

WGB Benjey INC. Cylinders

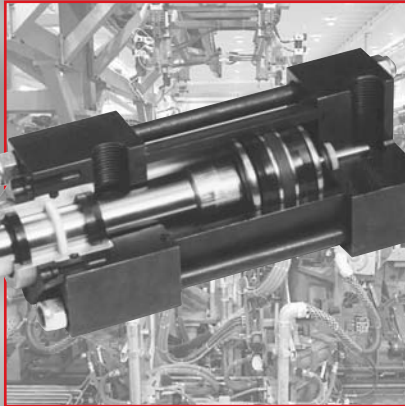
Formerly DE-STA-CO Cylinders

2293 Werth Road • Alpena, Michigan 49707

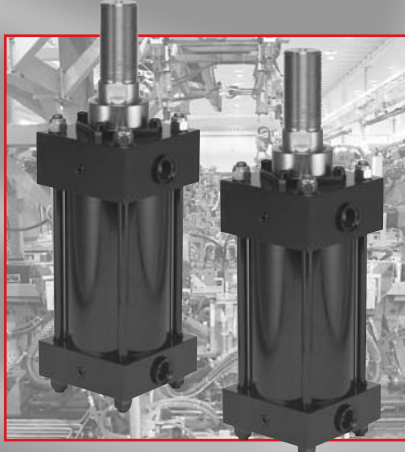
Phone: (800) 942-2957 (WGB-CYLS) • Fax: (866) 942-3297 (WGB-FAXS)



**Pre-Lubricated
Pressures to 250 psi**



**NFPA Industrial,
Interchangeable**



**Built to Ford Standards,
Effective January 2002**

Your Worldwide Provider for Productivity Solutions

**NC9
Cylinders**

LIMITED EXPRESS WARRANTY

WGBenjoy, INC. herein supplies only a LIMITED EXPRESS WARRANTY for all products the company manufactures or assembles for a period of one year from the date of manufacture as follows:

It will only repair or replace any parts which its inspection proves to be defective in material or workmanship occurring within twelve (12) months from its date of delivery to its original purchaser when the product has been used under conditions in which it was designed to operate. We will not accept any charges for removal, installation, assembly or any other charges in connection with replacement or repair of the product(s). No warranty is extended against corrosion, erosion or chemical attack, and the liability of the company under this warranty for loss or damage of any nature, whether based on contract or tort, shall not exceed the purchase price of the equipment manufactured by the company. The company shall not be liable for any consequential, contingent, punitive or incidental damages. At our option, we retain the right to have the product(s) repaired on site or returned to our manufacturing plant for our inspection, repair and testing of the units. All product(s) under warranty, which are alleged to be defective, are to be returned to the factory freight prepaid. A complete explanation is required of the alleged defects and circumstances of such claimed failure.

REPRESENTATIONS

If manufacturer representatives or other persons or entities in soliciting a sale of our product have made oral or written statements about the merchandise described in this contract or the literature of the company or its statements, such statements do not constitute warranties, shall not be relied on by the buyer, and are not part of this contract of sale. The entire contract is embodied in this writing except as to engineering details and specifications. This writing constitutes the final expression of the parties' agreement, and it is a complete and exclusive statement of the terms of that agreement.

LIMITATION OF REMEDY

The parties agree that the purchaser's sole and exclusive remedy against the seller shall be for the repair or replacement of defective parts as provided herein. The purchaser agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, lost incidental or consequential loss) shall be available to purchaser. This exclusive remedy shall not be deemed to have failed of its essential purpose so long as the seller is willing and able to repair or replace defective parts in the prescribed manner.

EXCLUSION OF WARRANTIES

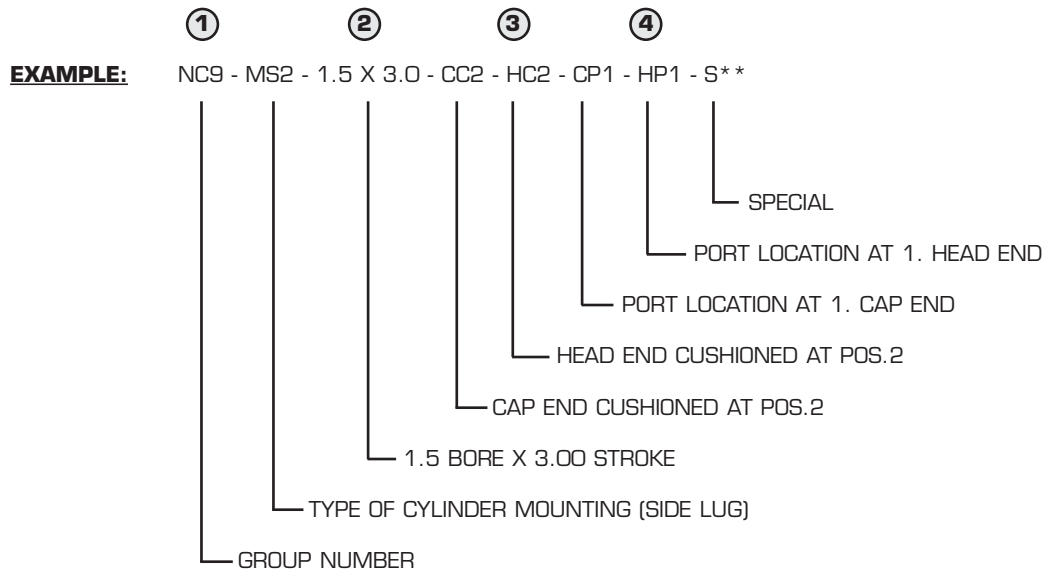
The parties agree that the implied warranties of merchantability and fitness for a particular purpose are excluded from this transaction and shall not apply to the goods sold.

The above limited warranty is in lieu of any other warranties including any implied warranty of merchantability of fitness for a particular purpose. The company neither assumes nor authorizes any other person to assume for it any other liability in connection with the products hereby purchased.

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NC9 - PRELUBRICATED PNEUMATIC CYLINDERS



① CYLINDER MOUNT DESCRIPTION

NC9 (MX1)	TIE RODS EXTENDED BOTH ENDS
NC9 (MX2)	TIE RODS EXTENDED CAP END
NC9 (MX3)	TIE RODS EXTENDED HEAD END
NC9 (MF1) (1.50 THRU 6.00)	HEAD RECTANGULAR FLANGE
NC9 (MF2) (1.50 THRU 6.00)	CAP RECTANGULAR FLANGE
NC9 (ME3)(8.00 THRU 12.00)	HEAD SQUARE
NC9 (ME4)(8.00 THRU 12.00)	CAP SQUARE
NC9 (MP1)	CAP FIXED CLEVIS
NC9 (MS2)	SIDE LUG
NC9 (MT4)	INTERMEDIATE FIXED TRUNNION

② CYLINDER BORE AND STROKE (CUSTOMER SELECTED)

PISTON ROD AND ROD END STYLE

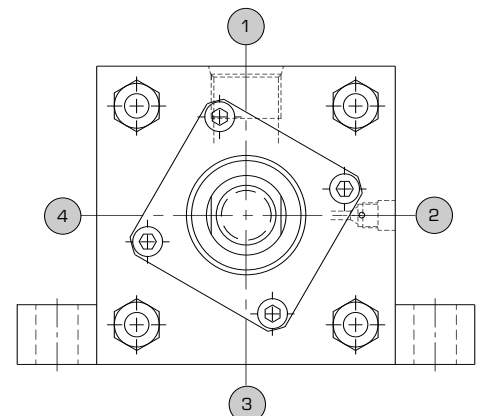
DO NOT INDICATE IN MODEL NUMBER (SEE EXAMPLE)
ONE ROD SIZE AVAILABLE FOR EACH BORE SIZE ONLY

③ CUSHION LOCATIONS

MUST BE SPECIFIED BY CUSTOMER
"CC" INDICATES CAP END CUSHION
"HC" INDICATES HEAD END CUSHION
• CUSHION ADJ. AVAILABLE AT POS. #1,2,3 OR 4
• CUSHIONS SHOULD BE SPECIFIED IN CYLINDERS WITH STROKES GREATER THAN 2.0

④ PORT LOCATIONS

MUST BE SPECIFIED BY CUSTOMER
"CP" INDICATES CAP END PORT NPT
"HP" INDICATES HEAD END PORT NPT
"T" INDICATES SAE STRAIGHT THREADS - J1926
• PORTS (SAE STRAIGHT THREADS ONLY - J1926) ARE AVAILABLE AT POS. #1,2,3 OR 4



NOTE: DIAGRAM INDICATES STANDARD PORT AND CUSHION LOCATION

STANDARD BORES AND RODS

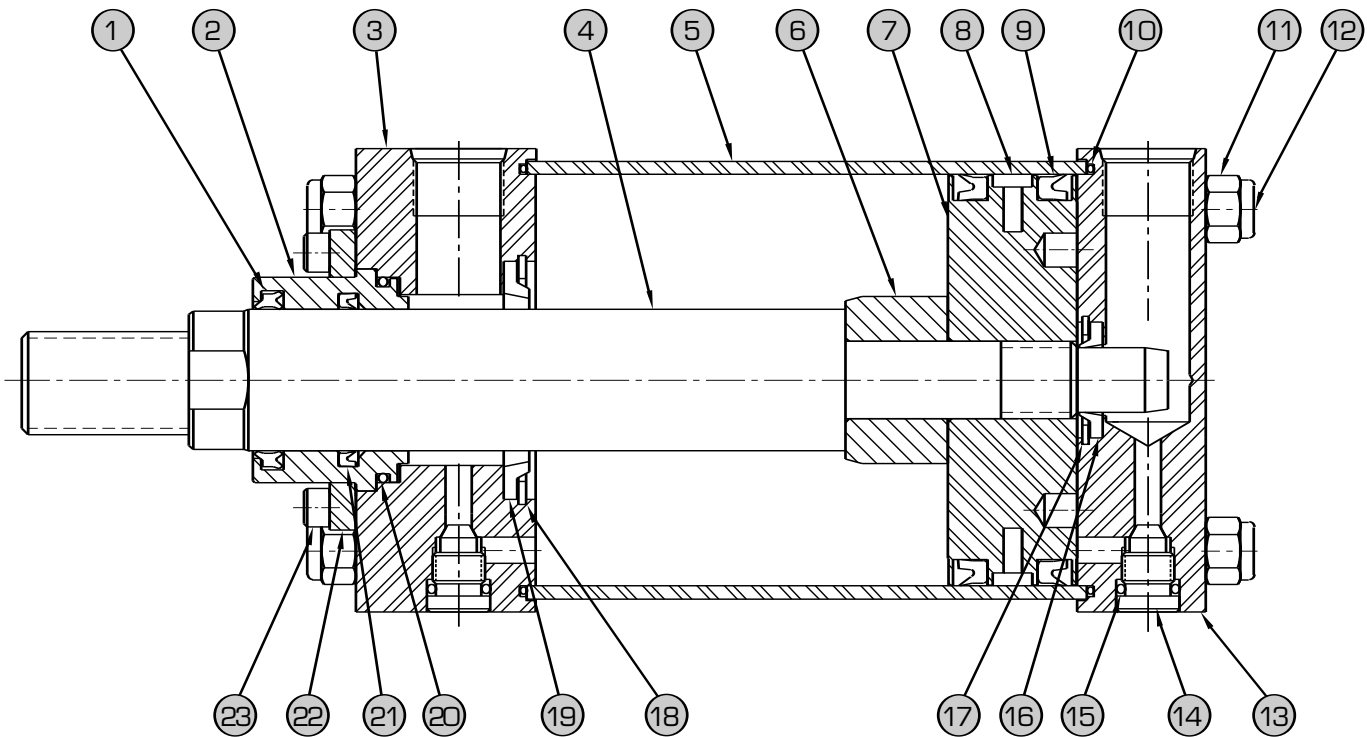
BORES	RODS
1.50	1.00
2.00	1.00
2.50	1.00
3.25	1.38
4.00	1.75
5.00	1.75
6.00	2.00
8.00	2.50
10.00	2.50
12.00	2.50

**NOTE: WHEN USING "S" IN THE MODEL NUMBER, ALL NON-STANDARD DIMENSIONS MUST BE SPECIFIED

NC9 CYLINDERS: ARE BUILT TO FORD MOTOR COMPANY VEHICLE OPERATION SPECIFICATIONS. ANY DEVIATIONS FROM THIS NEW STANDARD MUST BE APPROVED IN WRITING BY THE FORD MOTOR COMPANY.



