

Provenair®

Provenair®...The Most Flexible Cylinder for New or Retrofit

Your best creations are only as good as their parts. Ensure performance to your customer's expectations by including ARO® Provenair Cylinders in your original specifications. They are precision built using the latest extrusion technologies and feature a profiled barrel that is not only good looking, but eliminates cumbersome and dirt-catching tie rods. At the same time, the profiled barrel provides superior strength compared to traditional tie rod constructed cylinders. Provenair end caps, mounts, and rod end accessories - even our position sensor brackets, are protected against corrosion. To maximize cycle life, every Provenair has a factory-installed PTFE coated wearband on the piston. A "Floating" rod bushing provides smooth strokes and maximized wear; reduced galling compared to bronze bushings. Maintenance and repair of ARO® Provenair Cylinders is very simple and fast. The rod bushing is retained by a stainless steel spiro retaining ring and is easily removed with a small screwdriver. The retaining ring slides off the rod along with the bushing and its captive seals. There are no small screws to lose on the floor or under your machine, and no seals to fall inside the cylinder. Replacement of the reciprocating assembly and its seals is equally simple and, unlike tie rod cylinders, you needn't worry about equalizing torque on the Provenair tie bolts!



with an ARO® mounting kit. If you require an oversized rod diameter, Provenair converts easily - right on your machine! Simply specify the piston rod diameter, thread style, and material (chrome steel or stainless steel) when ordering the replacement reciprocating assembly; order a rod bushing for the new piston rod diameter and you're ready to install. Your original Provenair now needs a magnetic piston? Order a magnet and easily install it and you can select from three types of attachable position sensors.

Provenair is flexible, you can change it to fit most of your application requirements. Factory installed mounts save you time, but you may easily change your Provenair Cylinder mount

- Tie bolt construction eliminates rod binding and tie rod torque problems. (Series AN up to 4" bore)
- Series SN all stainless steel cylinders are corrosion resistant and have tie rods.
- Rugged thick walled tubes resist denting.
- NFPA repairable and interchangeable.
- 15 NFPA mounting styles.
- Factory lubricated grease that won't wash out.
- Optional oversized rods available to provide extra column strength. (Series AN and SN)
- Operates on air pressure up to 250 p.s.i.
- Output forces up to 19,635 lbs. (10" bore at 250 p.s.i.).
- Std. operating temp: 0° to 185°(F), -18° to 82° (C).
- Rotated ports are optional.
- Viton seals for high heat applications (up to 300° F, 149° C)

Provenair®

Performance Specifications

Aluminum NFPA Interchangeable

Bore sizes:	1-1/2", 2", 2-1/2", 3-1/4", 4", 5", 6", 8" and 10"
Seals:	Buna-N, Viton or Slippery (Aluminum alloy piston with lip-type seals)
Barrel:	Profiled Extrusion (5", 6", 8" and 10" have tie rods.) (Patented)
Bushings:	"Floating" Rod bushings for low friction, superior wear and side load resistance
Switches:	Metal Jacketed
Piston Rods:	Chrome plated ground and polished high tensile steel
Options:	Optional Piston Magnet Double Rod End 303 S.S. Piston Rods Studded male rods for 50% stronger threads than cold rolled thread rod ends

Stainless Steel NFPA Interchangeable

Bore sizes:	1-1/2", 2", 2-1/2", 3-1/4", 4", 5", 6", and 8"
Rod Bushing:	Bronze
Rod Wiper:	PTFE coated
External Components:	303/304 – End caps, tie rods, piston rods, mounts (barrel is 316)
Mounting Styles:	15 NFPA
Options:	Optional adjustable cushions Piston Magnet Viton Seals (Wiper PTFE coated) Double rod ends



Aluminum NFPA

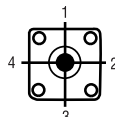
Ordering Include dashes. Dashes are significant.

Series AN (1-1/2' thru 10" Bore)

Position	1	2	3	4	5		6	7	8	9	10		11
Example:	A	N	X	X	X	-	X	X	X	X	X	-	XXX

Position 1 Actuators	Position 2 Series (NFPA)	Position 3 Type	Position 4 Bore Size	Position 5 Rod Diameter
A - Aluminum actuators	N - All Provenair Cylinders	A - Double Acting, Single Rod B - Double Acting, Double Rod	Q - 1- 1/2" S - 2" T - 2- 1/2" W - 3-1/4" 4 - 4" 5 - 5" 6 - 6" 8 - 8" Y - 10" <small>Note: 5", 6", 8" & 10" bores have tie rods</small>	K - 5/8" Note: Available in 1-1/2", 2" and 2-1/2" bores only. M - 1" Note: Available in 2", 2-1/2", 3-1/4", 4" and 5" bores only. P - 1 3/8" Note: Available in 3-1/4", 4", 5", 6" and 8" bores only. Q - 1 3/4" Note: Available in 6", 8" and 10" bores only. S - 2" Note: Available in 10" bores only.

Position 6 Rod Style	Position 7 Seals	Position 8 Cushions	Position 9 Port Location
A - Chrome, Std Male (KK₁) B - Chrome, Intermed. Male(KK ₂) C - Chrome, Full Male (CC) D - Chrome, Female (KK ₁) F - Chrome, No Threads G - S.S., Standard Male (KK ₁) H - S.S., Intermediate Male (KK ₂) J - S.S., Full Male (CC)	K - S.S., Female (KK ₁) L - S.S., No Threads 1 - KK ₁ Chrome, Studded 2 - KK ₂ Chrome, Studded 3 - CC Chrome, Studded 4 - KK ₁ SS, Studded 5 - KK ₂ SS, Studded 6 - CC SS, Studded	B - Buna-N V - Viton S - Slippery G - Buna-N + Magnetic Piston H - Viton + Magnetic Piston J - Slippery + Magnetic Piston	X - No Cushions B - Cushion Both Ends H - Cushion Head End (Rod End) C - Cushion Cap End A - H1, C1 (Std.) B - H1, C2 C - H1, C3 D - H1, C4 F - H2, C1 G - H2, C2 H - H2, C3 J - H2, C4 <small>(MS4 mounts: Port locations other than "A", call factory. Trunnion mounts: ports "A" or "C" only.)</small>



Determine port location looking at rod end of cylinder.

Position 10 Mount	Position 11 Stroke Length																																	
A MS1 (8" and 10" Bore ME3, ME4) B MS4** (Mounts must be factory installed on 5", 6", 8" and 10" Bore) C MP1** D MP2** F MF1/ME3** H MF2/ME4** K MP4*	<table border="0"> <tr> <td>Q MX1</td> <td>Whole Inches</td> <td>Fraction Inches</td> </tr> <tr> <td>T MX2</td> <td>00 = 0"</td> <td>0 = None</td> </tr> <tr> <td>U MX3</td> <td>01 = 1"</td> <td>1 = 1/8"</td> </tr> <tr> <td>4 FMB/MS4*</td> <td>02 = 2"</td> <td>2 = 1/4"</td> </tr> <tr> <td></td> <td>03 = 3"</td> <td>3 = 3/8"</td> </tr> <tr> <td></td> <td>04 = 4"</td> <td>4 = 1/2"</td> </tr> <tr> <td></td> <td>05 = 5"</td> <td>5 = 5/8"</td> </tr> <tr> <td></td> <td>06 = 6"</td> <td>6 = 3/4"</td> </tr> <tr> <td></td> <td>- to -</td> <td>7 = 7/8"</td> </tr> <tr> <td></td> <td>99 = 99"</td> <td></td> </tr> <tr> <td></td> <td>etc.</td> <td></td> </tr> </table> <p>Maximum stroke 99 7/8", for longer strokes consult factory. Stroke lengths 20" and longer may require stop tubes, see page 7.</p>	Q MX1	Whole Inches	Fraction Inches	T MX2	00 = 0"	0 = None	U MX3	01 = 1"	1 = 1/8"	4 FMB/MS4*	02 = 2"	2 = 1/4"		03 = 3"	3 = 3/8"		04 = 4"	4 = 1/2"		05 = 5"	5 = 5/8"		06 = 6"	6 = 3/4"		- to -	7 = 7/8"		99 = 99"			etc.	
Q MX1	Whole Inches	Fraction Inches																																
T MX2	00 = 0"	0 = None																																
U MX3	01 = 1"	1 = 1/8"																																
4 FMB/MS4*	02 = 2"	2 = 1/4"																																
	03 = 3"	3 = 3/8"																																
	04 = 4"	4 = 1/2"																																
	05 = 5"	5 = 5/8"																																
	06 = 6"	6 = 3/4"																																
	- to -	7 = 7/8"																																
	99 = 99"																																	
	etc.																																	

