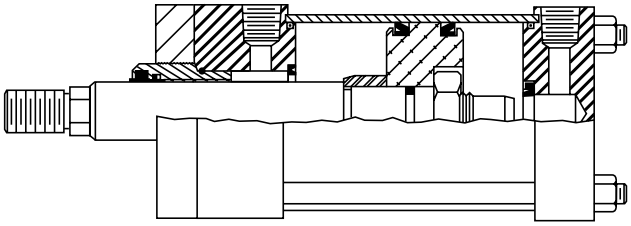
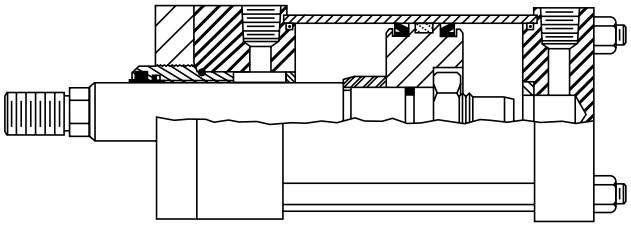
NFPA/JIC DOUBLE ACTING 1½-8" BORE

BE11 — HEAVY DUTY PNEUMATIC



BJ11 — MEDIUM DUTY HYDRAULIC



RATINGS (PSIG)

Cylinder Bore	BE11		BJ11	
	Air	Oil	Severe	Moderate (Non Shock)
1-1/2			1500	2000
2			1500	2000
2-1/2			1000	1500
3-1/4	250	500	900	1250
4			750	1000
5			725	950
6			675	900
8			500	750

FEATURES

INDUSTRY INTERCHANGEABLE — Meets NFPA/JIC dimensional standards.

ADJUSTABLE CUSHIONS AVAILABLE

REMOVABLE ROD BEARING — Piloted by the head to provide positive alignment to the tube. It can be easily removed without disturbing the tie rods.

ROD WIPER and ROD SEAL CONTAINED IN THE ROD BEARING — For easy accessibility.

ROD BEARING CONSTRUCTED OF A BRONZE INSERT PRESSED INTO A STEEL HOUSING — To provide maximum side support when the piston is extended.

PISTON ROD — 100,000 psi minimum yield, steel, hard chrome plated and polished smooth to extend seal and rod bearing life.

STEEL TUBING — Honed and chrome plated I.D. for minimum friction and long seal life.

HEAD and CAPS — Machined from precision steel blocks to insure concentricity of piston rod to tubing and to mounting surfaces.

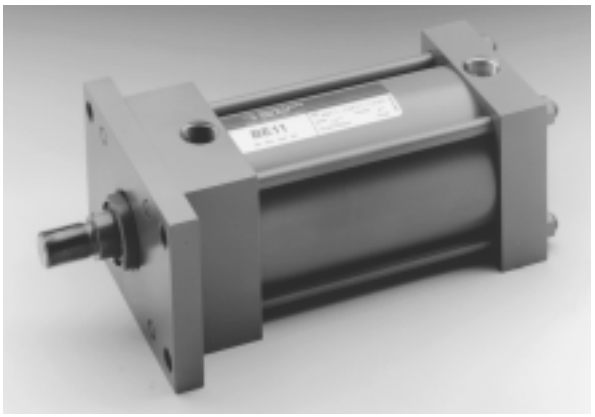
PISTON SEALS — U-cup seals made of Buna-N for minimum friction and positive sealing — BJ11 series piston includes a teflon wear ring to help reduce friction.

TIE RODS — 100,000 psi minimum yield material with rolled threads for added strength.

PISTON — BE11 – Aluminum, BJ11 – Steel

TIE-ROD CYLINDERS

DOUBLE ACTING — *BE11/BJ11 Series*



BE11 — HEAVY DUTY, PNEUMATIC
BJ11 — MEDIUM DUTY, HYDRAULIC

HOW TO ORDER BE11/BJ11 SERIES CYLINDERS

To develop a Cylinder Order Number, select only those Code Numbers that represent the cylinder required, and place in the sequence shown below:

EXAMPLE: Required Cylinder — Heavy Duty Air Cylinder, 4" Bore, Detachable Clevis (NFPA Mounting MP2), Standard Rod, Adjustable Cushion Head End, Standard Port location, 73" of Stroke, 1" Standard Rod Diameter, 1-14 Full Diameter Rod Threads.

SPECIFY

BE11	40	P2	2	1	73	0	02

Series
BE11 Pneumatic
BJ11 Hydraulic

Code No.	Bore Dia.
15	- 1-1/2
20	- 2
25	- 2-1/2
32	- 3-1/4
40	- 4
50	- 5
60	- 6
80	- 8

Code No.	Mounting	NFPA Des.
BX	- None (Basic Cylinder)	—
DBX	- Double Rod (Basic Cylinder)	—
E3	- Head Square (8" bore only)	ME3
E4	- Cap Square (8" bore only)	ME4
F1	- Head Rectangular Flange*	MF1
F2	- Cap Rectangular Flange*	MF2
F5	- Head Square Flange*	MF5
F6	- Cap Square Flange*	MF6
P1	- Cap Fixed Clevis	MP1
P2	- Cap Detachable Clevis*	MP2
P3	- Cap Fixed Eye	MP3
S2	- Side Lugs	MS2
S4	- Side Tapped	MS4
S7	- Side End Lugs	MS7
T1	- Head Trunnion	MT1
T2	- Cap Trunnion	MT2
T4	- Intermediate Trunnion	MT4
X1	- Extended Tie Rods-Both Ends	MX1
X2	- Extended Tie Rods-Cap End	MX2
X3	- Extended Tie Rods-Head End	MX3

Add D to mounting for Double Rod ex. DS4
*Not available for 8" bore.

Code No.	Cushions and Rod
	Standard Rod Diameter
1	- Non Cushioned
2	- Cushioned Head End
3	- Cushioned Cap End
4	- Cushioned Both Ends
	1st Oversize Rod Diameter
5	- Non Cushioned
6	- Cushioned Head End
7	- Cushioned Cap End
8	- Cushioned Both Ends
9	- 2nd Oversize Rods and larger-Specify

Code No.	Port Positions**
1	- Standard Port Position
2	- 90° Clockwise Port Position
3	- 180° Clockwise Port Position
4	- 270° Clockwise Port Position

**View facing Rod End.

Code No.	Stroke in Whole Inches
01	- 1 inch
05	- 5
12	-12
25	- 25
30	- 30
43	- 43
66	- 66
	etc.

Code No.	Fractional Stroke Length
0	- No fraction
1	- 1/8 inch
2	- 1/4
3	- 3/8
4	- 1/2
5	- 5/8
6	- 3/4
7	- 7/8
9	- For fractions not shown - Specify

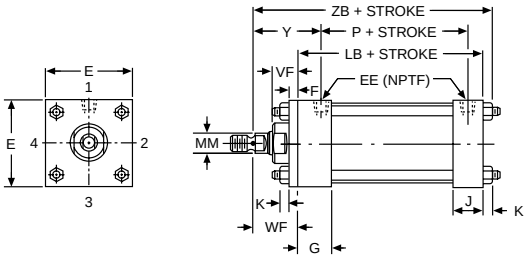
Code No.	Modification Descriptions
	- Style 1 Standard Thread (code not required — leave blank)
02	- Style 2 Rod End — Full diameter Male Th'd.
03	- Style 3 Rod End — Female Th'd.
04	- Style 4 Rod End — Optional Shoulder, Male Th'd.
XX	- Special (Specify)

ROD DIAMETERS AVAILABLE

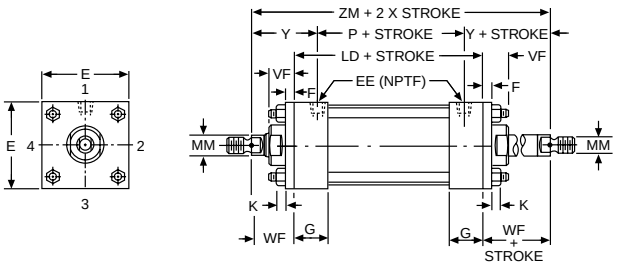
Rod Dia.	Bore Dia. 1-1/2	2	2-1/2	3-1/4	4	5	6	8
5/8	STD	STD	STD	—	—	—	—	—
1	1st OS†	1st OS	1st OS	STD	STD	STD	—	—
1-3/8	—	A	A	1st OS	1st OS	1st OS	STD	STD
1-3/4	—	—	A	A	A	A	1st OS	1st OS
2	—	—	—	A	A	A	A	A
2-1/2	—	—	—	—	A	A	A	A
3	—	—	—	—	—	A	A	A
3-1/2	—	—	—	—	—	A	A	A
4	—	—	—	—	—	—	A	A
4-1/2	—	—	—	—	—	—	—	A
5	—	—	—	—	—	—	—	A
5-1/2	—	—	—	—	—	—	—	A

STD — Standard Rod Diameter; 1st OS — First Oversized Rod Diameter
A — Available Rod Diameters, Consult Factory
†Adjustable cushion not available on head end; 1-1/2 bore with 1" rod diameter.