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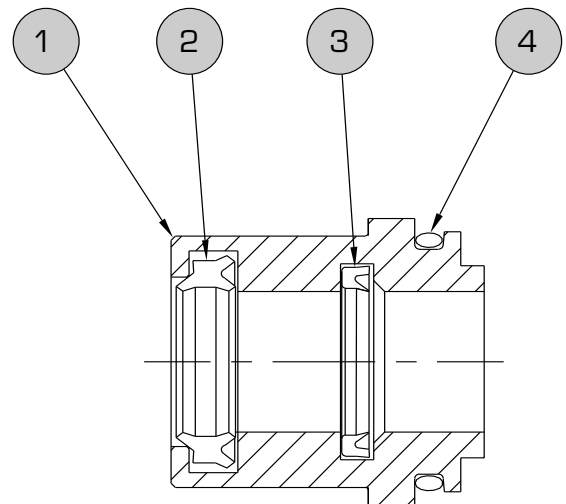


- 1 ROD WIPER**
OFFERS SUPERIOR ROD PROTECTION AND IS A SECONDARY SEALING SOURCE
- 2 ROD CARTRIDGE**
MADE FROM DUCTILE IRON AND ENDURA COATED FOR MAXIMUM CORROSION RESISTANCE, REDUCED FRICTION AND INCREASED SURFACE HARDNESS
- 3 HEAD**
- 13 CAP**
PRECISION MACHINED ASSURING CONCENTRICITY OF ALL MATING PARTS BLACK OXIDED AFTER MACHINING TO PREVENT CORROSION
- 4 PISTON ROD**
CORE HARDNESS OF Rc28-34, OD CASE HARDENED TO Rc50-55 AND HARD CHROME PLATED .0003/.0005" THICK
- 5 TUBE**
DOM STEEL HONED TO 15 MICRO INCH FINISH AND HARD CHROME PLATED .0003/.0005" THICK ON THE ID
- 6 CUSHION BUSHING**
MADE FROM GRAY IRON FOR CORROSION RESISTANCE AND SMOOTH OD ALLOWS FOR SMOOTH CUSHIONING
- 7 PISTON**
ONE PIECE STEEL PISTON, SEALED TO THE ROD WITH LOCTITE TO PREVENT LEAKAGE. BLACK OXIDED TO PREVENT CORROSION
- 8 WEAR BAND**
MADE FROM HIGH STRENGTH DELRIN FOR MAXIMUM WEAR RESISTANCE
- 9 PISTON SEAL**
LUBRITHANE K-SEAL FOR REDUCED SEAL FRICTION, INTERNAL LUBRICATION AND ABRASION RESISTANCE
- 10 TUBE O-RING**
CONFINEMENT OF THE O-RING IN THE HEADS PREVENT EXTRUSION UNDER NORMAL OPERATING CONDITIONS
- 11 TIE ROD NUT**
ALLOY STEEL SELF LOCKING NUT
- 12 TIE ROD**
MANUFACTURED FROM HIGH STRENGTH 100,000 PSI MINIMUM TENSILE STEEL WITH ROLLED THREADS
- 14 ADJUSTMENT SCREW**
ALLOWS FINE METERING FOR EXACT CUSHIONING PERFORMANCE, SCREW IS FLUSH WITH NO BALL CHECK NEEDED
- 15 ADJUSTMENT SCREW O-RING**
SEALS THE SCREW TO THE HEAD WHILE ALLOWING FOR METERING ADJUSTMENT
- 16 CAP CUSHION SEAL**
- 19 HEAD CUSHION SEAL**
POSITIVE, RESILIENT CUSHION SEALS ARE USED FOR LONG LIFE, SEALS ALSO ACT AS A BALL CHECK FOR PROMPT ACCELERATION
- 17 CAP CUSHION SEAL RETAINER**
- 18 HEAD CUSHION SEAL RETAINER**
RETAINS THE CUSHION SEAL, ALLOWING FOR EASY REMOVAL
- 20 ROD CARTRIDGE O-RING**
STATIC SEAL SURROUNDING THE ROD CARTRIDGE
- 21 ROD SEAL**
LUBRITHANE K-SEAL FOR REDUCED SEAL FRICTION, INTERNAL LUBRICATION AND ABRASION RESISTANCE
- 22 CARTRIDGE RETAINER**
HIGH STRENGTH STEEL BLACK OXIDED FOR CORROSION RESISTANCE
- 23 RETAINER SCREW**
ALLOY STEEL SOCKET HEAD CAP SCREW

ROD	BORE	ROD CARTRIDGE ASSEMBLY
.63	1.50, 2.00	NC9-4001
.63	2.50	NC9-4002
1.00	1.50, 2.00, 2.50	NC9-4003
1.00	3.25, 4.00, 5.00	NC9-4004
1.38	3.25	NC9-4005
1.38	6.00, 8.00	NC9-4006
1.75	4.00, 5.00	NC9-4007
2.00	6.00	NC9-4008
2.50	8.00, 10.00, 12.00	NC9-4009

EACH OF THE ABOVE SEAL KITS CONTAINS:

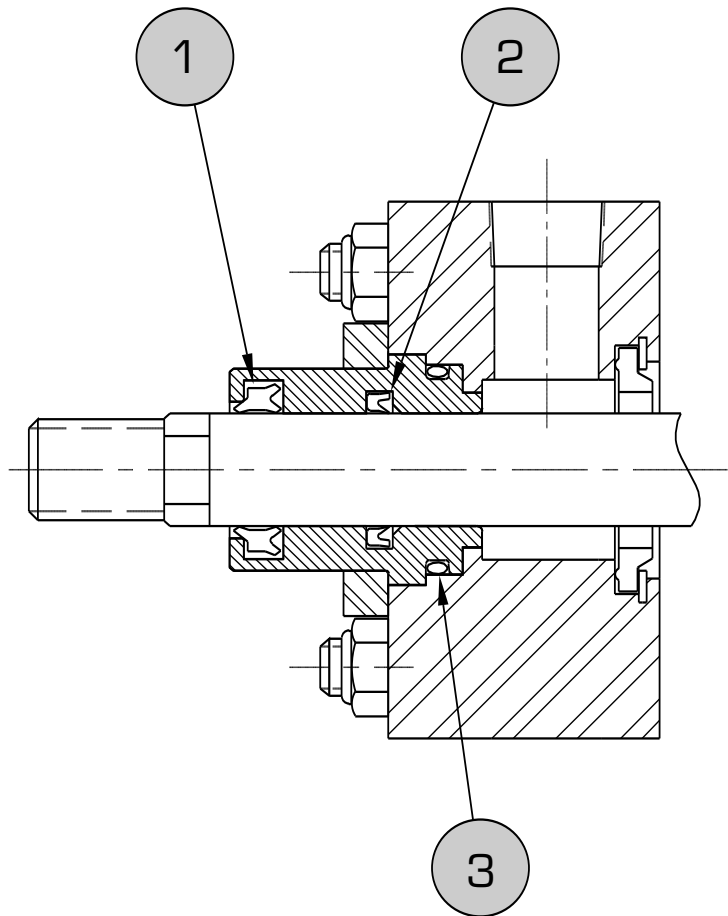
ITEM#	QTY	DESCRIPTION
1.	1	ROD CARTRIDGE
2.	1	ROD WIPER
3.	1	ROD SEAL
4.	1	ROD CARTRIDGE O-RING



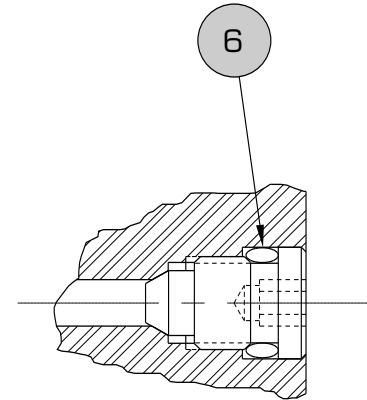
ROD	BORE	ROD SEAL KITS
.63	1.50, 2.00	NC9-4101
.63	2.50	NC9-4102
1.00	1.50, 2.00, 2.50	NC9-4103
1.00	3.25, 4.00, 5.00	NC9-4104
1.38	3.25	NC9-4105
1.38	6.00, 8.00	NC9-4106
1.75	4.00, 5.00	NC9-4107
2.00	6.00	NC9-4108
2.50	8.00, 10.00, 12.00	NC9-4109

EACH OF THE ABOVE SEAL KITS CONTAINS:

ITEM#	QTY	DESCRIPTION
1.	1	ROD WIPER
2.	1	ROD SEAL
3.	1	ROD CARTRIDGE O-RING

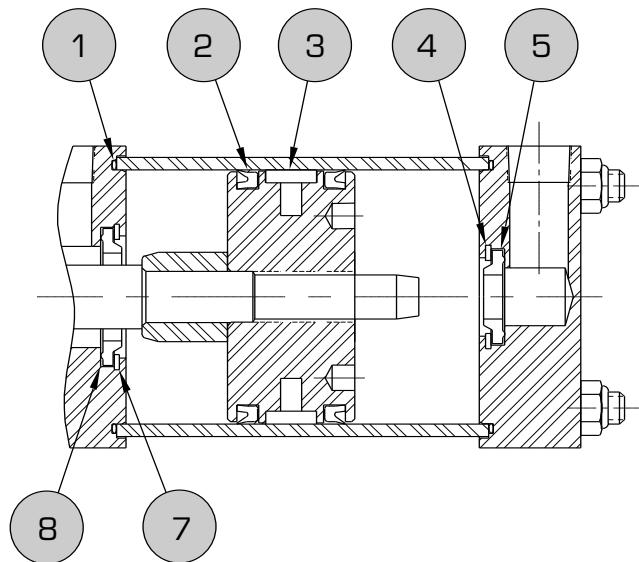


BORE	CYLINDER SEAL KITS
1.50	NC9-4201
2.00	NC9-4202
2.50	NC9-4203
3.25	NC9-4204
4.00	NC9-4205
5.00	NC9-4206
6.00	NC9-4207
8.00	NC9-4208
10.00	NC9-4209
12.00	NC9-4210



