Provenair®...

The Most Flexible Cylinder for New or Retrofit Designs

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!

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 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

- 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 303 S.S. piston rods provide corrosion resistance. (STD. Series SN)
- Optional oversized rods available to provide extra column strength. (Series AN and SN)
- Optional slippery seals enhance smooth operation and are self-lubricating.
- Available in 1-1/2", 2", 2-1/2", 3-1/4" and 4" bore sizes with extruded barrel (as shown). (Series AN)
- Larger bore sizes 5", 6", 8" and 10" bores have prestressed steel tie rods. (Series AN)
- Series SN, all stainless steel cylinders available in 1-1/2, 2, 2-1/2, 3-1/4, 4, 5, 6 and 8" bores.
- SN series cylinders have S.S. tie rods.
- 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)

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

"GripRidge" gives a better bracket fastening surface. Brackets and switches stay-put.

Lightweight aluminum body resists dents.

Retained cushion adjustment needles

End caps and mounts resist common coolants, cleaners, lubricants and corrosion.

Aluminum NFPA

Ordering

Include dashes (-). Dashes are significant.

A N X X X X X X X X X X X

ACTUATORS

Aluminum actuators begin with A

SERIES (NFPA)

All Provenair Cylinders are Series N

TYPE

A Double Acting, Single Rod
B Double Acting, Double Rod

BORE SIZE

Note: 5", 6", 8" & 10" bores have tie rods.

Q	1- 1/2"	**W**	3-1/4"	**6**	6"
S	2"	**4**	4"	**8**	8"
T	2- 1/2"	**5**	5"	**Y**	10"

ROD DIAMETER

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.

ROD STYLE

A	Chrome, Std Male (KK_1)	**K**	S.S., Female (KK_1)
B	Chrome, Intermed. Male(KK_2)	**L**	S.S., No Threads
C	Chrome, Full Male (CC)	**1**	KK_1 Chrome, Studded
D	Chrome, Female (KK_1)	**2**	KK_2 Chrome, Studded
F	Chrome, No Threads	**3**	CC Chrome, Studded
G	S.S., Standard Male (KK_1)	**4**	KK_1 SS, Studded
H	S.S., Intermediate Male (KK_2)	**5**	KK_2 SS, Studded
J	S.S., Full Male (CC)	**6**	CC SS, Studded

SEALS

B	Buna-N	**G**	Buna-N + Magnetic Piston
V	Viton	**H**	Viton + Magnetic Piston
S	Slippery	**J**	Slippery + Magnetic Piston

CUSHIONS

X	No Cushions	**H**	Cushion Head End (Rod End)
B	Cushion Both Ends	**C**	Cushion Cap End

Note: Highlighted selections denotes most popular models.

STROKE

Whole Inches

00 = 0 in
01 = 1 in
02 = 2 in
03 = 3 in
04 = 4 in
05 = 5 in
06 = 6 in
⇧ ⇧
to to
99 = 99 in

Fractions

0 = 0 in
1 = 1/8 in
2 = 1/4 in
3 = 3/8 in
4 = 1/2 in
5 = 5/8 in
6 = 3/4 in
7 = 7/8 in

Note:
Maximum stroke 99 7/8", for longer strokes consult factory. Stroke lengths 20" and longer may require stop tubes, see page 7.

MOUNT

(8" and 10" Bore ME3, ME4)
(Mounts must be factory installed on 5", 6", 8" and 10" Bore)

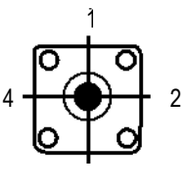
A	MS1	**P**	MT1
B	MS4**	**Q**	MX1
C	MP1**	**T**	MX2
D	MP2**	**U**	MX3
F	MF1/ME3**	**X**	No Mount
H	MF2/ME4**	**1**	FMB*
K	MP4*	**2**	FMC*
L	MS7*	**3**	FMH*
M	MT2	**4**	FMB/MS4*

All mounts available through 8" Bore except:
* 1 1/2" - 4" Bore Only
** Available 1 1/2" - 10" Bore

PORT LOCATION

(MS4 mounts: Port locations other than "A", call factory. Trunnion mounts: ports "A" or "C" only.)