NOTE: Bold selections denote most popular models.

Stainless Steel NFPA

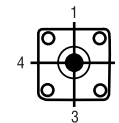
Ordering Include dashes. Dashes are significant.

Series AN (1-1/2' thru 10" Bore) All SN Series Cylinders have tie rods.

Position	1	2	3	4	5		6	7	8	9	10		11
Example:	S	N	X	X	X	-	X	X	X	X	X	-	XXX

Position 1 Actuators	Position 2 Series (NFPA)	Position 3 Type	Position 4 Bore Size	Position 5 Rod Diameter
S - Stainless Steel	N - All Provenair Cylinders	A - Double Acting, Single Rod B - Double Acting, Double Rod <small>Not available in 8" bore.</small>	Q - 1- 1/2" S - 2" T - 2- 1/2" W - 3-1/4" 4 - 4" 5 - 5" 6 - 6" 8 - 8"	K - 5/8" Available in 1-1/2", 2" & 2-1/2" bores only. M - 1" Available in 2", 2-1/2", 3-1/4", 4" & 5" bores only. P - 1 3/8" Available in 3-1/4", 4", 5", 6" & 8" bores only. Q - 1 3/4" Available in 6" & 8" bores only.

Position 6 Rod Style	Position 7 Seals	Position 8 Cushions	Position 9 Port Location
G - S.S., Standard Male (KK ₁) H - S.S., Intermediate Male (KK ₂) J - S.S., Full Male (CC) K - S.S., Female (KK ₁) L - S.S., No Threads	B - Buna-N V - Viton S - Slippery G - Buna-N + Magnetic Piston <small>Note: PTFE Wiper standard</small> H - Viton + Magnetic Piston J - Slippery + Magnetic Piston	X - No Cushions B - Cushion Both Ends H - Cushion Head End (Rod End) C - Cushion Cap End	A - H1, C1 (Std.) B - H1, C2 C - H1, C3 D - H1, C4 F - H2, C1 G - H2, C2 H - H2, C3 J - H2, C4 <small>(MS4 mounts: Port locations other than "A", call factory. Trunnion mounts: ports "A" or "C" only.)</small>



Determine port location looking at rod end of cylinder.

Position 10 Mount	Position 11 Stroke Length																						
B MS4** (8" Bore ME3, ME4) C MP1** (Mounts must be factory installed) F MF1/ME3** H MF2/ME4** K MP4* * 1 1/2" - 6" Bore Only Q MX1 ** Available 1 1/2" - 4" Bore Only T MX2 U MX3 X No Mount	<table border="1"> <thead> <tr> <th>Whole Inches</th> <th>Fraction Inches</th> </tr> </thead> <tbody> <tr><td>00 = 0"</td><td>0 = None</td></tr> <tr><td>01 = 1"</td><td>1 = 1/8"</td></tr> <tr><td>02 = 2"</td><td>2 = 1/4"</td></tr> <tr><td>03 = 3"</td><td>3 = 3/8"</td></tr> <tr><td>04 = 4"</td><td>4 = 1/2"</td></tr> <tr><td>05 = 5"</td><td>5 = 5/8"</td></tr> <tr><td>06 = 6"</td><td>6 = 3/4"</td></tr> <tr><td>- to -</td><td>7 = 7/8"</td></tr> <tr><td>99 = 99"</td><td></td></tr> <tr><td>etc.</td><td></td></tr> </tbody> </table> <p>Maximum stroke 99 7/8", for longer strokes consult factory. Stroke lengths 20" and longer may require stop tubes, see page 7.</p>	Whole Inches	Fraction Inches	00 = 0"	0 = None	01 = 1"	1 = 1/8"	02 = 2"	2 = 1/4"	03 = 3"	3 = 3/8"	04 = 4"	4 = 1/2"	05 = 5"	5 = 5/8"	06 = 6"	6 = 3/4"	- to -	7 = 7/8"	99 = 99"		etc.	
Whole Inches	Fraction Inches																						
00 = 0"	0 = None																						
01 = 1"	1 = 1/8"																						
02 = 2"	2 = 1/4"																						
03 = 3"	3 = 3/8"																						
04 = 4"	4 = 1/2"																						
05 = 5"	5 = 5/8"																						
06 = 6"	6 = 3/4"																						
- to -	7 = 7/8"																						
99 = 99"																							
etc.																							

NOTE: Bold selections denote most popular models.

Attachable Mounting Kits for Series AN

Series AN (1-1/2" Thru 4" Bore)

	1 1/2"	2"	2 1/2"	3 1/4"	4"
MP2 HD Clevis (Iron) *	118696	118697	118698	118699	118700
MP4 HD Eye (Iron)	118701	118702	118703	118704	118705
MF1, MF2 Flange (Steel)	115282	115283	115284	115285	115286
MP1 Fixed Clevis (Alum.) *	115477	115478		115480	115481
MP2 Det. Clevis (Alum.) *	115287	115288	115289	115290	115291
MP4 HD Eye (Alum.) *	115292	115293	115294	115295	115296

Above kits include all necessary hardware to complete mounting to Provenair cylinders. AN Series only.
 *Pivot pin included in kit. (Kits not available for 5", 6", 8", or 10" Bores) (Kits not available for SN Models)



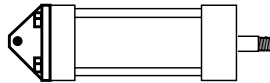
MX1, 2 or 3 Tie Rod Extensions

MX1 requires two tie rod extension bolt kits (four extension studs per kit).

Factory Installed Mounts



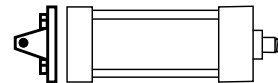
Mount C



MP1 Fixed Clevis



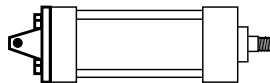
Mount K



MP4 Detachable Eye

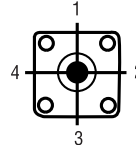


Mount D



MP2 Detachable Clevis

Determine port location looking at rod end of cylinder.



Note: Not all mounts are available on stainless steel models.

