

Rolling

Diaphragm Air Cylinders

The friction free alternative



THE “ROLLING DIAPHRAGM” AIR CYLINDER

The advent of the long stroke rolling diaphragm as a means of low-friction dynamic sealing has led to the development of our Diaphragm Air Cylinder. These cylinders provide virtually frictionless conversion of pneumatic pressure to linear force, and offer such operating features as:

- Super Sensitivity
- Absolutely No Lubrication Required
- Low Hysteresis
- No Blow-By Leakage
- Wide Temperature Variations

ControlAir supplies each of these cylinders with quick delivery, 100% leak testing, and full product support before and after the sale.

APPLICATIONS

The performance advantages of our Diaphragm Air Cylinders make them ideal for applications such as Web Tensioners, Dancer Roll Tensioners, Roll Loaders, Valve Actuators, Accumulators, Positioners, and Impact Absorbers to name a few.

DIAPHRAGMS

The rolling diaphragm creates the perfect seal for friction free cylinders. It is a durable, flexible membrane shaped like a top hat with the peak of the hat fastened to the end of the piston and the “brim” clamped to the cylinder cap. Inside of the cylinder this forms a long-lasting frictionless seal between the piston head and cylinder wall. The fabric reinforced elastomer rolling diaphragms are produced internally utilizing a microprocessor controlled process that is recognized as the leading edge mode of production. Custom diaphragm material design allows for operation of the cylinders at temperatures from -75°F to 400°F.

ULTRA CYLINDERS-LINEAR BALL BEARINGS

For applications where the absolute minimum in friction free performance is required, ControlAir has developed the Ultra Cylinder. These cylinders combine the advantages of the rolling diaphragm seal with Grade “A” linear ball bearings and a hardened steel rod to produce virtually zero friction operation. For the ultimate in precise response to small pressure variations, choose “The Ultra.”

MODIFICATIONS

Our standard Diaphragm Air Cylinders are easily modified to meet individual customer requirements. Modifications can include, but are not limited to, diaphragm, bearing, or rod materials, rod configurations, and spring design. Our engineering staff is always available to provide technical assistance for your application.

CUSTOM DIAPHRAGM DEVICES

In addition to ControlAir’s standard line of diaphragm air cylinders our staff has the ability to design and manufacture low cost, high reliability diaphragm devices. Our on-site machine shop allows for in-house prototypes to be provided with short lead times.

OPERATING INFORMATION

Our Cylinders are rated to operate on plant air up to 145 psi (10 Bar) over temperatures from -40°F to 225°F.

Custom diaphragm materials can be used to permit our cylinders to operate at temperatures of -75°F to 400°F.

Though ControlAir’s standard line of cylinders are for air service only, modifications are available to accommodate hydraulic or liquid pressurized applications.

MATERIALS

CYLINDER SHELL

Anodized Aluminum
(Sizes 4-9)
Steel (Sizes 12-36)

HEAD

Aluminum
(Sizes 4-16)
Iron (Size 36)

PISTON

Aluminum
(Sizes 4-9)
Steel (Sizes 12-36)

ROD

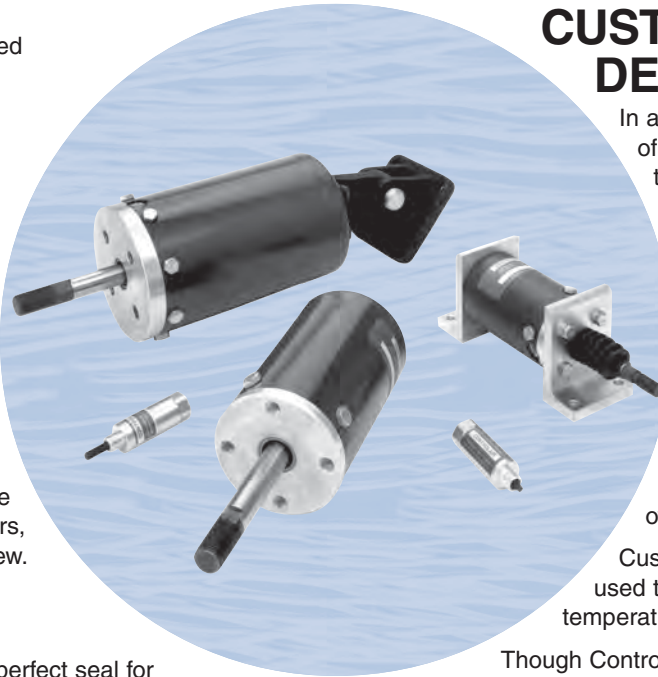
AISI 1141 chrome
Plated Steel Shaft
with Wrench Flats