A	H1, C1 (Std.)	**F**	H2, C1
B	H1, C2	**G**	H2, C2
C	H1, C3	**H**	H2, C3
D	H1, C4	**J**	H2, C4



Determine port location looking at rod end of cylinder.

Ordering

Series SN (1-1/2' thru 8" Bore)

NOTE: All SN Series Cylinders have tie rods.

Stainless Steel NFPA

Include dashes (-). Dashes are significant.

S N X X X X X X X X X X X
1

ACTUATORS

Stainless Steel actuators begin with S

SERIES (NFPA)

All Provenair Cylinders are Series N

TYPE

A Double Acting, Single Rod
B Double Acting, Double Rod **Note:** Not available in 8" bore.

BORE SIZE

Q 1- 1/2"
S 2"
T 2- 1/2"
W 3-1/4"
4 4"
5 5"
6 6"
8 8"

ROD DIAMETER

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" and 8" bores only.

ROD STYLE

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

SEALS

B Buna-N
V Viton
S Slippery
G Buna-N + Magnetic Piston
H Viton + Magnetic Piston
J Slippery + Magnetic Piston
Note: PTFE Wiper Std.

CUSHIONS

X No Cushions
B Cushion Both Ends
H Cushion Head End (Rod End)
C Cushion Cap End

STROKE

Whole Inches

00 = 0 in
01 = 1 in
02 = 2 in
03 = 3 in
04 = 4 in
05 = 5 in
06 = 6 in
to to
99 = 99 in

Fractions

0 = 0 in
1 = 1/8 in
2 = 1/4 in
3 = 3/8 in
4 = 1/2 in
5 = 5/8 in
6 = 3/4 in
7 = 7/8 in

Note:
Maximum stroke 99 7/8", for longer strokes consult factory. Stroke lengths 20" and longer may require stop tubes, see page 7.

MOUNT

(8" Bore ME3, ME4)
(Mounts must be factory installed.)

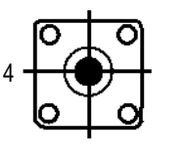
B MS4**
C MP1**
F MF1/ME3**
H MF2/ME4**
K MP4*
M MT2
P MT1
Q MX1
T MX2
U MX3
X No Mount

* 1 1/2" - 6" Bore Only
** 1 1/2" - 4" Bore Only

PORT LOCATION

(MS4 mounts: Port locations other than "A", call factory. Trunnion mounts: ports "A" or "C" only.)

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



Determine port location looking at rod end of cylinder.

NOTE: S.S. Cylinders are made to order, contact factory for lead time.

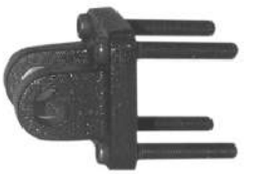
Attachable Mounting Kits for Series AN

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

Mounting Kits with Long Screws

Mount styles B (MS4) and X (No mounts) use mounting kits with long screws to attach through cap into barrel of cylinders.

1 1/2"		2"	2 1/2"	3 1/4"	4"
MS7 Side End Lugs (Steel)	119618	119619	119620	119621	119622
MF1 Rect. Flange (Steel)	119633	119634	119635	119636	119637
MF2 Rect. Flange (Steel)	119646	119647	119648	119649	119650
MP2 HD Clevis (Iron) *	119623	119624	119625	119626	119627
MP4 HD Eye (Iron)	119628	119629	119630	119631	119632
MS2 Side Lugs (Alum.)	119638	119639	119640	119641	119642
MP1 Fixed Clevis (Alum.) *	119796	119797	119798	119799	119800



Mounting Kits with Short Screws

Mount styles 1 (FMB), 2 (FMC) and 3 (FMH) use mounting kits with short screws to attach to female sleeve bolts.

