

Technical features

Medium:

Filtered, lubricated or non-lubricated, compressed air

Operating pressure

200 psig (13.6 Bar) Max.

Temperature range:

Standard Nitrile seals:

-40°F to 200°F (-40°C to 93°C)

150°F max. with Bumper Option

High Temp seals:

-20°F to 400°F (-29°C to 205°C)

*With dew point of supply air less than air temperature below 35°F (2°C).

Lubrication:

All F-Series Plus cylinders are prelubricated at the time of assembly with a PTFE based grease, for non-lube service and long life.

Side loading:

Cylinders are specifically designed to push and pull. Side loading and misalignment of the piston rod should be avoided to ensure maximum operating performance and life.

Materials:

Cylinder Body:

304 Stainless Steel

Head and Cap:

Clear Anodised Aluminum Alloy

Piston Rod:

303 Stainless Steel

Rod Bearing:

Oil Impregnated Bronze

Piston:

Aluminum Alloy

Rod & Piston seals:

Nitrile



Options selector

FP 106 x 2.375 - PTM - PS

Series	Substitute
Single Rod end	FP
Double Rod end	FPD
Spring Extend	FPC
Spring Retract	FPR
Bore	Substitute
9/16"	056
3/4"	075
1-1/16"	106
1-1/2"	150
2"	200
2-1/2"	250
3"	300
Stroke	Substitute
Increments of 1/8"	
Mounting Options	Substitute
*Screw Clearance Holes Front	SCF
*Screw Clearance Holes Rear	SCR
*Screw Clearance Holes Both ends	SCB
Basic Model	BAM
(std. c'bored mtg. holes)	
**Front Trunnion	TMF
**Rear Trunnion	TMR
**Trunnion both ends	TMB
Pivot Mount	PTM
Threaded mounting holes Front	THF
Threaded mounting holes Rear	THC
Threaded mounting holes Both ends	THB
***Nose Mount	NMT

* Screw clearance to allow bolt head to pass through - no counter bores

** Not available on 9/16" bore

*** Available in FP, FPC, and FPR. Includes a heavy duty end cap and rod wiper.

Options	Substitute
Bumper both ends (not avail. with HT) ¹	UB
Bumper Head (not avail. with HT) ¹	UH
Bumper Cap (not avail. with HT) ¹	UC
Non-Standard Female Thread**	FT()
Heavy Duty Rear End Cap ²	HD
Alternate Port Location	PL()
Low Friction Seals ²	LF
Magnetic Piston ²	PS
Switch Rail and Position (switches ordered separately)	M1,M2, M3,M4
No Rod Thread	PR
Non-Standard Male Thread	TM()
Thread Extension over standard (specify additional length) ³	TX()
Rod Extension over standard (specify additional length) ³	RX()
Stainless Steel Fasteners (125 PSI Max)	SF
High Temperature Seals ⁴	**HT
Rod Wiper	RW

¹ Stroke is reduced by .03" per bumper. Bumpers are rated to 150°F

² Overall length of cylinder may increase with this option.

³ Consult factory for negative thread or rod extensions.

⁴ Not available in single or reverse acting models.

Quality and durability in a compact, high performance cylinder!

The **Norgren F-Series Plus** offers a compact design using the highest quality components for dependable service and long life. All components of the F-Series Plus cylinder have been specifically selected to provide optimum reliability and performance.



1 Head/Cap: Aluminum alloy, clear anodised for corrosion resistance.

2 Seals: Nitrile, o-ring seals throughout

3 Piston: Aluminum alloy piston is lightweight, yet strong with excellent wear characteristics.

4 Tube: 304 Stainless steel tube, polished and buffed I.D.

5 Rod Bearing: Oil impregnated, bronze bearing, for long cylinder life and non-lube service.

6 Piston Rod: 303 Stainless steel, chrome plated for smooth finish and long seal life.

Bore	Code	Force Factor (Area)	
		Extend	Retract
9/16"	(056)	0.25	0.20
3/4"	(075)	0.44	0.36
1-1/16"	(106)	0.89	0.69
1-1/2"	(150)	1.77	1.46
2"	(200)	3.14	2.70
2-1/2"	(250)	4.91	4.47
3"	(300)	7.07	6.47

Force Output Formula

Cylinder Output Force = Force Factor (area) x Air Line Pressure (psi)

Ex: 1-1/16 bore cylinder operating at 80 psi:

Force exerted on the extend: 0.89 x 80 = 71.2 lbs.

