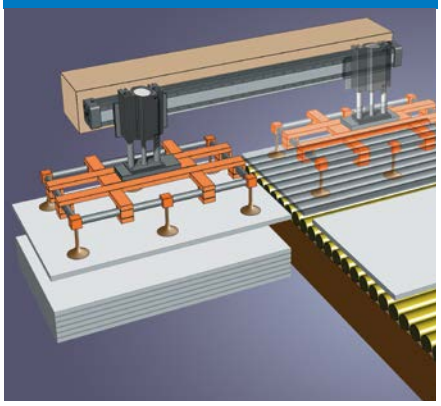
Tolomatic Solution:

This side mounted BC3D Band Cylinder with dual 180° option provides the motion along the X axis and support for the PB2 rod cylinder slide which provides the Y axis motion. In this application dual vacuum cups are used, however they are often replaced with a gripper unit with custom tooled fingers for product that does not present a smooth flat surface.

Result:

This continuing customer is pleased with the durability, price and delivery that the BC3 and PB2 actuators manufactured by Tolomatic provide.

Material Handling



Vacuumized sheet transfer application.

Customer Challenge:

A manufacturer of battery chargers needed a method of taking sheet metal off of pallets and placing onto the assembly line. Speed is critical and end-of-stroke position must be consistent, thus, Tolomatic pneumatic products were chosen for this system.

Application Requirements:

- Fast response, 1 part must be reoriented and moved each 3 seconds
- Movement from end-of-stroke to end-of-stroke with consistent positioning
- Low cost
- End-of-stroke adjustment

Tolomatic Solution:

This application uses a Tolomatic PB2 Rod Cylinder Slide, attached to a BC3 Band Cylinder with adjustable shocks. This actuator assembly moves the vacuum grid attachment that holds the sheet metal.

Result:

The BC3 and PB2 has long-lasting durability for reliable performance at the required speed. This continuing customer is pleased with the price and delivery that Tolomatic provides.

PB2 POWER-BLOCK 2

ENDURANCE TECHNOLOGY℠

A Tolomatic Design Principle

Endurance Technology features are designed for maximum durability to provide extended service life.

The Power Block 2 rod cylinder slide features two precision steel guide rods with linear ball or composite bearings to provide positive support of the load. The Power Block 2 withstands heavy side loads making it a great choice for conveyor line stops and load lifting applications. Built-to-order in stroke lengths up to 6 inches.

HIGH PRESSURE CAPABLE

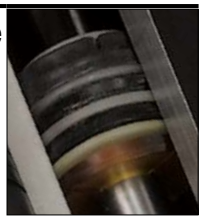
Designed for pressures up to 100 PSI (6.9 bar) with a 10,000,000 cycle rating

PISTON MAGNET

Piston magnet is a standard feature allowing sensor mounting whenever required

INTERNAL BUMPERS

Made of urethane composite to prolong cylinder life and reduce noise



LARGE SHAFTS

Shafts up to 1.25" diameter

DURABLE DESIGN

Tough, lightweight extruded aluminum in a low profile package

PLATED STEEL TOOLING PLATE

Threaded bolt thru holes for tooling plate mounting

MOUNTING FLEXIBILITY

T-slots and threaded holes for base mounting

DURABLE BEARING OPTIONS

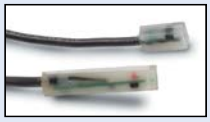
LINEAR BALL BEARINGS

- Low friction, long life
- Best tooling plate accuracy

COMPOSITE BEARINGS

- Thin profile allows use of oversize guide rods
- Best choice for impact use or high contaminant environments

OPTIONS



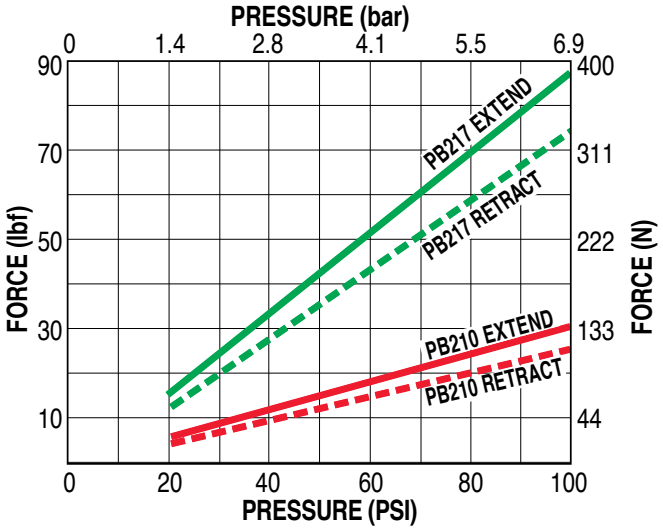
SWITCHES

- Available in Reed, Hall-effect and Triac
- 15ft. cable with flying leads; available with quick-disconnect couplers

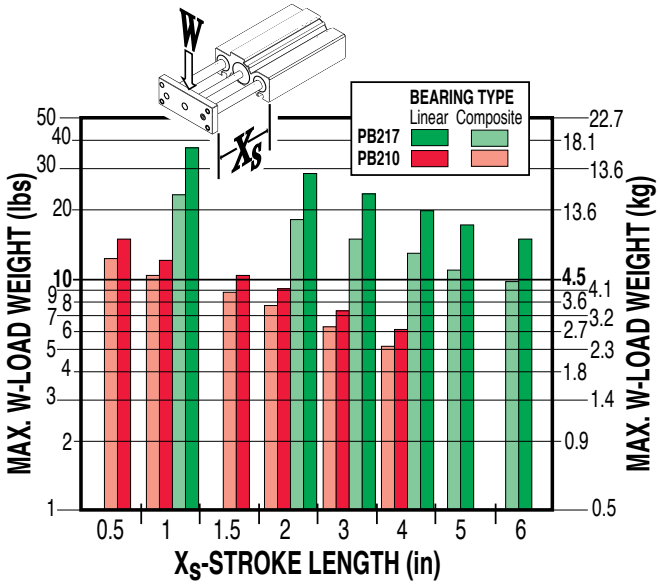
PB2 Power-Block2 Rod Cylinder Slide - 10, 17 Sizes