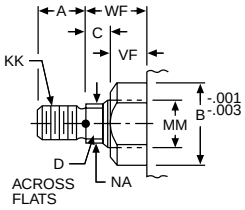
BX — Basic Mounting



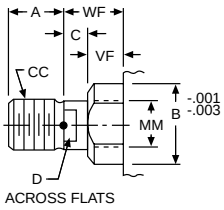
DBX — Double Rod Basic Mounting



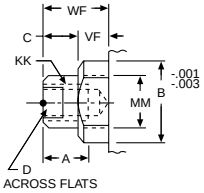
Style 1
Standard unless otherwise specified



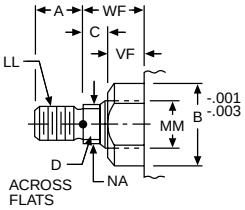
Style 2
Full Diameter Male Thread



Style 3
Female Thread



Style 4
Optional Shouldered Male Thread



ALL DIMENSIONS IN INCHES

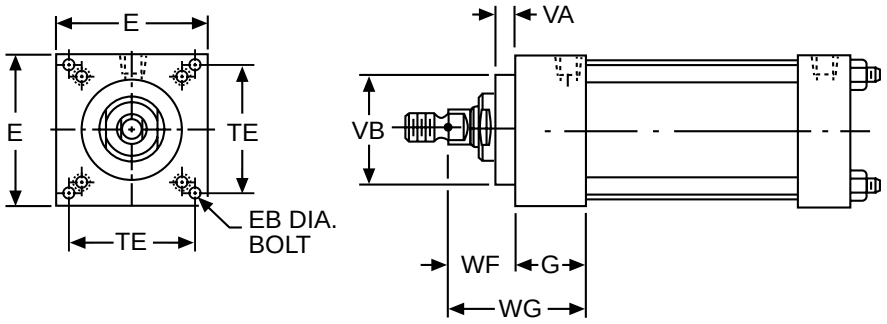
Bore	E	EE (NPTF)	F	G	J	K	LB	LD	P
1-1/2	2	3/8-18	3/8	1-1/2	1	1/4	3-5/8	4-1/8	2-1/4
2	2-1/2	3/8-18	3/8	1-1/2	1	5/16	3-5/8	4-1/8	2-1/4
2-1/2	3	3/8-18	3/8	1-1/2	1	5/16	3-3/4	4-1/4	2-3/8
3-1/4	3-3/4	1/2-14	5/8	1-3/4	1-1/4	3/8	4-1/4	4-3/4	2-5/8
4	4-1/2	1/2-14	5/8	1-3/4	1-1/4	3/8	4-1/4	4-3/4	2-5/8
5	5-1/2	1/2-14	5/8	1-3/4	1-1/4	7/16	4-1/2	5	2-7/8
6	6-1/2	3/4-14	3/4	2	1-1/2	7/16	5	5-1/2	3-1/8
8	8-1/2	3/4-14	3/4	2	1-1/2	9/16	5-1/8	5-5/8	3-1/4

Bore	Rod Dia.(MM)	Thread			A	B	C	D	NA	VF	WF	Y	ZB	ZM
		CC	KK*	LL										
1-1/2	5/8	5/8-18	7/16-20	1/2-20	3/4	1-1/8	3/8	1/2	19/32	5/8	1	1-15/16	4-7/8	6-1/8
	1	1-14	3/4-16	7/8-14	1-1/8	1-1/2	1/2	7/8	31/32	7/8	1-3/8	2-5/16	5-1/4	6-7/8
2	5/8	5/8-18	7/16-20	1/2-20	3/4	1-1/8	3/8	1/2	19/32	5/8	1	1-15/16	4-15/16	6-1/8
	1	1-14	3/4-16	7/8-14	1-1/8	1-1/2	1/2	7/8	31/32	7/8	1-3/8	2-5/16	5-5/16	6-7/8
2-1/2	5/8	5/8-18	7/16-20	1/2-20	3/4	1-1/8	3/8	1/2	19/32	5/8	1	1-15/16	5-1/16	6-1/4
	1	1-14	3/4-16	7/8-14	1-1/8	1-1/2	1/2	7/8	31/32	7/8	1-3/8	2-5/16	5-7/16	7
3-1/4	1	1-14	3/4-16	7/8-14	1-1/8	1-1/2	1/2	7/8	31/32	7/8	1-3/8	2-7/16	6	7-1/2
	1-3/8	1-3/8-12	1-14	1-1/4-12	1-5/8	2	5/8	1-1/8	1-11/32	1	1-5/8	2-11/16	6-1/4	8
4	1	1-14	3/4-16	7/8-14	1-1/8	1-1/2	1/2	7/8	31/32	7/8	1-3/8	2-7/16	6	7-1/2
	1-3/8	1-3/8-12	1-14	1-1/4-12	1-5/8	2	5/8	1-1/8	1-11/32	1	1-5/8	2-11/16	6-1/4	8
5	1	1-14	3/4-16	7/8-14	1-1/8	1-1/2	1/2	7/8	31/32	7/8	1-3/8	2-7/16	6-5/16	7-3/4
	1-3/8	1-3/8-12	1-14	1-1/4-12	1-5/8	2	5/8	1-1/8	1-11/32	1	1-5/8	2-11/16	6-9/16	8-1/4
6	1-3/8	1-3/8-12	1-14	1-1/4-12	1-5/8	2	5/8	1-1/8	1-11/32	1	1-5/8	2-13/16	7-1/16	8-3/4
	1-3/4	1-3/4-12	1-1/4-12	1-1/2-12	2	2-3/8	3/4	1-1/2	1-23/32	1-1/8	1-7/8	3-1/16	7-5/16	9-1/4
8	1-3/8	1-3/8-12	1-14	1-1/4-12	1-5/8	2	5/8	1-1/8	1-11/32	1	1-5/8	2-13/16	7-5/16	8-7/8
	1-3/4	1-3/4-12	1-1/4-12	1-1/2-12	2	2-3/8	3/4	1-1/2	1-23/32	1-1/8	1-7/8	3-1/16	7-9/16	9-3/8

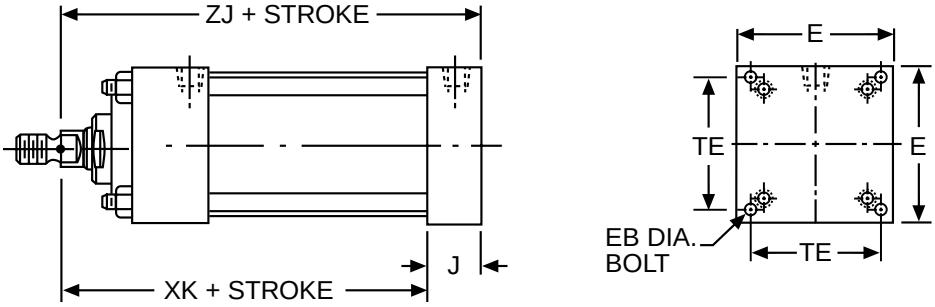
*Standard thread — other threads available.