Force exerted on the retract: 0.69 x 80 = 55.2 lbs.

Approximate Cylinder Weights (lbs.)

Bore	Code	FP		FPD		FPR, FPC		Nose Mount Option Adder to Base Weight
		Base	Adder per 1/8" stroke	Base	Adder per 1/8" stroke	Base	Adder per 1/8" stroke	
9/16"	(056)	0.075	0.005	0.081	0.009	0.094	0.005	0.006
3/4"	(075)	0.119	0.006	0.131	0.013	0.138	0.006	0.013
1-1/16"	(106)	0.306	0.019	0.363	0.025	0.331	0.019	0.069
1-1/2"	(150)	0.600	0.025	0.700	0.038	0.669	0.025	0.113
2"	(200)	0.813	0.031	0.950	0.044	0.894	0.031	0.169
2-1/2"	(250)	1.400	0.038	1.750	0.050	1.581	0.038	0.194
3"	(300)	1.806	0.050	2.375	0.069	2.050	0.050	0.219

Spring Forces

Bore	Code	Maximum Force (lbs.)	0.12 to 1" Stroke (lb/in)	Spring Rates		
				1.001 to 2" Stroke (lb/in)	2.001 to 3" Stroke (lb/in)	3.001 to 4" Stroke (lb/in)
9/16"	(056)	5.25	4.25	1.75	1.24	0.88
3/4"	(075)	10.00	6.00	2.50	1.76	1.25
1-1/16"	(106)	11.50	6.00	2.50	1.76	1.25
1-1/2"	(150)	13.00	5.50	2.25	1.60	1.13
2"	(200)	13.00	5.50	2.25	1.60	1.13
2-1/2"	(250)	25.00	6.50	2.75	1.93	1.38
3"	(300)	25.00	6.50	2.75	1.93	1.38

Overall length adders for options

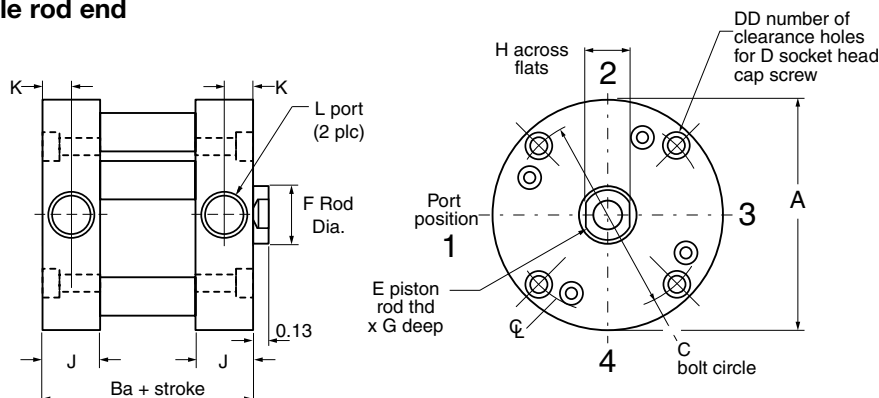
Bore	Code	Length Adder (Add to standard cataloged length)			FPR	FPC
		LF* (Low Friction Seals)	HD** (Heavy Duty Cap)	PS (Magnetic Piston) FP, FPD		
9/16"	(056)	0.25	0.13	0.88	0.63	0.38
3/4"	(075)	0.25	0.13	0.88	0.88	0.88
1-1/16"	(106)	0.38	0.19	0.88	0.88	0.88
1-1/2"	(150)	0.38	0.19	0.88	0.88	0.88
2"	(200)	0.38	0.19	0.88	0.88	0.88
2-1/2"	(250)	0.38	0.25	0.88	0.88	0.88
3"	(300)	0.50	0.25	0.88	0.88	0.88

*For Low Friction Seals used in combination with a magnetic piston, use the PS length adder only.