PERFORMANCE

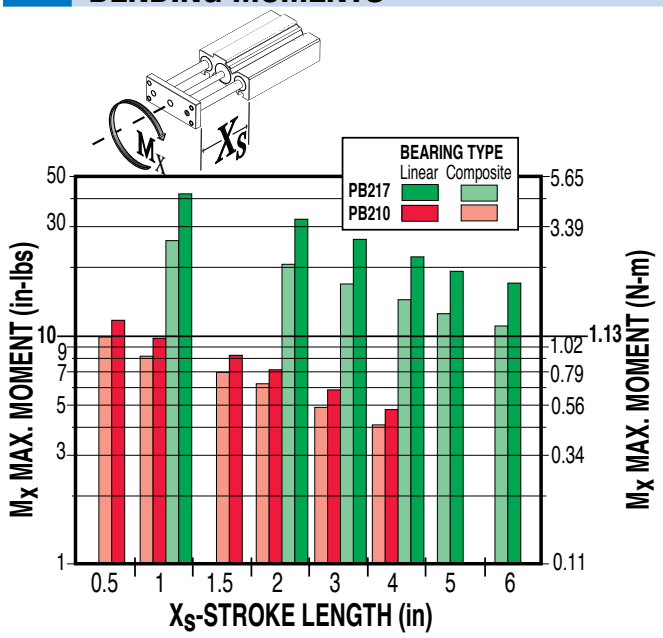
THEORETICAL FORCE vs PRESSURE



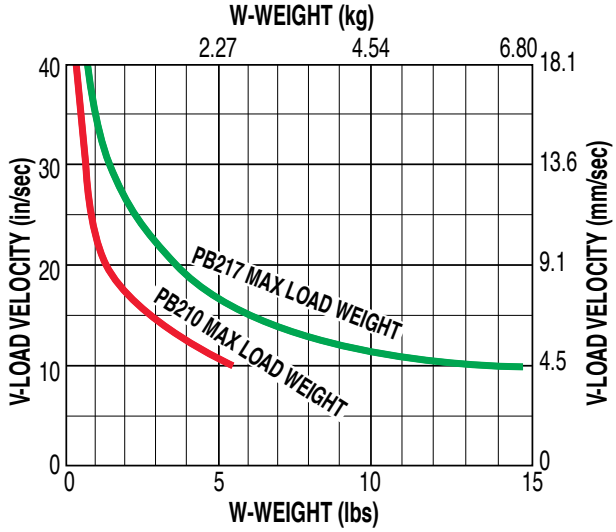
MAX. LOAD WEIGHT vs STROKE LENGTH



BENDING MOMENTS



LOAD WEIGHT vs VELOCITY (USING INTERNAL BUMPERS)



FORCE VS. PRESSURE
Force vs Pressure performance data applies to models with composite bearings.

MAX. LOAD WEIGHT vs STROKE LENGTH
Do not exceed Max. Load curve. Max. Load for composite bearings is based on 200 million linear inches of travel.

BENDING MOMENTS
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PERFORMANCE

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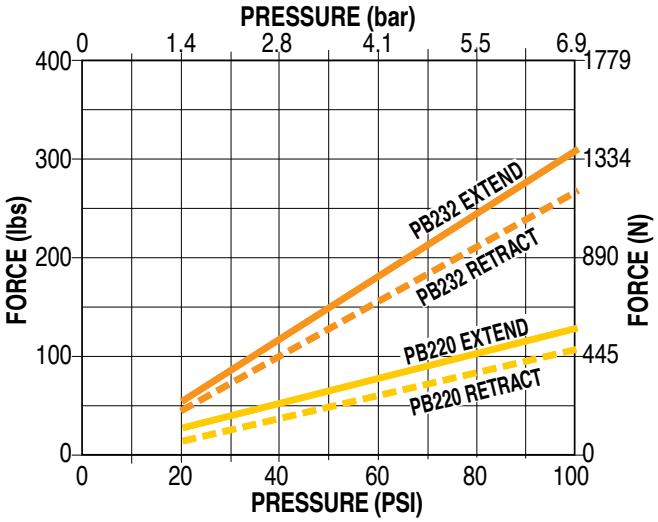

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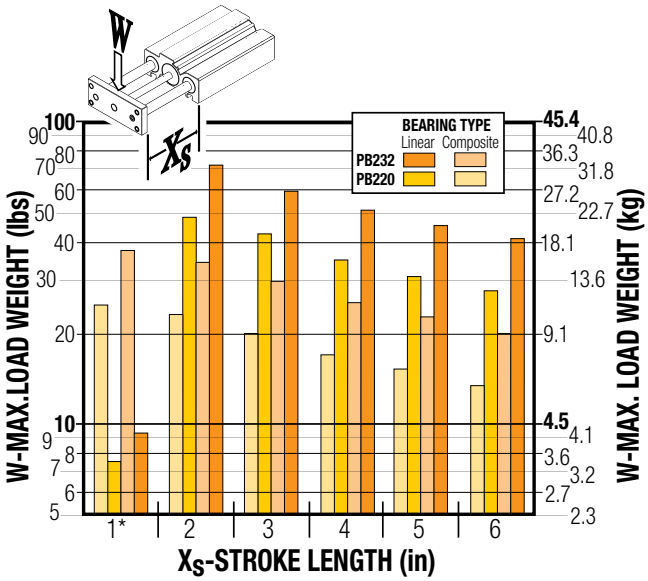
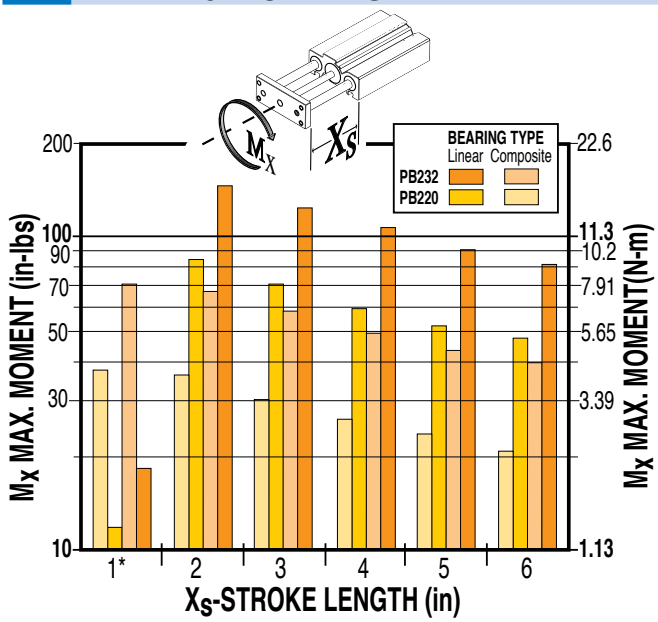


*PB220 & PB232 – with 1" stroke are units with one set of bearings and have reduced capacity

