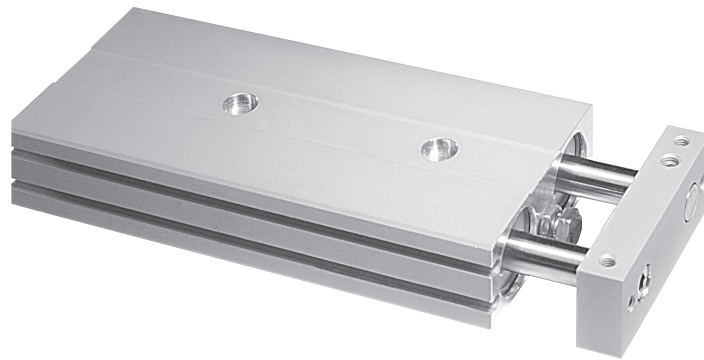


Twin Bore Cylinder

The IMI Bimba Twin Bore Cylinder is a small cross-section, double-bore cylinder that provides highly accurate linear motion. The cylinder incorporates extra long piston rod bearings, resulting in high radial load capacity. Single and double end rod units are available in both Delrin® and ball bushing styles. The highly precise Air Table incorporates a rigid linear rail with recirculating ball bearings.

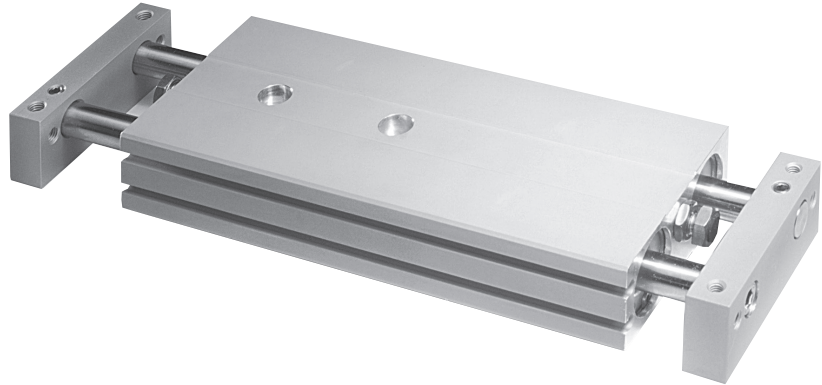
Basic Twin Bore (TB)

Dual bores exert twice the force of a traditional cylinder while providing smooth, non-rotating actuation. The cylinder is symmetric and can be mounted from either side to allow convenient port access.



Double End Twin Bore (TBD)

Double rod end provides a saddle-mount unit with improved loading and resistance to deflection.

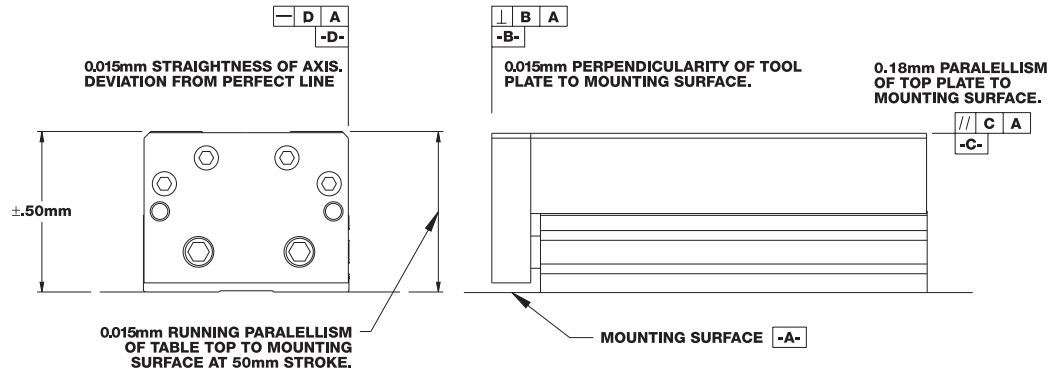


Twin Bore Air Table (TBA)

Smooth, precise movement is achieved via integration of a highly accurate recirculating ball bushing rail.



Twin Bore Air Table (TBA Models)



*For filtered, lubricated air, no-load conditions; if unlubricated, life is approximately 1/3.

Engineering Specifications

Operating Medium: Air

Lubrication: PTFE Grease

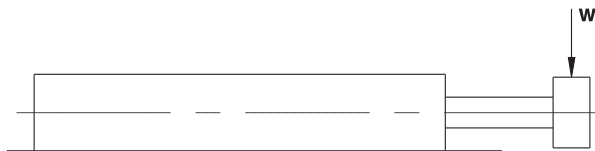
Maximum Operating Pressure: 140 PSI (10 bar)

Expected Service Life: 2500 kilometers (1500 miles)

Temperature Range: 15° to 160° F (-10° to 70° C)

Twin Bore (TB Models; Standard Bearings and Option X)

Maximum Radial Load kg-Force (lb)



Maximum allowable load for horizontally mounted cylinder with rods aligned in horizontal direction.

TB Standard Maximum Radial Loads Kgf (lb)							
Model No.	10	20	30	40	50	75	100
TB-6	0.15 (0.33)	0.12 (0.26)	0.10 (0.21)	0.08 (0.18)	0.07 (0.16)	N/A	N/A
TB-8	0.14 (0.31)	0.11 (0.24)	0.09 (0.20)	0.08 (0.17)	0.07 (0.15)	0.05 (0.11)	N/A
TB-12	1.0 (2.14)	0.8 (1.77)	0.7 (1.51)	0.6 (1.31)	0.5 (1.16)	0.4 (0.90)	N/A
TB-16	1.5 (3.31)	1.3 (2.80)	1.1 (2.42)	1.0 (2.14)	0.9 (1.91)	0.7 (1.51)	0.6 (1.25)
TB-20	2.3 (5.07)	2.0 (4.36)	1.7 (3.83)	1.6 (3.41)	1.4 (3.07)	1.1 (2.47)	0.9 (2.06)
TB-25	3.1 (6.76)	2.7 (5.85)	2.3 (5.15)	2.1 (4.60)	1.9 (4.16)	1.5 (3.35)	1.3 (2.81)
TB-32	5.8 (12.82)	5.1 (11.30)	4.6 (10.10)	4.2 (9.13)	3.8 (8.33)	3.1 (6.84)	2.6 (5.80)

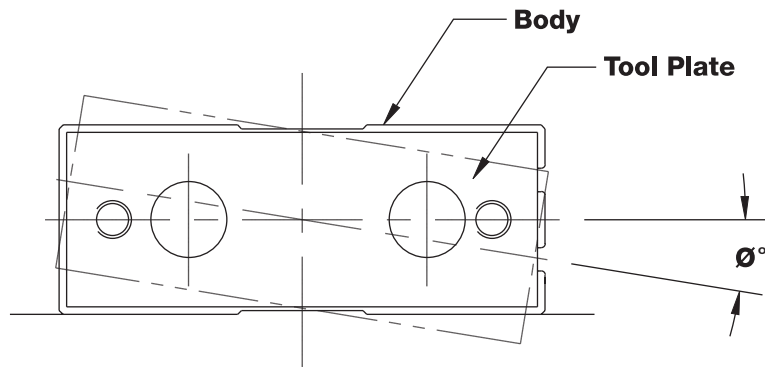
TB-X Maximum Radial Loads Kgf (lb)							
Model No.	10	20	30	40	50	75	100
TB-12-X	0.7 (1.50)	0.6 (1.28)	0.5 (1.11)	0.4 (0.98)	0.4 (0.88)	0.3 (0.70)	N/A
TB-16-X	0.9 (2.08)	0.8 (1.80)	0.7 (1.58)	0.6 (1.42)	0.6 (1.28)	0.5 (1.03)	0.4 (0.86)
TB-20-X	1.4 (3.06)	1.2 (2.69)	1.1 (2.41)	1.0 (2.17)	0.9 (1.98)	0.7 (1.63)	0.6 (1.38)
TB-25-X	1.5 (3.36)	1.4 (2.97)	1.2 (2.67)	1.1 (2.42)	1.0 (2.21)	0.8 (1.82)	0.7 (1.55)
TB-32-X	2.7 (5.97)	2.4 (5.35)	2.2 (4.85)	2.0 (4.43)	1.9 (4.08)	1.6 (3.41)	1.3 (2.93)

Twin Bore (TB Models; Standard Bearings and Option X)

Maximum Radial Load kg-Force (lb)

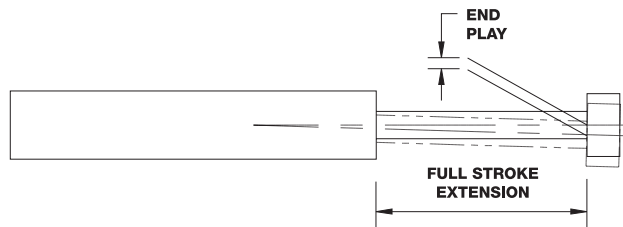
Non-Rotational Accuracy (degrees)

Maximum allowable value for $\emptyset^\circ$ in a free unloaded condition.



TB Model (Standard Bushings)	
Model No.	Degrees (±)
TB-6	0.15
TB-8	0.12
TB-12	0.10
TB-16	0.08
TB-20	0.08
TB-25	0.06
TB-32	0.05
TB Model - X Option (Ball Bushing)	
Model No.	Degrees (±)
TB-12	0.02
TB-16	0.02
TB-20	0.02
TB-25	0.01
TB-32	0.01

Maximum End Play mm (inch)



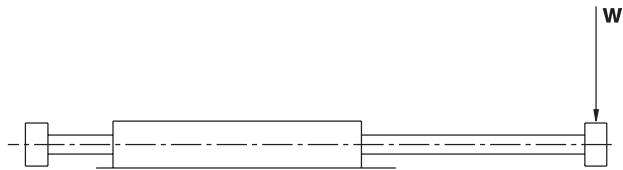
Maximum allowable movement of the tooling plate in the vertical direction with rods aligned in horizontal direction.

TB Model							
Model No. (Standard Bushings)	Stroke Length mm						
	10	20	30	40	50	75	100
TB-6	0.243 (0.010)	0.327 (0.013)	0.410 (0.016)	0.494 (0.019)	0.577 (0.023)	N/A	N/A
TB-8	0.255 (0.010)	0.343 (0.013)	0.431 (0.017)	0.519 (0.020)	0.607 (0.024)	0.828 (0.033)	N/A
TB-12	0.224 (0.009)	0.283 (0.011)	0.341 (0.013)	0.400 (0.016)	0.458 (0.018)	0.604 (0.024)	0.750 (0.030)
TB-16	0.229 (0.009)	0.283 (0.011)	0.337 (0.013)	0.391 (0.015)	0.445 (0.018)	0.581 (0.023)	0.716 (0.028)
TB-20	0.252 (0.010)	0.305 (0.012)	0.359 (0.014)	0.412 (0.016)	0.466 (0.018)	0.600 (0.024)	0.734 (0.029)
TB-25	0.231 (0.009)	0.278 (0.011)	0.325 (0.013)	0.372 (0.015)	0.420 (0.017)	0.537 (0.021)	0.655 (0.026)
TB-32	0.224 (0.009)	0.260 (0.010)	0.297 (0.012)	0.334 (0.013)	0.370 (0.015)	0.462 (0.018)	0.553 (0.022)

(Option X - Ball Bushing)	Stroke Length mm						
	10	20	30	40	50	75	100
TB-12-X	0.143 (0.006)	0.185 (0.007)	0.228 (0.009)	0.271 (0.011)	0.313 (0.012)	0.420 (0.017)	0.526 (0.021)
TB-16-X	0.140 (0.006)	0.178 (0.007)	0.216 (0.008)	0.254 (0.010)	0.291 (0.011)	0.386 (0.015)	0.480 (0.019)
TB-20-X	0.133 (0.005)	0.165 (0.006)	0.197 (0.008)	0.229 (0.009)	0.260 (0.010)	0.340 (0.013)	0.419 (0.017)
TB-25-X	0.154 (0.006)	0.190 (0.007)	0.225 (0.009)	0.261 (0.010)	0.296 (0.012)	0.385 (0.015)	0.474 (0.019)
TB-32-X	0.156 (0.006)	0.185 (0.007)	0.214 (0.008)	0.243 (0.010)	0.273 (0.011)	0.346 (0.014)	0.419 (0.016)

Twin Bore (Tb Models; Standard Bearings and Option X)

Maximum Radial Load kg-Force (lb)



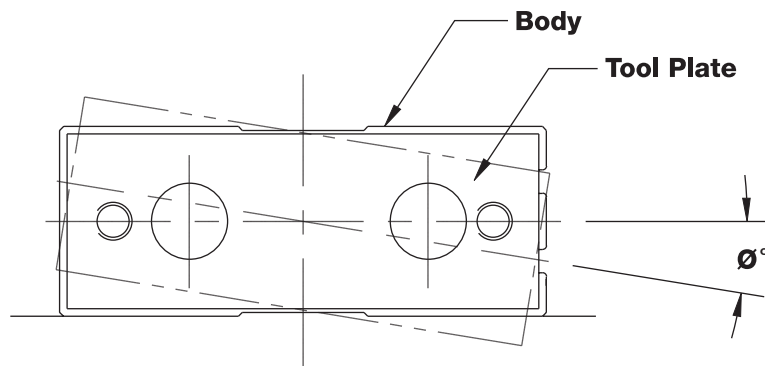
Maximum allowable load for horizontally mounted Double Rod End cylinder with rods aligned in horizontal direction.