DIAPHRAGM

Neoprene Rubber
w/Dacron Fabric

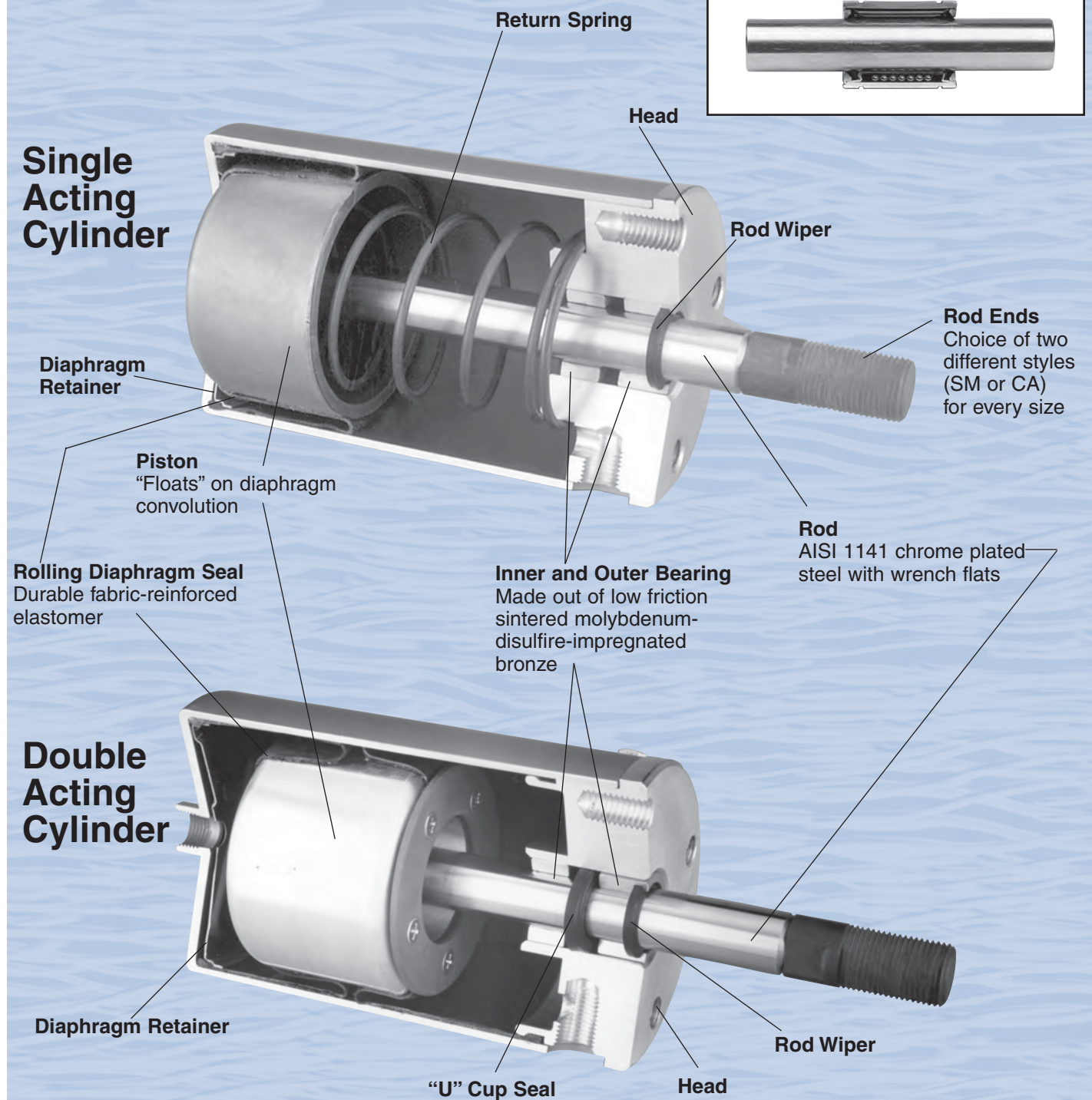
BEARING

Impregnated
Sintered Bronze



Friction Free Diaphragm Air Cylinders

THE INSIDE STORY ON CONTROLAIR DIAPHRAGM AIR CYLINDERS

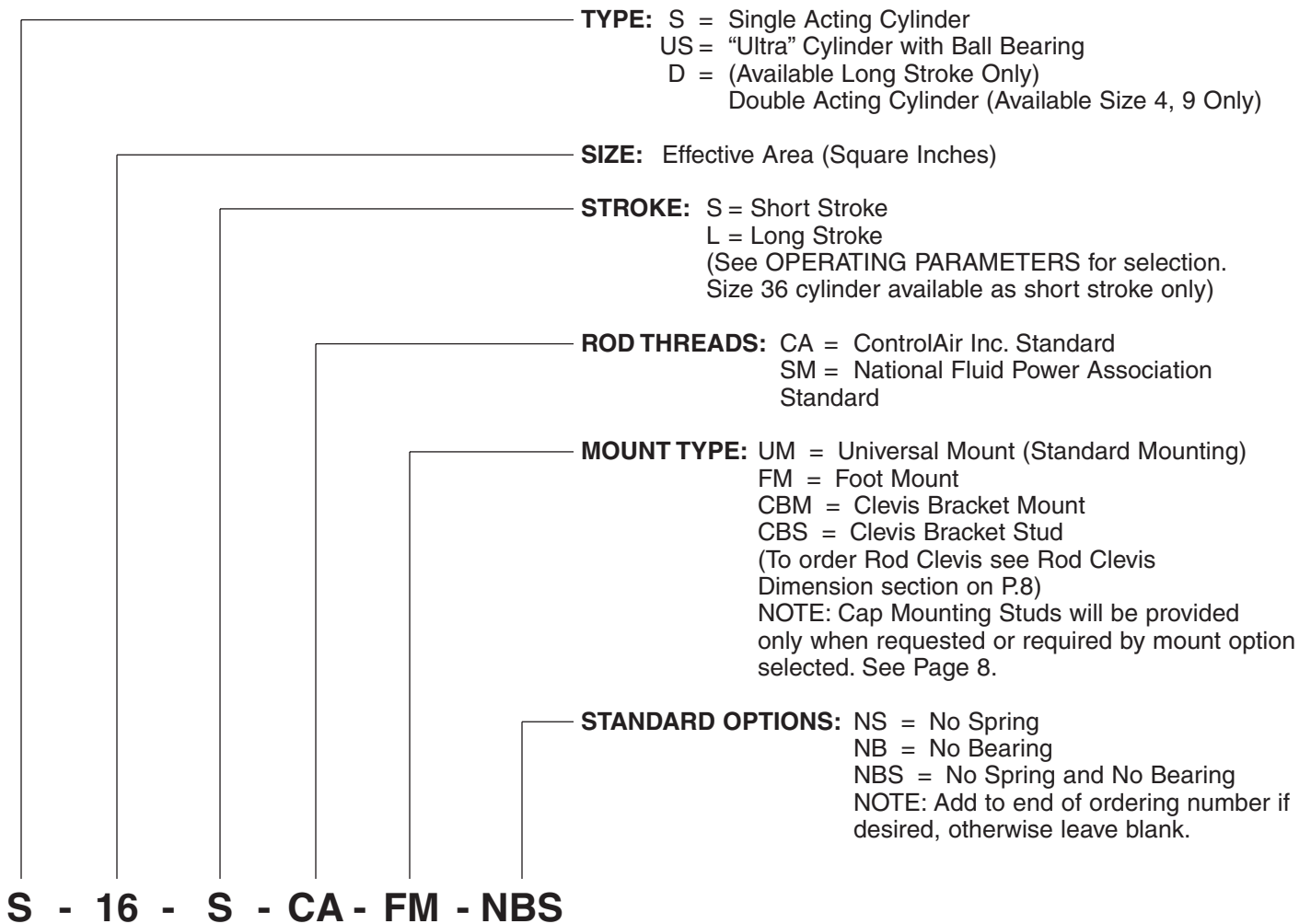


OPERATING PARAMETERS

SINGLE ACTING CYLINDERS							
CYLINDER MODEL		EFFECTIVE AREA (sq. inches)	EQUIVALENT BORE (inches)	STROKE (inches)	INITIAL SPRING FORCE (lbs.)	SPRING RATE (lbs/inch)	WEIGHTS
S-4-L	US-4-L	4	2.3	1.8	9	4	1.6
S-6-L	US-6-L	6	2.8	2.4	9	4	2.3
S-9-S		9	3.4	2.2	17	4	5.3
S-9-L	US-9-L	9	3.4	3.0	12	4	4.0
S-12-S		12	3.9	2.3	18	6	8.0
S-12-L	US-12-L	12	3.9	3.6	18	6	9.5
S-16-S		16	4.5	2.6	24	8	11.0
S-16-L	US-16-L	16	4.5	4.2	24	8	12.0
S-36-S		36	6.8	3.5	54	16	28
DOUBLE ACTING CYLINDERS							
D-4-L		4	2.3	1.3			2.0
D-9-L		9	3.4	2.5			4.5