	1 1/2"	2"	2 1/2"	3 1/4"	4"
MS7 Side End Lugs (Steel)	115277	115278	115279	115280	115281
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 Det. Clevis (Alum) *	115292	115293	115294	115295	115296

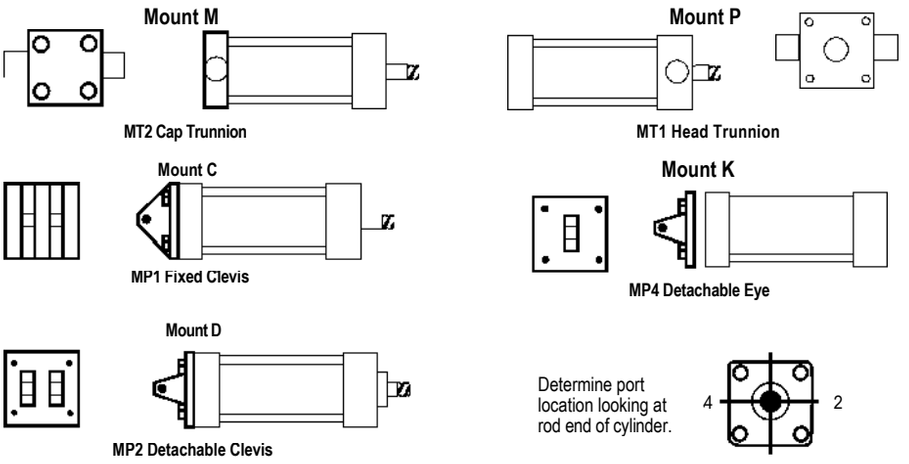
Above kits Include all necessary hardware to complete mounting to Provenair cylinders. AN Series only.

*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 117822-1 117822-2 117822-2 117822-3 117822-3

MX1 requires two tie rod extension bolt kits (four extension studs per kit). Extension bolts can only be used in female retaining bolt mounts: Use mounts 1, 2, 3 or contact factory for conversion kits.

Factory Installed Mounts



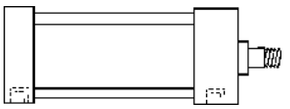
Note: Not all mounts are available on stainless steel models.