TBD Standard Maximum Radial Loads Kgf (lb)							
Model No.	10	20	30	40	50	75	100
TBD-6	0.83 (1.83)	0.79 (1.75)	0.77 (1.69)	0.75 (1.65)	0.73 (1.62)	N/A	N/A
TBD-8	0.90 (1.98)	0.86 (1.90)	0.84 (1.84)	0.82 (1.80)	0.81 (1.77)	0.78 (1.72)	N/A
TBD-12	1.5 (3.35)	1.5 (3.27)	1.5 (3.22)	1.4 (3.18)	1.4 (3.15)	1.4 (3.09)	N/A
TBD-16	2.3 (4.97)	2.2 (4.89)	2.2 (4.83)	2.2 (4.79)	2.2 (4.76)	2.1 (4.70)	2.1 (4.66)
TBD-20	3.3 (7.29)	3.3 (7.19)	3.2 (7.11)	3.2 (7.05)	3.2 (7.01)	3.1 (6.92)	3.1 (6.86)
TBD-25	4.3 (9.46)	4.2 (9.33)	4.2 (9.22)	4.2 (9.14)	4.1 (9.07)	4.1 (8.95)	4.0 (8.87)
TBD-32	7.5 (16.44)	7.4 (16.21)	7.3 (16.02)	7.2 (15.88)	7.2 (15.76)	7.1 (15.53)	7.0 (15.37)

TBD-X Maximum Radial Loads Kgf (lb)							
Model No.	10	20	30	40	50	75	100
TBD-12-X	12.1 (26.70)	11.9 (26.09)	11.7 (25.65)	11.5 (25.33)	11.4 (25.08)	11.2 (24.64)	N/A
TBD-16-X	15.0 (33.04)	14.8 (32.51)	14.6 (32.13)	14.5 (31.84)	14.4 (31.61)	14.2 (31.20)	14.1 (30.94)
TBD-20-X	21.1 (46.37)	20.8 (45.71)	20.6 (45.22)	20.4 (44.84)	20.2 (44.54)	20.0 (43.99)	19.8 (43.62)
TBD-25-X	23.5 (51.64)	23.1 (50.89)	22.9 (50.32)	22.7 (49.87)	22.5 (49.51)	22.2 (48.86)	22.0 (48.42)
TBD-32-X	44.7 (98.38)	44.1 (96.98)	43.6 (95.89)	43.2 (95.01)	42.9 (94.29)	42.2 (92.94)	41.8 (92.01)

Non-Rotational Accuracy (degrees)

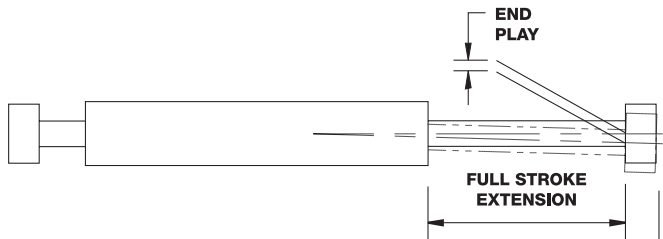
Maximum allowable value for $\varnothing^\circ$ in a free unloaded condition.



TBD Model (Standard Bushings)	
Model No.	Degrees (±)
TBD-6	0.15
TBD-8	0.12
TBD-12	0.10
TBD-16	0.08
TBD-20	0.08
TBD-25	0.06
TBD-32	0.05
TBD Model - X Option (Ball Bushing)	
Model No.	Degrees (±)
TBD-12	0.02
TBD-16	0.02
TBD-20	0.02
TBD-25	0.01
TBD-32	0.01

Twin Bore (TBD Models; Standard Bearings and Option X)

Maximum End Play mm (inch)



Maximum allowable movement of the tooling plate in the vertical direction with rods aligned in horizontal direction.

TBD Model							
Model No. (Standard Bushings)	Stroke Length mm						
	10	20	30	40	50	75	100
TB-6	0.076 (0.003)	0.089 (0.003)	0.098 (0.004)	0.106 (0.004)	0.112 (0.004)	N/A	N/A
TB-8	0.068 (0.003)	0.080 (0.003)	0.088 (0.003)	0.095 (0.004)	0.101 (0.004)	0.111 (0.004)	N/A
TB-12	0.063 (0.002)	0.071 (0.003)	0.077 (0.003)	0.082 (0.003)	0.086 (0.003)	0.094 (0.004)	0.100 (0.004)
TB-16	0.068 (0.003)	0.075 (0.003)	0.081 (0.003)	0.086 (0.003)	0.091 (0.004)	0.099 (0.004)	0.105 (0.004)
TB-20	0.074 (0.003)	0.082 (0.003)	0.088 (0.003)	0.094 (0.004)	0.099 (0.004)	0.108 (0.004)	0.115 (0.005)
TB-25	0.069 (0.003)	0.076 (0.003)	0.082 (0.003)	0.087 (0.003)	0.092 (0.004)	0.101 (0.004)	0.107 (0.004)
TB-32	0.078 (0.003)	0.084 (0.003)	0.089 (0.003)	0.093 (0.004)	0.097 (0.004)	0.104 (0.004)	0.110 (0.004)

(Option X - Ball Bushing)	Stroke Length mm						
	10	20	30	40	50	75	100
TB-12-X	0.007 (0.0003)	0.008 (0.0003)	0.009 (0.0003)	0.009 (0.0004)	0.010 (0.0004)	0.011 (0.0004)	0.012 (0.0005)
TB-16-X	0.006 (0.0002)	0.006 (0.0002)	0.007 (0.0003)	0.007 (0.0003)	0.008 (0.0003)	0.009 (0.0003)	0.009 (0.0004)
TB-20-X	0.008 (0.0003)	0.009 (0.0004)	0.010 (0.0004)	0.011 (0.0004)	0.012 (0.0005)	0.013 (0.0005)	0.014 (0.0005)
TB-25-X	0.009 (0.0004)	0.010 (0.0004)	0.011 (0.0004)	0.012 (0.0005)	0.013 (0.0005)	0.014 (0.0006)	0.015 (0.0006)
TB-32-X	0.010 (0.0004)	0.010 (0.0004)	0.011 (0.0004)	0.012 (0.0005)	0.013 (0.0005)	0.014 (0.0005)	0.015 (0.0006)

Twin Bore Air Table (TBA Models)

Table Deflection By Pitch Moment

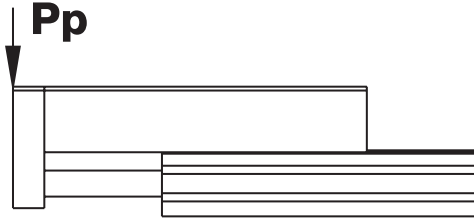
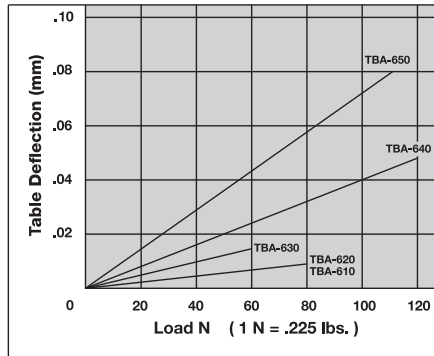
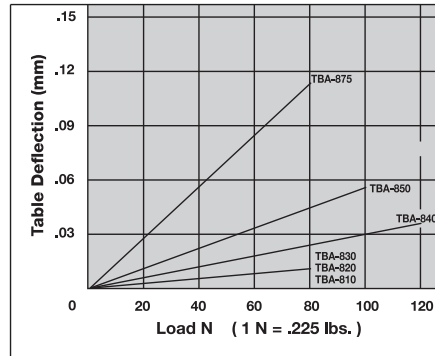


Table pitch deflection due to static pitch moment applied at arrow for fully extended stroke of slide table.

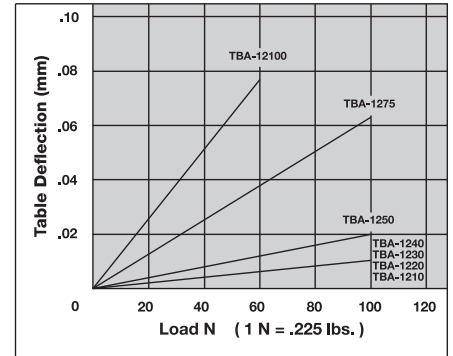
TBA-6



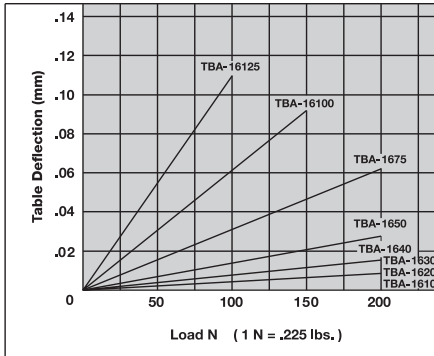
TBA-8



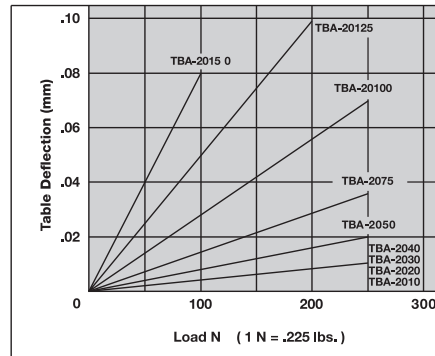
TBA-12



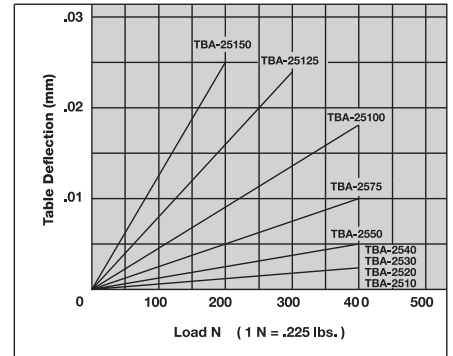
TBA-16



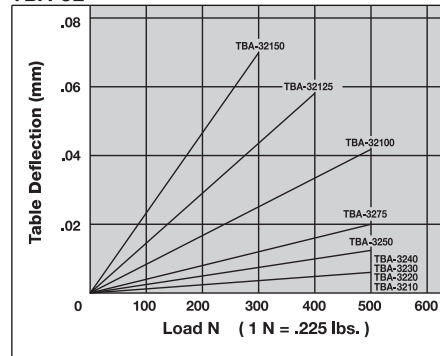
TBA-20



TBA-25



TBA-32



Twin Bore Air Table (TBA Models)

Table Deflection By Yaw Moment

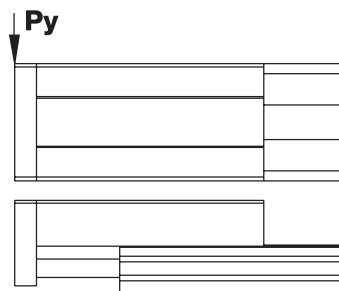
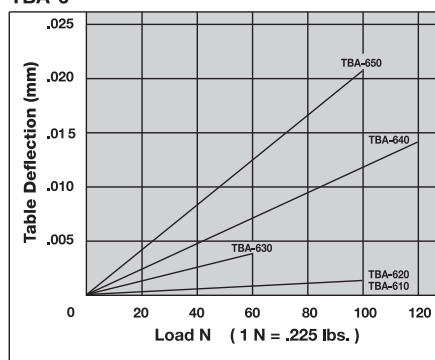
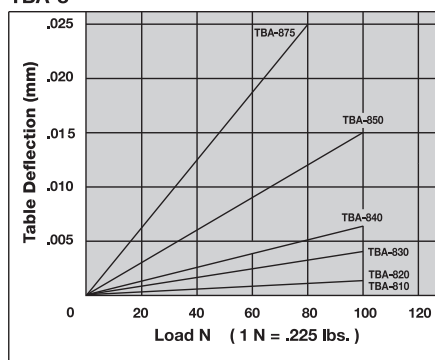


Table yaw deflection due to static yaw moment applied at arrow for fully extended stroke of slide table.

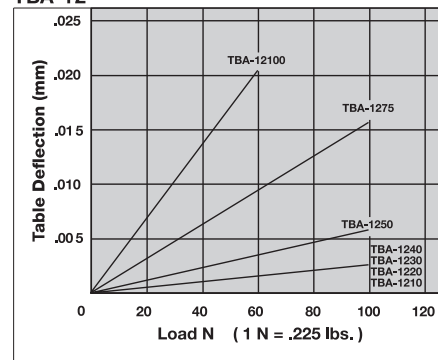
TBA-6



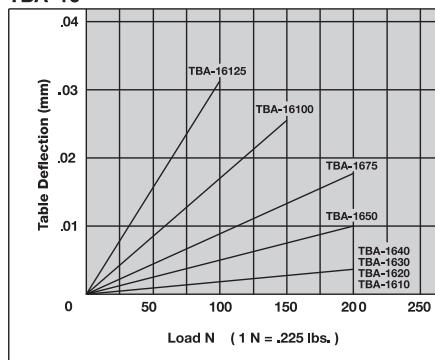
TBA-8



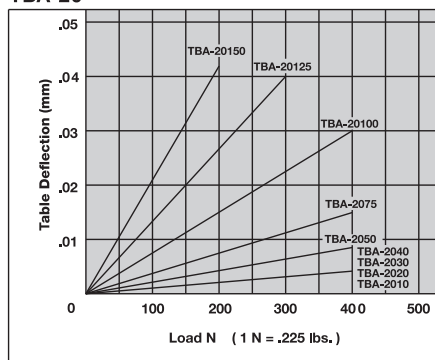
TBA-12



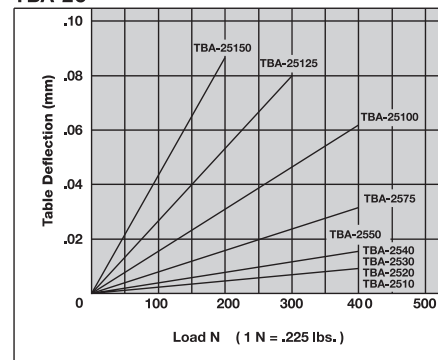
TBA-16



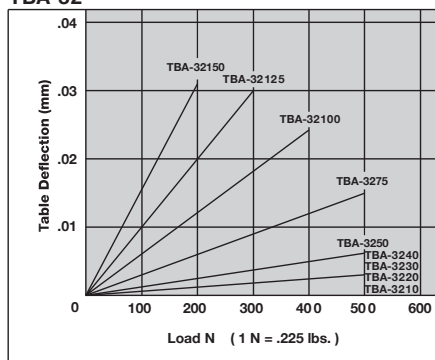
TBA-20



TBA-25

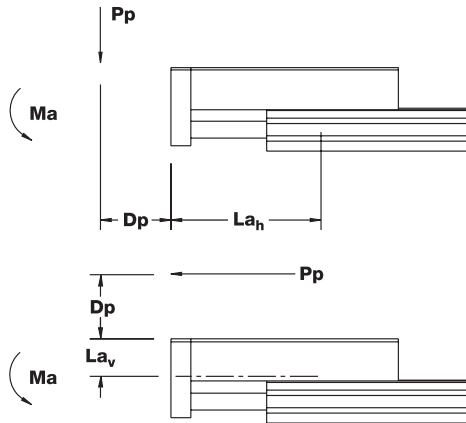


TBA-32



Twin Bore Air Table (TBA Models)

