numatics®

Cylinders

B Series

Compact Interchangeable Cylinder Line

We're everywhere you need us to be!

B Series 3-13

Rev. 11/03

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B Series
Compact Interchangeable

The **B Series** is a compact aluminum cylinder line that is designed to fit tight space requirements. The cylinders provide maximum reliability while meeting all of your space requirements. The B Series is an extremely capable product that will exceed all of your requirements. Additionally, the B Series includes non-rotating piston rod and double rod cylinders as a standard feature.

Tube
The **tube** is hard coat anodized. The hard coating is an electro-chemical process, which produces a very dense surface of aluminum oxide. This surface has extreme hardness (60 RC.), excellent wear and corrosion resistance, and a low coefficient of friction. Additionally, profile tubing is standard on 9/16" through 2-1/2" bore sizes (3" and 4" bores are round tube and spacer configuration). The profile tubing has a custom dovetail groove on all sides for trouble-free switch and accessory mounting.

End Caps
The **end caps** are accurately machined from aluminum alloy. They are anodized for corrosion resistance. Additionally, a recess on the piston-mating surface (at both ends) enables the air to work on a larger piston area for effortless breakaway.

Rod Bushing
The B Series includes a captive one piece oil impregnated sintered bronze **rod bushing** for maximum load bearing support.

Rod Seal
The quad type **rod seal** is used for double sealing efficiency. A Teflon® back-up ring guards against rod seal extrusion and external contaminants.

Piston Rod
High strength 303 stainless steel **piston rod** is roller burnished for long, trouble free life.

Piston Seal
The Buna-N O-Ring **piston seal** ensures proper sealing even at low pressures.

Piston
The solid aluminum alloy **piston** is strong and durable.

Tube End Seal
The **tube end seals** are compression type and reusable.

Standard Specifications:
- Variety of mounts
- Bore sizes from 3/4" through 4"
- Piston rod diameters from 9/16" to 1"
- Nominal pressure rating is 150 psi air
- Standard temperature -10°F to 165°F (-23°C to 74°C)

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How to Order

A AB G - 04 A 3 B - A AA 0

Mounting
A = Theaded Mounting Holes, Both Ends
B = Threaded Mounting Holes, Front
C = Threaded Mounting Holes, Rear
D = Screw Clearance Holes, Both Ends
E = Screw Clearance Holes, Front
F = Screw Clearance Holes, Rear
P = Pivot Mount
R = Pivot Mount 90° From Standard
T = Front Trunnion Mount
U = Rear Trunnion Mount
X = Basic Model

Type
AB = B Series Standard Interchangeable Compact
EB = B Series Non-Rotating (3/4" through 2" Bores Only)
BB = B Series Double Rod

Bore
B = 9/16"
C = 3/4"
G = 1-1/8"
K = 1-1/2"
L = 2"
M = 2-1/2"
N* = 3"
R* = 4"
* 3" and 4" bores are round tube and spacer construction.

Full Inch of Stroke
00 = 0" Stroke
01 = 1" Stroke
02 = 2" Stroke
03 = 3" Stroke
04 = 4" Stroke
Consult factory for strokes greater than 4"

Fractional Inches of Stroke
A = 0"
C = 1/8"
E = 1/4"
G = 3/8"
I = 1/2"
K = 5/8"
M = 3/4"
O = 7/8"

Magnet Piston
0 = No Magnet
2* = Magnet

Options
AA = No Option
CB = Counterbored Tooling Plate
HD* = Heavy Duty Rear Cap
LB = Low Breakaway Piston
NA = Nickel Plated
SH = Stainless Hardware
VA = Viton Seals
WA = Wear Band
1A = Rod Extension (One End only)
2A = Thread Extension (Male Threads)
3A = Studded Rod End
* Affects cylinder AOL. See overall length adder chart on page 10 for details.