Mounting Data

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

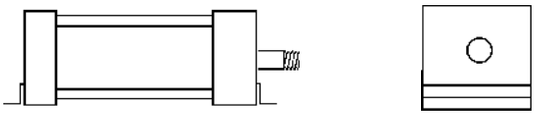
Factory Installed Mounts

Mount B



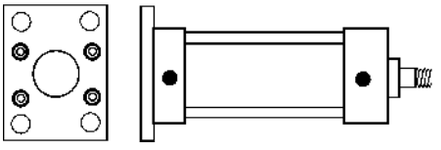
MS4 Side Tapped

Mount A

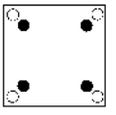


MS1 Side End Angle

Mount H

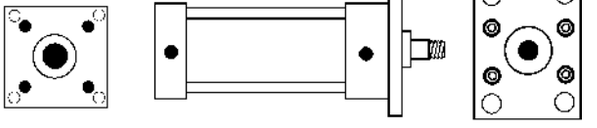


MF2 Cap. Rec. Flange



ME4 8" Bore

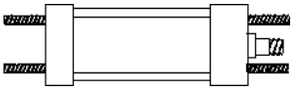
Mount F



ME3 8" Bore

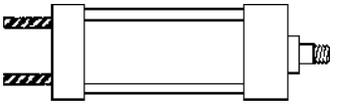
MF1 Head Rec. Flange

Mount Q



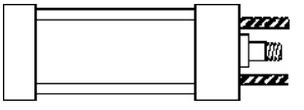
MX1 Cap and Head Ext. Tie Rod

Mount T



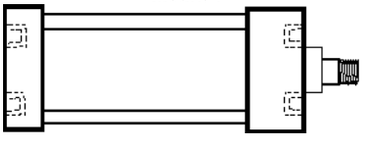
MX2 Cap Ext. Tie Rod

Mount U



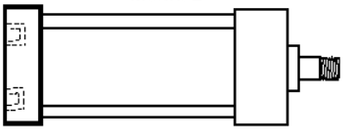
MX3 Head Ext. Tie Rod

Mount 1



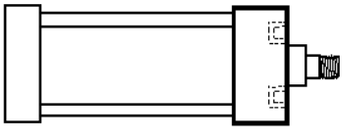
FMB Female retaining bolts, Both Ends

Mount 2



FMC Female retaining bolts, Cap

Mount 3



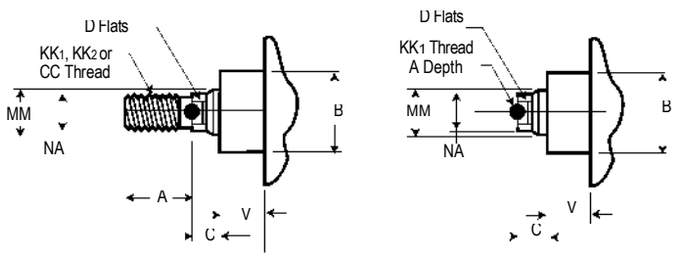
FMH Female retaining bolts, Head

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).

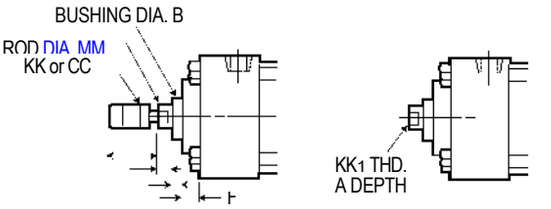
Note: Not all mounts are available on stainless steel models (Series SN)

1-1/2, 2, 2-1/2	Cylinder Bore (Inches)	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 on10")	

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.

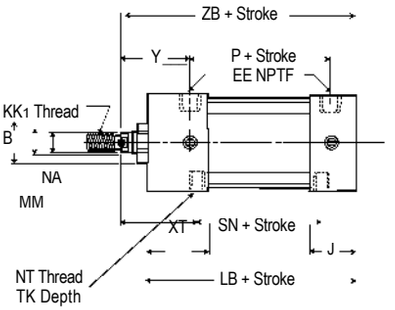


Series AN, SN Bore Sizes 1-1/2", 2", 2-1/2", 3-1/4", 4"

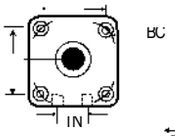


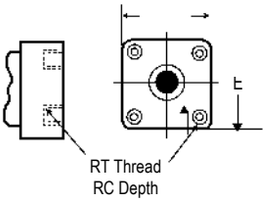
Series AN Bore Sizes 5", 6", 8", 10"
Series SN all Bore Sizes

Series AN , SN (With Standard Rod)

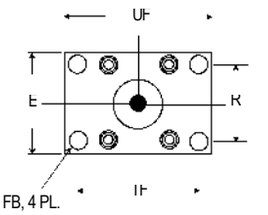


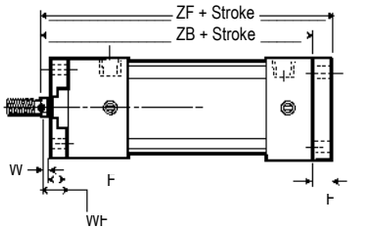
Side Tapped MS4
MOUNT B



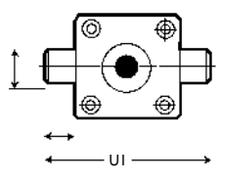


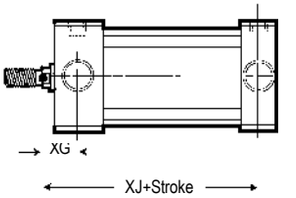
(Female retaining bolts either end)