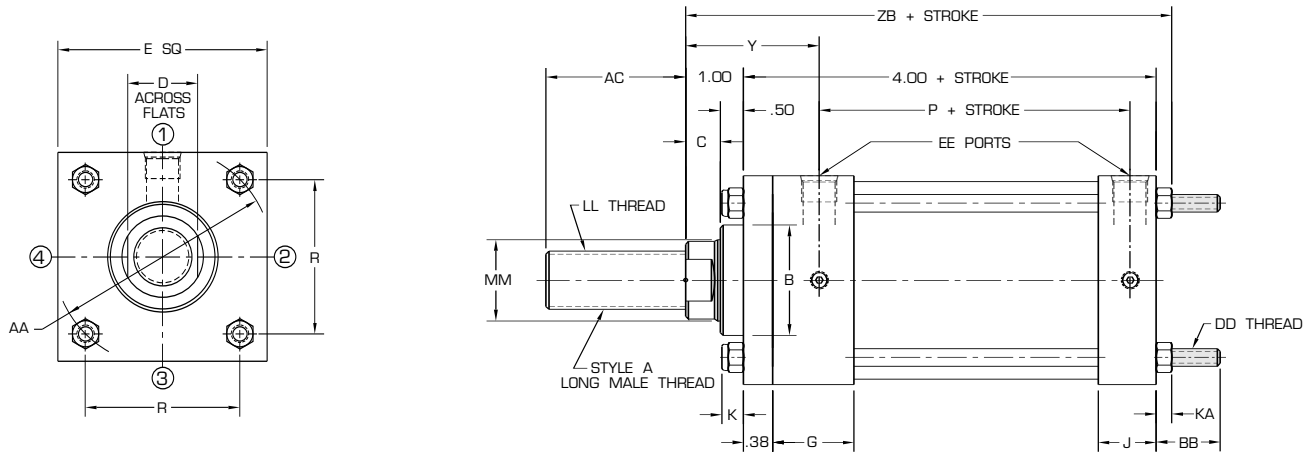
EACH OF THE ABOVE SEAL KITS CONTAINS:

ITEM#	QTY	DESCRIPTION
1.	2	TUBE SEAL
2*	2	PISTON SEAL
3.	1	WEAR BAND
4.	1	CAP RETAINING RING
5.	1	CAP CUSHION INSERT
6.	2	CUSHION ADJ. O-RING
7.	1	HEAD RETAINING RING
8.	1	HEAD CUSHION INSERT

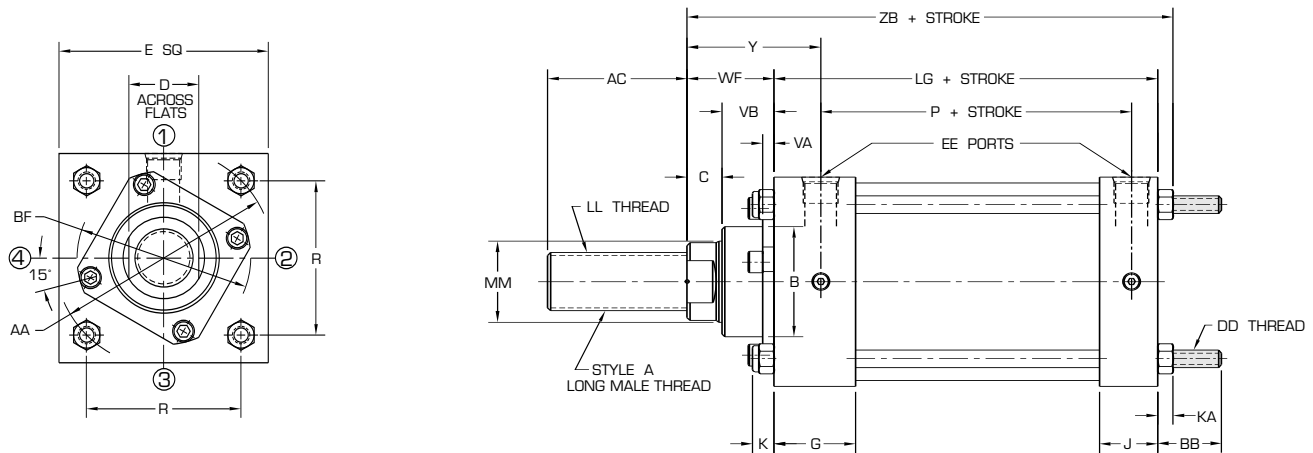


*Note: K-Seals do not need Back-up Rings
Back-up Rings only used on Parker Seals.

1.50" BORE



2.00" THRU 12.00" BORE



MXO - NO TIE RODS EXTENDED
MX1 - TIE RODS EXTENDED BOTH ENDS

MX2 - TIE RODS EXTENDED CAP END
MX3 - TIE RODS EXTENDED HEAD END



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ENVELOPE MOUNTING DIMENSIONS

BORE SIZE	AA	BB	DD	E	EE (SAE) OPTIONAL	EE (NPT) STANDARD	G	J	K	LG	P	R	KA
1.50	2.02	1.00	1/4-28	2.00	(#6) 9/16-18	3/8	1.50	1.00	0.33	3.63	2.31	1.43	0.22
2.00	2.60	1.13	5/16-24	2.50	(#6) 9/16-18	3/8	1.50	1.00	0.36	3.63	2.31	1.84	0.27
2.50	3.10	1.13	5/16-24	3.00	(#6) 9/16-18	3/8	1.50	1.00	0.36	3.75	2.44	2.19	0.27
3.25	3.90	1.38	3/8-24	3.75	(#10) 7/8-14	1/2	1.75	1.25	0.47	4.25	2.69	2.76	0.33
4.00	4.70	1.38	3/8-24	4.50	(#10) 7/8-14	1/2	1.75	1.25	0.47	4.25	2.69	3.32	0.33
5.00	5.80	1.81	1/2-20	5.50	(#10) 7/8-14	1/2	1.75	1.25	0.61	4.50	2.94	4.10	0.44
6.00	6.90	1.81	1/2-20	6.50	(#12) 1-1/16-12	3/4	2.00	1.50	0.61	5.00	3.19	4.88	0.44
8.00	9.10	2.31	5/8-18	8.50	(#12) 1-1/16-12	3/4	2.00	1.50	0.76	5.13	3.31	6.44	0.55
10.00	11.20	2.69	3/4-16	10.63	(#16) 1-5/16-12	1	2.25	2.00	0.89	6.38	4.19	7.92	0.64
12.00	13.30	2.69	3/4-16	12.75	(#16) 1-5/16-12	1	2.25	2.00	0.89	6.88	4.69	9.40	0.64

ROD END DIMENSIONS

MOUNT DIMENSIONS

BORE SIZE	MM ROD DIA	LL THREAD	AC	B	BF	C	D	VA	VB	WF	Y	ZB
				+ .000 - .002								
1.50	1.00	7/8-14	1.88	1.499	-	0.50	0.88	-	-	-	2.25	5.33
2.00	1.00	7/8-14	1.88	1.499	2.47	0.50	0.88	0.25	0.88	1.38	2.25	5.35
2.50	1.00	7/8-14	1.88	1.499	2.47	0.50	0.88	0.25	0.88	1.38	2.25	5.48
3.25	1.38	1-1/4-12	2.50	1.999	2.97	0.63	1.13	0.25	1.00	1.63	2.63	6.34
4.00	1.75	1-1/2-12	3.00	2.374	3.74	0.75	1.50	0.25	1.13	1.88	2.88	6.59
5.00	1.75	1-1/2-12	3.00	2.374	3.74	0.75	1.50	0.25	1.13	1.88	2.88	6.98
6.00	2.00	1-3/4-12	3.50	2.624	4.31	0.88	1.69	0.25	1.13	2.00	3.13	7.61
8.00	2.50	2-1/4-12	4.50	3.124	4.31	1.00	2.06	0.25	1.25	2.25	3.38	8.14
10.00	2.50	2-1/4-12	4.50	3.124	4.31	1.00	2.06	0.25	1.25	2.25	3.44	9.52
12.00	2.50	2-1/4-12	4.50	3.124	4.31	1.00	2.06	0.25	1.25	2.25	3.44	10.02

NOTE: 1.50 & 2.00 BORE WITH 1.00 ROD DIA - NON-ADJUSTABLE CUSHIONS HEAD END ONLY

NOTE: CUSHION SUPPLIED AT POSITION# 2 AS STANDARD UNLESS OTHERWISE SPECIFIED

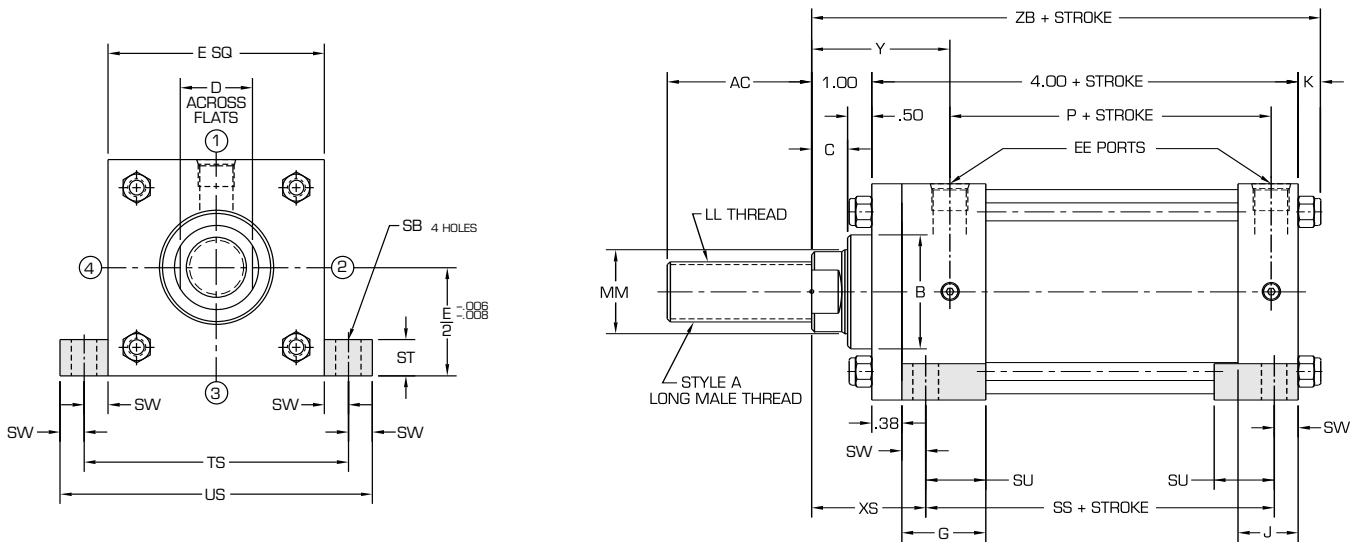
FOR ORDERING CODE SEE PAGE# 1



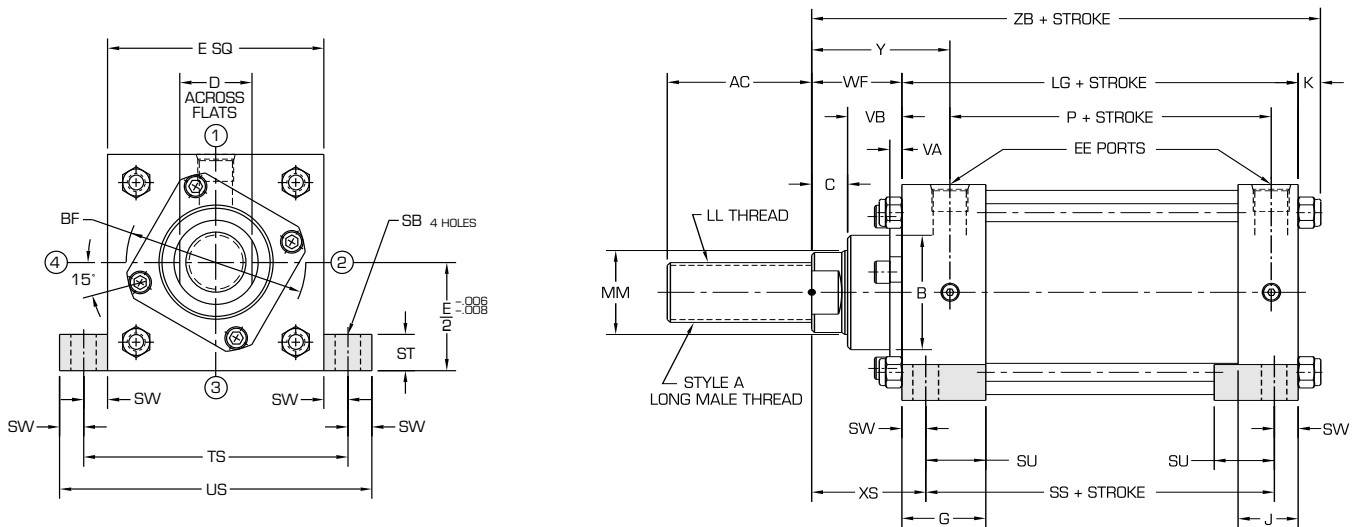
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1.50" BORE



