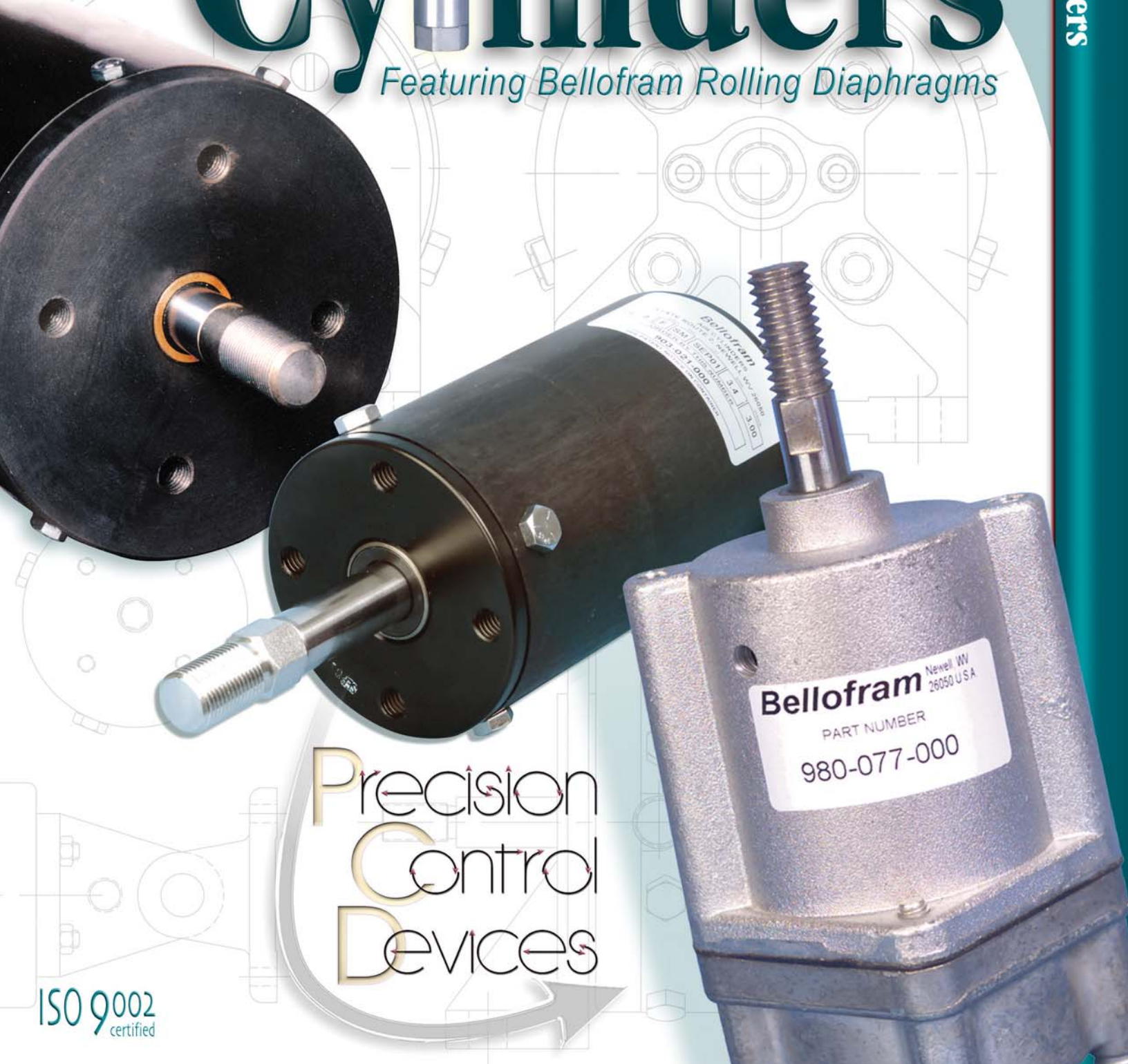


mB MARSH BELLOFRAM®

Diaphragm Cylinders

Featuring Bellofram Rolling Diaphragms

mB Diaphragm Cylinders



Precision
Control
Devices

ISO 9002
certified



FEATURES

- Low Start Up Pressure
- Low Breakaway Force
- Extremely Sensitive Response
- Very Smooth, "Non-Jarring" Action
- Wide Temperature Range
- Very Low Friction
- No Edge Seals To Replace
- No Blow-By Leakage
- Numerous Varieties
- Low Total Cost

DESCRIPTION

Diaphragm Air Cylinders are actuators made from elastomers, engineered metals and fabrics. They require no lubrication, are virtually frictionless, and economical. They can be used to provide lifting, clamping, pushing, coining, turning, and other linear force or actuation motions in many applications.

The development of the long stroke rolling diaphragm for dynamic sealing proved to be the solution for many applications requiring low friction, no lubrication, low leakage, wide temperature variations, and low total cost. The popularity of the rolling diaphragm as a sealing means led to many requests for a standard line of "off the shelf" diaphragm cylinders; single and double acting, short and long stroke with a wide selection of effective areas. To meet these requests, the long stroke rolling diaphragm cylinder was developed and Bellofram has supplied many thousands of them since their 1965 introduction.

STANDARD CYLINDERS

Standard Bellofram Air Cylinders are available in eight sizes. Each size is available in both a spring-return and a double-acting variety, with one or two stroke variations (Series E or F).

Four-inch and six-inch sizes have impact-extruded aluminum shells. Larger sizes have steel shells. Rods are ground, polished and hard-chrome plated steel. Bearings are sintered bronze, molybdenum disulphite impregnated. Other components are high strength materials with suitable corrosion resistant treatment.

- Bellofram engineers will help you define your specific needs.
- All Standard cylinders can be ordered with either no spring, or no bearing, as standard options.
- Standard cylinders can be ordered with one of six different mounting options.
- Specifications for Standard cylinders are shown in the table on the next page.

SUPER CYLINDERS

Bellofram Super Cylinders are standard spring-return cylinders equipped with linear ball bearings and hardened steel rods. This refinement allows an absolute minimum of friction for applications where maximum sensitivity is needed.

Super Cylinders are available only in spring-return varieties and in Series F stroke variations.

All mounting options offered on standard cylinders are also available on super cylinders.



APPLICATIONS

Diaphragm Air Cylinder applications are almost unlimited. They are replacing conventionally sealed cylinders and actuators where low cost and reliability are requirements. They can be used with vacuum and gaseous pressure systems. They are currently solving many unique problems, being used as:

- Expulsion Chambers
- Accumulators
- Pumps
- Reservoirs
- Shock Mounts
- Impact Absorbers
- Weld Drivers
- Tensioners
- Dancer Rolls
- Valve Actuation
- Louver Controls



SPECIFICATIONS

Plant Air	up to 145 psig (10 BAR)
Temperatures	-40° to 225° F (-40° to 107° C)
Extended Temperatures with special diaphragm materials	-75° to 400° F (-60° to 204° C)
Materials of Construction	Body: Sizes 4 to 6 are impact-extruded aluminum shell. Larger sizes are made from a steel shell. Diaphragm: Neoprene® elastomer reinforced with Flex-Weave Dacron® fabric Rods: Ground, polished and hard-chrome plated steel Bearings: Sintered bronze, molybdenum disulphite impregnated. Other components are high strength materials with suitable corrosion resistant treatment.
Testing	All cylinders are leak-tested prior to shipment. However, the cylinder is not a bubble tight assembly

OPERATING DATA

Size (Effective Area) Sq. In.	Equiv. Bore Diam. In.	Spring Return						Double Acting	
		Stroke +.03 -.12	Stroke +.03 -.12	Approx. Spring Force - Zero Stroke (lbs.)		Approx. Increase Force Per In. Of Stroke (lbs.)		Stroke +.03 -.12	Stroke +.03 -.12
		Series E	Series F					Series E	Series F
		In.	In.	Series E	Series F	Series E	Series F	In.	In.
4	2.3		1.80		6		3		1.3
6	2.8		2.40		9		4		1.9
9	3.4	2.20	3.00	17	12	4	4		2.5
12	3.9	2.30	3.60	18	18	6	6	1.8	3.1
16	4.5	2.62	4.20	24	24	8	8	2.1	3.7
24	5.5	2.60	5.24	36	36	11	11	2.0	4.6
30	6.3	3.07	6.00	45	54	13	14	2.4	5.4
36	6.8	3.55	6.00	54	54	16	14	2.9	5.4

External stroke limiters should be provided by the customer to limit the stroke in both directions on both single-acting and double-acting cylinders. Installation and operation procedures furnished with each cylinder should be followed for maximum service life.

SMALL BORE CYLINDERS

Bellofram's 0.7 sq. inch and 1.7 sq. inch equivalent bore diaphragm cylinders combine the performance of the diaphragm cylinder with small size. Two different stroke options are available in each size, with either flush or extended rods on 0.7 sq. inch cylinders. Only spring-return varieties are available.