Formula for Calculation of Allowable Static Load P_p , P_y and P_r



$$P_p = \frac{M_a \times 1000}{D_p + La} \text{ (Newtons)}$$

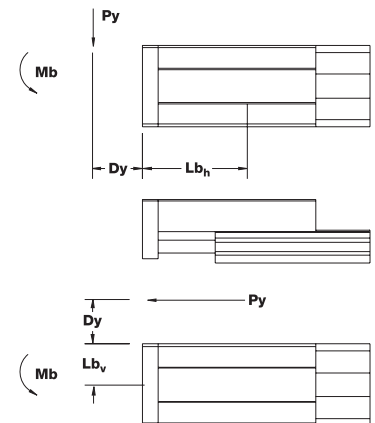
$$D_p + La$$

D_p = Distance from load point to body (mm)

La = Moment arm (mm) see chart

M_a (Pitching Moment)

Model	Maximum Allowable Moment (Nm) by Stroke								
	10	20	30	40	50	75	100	125	150
TBA-6	2.55	2.55	2.55	8.65	8.65	N/A	N/A	N/A	N/A
TBA-8	2.55	2.55	2.55	8.65	8.65	8.65	N/A	N/A	N/A
TBA-12	5.39	5.39	5.39	5.39	5.39	14.1	14.1	N/A	N/A
TBA-16	8.72	8.72	8.72	8.72	31.5	31.5	31.5	31.5	N/A
TBA-20	31.5	31.5	31.5	31.5	31.5	31.5	42.1	42.1	42.1
TBA-25	44.9	44.9	44.9	44.9	44.9	44.9	72.2	72.2	72.2
TBA-32	44.9	44.9	44.9	44.9	44.9	120	120	120	120



$$P_y = \frac{M_b \times 1000}{D_y + Lb} \text{ (Newtons)}$$

$$D_y + Lb$$

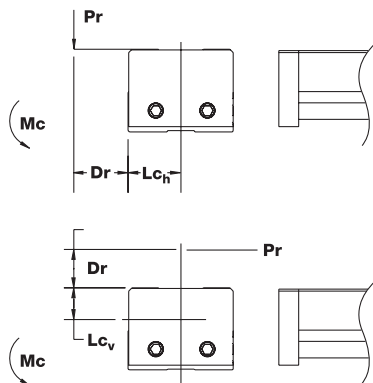
D_y = Distance from load point to body (mm)

Lb = Moment arm (mm) see chart

M_b (Yawing Moment)

Model	Maximum Allowable Moment (Nm) by Stroke								
		20	30	40	50	75	100	125	150
TBA-6	2.55	2.55	2.55	8.65	8.65	N/A	N/A	N/A	N/A
TBA-8	2.55	2.55	2.55	8.65	8.65	8.65	N/A	N/A	N/A
TBA-12	5.39	5.39	5.39	5.39	5.39	14.1	14.1	N/A	N/A
TBA-16	8.72	8.72	8.72	8.72	31.5	31.5	31.5	31.5	N/A
TBA-20	31.5	31.5	31.5	31.5	31.5	31.5	42.1	42.1	42.1
TBA-25	44.9	44.9	44.9	44.9	44.9	44.9	72.2	72.2	72.2
TBA-32	44.9	44.9	44.9	44.9	44.9	120	120	120	120

Twin Bore Air Table (TBA Models)



$$Pr = \frac{Mc \times 1000}{Dr + Lc} \text{ (Newtons)}$$

$$Dr + Lc$$

$$Dr = \text{Distance from load point to body (mm)}$$

$$Lc = \text{Moment arm (mm) see chart}$$

Mc (Rolling Moment)

Model	Maximum Allowable Moment (Nm) by Stroke								
	10	20	30	40	50	75	100	125	150
TBA-6	5.1	5.1	5.1	13.1	13.1	N/A	N/A	N/A	N/A
TBA-8	5.1	5.1	5.1	13.1	13.1	13.1	N/A	N/A	N/A
TBA-12	15.2	15.2	15.2	15.2	15.2	22.8	22.8	N/A	N/A
TBA-16	22.8	22.8	22.8	22.8	38.1	38.1	38.1	38.1	N/A
TBA-20	46.2	46.2	46.2	46.2	46.2	46.2	46.2	46.2	46.2
TBA-25	66.5	66.5	66.5	66.5	66.5	66.5	77.7	77.7	77.7
TBA-32	75.7	75.7	75.7	75.7	75.7	91.2	91.2	91.2	91.2

Bore/Stroke Constants

Model	Lah and Lbh Moment Lever Arm (mm) by Stroke								
	10	20	30	40	50	75	100	125	150
TBA-6	30.5	40.5	50.4	71.6	81.6	N/A	N/A	N/A	N/A
TBA-8	30.5	41	51	72.8	83.1	108.1	N/A	N/A	N/A
TBA-12	58	58	58	68	78	120	145	N/A	N/A
TBA-16	63.5	63.5	63.5	73.5	89.5	114.5	139.5	164.5	N/A
TBA-20	70.5	70.5	70.5	80.5	92.5	117.5	157	182	207
TBA-25	77	77	77	87.5	98.5	124.5	165	190	215
TBA-32	79	79	79	89	99	139.5	165.5	190.5	215

Model	Moment Lever Arm Distances (mm)			
	La_v	Lb_v	Lc_h	Lc_v
TBA-6	9.1	15.7	15.7	9.1
TBA-8	9.1	18.6	18.6	9.1
TBA-12	12.5	23	23	12.5
TBA-16	15.5	28.5	28.5	15.5
TBA-20	20.5	32	32	20.5
TBA-25	22.5	40	40	22.5
TBA-32	27	49	49	27

NOTE: 1 N-m = 8.851 in-lb

1N-m = .7376 ft-lb

Twin Bore Air Table (TBA Models)

Theoretical Cylinder Forces

Force = Power Factor x Input Pressure

Bore	Direction	Power Factor (When input pressure in bar)	Power Factor (When input pressure in psi)
6mm	Extend*	0.57	0.09
	Retract	0.42	0.07
8mm	Extend*	1.00	0.16
	Retract	0.75	0.12
12mm	Extend*	2.2	0.4
	Retract	1.6	0.2
16mm	Extend*	4.0	0.6
	Retract	3.0	0.4
20mm	Extend*	6.2	1.0
	Retract	4.8	0.8
25mm	Extend*	9.8	1.6
	Retract	7.6	1.2
32mm	Extend*	16.0	2.4
	Retract	12.0	1.8

*For TBD models use Retract Power Factors only; Extend is not applicable. BAR x Power Factor = kg
PSI x Power Factor = Pounds

Twin Bore Weights

TB Cylinder

Bore	Approx. Base Wt. of Cylinder gf (oz)	Wt. Added Per 5mm of Stk gf (oz)
6	52.3 (1.85)	4.9 (0.17)
8	75.5 (2.66)	6.5 (0.23)
12	127.4 (4.5)	9.4 (0.3)
16	212.6 (7.5)	13.6 (0.4)
20	345.6 (12.1)	19.1 (0.6)
25	551.8 (19.4)	28.0 (0.9)
32	1046.5 (36.9)	44.4 (1.5)

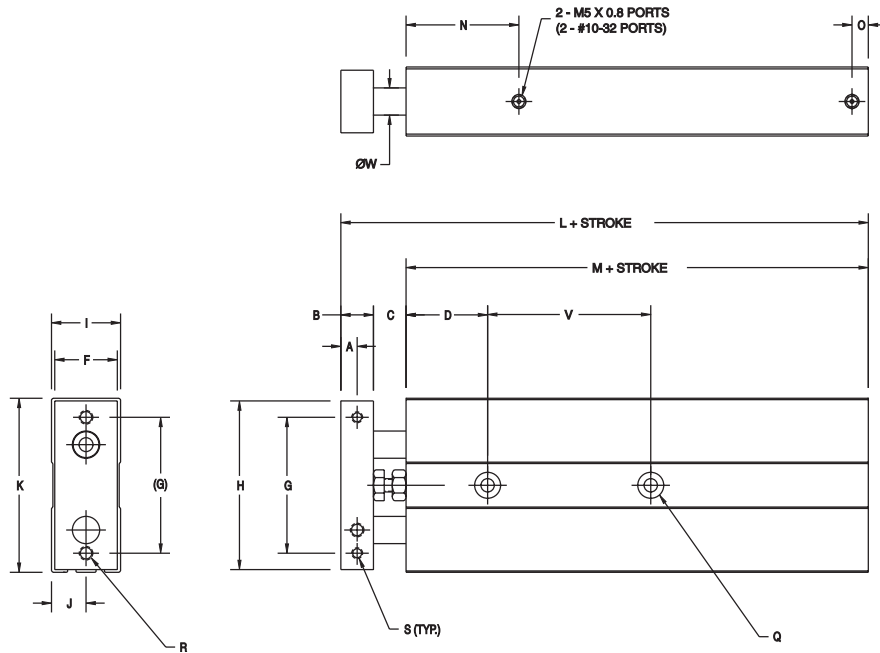
TBD Cylinder

Bore	Approx. Base Wt. of Cylinder gf (oz)	Wt. Added Per 5mm of Stk gf (oz)
6	81.8 (2.89)	5.5 (0.19)
8	109.7 (3.87)	7.4 (0.26)
12	208.7 (7.3)	11.6 (0.4)
16	361.3 (12.7)	17.6 (0.6)
20	580.9 (20.4)	25.3 (0.8)
25	943.1 (33.2)	36.9 (1.3)
32	1835.6 (64.7)	60.1 (2.1)

TBA Cylinder

Bore	Weight of Cylinder Based on Stroke Length gf (oz)								
	10mm	20mm	30mm	40mm	50mm	75mm	100mm	125mm	150mm
6	119.6 (4.22)	139.4 (4.92)	158.6 (5.60)	219.8 (7.75)	240.5 (8.48)	N/A	N/A	N/A	N/A
8	159.8 (5.64)	178.5 (6.30)	202.9 (7.16)	267.2 (9.42)	295.0 (10.41)	391.0 (13.79)	N/A	N/A	N/A
12	236.0 (8.3)	240.4 (8.4)	244.9 (8.6)	283.0 (9.9)	342.0 (12.0)	479.9 (16.9)	616.9 (21.7)	N/A	N/A
16	378.7 (13.3)	386.5 (13.6)	394.4 (13.9)	433.1 (15.2)	561.4 (19.8)	699.8 (24.6)	821.7 (28.9)	984.5 (34.7)	N/A
20	631.4 (22.2)	643.7 (22.7)	656.0 (23.1)	728.0 (25.6)	827.9 (29.2)	1047.4 (36.9)	1438.4 (50.7)	1645.0 (58.0)	1872.4 (66.0)
25	992.5 (35.0)	1010.2 (35.6)	1027.9 (36.2)	1128.3 (39.8)	1253.4 (44.2)	1636.0 (57.7)	2019.1 (71.2)	2525.8 (89.1)	2710.5 (95.6)
32	1660.0 (58.5)	1691.6 (59.6)	1723.1 (60.7)	1882.1 (66.3)	2078.8 (73.3)	2741.4 (96.7)	3277.9 (115.6)	4093.6 (144.4)	4591.6 (161.9)

TB Cylinder Dimensions mm (in)



Bore	A	B	C
6	2.8 (0.11)	5.5 (0.22)	8 (0.32)
8	3 (0.12)	6 (0.24)	8 (0.32)
12	4 (0.16)	8 (0.32)	9 (0.35)
16	5 (0.20)	10 (0.39)	9 (0.35)
20	6 (0.24)	12 (0.47)	12 (0.47)
25	6 (0.24)	12 (0.47)	12 (0.47)
32	8 (0.32)	16 (0.63)	14 (0.55)

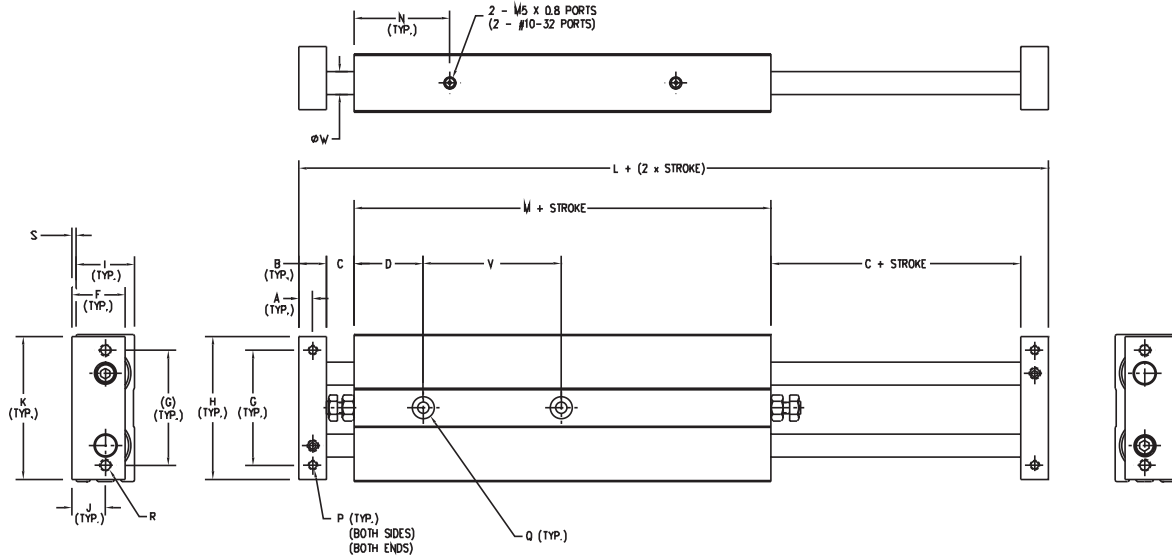
Bore	D	F	G
6	13 (0.51)	12 (0.47)	25 (0.98)
8	13 (0.51)	13 (0.51)	28 (1.10)
12	20 (0.79)	15 (0.59)	35 (1.38)
16	30 (1.18)	18 (0.71)	45 (1.77)
20	30 (1.18)	23 (0.91)	50 (1.97)
25	30 (1.18)	28 (1.10)	66 (2.60)
32	30 (1.18)	36 (1.42)	80 (3.15)