**For Heavy Duty End Cap used in combination with a magnetic piston, use both HD and PS length adders.

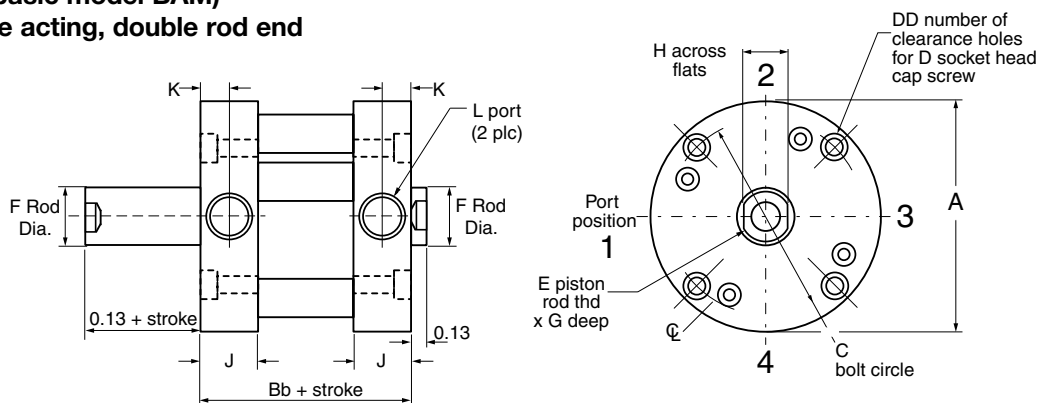
FP (basic model BAM)

Double acting, single rod end



FPD (basic model BAM)

Double acting, double rod end



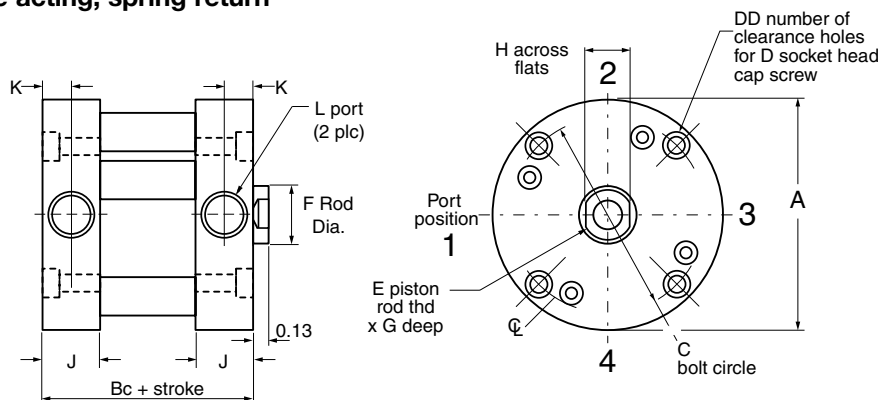
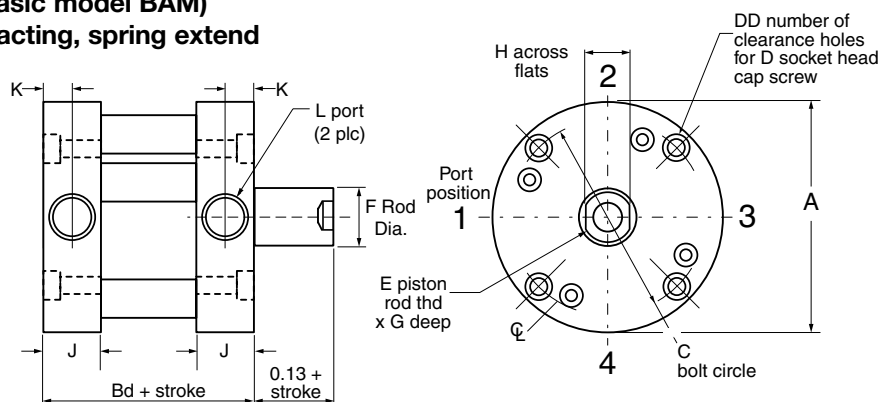
FP - Double acting, single rod end