SPECIFICATIONS:

0.7 sq. inch Cylinders have aluminum alloy shells and end caps, and carbon steel rods. 1.7 sq. inch Cylinders have die-cast aluminum shells and end caps, and chrome-plated carbon steel rods. All varieties have oil-impregnated bronze bearings, polyester fabric reinforced Nitrile diaphragms, and music wire springs. Optional foot mounts are available for the 1.7 sq. inch Cylinders.



SMALL BORE CYLINDER SPECIFICATIONS

Part Number	Size (Effective Area) Sq. In.	Stroke In.	Load @ 0 Stroke Lbs.	Spring Load @ Max. Stroke Lbs.	Spring Equiv. Bore Dia. In.	Maximum Operatg Press. PSI	Rod Type
908-013	0.384	0.70	2	7	0.7	125	Flush
908-034	0.384	0.70	2	7	0.7	125	3/4"
908-014	0.384	0.32	5	7	0.7	125	Flush
908-035	0.384	0.32	5	7	0.7	125	3/4"
980-008	1.7	1.0	4	8	1.5	125	
980-077	1.7	1.75	4	11	1.5	125	



Marsh Bellofram offers very smooth, "Non-Jarring" action in a Low Cost Cylinder

STANDARD CYLINDERS

Type:

S = Spring Return
D = Double Acting
Diaphragm

Size: Area in Square inches
04, 06, 09, 12, 16, 24, 30
or 36

Series: E or F
Determines Stroke
Make a selection from
OPERATING DATA TABLE pg. 2

Rod:

BP = Bellofram Product
Standard
SM = National Fluid Power
Assoc. Standard
Make a selection from
DIMENSIONAL DATA TABLE
pgs. 5-8

Mounting:

N = Nose Mount
UM = Universal Mount
FM = Foot Mount
CFM = Cap Flange Mount
HFM = Head Flange Mount
CBM = Clevis Bracket Mount
CBS = Clevis Bracket Stud

STANDARD OPTIONS: (add to end of ordering data)

NS — No Spring

NB — No Bearing

NBS — No Bearing or Spring

EXAMPLE: D-12-F-BP-CBM is a double acting, 12 sq. in., 3.1" stroke, BP rod end cylinder with Clevis Bracket Mount.

SUPER CYLINDERS

Type SS: Super Cylinders

Size: Area in Square inches
04, 06, 09, 12, 16, 24, 30
or 36

Series: F
Determines Stroke
Make a selection from
OPERATING DATA TABLE pg. 2

Rod:

BP = Bellofram Product
Standard
SM = National Fluid Power
Assoc. Standard
Make a selection from
DIMENSIONAL DATA TABLE
pgs. 5-8

Mounting:

UM = Universal Mount
FM = Foot Mount
CFM = Cap Flange Mount
HFM = Head Flange Mount
CBM = Clevis Bracket Mount
CBS = Clevis Bracket Stud

STANDARD OPTIONS: (add to end of ordering data)

NS — No Spring

EXAMPLE: SS-12-F-SM-HFM is a single acting super cylinder, 12 sq. in., 3.6" stroke, SM rod end cylinder with a Head Flange Mount.

REPAIR KITS

Repair Kits are available to permit user in-plant maintenance without delay and expense of returning parts to the factory. Each kit includes installation instructions. Nameplate data of the cylinder must accompany order to insure receipt of correct parts.

The following is included in the repair kits:

Spring Return Diaphragm Kit

1. Diaphragm, Cap
2. Adhesive, Cap
3. Nuts, Cap Retainer
4. Instructions

Spring Return Bearing Kit

1. Inner Bearing
2. Outer Bearing
3. Rod Wiper
4. Instructions

Double Acting Diaphragm Kit

1. Diaphragm, Cap
2. Diaphragm, Head
3. Adhesive, Cap
4. Adhesive, Head
5. Rivets, Blind (or screws)
6. Nuts, Cap Retainer
7. Seal "O" Ring
8. Instructions

Double Acting Bearing Kit

1. Inner Bearing
2. Outer Bearing
3. Rod Wiper
4. U-Cup Seal
5. Instructions

BREATHER VENTS

BREATHER VENTS ARE AVAILABLE FOR USE ON BELLOFRAM SPRING RETURN AIR CYLINDERS.

The Breather, which contains a 40 micron bronze filter, is simply threaded into the air relief port of the cylinder head. It prevents foreign matter from being drawn into the cylinder on the return stroke of the piston, and also acts as a snubber. The snubbing reduces the piston speed and impact at the end of the stroke in both directions.

ORDERING DATA

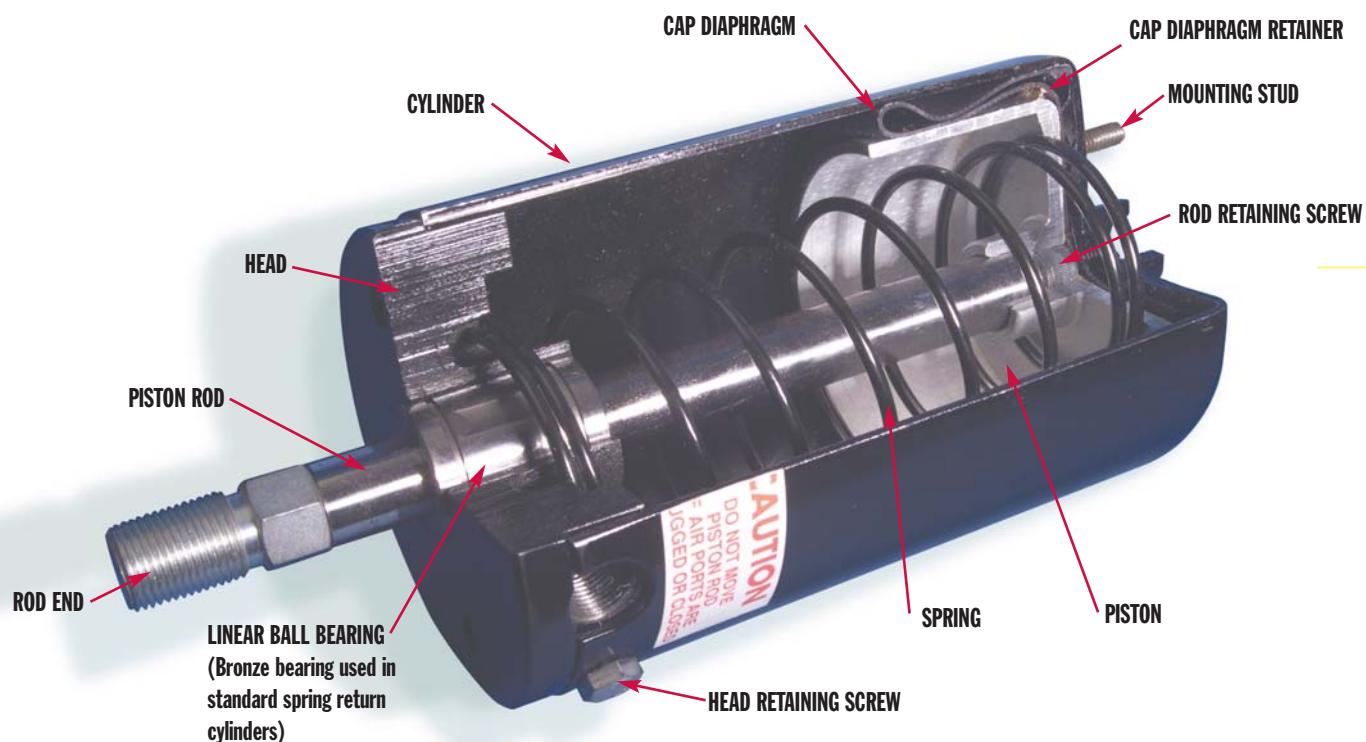
Breather Vent for 1/4" pipe tap
(Fits cylinder sizes 4, 6, 9)
Part No. 661-000-001

Breather Vent for 3/8" pipe tap
(Fits cylinder sizes 12, 16, 24, 30, 36)
Part No. 661-000-002

