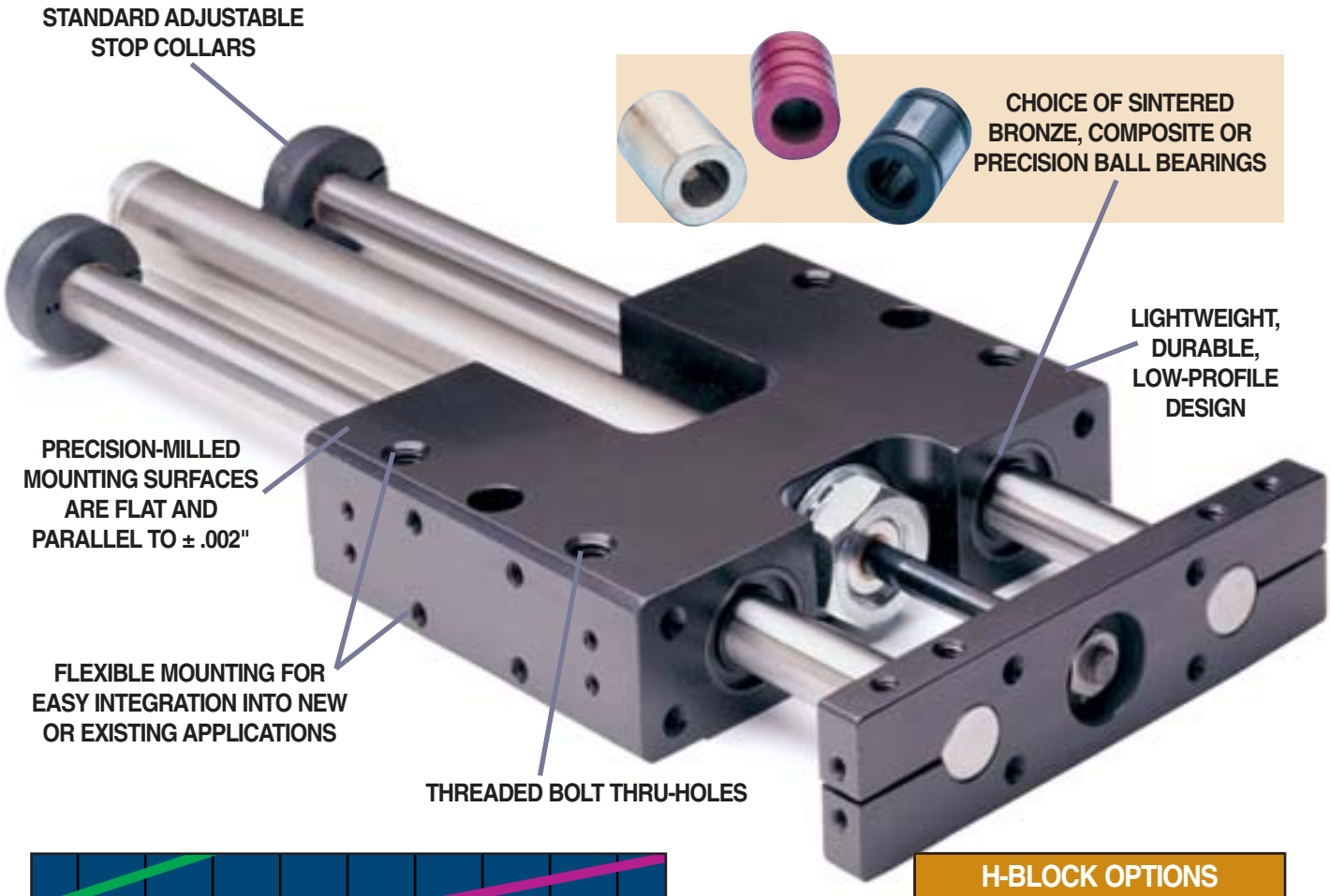
H-BLOCK

The lightweight, durable, low-profile H-Block design is the most versatile of our rod cylinder slides. It also has one of the highest ratings of load weight vs extension for its kind in the industry. The H-Block features flexible mounting with your choice of sintered bronze, composite or precision ball bearings.

Tol-O-Matic's H-Block Rod Cylinder Slide was developed in direct response to customer requests. Thanks to its flexible mounting options and lightweight yet strong and durable low-profile design, the H-Block is gaining popularity in a variety of linear motion applications.

H-Block actuators can be ordered with stroke lengths up to 12" [305mm] (longer stroke lengths are also available) in your choice of six cylinder bore sizes: $\frac{9}{16}$", $\frac{3}{4}$", $1\frac{1}{16}$", $1\frac{1}{2}$", 2" and 3". Three bearing types: sintered bronze bearings, composite bearings or precision ball bearings are available for smooth operation and longer bearing life. Best of all, the H-Block series is completely adaptable to other Tol-O-Matic actuators, making it the perfect building block for a complete motion system.

The unique "H" design allows for easy mounting of sensing systems: dc reed, Hall-effect or ac Traic switches. Shock absorbers are available for high inertia applications. See page 211 & 222 for detailed descriptions, dimensional drawings and performance data. In addition, stop collars and fasteners are available.



PERFORMANCE DATA

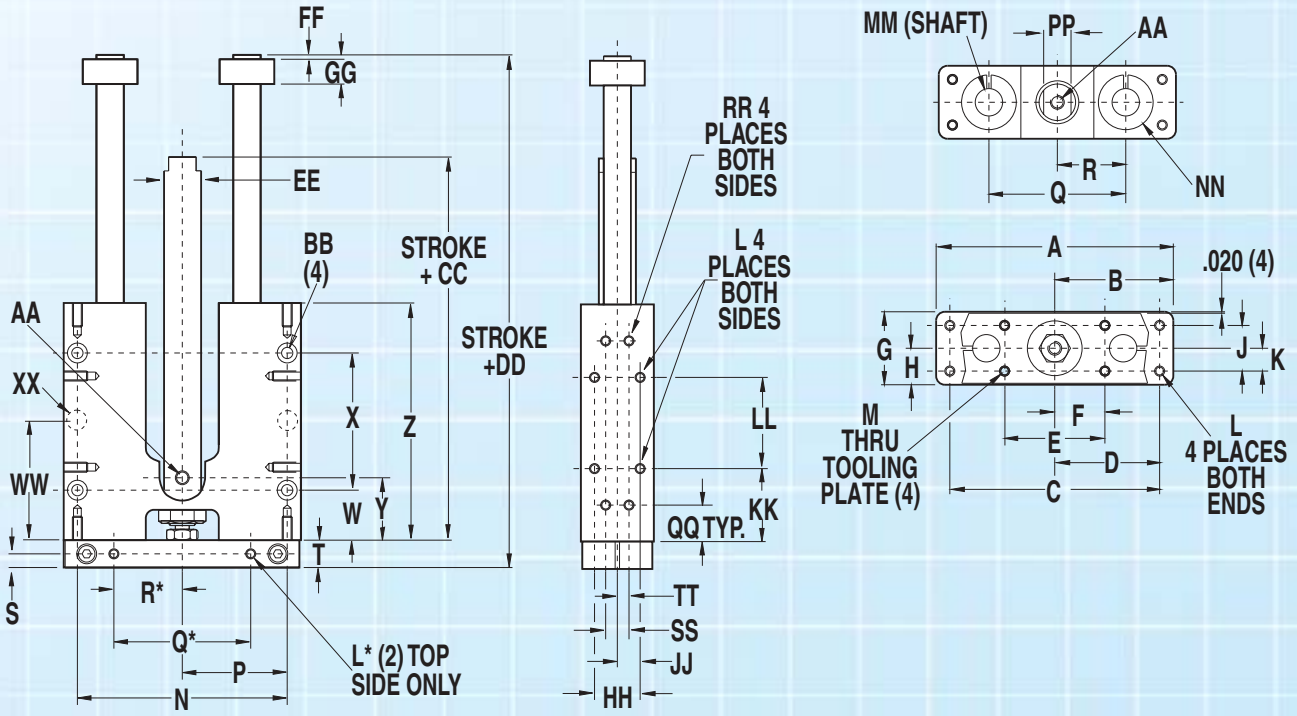
SEE PAGES 138 TO 143
FOR PERFORMANCE DATA FOR
H-BLOCK ROD CYLINDER SLIDES

H-BLOCK OPTIONS

HB.EXE
HB09.DWG
HB09.DXF
HB12.DWG
HB12.DXF
HB17.DWG
HB17.DXF

DIMENSIONAL DATA

HB.EXE
HB24.DWG
HB24.DXF
HB32.DWG
HB32.DXF
HB48.DWG
HB48.DXF



OVERALL UNIT SPECIFICATIONS						
	HB09	HB12	HB17	HB24	HB32	HB48
Bore size (in.)	0.562	0.75	1.062	1.50	2.00	3.00
Base weight (lbs.)	1.61	2.07	3.96	4.83	12.82	31.38
Weight per in. of stk. (lbs.)	0.08	0.15	0.22	0.34	0.59	0.97

OVERALL UNIT SPECIFICATIONS						
	HB09	HB12	HB17	HB24	HB32	HB48
Bore size (in.)	0.562	0.75	1.062	1.50	2.00	3.00
Base weight (kgs.)	0.7	0.9	1.8	2.2	5.8	14.2
Weight per in.(25mm) of stk. (kgs.)	0.04	0.07	0.10	0.15	0.27	0.44

For Assistance Call
1-800-328-2174
(Toll Free U.S. and Canada)
or
763-478-8000
Fax 763-478-8080

MODEL NO.	BORE SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q*	R*	S	T	W	X	Y	Z
HB09	9/16"	3.250	1.625	2.875	1.438	1.375	0.688	0.950	0.475	0.625	0.313	#6-32 x .31 DP	#6-32 thru	2.875	1.438	1.875	0.938	0.18	0.38	0.685	1.880	0.86	3.250
HB12	3/4"	4.531	2.266	3.937	1.969	1.750	0.875	1.200	0.600	0.700	0.350	#10-24 x .38 DP	#10-24 thru	3.937	1.969	2.500	1.250	0.18	0.38	0.825	2.000	1.30	3.650
HB17	1 1/16"	5.125	2.562	4.500	2.250	2.000	1.000	1.560	0.780	0.945	0.473	1.4-20 x .50 DP	1/4-20 thru	4.500	2.250	2.750	1.375	0.25	0.50	1.000	2.500	1.36	4.500
HB24	1 1/2"	6.250	3.125	5.438	2.719	2.500	1.250	1.935	0.968	1.250	0.625	1/4-20 x .50 DP	1/4-20 thru	5.438	2.719	3.500	1.750	0.31	0.63	1.063	2.625	1.88	4.750
HB32	2"	7.750	3.875	7.000	3.500	3.500	1.750	2.800	1.400	2.050	1.025	5/16-18 x .50 DP	5/16-18 thru	7.000	3.500	4.688	2.344	0.38	0.75	1.188	3.875	2.19	6.250
HB48	3"	10.000	5.000	9.000	4.500	4.500	2.250	3.560	1.780	2.500	1.250	3/8-16 x .63 DP	3/8-16 thru	9.000	4.500	6.000	3.000	0.50	1.00	1.437	4.125	2.66	7.000

MODEL	BORE	AA	BB	CC	CC¥	DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	PP	QQ	RR	SS	TT	WW	XX§
HB09	9/16"	#10-32	Clearance for #6 SHCS tapped #8-32 x .55DP from opposite side	2.41	2.66	4.07	Ø.62	0.03	0.31	0.625	0.313	1.000	1.250	.375 nom.	0.88	0.38	0.500	#6-32 x .18 DP	0.320	0.160	1.625	ø.250/.251 x .375DP
HB12	3/4"	1/8-27 NPTF	Clearance for 1/4 SHCS tapped 5/16 x .95DP from opposite side	3.30	3.55	4.44	Ø.81	0.03	0.38	0.700	0.350	1.275	1.100	.500 nom.	1.13	0.62	0.500	#6-32 x .18 DP	0.320	0.160	1.825	ø.375/.376 x .500DP
HB17	1 1/16"	1/8-27 NPTF	Clearance for 1/4 SHCS tapped 5/16 x .95DP from opposite side	3.47	3.63	5.44	Ø1.12	0.03	0.41	0.945	0.473	1.500	1.500	.625 nom.	1.50	0.88	0.625	#8-32 x .25 DP	0.450	0.225	2.250	ø.375/.376 x .500DP
HB24	1 1/2"	1/8-27 NPTF	Clearance for 1/4 SHCS tapped 5/16 x .95DP from opposite side	4.07	4.32	5.91	Ø1.56	0.03	0.50	1.250	0.625	1.500	1.750	.750 nom.	1.75	0.88	0.625	#8-32 x .25 DP	0.450	0.225	2.375	ø.375/.376 x .500DP
HB32	2"	1/4-18 NPT	Clearance for 5/16-18 SHCS tapped 3/8 x 1.00DP from opposite side	5.04	5.32	7.53	Ø2.08	0.03	0.50	2.050	1.025	1.750	2.750	1.000 nom.	2.00	1.25	0.625	#8-32 x .25 DP	0.450	0.225	3.125	ø.500/.502 x .500DP
HB48	3"	3/8-18 NPT	Clearance for 7/16 SHCS tapped 1/2-13UNC-2B x 1.50 DP from opposite side	5.82	6.07	8.53	Ø3.16	0.03	0.50	2.500	1.250	2.125	2.750	1.250 nom.	2.25	2.00	0.625	#8-32 x .25 DP	0.450	0.225	3.500	ø.500/.502 x .500DP