FPD - Double acting, double rod end

Bore	Code	A	Ba* (FP)	Bb* (FPD)	C	DD	D	E Thread	G depth	F	H	J	K	L
9/16"	(056)	1.12	0.56	0.69	0.88	2	#4	8-32 UNC	.46	.25	.22	.34	.14	10-32 UNF
3/4"	(075)	1.50	0.56	0.69	1.22	4	#6	10-32 UNC	.46	.31	.25	.34	.14	10-32 UNF
1-1/16"	(106)	2.00	0.88	0.94	1.69	4	#6	5/16-24 UNF	.70	.50	.44	.50	.25	1/8 NPT
1-1/2"	(150)	2.62	0.88	1.00	2.19	4	#10	3/8-24 UNF	.70	.63	.50	.50	.25	1/8 NPT
2"	(200)	3.12	0.95	1.06	2.69	4	#10	1/2-20 UNF	.70	.75	.63	.53	.25	1/8 NPT
2-1/2"	(250)	3.75	1.19	1.31	3.25	4	1/4	1/2-20 UNF	.70	.75	.63	.66	.33	1/4 NPT
3"	(300)	4.25	1.25	1.38	3.78	4	1/4	5/8-18 UNF	.73	.88	.75	.69	.33	1/4 NPT

* Length may increase with certain option combinations.

Dimensions in inches

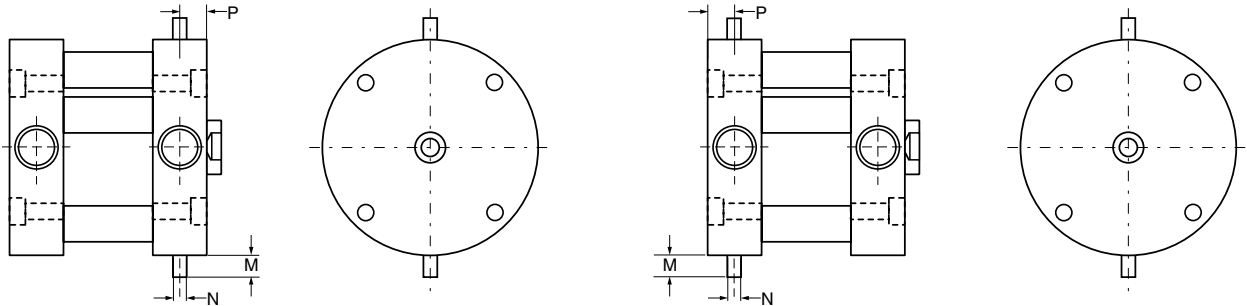
FPR (basic model BAM)
 Single acting, spring return