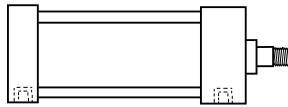
Provenair®

Mounting Data

Series AN, SN (1-1/2" Thru 10" Bore)

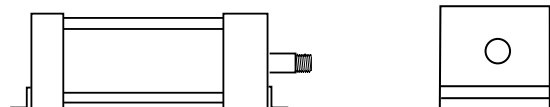
Factory Installed Mounts

Mount B



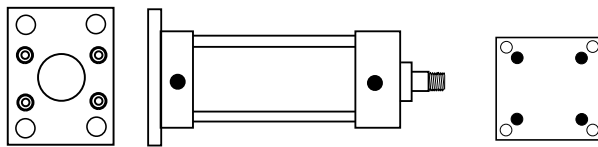
MS4 Side Tapped

Mount A

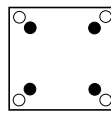


MS1 Side End Angle

Mount H

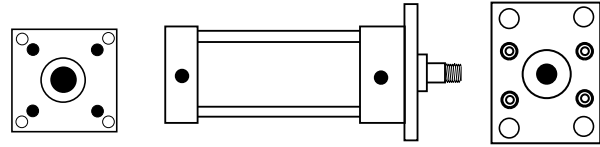


MF2 Cap. Rec. Flange

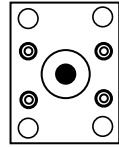


ME4 8" Bore

Mount F

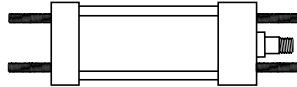


ME3 8" Bore



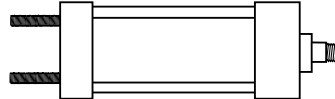
MF1 Head Rec. Flange

Mount Q



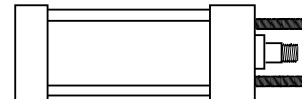
MX1 Cap and Head Ext. Tie Rod

Mount T



MX2 Cap Ext. Tie Rod

Mount U



MX3 Head Ext. Tie Rod

Note: Mounts H & F 8" and 10" bore cylinders use oversized end cap as shown (ME3 or ME4).
A steel rectangular flange plate is used for all MF1 or MF2 (1 1/2 thru 6" bore).

Note: Not all mounts are available on stainless steel models (Series SN)

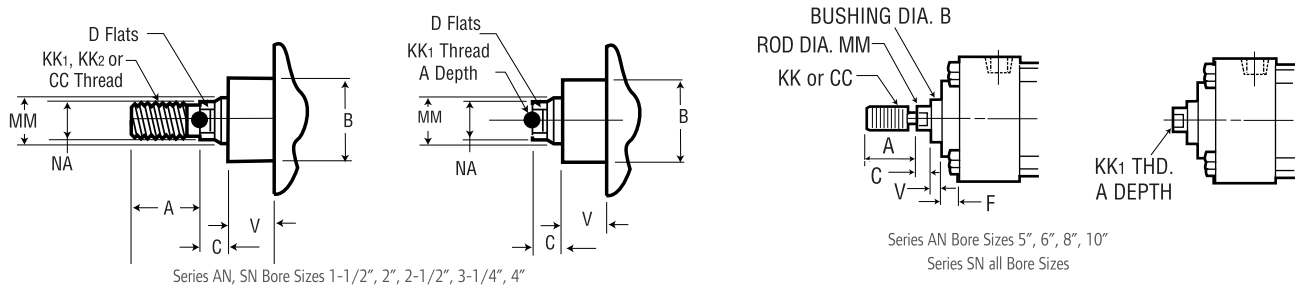
Dimensional Data

Series AN , SN (Rod End)

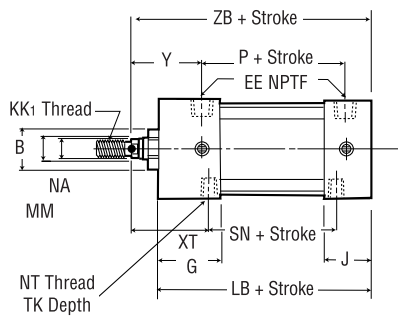
Rod End Dimensions for 1-1/2" – 10" Bore Sizes

	Cylinder Bore (Inches)							
	1-1/2, 2, 2-1/2	2, 2-1/2	3-1/4, 4	3-1/4, 4	5	5, 6, 8	6, 8, 10	10
Rod Diameter (Inches)	5/8	1	1	1-3/8	1	1-3/8	1-3/4	2
KK1 THD. (M OR F)	7/16"-20	3/4"-16	3/4"-16	1"-14	3/4"-16	1"-14	1-1/4"-12	1-1/2"-12
KK2 THD. (MALE)	1/2"-20	7/8"-14	7/8"-14	1-1/4"-12	7/8"-14	1-1/4"-12	1-1/2"-12	1-3/4"-12
CC (MALE)	5/8"-18	1"-14	1"-14	1-3/8"-12	1"-14	1-3/8"-12	1-3/4"-12	2"-12
A	.75	1.13	1.13	1.63	1.13	1.63	2.00	2.25
B	1.13	1.50	1.50	1.50	1.50	2.00	2.38	2.38
C	.34	.62	.48	.60	.50	.63	.75	.88
D	.50	.88	.88	.81	.81	1.13	1.50	1.75
F	.325	.325	.625	.625	.625	.625	.625	.75
MM	.625	1.00	1.00	1.00	1.00	1.375	1.75	2.00
V	.66	.75	.89	1.02	.25	.38	.38 *	.38
	-	-	-	-	-	-	*(.50 on 10")	

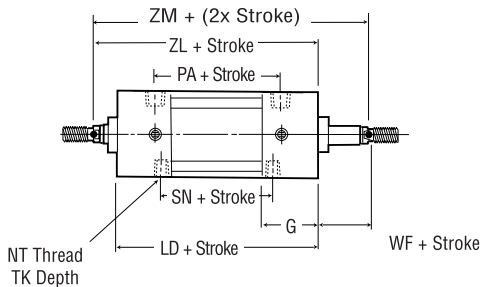
Selection of oversize piston rod affects the following dimensions: ZB, ZC, ZD, ZE, ZF, ZL, ZM, XC, XD, XE, XG, XJ, XS, XT, V, W, WF, C, V, LA. See rod end dimensions.



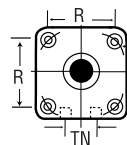
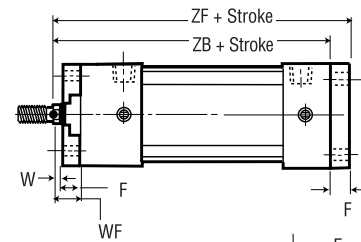
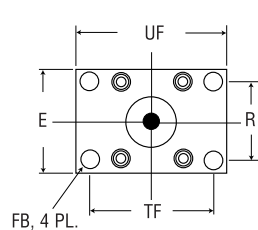
Series AN , SN (With Standard Rod)



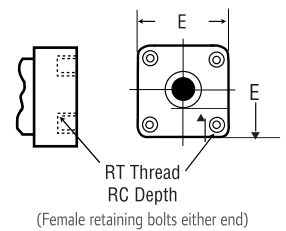
Double Rod End MS4 MOUNT B



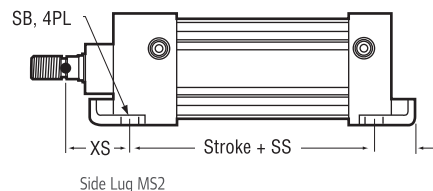
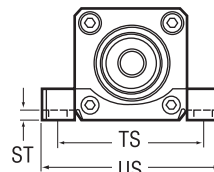
Rect. Flange – Head-MF1, Cap-MF2 MOUNT F & H (1 1/2" - 4" BORE ONLY)



Side Tapped MS4 MOUNT B



Head Trunnion MT1 Cap Trunnion MT2 MOUNT M & P



Provenair®

Dimensional Data

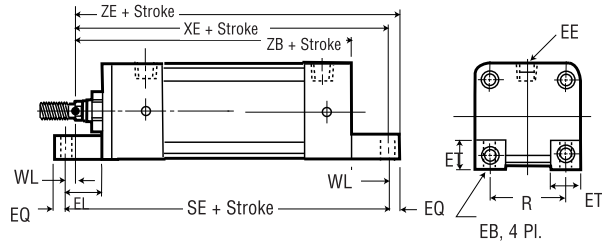
Series AN, SN (1-1/2" Thru 4" Bore w/standard rod)