2.00" THRU 12.00" BORE



ENVELOPE MOUNTING DIMENSIONS

BORE SIZE	E	EE (SAE)	EE (NPT)	G	J	K	LG	P	SB		SS	ST	SU	SW	TS	US
		OPTIONAL	STANDARD						(DIA)	(BOLT)						
1.50	2.00	(#6) 9/16-18	3/8	1.50	1.00	0.33	3.63	2.31	0.44	3/8	2.88	0.50	0.94	0.38	2.75	3.50
2.00	2.50	(#6) 9/16-18	3/8	1.50	1.00	0.36	3.63	2.31	0.44	3/8	2.88	0.50	0.94	0.38	3.25	4.00
2.50	3.00	(#6) 9/16-18	3/8	1.50	1.00	0.36	3.75	2.44	0.44	3/8	3.00	0.50	0.94	0.38	3.75	4.50
3.25	3.75	(#10) 7/8-14	1/2	1.75	1.25	0.47	4.25	2.69	0.56	1/2	3.25	0.75	1.25	0.50	4.75	5.75
4.00	4.50	(#10) 7/8-14	1/2	1.75	1.25	0.47	4.25	2.69	0.56	1/2	3.25	0.75	1.25	0.50	5.50	6.50
5.00	5.50	(#10) 7/8-14	1/2	1.75	1.25	0.61	4.50	2.94	0.81	3/4	3.13	1.00	1.56	0.69	6.88	8.25
6.00	6.50	(#12) 1-1/16-12	3/4	2.00	1.50	0.61	5.00	3.19	0.81	3/4	3.63	1.00	1.56	0.69	7.88	9.25
8.00	8.50	(#12) 1-1/16-12	3/4	2.00	1.50	0.76	5.13	3.31	0.81	3/4	3.75	1.00	1.56	0.69	9.88	11.25
10.00	10.63	(#16) 1-5/16-12	1	2.25	2.00	0.89	6.38	4.19	1.06	1	4.63	1.25	2.00	0.88	12.38	14.13
12.00	12.75	(#16) 1-5/16-12	1	2.25	2.00	0.89	6.88	4.69	1.06	1	5.13	1.25	2.00	0.88	14.50	16.25

ROD END DIMENSIONS

MOUNT DIMENSIONS

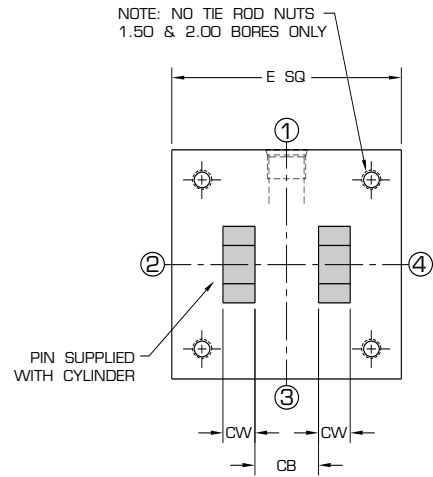
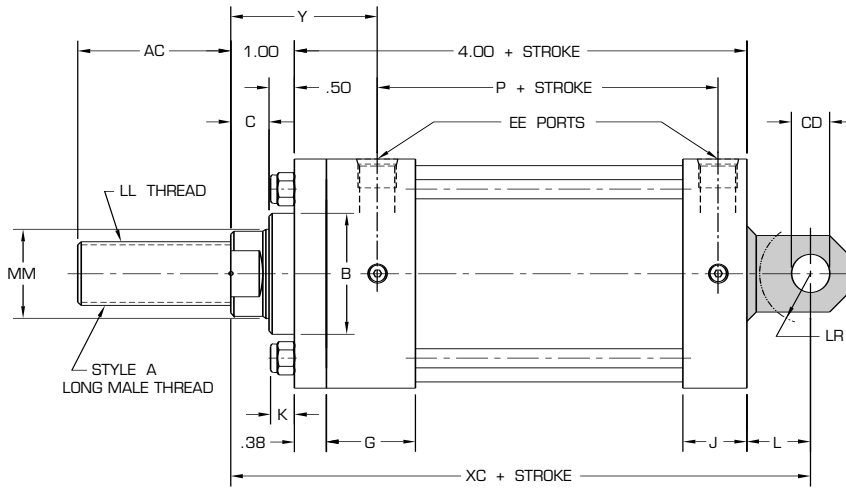
BORE SIZE	MM ROD DIA	LL THREAD	AC	B	BF	C	D	VA	VB	WF	XS	Y	ZB
				+ .000 - .002									
1.50	1.00	7/8-14	1.88	1.499	-	0.50	0.88	-	-	-	1.75	2.25	5.33
2.00	1.00	7/8-14	1.88	1.499	2.47	0.50	0.88	0.25	0.88	1.38	1.75	2.25	5.35
2.50	1.00	7/8-14	1.88	1.499	2.47	0.50	0.88	0.25	0.88	1.38	1.75	2.25	5.48
3.25	1.38	1-1/4-12	2.50	1.999	2.97	0.63	1.13	0.25	1.00	1.63	2.13	2.63	6.34
4.00	1.75	1-1/2-12	3.00	2.374	3.74	0.75	1.50	0.25	1.13	1.88	2.38	2.88	6.59
5.00	1.75	1-1/2-12	3.00	2.374	3.74	0.75	1.50	0.25	1.13	1.88	2.56	2.88	6.98
6.00	2.00	1-3/4-12	3.50	2.624	4.31	0.88	1.69	0.25	1.13	2.00	2.69	3.13	7.61
8.00	2.50	2-1/4-12	4.50	3.124	4.31	1.00	2.06	0.25	1.25	2.25	2.94	3.38	8.14
10.00	2.50	2-1/4-12	4.50	3.124	4.31	1.00	2.06	0.25	1.25	2.25	3.13	3.44	9.52
12.00	2.50	2-1/4-12	4.50	3.124	4.31	1.00	2.06	0.25	1.25	2.25	3.13	3.44	10.02

NOTE: 1.50 & 2.00 BORE WITH 1.00 ROD DIA - NON-ADJUSTABLE CUSHIONS HEAD END ONLY

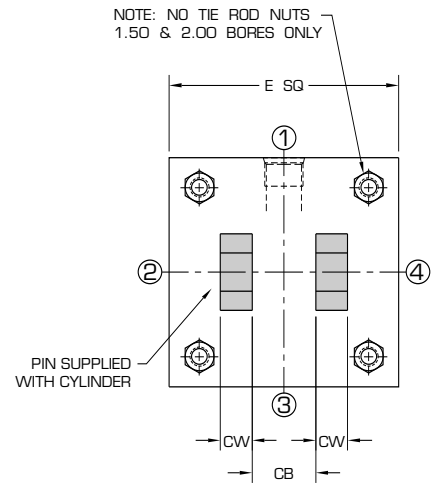
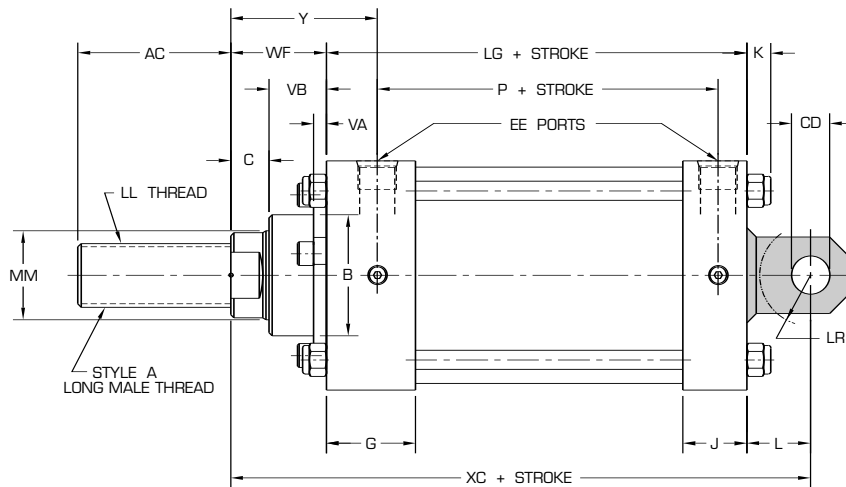
NOTE: CUSHION SUPPLIED AT POSITION# 2 AS STANDARD UNLESS OTHERWISE SPECIFIED

FOR ORDERING CODE SEE PAGE# 1

1.50" BORE



2.00" THRU 12.00" BORE



ENVELOPE MOUNTING DIMENSIONS

BORE SIZE	CB	CD PIN DIA	CW	E	EE (SAE)	EE (NPT)	G	J	K	L	LG	LR	P
					OPTIONAL	STANDARD							
1.50	0.75	0.50	0.50	2.00	(#6) 9/16-18	3/8	1.50	1.00	0.33	0.75	3.63	0.56	2.31
2.00	0.75	0.50	0.50	2.50	(#6) 9/16-18	3/8	1.50	1.00	0.36	0.75	3.63	0.56	2.31
2.50	0.75	0.50	0.50	3.00	(#6) 9/16-18	3/8	1.50	1.00	0.36	0.75	3.75	0.56	2.44
3.25	1.25	0.75	0.63	3.75	(#10) 7/8-14	1/2	1.75	1.25	0.47	1.25	4.25	1.00	2.69
4.00	1.25	0.75	0.63	4.50	(#10) 7/8-14	1/2	1.75	1.25	0.47	1.25	4.25	1.00	2.69
5.00	1.25	0.75	0.63	5.50	(#10) 7/8-14	1/2	1.75	1.25	0.61	1.25	4.50	1.00	2.94
6.00	1.50	1.00	0.75	6.50	(#12) 1-1/16-12	3/4	2.00	1.50	0.61	1.50	5.00	1.25	3.19
8.00	1.50	1.00	0.75	8.50	(#12) 1-1/16-12	3/4	2.00	1.50	0.76	1.50	5.13	1.25	3.31
10.00	2.00	1.38	1.00	10.63	(#16) 1-5/16-12	1	2.25	2.00	0.89	2.13	6.38	1.81	4.19
12.00	2.50	1.75	1.25	12.75	(#16) 1-5/16-12	1	2.25	2.00	0.89	2.25	6.88	1.88	4.69