Bore	H	I	J	K	L	M	N	O
6	31 (1.22)	13.2 (0.52)	6.4 (0.25)	32 (1.26)	58.5 (2.30)	45 (1.77)	16 (0.63)	6.7 (0.27)
8	36 (1.42)	14.7 (0.58)	7.3 (0.29)	37.8 (1.49)	64 (2.52)	50 (1.97)	16.1 (0.64)	6.7 (0.27)
12	44 (1.73)	17.3 (0.68)	8.7 (0.34)	46 (1.81)	72 (2.83)	55 (2.17)	30.6 (1.20)	5 (0.20)
16	55 (2.17)	20.4 (0.80)	10.2 (0.40)	57 (2.24)	80 (3.16)	61 (2.41)	36.2 (1.42)	4.5 (0.18)
20	62 (2.44)	25.4 (1.00)	12.7 (0.50)	64 (2.52)	94 (3.70)	70 (2.76)	41.5 (1.63)	6 (0.24)
25	78 (3.07)	30.4 (1.20)	15.2 (0.60)	80 (3.15)	96 (3.78)	72 (2.84)	45 (1.77)	5 (0.20)
32	96 (3.78)	38.4 (1.51)	19.2 (0.76)	98 (3.86)	115 (4.51)	85 (3.33)	53 (2.09)	7.2 (0.28)

Bore	Q (Body Mounting Holes)	R	S	T (Ports)
6	M4x0.7 6H (#8-32 UNC-2B)	M3x0.5 6H (#4-40 UNC-2B)	M3x0.5 6H (#4-40 UNC-2B)	M5x0.8 6H (#10-32 UNF-2B)
8	M4x0.7 6H (#8-32 UNC-2B)	M3x0.5 6H (#4-40 UNC-2B)	M3x0.5 6H (#4-40 UNC-2B)	M5x0.8 6H (#10-32 UNF-2B)
12	M4x0.7 6H (#8-32 UNC-2B)	M4x0.7 6H (#8-32 UNC-2B)	M3x0.5 6H (#4-40 UNC-2B)	M5x0.8 6H (#10-32 UNF-2B)
16	M5x0.8 6H (#10-32 UNF-2B)	M5x0.8 6H (#10-32 UNF-2B)	M4x0.7 6H (#8-32 UNC-2B)	M5x0.8 6H (#10-32 UNF-2B)
20	M6x1 6H (1/4-20 UNC-2B)	M5x0.8 6H (#10-32 UNF-2B)	M4x0.7 6H (#8-32 UNC-2B)	M5x0.8 6H (#10-32 UNF-2B)
25	M8x1.25 6H (5/16-18 UNC-2B)	M6x1 6H (1/4-20 UNC-2B)	M5x0.8 6H (#10-32 UNF-2B)	M5x0.8 6H (#10-32 UNF-2B)
32	M8x1.25 6H (5/16-18 UNC-2B)	M6x1 6H (1/4-20 UNC-2B)	M5x0.8 6H (#10-32 UNF-2B)	G 1/8 (NPT 1/8)

Bore	V Based on Stroke											W
	0-10mm	11-20mm	0-20mm	21-25mm	21-30mm	26-50mm	31-40mm	41-50mm	51-75mm	51-80mm	81-100mm	
6	15 (0.59)	20 (0.79)	N/A	N/A	25 (0.98)	N/A	30 (1.18)	35 (1.38)	N/A	N/A	N/A	3 (.12)
8	15 (0.59)	20 (0.79)	N/A	N/A	25 (0.98)	N/A	30 (1.18)	35 (1.38)	47.5 (1.87)	N/A	N/A	4 (.16)
12	N/A	N/A	30 (1.18)	30 (1.18)	N/A	40 (1.58)	N/A	N/A	N/A	50 (1.97)	N/A	6 (.24)
16	N/A	N/A	25 (0.98)	35 (1.38)	N/A	35 (1.38)	N/A	N/A	N/A	45 (1.77)	55 (2.17)	8 (.32)
20	N/A	N/A	30 (1.18)	30 (1.18)	N/A	40 (1.58)	N/A	N/A	N/A	60 (2.36)	60 (2.36)	10 (.39)
25	N/A	N/A	30 (1.18)	30 (1.18)	N/A	40 (1.58)	N/A	N/A	N/A	60 (2.36)	60 (2.36)	12 (.47)
32	N/A	N/A	40 (1.58)	40 (1.58)	N/A	50 (1.97)	N/A	N/A	N/A	70 (2.76)	70 (2.76)	16 (.63)

TBD Cylinder Dimensions mm (in)

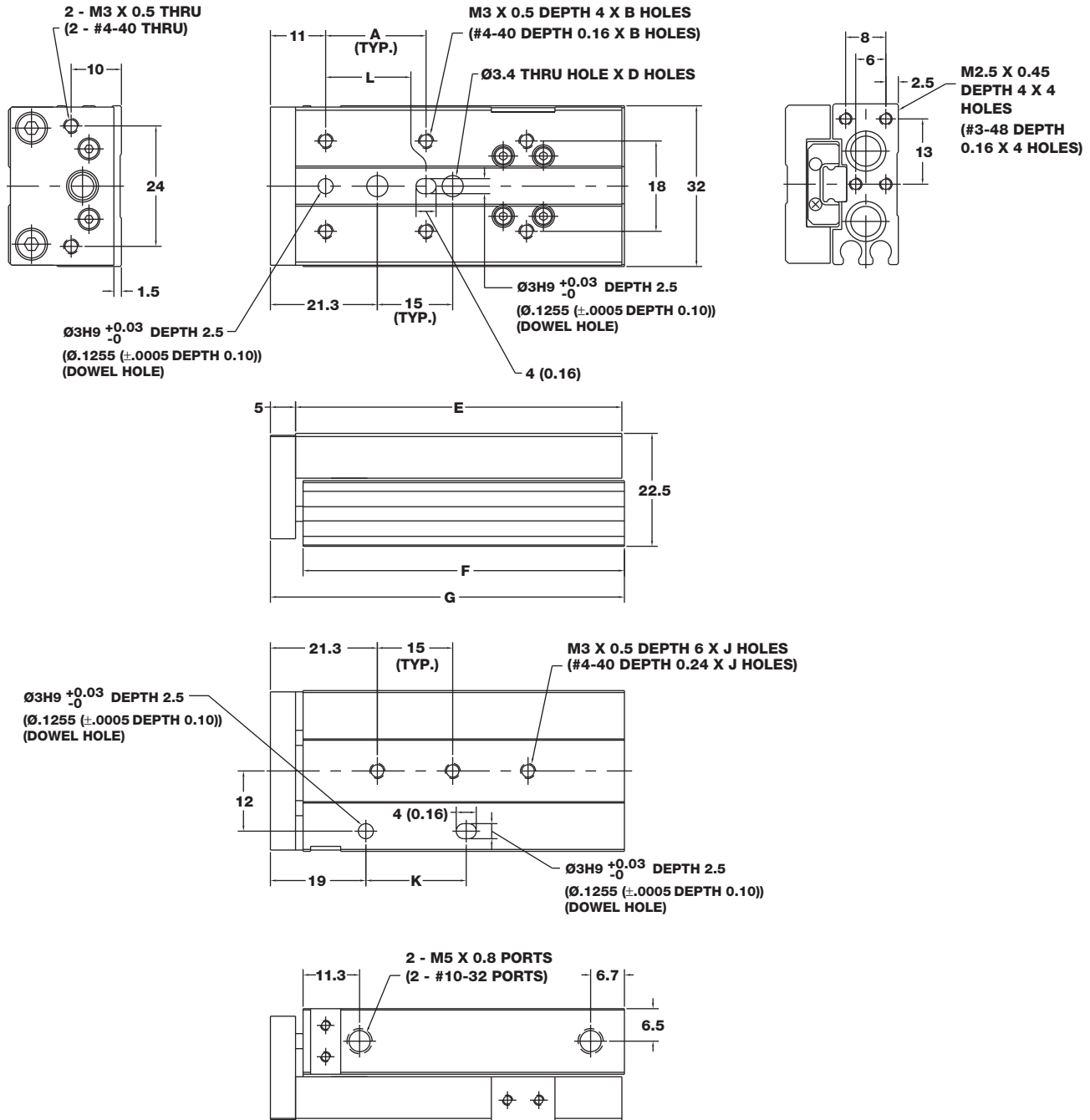


Bore	A	B	C	D	F	G	H	I	J	K	L	M	N
6	2.8 (0.11)	5.5 (0.22)	8 (0.32)	13 (0.51)	12 (0.47)	25 (0.98)	31 (1.22)	13.2 (0.52)	7.8 (0.31)	32 (1.26)	92.9 (3.66)	66 (2.60)	16 (0.63)
8	3 (0.12)	6 (0.24)	8 (0.32)	13 (0.51)	13 (0.51)	28 (1.10)	36 (1.42)	14.7 (0.58)	8.6 (0.34)	37.8 (1.49)	92.9 (3.66)	66 (2.60)	16.1 (0.64)
12	4 (0.16)	8 (0.32)	9 (0.35)	20 (0.79)	15 (0.59)	35 (1.38)	44 (1.73)	17.3 (0.68)	10.4 (0.41)	46 (1.81)	116.3 (4.58)	82.3 (3.24)	30.6 (1.20)
16	5 (0.20)	10 (0.39)	9 (0.35)	30 (1.18)	18 (0.71)	45 (1.77)	55 (2.17)	20.4 (0.80)	12.0 (0.47)	57 (2.24)	131.5 (5.16)	93.5 (3.68)	36.2 (1.42)
20	6 (0.24)	12 (0.47)	12 (0.47)	30 (1.18)	23 (0.91)	50 (1.97)	62 (2.44)	25.4 (1.00)	14.5 (0.57)	64 (2.52)	154.2 (6.07)	106.2 (4.18)	41.5 (1.63)
25	6 (0.24)	12 (0.47)	12 (0.47)	30 (1.18)	28 (1.10)	66 (2.60)	78 (3.07)	30.4 (1.20)	17.0 (0.67)	80 (3.15)	160.9 (6.33)	112.9 (4.45)	45 (1.77)
32	8 (0.32)	16 (0.63)	14 (0.55)	30 (1.18)	36 (1.42)	80 (3.15)	96 (3.78)	38.4 (1.51)	21.0 (0.83)	98 (3.86)	192.6 (7.58)	132.6 (5.22)	53 (2.09)

Bore	P	Q (Body Mounting Holes)	R	S	T (Ports)
6	M3x0.5 6H (#4-40 UNC-2B)	M4x0.7 6H (#8-32 UNC-2B)	M3x0.5 6H (#4-40 UNC-2B)	1.3 (.05)	M5x0.8 6H (#10-32 UNF-2B)
8	M3x0.5 6H (#4-40 UNC-2B)	M4x0.7 6H (#8-32 UNC-2B)	M3x0.5 6H (#4-40 UNC-2B)	1.3 (.05)	M5x0.8 6H (#10-32 UNF-2B)
12	M3x0.5 6H (#4-40 UNC-2B)	M4x0.7 6H (#8-32 UNC-2B)	M4x0.7 6H (#8-32 UNC-2B)	1.8 (.07)	M5x0.8 6H (#10-32 UNF-2B)
16	M4x0.7 6H (#8-32 UNC-2B)	M5x0.8 6H (#10-32 UNF-2B)	M5x0.8 6H (#10-32 UNF-2B)	1.8 (.07)	M5x0.8 6H (#10-32 UNF-2B)
20	M4x0.7 6H (#8-32 UNC-2B)	M6x1 6H (1/4-20 UNC-2B)	M5x0.8 6H (#10-32 UNF-2B)	1.8 (.07)	M5x0.8 6H (#10-32 UNF-2B)
25	M5x0.8 6H (#10-32 UNF-2B)	M8x1.25 6H (5/16-18 UNC-2B)	M6x1 6H (1/4-20 UNC-2B)	1.8 (.07)	M5x0.8 6H (#10-32 UNF-2B)
32	M5x0.8 6H (#10-32 UNF-2B)	M8x1.25 6H (5/16-18 UNC-2B)	M6x1 6H (1/4-20 UNC-2B)	1.8 (.07)	G 1/8 (NPT 1/8)