	Cylinder Bore (Inches)				
	1-1/2	2	2-1/2	3-1/4	4
B	1.13	1.13	1.13	1.50	1.50
BC	2.02	2.60	3.10	3.90	4.70
E	2.00	2.50	3.00	3.75	4.50
EE	3/8-18	3/8-18	3/8-18	1/2-14	1/2-14
F	.38	.38	.38	.63	.63
FB	.31	.38	.38	.44	.44
G	1.44	1.44	1.44	1.69	1.69
J	.94	.94	.94	1.19	1.19
KK1 (thread)	7/16-20	7/16-20	7/16-20	3/4-16	3/4-16
LB	3.62	3.62	3.75	4.25	4.25
LD	4.12	4.12	4.25	4.75	4.75
MM (rod dia.)	5/8	5/8	5/8	1.00	1.00
NA	.59	.59	.59	.97	.97
NT	1/4-20	5/16-18	3/8-16	1/2-13	1/2-13
P	2.25	2.25	2.38	2.62	2.62
PA	2.75	2.75	2.88	3.12	3.12
R	1.43	1.84	2.19	2.76	3.32
RC	.41	.538	.41	.599	.44
RT	1/4-28	5/16-24	5/16-24	3/8-24	3/8-24
SB	.38	.38	.38	.50	.50
SN	2.25	2.25	2.38	2.63	2.63
SS	2.88	2.88	3.00	3.25	3.25
ST	.56	.69	.81	1.00	1.19
SX	.34	.34	.34	.47	.47
SY1	1.34	1.53	1.53	2.13	2.19
SY2	.94	1.13	1.13	1.50	1.56
TF	2.75	3.38	3.88	4.69	5.44
TK	.38	.43	.69	.75	.75
TN	.63	.88	1.25	1.50	2.06
TS	2.75	3.25	3.75	4.75	5.50
UF	3.38	4.13	4.63	5.50	6.25
US	3.50	3.69	4.50	5.75	6.50
UT	4.00	4.50	5.00	5.75	6.50
W	.66	.66	.66	.75	.75
WF*	1.00	1.00	1.00	1.38	1.38
XG*	1.75	1.75	1.75	2.25	2.25
XJ*	4.12	4.12	4.25	5.00	5.00
XS*	1.38	1.38	1.38	1.88	1.88
XT*	1.94	1.94	1.94	2.44	2.44
Y*	1.94	1.94	1.94	2.44	2.44
ZB*	4.63	4.63	4.75	5.63	5.63
ZF*	5.00	5.00	5.12	6.25	6.25
ZL*	5.12	5.12	5.25	6.12	6.12
ZM*	6.15	6.15	6.27	7.52	7.52

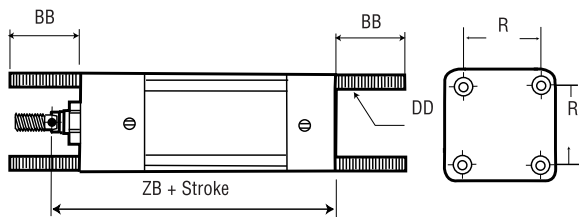
* Oversize piston rod option affects these dimensions. See rod end dimensions.

Dimensional Data

Series AN, SN (1-1/2" Thru 10" Bore w/standard rod)

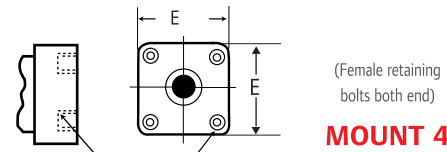


Angle Mount MS1 MOUNT A

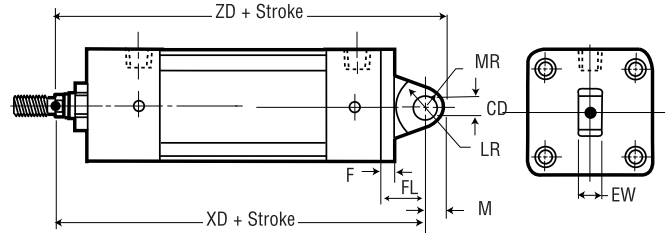


Tie Rod Mounts

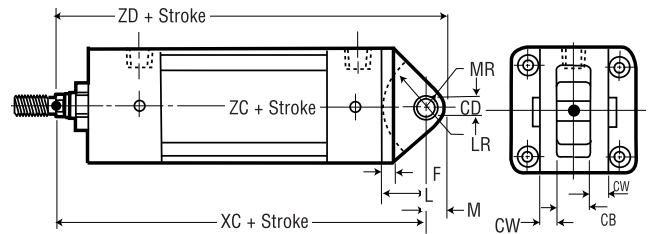
MX1 Extended Both Ends MX3 Extended Head End MOUNT Q, T & U



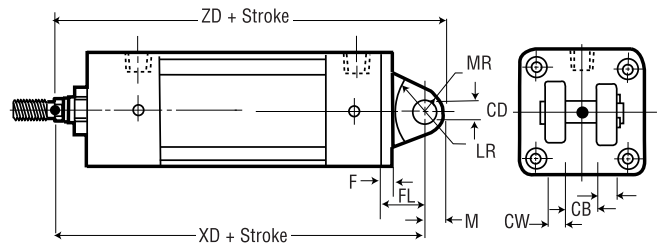
MOUNT 4



Detachable Eye MP4 MOUNT K



Fixed Clevis MP1 MOUNT C



Detachable Clevis MP2 MOUNT D (AN Series only)

Dimensional Data

Series AN (1-1/2" Thru 4" Bore w/standard rod)

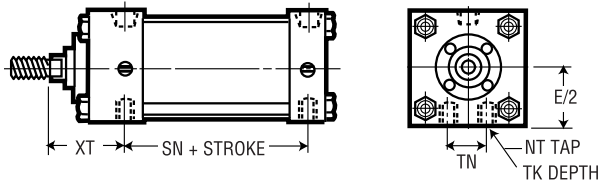
	Cylinder Bore (Inches)						Cylinder Bore (Inches)						Cylinder Bore (Inches)				
	1-1/2	2	2-1/2	3-1/4	4		1-1/2	2	2-1/2	3-1/4	4		1-1/2	2	2-1/2	3-1/4	4
AB	.38	.38	.38	.50	.50	EQ	.25	.31	.31	.38	.38	SE	5.50	5.88	6.25	6.63	6.88
AH	1.18	1.44	1.62	1.94	2.25	ET	.56	.69	.81	1.00	1.19	W*	.66	.66	.66	.75	.75
AL	1.00	1.00	1.00	1.25	1.25	EW	.75	.75	.75	1.25	1.25	WL	.14	.33	.45	.13	.25
AO	.38	.38	.38	.50	.50	F	.38	.38	.38	.63	.63	XA	5.62	5.62	5.75	6.88	6.88
BB	1.00	1.13	1.13	1.38	1.38	KK ₁ (Thread)	7/16-207/16-207/16-20	3/4-16	3/4-16			XC*	5.38	5.38	5.50	6.88	6.88
CB	.75	.75	.75	1.25	1.25	FL	1-1/8	1-1/8	1-1/8	1-7/8	1-7/8	XD*	5.75	5.75	5.88	7.50	7.50
CD	.50	.50	.50	.75	.75	L	3/4	3/4	3/4	1-1/4	1-1/4	XE*	5.38	5.56	5.81	6.50	6.63
CW	.50	.50	.50	.63	.63	LR	3/4	3/4	3/4	1-1/4	1-1/4	ZB*	4.63	4.63	4.75	5.63	5.63
DD	1/4-28	5/16-24	5/16-24	3/8-24	3/8-24	M	5/8	5/8	5/8	7/8	7/8	ZC*	5.84	5.88	6.00	7.63	7.63
E	2.00	2.50	3.00	3.75	4.50	MR	.47	.50	.50	.75	.75	ZD*	6.22	6.25	6.38	8.25	8.25
EB	.28	.34	.34	.38	.38	R	1.43	1.84	2.19	2.76	3.32	ZE*	5.63	5.84	6.13	6.88	7.00
EE (NPTF)	3/8-18	3/8-18	3/8-18	1/2-14	1/2-14	S	1.25	1.75	2.25	2.75	3.50						
EL	.75	.94	1.06	.88	1.00	SA	6.00	6.00	6.12	7.38	7.38						

* Oversize piston rod option affects these dimensions.