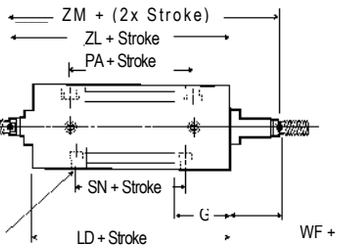




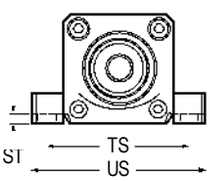
Rect. Flange
– Head-MF1, Cap-MF2



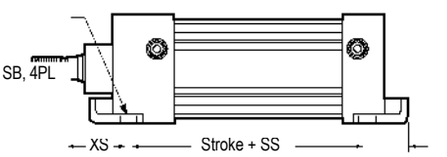




Double Rod End MS4
MOUNT B



Head Trunnion MT1
Cap Trunnion MT2
MOUNT M & P



Side Lug MS2

Dimensional Information see page 48

Provenair® - Dimensional Data

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

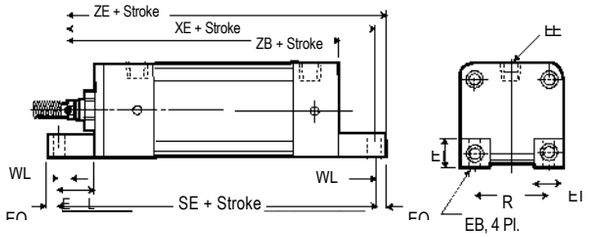
* Oversize piston rod option affects these dimensions.
See rod end dimensions.

MEETING THE STANDARDS.
ARO Provenair Cylinders meet NFPA standards. Use valves that meet the highest standards – ARO Alpha and Genesis Valves. Alpha valves are available in body ported and sub-base configurations. Genesis valves are available in sub-base configuration only and have convenient "plug-into-the-base" electronics.

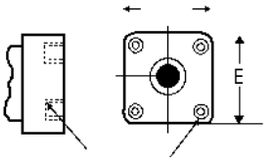
Provenair® - Dimensional Data

Dimensional Data

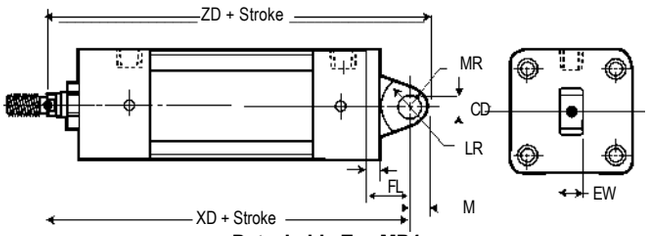
Series AN, SN (1-1/2" Thru 10" Bore w/standard rod)



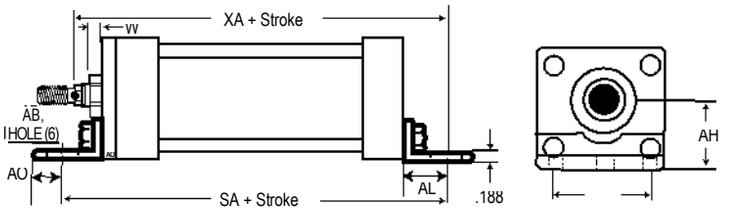
Side End Lugs MS7
MOUNT L



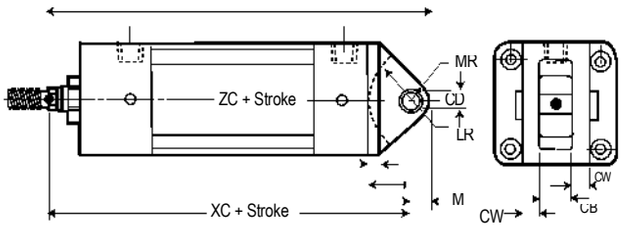
(Female retaining bolts either end)
MOUNTS 1,2,3,4