ROD END DIMENSIONS

MOUNT DIMENSIONS

BORE SIZE	MM ROD DIA	LL THREAD	AC	B	C	VA	VB	WF	XC	Y
				+ .000 - .002						
1.50	1.00	7/8-14	1.88	1.499	0.50	-	-	-	5.75	2.25
2.00	1.00	7/8-14	1.88	1.499	0.50	0.25	0.88	1.38	5.75	2.25
2.50	1.00	7/8-14	1.88	1.499	0.50	0.25	0.88	1.38	5.88	2.25
3.25	1.38	1-1/4-12	2.50	1.999	0.63	0.25	1.00	1.63	7.13	2.63
4.00	1.75	1-1/2-12	3.00	2.374	0.75	0.25	1.13	1.88	7.38	2.88
5.00	1.75	1-1/2-12	3.00	2.374	0.75	0.25	1.13	1.88	7.63	2.88
6.00	2.00	1-3/4-12	3.50	2.624	0.88	0.25	1.13	2.00	8.50	3.13
8.00	2.50	2-1/4-12	4.50	3.124	1.00	0.25	1.25	2.25	8.88	3.38
10.00	2.50	2-1/4-12	4.50	3.124	1.00	0.25	1.25	2.25	10.75	3.44
12.00	2.50	2-1/4-12	4.50	3.124	1.00	0.25	1.25	2.25	11.38	3.44

NOTE: 1.50 & 2.00 BORE WITH 1.00 ROD DIA - NON-ADJUSTABLE CUSHIONS HEAD END ONLY

NOTE: CUSHION SUPPLIED AT POSITION# 2 AS STANDARD UNLESS OTHERWISE SPECIFIED

FOR ORDERING CODE SEE PAGE# 1



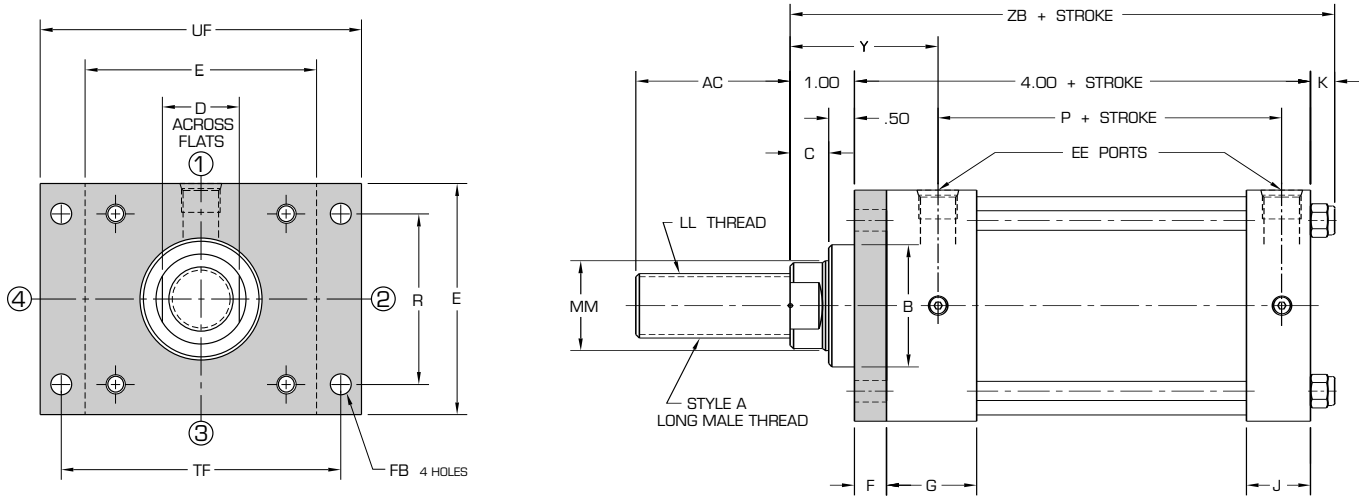
Formerly **DE-STA-CO** Cylinders

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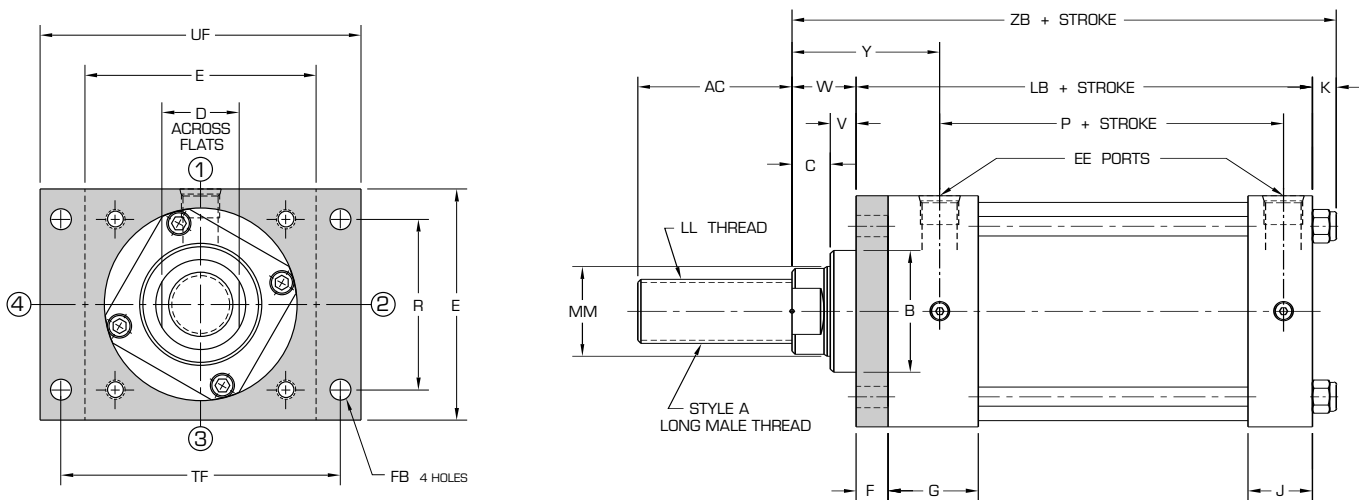
Direct: (989) 354-6140 • Fax: (866) 942-3297 (WGB-FAXS)

Website: www.benjey.com • E-mail: wgbcylinders@benjey.com

1.50" & 2.00" BORE



2.50" THRU 6.00" BORE



ENVELOPE MOUNTING DIMENSIONS

BORE SIZE	E	EE (SAE) OPTIONAL	EE (NPT) STANDARD	F	FB		G	J	K	LB	P	R	TF	UF
					(DIA)	(BOLT)								
1.50	2.00	(#6) 9/16-18	3/8	0.38	0.31	1/4	1.50	1.00	0.33	4.00	2.31	1.43	2.75	3.38
2.00	2.50	(#6) 9/16-18	3/8	0.38	0.38	5/16	1.50	1.00	0.36	4.00	2.31	1.84	3.38	4.13
2.50	3.00	(#6) 9/16-18	3/8	0.38	0.38	5/16	1.50	1.00	0.36	4.13	2.44	2.19	3.88	4.63
3.25	3.75	(#8) 7/8-14	1/2	0.63	0.44	3/8	1.75	1.25	0.47	4.88	2.69	2.76	4.69	5.50
4.00	4.50	(#10) 7/8-14	1/2	0.63	0.44	3/8	1.75	1.25	0.47	4.88	2.69	3.32	5.44	6.25
5.00	5.50	(#10) 7/8-14	1/2	0.63	0.56	1/2	1.75	1.25	0.61	5.13	2.94	4.10	6.63	7.63
6.00	6.50	(#12) 1-1/16-12	3/4	0.75	0.56	1/2	2.00	1.50	0.61	5.75	3.19	4.88	7.63	8.63

ROD END DIMENSIONS

MOUNT DIMENSIONS

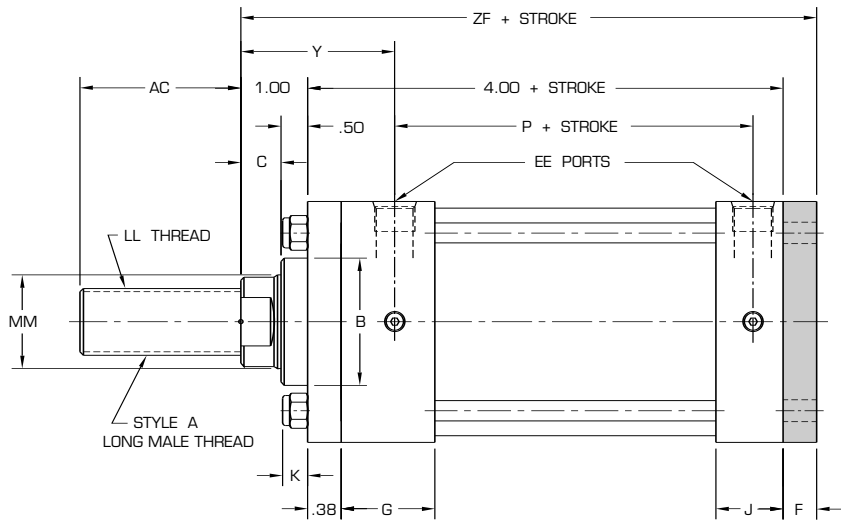
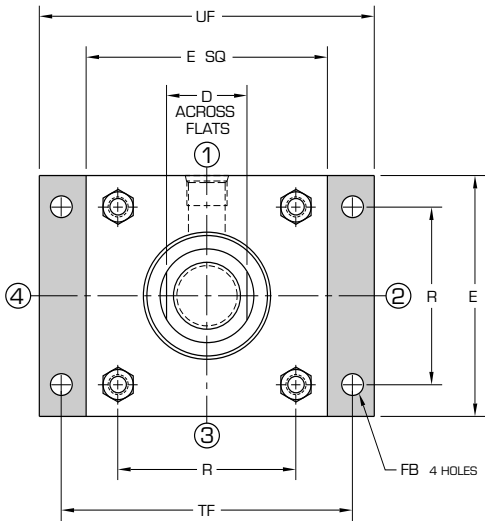
BORE SIZE	MM ROD DIA	LL THREAD	AC	B	C	D	V	W	Y	ZB
				+ .000						
				- .002						
1.50	1.00	7/8-14	1.88	1.499	0.50	0.88	0.50	1.00	2.25	5.33
2.00	1.00	7/8-14	1.88	1.499	0.50	0.88	0.50	1.00	2.25	5.35
2.50	1.00	7/8-14	1.88	1.499	0.50	0.88	0.50	1.00	2.25	5.48
3.25	1.38	1-1/4-12	2.50	1.999	0.63	1.13	0.38	1.00	2.63	6.34
4.00	1.75	1-1/2-12	3.00	2.374	0.75	1.50	0.50	1.25	2.88	6.59
5.00	1.75	1-1/2-12	3.00	2.374	0.75	1.50	0.50	1.25	2.88	6.98
6.00	2.00	1-3/4-12	3.50	2.624	0.88	1.69	0.38	1.25	3.13	7.61