BENDING MOMENTS



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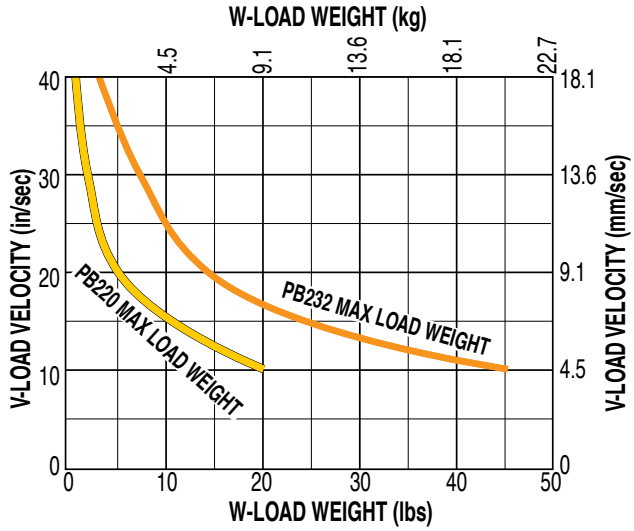

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LOAD VS VELOCITY
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PB2 Power-Block2 Rod Cylinder Slide - All Sizes

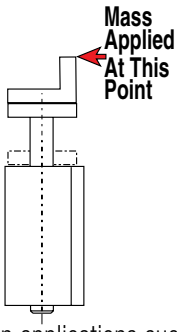
SPECIFICATIONS

LB = Linear Bearing CB = Composite Bearing

SIZE			10		17		20		32	
BEARING			LB	CB	LB	CB	LB	CB	LB	CB
BORE SIZE		in	0.63		1.06		1.25		2.00	
		mm	*15.9*		*27.0*		*31.8*		*50.8*	
STROKE & WEIGHT	0.5" (13mm)	lbs	0.86	0.90	NA	NA	NA	NA	NA	NA
		kg	*0.39*	*0.41*						
	1.0" (25mm)	lbs	0.97	1.03	1.97	2.32	2.79	3.32	4.85	5.59
		kg	*0.44*	*0.47*	*0.89*	*1.05*	*1.27*	*1.51*	*2.20*	*2.54*
	1.5" (38mm)	lbs	1.08	1.17	NA	NA	NA	NA	NA	NA
		kg	*0.49*	*0.53*						
	2.0" (51mm)	lbs	1.19	1.30	2.38	2.88	3.87	4.36	6.43	6.95
		kg	*0.54*	*0.59*	*1.08*	*1.31*	*1.76*	*1.98*	*2.92*	*3.15*
	3.0" (76mm)	lbs	1.42	1.57	2.80	3.43	4.49	5.14	5.48	8.03
		kg	*0.64*	*0.71*	*1.27*	*1.56*	*2.04*	*2.33*	*2.49*	*3.64*
	4.0" (102mm)	lbs	1.64	1.84	3.21	3.40	5.11	5.92	8.20	9.12
		kg	*0.74*	*0.83*	*1.46*	*1.54*	*2.32*	*2.69*	*3.72*	*4.14*
	5.0" (127mm)	lbs	NA	NA	3.63	4.54	5.72	6.71	9.08	10.20
		kg			*1.65*	*2.06*	*2.59*	*3.04*	*4.12*	*4.63*
	6.0" (152mm)	lbs	NA	NA	4.04	5.09	6.34	7.49	9.97	11.28
		kg			*1.83*	*2.31*	*2.88*	*3.40*	*4.52*	*5.12*
STROKE LENGTH		in	0.5, 1.0, 1.5, 2.0, 3.0, 4.0				1.0, 2.0, 3.0, 4.0, 5.0, 6.0			
		mm	*13, 25, 38, 51, 76, 102*				*25, 51, 76, 102, 127, 152*			
MAX. PRESSURE		PSI	100							
		bar	*6.895*							
TEMP. RANGE		°F	20 to 140							
		°C	*-7 to 60*							

IMPACT LOADING

(Composite Bearings ONLY)



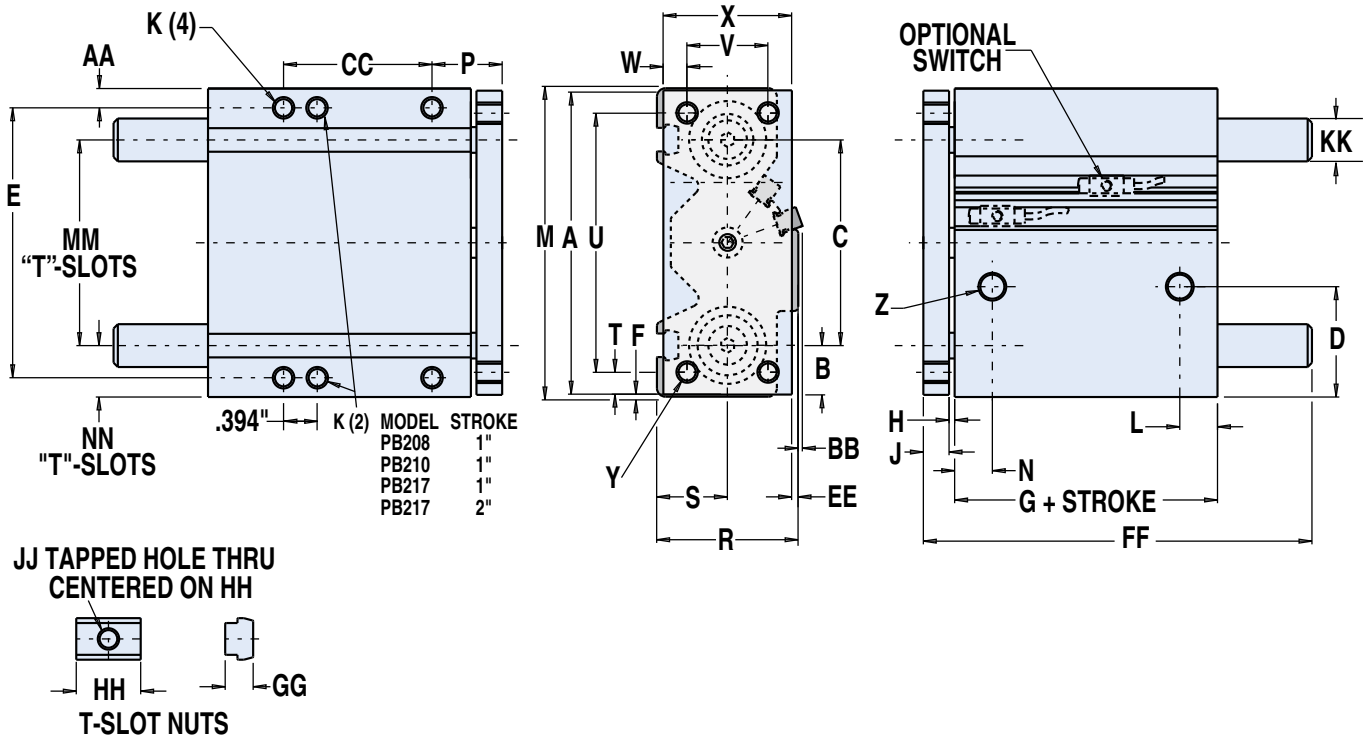
$KE = \frac{1}{2}\frac{W}{g}v^2$

KE = Energy
w = Weight in Lbs.
g = 32.2 Ft./sec.^{2} (gravitational constant)
v = Ft./sec. (velocity)