To order, see "How to Order" page 50

E3 — Head Square Mounting
NFPA — ME3
8" Bore only



E4 — Cap Square Mounting
NFPA — ME4
8" Bore only



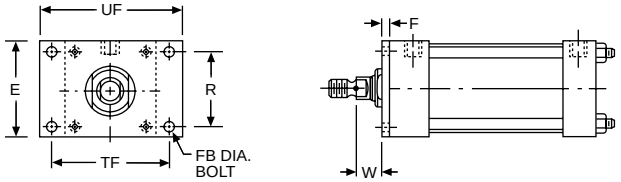
ALL DIMENSIONS IN INCHES

Bore	Rod Dia.	E	EB†	G	J	TE	VA	VB	WF	WG	XK	ZJ
8	1-3/8	8-1/2	5/8	2	1-1/2	7.57	.50	3-5/8	1-5/8	3-5/8	5-1/4	6-3/4
	1-3/4							3-15/16	1-7/8	3-7/8	5-1/2	7

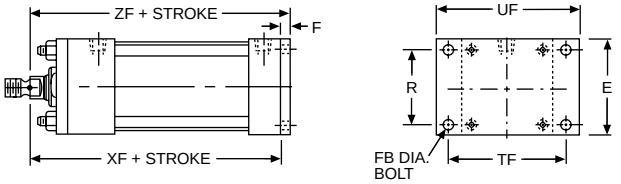
†Bolt dia. holes are 1/16" over bolt diameter.

To order, see "How to Order" page 50

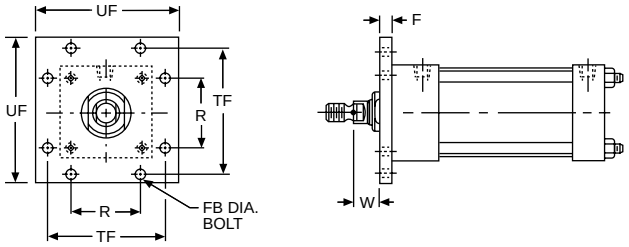
F1 — Head Rectangular Flange Mounting NFPA — MF1 1-1/2" to 6" Bore only



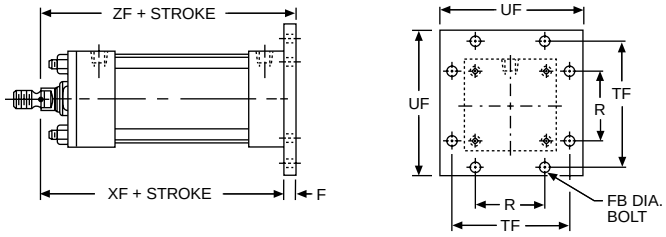
F2 — Cap Rectangular Flange Mounting NFPA — MF2 1-1/2" to 6" Bore only



F5 — Head Square Flange Mounting NFPA — MF5 1-1/2" to 6" Bore only



F6 — Cap Square Flange Mounting NFPA — MF6 1-1/2" to 6" Bore only



ALL DIMENSIONS IN INCHES

Bore	Rod Dia.	E	F	R	W	FB†	TF	UF	XF	ZF
1-1/2	5/8	2	3/8	1.43	5/8	1/4	2-3/4	3-3/8	4-5/8	5
	1				1				5	5-3/8
2	5/8	2-1/2	3/8	1.84	5/8	5/16	3-3/8	4-1/8	4-5/8	5
	1				1				5	5-3/8
2-1/2	5/8	3	3/8	2.19	5/8	5/16	3-7/8	4-5/8	4-3/4	5-1/8
	1				1				5-1/8	5-1/2
3-1/4	1	3-3/4	5/8	2.76	3/4	3/8	4-11/16	5-1/2	5-5/8	6-1/4
	1-3/8				1				5-7/8	6-1/2
4	1	4-1/2	5/8	3.32	3/4	3/8	5-7/16	6-1/4	5-5/8	6-1/4
	1-3/8				1				5-7/8	6-1/2
5	1	5-1/2	5/8	4.10	3/4	1/2	6-5/8	7-5/8	5-7/8	6-1/2
	1-3/8				1				6-1/8	6-3/4
6	1-3/8	6-1/2	3/4	4.88	7/8	1/2	7-5/8	8-5/8	6-5/8	7-3/8
	1-3/4				1-1/8				6-7/8	7-5/8

† Bolt dia. Holes are 1/16" over bolt diameter.

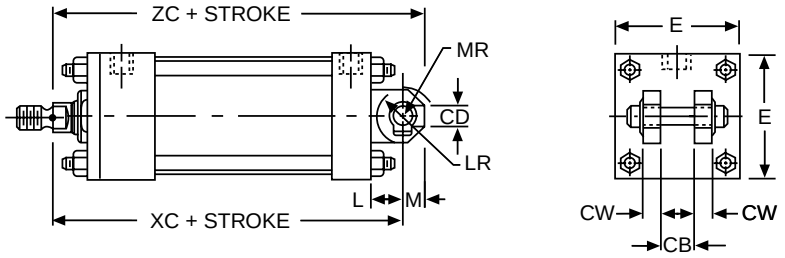
To order, see "How to Order" page 50

TIE-ROD CYLINDERS

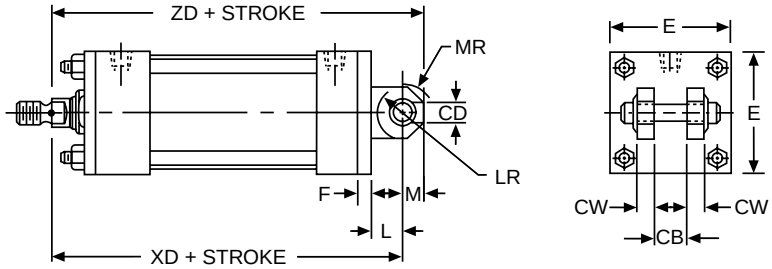
DOUBLE ACTING CLEVIS MOUNTING

BE11/BJ11 Series 1-1/2" to 8" Bore

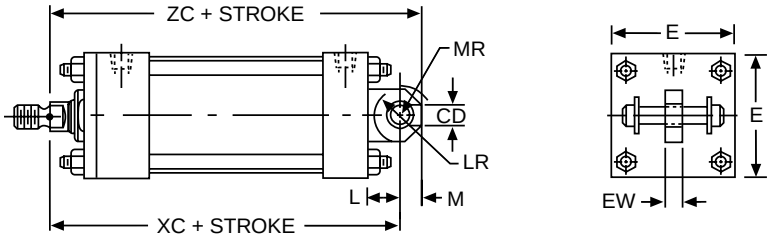
P1 — Cap Fixed Clevis Mounting NFPA — MP1