*Holes on top side only, set screws fill holes on bottom side ¥Cylinders equipped with magnets §Dowel Pins ⌖ Ø.002 Ⓜ

Above Dimensions in inches

MODEL NO.	BORE SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q*	R*	S	T	W	X	Y	Z
HB09	9/16"	82.55	41.28	73.03	36.53	34.93	17.48	24.13	12.07	15.88	7.95	#6-32 x .31 DP	#6-32 thru	73.03	36.53	47.63	23.83	4.6	9.7	17.40	47.75	21.8	82.55
HB12	3/4"	115.09	57.56	100.00	50.01	44.45	22.23	30.48	15.24	17.78	8.89	#10-24 x .38 DP	#10-24 thru	100.00	50.01	63.50	31.75	4.6	9.7	20.96	50.80	33.0	92.71
HB17	1 1/16"	130.18	65.07	114.30	57.15	50.80	25.40	39.62	19.81	24.00	12.01	1.4-20 x .50 DP	1/4-20 thru	114.30	57.15	69.85	34.93	6.4	12.7	25.40	63.50	34.5	114.30
HB24	1 1/2"	158.75	79.38	138.13	69.06	63.50	31.75	49.15	24.59	31.75	15.88	1/4-20 x .50 DP	1/4-20 thru	138.13	69.06	88.90	44.45	7.9	16.0	27.00	66.68	47.8	120.65
HB32	2"	196.85	98.43	177.80	88.90	88.90	44.45	71.12	35.56	52.07	26.04	5/16-18 x .50 DP	5/16-18 thru	177.80	88.90	119.08	59.54	9.7	19.1	30.18	98.43	55.6	158.75
HB48	3"	254.00	127.00	228.60	114.30	114.30	57.15	90.42	45.21	63.50	31.75	3/8-16 x .63 DP	3/8-16 thru	228.60	114.30	152.40	76.20	12.7	25.4	36.50	104.78	67.6	177.80

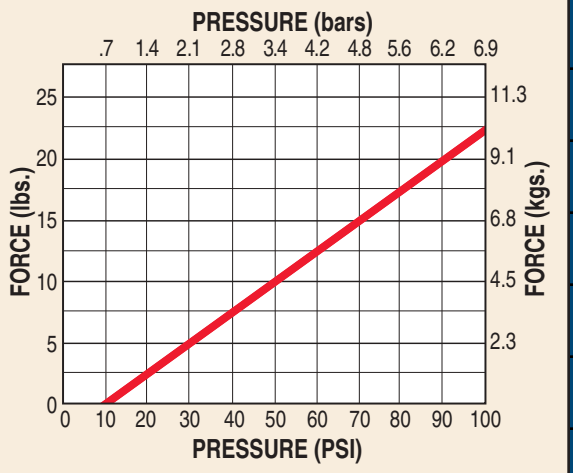
MODEL	BORE	AA	BB	CC	CC¥	DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	PP	QQ	RR	SS	TT	WW	XX§
HB09	9/16"	#10-32	Clearance for #6 SHCS tapped #8-32 x .55DP from opposite side	61.21	67.6	103.4	Ø15.7	0.8	7.9	15.88	7.95	25.40	31.75	9.53 nom.	22.4	9.7	12.70	#6-32 x .18 DP	8.13	4.06	41.28	ø.250/.251 x .375DP
HB12	3/4"	1/8-27 NPTF	Clearance for 1/4 SHCS tapped 5/16 x .95DP from opposite side	83.82	90.2	112.8	Ø20.6	0.8	9.7	17.78	8.89	32.39	27.94	12.70 nom.	28.7	15.7	12.70	#6-32 x .18 DP	8.13	4.06	46.36	ø.375/.376 x .500DP
HB17	1 1/16"	1/8-27 NPTF	Clearance for 1/4 SHCS tapped 5/16 x .95DP from opposite side	88.14	92.2	138.2	Ø28.4	0.8	10.4	24.00	12.01	38.10	38.10	15.88 nom.	38.1	22.4	15.88	#8-32 x .25 DP	11.43	5.72	57.15	ø.375/.376 x .500DP
HB24	1 1/2"	1/8-27 NPTF	Clearance for 1/4 SHCS tapped 5/16 x .95DP from opposite side	103.4	109.7	150.1	Ø39.6	0.8	12.7	31.75	15.88	38.10	44.45	19.05 nom.	44.5	22.4	15.88	#8-32 x .25 DP	11.43	5.72	60.33	ø.375/.376 x .500DP
HB32	2"	1/4-18 NPT	Clearance for 5/16-18 SHCS tapped 3/8 x 1.00DP from opposite side	128.0	135.1	191.3	Ø52.8	0.8	12.7	52.07	26.04	44.45	69.85	25.40 nom.	50.8	31.8	15.88	#8-32 x .25 DP	11.43	5.72	79.38	ø.500/.502 x .500DP
HB48	3"	3/8-18 NPT	Clearance for 7/16 SHCS tapped 1/2-13UNC-2B x 1.50 DP from opposite side	147.8	154.2	216.7	Ø80.3	0.8	12.7	63.50	31.75	53.98	69.85	31.75 nom.	57.2	50.8	15.88	#8-32 x .25 DP	11.43	5.72	88.90	ø.500/.502 x .500DP

*Holes on top side only, set screws fill holes on bottom side ¥Cylinders equipped with magnets §Dowel Pins ⌖ Ø.051 Ⓜ

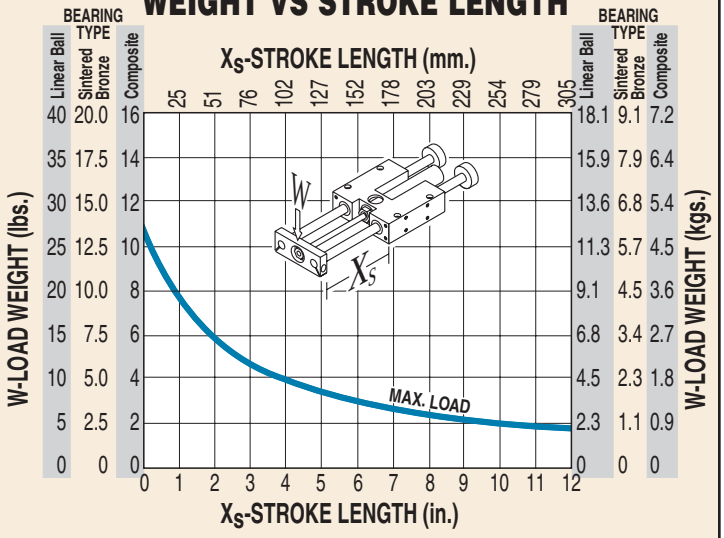
Above Dimensions in millimeters

Performance Data
9/16" Bore HB09

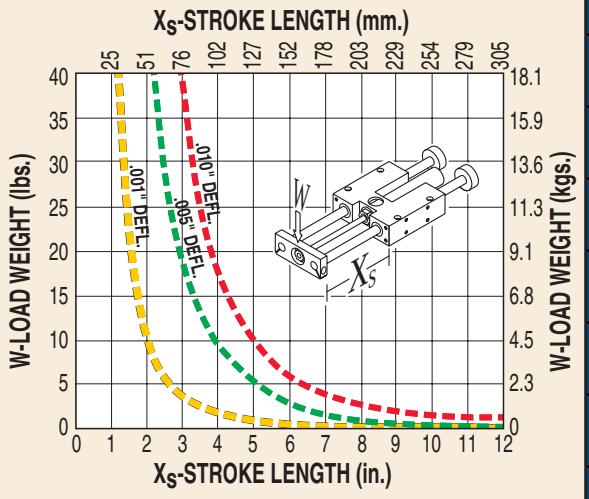
FORCE VS PRESSURE



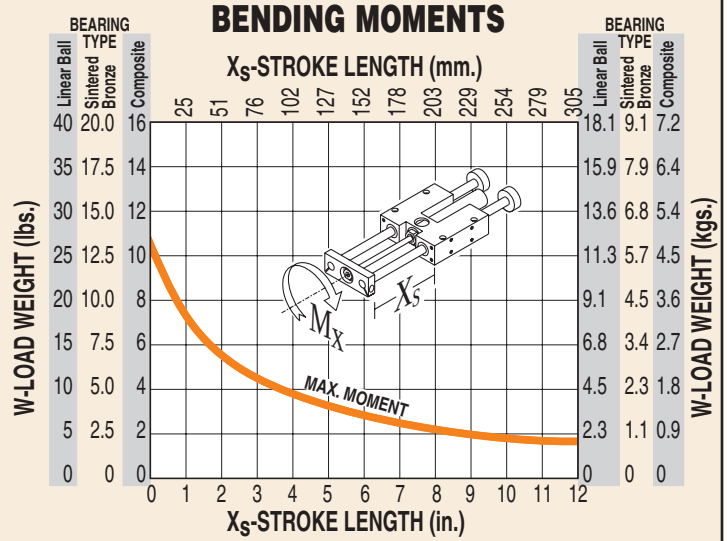
WEIGHT VS STROKE LENGTH



DEFLECTION



BENDING MOMENTS



FORCE VS. PRESSURE

NOTE: Force vs Pressure performance data applies to models with either linear ball, sintered bronze or composite bearings.

MAX. LOAD WEIGHT VS. STROKE LENGTH

Do not exceed Max. Load curve. (Deflection curves are provided for reference.)

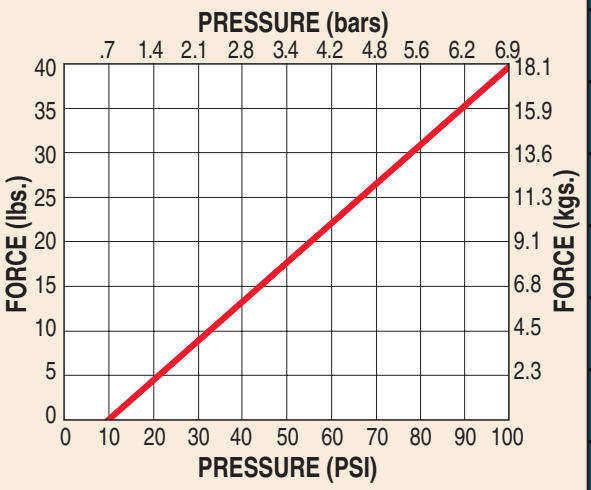
Max. Load for linear ball and composite bearings is based on 200 million linear inches of travel; 20 million for sintered bronze bearings.

BENDING MOMENTS

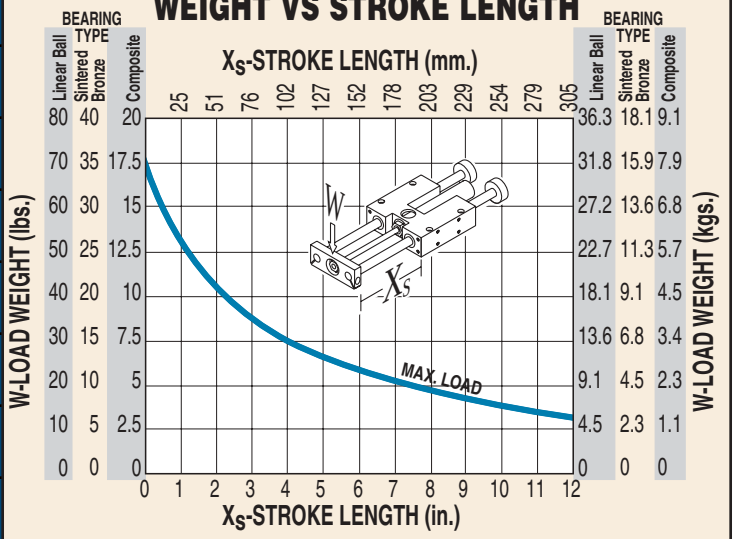
Max. Moment for linear ball and composite bearings is based on 200 million linear inches of travel; 20 million for sintered bronze.