In applications such as conveyor stops impact loading may be a factor. The table below gives the maximum KE energy for each of the PB2 models. Use the above equation to determine the KE for your application. Your result should not exceed the maximum KE for the PB2 model you select.

	BORE SIZE		MAX. "KE"	
	in	mm	in-lbs	N-m
10	0.625	15.9	5.64	0.64
17	1.063	27.0	17.88	2.02
20	1.250	31.8	40.80	4.61
32	2.000	50.8	129.60	14.64

DIMENSIONS



Size	10		17		20		32	
Bore	0.625 *(15.9)*		1.125 *(27.0)*		1.250 *(31.8)*		2.000 *(50.8)*	
A	2.380	*60.5*	3.380	*85.9*	4.440	*112.8*	5.440	*138.2*
B	0.39	*9.9*	0.55	*14.0*	0.72	*18.3*	0.81	*20.6*
C	1.59	*40.5*	2.28	*57.9*	3.00	*76.2*	3.81	*96.9*
D	1.220	*31.0*	1.200	*30.5*	1.610	*40.9*	1.670	*42.4*
E	2.126	*54.0*	2.992	*76.0*	3.937	*100.0*	4.882	*124.0*
F	0.031	*0.8*	0.047	*1.2*	0.031	*0.8*	0.031	*0.8*
G	1.795	*45.6*	1.881	*47.8*	1.834	*46.6*	2.297	*58.3*
H	0.063	*1.6*	0.063	*1.6*	0.082	*2.1*	0.063	*1.6*
J	0.38	*9.7*	0.38	*9.7*	0.38	*9.7*	0.50	*12.7*
K	#10-24 x.38DP (4)		1/4-20 x.44 DP (4)		5/16-18 x .44 DP (4)		3/8-16 x .56 DP (4)	
L	0.55	*14.0*	0.52	*13.2*	0.53	*13.5*	0.58	*14.7*
M	2.44	*62.0*	3.47	*88.1*	4.50	*114.3*	5.50	*139.7*
N	0.50	*12.7*	0.52	*13.2*	0.53	*13.5*	0.58	*14.7*
P	0.91	*23.0*	0.95	*24.0*	1.02	*26.0*	1.14	*29.0*
R	1.33	*33.8*	1.72	*43.7*	2.06	*52.3*	2.48	*63.0*
S	0.67	*17.0*	0.83	*21.1*	1.03	*26.2*	1.23	*31.2*
T	0.16	*4.1*	0.31	*7.9*	0.33	*8.4*	0.36	*9.1*
U	2.047	*51.99*	2.756	*70.00*	3.780	*96.01*	4.724	*119.99*
V	0.630	*16.00*	1.024	*26.01*	1.181	*30.00*	1.575	*40.01*
W	0.19	*4.8*	0.24	*6.1*	0.35	*8.9*	0.37	*9.4*
X	1.00	*25.4*	1.50	*38.1*	1.88	*47.8*	2.38	*60.5*
Y	#10-24 Thru (4)		1/4-20 Thru (4)		5/16-18 Thru (4)		3/8-16 Thru (4)	
Z	10-32UNF (2)		1/8 NPT (2)		1/8-27 NPT (2)		1/4-18 NPT (2)	
AA	0.16	*4.1*	0.24	*6.1*	0.28	*7.1*	0.31	*7.9*
BB	0.08	*2.0*	0.18	*4.6*	0.06	*1.5*	–	–

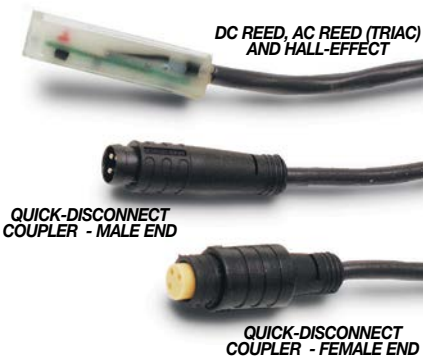
LB = Linear Bearing

CB = Composite Bearing

Size		10		17		20		32	
Bore		0.625 *(15.9)*		1.125 *(27.0)*		1.250 *(31.8)*		2.000 *(50.8)*	
CC - STROKE LENGTH	0.5	0.669	*16.99*	NA		NA		NA	
	1.0	1.457	*37.01*	1.575	*40.01*	1.181	*30.00*	1.378	*35.00*
	1.5	1.850	*46.99*	NA		NA		NA	
	2.0	2.244	*57.00*	2.362	*59.99*	2.165	*54.99*	2.362	*59.99*
	3.0	3.228	*81.99*	3.346	*84.99*	3.150	*80.01*	3.346	*84.99*
	4.0	4.213	*107.01*	4.331	*110.01*	4.134	*105.00*	4.331	*110.01*
	5.0	NA		5.315	*135.00*	5.118	*130.00*	5.315	*135.00*
	6.0	NA		6.299	*159.99*	6.102	*154.99*	6.299	*159.99*
EE		0.17	*4.3*	0.08	*2.0*	0.09	*2.3*	0.03	*0.8*
FF - Linear Bearing / Stroke Length	0.5	2.86	*72.6*	NA		NA		NA	
	1.0	3.36	*85.3*	4.14	*105.2*	3.17	*80.5*	3.43	*87.1*
	1.5	3.86	*98.0*	NA		NA		NA	
	2.0	4.36	*110.7*	5.14	*130.6*	5.67	*144.0*	6.06	*153.9*
	3.0	5.36	*136.1*	6.14	*156.0*	6.67	*169.4*	7.06	*179.3*
	4.0	6.36	*161.5*	7.14	*181.4*	7.67	*194.8*	8.06	*204.7*
	5.0	NA		8.14	*206.8*	8.67	*220.2*	9.06	*230.1*
	6.0	NA		9.14	*232.2*	9.67	*245.6*	10.06	*255.5*
FF - Composite Bearing / Stroke Length	0.5	2.86	*72.6*	NA		NA		NA	
	1.0	3.36	*85.3*	4.14	*105.2*	3.92	*99.6*	4.43	*112.5*
	1.5	3.86	*98.0*	NA		NA		NA	
	2.0	4.36	*110.7*	5.14	*130.6*	5.67	*144.0*	6.06	*153.9*
	3.0	5.36	*136.1*	6.14	*156.0*	6.67	*169.4*	7.06	*179.3*
	4.0	6.36	*161.5*	7.14	*181.4*	7.67	*194.8*	8.06	*204.7*
	5.0	NA		8.14	*206.8*	8.67	*220.2*	9.06	*230.1*
	6.0	NA		9.14	*232.2*	9.67	*245.6*	10.06	*255.5*
GG		0.22	*5.6*	0.25	*6.4*	0.25	*6.4*	0.41	*10.4*
HH		0.66	*16.8*	0.75	*19.1*	0.75	*19.1*	0.94	*23.9*
JJ		10-24		1/4-20		1/4-20		5/16-18	
KK - Shaft Ø	LB	0.375	*9.53*	0.500	*12.70*	0.625	*15.88*	0.750	*19.05*
	CB	0.500	*12.70*	0.750	*19.05*	0.875	*22.23*	1.000	*25.40*
MM		1.438	*36.5*	2.125	*54.0*	3.000	*76.2*	3.625	*92.1*
NN		0.50	*12.7*	0.67	*17.0*	0.75	*19.1*	0.94	*23.9*