P2 — Cap Detachable Clevis Mounting NFPA — MP2



P3 — Cap Fixed Eye Mounting NFPA — MP3

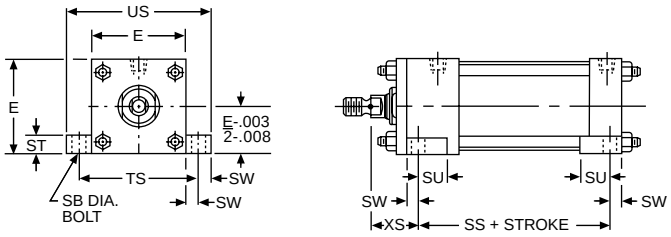


ALL DIMENSIONS IN INCHES

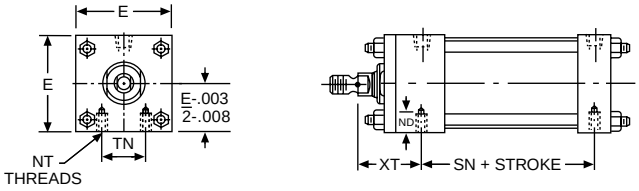
Bore	Rod Dia.	E	F	L	M	CB	CD	CW	EW	LR	MR	XC	XD	ZC	ZD
1-1/2	5/8	2	3/8	3/4	1/2	3/4	1/2	1/2	3/4	5/8	19/32	5-3/8	5-3/4	5-7/8	6-1/4
	1											5-3/4	6-1/8	6-1/4	6-5/8
2	5/8	2-1/2	3/8	3/4	1/2	3/4	1/2	1/2	3/4	5/8	19/32	5-3/8	5-3/4	5-7/8	6-1/4
	1											5-3/4	6-1/8	6-1/4	6-5/8
2-1/2	5/8	3	3/8	3/4	1/2	3/4	1/2	1/2	3/4	5/8	19/32	5-1/2	5-7/8	6	6-3/8
	1											5-7/8	6-1/4	6-3/8	6-3/4
3-1/4	1	3-3/4	5/8	1-1/4	3/4	1-1/4	3/4	5/8	1-1/4	1	7/8	6-7/8	7-1/2	7-5/8	8-1/4
	1-3/8											7-1/8	7-3/4	7-7/8	8-1/2
4	1	4-1/2	5/8	1-1/4	3/4	1-1/4	3/4	5/8	1-1/4	1	7/8	6-7/8	7-1/2	7-5/8	8-1/4
	1-3/8											7-1/8	7-3/4	7-7/8	8-1/2
5	1	5-1/2	5/8	1-1/4	3/4	1-1/4	3/4	5/8	1-1/4	1	7/8	7-1/8	7-3/4	7-7/8	8-1/2
	1-3/8											7-3/8	8	8-1/8	8-3/4
6	1-3/8	6-1/2	3/4	1-1/2	1	1-1/2	1	3/4	1-1/2	1-1/4	1-7/32	8-1/8	8-7/8	9-1/8	9-7/8
	1-3/4											8-3/8	9-1/8	9-3/8	10-1/8
8	1-3/8	8-1/2	3/4	1-1/2	1	1-1/2	1	3/4	1-1/2	1-1/4	1-7/32	8-1/4	9-1/4	9-1/4	10-1/4
	1-3/4											8-1/2	9-1/2	9-1/2	10-1/2

To order, see "How to Order" page 50

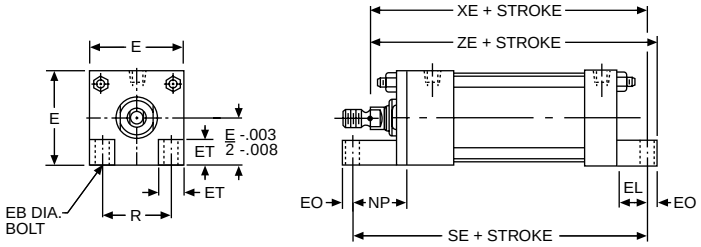
S2 — Side Lugs Mounting NFPA — MS2



S4 — Side Tapped Mounting NFPA — MS4



S7 — End Lugs Mounting NFPA — MS7



ALL DIMENSIONS IN INCHES

Bore	R	SB†	SE	SN	SS	ST	SU	SW	TN	TS	US
1-1/2	1.43	3/8	5-1/2	2-1/4	2-7/8	1/2	15/16	3/8	5/8	2-3/4	3-1/2
2	1.84	3/8	5-7/8	2-1/4	2-7/8	1/2	15/16	3/8	7/8	3-1/4	4
2-1/2	2.19	3/8	6-1/4	2-3/8	3	1/2	15/16	3/8	1-1/4	3-3/4	4-1/2
3-1/4	2.76	1/2	6-5/8	2-5/8	3-1/4	3/4	1-1/4	1/2	1-1/2	4-3/4	5-3/4
4	3.32	1/2	6-7/8	2-5/8	3-1/4	3/4	1-1/4	1/2	2-1/16	5-1/2	6-1/2
5	4.10	3/4	7-1/4	2-7/8	3-1/8	1	1-9/16	11/16	2-11/16	6-7/8	8-1/4
6	4.88	3/4	7-3/4	3-1/8	3-5/8	1	1-9/16	11/16	3-1/4	7-7/8	9-1/4
8	6.44	3/4	7-3/8	3-1/4	3-3/4	1	1-9/16	11/16	4-1/2	9-7/8	11-1/4

ALL DIMENSIONS IN INCHES

Bore	Rod Dia.	E	EB†	EL	EO	ET	ND	NP	NT	XE	XS	XT	ZE
1-1/2	5/8	2	1/4	3/4	1/4	9/16	3/8	1-1/8	1/4-20	5-3/8	1-3/8	1-15/16	5-5/8
	1						1/4			5-3/4	1-3/4	2-5/16	6
2	5/8	2-1/2	5/16	15/16	5/16	11/16	9/16	1-5/16	5/16-18	5-9/16	1-3/8	1-15/16	5-7/8
	1						7/16			5-15/16	1-3/4	2-5/16	6-1/4
2-1/2	5/8	3	5/16	1-1/16	5/16	13/16	5/8	1-7/16	3/8-16	5-13/16	1-3/8	1-15/16	6-1/8
	1									6-3/16	1-3/4	2-5/16	6-1/2
3-1/4	1	3-3/4	3/8	7/8	3/8	1	3/4	1-1/2	1/2-13	6-1/2	1-7/8	2-7/16	6-7/8
	1-3/8									6-3/4	2-1/8	2-11/16	7-1/8
4	1	4-1/2	3/8	1	3/8	1-3/16	1	1-5/8	1/2-13	6-5/8	1-7/8	2-7/16	7
	1-3/8									6-7/8	2-1/8	2-11/16	7-1/4
5	1	5-1/2	1/2	1-1/16	1/2	1-3/8	1	1-11/16	5/8-11	6-15/16	2-1/16	2-7/16	7-7/16
	1-3/8									7-3/16	2-5/16	2-11/16	7-11/16
6	1-3/8	6-1/2	1/2	1	1/2	1-5/8	1-1/8	1-3/4	3/4-10	7-5/8	2-5/16	2-13/16	8-1/8
	1-3/4									7-7/8	2-9/16	3-1/16	8-3/8
8	1-3/8	8-1/2	5/8	1-1/8	5/8	2	1-1/8	1-1/8	3/4-10	7-7/8	2-5/16	2-13/16	8-1/2
	1-3/4									8-1/8	2-9/16	3-1/16	8-3/4

† Bolt dia., Holes are 1/16" over bolt diameter.

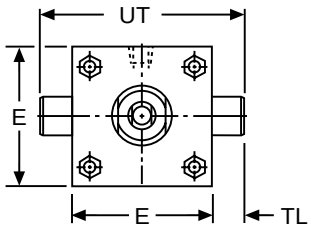
To order, see "How to Order" page 50

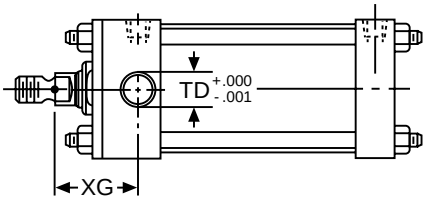
TIE-ROD CYLINDERS

DOUBLE ACTING TRUNNION MOUNTING

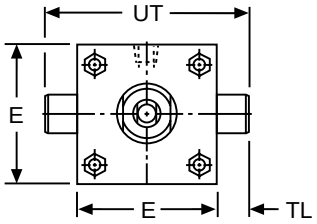
BE11/BJ11 Series 1-1/2" to 8" Bore

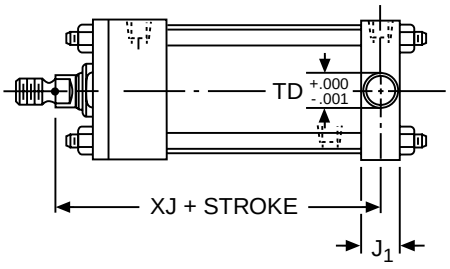
T1 — Head Trunnion Mounting NFPA — MT1



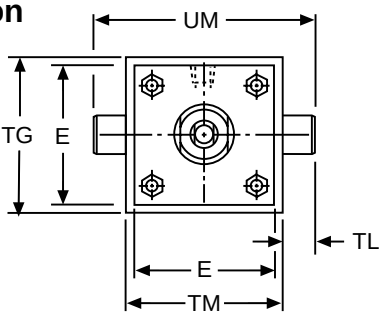


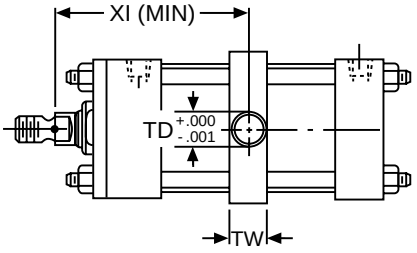
T2 — Cap Trunnion Mounting NFPA — MT2





T4 — Intermediate Trunnion Mounting NFPA — MT4





CUSTOMER TO SPECIFY
TRUNNION LOCATION (XI DIM)