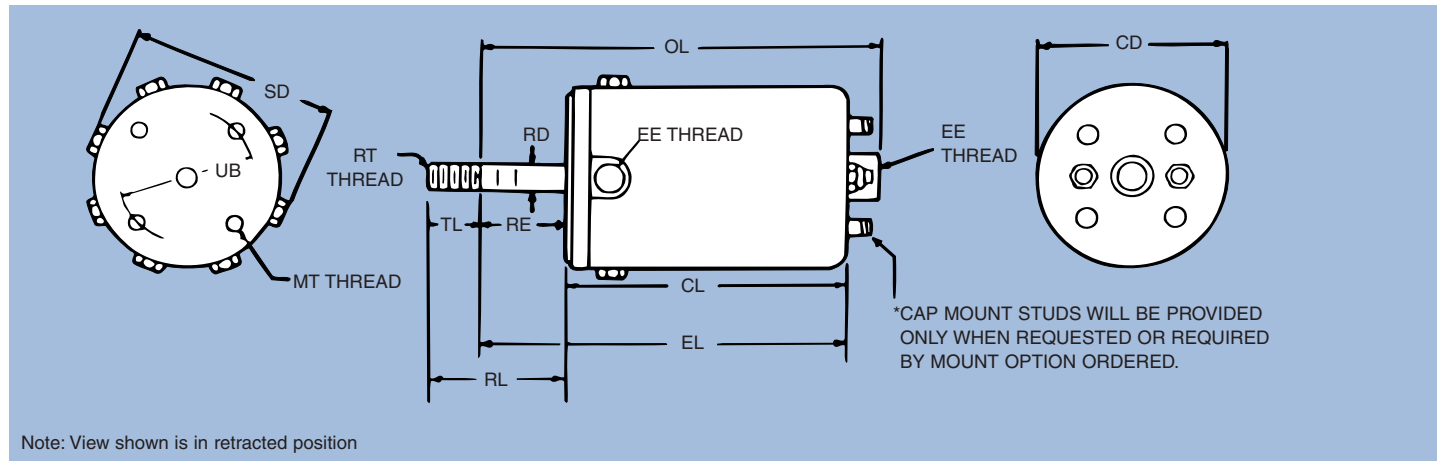
ORDERING INFORMATION

DIAPHRAGM AIR CYLINDERS



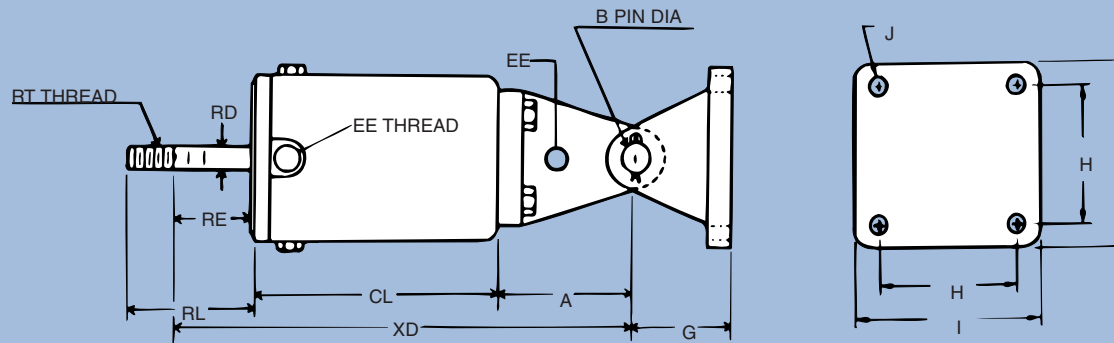
EXAMPLE

STANDARD DIAPHRAGM AIR CYLINDERS



CYLINDER MODEL	EFFEC. AREA SQ INCHES	STROKE INCHES	CL	CD	SD	EE	UB	MT	CA ROD END					RL	RD	SM ROD END				
									EL	RE	TL	RT	OL			EL	RE	TL	RT	OL
SINGLE ACTING CYLINDERS																				
S-4-L	4	1.8	4.34	2.71	3.02	1/4 npt	2.00	1/4-20	6.32	1.98	.75	3/8-24	6.72	2.73	1/2	6.07	1.73	1.00	7/16-20	6.47
S-6-L	6	2.4	5.28	3.27	3.58	1/4 npt	2.00	1/4-20	7.22	1.94	.75	3/8-24	7.63	2.69	1/2	6.97	1.69	1.00	7/16-20	7.38
S-9-S	9	2.2	5.31	3.84	4.25	1/4 npt	3.00	7/16-14	7.23	1.92	1.00	1/2-20	7.63	2.92	3/4	7.11	1.80	1.12	3/4-16	7.51
S-9-L	9	3.0	6.34	3.84	4.25	1/4 npt	3.00	7/16-14	8.03	1.69	1.00	1/2-20	8.44	2.69	3/4	7.91	1.57	1.12	3/4-16	8.32
S-12-S	12	2.3	5.31	4.38	4.79	3/8 npt	3.00	7/16-14	7.23	1.92	1.00	1/2-20	7.78	2.92	3/4	7.11	1.80	1.12	3/4-16	7.66
S-12-L	12	3.6	7.28	4.38	4.79	3/8 npt	3.00	7/16-14	9.23	1.95	1.00	1/2-20	9.78	2.95	3/4	9.11	1.83	1.12	3/4-16	9.66
S-16-S	16	2.6	6.03	4.99	5.40	3/8 npt	3.00	1/2-13	8.09	2.06	1.00	1/2-20	8.64	3.06	3/4	7.97	1.94	1.12	3/4-16	8.52
S-16-L	16	4.2	8.38	4.99	5.40	3/8 npt	3.00	1/2-13	10.16	1.78	1.00	1/2-20	10.71	2.78	3/4	10.04	1.66	1.12	3/4-16	10.59