REPLACEMENT PARTS

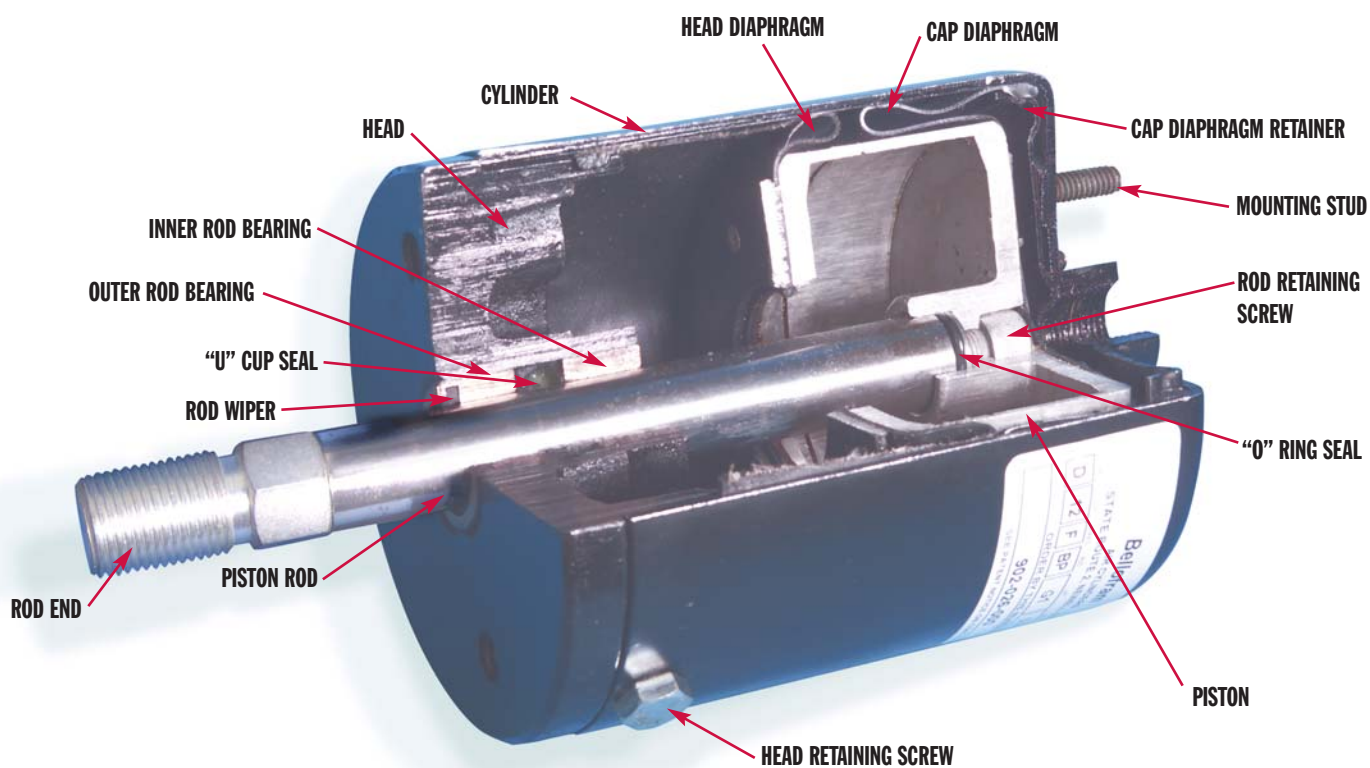
When ordering replacement parts provide nomenclature of part from photographs in addition to the following information from the nameplate on the cylinder: Type, Size, Series, and Rod type.

Complete kits are available for replacement.

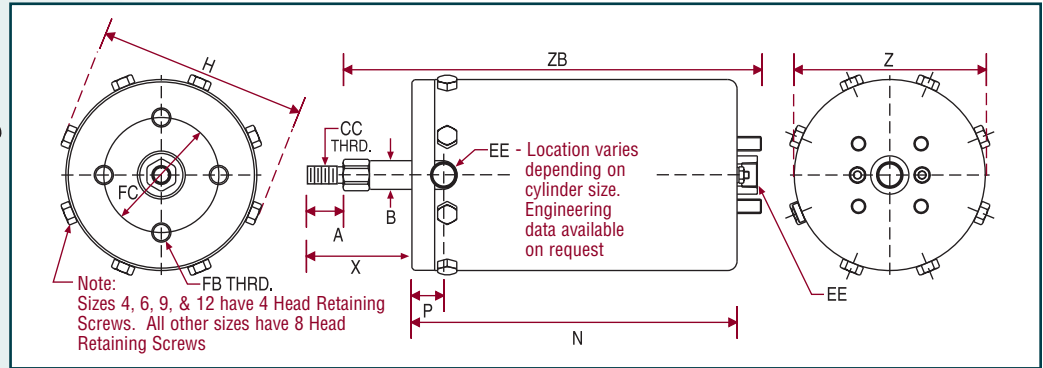
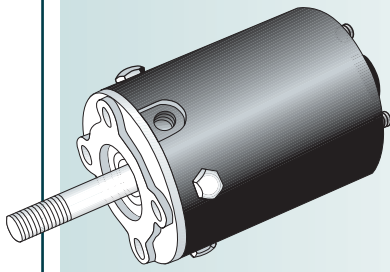


SPRING RETURN CYLINDERS (SUPER CYLINDER SHOWN)

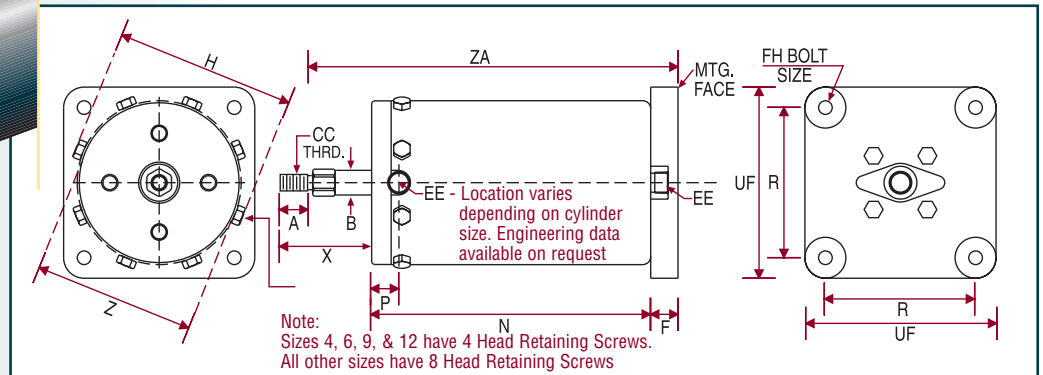
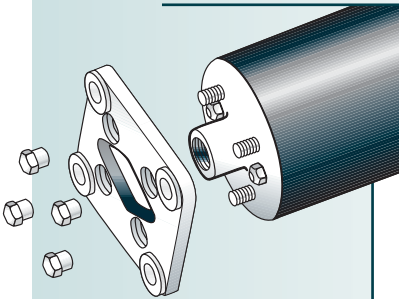
DOUBLE ACTING CYLINDERS



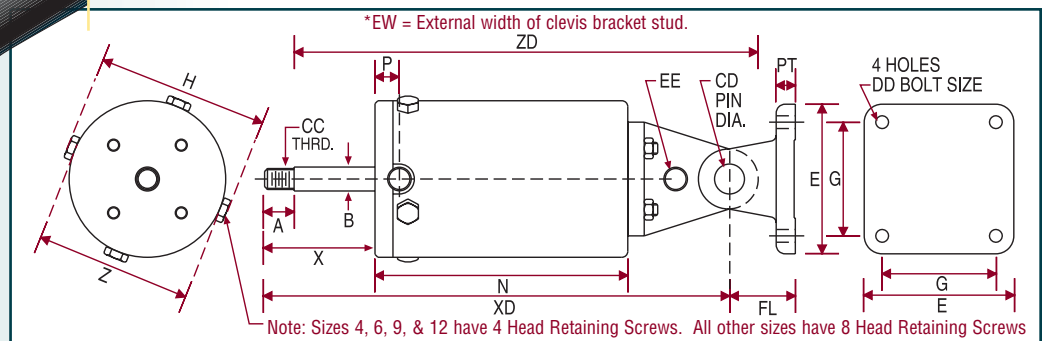
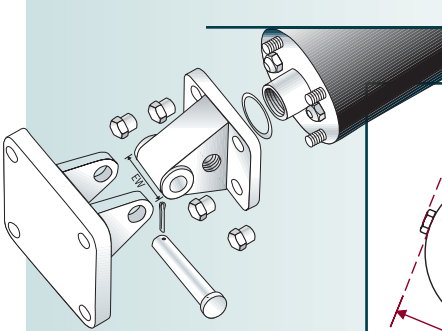
UNIVERSAL MOUNT



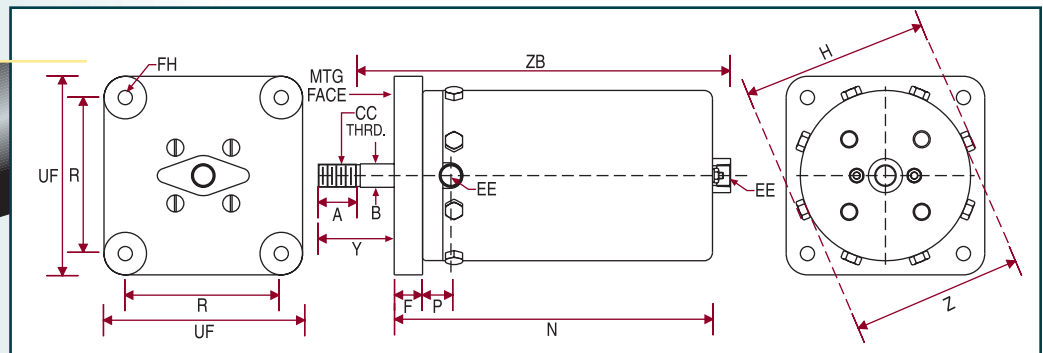
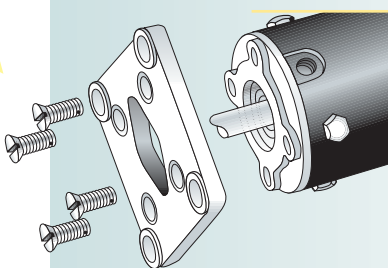
CAP FLANGE MOUNT