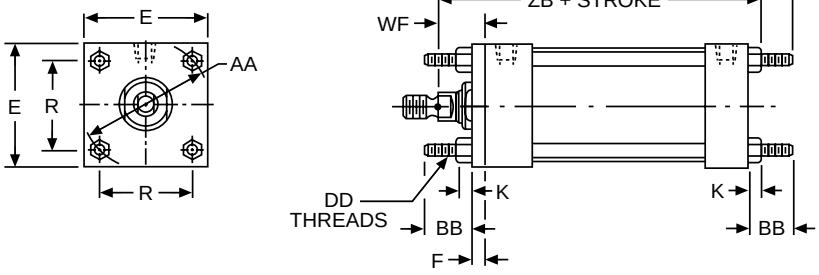
ALL DIMENSIONS IN INCHES

Bore	Rod Dia.	E	J1	TD	TG	TL	TM	TW	UM	UT	XG	XI (MIN)	XJ
1-1/2	5/8	2	1-1/8*	1	2-1/2	1	2-1/2	1-1/4	4-1/2	4	1-3/4	3-1/8	4-1/4
	1										2-1/8	3-1/2	4-5/8
2	5/8	2-1/2	1-1/8*	1	3	1	3	1-1/2	5	4-1/2	1-3/4	3-1/4	4-1/4
	1										2-1/8	3-5/8	4-5/8
2-1/2	5/8	3	1-1/8*	1	3-1/2	1	3-1/2	1-1/2	5-1/2	5	1-3/4	3-1/4	4-3/8
	1										2-1/8	3-5/8	4-3/4
3-1/4	1	3-3/4	1-1/4	1	4-1/4	1	4-1/2	2	6-1/2	5-3/4	2-1/4	4-1/8	5
	1-3/8										2-1/2	4-3/8	5-1/4
4	1	4-1/2	1-1/4	1	5	1	5-1/4	2	7-1/4	6-1/2	2-1/4	4-1/8	5
	1-3/8										2-1/2	4-3/8	5-1/4
5	1	5-1/2	1-1/4	1	6	1	6-1/4	2	8-1/4	7-1/2	2-1/4	4-1/8	5-1/4
	1-3/8										2-1/2	4-3/8	5-1/2
6	1-3/8	6-1/2	1-1/2	1-3/8	7	1-3/8	7-5/8	2-1/2	10-3/8	9-1/4	2-5/8	4-7/8	5-7/8
	1-3/4										2-7/8	5-1/8	6-1/8
8	1-3/8	8-1/2	1-1/2	1-3/8	9-1/2	1-3/8	9-3/4	2-1/2	12-1/2	11-1/4	2-5/8	4-7/8	6
	1-3/4										2-7/8	5-1/8	6-1/4

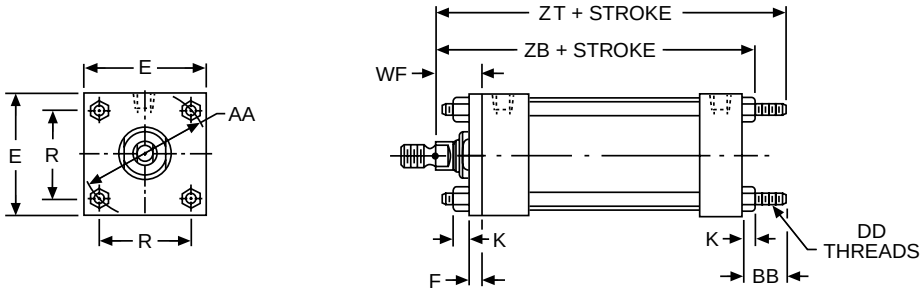
* Dimension exceeds NFPA by 1/8".

To order, see "How to Order" page 50

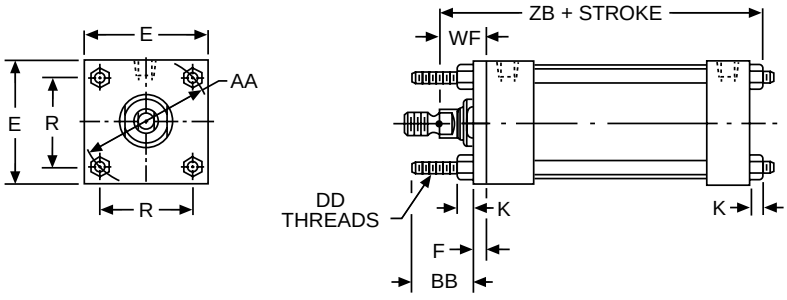
X1 — Extended Tie Rods Both Ends NFPA — MX1



X2 — Extended Tie Rods Cap End NFPA — MX2



X3 — Extended Tie Rods Head End NFPA — MX3



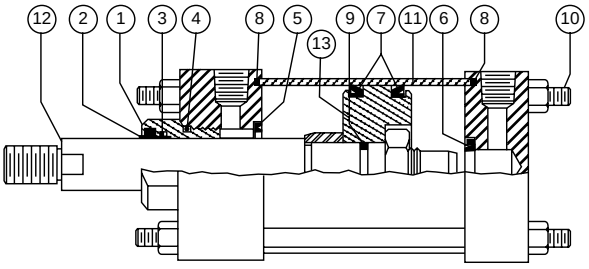
ALL DIMENSIONS IN INCHES

Bore	Rod Dia.	E	F	K	R	AA	BB	DD	WF	ZB	ZT
1-1/2	5/8	2	3/8	1/4	1.43	2.02	1	1/4-28	1	4-7/8	5-5/8
	1								1-3/8	5-1/4	6
2	5/8	2-1/2	3/8	5/16	1.84	2.60	1-1/8	5/16-24	1	4-15/16	5-3/4
	1								1-3/8	5-5/16	6-1/8
2-1/2	5/8	3	3/8	5/16	2.19	3.10	1-1/8	5/16-24	1	5-1/16	5-7/8
	1								1-3/8	5-7/16	6-1/4
3-1/4	1	3-3/4	5/8	3/8	2.76	3.90	1-3/8	3/8-24	1-3/8	6	7
	1-3/8								1-5/8	6-1/4	7-1/4
4	1	4-1/2	5/8	3/8	3.32	4.70	1-3/8	3/8-24	1-3/8	6	7
	1-3/8								1-5/8	6-1/4	7-1/4
5	1	5-1/2	5/8	7/16	4.10	5.80	1-13/16	1/2-20	1-3/8	6-5/16	7-11/16
	1-3/8								1-5/8	6-9/16	7-15/16
6	1-3/8	6-1/2	3/4	7/16	4.88	6.90	1-13/16	1/2-20	1-5/8	7-1/16	8-7/16
	1-3/4								1-7/8	7-5/16	8-11/16
8	1-3/8	8-1/2	3/4	9/16	6.44	9.10	2-5/16	5/8-18	1-5/8	7-5/16	9-1/16
	1-3/4								1-7/8	7-9/16	9-5/16

To order, see "How to Order" page 50

TIE ROD CYLINDERS

REPAIR PARTS



NOT SHOWN:

14 WEAR RING PISTON

15 O-RING, CUSHION

BE10 Series shown for example

All cylinders are different yet similar in construction

DESCRIPTIONS:

Number	Description
1	Rod Bearing
2	Rod Wiper
3	Rod Packing
4	Bearing O-Ring
5	Cushion Seal (Head)
6	Cushion Seal (Cap)
7	Piston Packing
8	Tube Seals

Number	Description
9	Piston O-Ring
10	Tie Rods (4)
11	Tube
12	Piston Rod
13	Piston
14	Wear Ring (BJ11 only)
15	O-Ring, Cushion Screw

BE10 Series

Body Kit includes: all seals required to rebuild the cylinder body and bearing cartridge for the standard and first oversize rod. For this reason, extra seals are included and you should not use every seal.