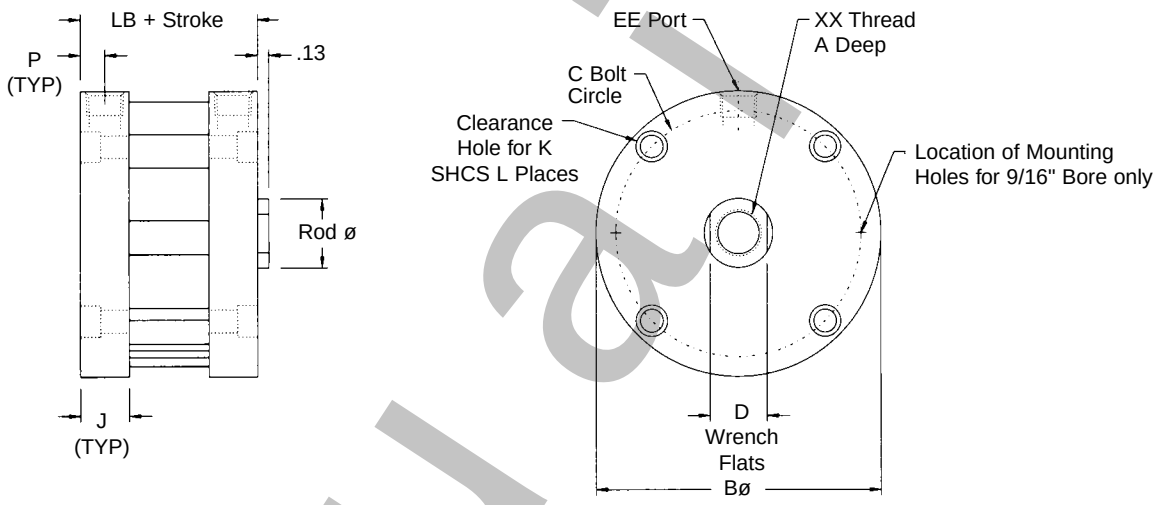
Cushions
A = N/A

Ports
A = 10-32 Port for 9/16" to 3/4" Bore
B = 1/8 NPTF for 1-1/16" to 2" Bore
C = 1/4 NPTF for 2-1/2" to 3" Bore
D = 3/8 NPTF for 4" Bore

Rod End Codes
1 = Male Fine Thread
2 = Non-Threaded Rod (Same Length as Female Rod)
3 = Female Fine Thread (Must Use This Code with EB Type Cylinder)
6 = Male Coarse Thread
8 = Female Coarse Thread