CLEVIS BRACKET MOUNT (OR STUD)



HEAD FLANGE MOUNT



STANDARD CYLINDERS - UNIVERSAL, CAP FLANGE, CLEVIS BRACKET, HEAD FLANGE MOUNTS

DIMENSIONS - INCHES

Size	Series	Z	H	N	EE	FC	FB	B	P	F	R	UF	FH	CD	DD	E	FL	EW	PT	G
4	F	2.71	3.02	4.34	¼ NPT	2.00	¾ - 20	½	.50	.781	2.81	3.62	¾	.625	¾	3.12	1.38	.93	¾	2.38
6	F	3.27	3.58	5.28	¼ NPT	2.00	¾ - 20	½	.51	.781	2.81	3.62	¾	.625	¾	3.12	1.38	.93	½	2.38
9	E F	3.84	4.25	5.31 6.34	¼ NPT	3.00	¾-14	¾	.75	.690	4.38	5.50	⅞	.750	¾	3.75	1.69	.99	½	3.0
12	E F	4.38	4.79	5.31 7.28	¾ NPT	3.00	¾-14	¾	.75	.690	4.38	5.50	⅞	.750	½	4.00	1.75	1.24	½	3.0
16	E F	4.99	5.40	6.03 8.38	¾ NPT	3.00	¾-13	¾	.87	.690	4.38	5.50	½	.750	½	4.00	1.75	1.24	½	3.0
24	E F	6.16	6.57	6.28 10.22	¾ NPT	4.75	¾-11	¾	1.00	.656	6.00	7.50	½	1.00	½	5.12	2.00	1.49	¾	4.0
30	E F	6.88	7.29	7.00 11.44	¾ NPT	4.75	¾-11	1	1.00	.656	6.00	7.50	½	1.00	½	5.12	2.00	1.49	¾	4.0
36	E F	7.38	7.79	7.69 11.47	¾ NPT	4.75	¾-11	1	1.00	.656	6.00	7.50	½	1.00	½	5.12	2.00	1.49	¾	4.0

Size	Series	BP Rod End*								SM Rod End†					
		X	Y	A	ZA	ZD	XD	ZB	CC	A	ZA	ZD	XD	ZB	CC
4	F	2.73	1.95	.75	7.10	9.07	8.45	6.72	¾-24	1.00	6.85	8.82	8.19	6.47	¾-20
6	F	2.69	1.91	.75	8.00	9.97	9.35	7.63	¾-24	1.00	7.75	9.72	9.09	7.38	¾-20
9	E F	2.92 2.69	2.23 2.00	1.00	7.92 8.72	10.73 11.55	9.98 10.80	7.63 8.44	¾-20	1.12	7.80 8.60	10.61 11.42	9.86 10.67	7.56 8.32	¾-16
12	E F	2.92 2.95	2.23 2.26	1.00	7.92 9.91	10.98 12.98	10.23 12.23	7.78 9.78	¾-20	1.12	7.80 9.80	10.86 12.86	10.11 12.11	7.66 9.66	¾-16
16	E F	3.06 2.78	2.37 2.09	1.00	8.18 10.85	11.84 13.91	11.09 13.16	8.64 10.71	¾-20	1.12	8.66 10.73	11.72 13.78	10.97 13.03	8.52 10.59	¾-16
24	E F	2.86 2.44	2.17 1.78	1.00	8.53 12.35	11.78 16.22	10.78 15.22	8.73 12.08	¾-20	1.12	8.71 12.23	12.16 15.68	11.16 14.68	8.59 12.03	¾-16
30	E F	2.83 3.05	2.14 2.36	1.25	9.27 13.68	12.70 17.11	11.70 16.11	9.26 13.53	¾-18 1-12	1.50	8.02 13.68	12.89 17.11	11.89 16.11	9.30 13.53	1-14
36	E F	2.83 3.05	2.14 2.36	1.25	9.96 13.71	13.31 17.13	12.31 16.13	9.82 13.54	¾-18 1-12	1.50	9.71 13.71	13.60 17.13	12.60 16.13	10.00 13.54	1-14

*BP Rod End -
Bellofram
Products Co.
Standard
†SM Rod End -
National Fluid
Power Assoc.
Standards



STANDARD CYLINDERS - UNIVERSAL, CAP FLANGE, CLEVIS BRACKET, HEAD FLANGE MOUNTS

DIMENSIONS (MILLIMETERS)

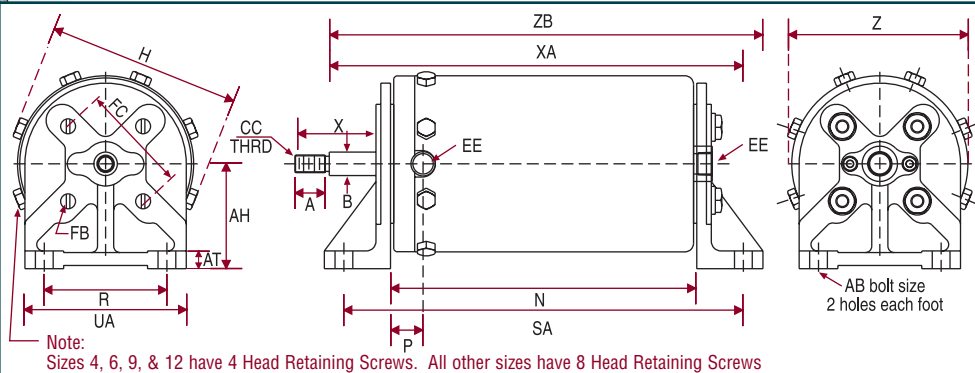
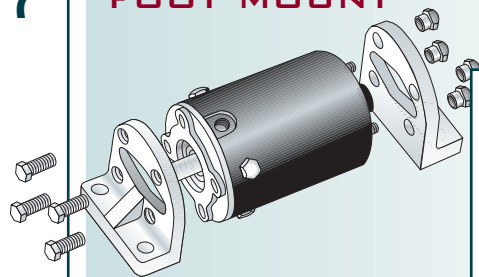
Size	Series	Z	H	N	FC	B	P	F	R	UF	FH	CD	DD	E	FL	EW	PT	G
4	F	68.83	76.71	110.24	50.80	12.70	12.70	19.84	71.37	91.95	6.35	15.88	6.25	79.25	35.05	23.62	9.53	60.45
6	F	83.06	90.93	134.11	50.80	12.70	12.95	19.84	71.37	91.95	6.35	15.88	6.25	79.25	35.05	23.62	12.70	60.45
9	E F	97.52	107.95	134.87 161.04	76.20	19.05	19.05	17.53	111.25	139.70	11.11	19.50	6.25	95.25	42.93	25.15	12.70	76.20
12	E F	111.25	121.67	134.87 184.91	76.20	19.05	19.05	17.53	111.25	139.70	11.11	19.50	12.70	101.60	44.45	31.50	12.70	76.20
16	E F	126.75	137.16	153.16 212.85	76.20	19.50	22.10	17.53	111.25	139.70	12.70	19.50	12.70	101.60	44.45	31.50	12.70	76.20
24	E F	156.46	166.88	159.51 159.59	120.65	19.50	25.40	16.66	152.40	190.50	12.70	25.40	12.70	130.05	50.80	37.85	15.88	101.60
30	E F	174.75	185.17	177.80 290.58	120.65	25.40	25.40	16.66	152.40	190.50	12.70	25.40	12.70	130.05	50.80	37.85	15.88	101.60
36	E F	187.45	197.87	195.33 291.34	120.65	25.40	25.40	16.66	152.40	190.50	12.70	25.40	12.70	130.05	50.80	37.85	15.88	101.60

Size	Series	X	Y	BP Rod End*					SM Rod End†				
				A	ZA	ZD	XD	ZB	A	ZA	ZD	XD	ZB
4	F	69.34	49.53	19.05	180.34	230.38	244.63	170.69	25.40	173.99	224.03	208.03	164.34
6	F	68.33	48.51	19.05	203.20	253.24	237.49	193.80	25.40	196.85	246.89	230.89	187.45
9	E F	74.17 68.33	56.64 50.80	25.40	201.17 221.49	272.54 293.37	253.49 274.32	193.80 214.38	28.45	198.12 218.44	269.49 290.07	250.44 271.02	192.02 211.33
12	E F	74.17 74.93	56.64 57.40	25.40	201.17 251.97	278.89 329.69	259.84 310.64	197.61 257.41	28.45	198.12 248.92	275.84 326.64	256.79 307.59	194.56 245.36
16	E F	77.72 70.61	60.20 53.09	25.40	207.77 275.59	300.74 353.31	281.69 334.26	219.46 272.03	28.45	219.93 272.54	279.69 350.01	278.64 330.96	216.41 268.99
24	E F	72.64 61.98	55.12 45.21	25.40	216.66 313.69	299.21 411.99	273.81 286.59	221.74 306.83	28.45	221.23 310.64	308.86 398.27	283.46 372.87	218.19 305.56
30	E F	71.88 77.47	54.36 59.94	31.75	235.46 347.47	322.58 434.59	297.18 409.19	235.20 343.66	38.10	203.71 347.47	327.41 434.59	302.00 409.19	236.22 343.66
36	E F	71.88 77.47	54.36 59.94	31.75	252.98 248.23	338.07 435.10	312.67 409.70	249.43 343.92	38.10	246.63 248.23	345.44 435.10	320.04 409.70	254.00 343.92