Rod Kit includes: Rod Bearing, Bearing O-Ring, Rod Wiper and Rod Packing

To replace all seals — order both the Cylinder Service Kit and the Rod Seal Kit.

BODY KITS

SELECT BY BORE DIA.

Bore Dia.	Catalog Number	Item Code
1-1/2	BE10-15BX4-9003	78325
2	BE10-20BX4-9003	78327
2-1/2	BE10-25BX4-9003	78329
3-1/4	BE10-32BX4-9003	78331
4	BE10-40BX4-9003	78333
5	BE10-50BX4-9003	78335
6	BE10-60BX4-9003	78337

ROD KITS

SELECT BY ROD DIA.

Rod Dia.	Catalog Number	Item Code
5/8	BE10-15BX4-9002	78326
1	BE10-32BX4-9002	78328
1-3/8	BE10-60BX4-9002	78330
1-3/4	BE10-90BX4-9002	78332
2	BE10-92BX4-9002	78334

SEAL KITS

REPAIR PARTS

BE11/BJ11 Series

Body Kit includes: all seals required to rebuild the cylinder body and bearing cartridge for the standard and first oversize rod. For this reason, extra seals are included and you should not use every seal.

Rod Seal Kit includes: Bearing O-Ring, Rod Wiper and Rod Packing

Rod Seal Kit with Rod Bearing includes: Rod Bearing, Bearing O-Ring, Rod Wiper and Rod Packing.

To replace all seals — order both the Cylinder Body Service Kit and the Rod Seal Kit.

CYLINDER BODY SERVICE KITS

SELECT BY BORE DIA.

Bore Dia.	BE11 Cylinder		BJ11 Cylinder	
	Catalog Number	Item Code	Catalog Number	Item Code
1-1/2	BE11-15BX4-9003	73351	BJ11-15BX4-9003	73359
2	BE11-20BX4-9003	73352	BJ11-20BX4-9003	73360
2-1/2	BE11-25BX4-9003	73353	BJ11-25BX4-9003	73361
3-1/4	BE11-32BX4-9003	73354	BJ11-32BX4-9003	73362
4	BE11-40BX4-9003	73355	BJ11-40BX4-9003	73363
5	BE11-50BX4-9003	73356	BJ11-50BX4-9003	73364
6	BE11-60BX4-9003	73357	BJ11-60BX4-9003	73365
8	BE11-80BX4-9003	73358	BJ11-80BX4-9003	73366

ROD SEAL KITS

SELECT BY ROD DIA.

Rod Dia.	Rod Seal Kit		Rod Seal Kit with Rod Bearing	
	Catalog Number	Item Code	Catalog Number	Item Code
5/8	BE11-15BX1-9002	73367	BE11-15BX1-9004	73372
1	BE11-32BX1-9002	73368	BE11-32BX1-9004	73373
1-3/8	BE11-60BX1-9002	73369	BE11-60BX1-9004	73374
1-3/4	BE11-90BX1-9002	73370	BE11-90BX1-9004	73375
2	BE11-92BX1-9002	73371	BE11-92BX1-9004	73376

REPLACEMENT PARTS

Many of the cylinder parts other than those available in repair kits or seal kits can be replaced. To order please specify the complete catalog number of the cylinder and the parts required.

Piston Rod only — Specify rod diameter and thread (will require the assembly of piston from replaced cylinder)

Piston Rod Assembly — Specify rod diameter and thread (will include piston rod, piston and piston packings)

Tube only — Will require seal kit for tube seals at re-assembly

Tie Rods — Set of 4

THEORETICAL PUSH AND PULL STROKE FORCES

PNEUMATIC CYLINDERS *E25, BE10 and BE11 Series*

CYLINDER FORCE AND VOLUME CHART — PNEUMATIC

Cyl. Bore	Rod Dia.	Action	Working Area	STROKE FORCE IN POUNDS* Operating Pressure (psig)									SCF of Air Consumed Per Inch of Stroke At 100 psig Inlet
				50	60	70	80	90	100	150	200	250	
7/16	—	PUSH	0.150	8	9	11	12	14	15	23	30	38	0.0007
	3/16	PULL	0.123	6	7	9	10	11	12	18	25	31	0.0006
9/16	—	PUSH	0.249	12	15	17	20	22	25	37	50	62	0.0011
	3/16	PULL	0.221	11	13	15	18	20	22	33	44	55	0.0010
3/4	—	PUSH	0.442	22	27	31	35	40	44	66	88	110	0.0020
	1/4	PULL	0.393	20	24	27	31	35	39	59	79	98	0.0018
1-1/16	—	PUSH	0.887	44	53	62	71	80	89	133	177	222	0.0040
	5/16	PULL	0.810	40	49	57	65	73	81	121	162	202	0.0037
	3/8	PULL	0.776	39	47	54	62	70	78	116	155	194	0.0035
1-1/4	—	PUSH	1.227	61	74	86	98	110	123	184	245	307	0.0055
	7/16	PULL	1.077	54	65	75	86	97	108	162	215	269	0.0049
1-1/2	—	PUSH	1.767	88	106	124	141	159	177	265	353	442	0.0080
	7/16	PULL	1.617	81	97	113	129	146	162	243	323	404	0.0073
	5/8	PULL	1.460	73	88	102	117	131	146	219	292	365	0.0066
	1	PULL	0.982	49	59	69	79	88	98	147	196	245	0.0044
2	—	PUSH	3.142	157	188	220	251	283	314	471	628	785	0.0142
	5/8	PULL	2.835	142	170	198	227	255	283	425	567	709	0.0128
	1	PULL	2.356	118	141	165	188	212	236	353	471	589	0.0106
2-1/2	—	PUSH	4.909	245	295	344	393	442	491	736	982	1227	0.0222
	5/8	PULL	4.602	230	276	322	368	414	460	690	920	1150	0.0208
	1	PULL	4.123	206	247	289	330	371	412	619	825	1031	0.0186
3-1/4	—	PUSH	8.296	415	498	581	664	747	830	1244	1659	2074	0.0375
	1	PULL	7.510	376	451	526	601	676	751	1127	1502	1878	0.0339
	1-3/8	PULL	6.811	341	409	477	545	613	681	1022	1362	1703	0.0308
4	—	PUSH	12.566	628	754	880	1005	1131	1257	1885	2513	3142	0.0567
	1	PULL	11.781	589	707	825	942	1060	1178	1767	2356	2945	0.0532
	1-3/8	PULL	11.082	554	665	776	887	997	1108	1662	2216	2770	0.0500
5	—	PUSH	19.635	982	1178	1374	1571	1767	1964	2945	3927	4909	0.0887
	1	PULL	18.850	942	1131	1319	1508	1696	1885	2827	3770	4712	0.0851
	1-3/8	PULL	18.150	908	1089	1271	1452	1634	1815	2723	3630	4538	0.0820
6	—	PUSH	28.274	1414	1696	1979	2262	2545	2827	4241	5655	7069	0.1277
	1-3/8	PULL	26.790	1339	1607	1875	2143	2411	2679	4018	5358	6697	0.1210
	1-3/4	PULL	25.869	1293	1552	1811	2070	2328	2587	3880	5174	6467	0.1168
8	—	PUSH	50.266	2513	3016	3519	4021	4524	5027	7540	10053	12566	0.2270
	1-3/8	PULL	48.781	2439	2927	3415	3902	4390	4878	7317	9756	12195	0.2203
	1-3/4	PULL	47.860	2393	2872	3350	3829	4307	4786	7179	9572	11965	0.2161

*Double Acting Only, refer to page 27 for spring forces.