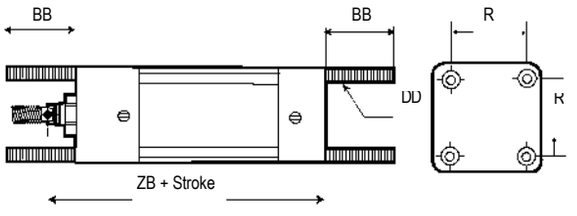
Detachable Eye MP4
MOUNT K



Angle Mount MS1
MOUNT A



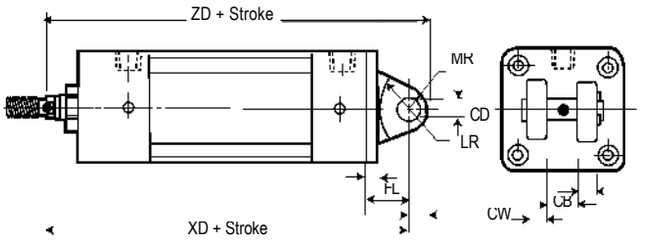
Fixed Clevis MP1
MOUNT C



Tie Rod Mounts

MX1 Extended Both Ends

MX3 Extended Head End
MOUNT Q, T & U



Detachable Clevis MP2
MOUNT D (AN Series only)

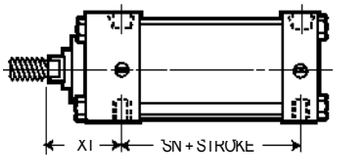
Dimensional Data Series AN (1-1/2" Thru 4" Bore w/standard rod)

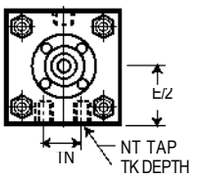
	Cylinder Bore (Inches)						Cylinder Bore (Inches)						Cylinder Bore (Inches)				
	1-1/2	2	2-1/2	3-1/4	4		1-1/2	2	2-1/2	3-1/4	4		1-1/2	2	2-1/2	3-1/4	4
AB	.38	.38	.38	.50	.50	**EQ**	.25	.31	.31	.38	.38	**SE**	5.50	5.88	6.25	6.63	6.88
AH	1.18	1.44	1.62	1.94	2.25	**ET**	.56	.69	.81	1.00	1.19	**W***	.66	.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	**KK1** (Thread)	7/16-20	7/16-20	7/16-20	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.