S-36-S	36	3.5	7.69	7.38	7.79	3/8 npt	4.75	5/8-11	9.27	1.58	1.25	5/8-18	9.82	2.83	1	9.02	1.33	1.50	1-14	9.57
DOUBLE ACTING CYLINDERS																				
D-4-L	4	1.3	4.34	2.71	3.02	1/4 npt	2.00	1/4-20	6.32	1.98	.75	3/8-24	6.72	2.73	1/2	6.07	1.73	1.00	7/16-20	6.47
D-9-L	9	2.5	6.34	3.84	4.25	1/4 npt	3.00	7/16-14	8.03	1.69	1.00	1/2-20	8.44	2.69	3/4	7.91	1.57	1.12	3/4-16	8.32
ULTRA CYLINDERS WITH LINEAR BALL BEARINGS																				
US-4-L	4	1.8	4.34	2.71	3.02	1/4 npt	2.00	1/4-20	6.69	2.35	.75	3/8-24	7.09	3.10	1/2	6.44	2.10	1.00	7/16-20	6.85
US-6-L	6	2.4	5.28	3.27	3.58	1/4 npt	2.00	1/4-20	6.69	1.41	.75	3/8-24	7.09	2.16	1/2	6.44	1.16	1.00	7/16-20	6.85
US-9-L	9	3.0	6.34	3.84	4.25	1/4 npt	3.00	7/16-14	8.84	2.50	1.00	1/2-20	9.25	3.50	3/4	8.72	2.38	1.12	3/4-16	9.13
US-12-L	12	3.6	7.28	4.38	4.79	3/8 npt	3.00	7/16-14	8.85	1.57	1.00	1/2-20	9.38	2.57	3/4	8.73	1.45	1.12	3/4-16	9.26
US-16-L	16	4.2	8.38	4.99	5.40	3/8 npt	3.00	1/2-13	11.16	2.78	1.00	1/2-20	11.69	3.78	3/4	11.04	2.66	1.12	3/4-16	11.57

CLEVIS BRACKET STUD / CLEVIS BRACKET MOUNT

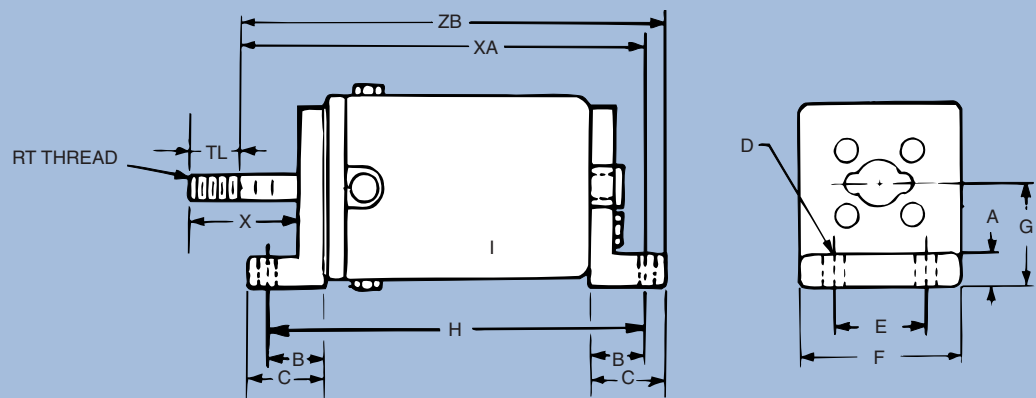


Note: Clevis bracket mount includes all parts shown — clevis bracket stud includes only the male bracket. "F" dimension refers to the width of the male bracket at the point the pin goes through.