PISTON ROD DIAMETER SELECTION:

Applications requiring long extend (push) strokes may require oversize piston rod diameters to prevent buckling. To determine the correct rod diameter for your application follow these simple steps:

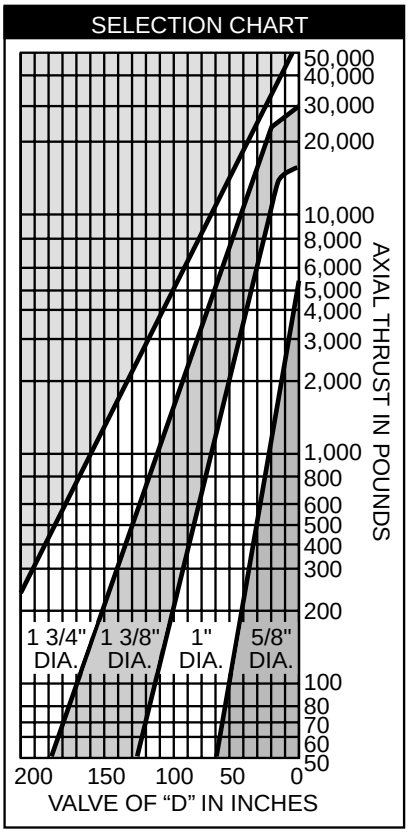
1. Select the thrust from the **"Cylinder Force and Volume Chart"** that is required for your application. Thrust = Piston Surface Area x Operating Pressure.
2. From the **"Cylinder Mounting Diagrams"** select the mounting style being used.
3. With the piston rod fully extended, calculate the value of "D" (in inches) using the formula shown for the cylinder mounting diagram selected in Step #2.
4. Locate the value of "D" (in inches) at the bottom of the **"Selection Chart"**. Enter the chart at this point and move vertically upward until intersecting with the horizontal line representing the required thrust which was selected in Step #1. The band within which these lines intersect represents the minimum recommended piston rod diameter.

THEORETICAL PUSH AND PULL STROKE FORCES

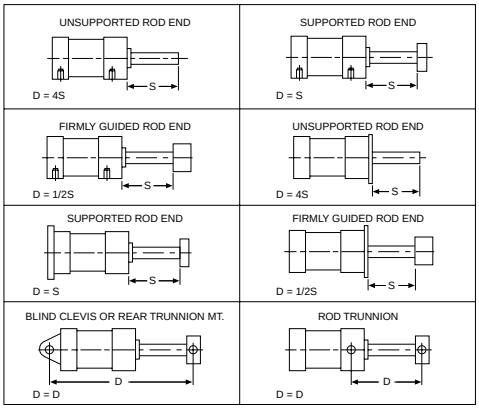
HYDRAULIC CYLINDERS — BJ11 SERIES

CYLINDER FORCE AND VOLUME CHART — HYDRAULIC

Cyl. Bore	Rod Size	Action	Working Area	STROKE FORCE IN POUNDS Operating Pressure (psig) 50	80	100	250	500	750	1000	1500	2000	Fluid Displacement Per Inch of Stroke (U.S. Gallons)
1-1/2	—	PUSH	1.767	88	141	177	442	884	1325	1767	2651	3534	.0076
	5/8	PULL	1.460	73	117	146	365	730	1095	1460	2191	2921	.0063
	1	PULL	.982	49	79	98	245	491	736	982	1473	1963	.0042
2	—	PUSH	3.142	157	251	314	785	1571	2356	3142	4712	6283	.0136
	5/8	PULL	2.835	142	227	283	709	1417	2126	2835	4252	5670	.0123
	1	PULL	2.356	118	188	236	589	1178	1767	2356	3534	4712	.0102
2-1/2	—	PUSH	4.909	245	393	491	1227	2454	3682	4909	7363		.0212
	5/8	PULL	4.602	230	368	460	1150	2301	3451	4602	6903		.0199
	1	PULL	4.123	206	330	412	1031	2062	3093	4123	6185		.0178
3-1/4	—	PUSH	8.296	415	664	830	2074	4148	6222	8296	12444		.0359
	1	PULL	7.510	376	601	751	1878	3755	5633	7510	11266		.0325
	1-3/8	PULL	6.811	341	545	681	1703	3405	5108	6811	10216		.0295
4	—	PUSH	12.566	628	1005	1257	3142	6283	9425	12566			.0544
	1	PULL	11.781	589	942	1178	2945	5890	8836	11781			.0510
	1-3/8	PULL	11.081	554	887	1108	2770	5541	8311	11081			.0480
5	—	PUSH	19.635	982	1571	1963	4909	9817	14726	19635			.0850
	1	PULL	18.850	942	1508	1885	4712	9425	14137	18850			.0816
	1-3/8	PULL	18.150	908	1452	1815	4538	9075	13613	18150			.0786
6	—	PUSH	28.274	1414	2262	2827	7069	14137	21206	28274			.1224
	1-3/8	PULL	26.789	1339	2143	2679	6697	13395	20092	26789			.1160
	1-3/4	PULL	25.869	1293	2070	2587	6467	12935	19402	25869			.1120
8	—	PUSH	50.265	2513	4021	5027	12566	25133	37699				.2176
	1-3/8	PULL	48.781	2439	3902	4878	12195	24390	36585				.2112
	1-3/4	PULL	47.860	2393	3829	4786	11965	23930	35895				.2072



Cylinder Mounting Diagrams
All Piston Rods Shown in Extended Position



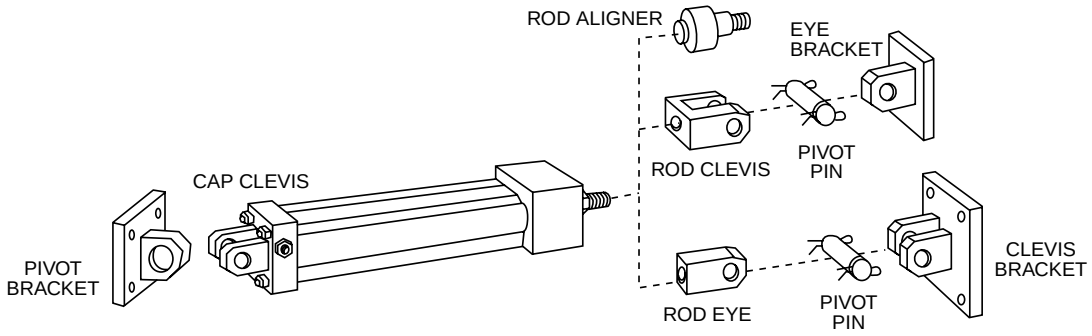
STOP TUBE SELECTION:

Stop tubes enhance the transverse load carrying capability of a long stroke cylinder by increasing the distance between the piston and rod bearing at full extension.

When the value of "D" (calculated from the piston rod diameter selection instructions) is less than 40", a stop tube is NOT required. However, if "D" is 40" or more, one-inch of stop tube is recommended for every 10" (or fraction thereof) over 40".