NOTE: 1.50 & 2.00 BORE WITH 1.00 ROD DIA - NON-ADJUSTABLE CUSHIONS HEAD END ONLY

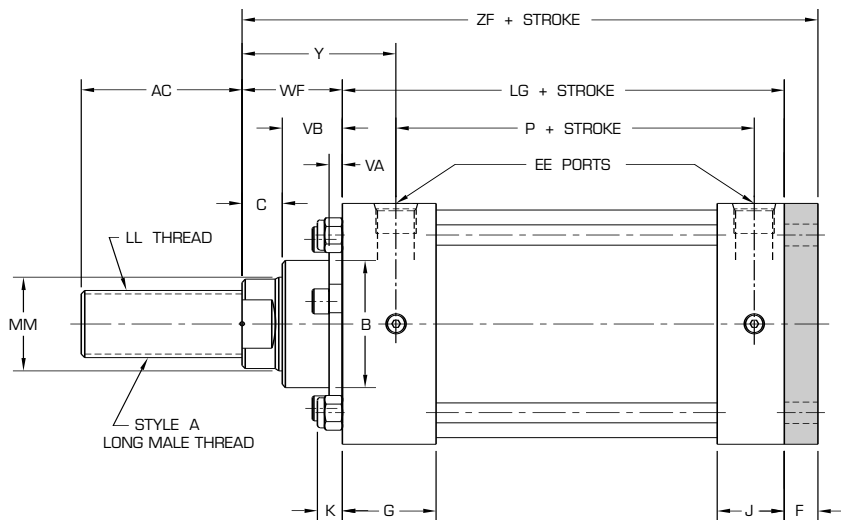
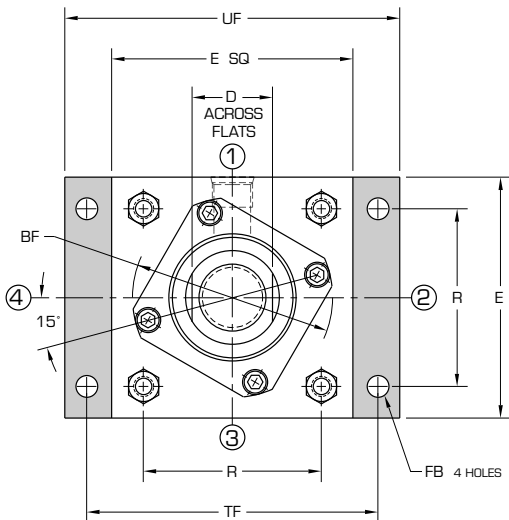
NOTE: CUSHION SUPPLIED AT POSITION# 2 AS STANDARD UNLESS OTHERWISE SPECIFIED

FOR ORDERING CODE SEE PAGE# 1

1.50" BORE



2.00" THRU 6.00" BORE



ENVELOPE MOUNTING DIMENSIONS

BORE SIZE	E	EE (SAE) OPTIONAL	EE (NPT) STANDARD	F	FB		G	J	K	LG	P	R	TF	UF
					(DIA)	(BOLT)								
1.50	2.00	(#6) 9/16-18	3/8	3/8	0.31	1/4	1.50	1.00	0.33	4.00	2.31	1.43	2.75	3.38
2.00	2.50	(#6) 9/16-18	3/8	3/8	0.38	5/16	1.50	1.00	0.36	3.63	2.31	1.84	3.38	4.13
2.50	3.00	(#6) 9/16-18	3/8	3/8	0.38	5/16	1.50	1.00	0.36	3.75	2.44	2.19	3.88	4.63
3.25	3.75	(#10) 7/8-14	1/2	5/8	0.44	3/8	1.75	1.25	0.47	4.25	2.69	2.76	4.69	5.50
4.00	4.50	(#10) 7/8-14	1/2	5/8	0.44	3/8	1.75	1.25	0.47	4.25	2.69	3.32	5.44	6.25
5.00	5.50	(#10) 7/8-14	1/2	5/8	0.56	1/2	1.75	1.25	0.61	4.50	2.94	4.10	6.63	7.63
6.00	6.50	(#12) 1-1/16-12	3/4	3/4	0.56	1/2	2.00	1.50	0.61	5.00	3.19	4.88	7.63	8.63

ROD END DIMENSIONS

MOUNT DIMENSIONS

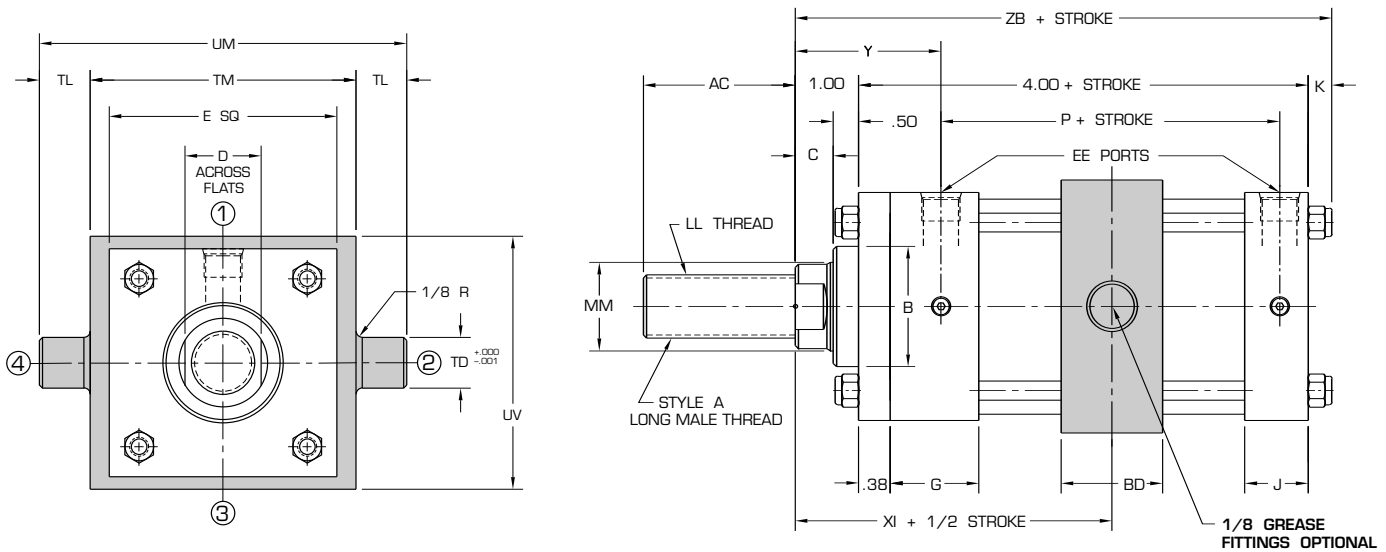
BORE SIZE	MM ROD DIA	LL THREAD	AC	B	BF	C	D	VA	VB	WF	Y	ZF
				+ .000								
				- .002								
1.50	1.00	7/8-14	1.88	1.499	-	0.50	0.88	-	-	-	2.25	5.38
2.00	1.00	7/8-14	1.88	1.499	2.47	0.50	0.88	0.25	0.88	1.38	2.25	5.38
2.50	1.00	7/8-14	1.88	1.499	2.47	0.50	0.88	0.25	0.88	1.38	2.25	5.50
3.25	1.38	1-1/4-12	2.50	1.999	2.97	0.63	1.13	0.25	1.00	1.63	2.63	6.50
4.00	1.75	1-1/2-12	3.00	2.374	3.74	0.75	1.50	0.25	1.13	1.88	2.88	6.75
5.00	1.75	1-1/2-12	3.00	2.374	3.74	0.75	1.50	0.25	1.13	1.88	2.88	7.00
6.00	2.00	1-3/4-12	3.50	2.624	4.31	0.88	1.69	0.25	1.13	2.00	3.13	7.75

NOTE: 1.50 & 2.00 BORE WITH 1.00 ROD DIA - NON-ADJUSTABLE CUSHIONS HEAD END ONLY

NOTE: CUSHION SUPPLIED AT POSITION# 2 AS STANDARD UNLESS OTHERWISE SPECIFIED

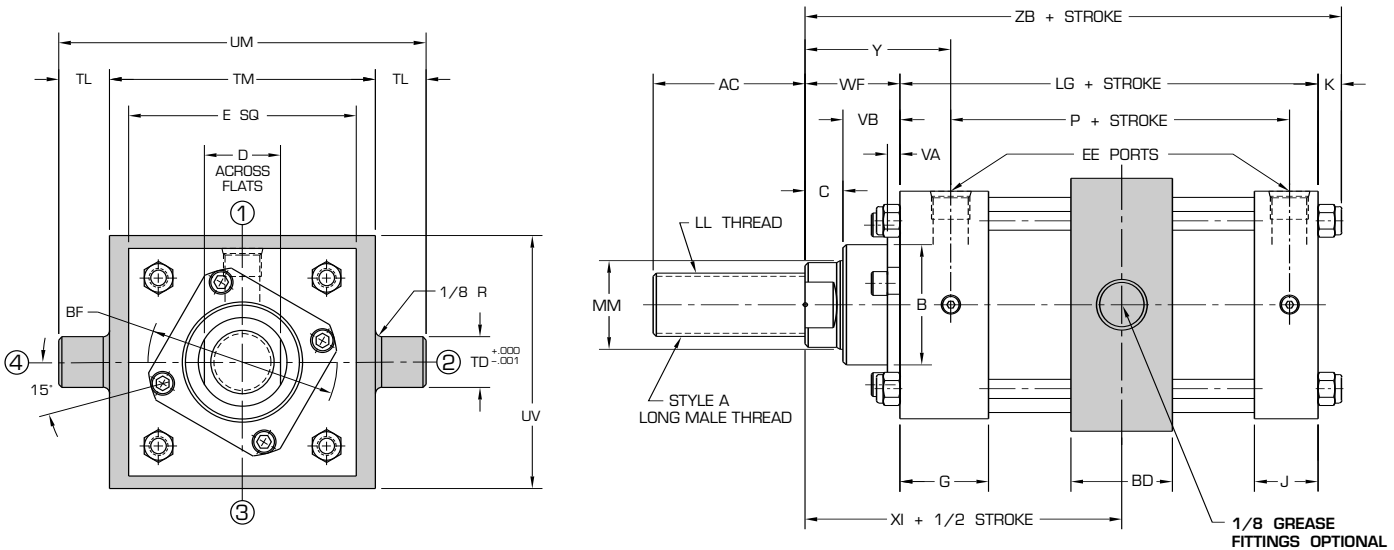
FOR ORDERING CODE SEE PAGE# 1

1.50" BORE



TRUNNION WILL BE POSITIONED AT XI + 1/2 STROKE UNLESS OTHERWISE SPECIFIED BY THE CUSTOMER

2.00" THRU 12.00" BORE



TRUNNION WILL BE POSITIONED AT XI + 1/2 STROKE UNLESS OTHERWISE SPECIFIED BY THE CUSTOMER

ENVELOPE MOUNTING DIMENSIONS

BORE SIZE	BD	E	EE (SAE)	EE (NPT)	G	J	K	LG	P	TD	TL	TM	UM	UV	MIN STROKE
			OPTIONAL	STANDARD											
1.50	1.25	2.00	(#6) 9/16-18	3/8	1.50	1.00	0.33	3.63	2.31	1.000	1.00	2.50	4.50	2.50	6.00
2.00	1.50	2.50	(#6) 9/16-18	3/8	1.50	1.00	0.36	3.63	2.31	1.000	1.00	3.00	5.00	3.00	2.00
2.50	1.50	3.00	(#6) 9/16-18	3/8	1.50	1.00	0.36	3.75	2.44	1.000	1.00	3.50	5.50	3.50	2.00
3.25	2.00	3.75	(#10) 7/8-14	1/2	1.75	1.25	0.47	4.25	2.69	1.000	1.00	4.50	6.50	4.25	4.00
4.00	2.00	4.50	(#10) 7/8-14	1/2	1.75	1.25	0.47	4.25	2.69	1.000	1.00	5.25	7.25	5.00	4.00
5.00	2.00	5.50	(#10) 7/8-14	1/2	1.75	1.25	0.61	4.50	2.94	1.000	1.00	6.25	8.25	6.00	6.00
6.00	2.50	6.50	(#12) 1-1/16-12	3/4	2.00	1.50	0.61	5.00	3.19	1.380	1.38	7.63	10.38	7.00	2.00
8.00	2.50	8.50	(#12) 1-1/16-12	3/4	2.00	1.50	0.76	5.13	3.31	1.380	1.38	9.75	12.50	9.50	6.00
10.00	3.00	10.63	(#16) 1-5/16-12	1	2.25	2.00	0.89	6.38	4.19	1.750	1.75	12.00	15.50	11.75	6.00
12.00	3.00	12.75	(#16) 1-5/16-12	1	2.25	2.00	0.89	6.88	4.69	1.750	1.75	14.00	17.50	13.75	6.00