*BP Rod End -
Bellofram
Products Co.
Standard
†SM Rod End -
National Fluid
Power Assoc.
Standards



FOOT MOUNT



STANDARD CYLINDERS WITH FOOT MOUNT DIMENSIONS - INCHES

Size	Series	Z	H	N	EE	FC	FB	B	P	AT	AH	UA	R	SA	AB	X	BP Rod End [*]				SM Rod End [†]			
																	A	XA	ZB	CC	A	XA	ZB	CC
4	F	2.71	3.02	4.34	1/4 NPT	2.00	1/2-20	1/2	.50	.38	1.88	2.62	2.00	6.59	1/4	2.41	.75	7.44	7.82	1/4-24	1.00	7.19	7.57	1/4-20
6	F	3.27	3.58	5.28	1/4 NPT	2.00	1/2-20	1/2	.51	.38	1.88	2.62	2.00	7.53	1/4	2.38	.75	8.35	8.72	1/4-24	1.00	8.10	8.47	1/4-20
9	E	3.84	4.25	5.31	1/4 NPT	3.00	1/2-14	3/4	.75	.56	2.75	4.00	3.00	8.56	1/2	2.24	1.00	8.86	9.55	1/2-20	1.12	8.74	9.43	1/2-16
	F			6.34										9.59		2.06		9.67	10.29			9.55	10.16	
12	E	4.38	4.79	5.31	1/4 NPT	3.00	1/2-14	3/4	.75	.56	2.75	4.00	3.00	8.56	1/2	2.30	1.00	8.86	9.56	1/2-20	1.12	8.73	9.44	1/2-16
	F			7.28										10.53		2.33		10.86	11.56			10.73	11.36	
16	E	4.99	5.40	6.03	1/4 NPT	3.00	1/2-13	3/4	.87	.56	2.75	4.00	3.00	9.28	1/2	2.31	1.00	9.72	10.42	1/2-20	1.12	9.59	10.22	1/2-16
	F			8.38										11.62		2.16		11.78	12.41			11.66	12.28	
24	E	6.16	6.57	6.28	1/4 NPT	4.75	1/2-11	3/4	1.00	.68	4.00	6.25	4.75	10.16	3/8	2.23	1.00	10.09	10.86	1/2-20	1.12	9.94	10.63	1/2-16
	F			10.22										14.09		1.80		13.06	14.29			13.10	13.79	
30	E	6.88	7.29	7.00	1/4 NPT	4.75	1/2-11	1	1.00	.68	4.00	6.25	4.75	10.88	3/8	2.20	1.25	10.52	11.20	1/2-18	1.50	10.26	10.95	1-14
	F			11.44										15.31		2.41		14.92	15.61			14.92	15.69	
36	E	7.38	7.79	7.69	1/4 NPT	4.75	1/2-11	1	1.00	.68	4.00	6.25	4.75	11.56	3/8	2.20	1.25	11.22	11.91	1/2-18	1.50	10.97	11.66	1-14
	F			11.47										15.34		2.41		14.94	15.62			14.94	15.62	

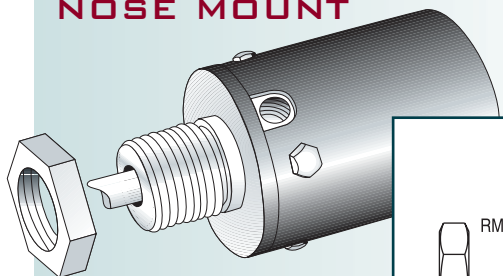
STANDARD CYLINDERS WITH FOOT MOUNT DIMENSIONS - MILLIMETERS

STANDARD CYLINDERS WITH FOOT MOUNT DIMENSIONS - MILLIMETERS															BP Rod End*			SM Rod End†		
Size	Series	Z	H	N	FC	B	P	AT	AH	UA	R	SA	AB	X	A	XA	ZB	A	XA	ZB
4	F	68.83	76.71	110.24	50.80	12.70	12.70	9.65	47.75	66.65	50.80	167.39	6.35	61.21	19.05	188.98	198.63	25.40	182.63	192.28
6	F	83.06	90.93	134.11	50.80	12.70	12.95	9.65	47.75	66.55	50.80	191.26	6.35	60.45	19.05	212.09	221.49	25.40	205.74	215.14
9	E F	97.54	107.95	134.87	76.20	19.05	19.05	14.22	69.85	101.60	76.20	273.41	12.70	56.90	25.40	225.04	242.57	28.45	222.00	239.52
				161.04								243.59		52.32		245.62	261.37		242.57	258.06
12	E F	111.25	121.67	134.87	76.20	19.05	19.05	14.22	69.85	101.60	76.20	273.41	12.70	58.42	25.40	225.04	242.82	28.45	221.74	239.78
				184.91								267.46		59.18		275.84	293.62		272.54	288.54
16	E F	126.75	137.16	153.16	76.20	19.05	22.10	14.22	69.85	101.60	76.20	235.71	12.70	58.67	25.40	246.89	264.67	28.45	243.59	259.59
				212.85								295.15		54.86		299.21	315.21		296.16	311.91
24	E F	156.46	166.88	159.51	120.65	19.05	25.40	17.27	101.60	158.75	120.65	258.06	15.88	56.64	25.40	256.29	275.84	28.45	252.48	270.00
				259.59								357.89		45.72		331.72	362.97		332.74	350.27
30	E F	174.75	185.17	177.80	120.65	25.40	25.40	17.27	101.60	158.75	120.65	276.35	15.88	55.88	31.75	267.21	284.48	38.10	260.60	278.13
				290.58								388.87		61.21		38.10	378.97		396.49	378.97
36	E F	187.45	197.8	195.33	120.65	25.40	25.40	17.27	101.60	158.75	120.65	293.62	15.88	55.88	31.75	284.99	302.51	38.10	278.64	296.16
				291.34								389.64		61.21		38.10	379.48		396.75	379.48

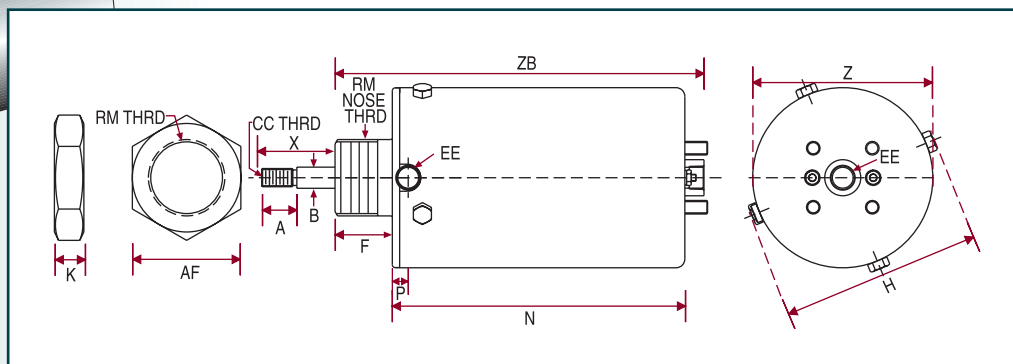
*BP Rod End - Bellofram Products Co. Standard

†SM Rod End - National Fluid Power Assoc. Standards

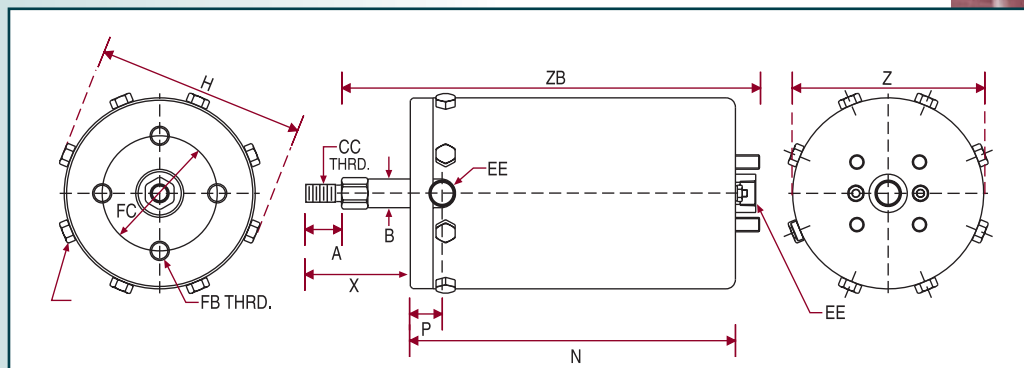
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NOSE MOUNT DIMENSIONS >>