PB & PB2 Switches - All Sizes

SWITCHES



There are 10 sensing choices: DC reed, form A (open) or form C (open or closed); AC reed (Triac, open); Hall-effect, sourcing, PNP (open); Hall-effect, sinking, NPN (open); each with either flying leads or QD (quick disconnect). Commonly used to send analog signals to PLC (programmable logic controllers), TLL, CMOS circuit or other controller device. These switches are activated by the actuator's magnet.

Switches contain reverse polarity protection. QD cables are shielded; shield should be terminated at flying lead end.

If necessary to remove factory installed switches, be sure to reinstall on the same of side of actuator with scored face of switch toward internal magnet.

SPECIFICATIONS

		REED DC				REED AC		HALL-EFFECT DC			
ORDER CODE		RT	RM	BT	BM	CT	CM	TT	TM	KT	KM
LEAD		5m	QD*	5m	QD*	5m	QD*	5m	QD*	5m	QD*
CABLE SHIELDING		Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†	Unshielded	Shielded†
SWITCHING LOGIC		"A" Normally Open		"C" Normally Open or Closed		Triac Normally Open		PNP (Sourcing) Normally Open		NPN (Sinking) Normally Open	
MECHANICAL CONTACTS		Single-Pole Single-Throw		Single-Pole Double-Throw		Single-Pole Single-Throw		NO, These Are Solid State Components			
COIL DIRECT		Yes		Yes		Yes		—			
POWER LED		None		None		None		None		None	
SIGNAL LED		Red TOL-O-MATIC						Red TOL-O-MATIC		Red TOL-O-MATIC	
OPERATING VOLTAGE		200 Vdc max.		120 Vdc max.		120 Vac max.		5 - 25 Vdc			
OUTPUT RATING		—				—		25 Vdc, 200mA dc			
OPERATING TIME		0.6 msec max. (including bounce)		0.7 msec max. (including bounce)		—		< 10 micro sec.			
OPERATING TEMPERATURE		-40°F [-40°C] to 158°F [70°C]						0°F [-18°C] to 150°F [66°C]			
RELEASE TIME		1.0 msec. max.				—		—			
ON TRIP POINT		—				—		150 Gauss maximum			
OFF TRIP POINT		—				—		40 Gauss minimum			
****POWER RATING (WATTS)**		10.0 §		3.0 §§		10.0		5.0			
VOLTAGE DROP		2.6 V typical at 100 mA		NA		—		—			
RESISTANCE		0.1 Ω Initial (Max.)				—		—			
CURRENT CONSUMPTION		—				1 Amp at 86°F [30°C]	0.5 Amp at 140°F [60°C]	200 mA at 25 Vdc			
FREQUENCY		—				47 - 63 Hz		—			
CABLE MIN. BEND RADIUS	**STATIC**	0.630" *[16mm]*									
	DYNAMIC	Not Recommended									

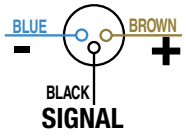
CAUTION: DO NOT OVER TIGHTEN SWITCH HARDWARE WHEN INSTALLING!

** **WARNING**: Do not exceed power rating (Watt = Voltage X Amperage). Permanent damage to sensor will occur.

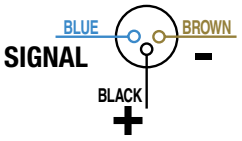
*QD = Quick Disconnect; Male coupler is located 6" [152mm} from sensor,
Female coupler to flying lead distance is 197" [5m] also see Cable Shielding specification above

REPLACEMENT OF QD SWITCHES MANUFACTURED BEFORE JULY 1, 1997: It will be necessary to replace or rewire the female end coupler.

CURRENT
Quick disconnect Wiring



OLD
Quick disconnect Wiring



Reed Switch Life Expectancy: Up to 200,000,000 cycles (depending on load current, duty cycle and environmental conditions)

†Shielded from the female quick disconnect coupler to the flying leads. Shield should be terminated at flying lead end.

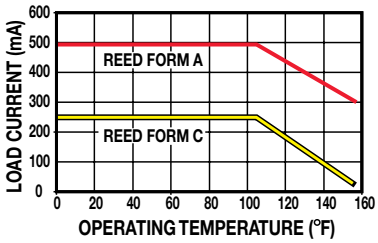
§ Maximum current 500mA (not to exceed 10VA) Refer to Temperature vs. Current graph and Voltage Derating graph

§§ Maximum current 250mA (not to exceed 3VA) Refer to Temperature vs. Current graph and Voltage Derating graph