Basic Cylinder Models

X Mount
Standard B Series Cylinders

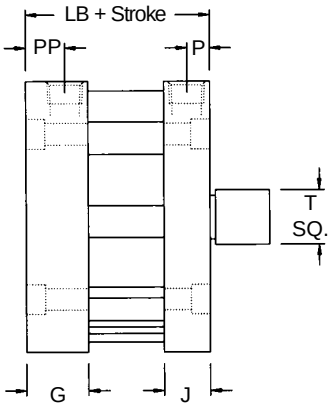


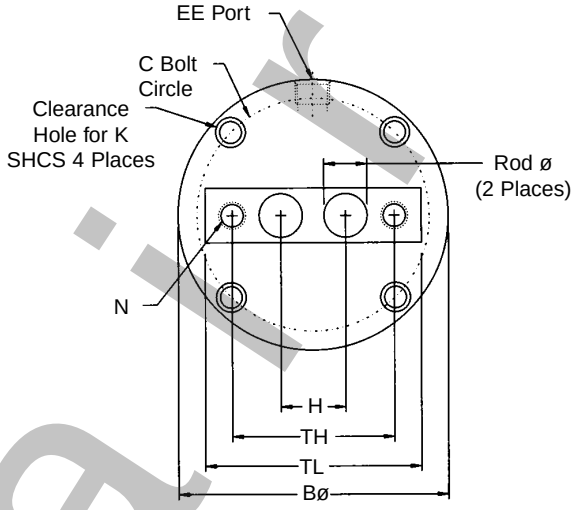
Dimensions

BORE	ROD	A	B	C	D	EE	J	K	L	LB	P	XX (FINE)	XX (COARSE)
0.563	0.250	0.46	1.12	0.88	0.22	10-32	0.34	#4	2	0.56	0.14	8-36	8-32
0.750	0.313	0.46	1.50	1.22	0.25	10-32	0.34	#6	4	0.56	0.14	10-32	10-24
1.125	0.500	0.70	2.00	1.69	0.44	1/8	0.50	#6	4	0.88	0.25	5/16-24	5/16-18
1.500	0.625	0.70	2.63	2.19	0.50	1/8	0.50	#10	4	0.88	0.25	3/8-24	3/8-16
2.000	0.750	0.70	3.13	2.69	0.63	1/8	0.53	#10	4	0.94	0.25	1/2-20	1/2-13
2.500	0.750	0.70	3.75	3.25	0.63	1/4	0.66	1/4	4	1.19	0.33	1/2-20	1/2-13
3.000	1.000	0.73	4.25	3.78	0.88	1/4	0.69	1/4	4	1.25	0.33	5/8-18	5/8-11
4.000	1.000	0.80	5.50	4.94	0.88	3/8	0.84	5/16	4	1.56	0.42	3/4-16	3/4-10

Non-Rotating Models

EB Cylinder Type
Non-Rotating Cylinders





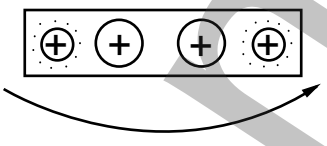
This drawing represents an "X" type Mount.
* Heavy Duty Cap and Low Breakaway piston comes standard on all Non-rotating models.

Dimensions

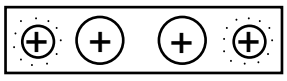
BORE	ROD	B	C	EE	H	J	G	K	LB	N	P	PP	T	TH	TL
0.750	0.188	1.50	1.22	10-32	0.331	0.34	0.34	#6	0.94	#6-32	0.14	0.14	0.38	0.88	1.25
1.125	0.250	2.00	1.69	1/8	0.422	0.50	0.69	#6	1.31	#8-32	0.25	0.44	0.38	1.06	1.44
1.500	0.375	2.63	2.19	1/8	0.563	0.50	0.69	#10	1.31	1/4-20	0.25	0.44	0.50	1.50	2.00
2.000	0.500	3.13	2.69	1/8	0.750	0.53	0.72	#10	1.31	5/16-18	0.25	0.44	0.63	1.88	2.50

Load and Torque Information

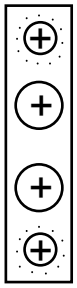
Torque (in. lbs.)

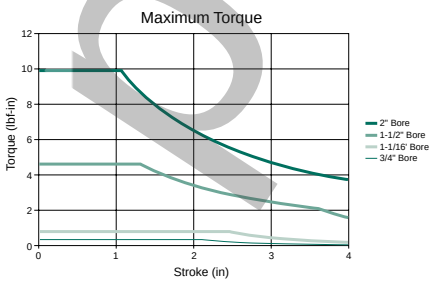


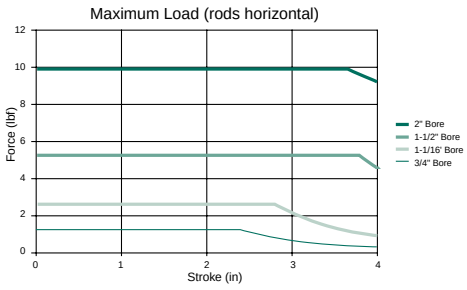
Side Load (lb)

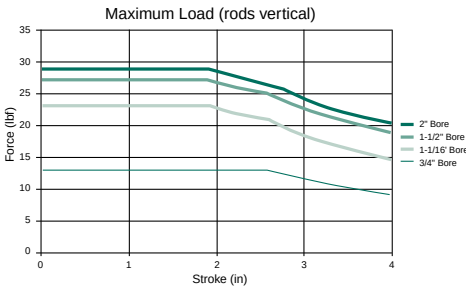


Side Load (lb)