SUPER CYLINDER



SUPER CYLINDERS DIMENSIONS - INCHES

Size	Series	Z	H	N	EE	FC	FB	B	P	X	BP Rod End [*]			SM Rod End [†]		
											A	ZB	CC	A	ZB	CC
4	F	2.71	3.02	4.34	¼ NPT	2.00	¾-20	½	.50	3.10	.75	7.09	¾-24	1.00	6.85	¾-20
6	F	3.27	3.58	5.28	¼ NPT	2.00	¾-20	½	.51	2.16	.75	7.09	¾-24	1.00	6.85	¾-20
9	E F	3.84	4.25	6.34	¼ NPT	3.00	½-14	¾	.75	3.50	1.00	9.25	½-20	1.12	9.13	¾-16
12	E F	4.38	4.79	7.28	¼ NPT	3.00	½-14	¾	.75	2.57	1.00	9.38	½-20	1.12	9.26	¾-16
16	E F	4.99	5.40	8.38	¼ NPT	3.00	½-13	¾	.87	3.78	1.00	11.69	½-20	1.12	11.57	¾-16
24	E F	6.16	6.57	10.22	¼ NPT	4.75	¾-11	1	1.00	2.00	1.00	11.75	½-20	1.12	11.75	¾-16
30	E F	6.88	7.29	11.44	¼ NPT	4.75	¾-11	1	1.00	3.05	1.50	13.52	1-12	1.50	13.52	1-14
36	E F	7.38	7.79	11.47	¼ NPT	4.75	¾-11	1	1.00	3.05	1.50	13.55	1-12	1.50	13.55	1-14

SUPER CYLINDERS DIMENSIONS - MILLIMETERS

Size	Series	Z	H	N	FC	B	P	X	BP Rod End [*]		SM Rod End [†]	
									A	ZB	A	ZB
4	F	68.83	76.71	110.24	50.80	12.70	12.70	78.74	19.05	180.09	25.40	173.99
6	F	83.06	90.93	134.11	50.80	12.70	12.95	54.86	19.05	180.09	25.40	173.99
9	E F	97.54	107.95	161.04	76.20	19.05	19.05	88.90	25.40	234.95	28.45	231.90
12	E F	111.25	121.67	184.91	76.20	19.05	19.05	65.28	25.40	238.25	28.45	235.20
16	E F	126.75	137.16	212.85	76.20	19.05	22.10	96.01	25.40	296.93	28.45	293.88
24	E F	156.46	166.88	259.59	120.65	19.05	25.40	50.80	25.40	298.45	28.45	298.45
30	E F	174.75	185.17	290.58	120.65	25.40	25.40	77.47	38.10	343.41	38.10	343.41
36	E F	187.45	197.8	195.33	120.65	25.40	25.40	77.47	38.10	344.17	38.10	344.17

^{*}BP Rod End - Bellofram Products Co. Standard

[†]SM Rod End - National Fluid Power Assoc. Standards

Super Cylinders are equipped with linear ball bearings and hardened steel rods.

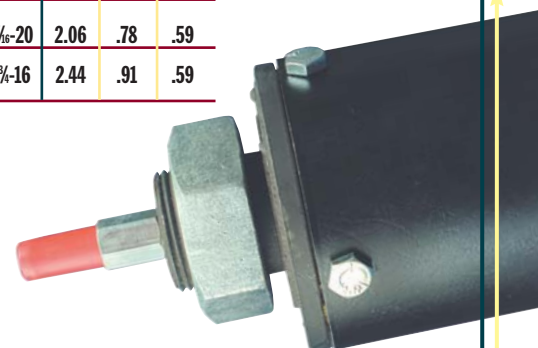
NOSE MOUNT

DIMENSIONS - INCHES

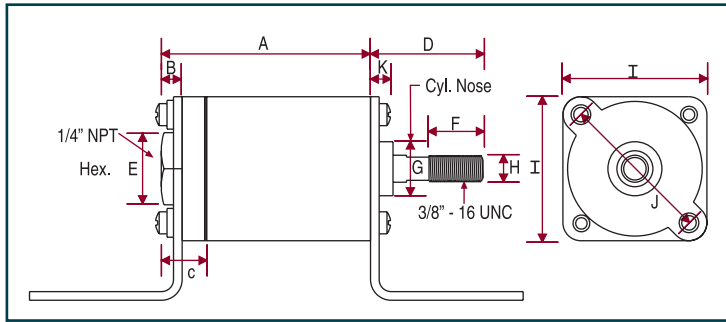
Size	Series	Z	H	N	EE	F	RM	B	BP Rod End				SM Rod End [†]				AF	K	P
									X	A	ZB	CC	X	A	ZB	CC			
4	F	2.71	3.02	4.34	¼ NPT	1.25	1½-12	½	1.48	.75	6.72	¾-24	1.48	1.00	6.47	¾-20	2.06	.78	.59
6	F	3.27	3.58	5.28	¼ NPT	1.25	1½-12	½	1.44	.75	7.63	¾-24	1.44	1.00	7.06	¾-20	2.06	.78	.59
9	E F	3.84	4.15	5.16 6.19	¼ NPT	1.25	1½-12	¾	1.83 1.61	1.00	7.65 8.45	½-20	1.83 1.61	1.12	7.53 8.33	¾-16	2.44	.91	.59

DIMENSIONS - MILLIMETERS

Size	Series	Z	H	N	F	B	X	BP Rod End [*]		SM Rod End [†]		AF	K	P
								A	ZB	A	ZB			
4	F	68.83	76.71	110.24	31.75	12.70	37.59	19.05	170.69	25.40	164.34	52.32	19.81	14.99
6	F	83.06	91.93	134.11	31.75	12.70	36.58	19.05	193.80	25.40	179.32	52.32	19.81	14.99
9	E F	97.54	105.41	131.06 157.23	31.75	19.05	46.48 40.89	25.40	194.31 214.63	28.45	191.26 211.58	61.98	23.11	14.99



SMALL BORE CYLINDER DIMENSIONS

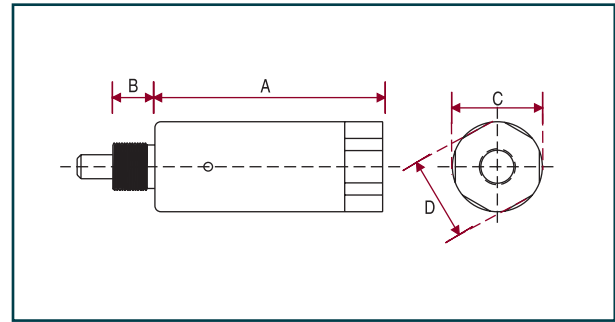


DIMENSIONS - INCHES

Part No.	A	B	C	D	E	F	G	H	I	J	K
421-980-008	2 ²⁹ / ₃₂	¹³ / ₆₄	⁵ / ₁₆	1 ⁹ / ₁₆	¹³ / ₁₆	³ / ₄	³ / ₄	³ / ₈	2	2 ⁷ / ₈	⁵ / ₁₆
421-980-077	3 ²¹ / ₃₂	¹³ / ₆₄	⁵ / ₁₆	1 ⁹ / ₁₆	¹³ / ₁₆	³ / ₄	³ / ₄	³ / ₈	2	2 ⁷ / ₈	⁵ / ₁₆

DIMENSIONS - MILLIMETERS

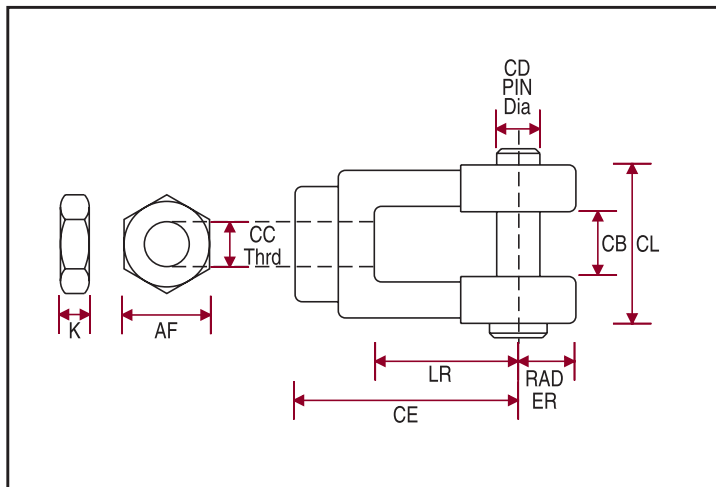
Part No.	A	B	C	D	E	F	G	H	I	J	K
421-980-008	73.8	5.2	15.9	39.6	20.6	19.1	19.1	9.5	50.8	54.0	7.9
421-980-077	92.9	5.2	15.9	39.6	20.6	19.1	19.1	9.5	50.8	54.0	7.9



DIMENSIONS

Part No.	INCHES				MILLIMETERS			
	A	B	C	D	A	B	C	D
311-908-013	2.81	0.438	¹⁵ / ₁₆	⁷ / ₈	71.4	11.1	23.8	22.2
311-908-034								
311-908-014	1.95	0.244	¹⁵ / ₁₆	⁷ / ₈	49.5	6.2	23.8	22.2
311-908-035								

ROD CLEVIS & JAM NUT DIMENSIONS & ORDERING DATA



From cylinder on which
clevis is to be used.