FPC (basic model BAM)
 Single acting, spring extend

FPR - Single acting, spring return
FPC - Single acting, spring extend

Bore	Code	A	Bc* (FPR)				Bd* (FPC)				C	DD	D	E	G	F	H	J	K	L
			0-1"	1.001-2"	2.001-3"	3.001-4"	0-1"	1.001-2"	2.001-3"	3.001-4"										
Stk.	Stk.	Stk.	Stk.	Stk.	Stk.	Stk.	Stk.	Stk.	Stk.	Stk.				thread	depth					
9/16"	(056)	1.12	0.81	1.38	1.96	2.52	1.06	1.62	2.14	2.70	0.88	2	#4	8-32 UNC	.46	.25	.22	.34	.14	10-32 UNF
3/4"	(075)	1.50	0.81	1.38	1.94	2.50	1.06	1.62	2.19	2.75	1.22	4	#6	10-32 UNC	.46	.31	.25	.34	.14	10-32 UNF
1-1/16"	(106)	2.00	0.88	1.50	2.13	2.75	1.38	2.00	2.63	3.25	1.69	4	#6	5/16-24 UNF	.70	.50	.44	.50	.25	1/8 NPT
1-1/2"	(150)	2.62	0.88	1.50	2.13	2.75	1.38	2.00	2.63	3.25	2.19	4	#10	3/8-24 UNF	.70	.63	.50	.50	.25	1/8 NPT
2"	(200)	3.12	0.94	1.56	2.19	2.81	1.44	2.06	2.69	N/A	2.69	4	#10	1/2-20 UNF	.70	.75	.63	.53	.25	1/8 NPT
2-1/2"	(250)	3.75	1.19	2.06	2.94	3.81	1.94	2.81	2.81	N/A	3.25	4	1/4	1/2-20 UNF	.70	.75	.63	.66	.33	1/4 NPT
3"	(300)	4.25	1.25	2.12	3.00	3.88	2.00	2.88	2.88	N/A	3.78	4	1/4	5/8-18 UNF	.73	.88	.75	.69	.33	1/4 NPT

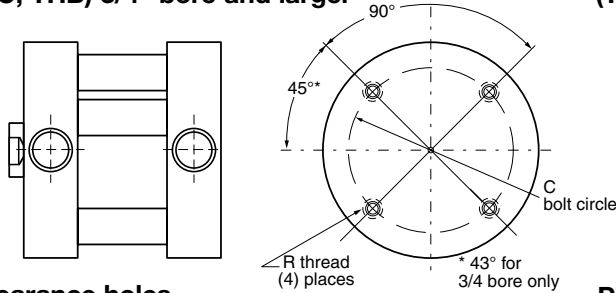
* Length may increase with certain option combinations.

Dimensions in inches

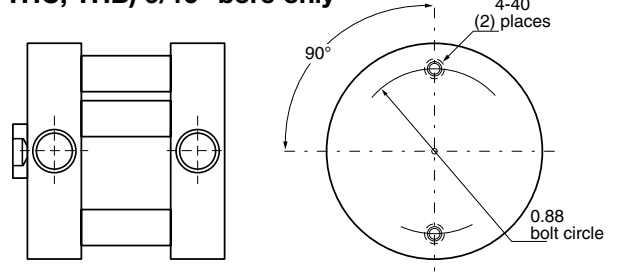
Tunnion mount (TMF, TMR, TMB)



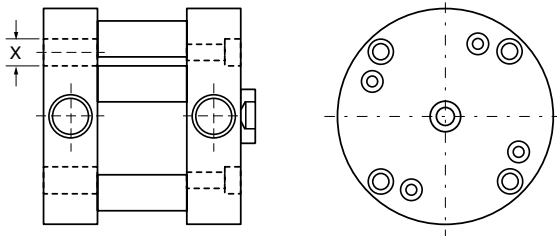
**Threaded mounting holes
(THF, THC, THB) 3/4" bore and larger**



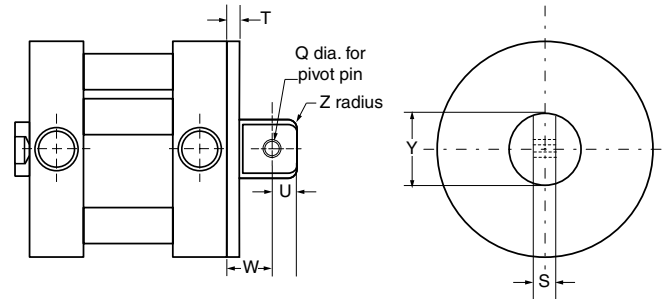
**Threaded mounting holes
(THF, THC, THB) 9/16" bore only**