ROD END DIMENSIONS

MOUNT DIMENSIONS

BORE SIZE	MM ROD DIA	LL THREAD	AC	B	BF	C	D	VA	VB	WF	XI	Y	ZB
				+ .000 - .002									
1.50	1.00	7/8-14	1.88	1.499	-	0.50	0.88	-	-	-	3.44	2.25	5.33
2.00	1.00	7/8-14	1.88	1.499	2.47	0.50	0.88	0.25	0.88	1.38	3.44	2.25	5.35
2.50	1.00	7/8-14	1.88	1.499	2.47	0.50	0.88	0.25	0.88	1.38	3.50	2.25	5.48
3.25	1.38	1-1/4-12	2.50	1.999	2.97	0.63	1.13	0.25	1.00	1.63	4.00	2.63	6.34
4.00	1.75	1-1/2-12	3.00	2.374	3.74	0.75	1.50	0.25	1.13	1.88	4.25	2.88	6.59
5.00	1.75	1-1/2-12	3.00	2.374	3.74	0.75	1.50	0.25	1.13	1.88	4.38	2.88	6.98
6.00	2.00	1-3/4-12	3.50	2.624	4.31	0.88	1.69	0.25	1.13	2.00	4.75	3.13	7.61
8.00	2.50	2-1/4-12	4.50	3.124	4.31	1.00	2.06	0.25	1.25	2.25	5.06	3.38	8.14
10.00	2.50	2-1/4-12	4.50	3.124	4.31	1.00	2.06	0.25	1.25	2.25	5.56	3.44	9.52
12.00	2.50	2-1/4-12	4.50	3.124	4.31	1.00	2.06	0.25	1.25	2.25	5.81	3.44	10.02

NOTE: 1.50 & 2.00 BORE WITH 1.00 ROD DIA - NON-ADJUSTABLE CUSHIONS HEAD END ONLY

NOTE: CUSHION SUPPLIED AT POSITION# 2 AS STANDARD UNLESS OTHERWISE SPECIFIED

FOR ORDERING CODE SEE PAGE# 1



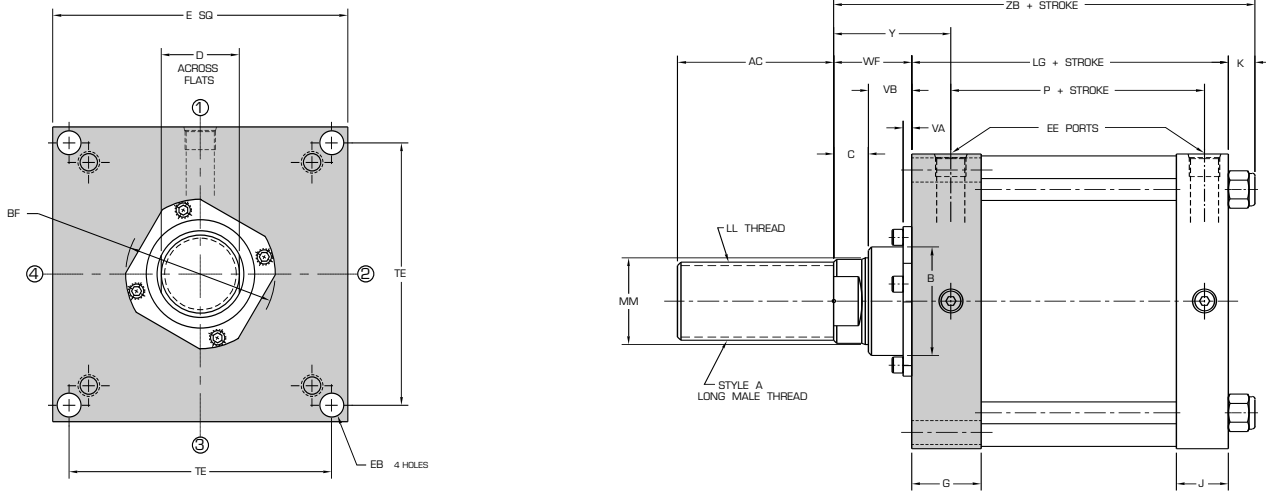
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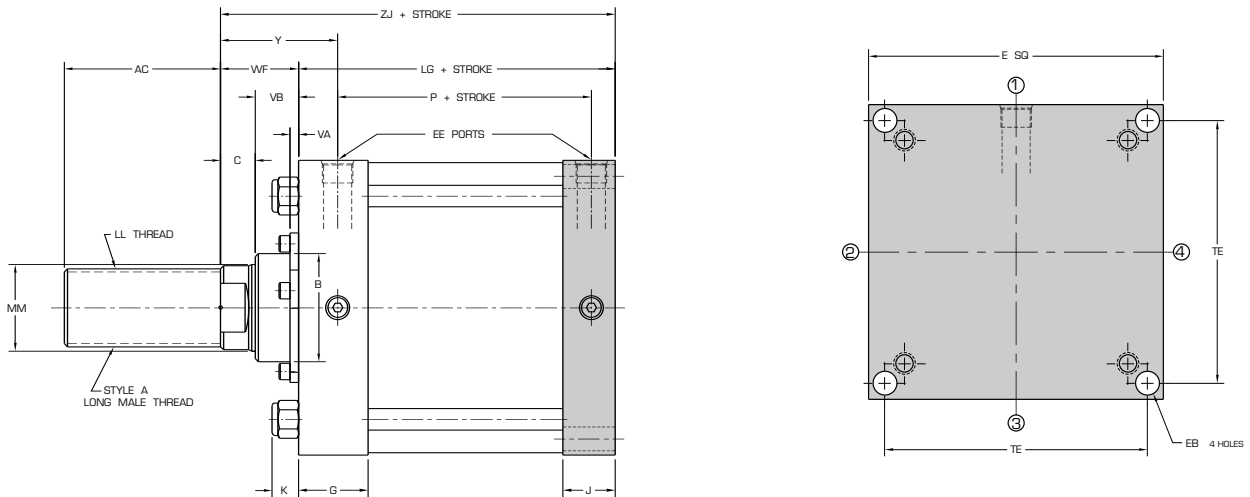
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8.00" THRU 12.00" BORE



8.00" THRU 12.00" BORE



ENVELOPE MOUNTING DIMENSIONS

BORE SIZE	E	EB		EE (SAE) OPTIONAL	EE (NPT) STANDARD	G	J	K	LG	P	TE
		(DIA)	(BOLT)								
8.00	8.50	0.69	5/8	(#12) 1-1/16-12	3/4	2.00	1.50	0.76	5.13	3.31	7.57
10.00	10.63	0.81	3/4	(#16) 1-5/16-12	1	2.25	2.00	0.89	6.38	4.19	9.40
12.00	12.75	0.81	3/4	(#16) 1-5/16-12	1	2.25	2.00	0.89	6.88	4.69	11.10

ROD END DIMENSIONS

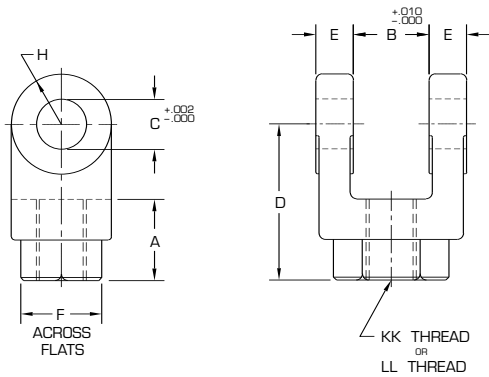
MOUNT DIMENSIONS

BORE SIZE	MM ROD DIA	LL THREAD	AC	B	BF	C	D	VA	VB	WF	Y	ZB	ZJ
				+ .000									
				- .002									
8.00	2.50	2-1/4-12	4.50	3.124	4.31	1.00	2.06	0.25	1.25	2.25	3.38	7.92	7.38
10.00	2.50	2-1/4-12	4.50	3.124	4.31	1.00	2.06	0.25	1.25	2.25	3.44	9.26	8.63
12.00	2.50	2-1/4-12	4.50	3.124	4.31	1.00	2.06	0.25	1.25	2.25	3.44	9.76	9.13