Performance Data
3/4" Bore HB12

FORCE VS PRESSURE



WEIGHT VS STROKE LENGTH



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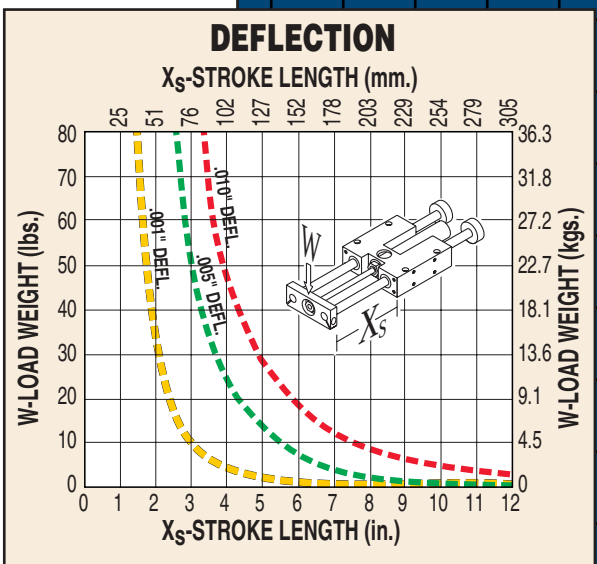
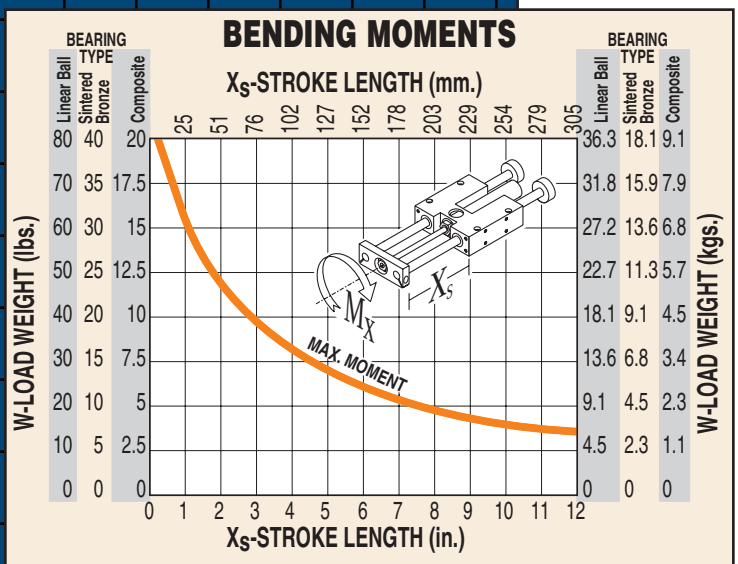


BENDING MOMENTS



FORCE VS. PRESSURE

NOTE: Force vs Pressure performance data applies to models with either linear ball, sintered bronze or composite bearings.

MAX. LOAD WEIGHT VS. STROKE LENGTH

Do not exceed Max. Load curve. (Deflection curves are provided for reference.)

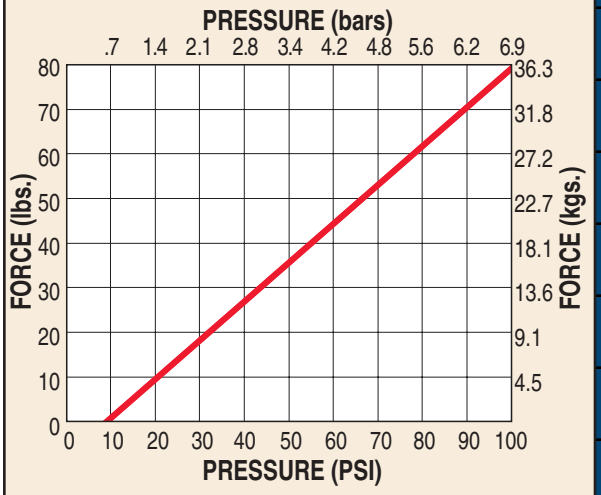
Max. Load for linear ball and composite bearings is based on 200 million linear inches of travel; 20 million for sintered bronze bearings.

BENDING MOMENTS

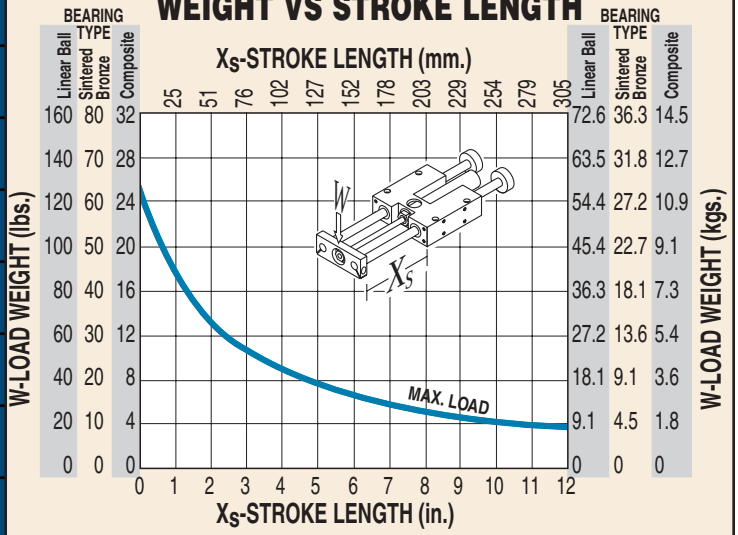
Max. Moment for linear ball and composite bearings is based on 200 million linear inches of travel; 20 million for sintered bronze.

Performance Data
1 1/16" Bore HB17

FORCE VS PRESSURE



WEIGHT VS STROKE LENGTH



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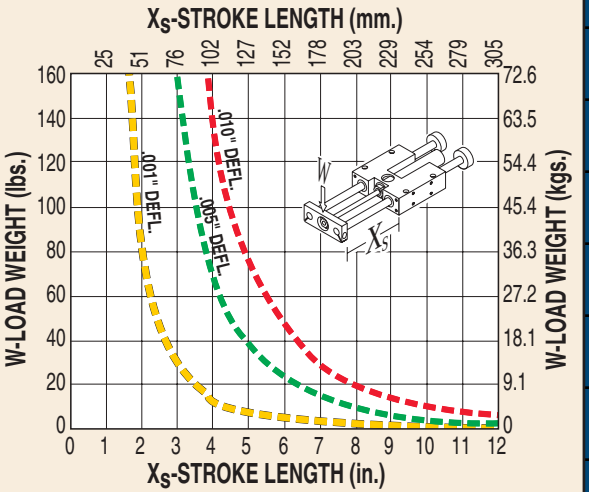
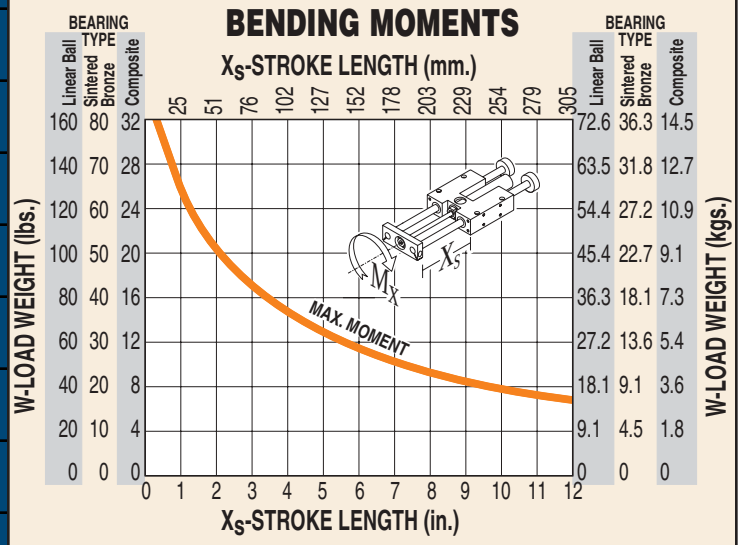


BENDING MOMENTS



FORCE VS. PRESSURE

NOTE: Force vs Pressure performance data applies to models with either linear ball, sintered bronze or composite bearings.

MAX. LOAD WEIGHT VS. STROKE LENGTH

Do not exceed Max. Load curve. (Deflection curves are provided for reference.)

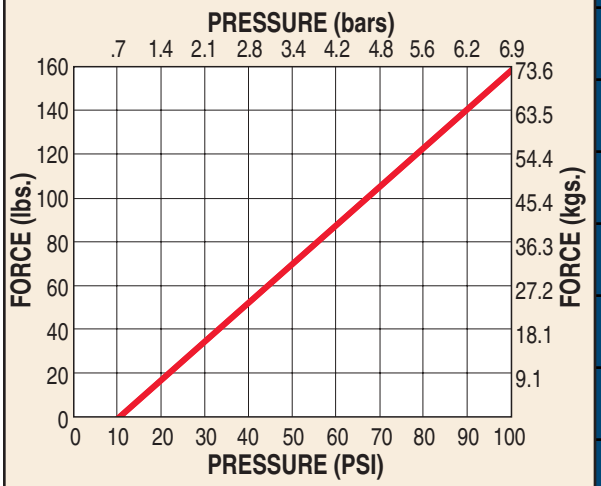
Max. Load for linear ball and composite bearings is based on 200 million linear inches of travel; 20 million for sintered bronze bearings.

BENDING MOMENTS

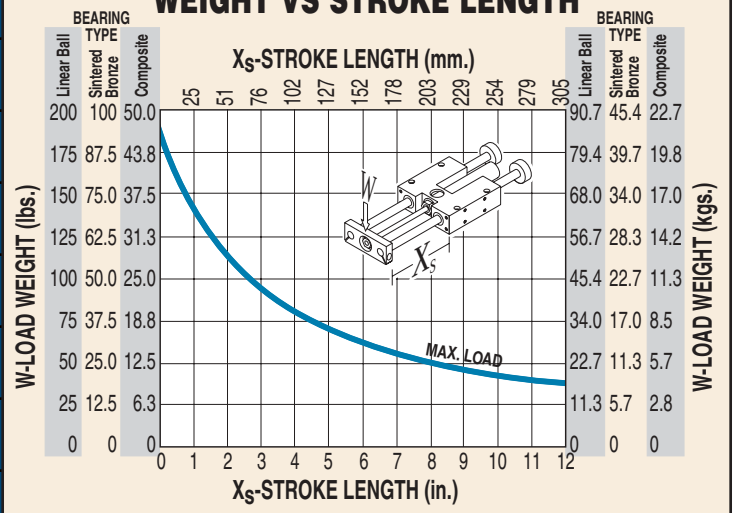
Max. Moment for linear ball and composite bearings is based on 200 million linear inches of travel; 20 million for sintered bronze.

Performance Data
1½" Bore HB24

FORCE VS PRESSURE



WEIGHT VS STROKE LENGTH



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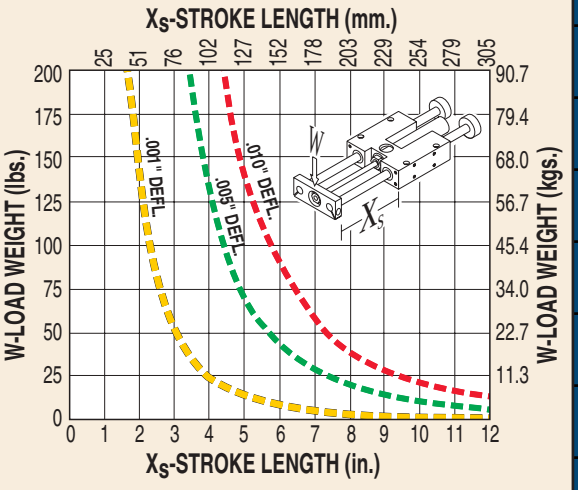
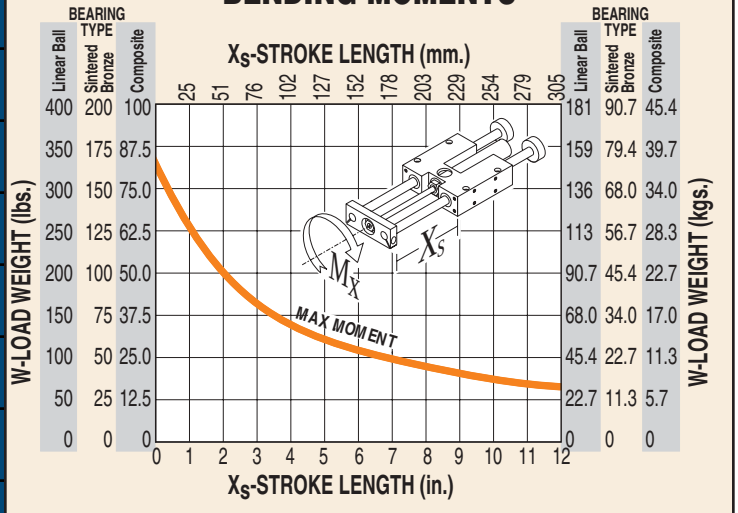


BENDING MOMENTS



FORCE VS. PRESSURE

NOTE: Force vs Pressure performance data applies to models with either linear ball, sintered bronze or composite bearings.

MAX. LOAD WEIGHT VS. STROKE LENGTH

Do not exceed Max. Load curve. (Deflection curves are provided for reference.)

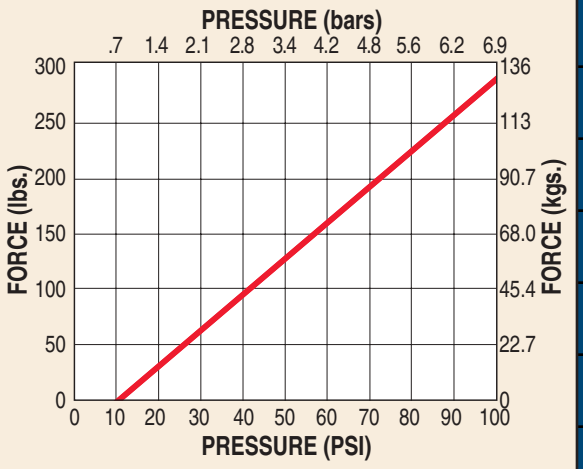
Max. Load for linear ball and composite bearings is based on 200 million linear inches of travel; 20 million for sintered bronze bearings.