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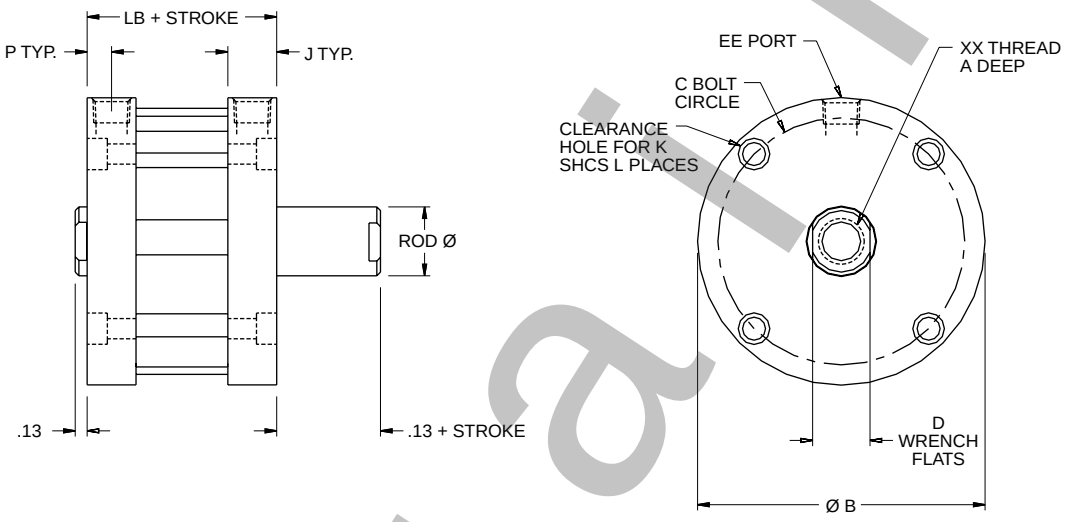
B Series
Compact Interchangeable

The B Series Double-Rod is commonly desired when equal displacement is required on both sides of the piston, or when it is mechanically beneficial to couple a load to both ends of the cylinder.



Dimensions

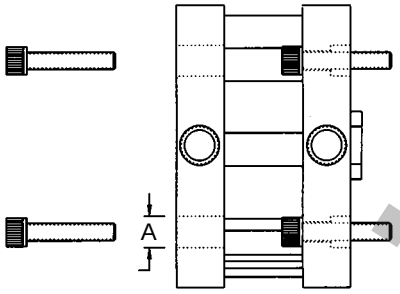
BORE	ROD	A	B	C	D	EE	J	K	L	LB	P	XX (FINE)	XX (COARSE)
0.750	5/16	0.46	1.50	1.22	0.25	10-32	0.34	#6	4	0.69	0.14	10-32	10-24
1.125	1/2	0.70	2.00	1.69	0.44	1/8	0.50	#6	4	0.97	0.25	5/16-24	5/16-18
1.500	5/8	0.70	2.63	2.19	0.50	1/8	0.50	#10	4	1.00	0.25	3/8-24	3/8-16
2.000	3/4	0.70	3.13	2.69	0.63	1/8	0.53	#10	4	1.07	0.28	1/2-20	1/2-13
2.500	3/4	0.70	3.75	3.25	0.63	1/4	0.66	1/4	4	1.31	0.33	1/2-20	1/2-13
3.000	1.00	0.73	4.25	3.78	0.88	1/4	0.69	1/4	4	1.38	0.33	5/8-18	5/8-11
4.000	1.00	0.80	5.50	4.94	0.88	3/8	0.84	5/16	4	1.69	0.42	3/4-16	3/4-10

Notes: Magnet and "LB" Piston Adders are the same as Standard Single Rod B Series Cylinders.