Note: View shown is in retracted position

CYLINDER MODEL	CL	EE	RD	B	CA ROD END				SM ROD END				J	H	I	G	A	F
					RL	RE	XD	RT	RL	RE	XD	RT						
SINGLE ACTING CYLINDERS																		
S-4-L	4.34	1/4 npt	1/2	.625	2.73	1.98	8.45	3/8-24	2.73	1.73	8.20	7/16-20	1/4	2.38	3.12	1.38	2.125	.93
S-6-L	5.28	1/4 npt	1/2	.625	2.69	1.94	9.35	3/8-24	2.69	1.69	9.09	7/16-20	1/4	2.38	3.12	1.38	2.125	.93
S-9-S	5.31	1/4 npt	3/4	.750	2.92	1.92	9.98	1/2-20	2.92	1.80	9.86	3/4-16	1/4	3.00	4.00	1.69	2.750	.99
S-9-L	6.34	1/4 npt	3/4	.750	2.69	1.69	10.80	1/2-20	2.69	1.57	10.67	3/4-16	1/4	3.00	4.00	1.69	2.750	.99
S-12-S	5.31	3/8 npt	3/4	.750	2.92	1.92	10.23	1/2-20	2.92	1.80	10.11	3/4-16	1/2	3.00	4.00	1.75	3.00	1.24
S-12-L	7.28	3/8 npt	3/4	.750	2.95	1.95	12.23	1/2-20	2.95	1.83	12.11	3/4-16	1/2	3.00	4.00	1.75	3.00	1.24
S-16-S	6.03	3/8 npt	3/4	.750	3.06	2.06	11.09	1/2-20	3.06	1.94	10.97	3/4-16	1/2	3.00	4.00	1.75	3.00	1.24
S-16-L	8.38	3/8 npt	3/4	.750	2.78	1.78	13.16	1/2-20	2.78	1.66	13.03	3/4-16	1/2	3.00	4.00	1.75	3.00	1.24
DOUBLE ACTING CYLINDERS																		
D-4-L	4.34	1/4 npt	1/2	.625	2.73	1.98	8.45	3/8-24	2.73	1.73	8.20	7/16-20	1/4	2.38	3.12	1.38	2.125	.93
D-9-L	6.43	1/4 npt	3/4	.750	2.69	1.69	10.76	1/2-20	2.69	1.57	10.67	3/4-16	1/4	3.00	4.00	1.69	2.750	.99
ULTRA CYLINDERS WITH LINEAR BALL BEARINGS																		
US-4-L	4.34	1/4 npt	1/2	.625	3.10	2.35	8.82	3/8-24	3.10	2.10	8.57	7/16-20	1/4	2.38	3.12	1.38	2.125	.93
US-6-L	5.28	1/4 npt	1/2	.625	2.16	1.41	8.82	3/8-24	2.16	1.16	8.57	7/16-20	1/4	2.38	3.12	1.38	2.125	.93
US-9-L	6.34	1/4 npt	3/4	.750	3.50	2.50	11.60	1/2-20	3.50	2.38	11.47	3/4-16	1/4	3.00	4.00	1.69	2.750	.99
US-12-L	7.28	3/8 npt	3/4	.750	2.57	1.57	11.85	1/2-20	2.57	1.45	11.73	3/4-16	1/2	3.00	4.00	1.75	3.00	1.24
US-16-L	8.38	3/8 npt	3/4	.750	3.78	2.78	14.16	1/2-20	3.78	2.66	14.04	3/4-16	1/2	3.00	4.00	1.75	3.00	1.24