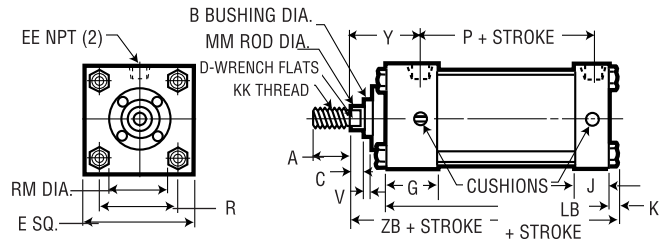
Provenair®

Dimensional Data

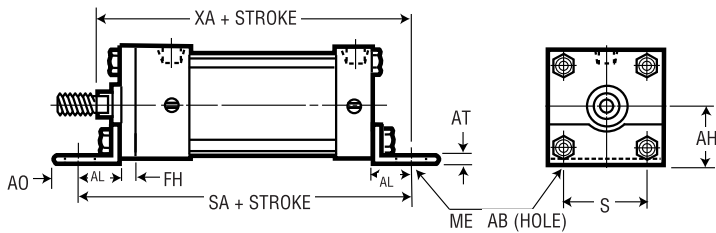
Series AN, SN (5", 6", 8" and 10" Bore)



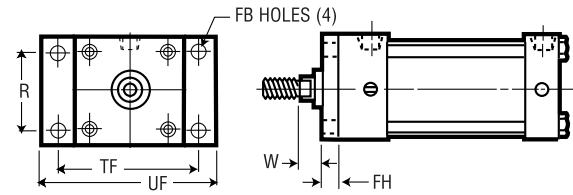
Side Tapped MS4



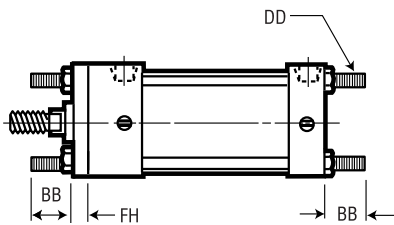
Basic Cylinder Dimensions



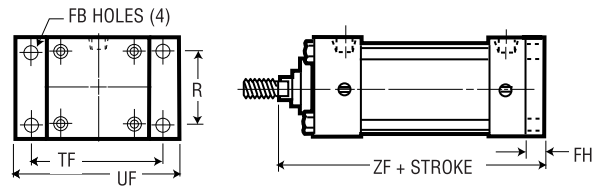
End Angle MS1



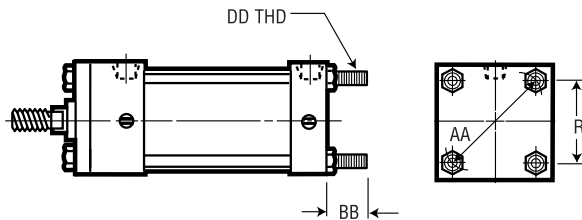
Head Rectangular Flange MF1



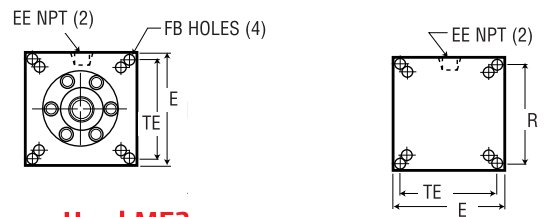
Tie Rods Extended Both Ends MX1



Cap Rectangular Flange MF2

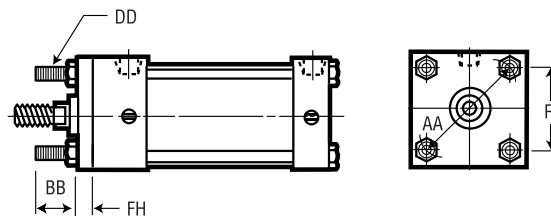


Tie Rods Extended, Cap End MX2



Flange Head ME3

Flange Cap ME4



Tie Rods Extended, Head End MX3

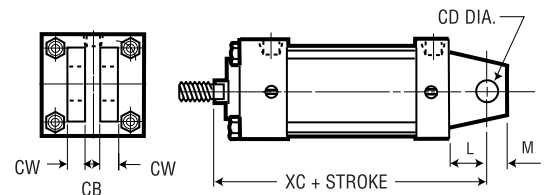
Dimensional Data

Provenair Mounts

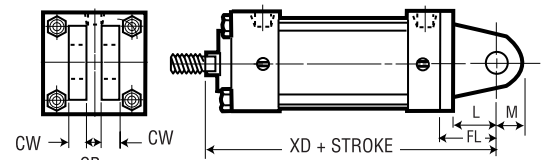
Series AN, SN (5", 6", 8", & 10" Bore)

ROD	CYLINDER BORE (INCHES)							
	5 1	5 1-3/8	6 1-3/8	6 1-3/4	8 1-3/8	8 1-3/4	10 1-3/4	
A	1.13	1.63	1.63	2.00	1.63	2.00	2.00	
AA	5.18	5.18	6.90	6.90	9.10	9.10	11.20	
AB	.69	.69	.81	.81	.81	.81	-	
AH	2.88	2.88	3.25	3.25	4.25	4.25	-	
AL	1.38	1.38	1.38	1.38	1.81	1.81	-	
AO	.63	.63	.63	.63	.69	.69	-	
AT	.19	.19	.19	.19	.25	.25	-	
B	1.50	2.00	2.00	2.38	2.00	2.38	2.38	
BB	1.81	1.81	1.81	1.81	2.31	2.31	2.69	
C	.50	.63	.63	.75	.63	.75	.75	
CB	1.25	1.25	1.50	1.50	1.50	1.50	2.00	
CD	.75	.75	1.00	1.00	1.00	1.00	1.38	
CW	.63	.63	.75	.75	.75	.75	1.00	
D	.81	1.13	1.13	1.50	1.13	1.50	1.50	
DD	1/2"-20	1/2"-20	1/2"-20	1/2"-20	5/8"-18	5/8"-18	3/4"-16	
E	5.50	5.50	6.50	6.50	8.50	8.50	10.63	
EE (NPTF)	1/2	1/2	3/4	3/4	3/4	3/4	1.00	
F	.63	.63	.63	.75	.63	.75	.63	
FB	.56	.56	.56	.56	.69	.69	.81	
FH	.63	.63	.75	.75	-	-	.63	
FL	2.13	2.13	2.25	2.25	-	-	-	
G	1.75	1.75	2.00	2.00	2.00	2.00	2.25	
J	1.25	1.25	1.50	1.50	1.50	1.50	2.00	
K	.44	.44	.50	.50	.63	.63	.69	
KK ₁ THREAD	3/4-16	1-14	1-14 1/4-12	1-14 1/4-12	1-14 1/4-12	1-1/4-12		
L	1.25	1.25	1.50	1.50	1.50	1.50	2.13	
LB	4.25	4.25	5.00	5.00	5.13	5.13	6.38	
LD	4.75	4.75	5.50	5.50	5.63	5.63	6.63	
M	.88	.88	1.00	1.00	1.00	1.00	1.38	
MM	1	1-3/8	1-3/8	1-3/4	1-3/8	1-3/4	1-3/4	
NT	5/8"-11	5/8"-11	3/4"-10	3/4"-10	3/4"-10	3/4"-10	1-8	
P	2.63	2.63	3.00	3.00	3.13	3.13	4.31	
R	4.10	4.10	4.88	4.88	7.57	7.57	7.92	
RM	2.63	3.38	3.38	3.50	3.38	3.50	3.50	
S	4.25	4.25	5.25	5.25	7.13	7.13	7.13	
SA	7.63	7.63	8.50	8.50	8.75	8.75	-	
SN	2.88	2.88	3.13	3.13	3.25	3.25	4.13	
TD	1.00	1.00	1.38	1.38	1.38	1.38	-	
TE	-	-	-	-	7.57	7.57	9.40	
TF	6.63	6.63	7.63	7.63	7.57*	7.57*	-	
TK	1.00	1.00	1.13	1.13	1.13	1.13	1.50	
TL	1.00	1.00	1.38	1.38	1.38	1.38	-	
TN	2.69	2.69	3.25	3.25	4.50	4.50	5.50	
UF	7.63	7.63	8.63	8.63	-	-	-	
UT	7.50	7.50	9.25	9.25	11.25	11.25	-	
V	.25	.38	.38	.38	.38	.38	.50	
W	.75	1.00	.88	1.13	1.63	1.88	1.88	
XA	7.00	7.25	8.00	8.25	8.56	8.81	-	
XC	6.88	7.13	8.13	8.38	8.25	8.50	10.38	
XD	7.75	8.00	8.88	9.13	-	-	-	
XG	2.25	2.50	2.63	2.88	2.63	2.88	-	
XJ	5.00	5.25	5.88	6.13	6.00	6.25	-	
XT	2.31	2.56	2.81	3.06	2.81	3.06	3.13	
Y	2.44	2.44	2.88	2.88	2.88	2.88	3.00	
ZB	6.06	6.31	7.13	7.38	7.38	7.63	8.94	
ZF	6.50	6.75	7.38	7.63	6.75	7.00	8.25	
ZM	7.75	8.25	8.75	9.25	8.88	9.38	10.63	