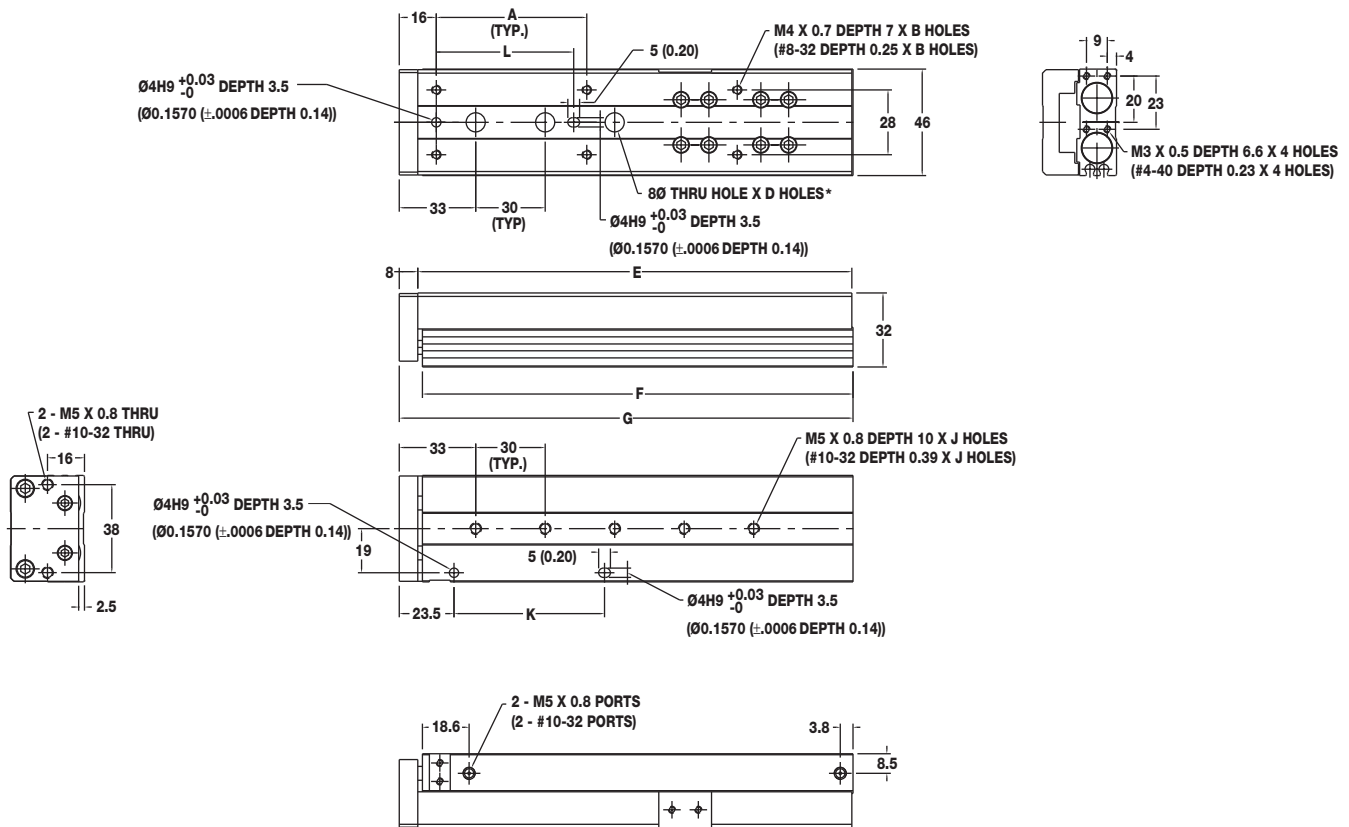
Bore	V Based on Stroke											W
	0-10mm	11-20mm	0-20mm	21-25mm	21-30mm	26-50mm	31-40mm	41-50mm	51-75mm	51-80mm	81-100mm	
6	15 (0.59)	20 (0.79)	N/A	N/A	25 (0.98)	N/A	30 (1.18)	35 (1.38)	N/A	N/A	N/A	3 (.12)
8	15 (0.59)	20 (0.79)	N/A	N/A	25 (0.98)	N/A	30 (1.18)	35 (1.38)	47.5 (1.87)	N/A	N/A	4 (.16)
12	N/A	N/A	30 (1.18)	30 (1.18)	N/A	40 (1.58)	N/A	N/A	N/A	50 (1.97)	N/A	6 (.24)
16	N/A	N/A	25 (0.98)	35 (1.38)	N/A	35 (1.38)	N/A	N/A	N/A	45 (1.77)	55 (2.17)	8 (.32)
20	N/A	N/A	30 (1.18)	30 (1.18)	N/A	40 (1.58)	N/A	N/A	N/A	60 (2.36)	60 (2.36)	10 (.39)
25	N/A	N/A	30 (1.18)	30 (1.18)	N/A	40 (1.58)	N/A	N/A	N/A	60 (2.36)	60 (2.36)	12 (.47)
32	N/A	N/A	40 (1.58)	40 (1.58)	N/A	50 (1.97)	N/A	N/A	N/A	70 (2.76)	70 (2.76)	16 (.63)

TBA Cylinder (6mm bore) Dimensions mm (in)



Stroke	A	B	D	E	F	G	J	K	L
10	20 (0.79)	4	2	45 (1.77)	44 (1.73)	50.5 (1.99)	2	16 (0.630)	20 (0.787)
20	30 (1.18)	4	2	55 (2.17)	54 (2.13)	60.5 (2.38)	3	18 (0.709)	20 (0.787)
30	20 (0.79)	6	2	65 (2.56)	64 (2.52)	70.5 (2.78)	3	20 (0.787)	20 (0.787)
40	28 (1.10)	6	3	95 (3.74)	94 (3.70)	100.5 (3.96)	5	28 (1.102)	35 (1.378)
50	38 (1.50)	6	3	104.5 (4.11)	104.5 (4.11)	111 (4.37)	6	28 (1.102)	35 (1.378)

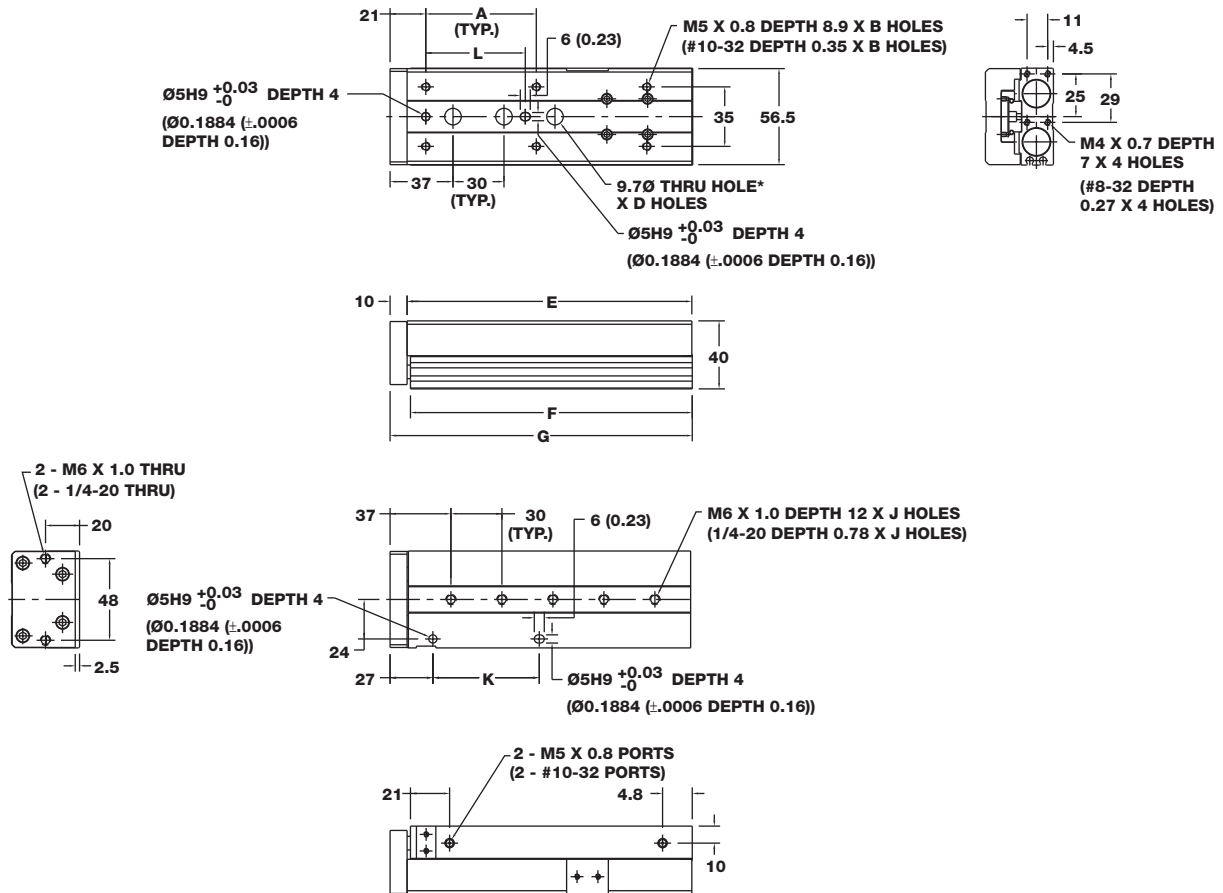
TBA Cylinder (12mm bore) Dimensions mm (in)



*Thru holes go through table top to access smaller counter-bored mounting holes in the cylinder body.

Stroke	A	B	D	E	F	G	J	K	L
10	35 (1.38)	4	1	73 (2.86)	71 (2.80)	81 (3.20)	2	35 (1.378)	35 (1.378)
20	35 (1.38)	4	1	73 (2.86)	71 (2.80)	81 (3.20)	2	35 (1.378)	35 (1.378)
30	35 (1.38)	4	1	73 (2.86)	71 (2.80)	81 (3.20)	2	35 (1.378)	35 (1.378)
40	50 (1.97)	4	1	85 (3.36)	83 (3.28)	93 (3.67)	2	50 (1.968)	50 (1.968)
50	35 (1.38)	6	1	105 (4.12)	103 (4.06)	113 (4.46)	3	35 (1.378)	35 (1.378)
75	55 (2.17)	6	2	151 (5.93)	149 (5.88)	159 (6.27)	4	55 (2.165)	55 (2.165)
100	65 (2.56)	6	3	189 (7.43)	187 (7.37)	197 (7.76)	5	65 (2.559)	65 (2.559)

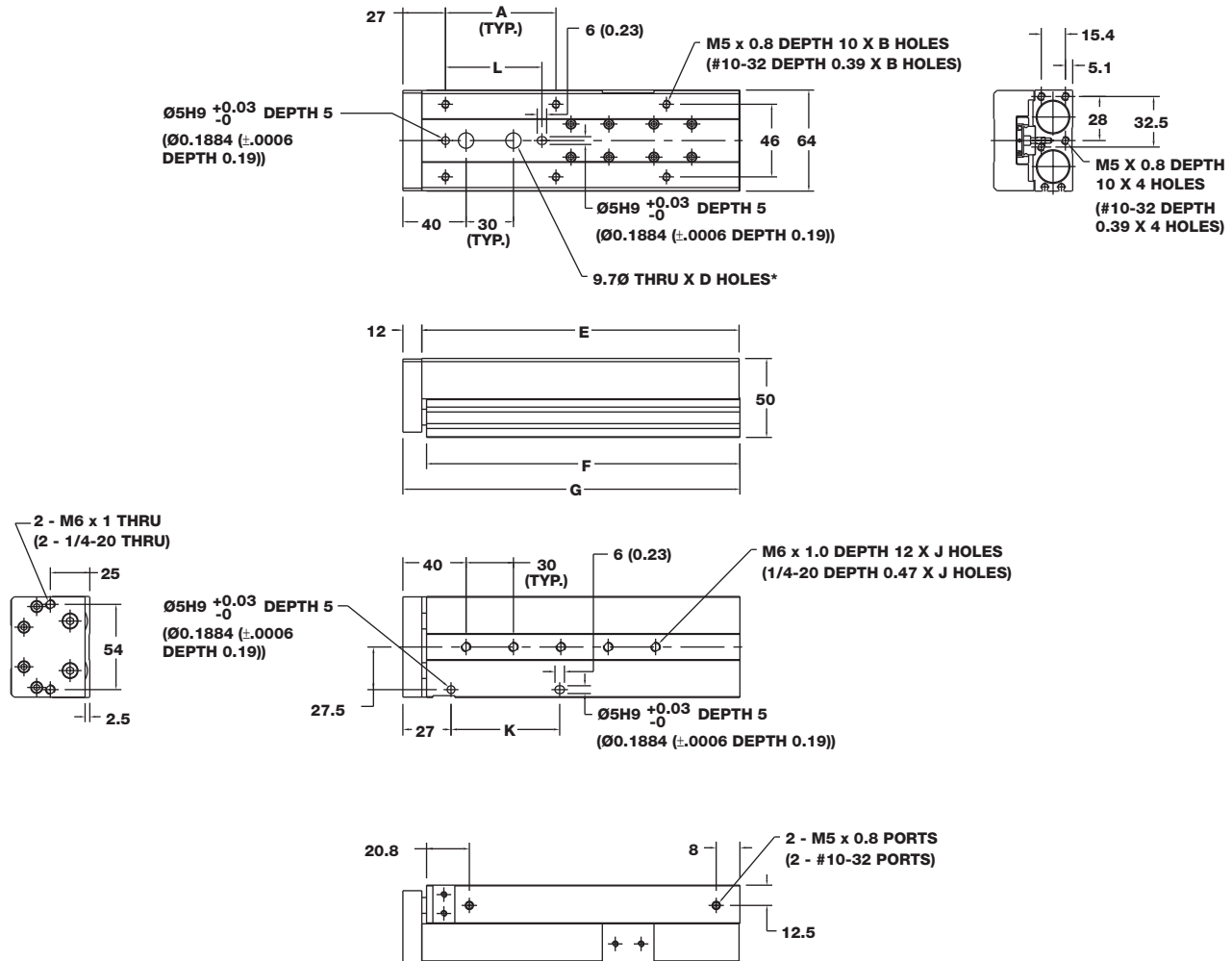
TBA Cylinder (16mm bore) Dimensions mm (in)



*Thru holes go through table top to access smaller counterbored mounting holes in the cylinder body.