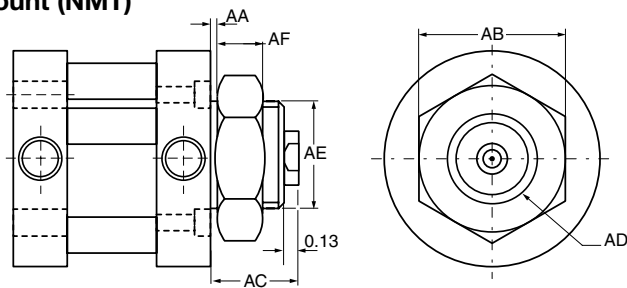
**Screw clearance holes
(SCF, SCR, SCB)**



Pivot mount (PTM)



Nose mount (NMT)



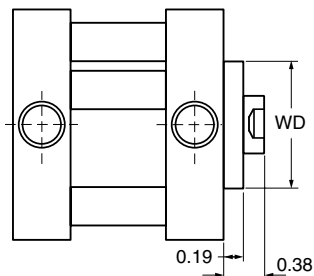
Nose Mount Maximum Torque Recommendation

Bore	Code	Maximum Torque (ft.-lb.)
9/16"	(056)	12
3/4"	(075)	28
1-1/16"	(106)	100
1-1/2"	(150)	120
2"	(200)	130
2-1/2"	(250)	130
3"	(300)	130

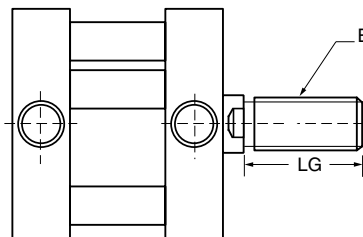
Mounting Dimensions (in)

Bore	Code	AA	AB	AC	AD	AE	AF	C	M	N	P	Q	R	S	T	U	W	X	Y	Z
9/16"	(056)	0.06	0.75 Hex	0.38	1/2-20 UNF-2A	0.50	0.31	0.88	N/A	N/A	N/A	0.19	#4-40 UNC	0.38	0.19	0.25	0.75	0.17	0.63	0.19
3/4"	(075)	0.06	0.75 Hex	0.38	5/8-18 UNF-2A	0.62	0.25	1.22	0.31	0.12	0.17	0.19	#6-32 UNC	0.38	0.19	0.25	0.75	0.23	0.75	0.19
1-1/16"	(106)	0.13	1.50 Hex	0.75	1-14 UNS-2A	1.00	0.55	1.69	0.50	0.25	0.25	0.19	#6-32 UNC	0.38	0.25	0.25	0.81	0.25	0.75	0.19
1-1/2"	(150)	0.13	1.88 Hex	0.75	1-1/4-12 UNF-2A	1.25	0.52	2.19	0.50	0.25	0.25	0.38	#10-24 UNC	0.75	0.25	0.44	1.19	0.34	1.38	0.38
2"	(200)	0.19	1.88 Hex	0.88	1-3/8-12 UNF-2A	1.38	0.52	2.69	0.50	0.25	0.25	0.38	#10-24 UNC	0.75	0.31	0.44	1.25	0.34	1.38	0.38
2-1/2"	(250)	0.25	1.88 Hex	1.00	1-3/8-12 UNF-2A	1.38	0.52	3.25	0.63	0.31	0.33	0.38	1/4-20 UNC	0.75	0.38	0.44	1.31	0.41	1.38	0.38
3"	(300)	0.25	1.88 Hex	1.00	1-3/8-12 UNF-2A	1.38	0.52	3.78	0.63	0.31	0.33	0.63	1/4-20 UNC	1.00	0.38	0.56	1.69	0.41	1.88	0.38

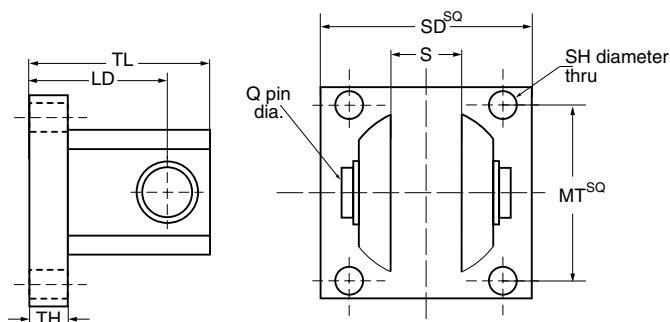
Dimensions in inches

Rod Wiper (RW)