* R Dimension on 8" bore.



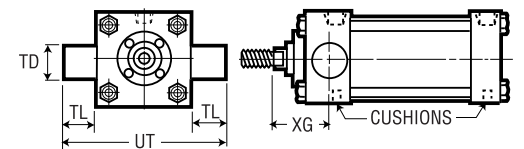
Fixed Clevis MP1



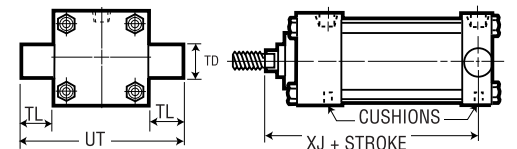
Detachable Clevis MP2

(Not available on 8-inch bore)

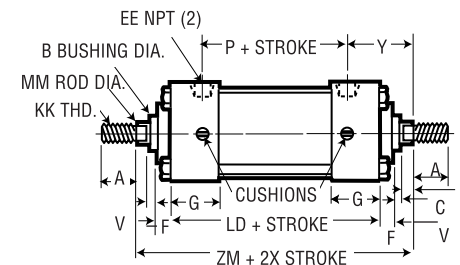
Cap Rectangular Flange MF2



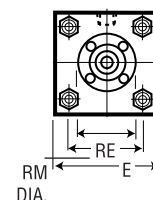
Head Trunnion



Cap Trunnion MT2



Double Rod End



Provenair®

Accessories

Series AN (5/8" thru 1-3/4" Rod)

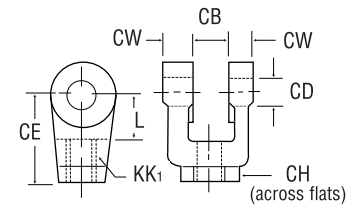
	Rod Thread			
	7/16-20	3/4-16	1-14	1-1/4-12
ROD CLEVIS KIT (includes pin)	116183	116046	116049	116052
ROD EYE KIT	116184	116047	116050	116053
CLEVIS PIN	115299	115300	-	-
PIVOT PIN	-	-	116048	116051
Mating parts to rod end accessories and mounting brackets				
Clevis Bracket (Iron)	-	117206-5	117206-6	-
Eye Bracket (Iron)	-	117205-5	117205-6	-

Dimensional Data

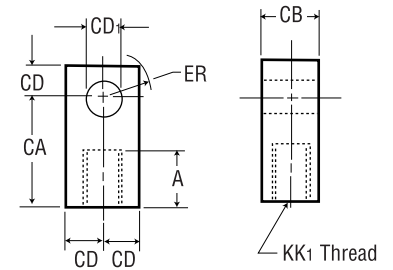
ROD DIAMETER (INCHES)	5/8	1	1-3/8	1-3/4
Rod Eye, Rod Clevis and Pin				
A	.75	1.13	1.63	2.00
CA	1.50	2.06	2.81	3.44
CB	.75	1.25	1.50	2.00
CD	.50	.75	1.00	1.38
CD1	.44	.75	-	-
CE	1.50	2.38	3.13	4.13
CH	1.00	1.25	1.50	2.00
CW	.50	.63	.75	1.00
ER	.72	1.06	1.00	1.38
HP	.156	.156	-	-
KK1	7/16-20	3/4-16	1-14	1 1/4-12
L	.75	1.25	1.50	2.13
LH	2.25	3.13	3.75	5.00
LP	2.10	2.75	3.25	4.50

Mating parts to rod end accessories and mounting brackets

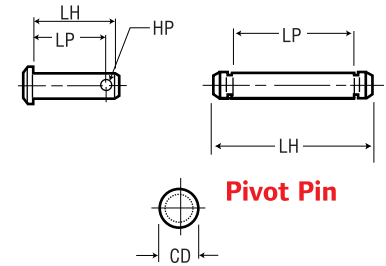
BA	-	2.56	3.25	-
CB	-	1.25	1.50	-
CD	-	.75	1.00	-
CW	-	.63	.75	-
DD DIA.	-	.53	.66	-
DD TAP	-	1/2-20	5/8-18	-
E	-	3.50	4.50	-
F	-	.63	.75	-
FL	-	1.88	2.25	-
M	-	.75	1.00	-



Rod Clevis

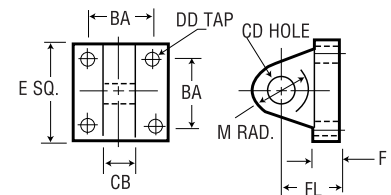


Rod Eye

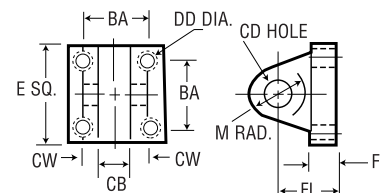


Pivot Pin

Use for Both Pins



Eye Bracket*



Clevis Bracket*

* These accessory brackets attach to mating cylinder mounts. See Cylinder Mounting Dimensions on page 39.

Tanks & Reservoirs (1-1/2" thru 4" Bore)

Two Provenair tank styles provide unique capabilities for your applications.

Style A air-over-oil tanks provide the smooth control hydraulic systems are known for, without the expense, using shop air.

Style T reservoirs provide a supply of air near the point of use, allowing your system to use a smaller compressor or smaller system supply lines.



Air Reservoir

Ordering Include dashes. Dashes are significant.

Position	1	2	3	4	5	6	7	8	9	10	11	
Example:	A	N	T	X	X	-	X	X	X	X	-	XX X

Position 1 Actuators	Position 2 Series (NFPA)	Position 3 Type	Position 4 Bore Size	Position 5	Position 6 Tank Style	Position 7 Seals	Position 8 Sight Glass Location
All actuators begin with A	N - All Provenair Cylinders	T - TANK	Q - 1- 1/2" S - 2" T - 2- 1/2" W - 3-1/4" 4 - 4"	Enter X in this position	A - Air / Oil T - Air Reservoir	B - Buna-N V - Viton	X - None* A - 1 B - 2 C - 4 <small>*X must be used with Tank Style T</small>

Position 9 Port Location	Position 10 Mount	Position 11 Stroke	
		Whole Inches	Fraction Inches
A - H1, C1 (Std.)	A - MS1	00 = 0"	0 = None
B - H1, C2	B - MS4	01 = 1"	1 = 1/8"
D - H1, C4	X - No Mount	02 = 2"	2 = 1/4"
F - H2, C1		03 = 3"	3 = 3/8"
G - H2, C2		04 = 4"	4 = 1/2"
J - H2, C4		05 = 5"	5 = 5/8"
U - H4, C4		06 = 6"	6 = 3/4"
		07 = 7"	7 = 7/8"
		- to -	
		99 = 99"	
			Maximum stroke 99 7/8", for longer strokes consult factory. Style T Minimum stroke 2". Style A Note: Sight glass (required) Minimum 5" stroke.