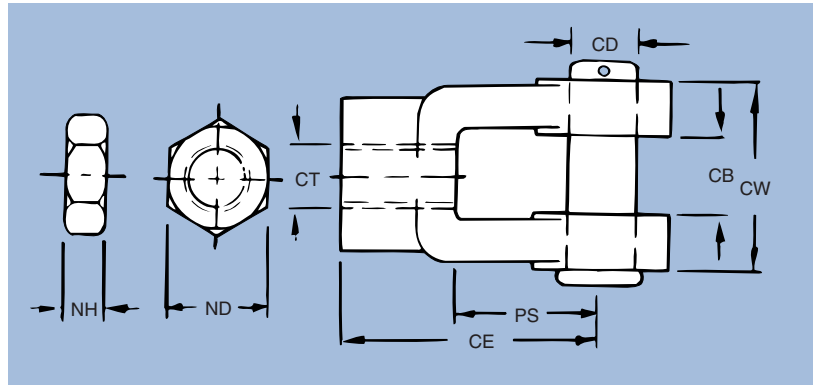
FOOT MOUNT



Note: View shown is in retracted position

CYLINDER MODEL	A	B	C	D	E	F	G	CA ROD END					H	SM ROD END				
								TL	X	RT	XA	ZB		TL	X	RT	XA	ZB
SINGLE ACTING CYLINDERS																		
S-4-L	.380	1.125	1.500	.312	2.00	2.625	1.88	.75	2.41	3/8-24	7.44	7.94	6.59	1.00	2.41	7/16-20	7.19	7.69
S-6-L	.380	1.125	1.500	.312	2.00	2.625	1.88	.75	2.38	3/8-24	8.35	8.84	7.53	1.00	2.38	7/16-20	8.10	8.59
S-9-S	.500	1.625	2.375	.562	3.00	4.00	2.75	1.00	2.24	1/2-20	8.86	9.67	8.56	1.12	2.24	3/4-16	8.74	9.55
S-9-L	.500	1.625	2.375	.562	3.00	4.00	2.75	1.00	2.06	1/2-20	9.67	10.41	9.59	1.12	2.06	3/4-16	9.55	10.28
S-12-S	.500	1.625	2.375	.562	3.00	4.00	2.75	1.00	2.30	1/2-20	8.86	9.68	8.56	1.12	2.30	3/4-16	8.73	9.56
S-12-L	.500	1.625	2.375	.562	3.00	4.00	2.75	1.00	2.33	1/2-20	10.86	11.68	10.53	1.12	2.33	3/4-16	10.73	11.48
S-16-S	.500	1.625	2.375	.562	3.00	4.00	2.75	1.00	2.31	1/2-20	9.72	10.54	9.28	1.12	2.34	3/4-16	9.59	10.34
S-16-L	.500	1.625	2.375	.562	3.00	4.00	2.75	1.00	2.16	1/2-20	11.78	12.53	11.62	1.12	2.16	3/4-16	11.66	12.40
DOUBLE ACTING CYLINDERS																		
D-4-L	.380	1.125	1.500	.312	2.00	2.625	1.88	.75	2.41	3/8-24	7.44	7.94	6.59	1.00	2.41	7/16-20	7.19	7.69
D-9-L	.500	1.625	2.375	.562	3.00	4.00	2.75	1.00	2.99	1/2-20	9.67	10.41	9.59	1.12	2.06	3/4-16	9.55	10.28
ULTRA CYLINDERS WITH LINEAR BALL BEARINGS																		
US-4-L	.380	1.125	1.500	.312	2.00	2.625	1.88	.75	2.72	3/8-24	7.81	8.30	6.59	1.00	2.78	7/16-20	7.56	8.06
US-6-L	.380	1.125	1.500	.312	2.00	4.00	1.88	.75	1.78	3/8-24	7.82	8.30	7.53	1.00	1.85	7/16-20	7.57	8.06
US-9-L	.500	1.625	2.375	.562	3.00	4.00	2.75	1.00	3.00	1/2-20	10.48	11.21	9.59	1.12	2.87	3/4-16	10.36	11.09
US-12-L	.500	1.625	2.375	.562	3.00	4.00	2.75	1.00	2.07	1/2-20	11.41	11.30	10.53	1.12	1.95	3/4-16	10.35	11.40
US-16-L	.500	1.625	2.375	.562	3.00	4.00	2.75	1.00	3.28	1/2-20	12.78	13.53	11.62	1.12	3.16	3/4-16	12.66	13.40

ROD CLEVIS MOUNT



Two styles available — CA or SM must be ordered as a separate item.
Dimensions (inches)

	4-L	6-L	9-S	9-L	12-S	12-L	16-S	16-L	36-S
CA - CONTROLAIR STANDARD									
(CT) Clevis Thread	$\frac{3}{8}$ -24	$\frac{3}{8}$ -24	$\frac{1}{2}$ -20	$\frac{1}{2}$ -20	$\frac{1}{2}$ -20	$\frac{1}{2}$ -20	$\frac{1}{2}$ -20	$\frac{1}{2}$ -20	$\frac{5}{8}$ -18
(CE) Clevis Extension	$1\frac{15}{16}$	$1\frac{15}{16}$	$1\frac{15}{16}$	$1\frac{15}{16}$	$1\frac{15}{16}$	$1\frac{15}{16}$	$1\frac{15}{16}$	$1\frac{15}{16}$	$1\frac{15}{16}$
(PS) Pin Spacing	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
(CW) Clevis Width	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38
(CB) Clevis Gap	.56	.56	.56	.56	.56	.56	.56	.56	.56
(CD) Pin Diameter	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
(NH) Nut Height	$\frac{7}{32}$	$\frac{7}{32}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{8}$
(ND) Width Across Flats	$\frac{9}{16}$	$\frac{9}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{15}{16}$

SM — *NFPA STANDARD									
(CT) Clevis Thread	$\frac{7}{16}$ -20	$\frac{7}{16}$ -20	$\frac{3}{4}$ -16	$\frac{3}{4}$ -16	$\frac{3}{4}$ -16	$\frac{3}{4}$ -16	$\frac{3}{4}$ -16	$\frac{3}{4}$ -16	1-14
(CE) Clevis Extension	$1\frac{15}{16}$	$1\frac{15}{16}$	$2\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{3}{8}$	$3\frac{1}{8}$
(PS) Pin Spacing	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.50
(CW) Clevis Width	1.38	1.38	2.50	2.50	2.50	2.50	2.50	2.50	3.00
(CB) Clevis Gap	.56	.56	1.25	1.25	1.25	1.25	1.25	1.25	1.50
(CD) Pin Diameter	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1
(NH) Nut Height	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{27}{64}$	$\frac{27}{64}$	$\frac{27}{64}$	$\frac{27}{64}$	$\frac{27}{64}$	$\frac{27}{64}$	$\frac{35}{64}$
(ND) Width Across Flats	$1\frac{1}{16}$	$1\frac{1}{16}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$

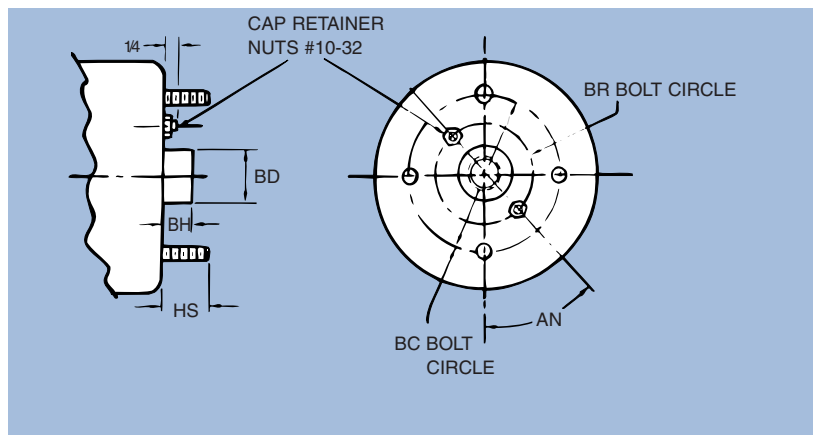
ORDERING INFORMATION — Rod Clevis

Example: 12 — CA — RC
(1) (2) (3)

- (1) Cylinder Size: Area in sq. in. 4, 5, 9, 12, 16, 36
- (2) Rod End Thread Size: CA (ControlAir Standard), SM (NFPA Standard)
- (3) Mount Type: RC indicates Rod Clevis Mount

CYLINDER CAP END MOUNTING STUDS

Cap end mounting studs are supplied only when required by mount accessory selected or when specifically requested by customer. If mounting studs on the cap end are desired add "with studs" to end of ordering data.