Mounting Options

Screw Clearance Holes

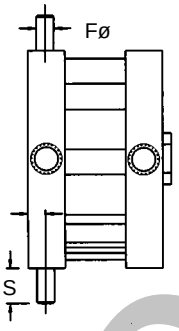
D Mount-Both Ends
E Mount-Front End
F Mount-Rear End



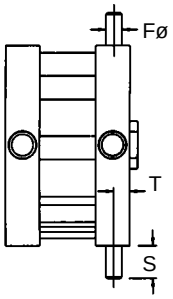
Screw Clearance Holes

BORE	A
0.563	0.17
0.750	0.23
1.125	0.25
1.500	0.34
2.000	0.34
2.500	0.41
3.000	0.41
4.000	0.50

Trunnion Mounts
U Mount-Rear



T Mount-Front



* 3/4" & 1-1/8" bore trunnion ears are located 68° and 65° respectively from port position. All others are 90°

Trunnion Mounts

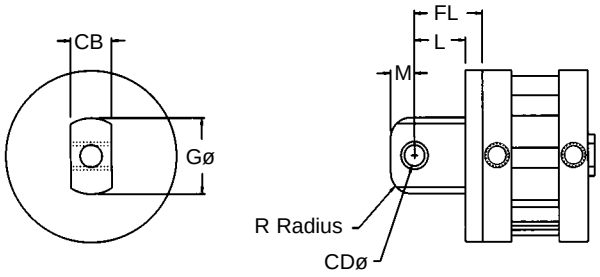
BORE	F	S	T
0.750	0.125	0.31	0.17
1.125	0.250	0.50	0.25
1.500	0.250	0.50	0.25
2.000	0.250	0.50	0.25
2.500	0.313	0.63	0.33
3.000	0.313	0.63	0.33
4.000	0.375	0.75	0.42

(N/A 9/16" Bore)

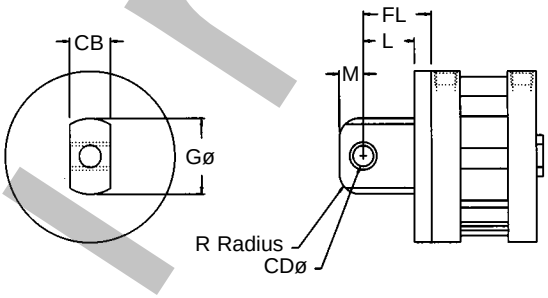
Mounting Options continued

Pivot Mounts

P Mount-Standard



R Mount-90° from Standard

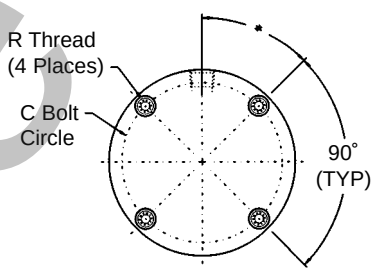


Dimensions

BORE	CB	CD	FL	G	L	M	R
0.563	0.375	0.188	0.75	0.63	0.56	0.25	0.19
0.750	0.375	0.188	0.75	0.75	0.56	0.25	0.19
1.125	0.375	0.188	0.81	0.75	0.56	0.25	0.19
1.500	0.750	0.375	1.19	1.38	0.94	0.44	0.38
2.000	0.750	0.375	1.25	1.38	0.94	0.44	0.38
2.500	0.750	0.375	1.31	1.38	0.94	0.44	0.38
3.000	1.000	0.625	1.69	1.88	1.31	0.56	0.38
4.000	1.000	0.625	1.75	1.88	1.31	0.56	0.38

Threaded Mounting Holes

A Mount-Both Ends
B Mount-Front End
C Mount-Rear End



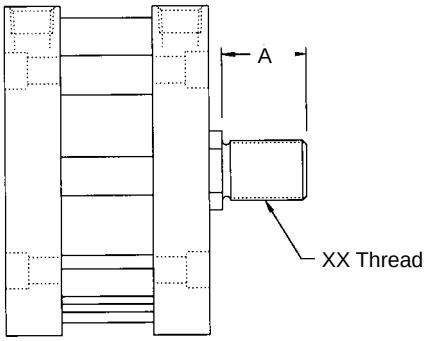
3/4" Bore and Larger
* 41° 1 1/2" Bore only, 45° All other sizes

Dimensions

BORE	C	R
0.563	0.88	#4-40 UNC
0.750	1.22	#6-32 UNC
1.125	1.69	#6-32 UNC
1.500	2.19	#10-24 UNC
2.000	2.69	#10-24 UNC
2.500	3.25	1/4-20 UNC
3.000	3.78	1/4-20 UNC
4.000	4.94	5/16-18 UNC