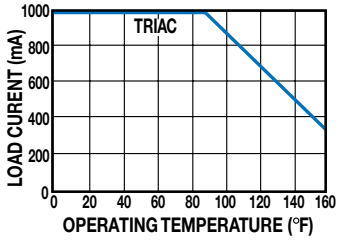
PB & PB2 Switches - All Sizes

PERFORMANCE

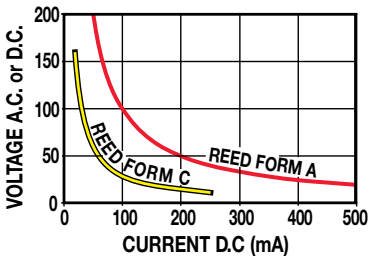
TEMP. vs CURRENT, DC REED



TEMP. vs CURRENT, AC REED

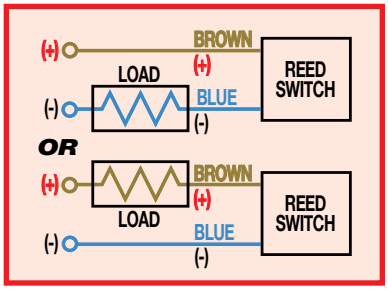


VOLTAGE DERATING, DC REED

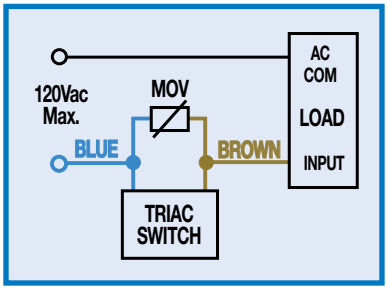


WIRING DIAGRAMS

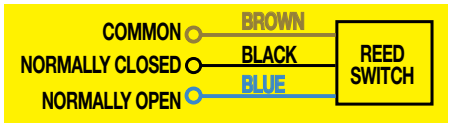
RT & RM DC REED, FORM A



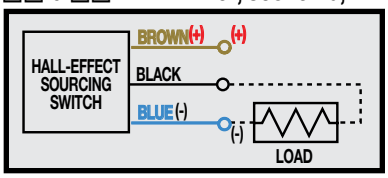
CT & CM AC REED, TRIAC



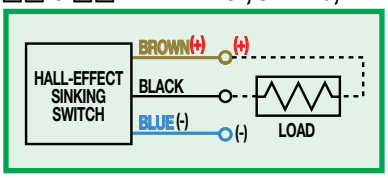
BT & BM DC REED, FORM C



TT & TM HALL-EFFECT, SOURCING, PNP



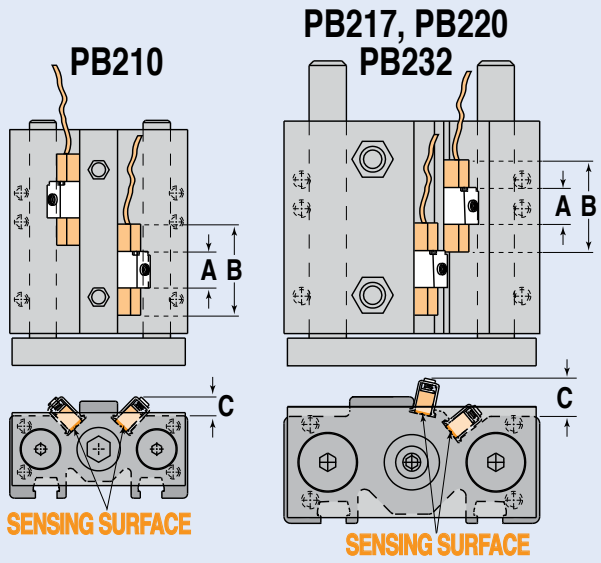
KT & KM HALL-EFFECT, SINKING, NPN



INSTALLATION INFORMATION

THE NOTCHED FACE OF THE SWITCH INDICATES THE SENSING SURFACE AND MUST FACE TOWARD THE MAGNET.

DIMENSIONS



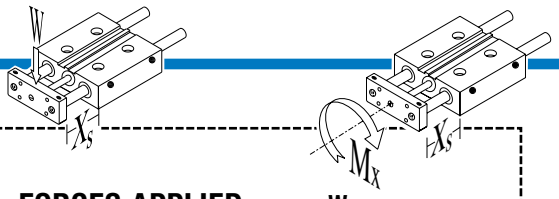
MODEL	BORE	A	B	C
PB210	0.625	0.50	1.25	0.26
PB217	1.063	0.50	1.25	0.52
PB220	1.250	0.50	1.25	0.48
PB232	2.000	0.50	1.25	0.64

Dimensions in inches

MODEL	BORE	A	B	C
PB210	15.88	12.70	31.75	6.60
PB217	27.00	12.70	31.75	13.21
PB220	31.75	12.70	31.75	12.19
PB232	50.80	12.70	31.75	16.26

Dimensions in millimeters

Application Data Worksheet



STROKE LENGTH _____
☐ inch (SK) (U.S. Standard) ☐ millimeters (Metric)

AVAILABLE AIR PRESSURE _____
☐ PSI (U.S. Standard) ☐ bar (Metric)

REQUIRED THRUST FORCE _____
☐ lbf (U.S. Standard) ☐ N (Metric)

LOAD _____
☐ lb (U.S. Standard) ☐ kg (Metric)

LOAD CENTER OF GRAVITY DISTANCE TO TOOLING PLATE CENTER
d_X _____
d_Y _____
d_Z _____
☐ inch (U.S. Standard) ☐ millimeters (Metric)

FORCES APPLIED TO TOOLING PLATE W _____
☐ lbf (U.S. Standard) ☐ N (Metric)

BENDING MOMENTS APPLIED TO TOOLING PLATE M_X _____
☐ in-lbs (U.S. Standard) ☐ N-m (Metric)

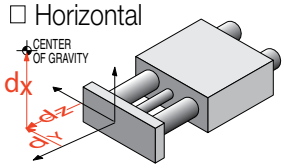
FINAL VELOCITY _____
☐ in/sec (U.S. Standard) ☐ mm/sec (Metric)

MOVE TIME sec. _____

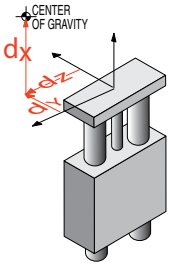
NO. OF CYCLES _____
☐ per minute ☐ per hour

ORIENTATION

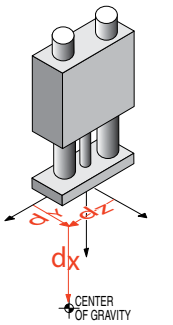
☐ Horizontal



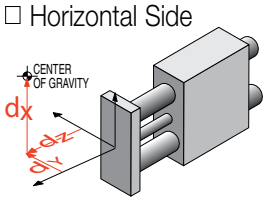
☐ Vertical



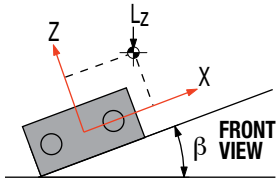
☐ Vertical Down

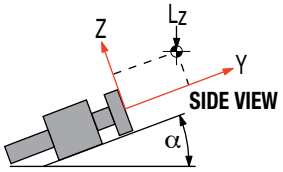


☐ Horizontal Side



☐ Angled α _____ β _____





OTHER ISSUES:
(i.e. Environment, Temperature, Contamination, etc.) _____

Contact information: _____

Fax (1-763-478-8080) or call Tolomatic (1-800-328-2174) with the above information. We will provide any assistance needed to determine the proper actuator.