CYLINDER MOUNTING ACCESSORIES

FOR JIC—NFPA SQUARE END PNEUMATIC AND HYDRAULIC CYLINDERS



ORDER BY CATALOG NUMBER OR ITEM CODE

KK Rod Thread	Rod Aligner		Mating Rod Clevis		Mating Pin		Mating Eye Bracket		Mating Rod Eye		Mating Pin		Mating Clevis Bracket	
	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code
7/16–20	RA-0720-L	74603	FCV-08-0720	71040	PIN-08	71049	EB-08	71043	FRE-08-0720	71037	PIN-08	71049	CVB-08	71046
1/2–20	RA-0820-L	74604	FCV-08-0820	71609	PIN-08	71049	EB-08	71043	FRE-08-0820	71610	PIN-08	71049	CVB-08	71046
5/8–18	RA-1018-L	74605												
3/4–16	RA-1216-L	74607	FCV-12-1216	71041	PIN-12	71050	EB-12	71044	FRE-12-1216	71038	PIN-12	71050	CVB-12	71047
7/8–14	RA-1414-L	74608												
1–14	RA-1614-L	74609	FCV-16-1614	71042	PIN-16	71051	EB-16	71045	FRE-16-1614	71039	PIN-16	71051	CVB-16	71048
1-1/4-12			FCV-22-2012	71605	PIN-22	71607	EB-22	71604	FRE-22-2012	71606	PIN-22	71607	CVB-22	71608
1-1/2-12			FCV-28-2412	71268	PIN-28	79413	EB-28	71085	FRE-28-2412	71236	PIN-28	79413	CVB-28	71088

PIVOT BRACKET FOR CYLINDERS

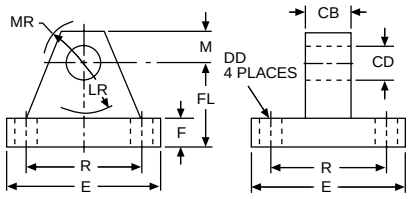
ORDER BY CATALOG NUMBER OR ITEM CODE

BORE DIA. BE10 BE11/BJ11	C.D. Pin Dia.	For P1 and P2 Mtgs.		For P3 Mtgs.	
		Catalog Number	Item Code	Catalog Number	Item Code
1-1/2, 2, 2-1/2	1/2	EB-08	71043	CVB-08	71046
3-1/4, 4, 5	3/4	EB-12	71044	CVB-12	71047
6,8	1	EB-16	71045	CVB-16	71048

EYE BRACKET Select by Pin Diameter (CD)

ORDER BY CATALOG NUMBER OR ITEM CODE

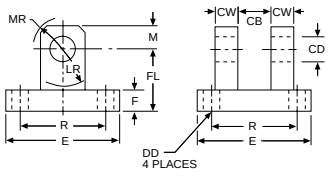
CB	CD	For DD Bolt	E	F	FL	LR	M	MR	R	Catalog No.	Item Code
3/4	1/2	3/8	2-1/2	3/8	1-1/8	5/8	1/2	19/32	1-5/8	EB-08	71043
1-1/4	3/4	1/2	3-1/2	5/8	1-7/8	1	3/4	7/8	2-9/16	EB-12	71044
1-1/2	1	5/8	4-1/2	3/4	2-1/4	1-1/4	1	1-7/32	3-1/4	EB-16	71045
2	1-3/8	5/8	5	7/8	3	1-11/16	1-3/8	1-21/32	3-13/16	EB-22	71604
2-1/2	1-3/4	7/8	6-1/2	7/8	3-1/8	1-13/16	1-3/4	2-3/32	4-15/16	EB-28	71085



CLEVIS BRACKET Select by Pin Diameter (CD)

ORDER BY CATALOG NUMBER OR ITEM CODE

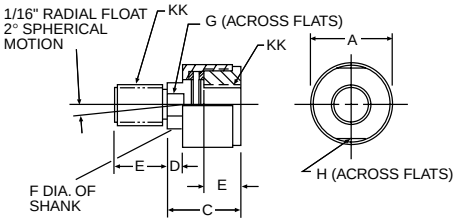
CB	CD	CW	For DD Bolt	E	F	FL	LR	M	MR	R	Catalog No.	Item Code
3/4	1/2	1/2	3/8	2-1/2	3/8	1-1/8	5/8	1/2	19/32	1-5/8	CVB-08	71046
1-1/4	3/4	5/8	1/2	3-1/2	5/8	1-7/8	1	3/4	7/8	2-9/16	CVB-12	71047
1-1/2	1	3/4	5/8	4-1/2	3/4	2-1/4	1-1/4	1	1-7/32	3-1/4	CVB-16	71048
2	1-3/8	1	5/8	5	7/8	3	1-11/16	1-3/8	1-21/32	3-13/16	CVB-22	71608
2-1/2	1-3/4	1-1/4	7/8	6-1/2	7/8	3-1/8	1-13/16	1-3/4	2-3/32	4-15/16	CVB-28	71088



ROD ALIGNER

ORDER BY CATALOG NUMBER OR ITEM CODE

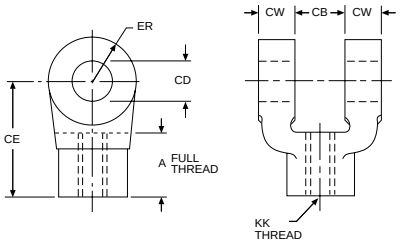
KK	A	C	D	E	F	G	H	Max. Pull At Yield (lbs)	Catalog No.	Item Code
7/16-20	1-1/4	2	1/2	3/4	5/8	1/2	1	10000	RA-0720-L	74603
1/2-20	1-1/4	2	1/2	3/4	5/8	1/2	1	14000	RA-0820-L	74604
5/8-18	1-1/4	2	1/2	3/4	5/8	1/2	1	19000	RA-1018-L	74605
3/4-16	1-3/4	2-5/16	1/2	1-1/8	31/32	13/16	1-1/2	34000	RA-1216-L	74607
7/8-14	1-3/4	2-5/16	1/2	1-1/8	31/32	13/16	1-1/2	39000	RA-1414-L	74608
1-14	2-1/2	2-15/16	1/2	1-5/8	1-3/8	1-5/32	2-1/4	64000	RA-1614-L	74609



ROD CLEVIS

ORDER BY CATALOG NUMBER OR ITEM CODE

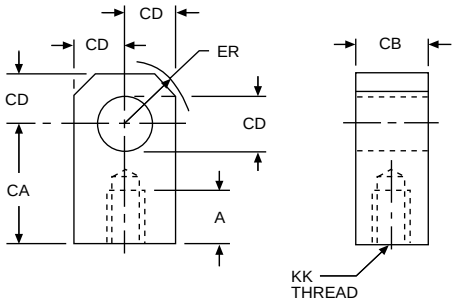
KK	A	CB	CD	CE	CW	ER	Catalog No.	Item
7/16-20	3/4	3/4	1/2	1-1/2	1/2	1/2	FCV-08-0720	71040
1/2-20	3/4	3/4	1/2	1-1/2	1/2	1/2	FCV-08-0820	71609
3/4-16	1-1/8	1-1/4	3/4	2-3/8	5/8	3/4	FCV-12-1216	71041
1-14	1-5/8	1-1/2	1	3-1/8	3/4	1	FCV-16-1614	71042
1-1/4-12	2	2	1-3/8	4-1/8	1	1-3/8	FCV-22-2012	71605
1-1/2-12	2-1/4	2-1/2	1-3/4	4-1/2	1-1/4	1-3/4	FCV-28-2412	71268



ROD EYE

ORDER BY CATALOG NUMBER OR ITEM CODE

KK	A	CA	CB	CD	ER	Catalog No.	Item Code
7/16-20	3/4	1-1/2	3/4	1/2	9/16	FRE-08-0720	71037
1/2-20	3/4	1-1/2	3/4	1/2	9/16	FRE-08-0820	71610
3/4-16	1-1/8	2-1/16	1-1/4	3/4	27/32	FRE-12-1216	71038
1-14	1-5/8	2-13/16	1-1/2	1	1-1/8	FRE-16-1614	71039
1-1/4-12	2	3-7/16	2	1-3/8	1-1/2	FRE-22-2012	71606
1-1/2-12	2-1/4	4	2-1/2	1-3/4	1-15/16	FRE-28-2412	71236



PIN

ORDER BY CATALOG NUMBER OR ITEM CODE

CD	CL	CM	Catalog No.	Item Code
1/2	1-3/4	2-3/8	PIN-08	71049
3/4	2-1/2	3-1/8	PIN-12	71050
1	3	3-5/8	PIN-16	71051
1-3/8	4	4-3/4	PIN-22	71607
1-3/4	5	5-13/16	PIN-28	70413