Size: Area in Square inches
04, 06, 09, 12, 16, 24, 30
or 36

Series: E or F
Determines Stroke
Make a selection from
OPERATING DATA TABLE

Rod:
BP = Bellofram Product
Standard
SM = National Fluid Power
Assoc. Standard
Make a selection from
DIMENSIONAL DATA TABLE

RC = Rod Clevis

Example: 36-F-BP-RC is a
Rod Clevis for a size 36 sq.
in. cylinder with a 1-12 rod
thread.

DIMENSIONS - INCHES

Size	BP† Rod End CC Thrd.	SM† Rod End CC Thrd.	Series	CB	CD Pin Dia.	CE	CL	ER Rad.	LR	AF	K
4	³ / ₁₆ -24	-	F	.56	³ / ₁₆	1 ⁷ / ₈	1.38	.53	1.25	⁹ / ₁₆	⁷ / ₃₂
	-	¹ / ₁₆ -20	F	.56	⁷ / ₁₆	1 ¹ / ₄	1.38	.53	1.25	¹¹ / ₁₆	¹ / ₄
6	³ / ₁₆ -24	-	F	.56	³ / ₁₆	1 ⁷ / ₈	1.38	.53	1.25	⁹ / ₁₆	⁷ / ₃₂
	-	¹ / ₁₆ -20	F	.56	⁷ / ₁₆	1 ¹ / ₄	1.38	.53	1.25	¹¹ / ₁₆	¹ / ₄
9	¹ / ₂ -20	-	E or F	.56	¹ / ₂	1 ¹ / ₄	1.38	.53	1.25	³ / ₄	⁵ / ₁₆
	-	³ / ₄ -16	E or F	.88	³ / ₄	2 ¹ / ₄	2.12	.75	1.25	1 ¹ / ₈	²⁷ / ₆₄
12	¹ / ₂ -20	-	E or F	.56	¹ / ₂	1 ⁷ / ₈	1.38	.53	1.25	³ / ₄	⁵ / ₁₆
	-	³ / ₄ -16	E or F	.88	³ / ₄	2 ¹ / ₄	2.12	.75	1.25	1 ¹ / ₈	²⁷ / ₆₄
16	¹ / ₂ -20	-	E or F	.56	¹ / ₂	1 ⁷ / ₈	1.38	.53	1.25	³ / ₄	⁵ / ₁₆
	-	³ / ₄ -16	E or F	.88	³ / ₄	2 ³ / ₄	2.12	.75	1.25	1 ¹ / ₈	²⁷ / ₆₄
24	¹ / ₂ -20	-	E or F	.56	¹ / ₂	1 ¹ / ₄	1.38	.53	1.25	³ / ₄	⁵ / ₁₆
	-	³ / ₄ -16	E or F	.88	³ / ₄	2 ¹ / ₄	2.12	.75	1.25	1 ¹ / ₈	²⁷ / ₆₄
30	³ / ₄ -18	-	E	.56	⁹ / ₁₆	1 ⁷ / ₈	1.38	.53	1.25	1 ¹⁵ / ₁₆	³ / ₈
&	1-12	³ / ₄ -16	F	1.50	1	3 ¹ / ₂	3.50	1.00	1.50	1 ¹ / ₂	³⁵ / ₆₄
36	-	1-14	E or F	1.50	1	3 ¹ / ₂	3.50	1.00	1.50	1 ¹ / ₂	³⁵ / ₆₄

*BP Rod End —Bellofram Products Co. Standard

†SM Rod End—National Fluid Power Assoc. Standards

DIMENSIONS - MILLIMETERS

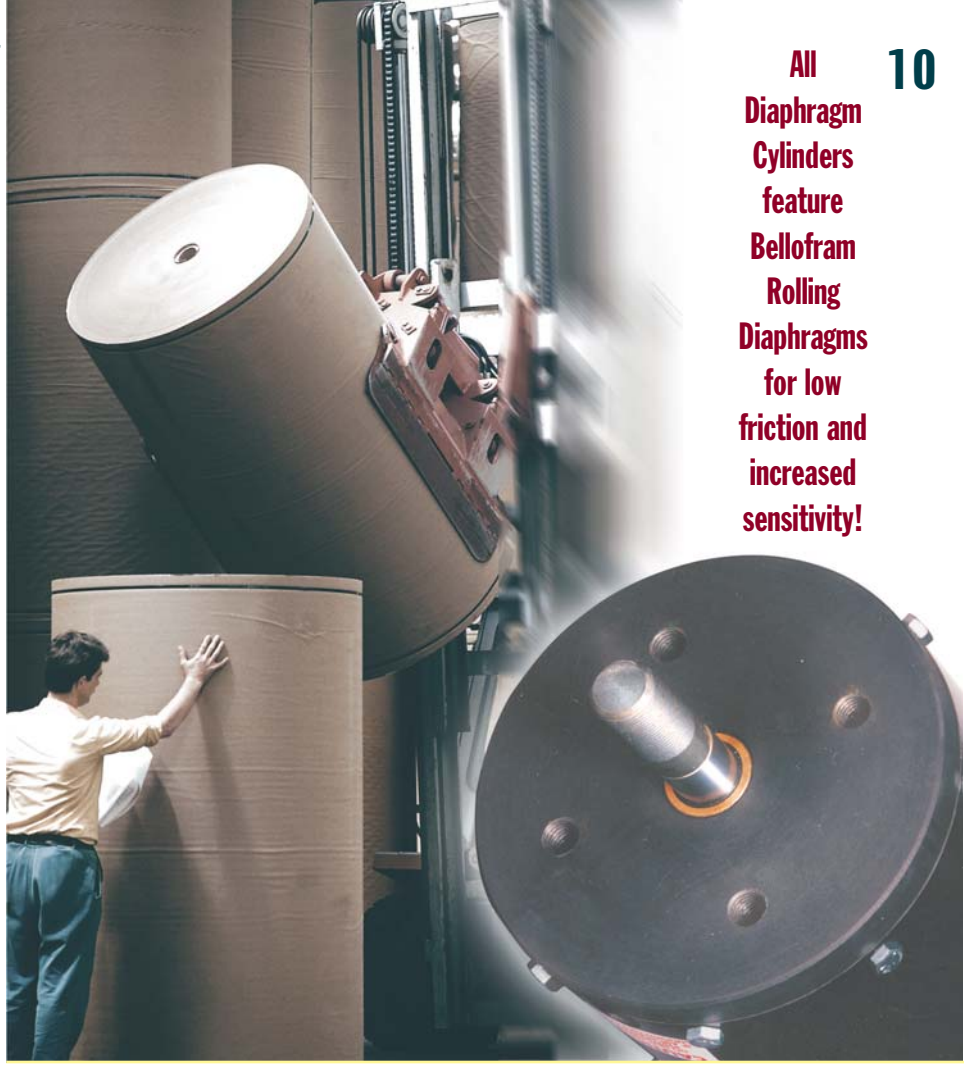
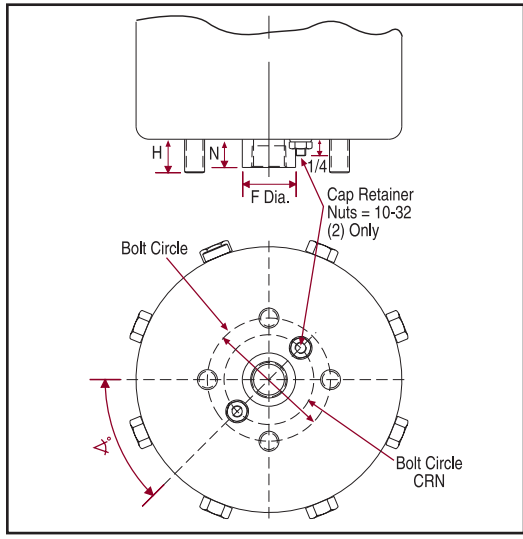
Size	Rod End	Series	CB	CD Pin Dia.	CE	CL	ER Rad.	LR	AF	K
4	BP	F	14.22	9.53	47.63	35.05	13.46	31.75	14.29	5.56
	SM			11.11					17.46	6.36
6	BP	F	14.22	9.53	47.63	35.05	13.56	31.75	14.29	5.56
	SM			11.11					17.46	6.35
9	BP	E or F	14.22	12.70	47.63	35.05	13.56	31.75	19.05	7.94
	SM		22.35	19.05	60.33	53.85	19.05		18.58	10.72
12	BP	E or F	14.22	12.70	47.63	35.05	13.56	31.75	19.05	7.94
	SM		22.35	19.05	60.33	53.85	19.05		28.58	10.72
16	BP	E or F	14.22	12.70	47.63	35.08	13.56	31.75	19.05	7.94
	SM		22.35	19.05	60.33	53.85	19.05		28.59	10.72
24	BP	E or F	14.22	12.70	47.63	35.08	13.56	31.75	19.05	7.94
	SM		22.35	19.05	60.33	53.85	19.05		28.59	13.89
30	BP	E	14.22	14.29	47.63	35.05	13.46	31.75	33.34	9.53
&	1-12	F	38.1	25.4	88.90	88.90	25.4	38.1	38.1	13.89
36	SM	E or F								
	1-14									

All Diaphragm Cylinders feature Bellofram Rolling Diaphragms for low friction and increased sensitivity!