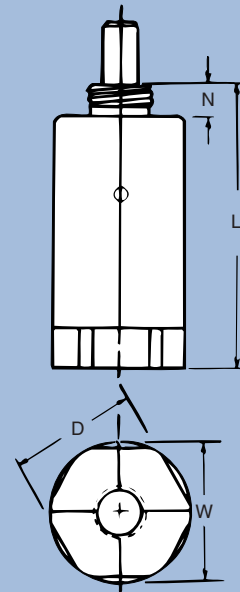
	Cylinder Size								
	4-L	6-L	9-S	9-L	12-S	12-L	16-S	16-L	36-S
# Cap Studs	2	2	4	4	4	4	4	4	4
(BC) Bolt Circle of Studs	$1\frac{15}{16}$	$1\frac{1}{2}$	2	2	$2\frac{3}{16}$	$2\frac{3}{16}$	$2\frac{3}{16}$	$2\frac{3}{16}$	4
(HS) Height of Studs	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$1\frac{1}{16}$
(SS) Stud Size	$\frac{1}{4}$ -20	$\frac{1}{4}$ -20	$\frac{1}{4}$ -20	$\frac{1}{4}$ -20	$\frac{1}{4}$ -20	$\frac{1}{4}$ -20	$\frac{3}{8}$ -16	$\frac{3}{8}$ -16	$\frac{1}{2}$ -13
(BD) Boss Diameter	$\frac{11}{16}$	$\frac{11}{16}$	$\frac{11}{16}$	$\frac{11}{16}$	1	1	1	1	1
(BH) Boss Height	$\frac{13}{32}$	$\frac{13}{32}$	$\frac{13}{32}$	$\frac{13}{32}$	$\frac{17}{32}$	$\frac{17}{32}$	$\frac{17}{32}$	$\frac{17}{32}$	$\frac{17}{32}$
(BR) Bolt Circle Retainer Nuts	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{3}{8}$	$1\frac{11}{16}$	$1\frac{11}{16}$	$1\frac{11}{16}$	$1\frac{11}{16}$	$1\frac{11}{16}$
(AN) Angle (Degrees)	90	90	45	45	45	45	45	45	45

SMALL BORE DIAPHRAGM AIR CYLINDERS

MINI MIGHTS

The MiniMights offer the same friction free performance as ControlAir's larger sized diaphragm air cylinders. These cylinders are highly sensitive with low hysteresis. They are available with threaded or unthreaded rod ends, flush or extended.

Specifications	MM-1 349-180-007	MM-2 349-180-009
Stroke	0.70"	0.70"
Effective Pressure Area	0.384 sq. in.	0.384 sq. in.
Bore	0.7"	0.7"
Spring Load ("0" Stroke)	2 lbs.	2 lbs.
Spring Load (Max Stroke)	7 lbs.	7 lbs.
Max Operating Pressure	125 psi	125 psi
Dimensions		
L	2.81"	2.81"
N	0.438"	0.438"
W	$\frac{15}{16}$ "	$\frac{15}{16}$ "
D	$\frac{7}{8}$ "	$\frac{7}{8}$ "
Nose Mount Thread Size	$\frac{1}{2}$ "-20 UNF	$\frac{1}{2}$ "-20 UNF
Rod Diameter	$\frac{1}{4}$ "	$\frac{1}{4}$ "
Rod Extension	Flush	$\frac{3}{4}$ "
Rod Thread	—	$\frac{1}{4}$ "-28 UNF
Pipe Connection	$\frac{1}{8}$ "-27 NPSF	$\frac{1}{8}$ "-27 NPSF

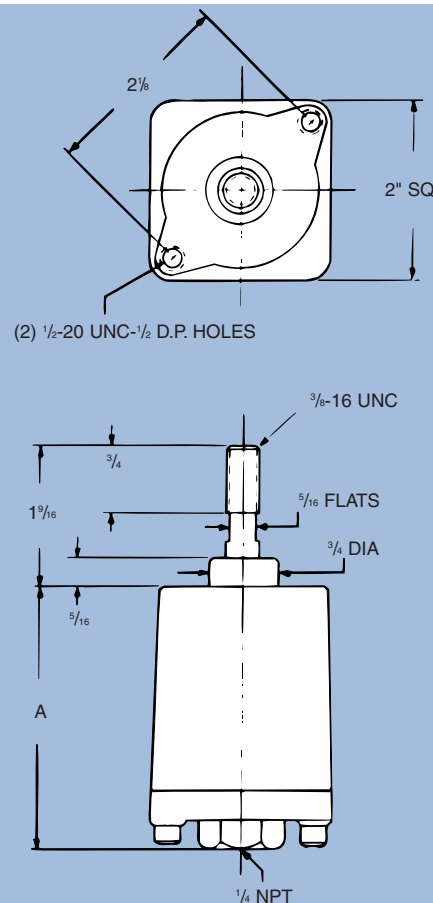


Materials: Aluminum Alloy Cylinder, Polyester Fabric Reinforced Nitrile Diaphragm, Treated Steel Rod, Music Wire Spring, Sintered Bronze Bearing.