Stroke	A	B	D	E	F	G	J	K	L
10	35 (1.38)	4	1	79 (3.11)	77 (3.05)	89 (3.52)	2	35 (1.378)	35 (1.378)
20	35 (1.38)	4	1	79 (3.11)	77 (3.05)	89 (3.52)	2	35 (1.378)	35 (1.378)
30	35 (1.38)	4	1	79 (3.11)	77 (3.05)	89 (3.52)	2	35 (1.378)	35 (1.378)
40	40 (1.58)	6	1	89 (3.50)	87 (3.44)	99 (3.91)	3	40 (1.575)	40 (1.575)
50	30 (1.18)	6	1	116 (4.56)	114 (4.51)	126 (4.98)	3	30 (1.181)	30 (1.181)
75	55 (2.17)	6	2	145 (5.71)	143 (5.65)	155 (6.12)	4	55 (2.165)	55 (2.165)
100	65 (2.56)	6	3	170 (6.69)	168 (6.63)	180 (7.10)	5	65 (2.559)	65 (2.559)
125	70 (2.70)	8	4	205 (8.07)	203 (8.01)	215 (8.48)	6	70 (2.756)	70 (2.756)

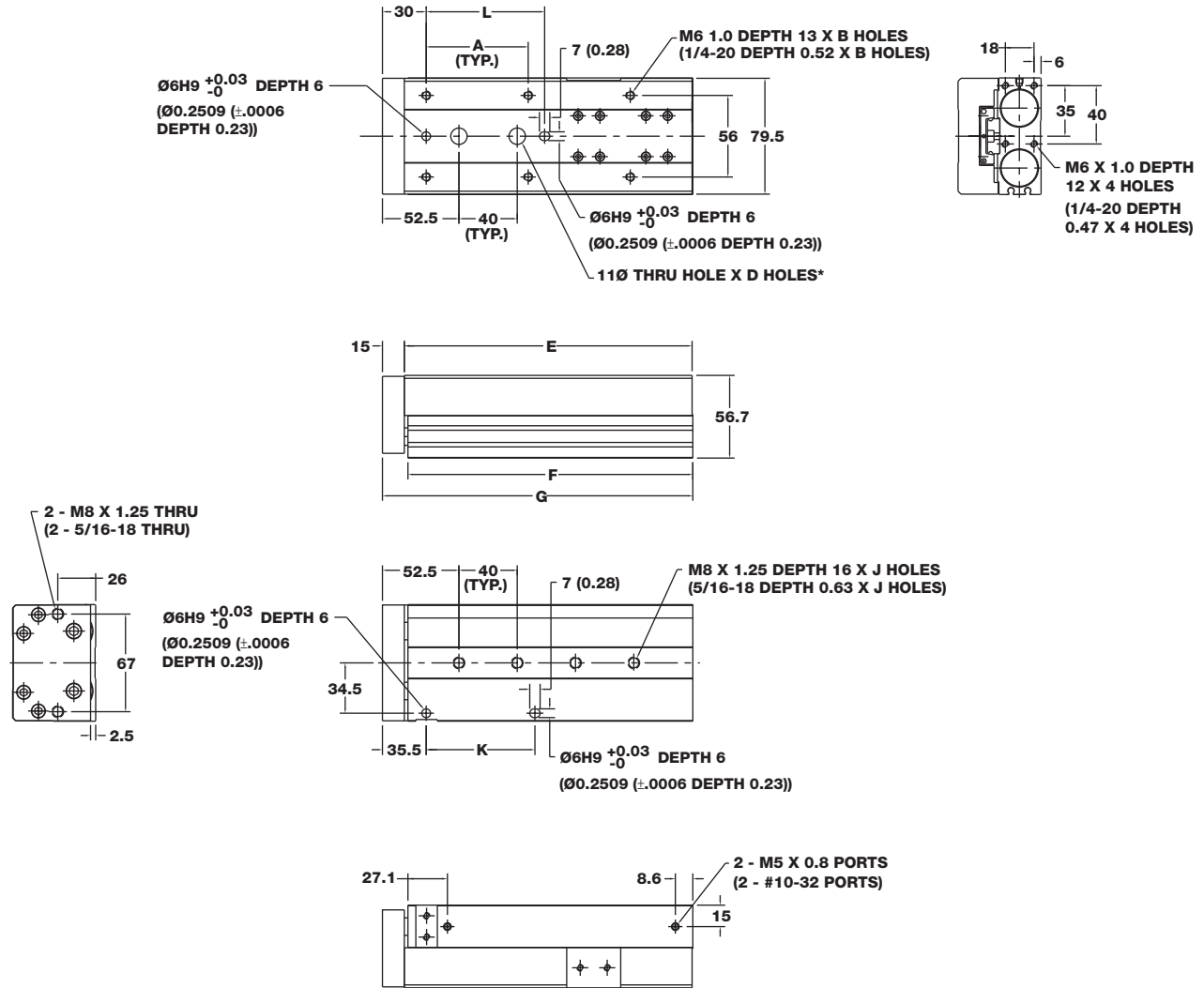
TBA Cylinder (20mm bore) Dimensions mm (in)



*Thru holes go through table top to access smaller counterbored mounting holes in the cylinder body.

Stroke	A	B	D	E	F	G	J	K	L
10	50 (1.97)	4	1	84 (3.30)	81.5 (3.21)	96 (3.78)	2	50 (1.968)	50 (1.968)
20	50 (1.97)	4	1	84 (3.30)	81.5 (3.21)	96 (3.78)	2	50 (1.968)	50 (1.968)
30	50 (1.97)	4	1	84 (3.30)	81.5 (3.21)	96 (3.78)	2	50 (1.968)	50 (1.968)
40	60 (2.36)	4	1	94 (3.69)	91.5 (3.60)	106 (4.17)	2	60 (2.362)	60 (2.362)
50	35 (1.38)	6	1	108.5 (4.27)	106.5 (4.19)	121 (4.76)	3	35 (1.378)	35 (1.378)
75	60 (2.36)	6	2	140 (5.51)	138 (5.44)	152.5 (6.01)	4	60 (2.362)	60 (2.362)
100	70 (2.76)	6	3	200.5 (7.89)	198.5 (7.82)	213 (8.39)	5	70 (2.756)	64 (2.520)
125	70 (2.76)	8	4	230 (9.06)	228 (8.98)	242.5 (9.55)	6	70 (2.756)	64 (2.520)
150	80 (3.15)	8	5	263 (10.36)	261 (10.28)	275.5 (10.85)	7	80 (3.150)	80 (3.150)

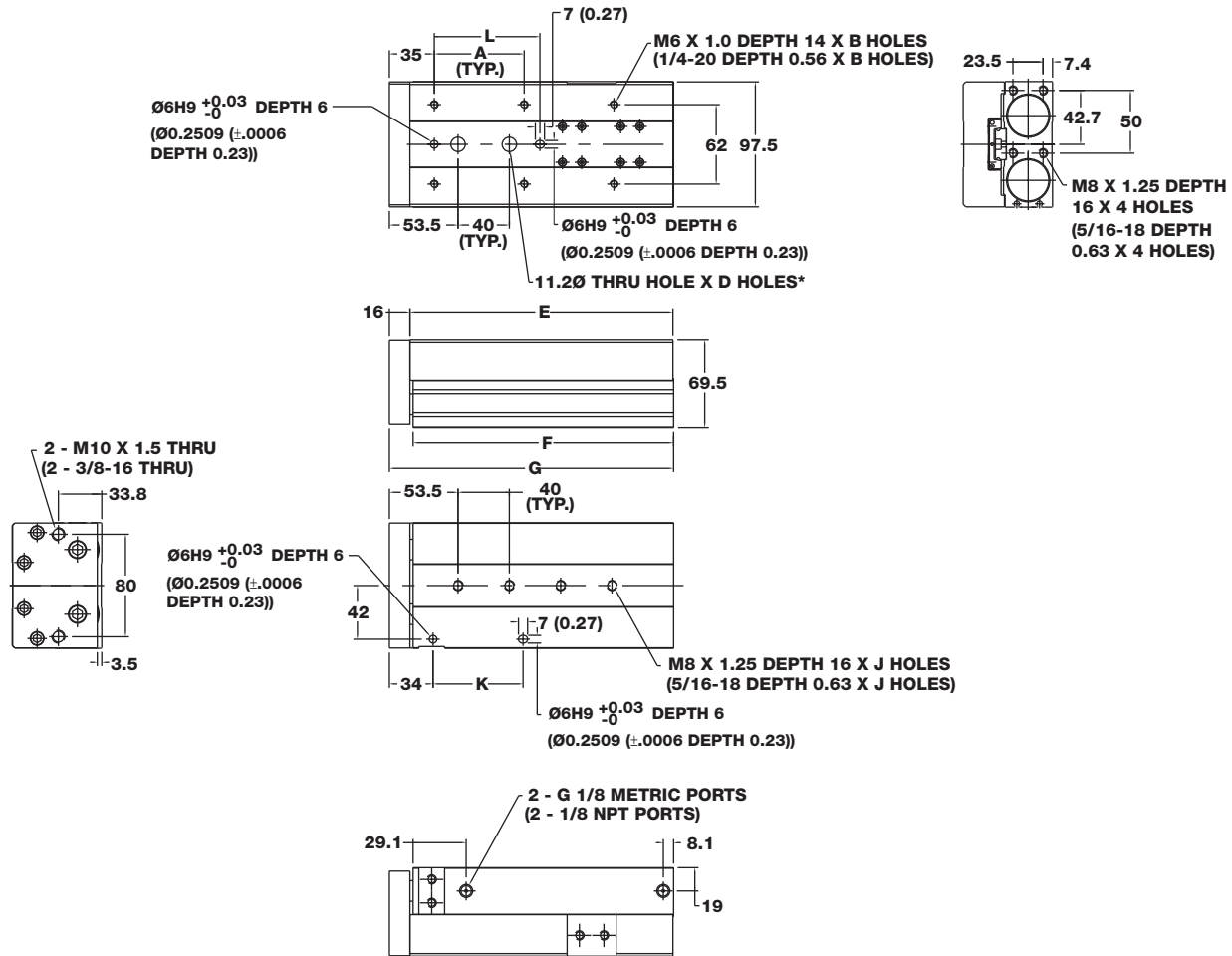
TBA Cylinder (25mm bore) Dimensions mm (in)



*Thru holes go through table top to access smaller counterbored mounting holes in the cylinder body.

Stroke	A	B	D	E	F	G	J	K	L
10	50 (1.97)	4	1	92.5 (3.64)	90.5 (3.56)	108 (4.25)	2	50 (1.968)	50 (1.968)
20	50 (1.97)	4	1	92.5 (3.64)	90.5 (3.56)	108 (4.25)	2	50 (1.968)	50 (1.968)
30	50 (1.97)	4	1	92.5 (3.64)	90.5 (3.56)	108 (4.25)	2	50 (1.968)	50 (1.968)
40	60 (2.36)	4	1	102.5 (4.04)	100.5 (3.96)	118 (4.65)	2	60 (2.362)	60 (2.362)
50	35 (1.38)	6	1	115.5 (4.55)	113.5 (4.47)	131 (5.16)	2	35 (1.378)	35 (1.378)
75	60 (2.36)	6	1	156.5 (6.16)	154.5 (6.08)	172 (6.77)	3	60 (2.362)	60 (2.362)
100	70 (2.76)	6	2	197.5 (7.78)	195.5 (7.70)	213 (8.39)	4	70 (2.756)	76 (2.992)
125	75 (2.95)	8	3	253.5 (9.98)	251.5 (9.90)	269 (10.59)	5	75 (2.953)	75 (2.953)
150	80 (3.15)	8	3	270.5 (10.65)	268.5 (10.57)	286 (11.26)	6	80 (3.150)	80 (3.150)

TBA Cylinder (32mm bore) Dimensions mm (in)



*Thru holes go through table top to access smaller counterbored mounting holes in the cylinder body.

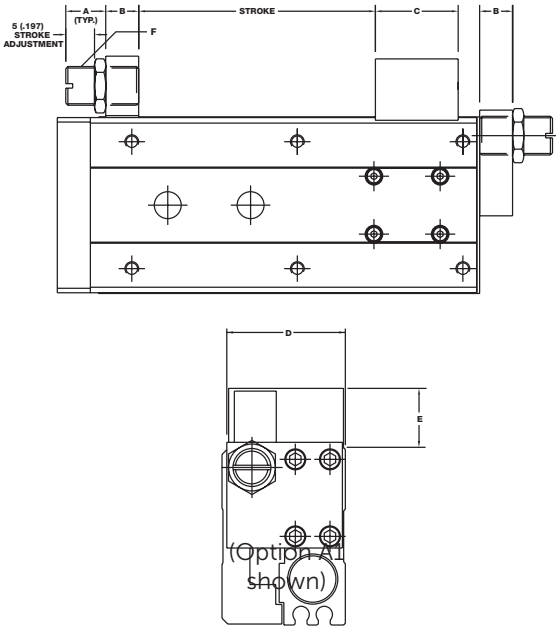
Stroke	A	B	D	E	F	G	J	K	L
10	50 (1.97)	4	NA	102 (4.02)	100 (3.94)	119 (4.67)	2	50 (1.968)	50 (1.968)
20	50 (1.97)	4	NA	102 (4.02)	100 (3.94)	119 (4.67)	2	50 (1.968)	50 (1.968)
30	50 (1.97)	4	NA	102 (4.02)	100 (3.94)	119 (4.67)	2	50 (1.968)	50 (1.968)
40	60 (2.36)	4	1	112 (4.41)	110 (4.34)	129 (5.06)	2	60 (2.362)	60 (2.362)
50	35 (1.38)	6	1	125 (4.93)	123 (4.85)	142 (5.58)	2	35 (1.378)	35 (1.378)
75	60 (2.36)	6	1	171 (6.73)	169 (6.66)	188 (7.39)	3	60 (2.362)	60 (2.362)
100	70 (2.76)	6	2	207 (8.15)	205 (8.08)	224 (8.80)	4	70 (2.756)	76 (2.992)
125	75 (2.95)	8	3	265 (10.44)	263 (10.36)	282 (11.09)	5	75 (2.953)	75 (2.953)
150	80 (3.15)	8	3	298 (11.74)	296 (11.66)	315 (12.39)	6	80 (3.150)	80 (3.150)

Twin Bore Air Table Cylinder Options

Stroke Adjuster (Options A1, A2, A3)

Provides 5mm (.197) of stroke adjustment at the end of stroke.