CYLINDER CAP END MOUNTING STUDS

DIMENSIONS - INCHES

Size	No. of Studs	Size of Stud	H (Approx.)	Bolt Circle	F (Boss)	N	Bolt Circle CRN	°
4	2	1/4-20	5/8	1 1/16	11/16	13/32	1 3/8	90
6	2	1/4-20	5/8	1 1/2	11/16	13/32	1 3/8	90
9	4	1/4-20	5/8	2	11/16	13/32	1 3/8	45
12	4	1/4-20	5/8	2 5/16	1	11/32	1 11/16	45
16	4	3/8-16	5/8	2 5/16	1	11/32	1 11/16	45
24	4	3/8-16	5/8	3 1/8	1	11/32	1 11/16	45
30	4	1/2-13	11/16	4	1	11/32	1 11/16	45
36	4	1/2-13	11/16	4	1	11/32	1 11/16	45



WARRANTY

Bellofram Corporation ("Warrantor") warrants only to its immediate purchase for commercial use or resale ("Buyer") for a period of one year from date of purchase that its products will be free from defects in material and workmanship under normal use and service and conform (subject to variations acceptable with the industry) to Bellofram's standard specifications for the products or to the specifications and drawings, if any, furnished to Bellofram by Buyer and expressly agreed to in writing by an authorized representative of Bellofram.

OBTAINING WARRANTY PERFORMANCE

Performance under this Warranty may be obtained only by communicating with Bellofram within the Warranty period at Newell, West Virginia. Buyer must provide its name, address and telephone number, evidence of date of purchase, and a statement of its complaint respecting the products to Bellofram. At Bellofram's request, Buyer must also, at its cost, provide samples of any products alleged to be defective or nonconforming. However, Buyer shall not return any products not authorized to be returned by Bellofram.

REMEDIES

Any product determined by Bellofram to be defective or non-conforming within the Warranty period shall be repaired or replaced, at Bellofram's discretion, and delivered F.O.B. Bellofram's facility located at Newell, West Virginia. The foregoing shall be Buyer's sole and exclusive remedy.

Exclusion From Coverage:

This Warranty does not apply to, and Warrantor shall not be obligated to repair or replace, products which have been repaired by others, abused, improperly installed, misapplied, altered or otherwise misused or damaged in any way.

LIMITATIONS

TO THE EXTENT PERMITTED BY LAW, THIS WARRANTY IS EXCLUSIVE, IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE. Bellofram's liability is limited solely and exclusively to the repair or replacement obligation specifically undertaken within. This Warranty is made only to Buyer and is not transferrable. No employee, agent or other person is authorized by Bellofram to assume for it any liability in addition to that set forth above or to make any further warranties on behalf of Bellofram.

IN NO EVENT SHALL WARRANTOR BE LIABLE FOR ANY AMOUNT IN EXCESS OF THE PAID PURCHASE PRICE OF THE PRODUCTS OR FOR ANY INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES OF ANY KIND WHATSOEVER, WHETHER ANY CLAIM IS BASED UPON THEORIES OF CONTRACT, NEGLIGENCE, TORT (INCLUDING STRICT LIABILITY) OR OTHERWISE.

Our recommendations, if any, for the use of this product are based on tests believed to be reliable. The greatest care is exercised in the selection of our raw materials and in our manufacturing operations. However, since the use of this product is beyond the control of the manufacturer, no guarantee or warranty, express or implied is made as to such use or effects incidental to such use, handling or possession or the results to be obtained, whether in accordance with the directions or claimed so to be. The manufacturer expressly disclaims responsibility therefor. Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing laws and/or patents covering any material or us.

WARRANTY

PART NUMBERS

TYPE S (SPRING RETURN)

SIZE (SQ. IN.)	E				F			
	BP		SM		BP		SM	
	UM	N	UM	N	UM	N	UM	N
4					900-002-000	900-006-000	900-004-000	900-008-000
6					900-010-000	900-014-000	900-012-000	900-016-000
9	900-018-000	900-022-000	900-020-000	900-024-000	900-026-000	900-030-000	900-028-000	900-032-000
12	900-034-000		900-036-000		900-038-000		900-040-000	
16	900-042-000		900-044-000		900-046-000		900-048-000	
24	900-050-000		900-052-000		900-054-000		900-056-000	
30	900-058-000		900-060-000		900-062-000		900-064-000	
36	900-066-000		900-068-000		900-070-000		900-072-000	

All cylinders are supplied with cap mounting studs. Consult factory for cylinders required without cap mounting studs.

☐ Select part numbers from non-shaded areas only.

TYPE D CYLINDERS (DOUBLE ACTING)

SIZE (SQ. IN.)	E		F				
	Series			BP		SM	
	Rod	BP	SM				
	Mount	UM	UM	UM	N	UM	N
4			902-002-000	902-006-000	902-004-000	902-008-000	
6			902-010-000	902-014-000	902-012-000	902-016-000	
9			902-018-000	902-022-000	902-020-000	902-024-000	
12	902-026-000	902-028-000	902-030-000		902-032-000		
16	902-034-000	902-036-000	902-038-000		902-040-000		
24	902-042-000	902-044-000	902-046-000		902-048-000		
30	902-050-000	902-052-000	902-054-000		902-056-000		
36	902-058-000	902-060-000	902-062-000		902-064-000		

All cylinders are supplied with cap mounting studs. Consult factory for cylinders required without cap mounting studs. ☐ Select part numbers from non-shaded areas only.

TYPE SS (SUPER CYLINDERS)

SIZE (SQ. IN.)	F	
	SM	
	Rod	
	Mount	UM
4	903-074-000	903-001-000
6	903-076-000	903-011-000
9	903-078-000	903-021-000
12	903-080-000	903-031-000
16	903-082-000	903-041-000
24	903-084-000	903-051-000
30	903-086-000	903-061-000
36	903-088-000	903-071-000

REPAIR KITS

Spring Return Cylinders				Double Acting Cylinders				Super Cylinders	
Diaphragm Kits		Bearing Kits		Diaphragm Kits		Bearing Kits		Bearing Kits	
Kit No.	Part No.	Kit No.	Part No.	Kit No.	Part No.	Kit No.	Part No.	Kit No.	Part No.
S4N	970-041-000	SB46S	970-058-000	D4S	970-014-000	DB46S	970-064-000	SSB46S	970-134-000
S6N	970-042-000	SB924S	970-060-000	D6S	970-018-000	DB924S	970-066-000	SSB924S	970-133-000
S9N	970-043-000	SB36FB	970-062-000	D9S	970-020-000	DB36FB	970-068-000	SSB36FB	970-135-000
S9N	970-044-000			D12ES	970-022-000				
S12E	970-045-000			D12ES	970-024-000				
S12F	970-046-000			D16ES	970-026-000				
S16E	970-047-000			D16ES	970-028-000				
S16F	970-048-000			D24ES	970-030-000				
S24E	970-049-000			D24ES	970-032-000				
S24F	970-050-000			D30ES	970-034-000				
S30E	970-051-000			D30ES	970-036-000				
S30F	970-052-000			D36ES	970-038-000				
S36E	970-053-000			D36ES	970-040-000				
S36F	970-054-000								

MOUNTING KITS

Size	FM	CFM	HFM	CBM	CBS
4	904-001-000	904-012-000	904-008-000	904-026-000	904-019-000
6	904-002-000	904-013-000	904-008-000	904-027-000	904-020-000
9	904-003-000	904-014-000	904-009-000	904-028-000	904-021-000
12	904-004-000	904-015-000	904-009-000	904-029-000	904-022-000
16	904-005-000	904-016-000	904-010-000	904-030-000	904-023-000
24	904-006-000	904-017-000	904-010-000	904-031-000	904-024-000
30	904-007-000	904-018-000	904-011-000	904-032-000	904-025-000
36	904-007-000	904-018-000	904-011-000	904-032-000	904-025-000

ROD CLEVIS MOUNTS

SIZE (SQ. IN.)	Rod	BP	SM
4		904-033-000	904-037-000
6		904-033-000	904-037-000
9		904-034-000	904-038-000
12		904-034-000	904-038-000
16		904-034-000	904-038-000
24		904-034-000	904-038-000
30 & 36 (E stroke)		904-035-000	904-039-000
30 & 36 (F stroke)		904-036-000	904-039-000



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