BENDING MOMENTS

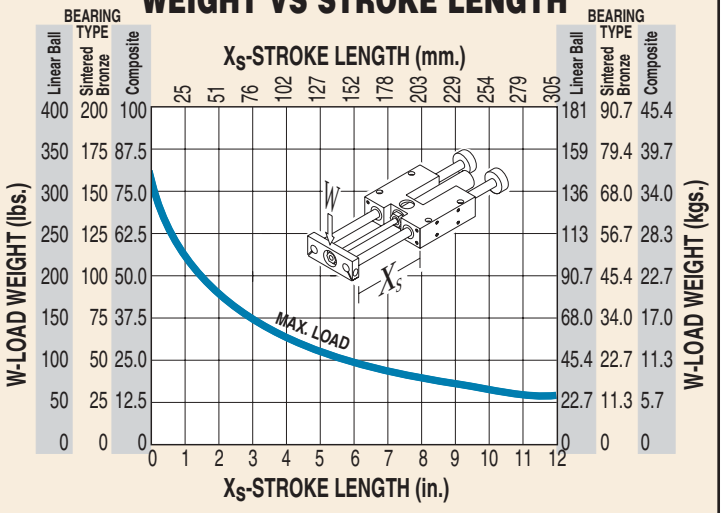
Max. Moment for linear ball and composite bearings is based on 200 million linear inches of travel; 20 million for sintered bronze.

Performance Data
2" Bore HB32

FORCE VS PRESSURE



WEIGHT VS STROKE LENGTH



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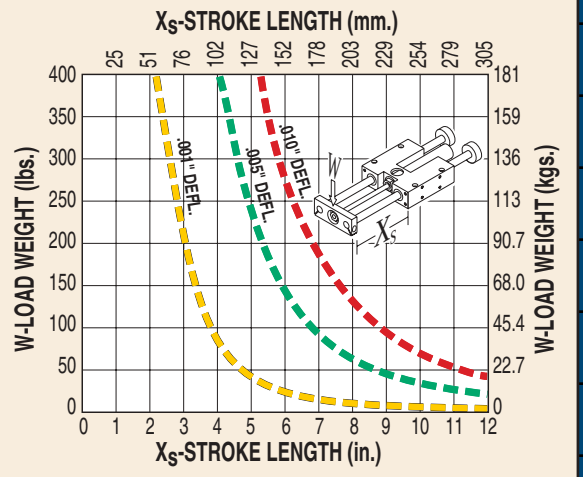
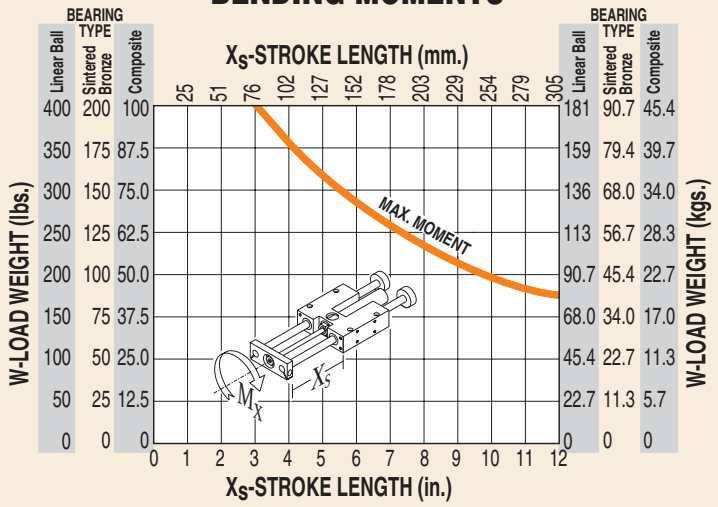


BENDING MOMENTS



FORCE VS. PRESSURE

NOTE: Force vs Pressure performance data applies to models with either linear ball, sintered bronze or composite bearings.

MAX. LOAD WEIGHT VS. STROKE LENGTH

Do not exceed Max. Load curve. (Deflection curves are provided for reference.)

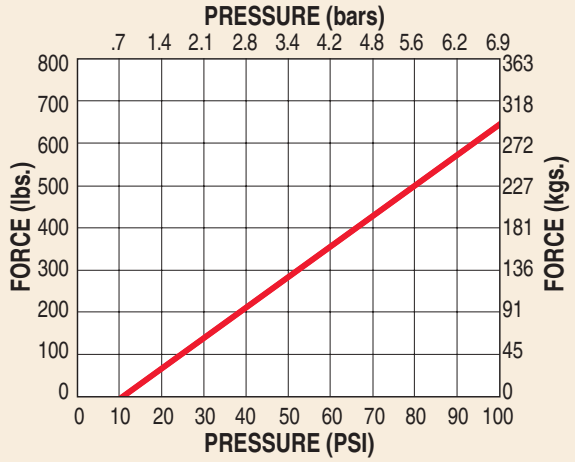
Max. Load for linear ball and composite bearings is based on 200 million linear inches of travel; 20 million for sintered bronze bearings.

BENDING MOMENTS

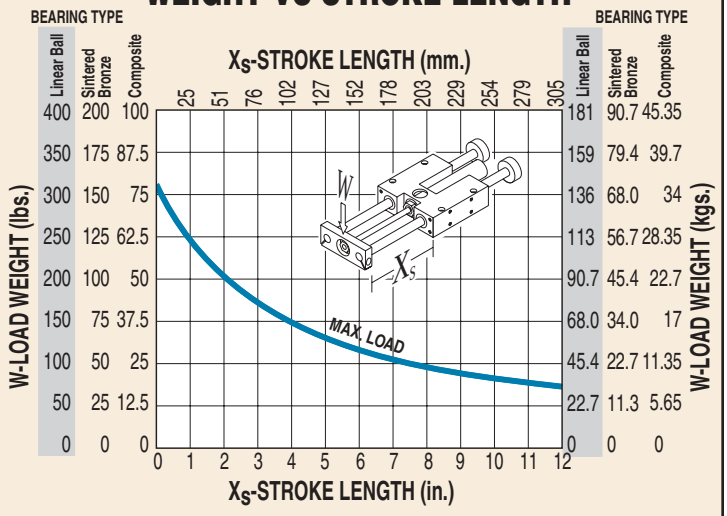
Max. Moment for linear ball and composite bearings is based on 200 million linear inches of travel; 20 million for sintered bronze.

Performance Data
3" Bore HB48

FORCE VS PRESSURE



WEIGHT VS STROKE LENGTH



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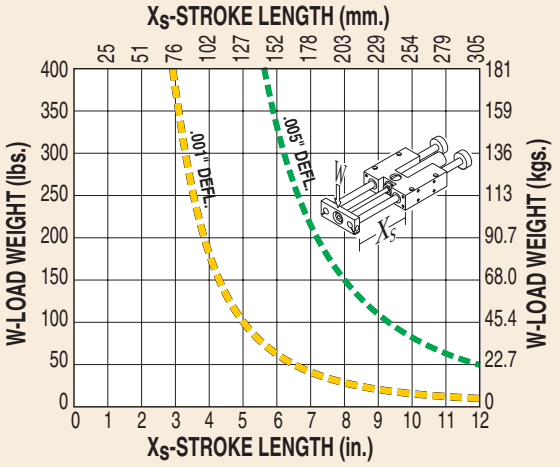
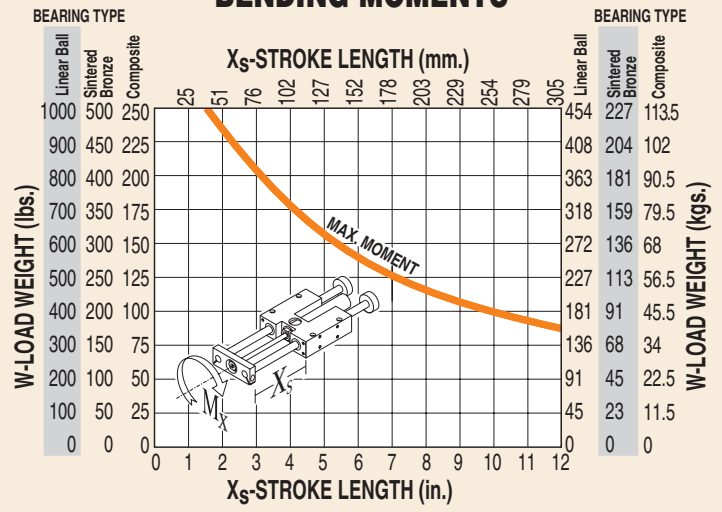


BENDING MOMENTS



FORCE VS. PRESSURE

NOTE: Force vs Pressure performance data applies to models with either linear ball or composite bearings.

MAX. LOAD WEIGHT VS. STROKE LENGTH

Do not exceed Max. Load curve. (Deflection curves are provided for reference.)

Max. Load for linear ball and composite bearings is based on 200 million linear inches of travel.

BENDING MOMENTS

Max. Moment for linear ball and composite bearings is based on 200 million linear inches of travel.

STOP COLLAR / BUMPER KITS

Stop Collar and Bumper Kits are available for most Tol-O-Matic rod cylinder slides. Bumpers are made of polyurethane and designed to prevent metal-to-metal contact and absorb impact shock. NOTE: All Bumpers are $^1/_4$" thick which may require additional cylinder stroke length.

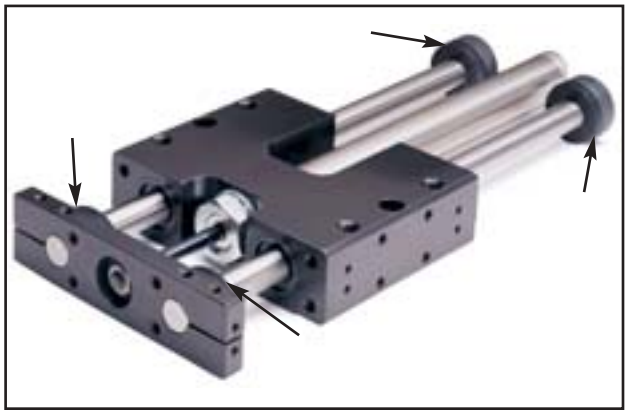
	HB	PB	PB2
Stop Collars	ST	OP	–
Bumpers	OP	OP	–

– Not Available OP Optional ST Standard

H-BLOCK
Stop Collars – *Standard feature*
Bumper Kit – *Optional feature:* contains 4 bumpers

POWER-BLOCK
Internal Bumpers – *Standard feature:* for use on light inertia applications
Stop Collar / Bumper Kit – *Optional feature:* contains 2 stop collars and 2 bumpers

POWER-BLOCK2
Internal Bumpers – *Standard feature:* made of urethane for noise reduction. Designed for operating pressures of up to 150 PSI (10.34 bar) with a 10,000,000 cycle rating.
Stop Collar / Bumpers – *Not Available*