Bore	Code	WD
9/16"	(056)	0.56
3/4"	(075)	0.69
1-1/16"	(106)	0.88
1-1/2"	(150)	1.00
2"	(200)	1.13
2-1/2"	(250)	1.13
3"	(300)	1.25

Male Rod End (TM(_))


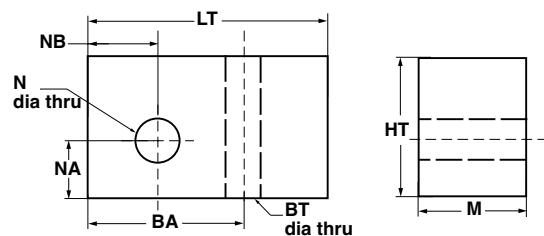
Bore	Code	E Fine	Course	LG
9/16"	(056)	#8-32 UNC	N/A	0.38
3/4"	(075)	#10-32 UNF	#10-24 UNC	0.38
1-1/16"	(106)	5/16-24 UNF	5/16-18 UNC	0.50
1-1/2"	(150)	3/8-24 UNF	3/8-16 UNC	0.50
2"	(200)	1/2-20 UNF	1/2-13 UNC	0.63
2-1/2"	(250)	1/2-20 UNF	1/2-13 UNC	0.63
3"	(300)	5/8-18 UNF	5/8-11 UNC	0.75

Clevis Bracket


Bore	Code	Part number	LD	MT	Q	S	SH	SD	TH	TL
9/16"	(056)									
3/4"	(075)	FCB-1	0.56	0.75	0.19	0.39	#6	1.00	0.16	0.78
1-1/16"	(106)									
1-1/2"	(150)									
2"	(200)	FCB-2	0.94	1.38	0.38	0.75	#10	1.75	0.22	1.34
2-1/2"	(250)									
3"	(300)	FCB-3	1.25	2.00	0.63	1.00	0.25	2.50	0.25	1.81

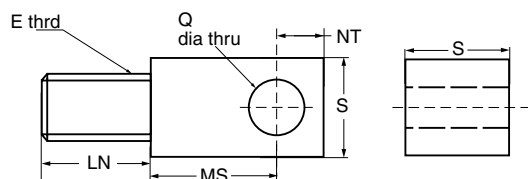
Dimensions in inches

Trunnion Block Mount



Bore	Code	Part number	BA	BT	HT	LT	M	N	NA	NB
3/4"	(075)	FTB-1	0.56	#10	0.63	1.12	0.31	0.13	0.30	0.22
1-1/16"	(106)									
1-1/2"	(150)	FTB-2	0.81	0.25	0.88	1.50	0.50	0.25	0.38	0.31
2"	(200)									
2-1/2"	(250)	FTB-3	0.94	0.31	1.00	1.63	0.63	0.31	0.45	0.38
3"	(300)									

Rod Clevis



Bore	Code	Part number	E	LN	MS	NT	Q	S
9/16"	(056)	FRE-1	#8-32 UNC	0.38	0.47	0.25	0.19	0.38
3/4"	(075)	FRE-2	#10-32 UNF	0.38	0.47	0.25	0.19	0.38
1-1/16"	(106)	FRE-a3	5/16-24 UNF	0.63	0.47	0.25	0.19	0.38
1-1/2"	(150)	FRE-4	3/8-24 UNF	0.63	0.75	0.44	0.38	0.75
2"	(200)	FRE-5	1/2-20 UNF	0.75	0.75	0.44	0.38	0.75
2-1/2"	(250)							
3"	(300)	FRE-6	5/8-18 UNF	0.88	1.00	0.63	0.63	1.00

Dimensions in inches