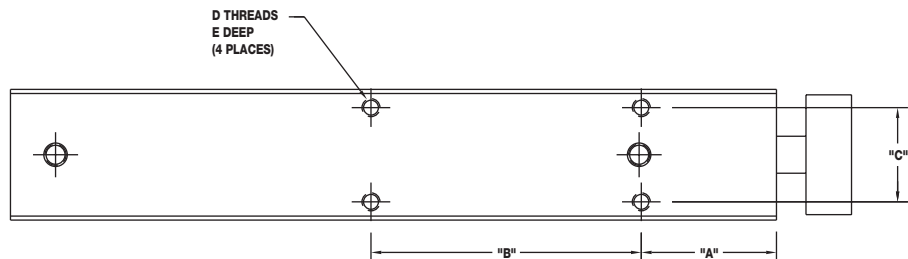
Bore	A	B	C	D	E	F
6	7.7 (0.30)	6 (0.24)	12.5 (0.49)	21.7 (0.85)	9 (0.35)	M5x0.8
8	8 (0.31)	6 (0.24)	14.3 (0.56)	24.6 (0.97)	12.2 (0.48)	M8x1
12	10 (.39)	8 (.31)	18.1 (.71)	30 (1.18)	17 (.67)	M10x1
16	10 (.39)	10 (.39)	21.1 (.83)	37.5 (1.48)	18 (.71)	M12x1
20	10 (.39)	12 (.47)	30 (1.18)	47.5 (1.87)	22 (.87)	M14x1
25	10 (.39)	16 (.63)	30 (1.18)	54.5 (2.15)	24.5 (.96)	M20x1.5
32	10 (.39)	16 (.63)	32 (1.26)	67.3 (2.65)	32.3 (1.27)	M25x1.5



Twin Bore Air Table Cylinder Options

Side Mounting Holes (Option S)

Use for TB and TBD model cylinders

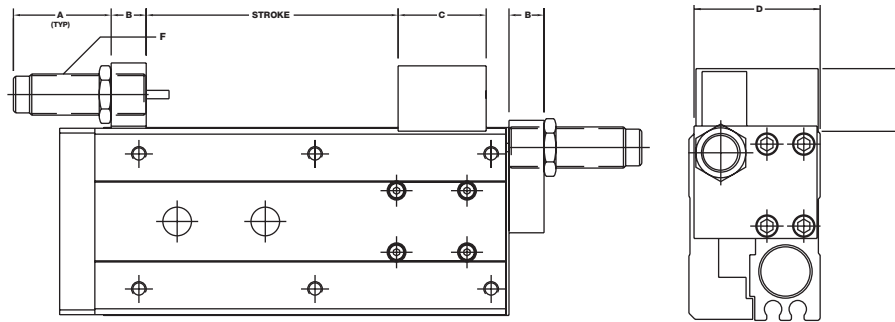


Bore	A	B	Stroke Length	C	D	E	
					Standard	Option E	
6mm	10 (0.394)	23 (0.906)	0-10mm	6 (0.236)	M2x0.4	#2-56 UNC	3 (0.118)
		33 (1.299)	11-20mm				
		43 (1.693)	21-30mm				
		53 (2.087)	31-40mm				
		63 (2.480)	41-50mm				
8mm	10 (0.394)	23 (0.906)	0-10mm	7 (0.276)	M2.5x0.45	#3-48 UNC	3 (0.118)
		33 (1.299)	11-20mm				
		43 (1.693)	21-30mm				
		53 (2.087)	31-40mm				
		63 (2.480)	41-50mm				
12mm	20 (.787)	88 (3.465)	51-75mm	10 (.394)	M3x.5	#4-40 UNC	4.5 (.177)
		30 (1.181)	0-25mm				
		40 (1.575)	26-50mm				
16mm	30 (1.181)	50 (1.969)	51-75mm	12 (.472)	M4x0.7	#8-32 UNC	4.5 (.177)
		25 (.984)	0-20mm				
		35 (1.378)	21-50mm				
		45 (1.772)	51-80mm				
20mm	30 (1.181)	55 (2.165)	81-100mm	16 (.630)	M4x0.7	#8-32 UNC	4.5 (.177)
		30 (1.181)	0-25mm				
		40 (1.575)	26-50mm				
25mm	30 (1.181)	60 (2.362)	51-100mm	22 (.866)	M5x0.8	#10-32 UNF	7.4 (.290)
		30 (1.181)	0-20mm				
		40 (1.575)	21-50mm				
32mm	30 (1.181)	60 (2.362)	51-80mm	25 (.984)	M5x0.8	#10-32 UNF	7.5 (.295)
		40 (1.575)	0-25mm				
		50 (1.969)	26-50mm				
		70 (2.756)	51-100mm				

Twin Bore Air Table Cylinder Options

Shock Absorbers (Option K)

Provides shock absorption at the ends of stroke. The shock absorbers are available in three dampening levels: light duty, standard duty, and heavy duty, so the shock can be selected based on the energies of the application. Shock absorbers can also be provided at either end of stroke or at both ends.



Bore	A	B	C	D	E	F
8	22.5 (0.89)	6 (0.24)	14.3 (0.56)	24.6 (0.97)	12.2 (0.48)	M8x1
12	20.7 (.81)	8 (.31)	18.1 (.71)	30 (1.18)	17 (.67)	M10x1
16	39.8 (1.57)	10 (.30)	21.1 (.83)	37.5 (1.48)	18 (.71)	M12x1
20	70.2 (2.76)	12 (.47)	30 (1.18)	47.5 (1.87)	22 (.87)	M14x1
25	82.7 (3.26)	16 (.63)	30 (1.18)	54.5 (2.15)	24.5 (.96)	M20x1.5
32	90.4 (3.56)	16 (.63)	32 (1.26)	67.3 (2.65)	32.3 (1.27)	M25x1.5

See the following section on how to size the shock absorber to a specific application. Shock absorbers within a given bore size have the same dimensions regardless of dampening strength.

How to Size The Shock Absorber

The shock absorber is pre selected for size by the bore diameter of the cylinder. However, the "dampening strength must be selected to choose the proper shock absorber". To calculate the necessary shock, the following values must be known.

Cylinder Bore Diameter	d(mm)
Operating Pressure	p(bar)
Load on the Actuator	W(kg)
Impact Velocity*	v(m / sec)
Weight Constant	k1
Cylinder Constant	k2
Shock Constant	k3
Cycles per Hour	c
Mounting Orientation (horizontal or vertical)	

* Impact velocity may be estimated at 2 times average velocity.

** The "work Energy" calculation varies with mounting orientation, Ewh for horizontal and Ewv for "vertical" applications.

Et (Total Energy) equals the sum of Ek (Kinetic Energy) and Ew (Work Energy). **

$$E_k = (W/2) + k_1 \times v^2 \text{ [Nm]}$$

$$E_{wh} = k_2 \times p \times k_3 \text{ [Nm]}$$

$$E_{wv} = ((k_2 \times p) + W + k_1) \times k_3 \text{ [Nm]}$$

$$E_t = E_k + E_w \text{ [Nm]}$$

$$E_{tC} = E_t \times c \text{ [Nm / hr]}$$

Et and EtC must not exceed maximum values listed.
Dampening must be chosen from graphs.

Twin Bore Air Table Cylinder Options

Shock Absorbers (Option K)

Shock Specifications

Model Bore	Shock Bore (mm)	K _s Shock Constant	Thread Size	E _t Max Nm per Cycle	E _c Max Nm per Hour	Max Shock Force (N)	Max Propelling Force (N)	Shock Weight (g)
8	5.6	0.0051	M8x1	0.45	3954	N/A	N/A	9
12	7.1	0.006	M10x1.0	2.2	4100	700	89	12
16	6	0.010	M12x1.0	5.0	14125	1000	220	42
20	7	0.016	M14x1.0	21.5	34000	2225	530	71
25	11	0.022	M20x1.5	45.0	53700	3110	890	200
32	13	0.025	M25x1.5	73.5	70000	4440	1550	285

Weight Constant (k1)

Stroke	Bore					
	8	12	16	20	25	32
10	0.08	0.17	0.29	0.51	0.82	1.34
20	0.10	0.17	0.29	0.52	0.84	1.38
30	0.12	0.17	0.30	0.53	0.86	1.41
40	0.15	0.20	0.33	0.58	0.92	1.51
50	0.20	0.23	0.42	0.64	0.99	1.63
75	0.22	0.32	0.50	0.78	1.22	2.05
100	N/A	0.40	0.57	1.02	1.46	2.38
125	N/A	N/A	0.67	1.15	1.76	2.86
150	N/A	N/A	N/A	1.29	1.88	3.17

Shock Graph Legend

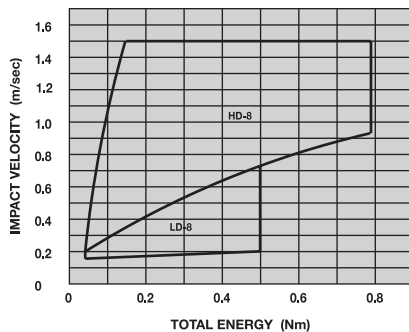
Bore	Dampening		
	Light Duty	Std. Duty	Heavy Duty
8	LD-8	SD-8	N/A
12	LD-12	SD-12	HD-12
16	LD-16	SD-16	HD-16
20	LD-20	SD-20	HD-20
25	LD-25	SD-25	HD-25
32	LD-32	SD-32	HD-32
Order Code	1	2	3

Cylinder Constant (k2)

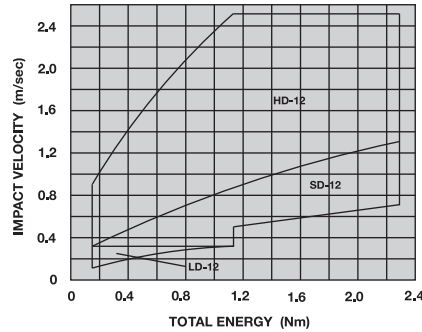
Bore	k
8	10.06
12	22.62
16	40.22
20	62.84
25	98.19
32	160.87

Based on bore diameter, impact velocity (v), and calculated Total Energy (Et), choose the LD, SD, or HD shock from the appropriate graph.

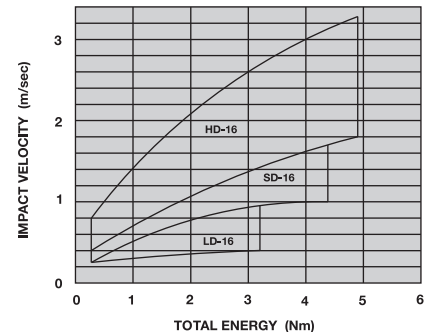
8mm Bore



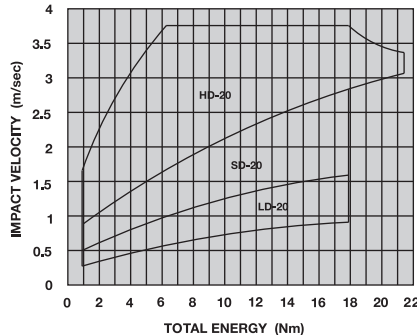
12mm Bore



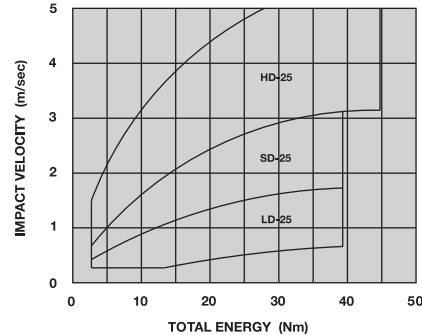
16mm Bore



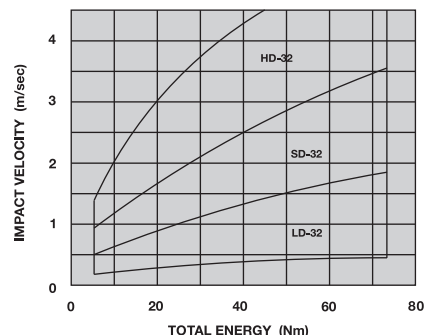
20mm Bore



25mm Bore

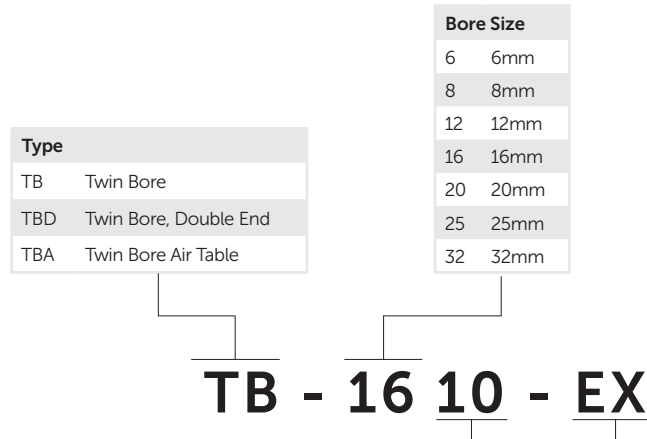


32mm Bore



NOTE: A minimum impact velocity of .25 m/sec. is necessary before shock will be effective.

The Model Number for all Twin Bore cylinders consists of alphanumeric clusters. These designate type, bore size, stroke length, and special options. Please refer to the charts below for an example of a standard double-acting Twin Bore model with 16mm bore, 10mm stroke, ball bushings, and U.S. customary threads.



Standard Stroke Lengths (Mm)	Bore Size													
	TB & TBD							TBA						
	6	8	12	16	20	25	32	6	8	12	16	20	25	32
10	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15	N/A	N/A	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20	X	X	X	X	X	X	X	X	X	X	X	X	X	X
25	N/A	N/A	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30	X	X	X	X	X	X	X	X	X	X	X	X	X	X
35	N/A	N/A	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
40	X	X	X	X	X	X	X	X	X	X	X	X	X	X
45	N/A	N/A	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
50	X	X	X	X	X	X	X	X	X	X	X	X	X	X
60	N/A	N/A	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
70	N/A	N/A	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
75	N/A	X	X	X	X	X	X	N/A	X	X	X	X	X	X
80	N/A	N/A	N/A	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
90	N/A	N/A	N/A	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
100	N/A	N/A	N/A	X	X	X	X	N/A	N/A	X	X	X	X	X
125	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X
150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X

Options	
(Enter in alphabetical order)	
A1	Stroke adjustment, both ends ¹
A2	Stroke adjustment, extend only ¹
A3	Stroke adjustment, retract only ¹
E	U.S. customary units (inch)
F	Full-flow port orifice
K_ _	Shock absorbers
First _ will be:	
1 (shock both ends)	
2 (shock extend only)	
3 (shock retract only)	
Second _ will be:	
1 (light shock)	
2 (standard shock)	
3 (heavy shock) ⁴	
M	Magnetic position sensing
S	Side mounting holes ²
V	High temperature; -15 to 135 C (0 to 275 F)
X	Ball bushings ^{2 3 4}

NOTE: Bumpers standard on all models.

¹ TBA models only.

² TB and TBD models only. (TB and TBD stroke lengths available in any 0.1mm increment up to 225mm maximum [12-32 bores only]. Consult your distributor for pricing of any stroke length not listed as standard. TBA models available only in those stroke lengths listed as standard above.

³ Not available on 6mm bore.

⁴ Not available on 8mm bore.