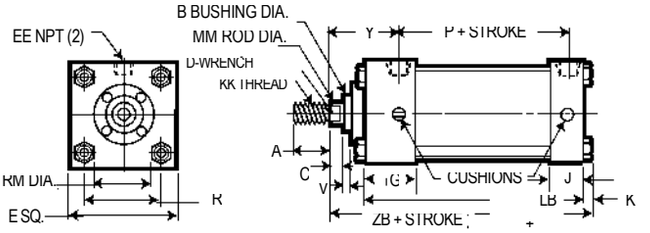
Dimensional Data

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

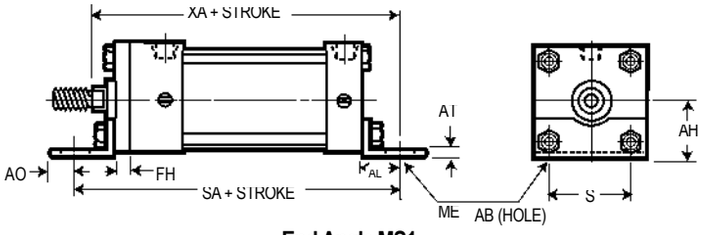




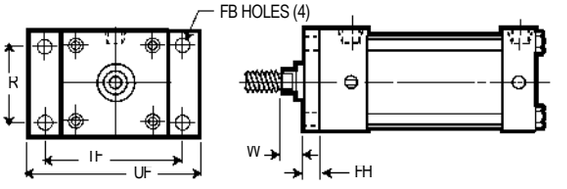
Side Tapped MS4



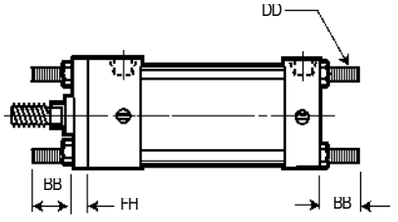
Basic Cylinder Dimensions

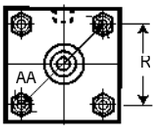


End Angle MS1

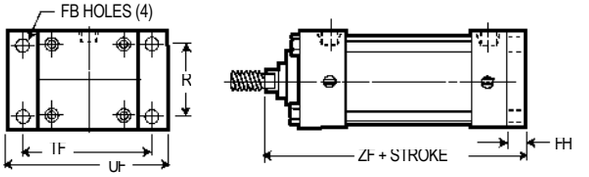


Head Rectangular Flange MF1

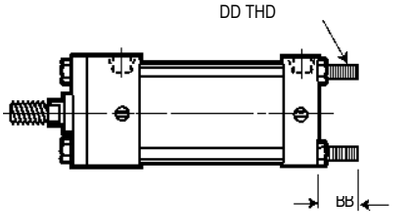


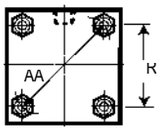


Tie Rods Extended Both Ends MX1

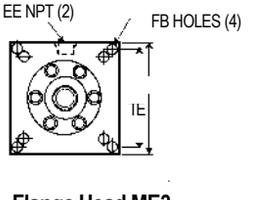


Cap Rectangular Flange MF2

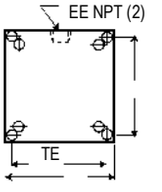




Tie Rods Extended, Cap End MX2

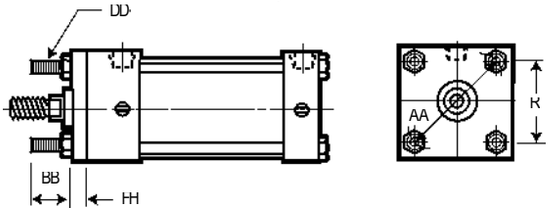


Flange Head ME3



Flange Cap ME4

Tie Rods Extended, Head End MX3



Dimensional information see page

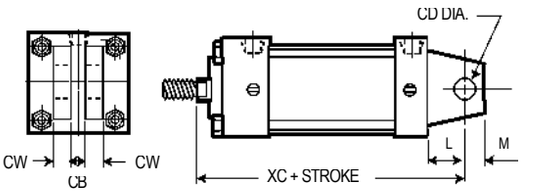
Dimensional Data

Provenair Mounts

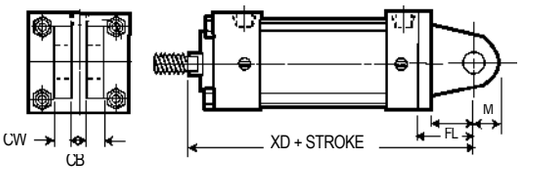
Series AN, SN (5", 6", 8", & 10" Bore)

	CYLINDER BORE (INCHES)						
ROD	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
KK1 THREAD	3/4-16	1-14	1-14	1-1/4-12	1-14	1-1/4-12	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.