Rod Cylinder Slide Selection Guidelines - PB & PB2 - All Sizes

PROVIDING LOAD GUIDANCE AND SUPPORT

The process of selecting a load bearing actuator for a given application can be complex. It is highly recommended that you contact Tolomatic or a Tolomatic Distributor for assistance in selecting the best actuator for your application. The following overview of the selection guidelines are for educational purposes only.

1 COMPILE APPLICATION REQUIREMENTS

To determine the appropriate Tolomatic rod cylinder slide for an application, compile the following information:

- Available pressure (PSI)
- Weight of load (lbs. or kgs.)
- Orientation of load (lbs. or kgs.)
- Velocity of load (in./sec. or mm/sec.)
- Stroke length (in. or mm)

Use the Application Data Worksheet on page PB_16

2 SELECT ROD CYLINDER SLIDE SIZE

- Consult the Theoretical Force vs. Pressure graphs

  NOTE: Graphs for PB are on page PB_5 and PB2 are on pages PB_10 to 11.

- Cross-reference the load force (or load weight if force is not known) and the available operating pressure. If the intersection falls below the diagonal line, and if moments do not exceed maximum values listed for that model (see Step 4) the Tolomatic rod cylinder slide will accommodate the application. If the intersection is above the diagonal line, a larger rod cylinder slide bore size should be considered.

NOTE: Additional force may be required to obtain the necessary acceleration for vertical or horizontal loads.

3 DETERMINE EFFECT OF LOAD VS. EXTENDED LENGTH

- Consult the Max. Load Weight vs Stroke Length Chart for the Tolomatic rod cylinder slides.
- Cross-reference the load weight and the extended length. If the intersection falls below the maximum load line, and if moments do not exceed maximum values listed for that model (see Step 4), the rod cylinder slide will accommodate the application. If the intersection is above the diagonal line, a larger rod cylinder slide bore size should be considered.

4 DETERMINE NATURE OF LOAD AND THE EFFECT OF BENDING MOMENTS

If the rod cylinder slide will guide and support a load located directly on center of the tooling plate, bending moments will not be a factor in the rod cylinder slide selection.

NOTE: the maximum load weight "W" must not exceed the capacity limits of the rod cylinder slide selected.

- Bending Moments

  For off center or side loads, determine the distance from the center of mass of the load to the center of the tooling plate. This measurement is needed to calculate the torque for bending moments.

Should the resulting maximum bending moment exceed figures indicated on the chart, a larger rod cylinder slide should be considered.

5 DETERMINE INTERNAL BUMPER CAPACITY [POWER-BLOCK2 ONLY]

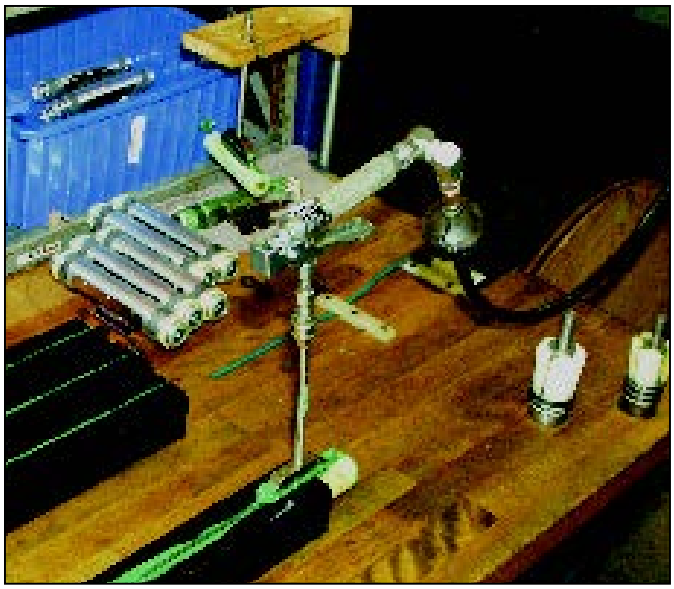
- Consult the Load vs Velocity Data Chart for the Power-Block model selected. The velocities listed on the charts are final or bumper impact velocities.
- Cross-reference the final velocity and weight of the load. If the intersection is below the diagonal lines, the internal bumpers on the Power-Block2 may be used. If the point falls above the dashed diagonal line or if the velocity is not known, select a larger rod cylinder slide. On high-cyclic applications, use of external stops is strongly recommended.

6 CONSIDER OPTIONS

- Switches– dc Reed, Hall-effect, or ac Triac - (All Models)
- Bumpers and Stop Collars - (Power-Block)
- Dual Tooling Plate (Power-Block)

Application Guidelines

The following conditional statements are intended as general guidelines for use of Tolomatic actuators. Since all applications have their own specific operating requirements, consult Tolomatic, Inc. or your local Tolomatic distributor if an application is unconventional or if questions arise regarding the selection process.



LUBRICATION GUIDELINES

All Tolomatic actuators (except Cable Cylinders) are prelubricated at the factory. To ensure maximum actuator life, the following guidelines should be followed.

- **Filtration**

  We recommend the use of dry, filtered air in our products. "Filtered air" means a level of 10 Micron or less. "Dry" means air should be free of appreciable amounts of moisture. Regular maintenance of installed filters will generally keep excess moisture in check.

- **External Lubricators (optional)**

  The factory prelubrication of Tolomatic actuators will provide optimal performance without the use of external lubrication. However, external lubricators can further extend service life of pneumatic actuators if the supply is kept constant.

  Oil lubricators, (mist or drop) should supply a minimum of 1 drop per 20 standard cubic feet per minute to the cylinder. As a rule of thumb, double that rate if water in the system is suspected. Demanding conditions may require more lubricant.

  If lubricators are used, we recommend a non-detergent, 20cP @ 140˚F 10-weight lubricant. Optimum conditions for standard cylinder operation are +32˚ to +150˚F (+0˚ to 65.5˚C).