LOW COST CYLINDERS

Specifications	Part No. 139-190-002	Part No. 139-190-001
Stroke	1"	$1\frac{3}{4}$ "
Effective Pressure Area	1.7 in. ²	1.7 in. ²
Dimension A	$2\frac{29}{32}$ "	$3\frac{21}{32}$ "
Bore Equivalent	1.5"	1.5"
Spring Load ("0" Stroke)	4 lbs.	4 lbs.
Spring Load (Max Stroke)	8 lbs.	11 lbs.
Max Operating Pressure	125 psi	125 psi
Mounting Hole Sizes	$\frac{1}{4}$ "-20 UNC	$\frac{1}{4}$ "-20 UNC

Materials: Diecast aluminum cylinder and end cap. Chrome plated carbon steel rod. Oil impregnated bronze bearing. Polyester fabric reinforced Nitrile diaphragm. Music wire spring.



REPAIR KITS

Repair kits and replacement components are available from stock. All ControlAir kits and components are completely interchangeable with similar competitive cylinders already in the field. The repair kits consist of the following:

Spring Return Diaphragm Kit

1. Diaphragm
2. Adhesive Disk
3. Cap Retainer Sealing Nuts (2)
4. Instructions

Spring Return Bearing Kit

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

Double Acting Diaphragm Kit

1. Diaphragm, Cap
2. Diaphragm, Head
3. Retainer Adhesive, Cap
4. Retainer Adhesive, Head
5. Retaining Screws
6. Nuts, Cap Retainer
7. Seal "O" Ring
8. Tube, Silicone, Sealant

Double Acting Bearing Kit

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

Ultra Cylinder Bearing Kit

1. Linear Ball Bearing
2. Instructions

CYLINDER MODEL	DIAPHRAGM KIT NO.	BEARING KIT NO.
D-4-L	D4L	CAB-1/2-D
D-9-L	D9L	CAB-3/4-D
S-4-L	S4L	CAB-1/2
S-6-L	S6L	CAB-1/2
S-9-S	S9S	CAB-3/4
S-9-L	S9L	CAB-3/4
S-12-S	S12S	CAB-3/4
S-12-L	S12L	CAB-3/4
S-16-S	S16S	CAB-3/4
S-16-L	S16L	CAB-3/4
S-36-S	S36S	CAB-1
US-4-L	S4L	US-CAB-1/2
US-6-L	S6L	US-CAB-1/2
US-9-L	S9L	US-CAB-3/4
US-12-L	S12L	US-CAB-3/4
US-16-L	S16L	US-CAB-3/4

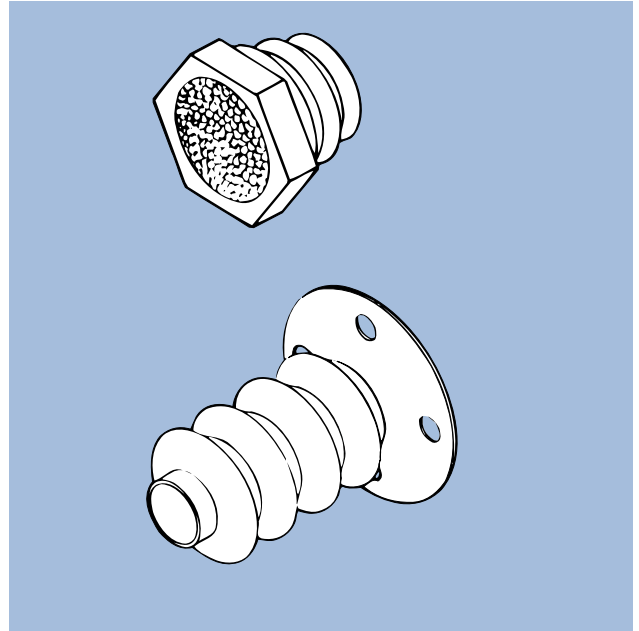
ACCESSORIES

Breather Vents — Are used to prevent contamination from being drawn into the air relief port on the side of the cylinder head during the return stroke of the single acting cylinders. The BVF consists of a 40 micron bronze filter and is installed by threading into the side relief port.

To order: BVF-1 Fits cylinder sizes 4, 6, 9. 1/4" pipe tap.
BVF-2 Fits cylinder sizes 12, 16, 36. 3/8" pipe tap.

Protective Bellows— Are used for No Bearing or Ultra Cylinder applications to prevent contaminants from being drawn in through the cylinder head. The flange of the bellows is trimmed to accommodate the mounting configuration on the face of the cylinder head.

To order: PB-1 Fits cylinder sizes 4, 6. 2" bolt circle.
PB-2 Fits cylinder sizes 9, 12, 16. 3" bolt circle.
Mount Kit for PB-1: P/N 149-400-019
Mount Kit for PB-2: P/N 149-400-021



LIMITED WARRANTY & DISCLAIMER

ControlAir, Inc. products are warranted to be free from defects in materials and workmanship for a period of one year from the date of sale, provided said products are used according to Control Air, Inc. recommended usages. ControlAir, Inc.'s liability is limited to repair of, refund of purchase paid for, or replacement in kind of, at ControlAir, Inc.'s sole option, any products proved defective. ControlAir, Inc. reserves the right to discontinue manufacture of any products or change products materials, design or specifications without notice.

WARNING

These products are intended for use in industrial compressed-air systems only. Do not use these products where pressures and temperatures can exceed those listed under Specifications.

Before using these products with fluids other than air, for nonindustrial applications, life-support systems, or other applications not within published specifications, consult ControlAir, Inc.

APPLICATIONS AND ENGINEERING ASSISTANCE

ControlAir engineers are always available to provide answers to any questions that you might have about product performance or applications. We encourage you to give us a call at (603) 886-9400.

NOTES



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