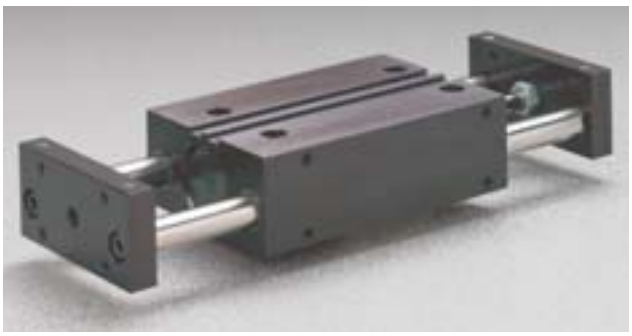


DUAL TOOLING PLATE

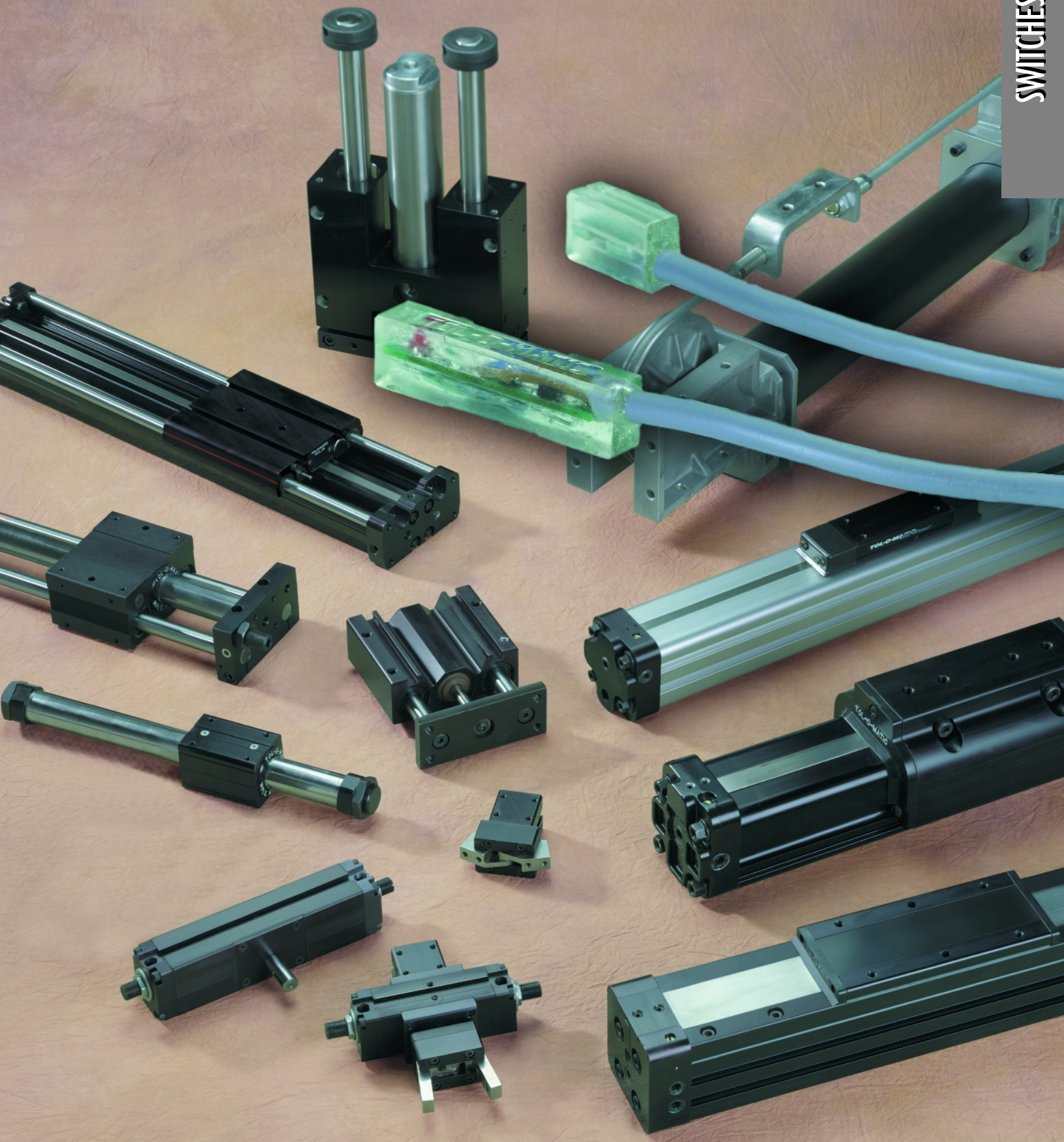
Dual Tooling Plates are available for all Power-Block models allowing both plates to be securely fastened for extra rigidity. Dual pick-and-place functions are also possible by attaching other actuators to each plate. Please consult the factory for this option.

	HB	PB	PB2
Dual Tooling	–	OP	–

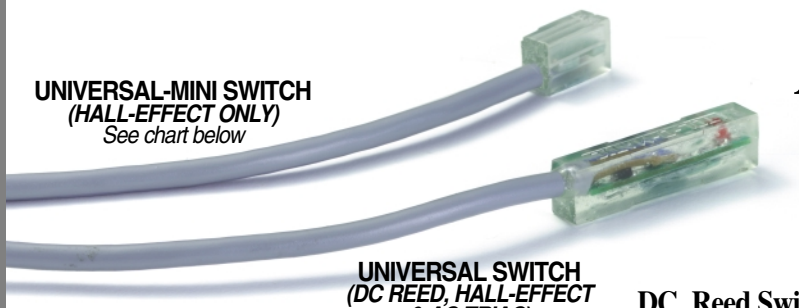
– Not Available OP Optional ST Standard



SWITCHES



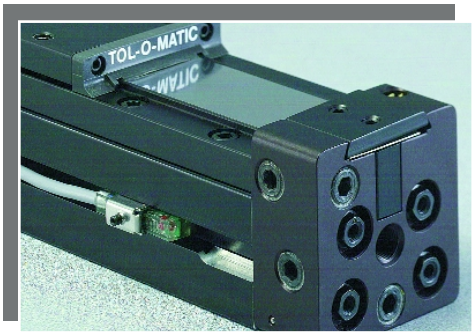
SWITCHES



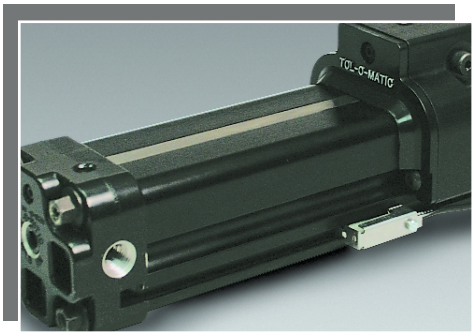
UNIVERSAL-MINI SWITCH
(HALL-EFFECT ONLY)
See chart below

UNIVERSAL SWITCH
(DC REED, HALL-EFFECT & AC TRIAC)

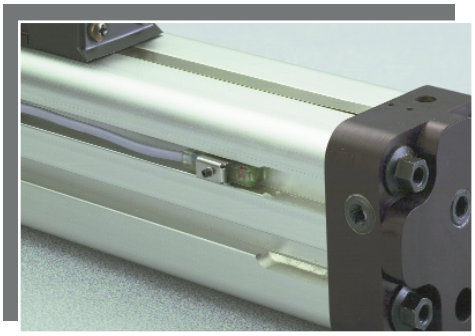
Available for use on most of Tol-O-Matic actuators, these switches are activated by the cylinder's internal piston magnet assembly, or on some actuators, the carrier mounted magnet. DC Reed, Hall-effect and AC Triac switches contain reverse polarity protection.



DC Reed Switches are designed for signalling end-of-stroke position to devices such as programmable controllers. They can be used to operate dc relays and solenoids if a protection circuit is used and if current and voltage limits are observed.



Hall-effect switches are available in either sinking type (NPN), or sourcing type (PNP). They are designed to signal devices such as programmable controllers, dc loads, and TTL or CMOS circuits.



AC Triac Reed Switches are designed for signalling end-of-stroke position to devices such as programmable controllers. They can be used to operate ac relays and solenoids if a protection circuit is used and if current and voltage limits are observed.

UNIVERSAL SWITCH AVAILABILITY

ST - STANDARD FEATURE **OP - INDICATES AVAILABLE OPTION** **– *NOT* AVAILABLE**

Switch	BC2	BC3	BC4	B3S	BCB	BCS	CB	CC	GP	HB	LS	SLS	MG_	MGS	PB	PB2	RA	UB
DC Reed	OP	OP	OP	OP	OP	OP	OP	OP [2]	OP [3]	OP	OP [5]	OP [5]	OP	OP	OP	OP	–	OP
AC Triac	OP	OP	OP	OP	OP	OP	OP	OP [2]	OP [3]	OP	OP [5]	OP [5]	OP	OP	OP	OP	–	OP
DC Hall-effect	OP [1]	OP	OP	OP	OP	OP	OP	–	OP [4]	OP	OP [5]	OP [5]	OP	OP	OP	OP	–	OP
Universal-Mini Hall-effect	–	–	–	–	–	–	–	–	OP [4]	–	–	–	–	–	–	–	OP	–
Magnet	OP	ST	ST	ST	OP	OP	OP	OP	OP	OP	OP	OP	ST	ST	OP	ST	OP	OP

[1] Not available on BC205
[2] Not available with steel tubes
[3] Not available for 3/8", 5/8" and 1" Grippers
[4] Universal-Mini available for 3/8", 5/8" and 1" Grippers
[5] Requires Rail

QUICK-DISCONNECT COUPLERS

Quick-disconnect couplers are available for all switches with shielded* cables in 5m (16.4 ft.) lengths. These couplers allow switches to be removed quickly and easily. Switch includes one male-end coupler (hard wired to switch) and one female-end coupler with additional cable for in-line splice. Replacement switch with hard-wired male-end connector is available as a service part.

NOTE: Quick-disconnect coupler is positioned 6" (152mm) from the sensor.
See switch note page 213

SWITCH PERFORMANCE

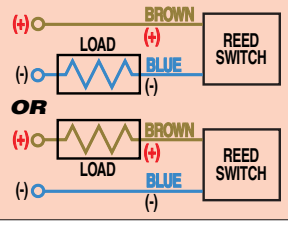
REED SWITCHES

See the following pages for mounting dimensions.

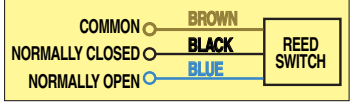
NOTE: All Reed switch codes that incorporate the QUICK-DISCONNECT COUPLER feature have SHIELDED cable from the female quick-disconnect coupler to the flying leads. Shield should be terminated at flying lead end. Switch cable is UNSHIELDED for Reed switch option codes that DO NOT incorporate the Quick-disconnect feature. Reed switches can be used to operate relays and solenoids if a protection circuit is used and if current, wattage and voltage limits are observed. (Call the factory for more information.)

NOT AVAILABLE FOR ROTARY ACTUATORS, GP_038, GP_063, GP_100

REED SWITCH, FORM A WIRING DIAGRAM



REED SWITCH, FORM C WIRING DIAGRAM



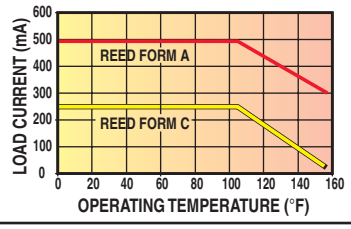
PERFORMANCE DATA

DC REED SWITCH SPECIFICATIONS

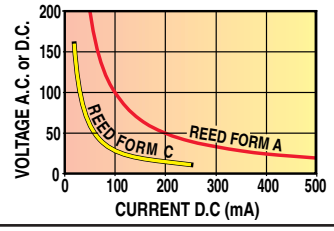
SPECS	REED SWITCH – FORM A	REED SWITCH – FORM C
CONTACTS	Single-pole, single-throw, normally open	Single-pole, double-throw, normally-open / normally-closed
CONTACT RATING	10 Watts, maximum current 500mA (not to exceed 10VA) (Refer to Temperature vs. Current and Voltage Derating charts.)	3 Watts, maximum current 250mA (not to exceed 3VA) (Refer to Temperature vs. Current and Voltage Derating charts.)
INPUT VOLTAGE	200Vdc maximum	120Vdc maximum
RESISTANCE	0.1 Ω Initial (Maximum)	0.1 Ω Initial (Maximum)
RELEASE TIME	1.0 msec. maximum	1.0 msec. maximum
OPERATING TIME	0.6 msec. maximum (including bounce)	0.7 msec. maximum (including bounce)
OPERATING TEMP.	-40° F (-40° C) to 158° F (70° C)	-40° F (-40° C) to 158° F (70° C)
INDICATOR	Red LED lit when 4mA min. flows through contacts	None
*LIFE EXPECTANCY	Up to 200,000,000 cycles (depending on load current,duty cycle and environmental conditions)	Up to 200,000,000 cycles (depending on load current,duty cycle and environmental conditions)
CABLE	5 meter with PVC jacket 2m or 5m Quick-Disconnect with PVC jacket	5 meter with PVC jacket 2m or 5m Quick-Disconnect with PVC jacket
VOLTAGE DROP	2.6V typical @ 100mA	NA

* Data available from manufacturer.

TEMPERATURE vs CURRENT



VOLTAGE DERATING

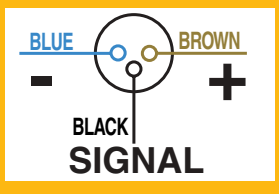


This chart is a quick reference to help select the correct Tol-O-Matic switch to use in your application. See the specifications for each switch to confirm your choice.

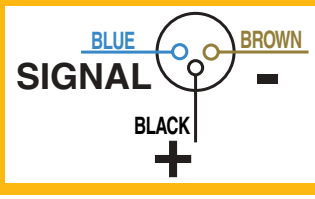
REQUIREMENTS	S Reed Form C	W Reed Form A	I Triac Reed	T Hall-effect Sinking	C Hall-effect Sourcing	H
AC			●			
DC	●	●		●	●	
Mechanical Switch	●	●	●			
Solid State Switch (Zero Bounce)				●	●	
Input-Programmable Controller	●	●	●	●	●	
Coil Direct	●	●	●			
Longest Life				●	●	
Reverse Polarity Protection	●	●	●	●	●	

An Important Note Regarding Field Retrofit of Quick-Disconnect Couplers: If replacing a Quick-Disconnect switch manufactured before 7-1-97 it will also be necessary to replace or rewire the female-end coupler with the in-line splice.

CURRENT – Quick-Disconnect Wiring



OLD – Quick-Disconnect Wiring



SWITCH PERFORMANCE

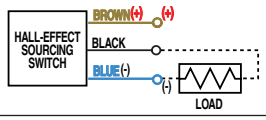
DC HALL-EFFECT SWITCHES

Refer to next pages for mounting data.

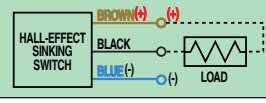
NOTE: All Hall-effect switch codes that incorporate the QUICK-DISCONNECT COUPLER feature have SHIELDED cable from the female quick-disconnect coupler to the flying leads. Shield should be terminated at flying lead end. Switch cable is UNSHIELDED for Hall-effect switch option codes that DO NOT incorporate the Quick-disconnect feature.