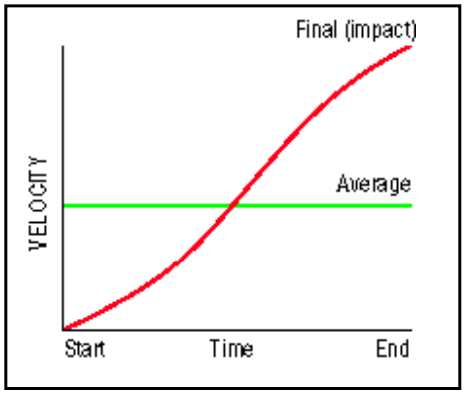
  NOTE: Use of external lubricators may wash away the factory installed lubrication. External lubricants must be maintained in a constant supply or the results will be a dry actuator prone to premature wear.

- **Sanitary Environments**

  Oil mist lubricators must dispense "Food Grade" lubricants to the air supply. Use fluids with ORAL LD50 toxicity ratings of 35 or higher such as Multitherm® PG-1 or equivalent. Demanding conditions can require a review of the application.

FINAL VELOCITY CALCULATION

Velocity calculations for all rodless cylinders need to differentiate between final velocity and average velocity. For example: Stroking a 100-inch BC3 model in one second yields an average velocity of 100 inches per second. To properly determine the inertial forces for cushioning, it is important to know the final (or impact) velocity. Rodless cylinders accelerate and decelerate at each end of the stroke. Therefore this acceleration must be considered (see diagram).



If final (or impact) velocity cannot be calculated directly, a reasonable guideline is to use 2 x average velocity.

PB & PB2 Service Parts Ordering - ALL Sizes

PB: Power-Block Rod Cylinder Slide	Inch (U.S. Standard)			
SIZE	06*	10*	17	20
Reed Switch Magnet[1]	2506-9003	2510-9003	2517-9003	2520-9003
Hall-effect Switch Magnet[1]	2506-9004	2510-9004	2517-9004	2520-9004
BP: Stop Collar / Bumper Kit[2]	2506-9002	2510-9002	2517-9002	2520-9002

*Discontinued Size: parts are listed for reference only. All parts listed are limited to stock on hand and are no longer manufactured (1-1-2020)

PB2: Power-Block2 Rod Cylinder Slide	Inch (U.S. Standard)					
SIZE	08*	10	17	20	32	52*
TN: T-Nuts	3410-1013	3410-1013	3415-1013	3415-1013	3420-1013	3420-1013

*Discontinued Size: parts are listed for reference only. All parts listed are limited to stock on hand and are no longer manufactured (1-1-2020)

	CONFIG. CODE ORDERING
	Mounting Hardware & FE conn. included
DESCRIPTION	CODE
Switch Kit, Reed, Form C, 5m	BT
Switch Kit, Reed, Form C, Male Conn.	BM
Switch Kit, Reed, Form A, 5m	RT
Switch Kit, Reed, Form A, Male Conn.	RM
Switch Kit, Triac, 5m	CT
Switch Kit, Triac, Male Conn.	CM
Switch Kit, Hall-effect, Sinking, 5m	KT
Switch Kit, Hall-effect, Sinking, Male Conn.	KM
Switch Kit, Hall-effect, Sourcing, 5m	TT
Switch Kit, Hall-effect, Sourcing, Male Conn.	TM

NOTE: When kit is ordered female connector & all mounting hardware is included

Switch Ordering NOTES:

To order field retrofit switch and hardware kits for all Tolomatic actuators: SW (Then the model and bore size, and type of switch required)
Example: SWPB20RT
(Hardware and Form A Reed switch with 5 meter lead for 1.25" bore PB Rod Cylinder Slide)

Replacing an existing switch on an actuator manufactured AFTER 7-1-1997
Order using PART NUMBER in table above

Replacing an existing switch on an actuator manufactured BEFORE 7-1-1997
Order using CONFIGURATOR CODE in table above
If replacing a quick-disconnect switch on an actuator manufactured BEFORE 7-1-1997 it will also be necessary to replace or require the female-end coupler with the in-line splice
(see page PB_13)

Service Parts Ordering NOTES:

1 One Each

2 Kit includes: 2 (two) stop collars and 2 (two) 1/4" thick polyurethane external bumpers to help absorb impact shock

PB & PB2 Ordering - All Sizes

MODEL, BORE, STROKE, BEARING | **OPTIONS**

PB_ 20 SK30 __ DP BP BM2

MODEL & MOUNTING

PB Power Block Rod Cylinder Slide-inch (U.S. Standard)
PB2 Power Block2 Rod Cylinder Slide-inch (U.S. Standard)

PB BORE SIZE

17 1.13" *(27mm)*
20 1.25" *(32mm)*

PB2 BORE SIZE

10 0.63" *(16mm)*
17 1.13" *(27mm)*
20 1.25" *(32mm)*
32 2.00" *(51mm)*

STROKE LENGTH

SK__ Enter desired stroke length from the code number in the table below

STROKE LENGTH	ORDER CODE PB		PB2			
	17	20	10	17	20	32
0.5" *(13mm)*			05			
1.0" *(25mm)*	10	10	10	10	10	10
1.5" *(38mm)*			15			
2.0" *(51mm)*	20	20	20	20	20	20
3.0" *(76mm)*	30	30	30	30	30	30
4.0" *(102mm)*			40	40	40	40
5.0" *(127mm)*				50	50	50
6.0" *(152mm)*				60	60	60

BEARING TYPE

PB
Composite Bearings - NO Entry Required

PB2
LB Linear Bearings
CB Composite Bearings

Not all codes listed are compatible with all options. Contact Tolomatic with any questions.

SWITCHES (PB_14)

(Quantity desired follows ordering code)

RM_ Reed Switch (Form A) with 5-meter lead/QD (Quick-disconnect)
RT_ Reed Switch (Form A) with 5-m lead
BM_ Reed Switch (Form C) with 5-meter lead/QD
BT_ Reed Switch (Form C) with 5-m lead
***KM_** Hall-effect Sinking Switch with 5-meter lead/QD
***KT_** Hall-effect Sinking Switch w/ 5-m lead
***TM_** Hall-effect Sourcing Switch with 5-meter lead/QD
***TT_** Hall-effect Sourcing Switch with 5-meter lead
CM_ TRIAC Switch with 5-meter lead/QD
CT_ TRIAC Switch with 5-meter lead
***MDR** Dual Magnet (Reed, Hall-effect, Triac)

* *Not available for 05 size*

STOP COLLARS/BUMPERS (PB ONLY)

BP For Bumpers/Stop Collars

DUAL TOOLING PLATE (PB ONLY)

DP For Dual Tooling Plate

T-NUTS (PB2 ONLY)

TN_ For T-Nuts, indicate number required