Combination Availability

Options	All Bore Sizes
A1	E; M; V
A2	E; K31, 2, or 3; M; V
A3	E; K21, 2, or 3; M; V
E	A1, 2, or 3; K11, 2, or 3; K21, 2, or 3; K31, 2, or 3; M; S; V; X
K11, 2 or 3	E; M; V
K21, 2 or 3	A3; E; M; V

Options	All Bore Sizes
K31, 2 or 3	A2; E; M; V
M	A1, 2, or 3; K11, 2, or 3; E; K21, 2, or 3; K31, 2, or 3; S; V; X
S	E; M; V; X
V	A1, 2, or 3; E; K11, 2, or 3; K21, 2, or 3; K31, 2, or 3; M; S; X
X	E; M; S; V

Twin Bore Repair Kits

Repair Kit

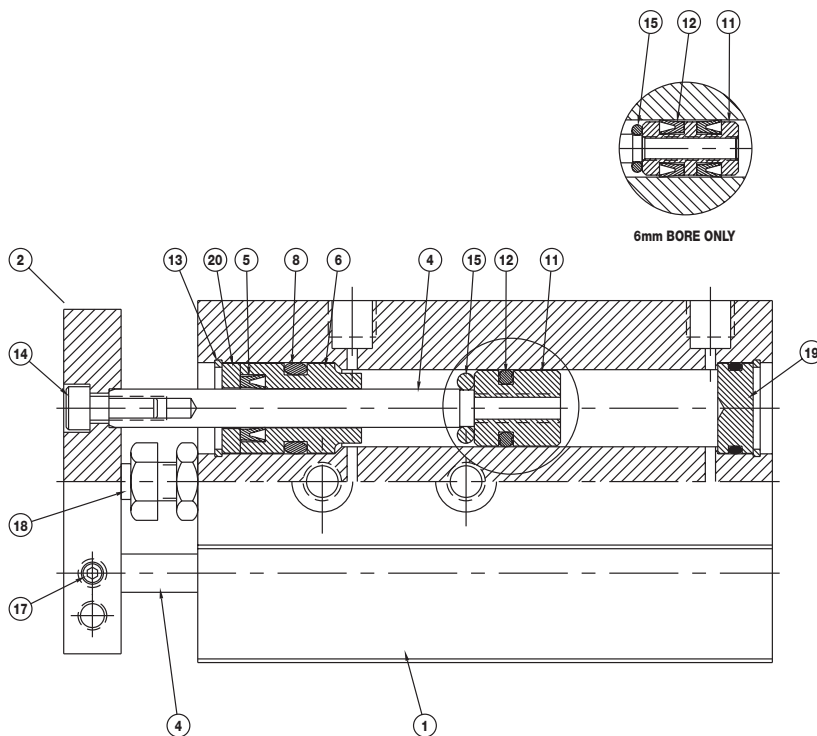
K2-B-TB-[Bore]
K2-B-TB-[Bore]-V
K2-B-TBD-[Bore]
K2-B-TBD-[Bore]-V
K2-B-TB-[Bore]-X
K2-B-TB-[Bore]-VX
K2-B-TBD-[Bore]-X
K2-B-TBD-[Bore]-VX
K2-B-TBA-[Bore]
K2-B-TBA-[Bore]-V

Each TB and TBD repair kit includes the appropriate number cup seals, rod wiper seals, rod seals, and rod guides. The TBA kits include the bumper in addition to the seals. Repair kits are not available on 6mm and 8mm.

To order, please insert the bore code after the model designation for the desired repair kit. Suffix after bore code indicates seal and ball bushing options. **For example, on cylinder part number TB-1610-EM, order repair kit number K2-B-TB-16.**

Contact your local IMI Bimba distributor for additional information.

Standard Model 6mm - 8mm Bore



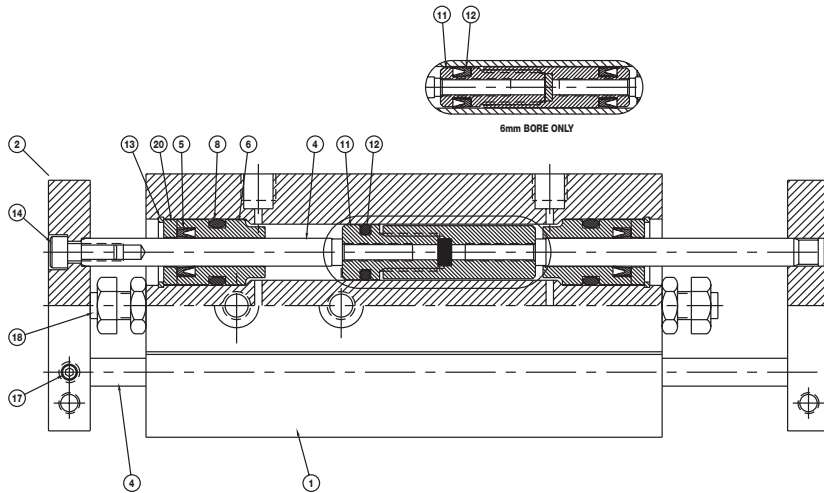
Part #	Description	Material
1	Body	Aluminum - (Anodized over wear surfaces)
2	End Block	Anodized Aluminum
4	Rod	Hard Chrome Plated Carbon Steel
5	Rod Seal	Nitrile
6	Rod Guide	White Delrin®
8	Rod Guide Seal	Nitrile
11	Piston	Aluminum
12	Piston Seal	Nitrile
13	Snap Ring	Zinc Plated Carbon Steel
14	Socket Head Cap Screw	Zinc Plated Carbon Steel
15	Bumper	Urethane
17	Socket Head Set Screw	Zinc Plated Carbon Steel
18	Stroke Adjuster/Bumper	Stainless Bolt with Urethane Bumper
19	Rear Head	Anodized Aluminum
20	Rod Seal Retainer	Stainless Steel

NOTE: Field repair requires special assembly tooling and may not be practical. Factory rework is recommended.

Contact IMI Bimba for all repair options.

Twin Bore Repair Kits

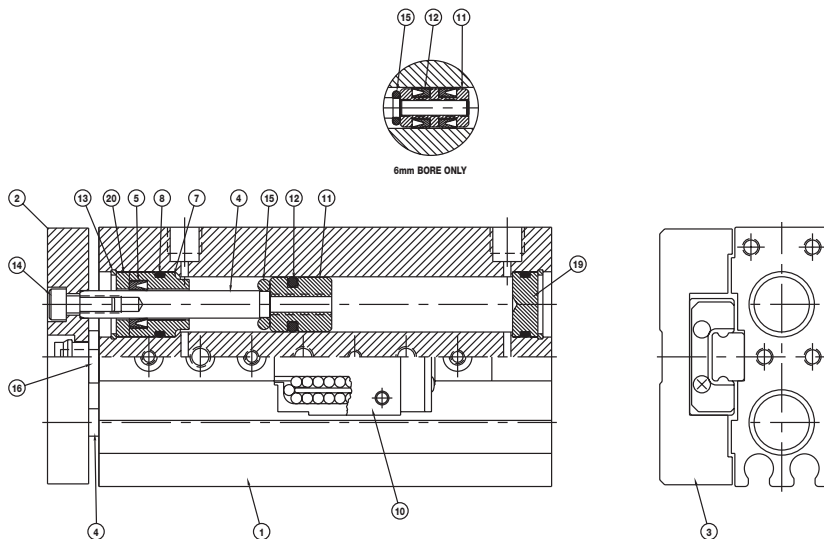
TBD (Double Rod End) 6mm - 8mm Bore



Part #	Description	Material
1	Body	Aluminum - (Anodized over wear surfaces)
2	End Block	Anodized Aluminum
4	Rod	Hard Chrome Plated Carbon Steel
5	Rod Seal	Nitrile
6	Rod Guide	White Delrin®
8	Rod Guide Seal	Nitrile
11	Piston	Aluminum
12	Piston Seal	Nitrile
13	Snap Ring	Zinc Plated Carbon Steel
14	Socket Head Cap Screw	Zinc Plated Carbon Steel
17	Socket Head Set Screw	Zinc Plated Carbon Steel
18	Stroke Adjuster/Bumper	Stainless Bolt with Urethane Bumper
20	Rod Seal Retainer	Stainless Steel

NOTE: Contact IMI Birmba for all repair options.

TBA (Air Table Model) 6mm - 8mm Bore



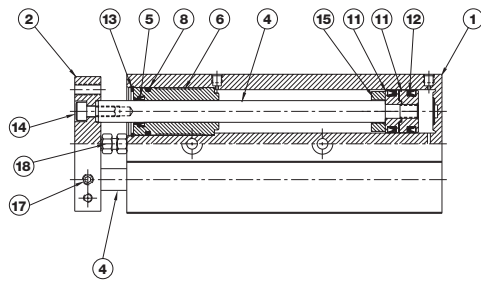
Part #	Description	Material
1	Body	Aluminum - (Anodized over wear surfaces)
2	End Block	Anodized Aluminum
3	Table Plate	Anodized Aluminum
4	Rod	Hard Chrome Plated Carbon Steel
5	Rod Seal	Nitrile
7	Rod Guide	Anodized Aluminum
8	Rod Guide Seal	Nitrile
10	Table Bearing	Stainless Steel Rail + Stainless Steel Bearings
11	Piston	Aluminum
12	Piston Seal	Nitrile
13	Snap Ring	Zinc Plated Carbon Steel
14	Socket Head Cap Screw	Zinc Plated Carbon Steel
15	Bumper	Urethane
19	Rear Head	Anodized Aluminum
20	Rod Seal Retainer	Stainless Steel

NOTE: Contact IMI Birmba for all repair options.

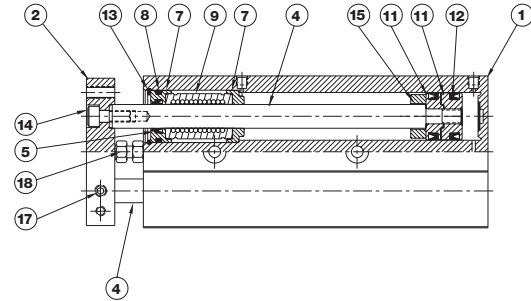
Twin Bore Repair Kits

12mm - 32mm Bore

Standard Model

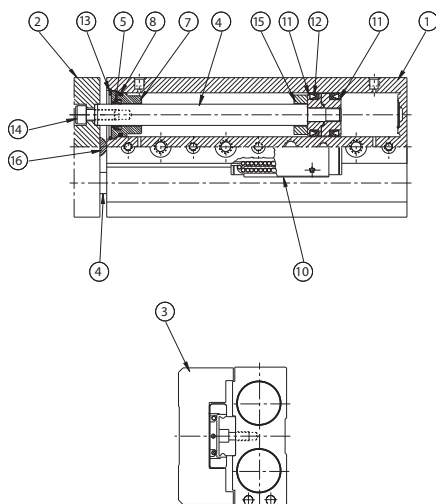


Ball Bearing Model (Option X)



Part #	Description	Material
1	Body	Aluminum - (Anodized over wear surfaces)
2	End Block	Anodized Aluminum
4	Rod	Hard Chrome Plated Carbon Steel
5	Rod Seal/Wiper	Nitrile (Standard) or Fluoroelastomer (High Temperature Option)
6	Rod Guide	White Delrin®
7	Rod Guide	Anodized Aluminum
8	Rod Guide Seal	Nitrile (Standard) or Fluoroelastomer (High Temperature Option)
9	Ball Bushing	Stainless Steel
11	Piston	Aluminum
12	Piston Seal	Nitrile (Standard) or Fluoroelastomer (High Temperature Option)
13	Snap Ring	Zinc Plated Carbon Steel
14	Socket Head Cap Screw	Zinc Plated Carbon Steel
15	Bumper	Urethane
17	Socket Head Set Screw	Zinc Plated Carbon Steel
18	Stroke Adjuster/Bumper	Stainless Bolt w/Urethane Bumper

Air Table Model (TBA) 12mm - 32mm Bore

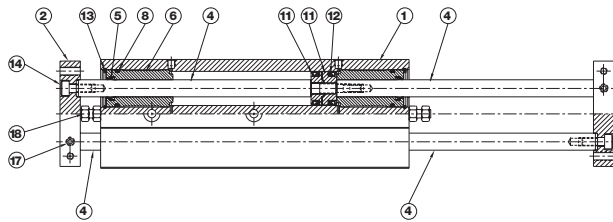


Part #	Description	Material
1	Body	Aluminum - (Anodized over wear surfaces)
2	End Block	Anodized Aluminum
3	Table Plate	Anodized Aluminum
4	Rod	Hard Chrome Plated Carbon Steel
5	Rod Seal/Wiper	Nitrile (Standard) or Fluoroelastomer (High Temperature Option)
7	Rod Guide	Anodized Aluminum
8	Rod Guide Seal	Nitrile (Standard) or Fluoroelastomer (High Temperature Option)
10	Table Bearing	Stainless Steel Rail + Stainless Steel Bearings
11	Piston	Aluminum
12	Piston Seal	Nitrile (Standard) or Fluoroelastomer (High Temperature Option)
13	Snap Ring	Zinc Plated Carbon Steel
14	Socket Head Cap Screw	Zinc Plated Carbon Steel
15	Bumper	Urethane
16	Bumper	Urethane

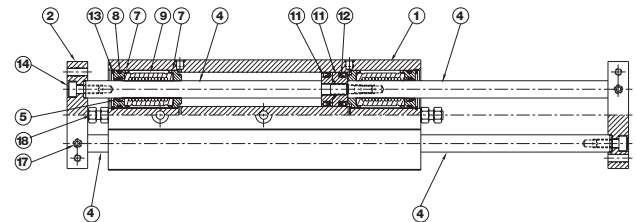
Twin Bore Repair Kits

TBD (Double Rod End) 12mm - 32mm Bore

Standard Model



Ball Bearing Model (Option X)



Part #	Description	Material
1	Body	Aluminum - (Anodized over wear surfaces)
2	End Block	Anodized Aluminum
4	Rod	Hard Chrome Plated Carbon Steel
5	Rod Seal/Wiper	Nitrile (Standard) or Fluoroelastomer (High Temperature Option)
6	Rod Guide	White Delrin®
7	Rod Guide	Anodized Aluminum
8	Rod Guide Seal	Nitrile (Standard) or Fluoroelastomer (High Temperature Option)
9	Ball Bushing	Stainless Steel
11	Piston	Aluminum
12	Piston Seal	Nitrile (Standard) or Fluoroelastomer (High Temperature Option)
13	Snap Ring	Zinc Plated Carbon Steel
14	Socket Head Cap Screw	Zinc Plated Carbon Steel
17	Socket Head Set Screw	Zinc Plated Carbon Steel
18	Stroke Adjuster/Bumper	Stainless Bolt w/Urethane Bumper