NOT AVAILABLE FOR CABLE CYLINDERS, BC205

HALL-EFFECT SOURCING (PNP) SWITCH WIRING DIAGRAM



HALL-EFFECT SINKING (NPN) SWITCH WIRING DIAGRAM



PERFORMANCE DATA

DC HALL-EFFECT SWITCH SPECIFICATIONS

SPECIFICATIONS	HALL-EFFECT SOURCING	HALL-EFFECT SINKING
INPUT VOLTAGE	5 to 25 Vdc	5 to 25 Vdc
OUTPUT	Open collector transistor switch	Open collector transistor switch
OUTPUT RATING	25 Vdc, 200mA dc	25 Vdc, 200mA dc
ON TRIP POINT	150 Gauss maximum	150 Gauss maximum
OFF TRIP POINT	40 Gauss minimum	40 Gauss minimum
OPERATING TEMP.	0° F (-18° C) to 150° F (66° C)	0° F (-18° C) to 150° F (66° C)
OPERATING SPEED	< 10 micro sec.	< 10 micro sec.
INDICATOR*	Red LED lit when sensor is activated	Red LED lit when sensor is activated
CABLE	5 meter with PVC jacket 2m or 5m Quick-Disconnect with PVC jacket	5 meter with PVC jacket 2m or 5m Quick-Disconnect with PVC jacket

*NOTE: Mini-style Universal Hall-effect switches do not have an L.E.D.

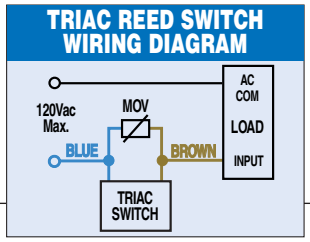
AC TRIAC REED SWITCHES

See next pages for mounting dimensions.

NOTE: All Reed switch codes that incorporate the QUICK-DISCONNECT COUPLER feature have SHIELDED cable from the female quick-disconnect coupler to the flying leads. Shield could be terminated at flying lead end. Switch cable is UNSHIELDED for Reed switch option codes that DO NOT incorporate the Quick-disconnect feature. Reed switches can be used to operate relays and solenoids if a protection circuit is used and if current, wattage and voltage limits are observed. (Call the factory for more information.)

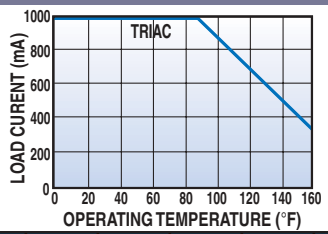
NOT AVAILABLE FOR ROTARY ACTUATORS, GP_038, GP_063, GP_100

TRIAC REED SWITCH WIRING DIAGRAM



PERFORMANCE DATA

TEMPERATURE vs CURRENT



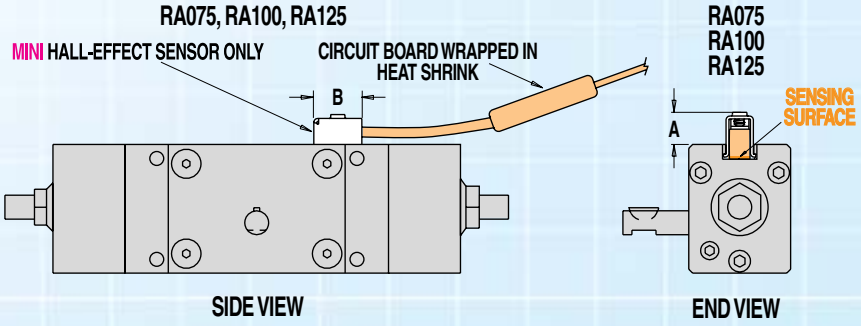
* Data available from manufacturer.

AC TRIAC REED SWITCH SPECIFICATIONS

SPECIFICATIONS	TRIAC SWITCH
CONTACTS	Single-pole, single-throw, normally open
INPUT VOLTAGE	120Vac maximum
FREQUENCY	47 - 63 Hz
CONTINUOUS CURRENT	1 Amp at 86° F (30° C); 0.5 Amp at 140° F (60° C)
PEAK SURGE CURRENT	10 Amp
OPERATING TEMP.	-40° F (-40° C) to 158° F (70° C)
INDICATOR	None
LIFE EXPECTANCY*	Up to 200,000,000 cycles (depending on load current,duty cycle and environmental conditions)
CABLE	5 meter with PVC jacket 2m or 5m Quick-Disconnect with PVC jacket

NOTE: THE SCORED FACE OF THE SWITCH INDICATES THE SENSING SURFACE AND MUST FACE TOWARD THE MAGNET

RACK & PINION ROTARY ACTUATORS



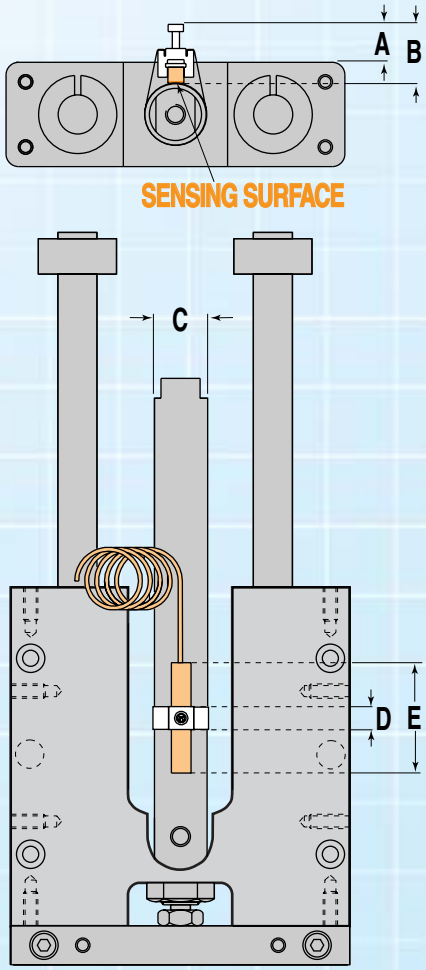
MODEL	BORE	A	B
RA075	0.75	.34	.50
RA100	1.00	.34	.50
RA125	1.25	.32	.50

Above dimensions in inches

MODEL	BORE	A	B
RA075	0.75"	8.51	12.70
RA100	1.00"	8.51	12.70
RA125	1.25"	8.18	12.70

Above dimensions in millimeters

H-BLOCK ROD CYLINDER SLIDE



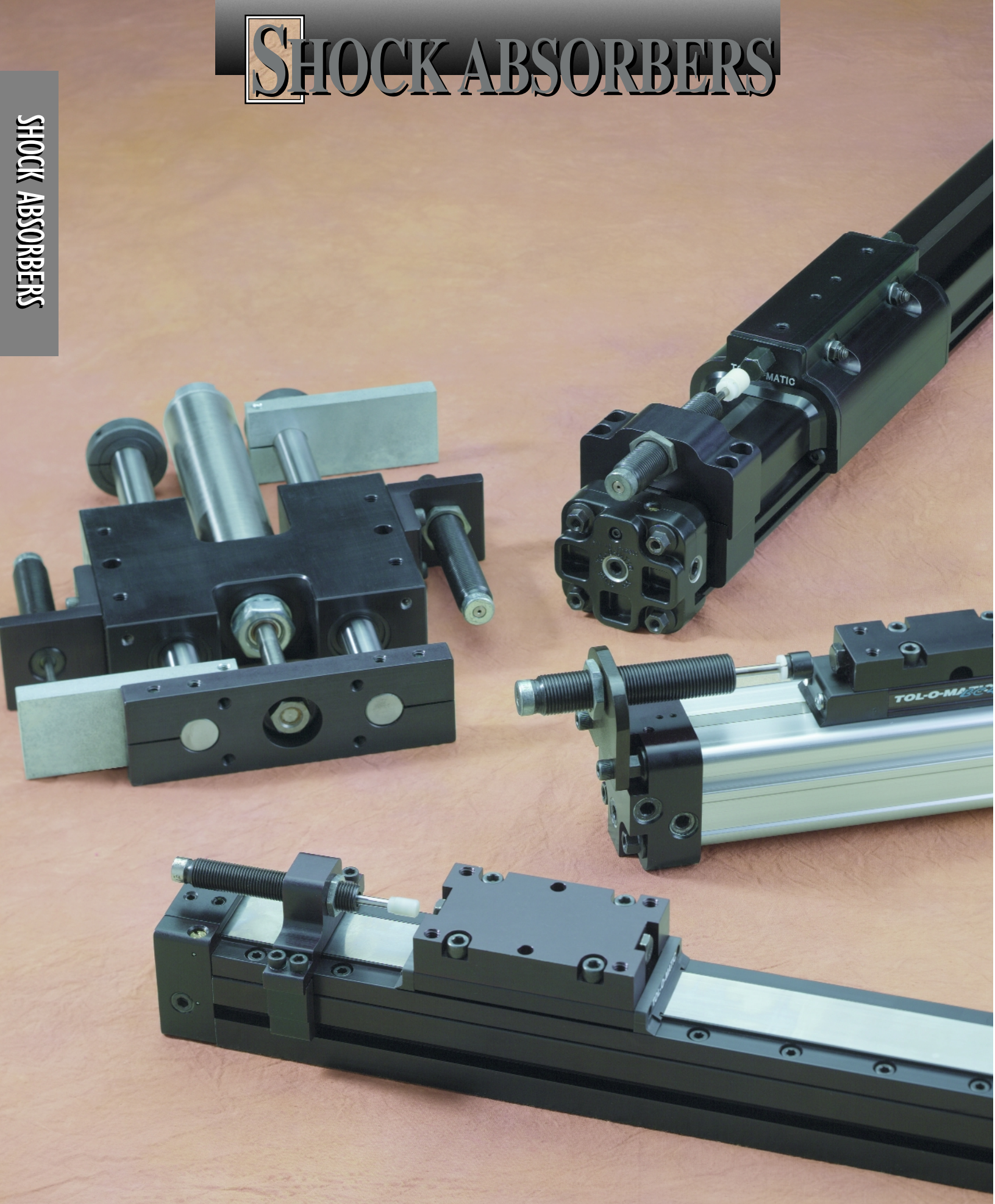
MODEL	BORE	A	B	C	D	E
HB09	0.563	0.69	0.85	0.62	0.37	1.25
HB12	0.750	0.66	0.85	0.81	0.37	1.25
HB17	1.063	0.63	0.85	1.12	0.37	1.25
HB24	1.500	0.66	0.85	1.56	0.37	1.25
HB32	2.000	0.49	0.85	2.08	0.37	1.25
HB48	3.000	0.65	0.85	3.16	0.37	1.25

Above dimensions in inches

MODEL	BORE	A	B	C	D	E
HB09	0.563"	17.40	21.59	15.75	9.40	31.75
HB12	0.750"	16.64	21.59	20.57	9.40	31.75
HB17	1.063"	16.00	21.59	28.45	9.40	31.75
HB24	1.500"	16.83	21.59	39.62	9.40	31.75
HB32	2.000"	12.45	21.59	52.83	9.40	31.75
HB48	3.000"	16.51	21.59	80.26	9.40	31.75

Above dimensions in millimeters

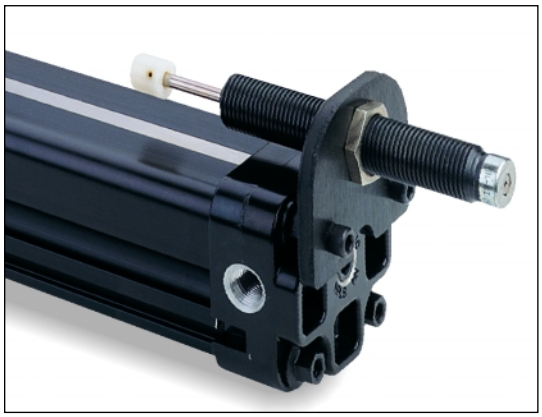
SHOCK ABSORBERS



ADVANTAGES OF SHOCK ABSORBERS:

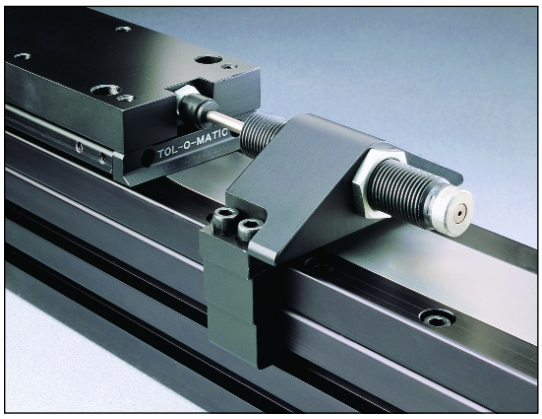
- Increases operating speed
- Smoother deceleration
- Self-compensates for load changes
- Minimizes shock load to equipment
- Reduces equipment maintenance
- Higher equipment productivity

BC2 BAND CYLINDER SHOCK ABSORBER

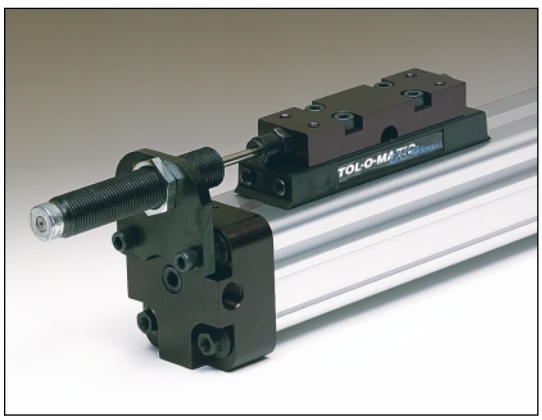


BC2 BAND CYLINDER ADJUSTABLE SHOCK ABSORBER

BC3 BAND CYLINDER SHOCK ABSORBER



BC4 BAND CYLINDER SHOCK ABSORBER



Tol-O-Matic's rodless cylinders with standard internal cushion offer an effective method of decelerating loads. (LS has no internal cushion, MGS has external bumper only.) However, all Tol-O-Matic rodless cylinders are capable of carrying heavier loads at higher velocities than the cylinder cushion can absorb. Optional shock absorbers can be used to increase the cylinder's life and broaden the application range for the cylinder model you have chosen.