Air/Oil Tank
250 P.S.I.
Sight glass available in Style A only

Note: Tank Dimensions and the Useable Volume Finder are located on page 45.

Provenair®

Position Sensors (Switches)

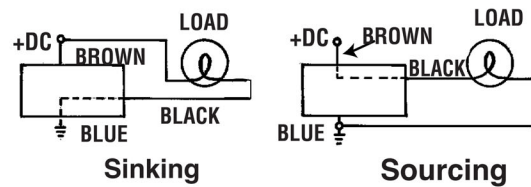
Reed Switches

Switch is normally open, load can be attached to BROWN or BLUE lead. The BROWN lead is the higher potential side of the switch. In a magnetic field, the two reeds are brought into contact to “make” the circuit. Reed switches have black, ‘two wire’ leads.



Hall Effect Switches

It is important to note that Hall Effect switches must always have current through them to work. In a magnetic field, the semiconductor generates a voltage across the sense leads. Removing the magnetic field returns the switch to its normally open state. Hall effect switches have ‘three wire’ leads. Black leads are sinking (NPN). Grey leads are sourcing (PNP). Load is controller.



There are two types of Hall Effect switches. Each is connected differently. Check your PLC for the input method used. Sinking (NPN) will sink current to ground. Sourcing (PNP) will provide current from the +VDC.

Switch Mounting Brackets

Bore	Model Number
1-1/2"	119584
2", 2-1/2"	119585
3-1/4" and 4"	119586



Note: Operating temperature is 14 - 140° F and the environmental rating is IEC IP 67 in all three switch types. Std. Red LED requires min 18 mA.

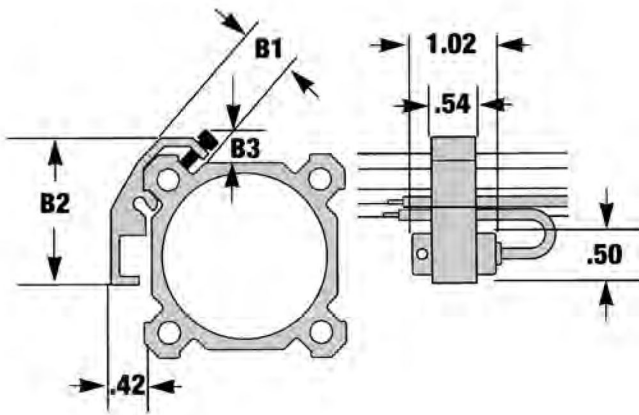
Technical Information:

- Do not exceed specification, permanent damage to the sensor may occur.
- For reed switch type sensors, polarity must be observed for the proper functioning of LED. Connect the brown wire in series with load positive (+) and the blue wire to negative (-) or power source space. If the polarity is reversed, reed switch remains functional but LED will remain in "OFF" state.
- For solid-state type sensors, polarity must also be observed. Connect brown wire to the positive (+) and the blue to the negative (-) of DC power source. The black wire must connect to the load ONLY. If the black wire is accidentally connected to the power source, permanent damage to the sensor may occur.
- An external protection circuit may be required if the reed switch is used with inductive load, such as relay or solenoid. For DC inductive load, attach an external diode parallel to the load and use R-C circuit parallel with AC inductive load.
- Keep sensors away from stray magnetic field to prevent malfunctions.
- When using reed switch with capacitive load or if the lead wire length exceeds 10-meter, and inductor must be installed in series with the sensor to prevent damage (Sticking effect).

Switch Specifications

Model Number	119581-1	119581-2	119581-3	119582-1	119582-2	119582-3	119583-1	119583-2	119583-3
Lead Length/Type	1m bare	3m bare	Plug	1m bare	3m bare	Plug	1m bare	3m bare	Plug
Lead Color	Black			Grey			Black		
Switch Type	REED			PNP (SOURCING)			NPN (SINKING)		
Input Voltage	100 VDC, 125 VAC Max.			10 - 30 VDC			5 - 30 VDC		
Operating Current	300mA (150mA Inductive)			7 - 100mA @ 12V			10 - 200mA @ 12V		
	-			14 - 200mA @ 24V			20 - 200mA @ 24V		
Detecting Distance	2.5 mm			1.5 mm			1.5 mm		
Detecting Width	-			3.0 mm			3.0 mm		
Response Time	1 mSec. Min.			-			-		
LED Function	18mA Min.			1mA Min.			1mA Min.		

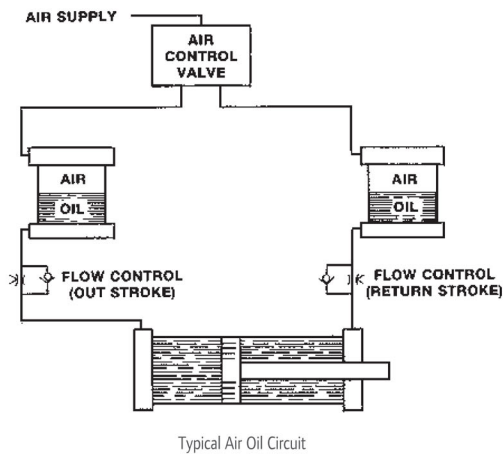
Dimensional Data



Cylinder Bore (Inches)

	1 1/2"	2 & 2 1/2"	3 1/4" & 4"
B1	.51	.60	.80
B2	1.50	1.77	2.45
B3	.26	.26	.33

Useable Volume Finder



Useable Volume Finder

	Bore	Style A	Style T
Q	1-1/2"	1.33	1.77
S	2"	2.36	3.14
T	2-1/2"	3.68	4.91
W	3-1/4"	6.22	8.29
4	4"	9.42	12.56

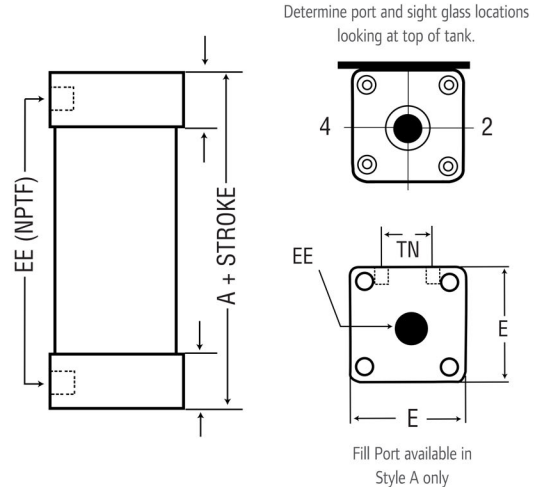
Style T or A

Derive required circuit volume (V) in Cu. In.

Divide (V) by factor from chart above to determine stroke (enter stroke value into model number).

Find unit length by adding stroke to dimension A from tank dimension table.