Rod Ends and Length Adders

Male Rod Ends



BORE	XX (FINE)	XX (COARSE)	A
9/16"	N/A	8-32	0.38
3/4"	10-32	10-24	0.38
1-1/8"	5/16-24	5/16-18	0.50
1.50"	3/8-24	3/8-16	0.50
2.00"	1/2-20	1/2-13	0.63
2.50"	1/2-20	1/2-13	0.63
3.00"	5/8-18	5/8-11	0.75
4.00"	3/4-16	3/4-10	0.75

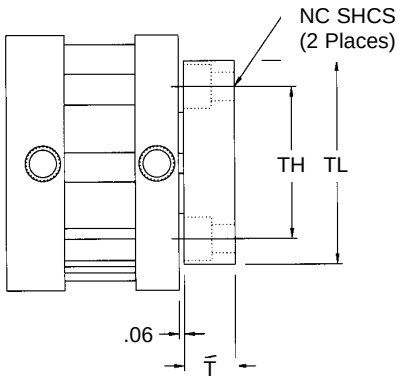
Dimensions

BORE	LOW BREAKAWAY*	HEAVY DUTY CAP**	WEAR BAND***	MAGNETIC PISTON	MAGNETIC PISTON NON-ROTATING
9/16"	0.25	0.13	0.188	0.88	N/A
3/4"	0.25	0.13	0.188	0.88	0.63
1-1/8"	0.38	0.19	0.188	0.88	0.63
1-1/2"	0.38	0.19	0.188	0.88	0.63
2"	0.38	0.19	0.188	0.88	0.63
2-1/2""	0.38	0.25	0.188	0.88	N/A
3"	0.50	0.25	0.188	0.88	N/A
4"	0.50	0.38	0.188	0.88	N/A

* The Low Breakaway Option uses low friction lip seals instead of the standard o-ring seals.
** The Heavy Duty Cap Option is standard on Non-rotating cylinders. For applications where the cylinder is mounted on the front face, trunnion mounted or impact loading applications with 20 or more cycles per minute, the Heavy Duty Cap Option is recommended.
***Wearband add this dimension to standard or low breakaway type cylinders overall length. Note that it does not add additional length to magnetic piston type cylinder.

Options, Weights

Counterbored Tooling Plate



Dimensions

BORE	NC	T	TH	TL
0.750	#6	0.38	0.88	1.25
1.125	#8	0.38	1.06	1.44
1.50	1/4	0.50	1.05	2.00
2.00	5/16	0.63	1.88	2.50

To be used on non-rotating cylinders only.

Electroless Nickel Plating
NA Option

Electroless Nickel Plating provides a corrosion free coating great for washdown environments. All hardware is stainless steel.

Stainless Hardware Option
SH Option

This option is for applications that require no steel parts exposed. It helps to cut down on the corrosion that can happen with carbon steel.

Viton Seals
VA Option

Viton seals are recommended for high temperature applications. The temperature range is 0° F to 400° F. Magnetic pistons are not recommended with temperatures higher than 180°.

Cylinder Weights

To calculate cylinder weight for single rod cylinders with strokes over 1/4", take the 1/4" stroke weight and add the 1/8" stroke adder for each 1/8" of stroke over 1/4". For non-rotating cylinder weights, add the 1/8" stroke adder for each 1/8" of stroke over 1/8". Cylinder weights may vary with certain options.

Single Rod Weights (ounces)

BORE	1/8" STROKE	1/4" STROKE	1/8" STRIKE ADDER
9/16"	1.28	1.39	0.08
3/4"	1.97	2.18	0.19
1-1/8"	4.78	5.22	0.40
1-1/2"	7.89	8.44	0.48
2"	11.42	12.16	0.64
2-1/2"	20.60	21.51	0.76
3"	26.96	28.42	1.21
4"	52.10	54.27	1.79

Non-rotating Weights (ounces)