Tol-O-Matic offers two types of shock absorber options for use with rodless cylinders. Standard style shocks, which are positioned on the cylinder heads for end-of-stroke deceleration and an adjustable position shock option which allows the shock to be positioned at any point along the cylinder tube. A Shock Stop Plate must be used in conjunction with the BC3, and BC4 shock to provide a stopping surface on the carrier. The H-Block rod cylinder slide also offers a shock absorber option for high inertia applications. Designed for reversible mounting in either extended or retractable positions, these shocks will increase life and broaden the application range of any H-Block model you choose.

NOTE: Shock absorber option will increase the overall carrier height on BC3 and BC4. (Refer to pages 228 to 229 for specifications.)

CAUTION: In applications which result in a load bending moment at deceleration, care should be taken to decelerate the *load* rather than the Band Cylinder *carrier.* Typical shock absorber life varies between 1-2 million cycles (depending on environment) appropriate preventative maintenance should be considered in high cyclic applications.

SHOCK ABSORBERS

LOAD DECELERATION / SHOCK ABSORBER OPTIONS

	INTERNAL AIR CUSHION	EXTERNAL BUMPERS	END-OF-STROKE SHOCK ABSORBERS	ADJUSTABLE POSITION SHOCK ABSORBERS	MAXIMUM CYCLES PER HOUR
BC2(M)05	–	ST	–	–	–
BC2(M,MM)10	ST	–	OP	OP	2000
BC2(M,MM)12	ST	–	OP	OP	1775
BC2(M,MM)15	ST	–	OP	OP	1775
BC2(M,MM)20	ST	–	OP	OP	1000
BC2(M,MM)25	ST	–	OP	OP	1000
BC3(M,MM)10	ST	–	OP*	OP	2000
BC3(M,MM)15	ST	–	OP*	OP	1775
BC3(M,MM)20	ST	–	OP*	OP	1000
BC4(M)06	ST	–	OP	–	2000
BC4(M,MM)10	ST	–	OP	–	2000
BC4(M,MM)12	ST	–	OP	–	1775
BC4(M,MM)15	ST	–	OP	–	1775
BC4(M,MM)20	ST	–	OP	–	1000
BC4(M,MM)25	ST	–	OP	–	1000
LS(MM)05	–	–	OP	–	3500
LS(MM)10	–	–	OP	–	2000
MGS038	–	ST	OP	–	3800
MGS062	–	ST	OP	–	2250
MGS100	–	ST	OP	–	2000
HB09	–	OP	OP	–	2000
HB12	–	OP	OP	–	1775
HB17	–	OP	OP	–	1775
HB24	–	OP	OP	–	1000
HB32	–	OP	OP	–	1000
HB48	–	OP	OP	–	1000

– Not Available OP Optional ST Standard *For BC3 Adjustable Position Shock Absorber is located at the end of stroke

ORDERING CONSIDERATIONS:

All band cylinder (slides) shock absorbers are configurated per cylinder head. For a cylinder with a shock absorber at each end, order a quantity of "2". Cylinders specified with single shocks will be mounted on the right cylinder head side (as the ports face you).

NOTE: For BC2, BC3, and BC4 Band Cylinders, when 2 external / adjustable shock absorbers are ordered, the unit will be assembled with NO internal cushions.

For H-Block shocks (both extending and retracting shock absorption), specify a quantity of "2". H-Blocks specified with single shock absorber will be mounted for the extending stroke.

FIELD RETROFIT ADDITIONAL CONSIDERATIONS:

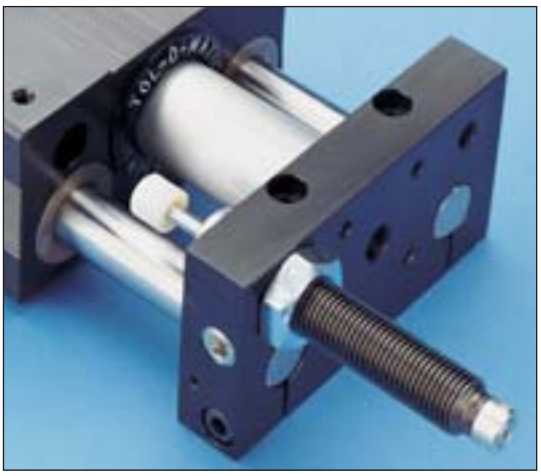
Standard end-of-stroke shock absorbers are designed to operate without the assistance of the standard band cylinder cushion. To ensure proper shock absorber performance, make sure the air cushion is disabled.

BC4 FIELD RETROFIT ORDERING

Be sure to order the shock stop when ordering the shock stop kit for the BC4.

LINEAR SLIDE SHOCK ABSORBER

MAGNETICALLY COUPLED SLIDE SHOCK ABSORBER

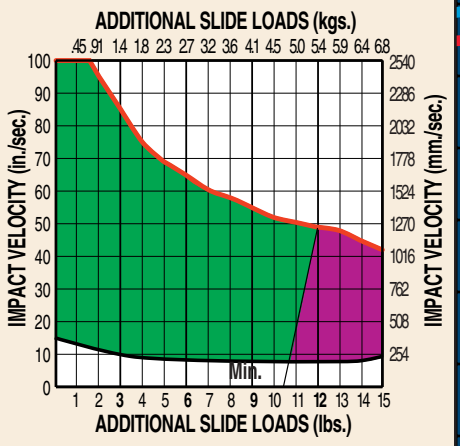


H-BLOCK SHOCK ABSORBER

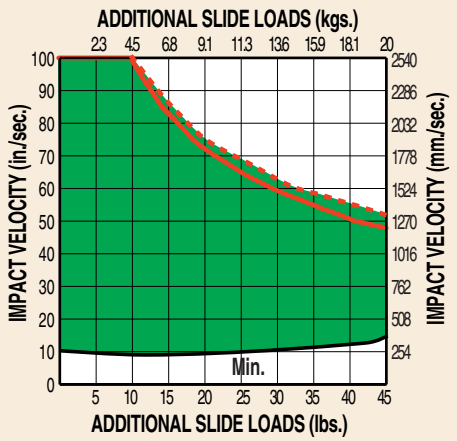
HB SHOCK ABSORBERS

PERFORMANCE DATA
H-BLOCK SHOCKS

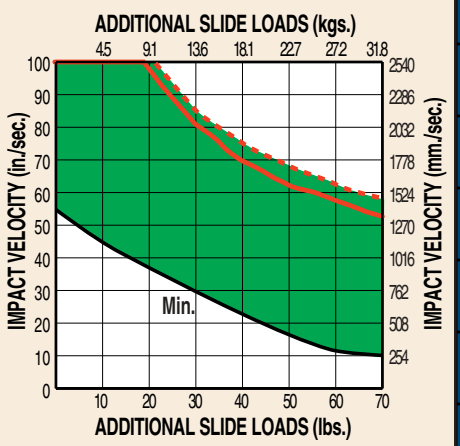
HB09



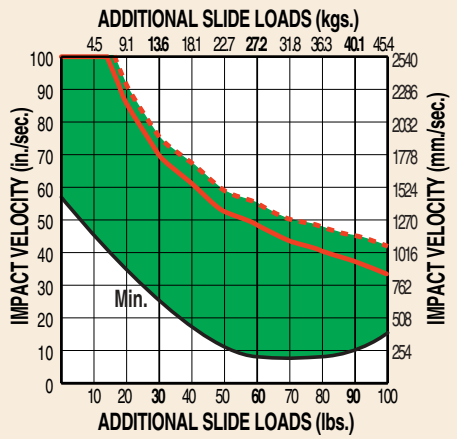
HB12



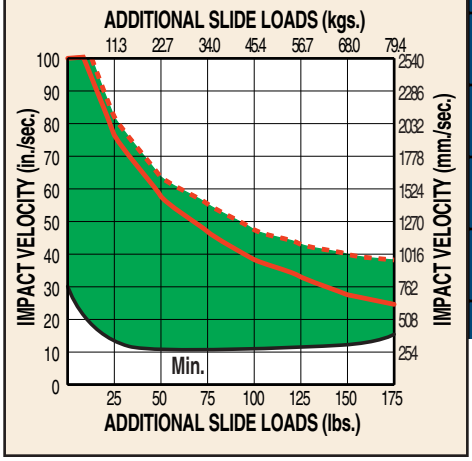
HB17



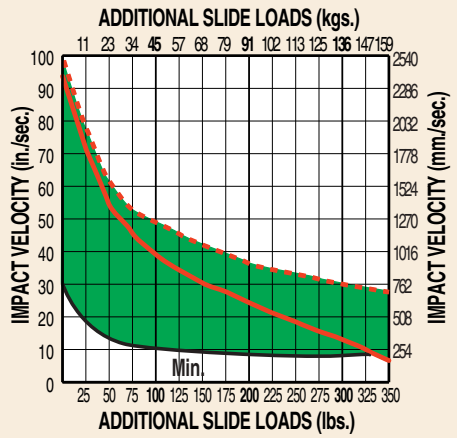
HB24



HB32



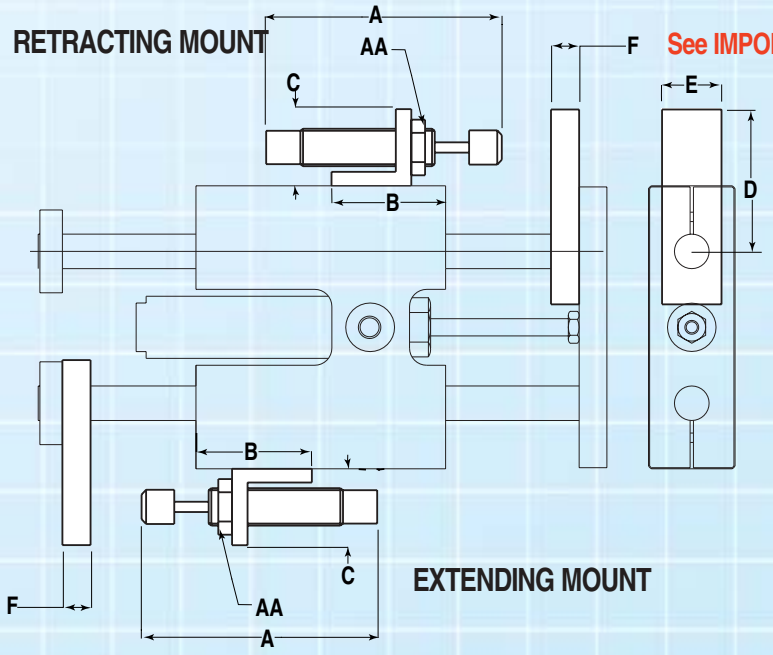
HB48



LITE DUTY (Light load/High velocity) HEAVY DUTY (Heavy load/Low velocity) Horizontal Max. Vel. Vertical Max. Vel.

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

DIMENSIONAL DATA
H-BLOCK SHOCKS



H-BLOCK MODEL NO.	H-BLOCK BORE SIZE	STROKE	SHOCK LENGTH A	MOUNT LOCATION B	MOUNT HEIGHT C	STOP HEIGHT D	STOP WIDTH E	SHOCK BODY AA	KIT NUMBER	THICKNESS F	KIT WEIGHT (OZ.)
HB09	9/16"	.41	2.74	1.16	1.25	2.16	.88	7/16-28UNEF	23099025§ 23099026**	.50	6.2
HB12	3/4"	.63	4.25	1.16	1.25	2.50	1.00	9/16-18UNF	23129025§	.50	7.3
HB17	1-1/16"	.88	5.38	1.29	1.25	2.38	1.25	3/4-16UNF	23179026§	.50	22.9
HB24	1-1/2"	.88	5.38	1.63	2.00	3.24	1.75	3/4-16UNF	23249025§	.50	22.9
HB32	2"	1.00	5.75	1.63	1.50	3.50	2.25	1-12UNF	23329025§	.50	30.9
HB48	3"	1.00	5.66	1.63	1.75	4.12	3.00	1 1/4-12UNF	23489025§	.50	42.9

Above Dimensions in Inches

H-BLOCK MODEL NO.	H-BLOCK BORE SIZE	STROKE	SHOCK LENGTH A	MOUNT LOCATION B	MOUNT HEIGHT C	STOP HEIGHT D	STOP WIDTH E	SHOCK BODY AA	KIT NUMBER	THICKNESS F	KIT WEIGHT (KGS.)
HB09	9/16"	10.4	69.6	29.5	31.8	54.9	22.4	7/16-28UNEF	23099025§ 23099026**	12.7	0.18
HB12	3/4"	16.0	108.0	29.5	31.8	63.5	25.4	9/16-18UNF	23129025§	12.7	0.21
HB17	1-1/16"	22.4	136.7	32.8	31.8	60.5	31.8	3/4-16UNF	23179026§	12.7	0.65
HB24	1-1/2"	22.4	136.7	41.4	50.8	82.3	44.5	3/4-16UNF	23249025§	12.7	0.65
HB32	2"	25.4	146.1	41.4	38.1	88.9	57.2	1-12UNF	23329025§	12.7	0.88
HB48	3"	25.4	143.8	41.4	44.5	104.6	76.2	1 1/4-12UNF	23489025§	12.7	1.22

Above Dimensions in Millimeters

* Measured shock is fully compressed.
§ Light duty (see application graph)
** Heavy duty (see application graph)

IMPORTANT NOTE: Shock stop will reduce overall stroke by dimension "F" for each shock absorber.