NOTE: CUSHION SUPPLIED AT POSITION# 2 AS STANDARD UNLESS OTHERWISE SPECIFIED
 FOR ORDERING CODE SEE PAGE# 1

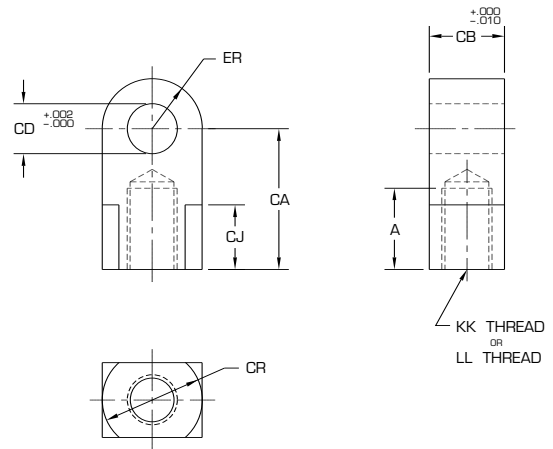
FEMALE ROD CLEVIS

NOTE: PIN MUST BE ORDERED SEPARATELY



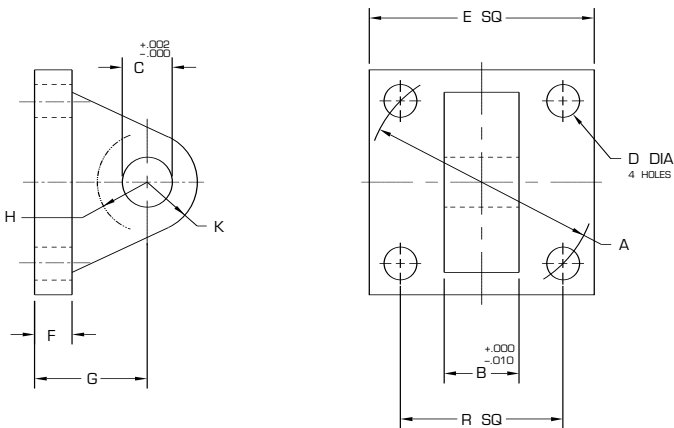
FEMALE ROD EYE

NOTE: PIN MUST BE ORDERED SEPARATELY

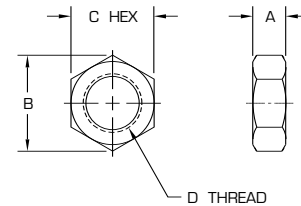


EYE BRACKET

NOTE: PIN MUST BE ORDERED SEPARATELY

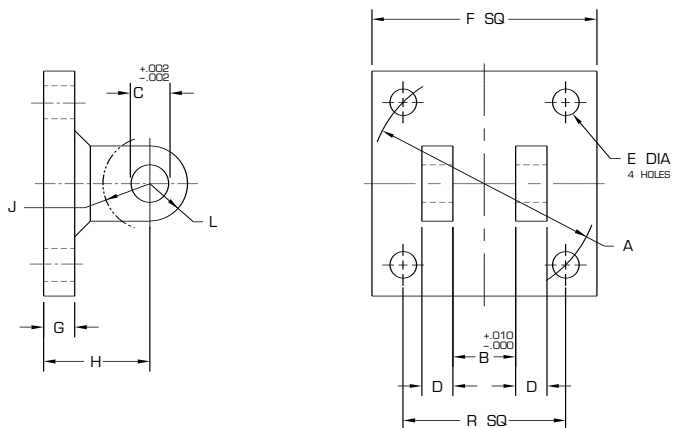


JAM NUT

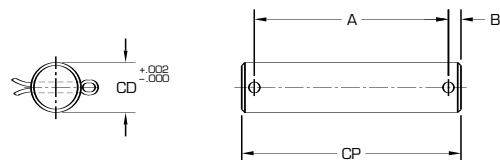


CLEVIS BRACKET

NOTE: PIN MUST BE ORDERED SEPARATELY



PIVOT PIN



FEMALE ROD CLEVIS

NC9 PART NO.	KK THREAD	WGB PART NO.	A	B	C	D	E	F	H	NC9 PART NO.	LL THREAD	WGB PART NO.
NC9-3401	7/16-20	BDC-05	0.75	0.75	0.50	1.50	0.50	0.69	0.50	NC9-3401A	1/2-20	BDC-06-S
NC9-3402	3/4-16	BDC-07	1.13	1.25	0.75	2.38	0.63	1.25	0.75	NC9-3402A	7/8-14	BDC-07-7/8
NC9-3403	1-14	BDC-10	1.63	1.50	1.00	3.13	0.75	1.63	1.00	NC9-3403A	1-1/4-12	BDC-10-M
NC9-3404	1-1/4-12	BDC-13	2.00	2.00	1.38	4.13	1.00	2.00	1.25	NC9-3404A	1-1/2-12	BDC-18-S
NC9-3405	1-1/2-12	BDC-17	2.25	2.50	1.75	4.50	1.25	2.38	1.75	NC9-3405A	1-3/4-12	BDC-19-S
NC9-3406	1-7/8-12	BDC-20	3.00	2.50	2.00	5.50	1.25	2.94	2.00	NC9-3406A	2-1/4-12	BDC-50-S
-	2-1/4-12	BDC-25	3.50	3.00	2.50	6.50	1.50	3.50	2.50	-	-	-

FEMALE ROD EYE

NC9 PART NO.	KK THREAD	WGB PART NO.	A	CA	CB	CD	CJ	CR	ER	NC9 PART NO.	LL THREAD	WGB PART NO.
NC9-3304	7/16-20	BDE-05	0.75	1.50	0.75	0.50	0.69	1.00	0.50	NC9-3304A	1/2-20	BDE-06-S
NC9-3305	3/4-16	BDE-07	1.13	2.06	1.25	0.75	0.75	1.50	0.75	NC9-3305A	7/8-14	BDE-08-S
NC9-3306	1-14	BDE-10	1.63	2.81	1.50	1.00	-	-	1.00	NC9-3306A	1-1/4-12	BDE-15-S
NC9-3307	1-1/4-12	BDE-13	2.00	3.44	2.00	1.38	-	-	1.38	NC9-3307A	1-1/2-12	BDE-18-S
NC9-3308	1-1/2-12	BDE-17	2.25	4.00	2.50	1.75	-	-	1.75	NC9-3308A	1-3/4-12	BDE-19-S
NC9-3309	1-7/8-12	BDE-20	3.00	5.00	2.50	2.00	-	-	2.00	NC9-3309A	2-1/4-12	BDE-50-S
-	2-1/4-12	BDE-25	3.50	5.81	3.00	2.50	-	-	2.81	-	-	-

JAM NUT

NC9 PART NO.	WGB PART NO.	A	CA	CB	CD
NC9-3506	1/4-28-JN	0.75	0.50	0.44	1/4-28
NC9-3502	5/16-24-JN	1.63	0.63	0.56	5/16-24
NC9-3503	3/8-24-JN	0.33	0.77	0.69	3/8-24
-	7/16-20-JN	0.25	0.79	0.69	7/16-20
NC9-3504	1/2-20-JN	0.31	0.97	0.88	1/2-20
NC9-3505	5/8-18-JN	0.38	1.17	1.06	5/8-18
-	3/4-16-JN	0.42	1.25	1.13	3/4-16
-	7/8-14-JN	0.48	1.47	1.31	7/8-14
-	1-14-JN	0.55	1.69	1.50	1-14
-	1-1/4-12-JN	0.72	2.13	1.88	1-1/4-12
-	1-1/2-12-JN	0.84	2.53	2.25	1-1/2-12
-	1-3/4-12-JN	0.97	2.94	2.63	1-3/4-12
-	1-7/8-12-JN	1.03	3.31	2.94	1-7/8-12
-	2-12-JN	1.13	3.63	3.13	2-12
-	2-1/4-12-JN	1.13	3.63	3.13	2-1/4-12

PIVOT PIN

NC9 PART NO.	WGB PART NO.	A	B	CD	CP
NC9-3301	BDP-05H	1.91	0.11	0.50	2.16
NC9-3302	BDP-07H	2.66	0.11	0.75	2.91
NC9-3303	BDP-10H	3.16	0.11	1.00	3.41
-	BDP-13H	4.25	0.20	1.38	4.66
-	BDP-17H	5.25	0.20	1.75	5.66
-	BDP-20H	5.28	0.22	2.00	5.72
-	BDP-25H	6.31	0.23	2.50	6.78

EYE BRACKET

NC9 PART NO.	WGB PART NO.	A	B	C	D	E	F	G	H	K	R
NC9-3201	BDEB-05	2.30	0.75	0.50	0.41	2.50	0.38	1.13	0.66	0.56	1.63
NC9-3202	BDEB-07	3.60	1.25	0.75	0.53	3.50	0.63	1.88	1.13	0.88	2.56
NC9-3203	BDEB-10	4.60	1.50	1.00	0.66	4.50	0.75	2.25	1.06	1.25	3.25
-	BDEB-13	5.40	2.00	1.38	0.66	5.00	0.88	3.00	1.63	1.63	3.81
-	BDEB-17	7.00	2.50	1.75	0.94	6.50	0.88	3.13	1.88	2.13	4.95
-	BDEB-20	8.10	2.50	2.00	1.06	7.50	1.00	3.50	2.13	2.44	5.75
-	BDEB-25	10.60	3.00	2.50	1.19	8.50	1.00	4.00	3.00	3.00	6.59

CLEVIS BRACKET

NC9 PART NO.	WGB PART NO.	A	B	C	D	E	F	G	H	J	L	R
NC9-3204	DCB-050	2.90	0.75	0.50	0.50	0.41	3.00	0.38	1.13	0.56	0.50	2.05
NC9-3205	DCB-075	4.60	1.25	0.75	0.63	0.53	4.50	0.63	1.88	0.94	0.75	3.25
NC9-3206	DCB-100	5.40	1.50	1.00	0.75	0.66	5.00	0.75	2.25	1.19	1.00	3.82
-	DCB-138	7.00	2.00	1.38	1.00	0.84	6.50	0.75	2.88	1.88	1.38	4.95
-	DCB175	8.10	2.50	1.75	1.25	0.84	7.50	0.75	3.00	2.00	1.75	5.73



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PUSH FORCE AND DISPLACEMENT

CYLINDER BORE SIZE (INCHES)	PISTON AREA (SQ. IN.)	CYLINDER PUSH STROKE FORCE IN POUNDS AT VARIOUS PRESSURES										DISPLACEMENT PER INCH OF PUSH STROKE	
		25	50	65	80	100	250	500	1000	2000	3000	GALLONS	CUBIC FT.
1.50	1.77	44	88	115	142	177	443	885	1770	3540	5310	0.0077	0.0010
2.00	3.14	79	157	204	251	314	785	1570	3140	6280	9420	0.0136	0.0018
2.50	4.91	123	245	319	393	491	1228	2455	4910	9820	14730	0.0213	0.0028
3.25	8.30	208	415	540	664	830	2075	4150	8300	16600	24900	0.0359	0.0048
4.00	12.57	314	628	817	1006	1257	3143	6285	12570	25140	37710	0.0544	0.0073
5.00	19.64	491	982	1277	1571	1964	4910	9820	19640	39280	58920	0.0850	0.0114
6.00	28.27	707	1414	1838	2262	2827	7068	14135	28270	56540	84810	0.1224	0.0164
8.00	50.27	1257	2513	3268	4022	5027	12568	25135	50270	100540	150810	0.2176	0.0291
10.00	78.54	1964	3927	5105	6283	7854	19635	39270	78540	157080	235620	0.3400	0.0455
12.00	113.10	2828	5655	7352	9048	11310	28275	56550	113100	226200	339300	0.4896	0.0655

DEDUCTIONS FOR PULL FORCE AND DISPLACEMENT

PISTON ROD DIA (INCHES)	PISTON ROD AREA (SQ. IN.)	PISTON ROD DIAMETER FORCE IN POUNDS AT VARIOUS PRESSURES TO DETERMINE CYLINDER PULL FORCE DISPLACEMENT, DEDUCT THE FOLLOWING FORCE OR DISPLACEMENT CORRESPONDING TO ROD SIZE, FROM SELECTED PUSH STROKE FORCE OR DISPLACEMENT CORRESPONDING TO BORE SIZE IN TABLE ABOVE										DISPLACEMENT PER INCH OF PUSH STROKE	
		25	50	65	80	100	250	500	1000	2000	3000	GALLONS	CUBIC FT.
0.63	0.31	8	15	20	25	31	77	154	307	614	921	0.0013	0.0002
1.00	0.79	20	39	51	65	79	196	392	785	1570	2355	0.0034	0.0005
1.38	1.49	37	75	97	119	149	373	745	1490	2980	4470	0.0067	0.0009
1.75	2.41	60	121	157	193	241	603	1205	2410	4820	7230	0.0104	0.0014
2.00	3.14	79	157	204	251	314	785	1570	3140	6280	9420	0.0136	0.0019
2.50	4.91	123	245	319	393	491	1228	2455	4910	9820	14730	0.0213	0.0028
3.00	7.07	177	354	460	566	707	1767	3535	7070	14140	21210	0.0306	0.0041

GENERAL FORMULA

THE CYLINDER OUTPUT FORCES ARE DERIVED FROM THE FORMULA:

$$F = P \times A$$

WHERE: **F** = FORCE IN POUNDS

P = PRESSURE AT THE CYLINDER IN POUNDS PER SQUARE INCH, GAUGE

A = EFFECTIVE AREA OF CYLINDER PISTON IN SQ. INCHES

NC9 CYLINDER WEIGHT CHART

BORE SIZE	STANDARD ROD DIA	BASE WEIGHT (ZERO STROKE) IN LBS.	ADD PER INCH OF STROKE IN LBS.
1.50	1.00	4.8	0.5
2.00	1.00	7.3	0.6
2.50	1.00	10.0	0.7
3.25	1.38	18.0	1.0
4.00	1.75	31.0	1.5
5.00	1.75	46.0	1.6
6.00	2.00	72.0	2.0
8.00	2.50	105.0	3.0
10.00	2.50	200.0	3.5
12.00	2.50	295.0	4.0

NOTE: CYLINDER WEIGHTS ARE APPROXIMATE TO WITHIN +/- 10% FOR ALL MOUNTS

NC9 CYLINDER TORQUE CHARTS

BORE SIZE	BRG PLATE SHCS	TORQUE (FT. LBS.)	TIE ROD NUT	TORQUE (FT. LBS.)
1.50	-	-	1/4-28	9
2.00	10-32	6	5/16-24	15
2.50	10-32	6	5/16-24	15
3.25	1/4-28	9	3/8-24	32
4.00	5/16-24	24	3/8-24	32
5.00	5/16-24	24	1/2-20	60
6.00	5/16-24	24	1/2-20	60
8.00	5/16-24	24	5/8-18	110
10.00	5/16-24	24	3/4-16	185
12.00	5/16-24	24	3/4-16	185



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