BORE	1/8" STROKE	1/8" STROKE ADDER
3/4"	5.5	0.10
1-1/8"	6.48	0.40
1-1/2"	11.22	0.56
2"	18.30	0.83

Position Sensing Switches

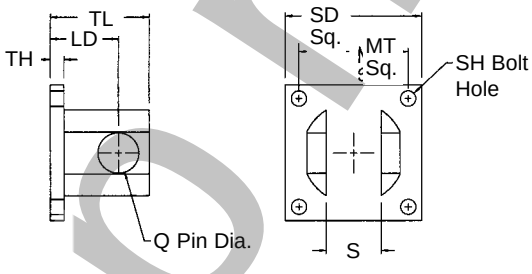
Magnetic Piston Adders
Minimum Stroke for Sensing End of Stroke

BORE	HEAD	CAP	BOTH
9/16"	0.50	0.38	0.50
3/4"	0.25	0.50	0.50
1-1/8"	0.38	0.50	0.50
1-1/2"	0.25	0.50	0.50
2"	0.25	0.50	0.50
2-1/2"	0.25	0.50	0.50
3"	0.25	0.50	0.50
4"	0.25	0.50	0.50

Note: For Switch ordering information see the switch section.

Accessories

Clevis Bracket

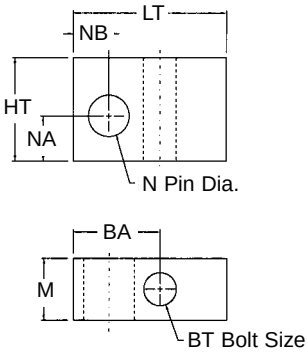


Dimensions

PART #	BORE	LD	MT	Q	S	SH	SD	TH	TL
B513-B01	9/16" 3/4" 1-1/8"	0.56	0.75	0.19	0.39	#6	1.00	0.16	0.78
B513-K01	1-1/2" 2" 2-1/2"	0.94	1.38	0.38	0.75	#10	1.75	0.22	1.34
B513-N01	3" 4"	1.25	2.00	0.63	1.00	0.25	2.50	0.25	1.81

Accessories continued

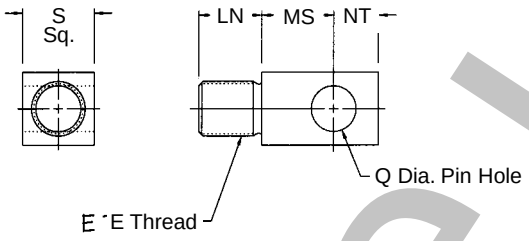
Trunnion Bracket (set)



Dimensions

PART #	BORE	BA	BT	HT	LT	M	N	NA	NB
B515-C01	3/4"	0.56	#10	0.63	1.12	0.31	0.13	0.30	0.22
B515-G01	1-1/8" 1-1/2" 2"	0.81	0.25	0.88	1.50	0.50	0.25	0.38	0.31
B515-M01	2-1/2" 3"	0.94	0.31	1.00	1.63	0.63	0.31	0.45	0.38
B515-R01	4"	1.06	0.38	1.25	1.88	0.75	0.38	0.55	0.44

Rod Pivot

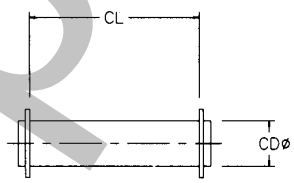


Dimensions

PART #	BORE	E	LN	MS	NT	Q	S
B511-B01	9/16"	8-32	0.38	0.47	0.25	0.19	0.38
B511-C01	3/4"	10-32	0.38	0.47	0.25	0.19	0.38
B511-G01	1-1/8"	5/16-24	0.63	0.47	0.25	0.19	0.38
B511-K01	1-1/2"	3/8-24	0.63	0.72	0.44	0.38	0.75
B511-L01	2" 2-1/2"	1/2-20	0.75	0.72	0.44	0.38	0.75
B511-N01	3"	5/8-18	0.88	1.00	0.63	0.63	1.00
B511-R01	4"	3/4-16	0.88	1.00	0.63	0.63	1.00

Pivot Pin

1 1/2" Through 4" Bores



Dimensions

PART NO.	ØCD	CL
B531-B01	0.188	0.750
B531-K01	0.375	1.313
B531-N01	0.625	1.813