Tank Dimensions



Tank Dimensions

	BORE	A	J	TN	E	EE NPTF
Q	1-1/2"	2.005	0.94	0.63	2	3/8-18
S	2"	2.005	0.94	0.88	2.5	3/8-18
T	2-1/2"	2.005	0.94	1.25	3	3/8-18
W	3-1/4"	2.505	1.19	1.50	3.75	1/2-14
4	4"	2.505	1.19	2.06	4.5	1/2-14

Repair Kits and Reciprocating Assemblies

Ordering

Micro-Air Seal Kits

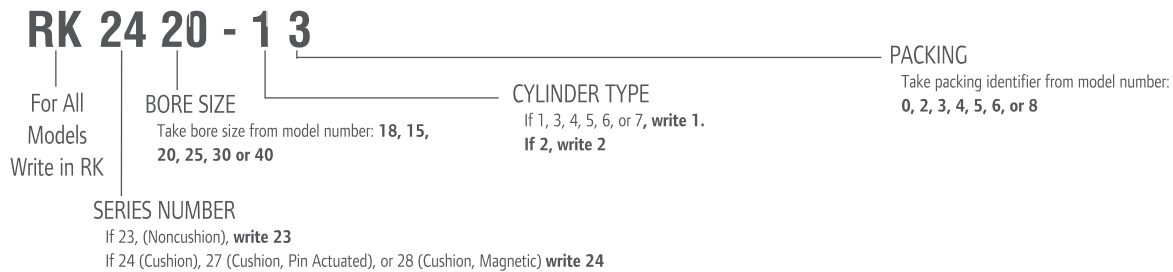
BORE SIZE (Inches)	1/2	3/4	1-1/8
	7150	7151	7152

Economair Seal Kits

EXAMPLE: 28 20 - 5 3 09-040

To order a repair kit, 1) Obtain model number from label on cylinder.
 2) Write "RK" for Repair Kit
 3) Using number from cylinder label, construct proper kit number as directed below.

Order Kit No: _____ Only these numbers are used

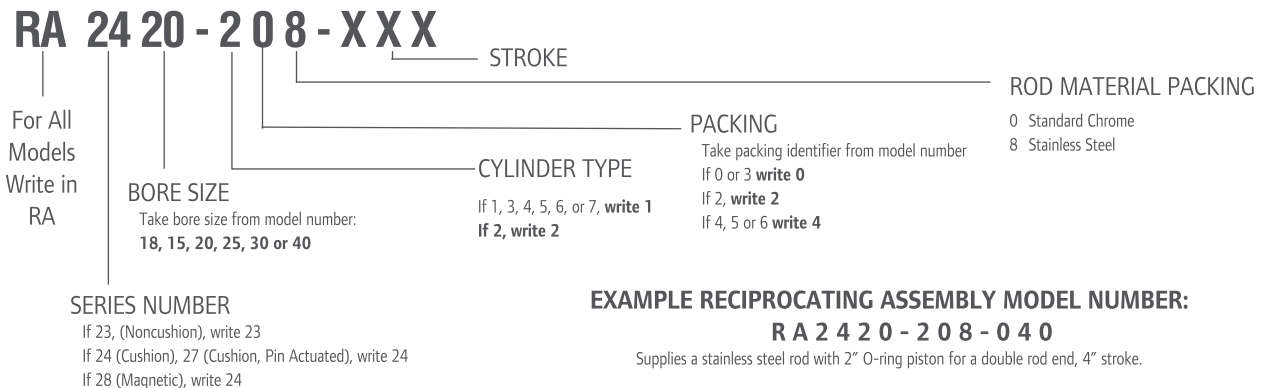


Economair Reciprocating Assembly

EXAMPLE: 28 20 - 2 3 8 9-040

To order a reciprocating assembly, 1) Obtain model number from label on cylinder.
 2) Write "RA" for reciprocating assembly
 3) Using number from cylinder label, construct proper assembly number as directed below.

Order Assembly No.: _____ ONLY THESE NUMBERS ARE USED



Repair Kits (Provenair Single Rod End Bushings) Order two kits for double rod end cylinders

Rod Diameter	Cylinder Bore Size (Inches)								
	1-1/2	2	2	2-1/2	2-1/2	3-1/4	3-1/4	4	4
Series AN Bushing	119454	119455	119456	119455	119456	119457	119458	119457	119458
Series SN Bronze Bushing	114171	114171	114172	114171	114172	114172	114173	114172	114173

Rod Diameter	Cylinder Bore Size (Inches)								
	5	5	6	6	8	8	10	10	
Series AN Bushing	-	115074	115075	115075	115076	115075	115076	115076	114130
Series SN Bronze Bushing	-	114172	114173	114172	114173	114173	114174	114174	114175

Repair Kits and Reciprocating Assemblies

Provenair Repair Kits

Example Repair Kit Model: **R K N A W M - V B**

Position	1			2	3	4		5	6	7		8	9		10
Cylinder Model No.	X	X	N	X	X	X	-	X	X	X	-	X	X	-	XXX
Repair Kit Model No.	RKN or SKN*			X	X	X	-	Not Used	X	B	-	Not Used			

*To order a repair kit, use the model number from the cylinder label. Provenair repair kits start with the letters "RKN", "SKN" and appear in the first three positions. Using the numbers from the cylinder label, construct the remainder of the Repair Kit or number as directed below.

Position 1 Repair Kit Designators	Position 2 Type	Position 3 Bore Size	Position 4 Rod Diameter	Position 5	Position 6 Replacement Seals	Position 7 Replacement Cushion Seals	Position 8 - 10
S or R and K for Repair Kit, N for Provenair	A - Double Acting Single Rod B - Double Acting Double Rod	Q - 1- 1/2" S - 2" T - 2- 1/2" W - 3-1/4" 4 - 4" 5 - 5" 6 - 6" 8 - 8" Y - 10"	K - 5/8" M - 1" P - 1-3/8" Q - 1- 3/4" S - 2"	Rod Style Not Used	B - Buna-N V - Viton S - Self-Lube H - Use V G - Use B J - Use S	(All Seal Kits Use "B") X - No Cushion Seals B - Cushion Both Ends C - Cushion Cap H - Cushion Head	Port Location Not Used, Mounts Not Used, Stroke Not Used

Provenair Reciprocating Assembly

Example Reciprocating Assembly Model: **RANASK-AB-120**

Supplies 5/8" diameter chrome rod, KK1 threads, cushioned, 12" stroke and 2" diameter piston for single rod end cylinder.

Position	1			2	3	4		5	6	7	8	9		10
Cylinder Model No.	X	X	N	X	X	X	-	X	X	X	X	X	-	XXX
Repair Kit Model No.	RAN or RSN*			X	X	X	-	X	Not Used	X	Not Used	-	X	

*To order a reciprocating assembly, use the model number from the cylinder label. Provenair reciprocating assemblies start with the letters "RAN" or "RSN" and appear in the first three positions. Using the numbers from the cylinder label, construct the remainder of the reciprocating assembly number as directed at left.

Position 1 Reciprocating Assembly Designators	Position 2 Type	Position 3 Bore Size	Position 4 Rod Diameter	Position 5 Rod Style	Position 6 Seals	Position 7 Replacement Cushion Seals	Position 8-9	Position 10 Stroke
RA or RS for Repair Kit, N for Provenair	A - Double Acting Single Rod B - Double Acting Double Rod	Q - 1- 1/2" S - 2" T - 2- 1/2" W - 3-1/4" 4 - 4" 5 - 5" 6 - 6" 8 - 8" Y - 10"	K - 5/8" M - 1" P - 1-3/8" Q - 1- 3/4" S - 2"	A - Chrome, Std Male (KK ₁) B - Chrome, Intermediate Male (KK ₂) C - Chrome, Full Male (CC) D - Chrome, Female (KK ₁) F - Chrome, No Threads G - S.S., Standard Male (KK ₁) H - S.S., Intermediate Male (KK ₂) J - S.S., Full Male (CC) K - S.S., Female (KK ₁) L - S.S., No Threads	Not Used	X - No Cushion Seals B - Cushion Both Ends	Port Location Mounts Not Used	X X X