H-BLOCK - ORDERING

CONFIGURATOR EXAMPLE

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

1.	2.	3.		4.		5.		6.		7.		
H	B	1	7	S	K	0	9	S	B	T	T	1			S	L	1

The above example describes a H-Block Rod Cylinder Slide with a 1¼" bore, a stroke length of 9.0* inches and sintered bronze bearings. Options include one Hall-effect (sourcing) switch with 5 meter lead, foot plate, and one light duty shock. (No proximity sensors are desired.)
*Actual stroke is 8"; optional foot plate reduces stroke by ½", one (1) shock stop reduces stroke by ½".

Boxes above represent the number of fields available for each section and not all of them will be used in every application. Omit empty boxes when you construct your configurator number (placeholders are not required). For the above example, the order string as it is typed would appear as follows: **HB17SK09SBTT1FPSL1.**

1. MODEL TYPE

Enter:
HB for H-Block rod cylinder slide
HBSS for H-Block rod cylinder slide Stainless-Steel[1]
[1]Stainless-steel version, shafts and fasteners only

2. CYLINDER BORE DIAMETER

Enter:
09 for 9/16" **12** for ¾" **17** for 1 1/16"
24 for 1½" **32** for 2" **48** for 3"

3. STROKE LENGTH

Enter:
SK then required stroke length in **inches**
from 01 to 12 in 1" increments
Example: SK09 for 9.0 inch stroke

4. BEARING TYPE

Enter:
[2]**LB** for linear bearings **SB** for sintered bronze
CB for composite bearings
[2]Not available on stainless-steel models

5. SWITCHES

Enter:
BT for Form C Reed Switch 5-meter lead.
BM for Form C Reed Switch 5-meter lead Quick-disconnect
RT for Form A Reed Switch 5-meter lead.
RM for Form A Reed Switch 5-meter lead Quick-disconnect
CT for AC Triac Reed Switch 5-meter lead
CM for AC Triac Reed Switch 5-meter lead Quick-disconnect
KT for Hall-Effect (Sinking) 5-meter lead
KM for Hall-Effect (Sinking) 5-meter lead Quick Disconnect
TT for Hall-Effect (Sourcing) 5-meter lead
TM for Hall-Effect (Sourcing) 5-meter lead Quick Disconnect
Then enter:
The number of Switches required.
NOTE: Switch magnet is included standard on all H-Block rod cylinder slides.

6. [3] BUMPER KIT (4 BUMPERS)

Enter:
BP for Bumper Kit
[3]**NOTE:** Bumpers will reduce overall stroke by .5"

7. SHOCK ABSORBERS

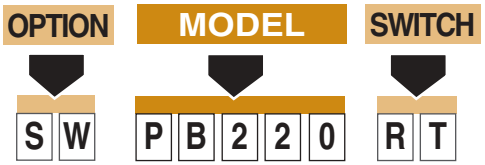
Enter:
SL for light duty shock absorber (Light Duty)
SH for heavy duty shock absorber (Heavy Duty) *HB09 only*
SD for shock hardware
number of shock kits in the third box
Leave blank if no shock absorbers are required.
When ordering one shock absorber it will be mounted for extending stroke
[5]**NOTE:** Shock Stop will reduce overall stroke

For Assistance Call
1-800-328-2174
(Toll Free U.S. and Canada)
or
763-478-8000
Fax 763-478-8080

For the available field retrofit options and accessories, refer to kit listings on page 156 for part numbers.

HB/PB/PB2 FIELD RETROFIT

KIT (HARDWARE & SWITCH)	DESCRIPTION	SWITCH ONLY (NO HARDWARE)
BT	Form C Reed Switch with 5 meter lead	3600-9084
BM	Form C Reed Switch with Quick-disconnect Coupler (Male)	3600-9085
RT	Form A Reed Switch with 5 meter lead	3600-9082
RM	Form A Reed Switch with Quick-disconnect Coupler (Male)	3600-9083
CT	ac Triac Reed Switch with 5 meter lead	3600-9086
CM	ac Triac Reed Switch with Quick-disconnect Coupler (Male)	3600-9087
KT	Hall-effect (Sinking) Switch with 5 meter lead	3600-9090
KM	Hall-effect (Sinking) Switch with Quick-disconnect Coupler (Male)	3600-9091
TT	Hall-effect (Sourcing) Switch with 5 meter lead	3600-9088
TM	Hall-effect (Sourcing) Switch with Q-D Coupler (Male)	3600-9089
	Connector (Female) 5 meter lead	2503-1025



To order field retrofit switch and hardware kits for all Tol-O-Matic actuators: SW (Then the model and bore size, and type of switch needed)

Example: SWPB220RT
(Hardware and Form A Reed switch with 5 meter lead for 1.25" bore PB2 Rod Cylinder Slide)

(NOTE: Mounting hardware is required if replacing switch for any actuator manufactured before 7/1/97.)

H-Block Switch Hardware Kits and Options

SWITCH KITS	HB09	HB12	HB17	HB24	HB32	HB48
Switch Hardware Kit	2309-9999	2312-9999	2317-9999	2324-9999	2332-9999	2348-9999

OTHER OPTIONS	HB09	HB12	HB17	HB24	HB32	HB48
BP Bumper Kit [2]	2309-9004	2312-9004	2317-9004	2324-9004	2332-9004	2348-9004
SL Light Duty Shock Absorber [3,4]	2309-9025	2312-9025	2317-9025	2324-9025	2332-9025	2348-9025
SH Heavy Duty Shock Absorber [3,4]	2309-9026	–	–	–	–	–
SD Shock Hardware [4]	2309-9027	2312-9027	2317-9027	2324-9027	2332-9027	2348-9027

Power-Block Switch Hardware Kits and Options

SWITCH HARDWARE	PB06	PB10	PB17	PB20
Switch Hardware Kit	2506-9999	2506-9999	2506-9999	2506-9999
Reed Switch Magnet [4]	2506-9003	2510-9003	2517-9003	2520-9003
Hall-effect Switch Magnet [4]	2506-9004	2510-9004	2517-9004	2520-9004
OTHER OPTIONS	**PB06**	**PB10**	**PB17**	**PB20**
BP Stop Collar / Bumper Kit [5]	2506-9002	2510-9002	2517-9002	2520-9002

Power-Block2 Switch Hardware Kits and Options

	PB208	PB210	PB217	PB220	PB232	PB252
Switch Hardware Kit	2506-9999	2506-9999	2506-9999	2506-9999	2506-9999	2506-9999
TN T-Nuts	3410-1013	3410-1013	3415-1013	3415-1013	3420-1013	3420-1013

[1] Kits include one switch with mounting hardware

[2] Bumper Kit for H-Block includes 4 Bumpers per kit

[3] Same shock absorbers used for both light duty and heavy duty applications.

[4] One each

[5] Stop Collar/ Bumper Kits for Power-Block include two stop collars and two 1/4" thick polyurethane external bumpers to help absorb impact shock

For Assistance Call
1-800-328-2174
(Toll Free U.S. and Canada)
or
763-478-8000
Fax 763-478-8080

ROD CYLINDER SLIDE SELECTION PROCEDURE:

1. COMPILE APPLICATION REQUIREMENTS

To determine the appropriate Tol-O-Matic 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)

2. SELECT ROD CYLINDER SLIDE SIZE

- ***Consult the Theoretical Force vs. Pressure graphs***

  NOTE: Graphs for HB are on pages 138 to 143, for PB are on pages 146 to 147 and PB2 are on pages 151 to 152.

- ***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 Tol-O-Matic 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 Tol-O-Matic 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-BLOCK(2) 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. NOTE: H-Block uses external bumpers only.

- ***Cross-reference the final velocity and weight of the load.*** If the intersection is below the diagonal lines, the internal bumpers on the Power-Block 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)*
- ***Shock Absorbers***– if needed - *(H-Block Only)*
- ***Bumpers and Stop Collars*** - *(H-Block and Power-Block)*

SELECTION EXAMPLE: HB

The procedure for selection of the various styles of rod cylinder slide are very similar. For illustrative purposes, charts for the HB17 model are used in this example.

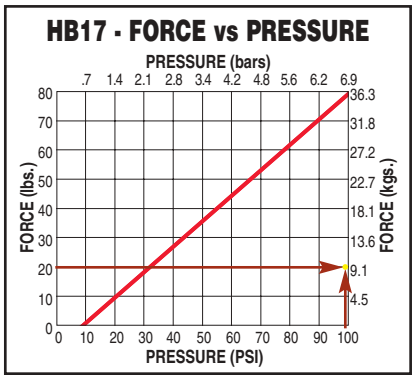
1. COMPILE APPLICATION REQUIREMENTS

- Available pressure 100 psi
- Weight of load 20 lbs.
- Orientation of load horiz.
- Final velocity* of load 12 "per sec
- Stroke length 6"

*2x average velocity, see page 243

2. SELECT ROD CYLINDER SLIDE SIZE

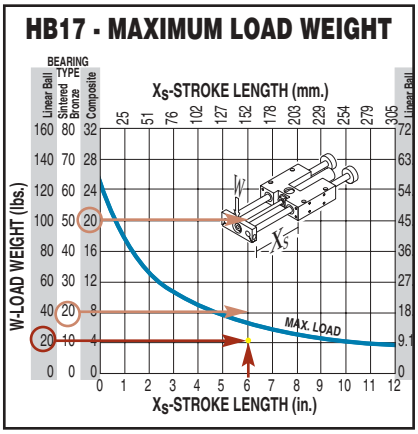
- Consult the Theoretical Force vs. Pressure charts.



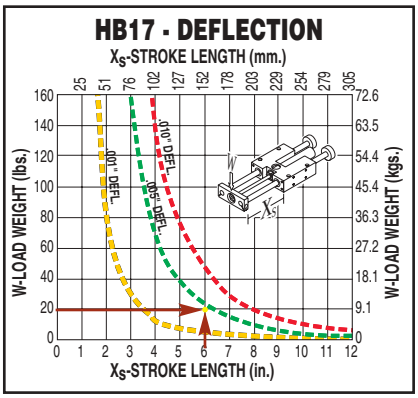
- Cross-reference the load force and the available operating pressure.

3. DETERMINE EFFECT OF LOAD VS. EXTENDED LENGTH

- Consult the Load vs Stroke Length Chart for the Tol-O-Matic rod cylinder slides.
- Cross-reference the load weight and the stroke length. In this example for the HB17 there are 3 bearing choices. With a 20 lb. load and 6" extension, the sintered bronze and composite bearings will not be acceptable. The linear ball bearings will accommodate the load.

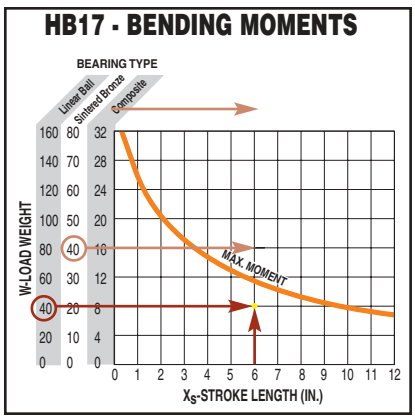


- Examine the deflection. The deflection will be nearly 0.005" which is acceptable for this application.



4. DETERMINE NATURE OF LOAD AND THE EFFECT OF BENDING MOMENTS

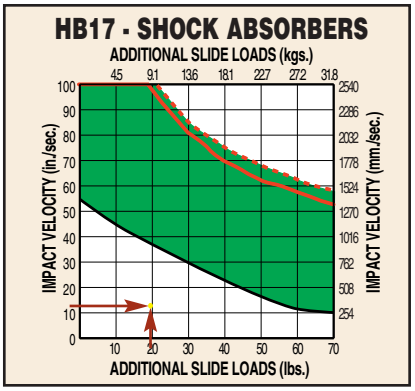
If the rod cylinder slide will guide and support a load located directly on center of the tooling plate, bending moments will not be a factor in the rod cylinder slide selection.



In this example, the center of the mass of the load will be 2" off the center of the tooling plate. Thus, the bending moment to be accommodated will be 40 in.lbs. The linear bearings chosen will work for this application.

5. DETERMINE INTERNAL BUMPER CAPACITY (POWER-BLOCK(2) ONLY)

- Cross-reference the final velocity and weight of the load. (For PB or PB2) The HB17 does not have internal bumpers so for this example we will consider shock absorbers.



The intersection is well below the shock capability. Shock absorbers could be used, but bumpers will be adequate.

6. CONSIDER OPTIONS

For this example, we will be adding bumpers and Form C dc Reed switches. Note: bumpers will reduce effective stroke. It will be necessary to order a 7" stroke to get an end result of a 6" stroke.

The final configurated string will appear as follows:

HB17SK07LBBM2BP