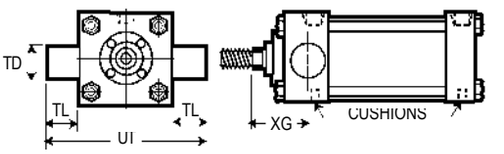


Fixed Clevis MP1

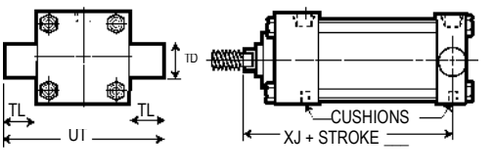


Detachable Clevis MP2
(Not available on 8-inch bore)

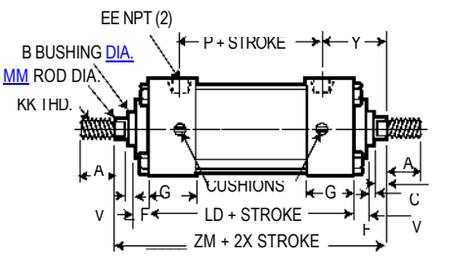
Cap Rectangular Flange MF2

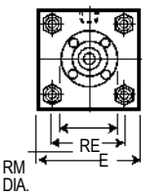


Head Trunnion MT1



Cap Trunnion MT2





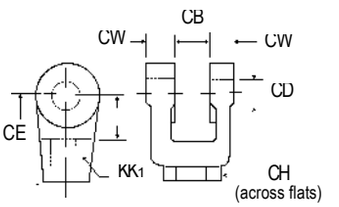
Double Rod End

Provenair® - Dimensional Data

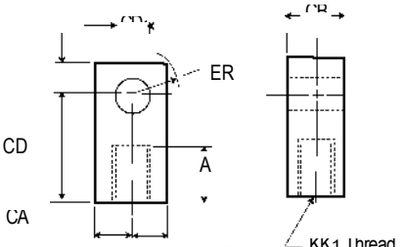
Accessories

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

	ROD DIAMETER (INCHES) 5/8 Stud Thread Part Number	1 Stud Thread Part Number	1-3/8 Stud Thread Part Number	1-3/4
KK1	7/16"-20 x 3/4"	3/4"-16 x 1-1/8"	1"-14 x 1-1/8"	
	117812-101	117812-201	117812-301	
KK1 (2 x length)	7/16"-20 x 1-1/2"	3/4"-16 x 2-1/4"	1"-14 x 2-1/4"	
	117812-121	117812-221	117812-321	
KK2 (1st oversize)	1/2"-20 x 3/4"	7/8"-14 x 1-1/8"	1-1/4"-12 x 1-5/8"	
	117812-102	117812-202	117812-302	
CC Full (2nd oversize)	5/8"-18 x 3/4"	1"-14 x 1-1/8"	1-3/8"-12 x 1-5/8"	
	117812-103	117812-203	117812-303	



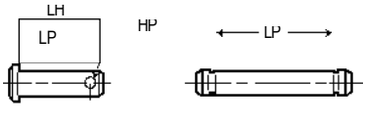
	Rod Thread 7/16-20	3/4-16	1-14	1-1/4-12
ROD CLEVIS KIT (includes pin)	116183	116046	116049	116052
ROD EYE KIT	116184	116047	116050	116053
CLEVIS PIN	115299	115300		
PIVOT PIN		–	116048	116051
Mating parts to rod end accessories and mounting brackets				
Clevis Bracket (Iron)	–	117206-5	117206-6	–
Eye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



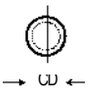
CD CD **Rod Eye**

Dimensional Data

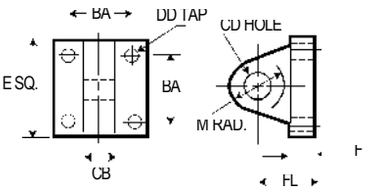
ROD DIAMETER (INCHES)	5/8	1	1-3/8	1-3/4
Rod Eye, Rod Clevis and Pin				
A	.75	1.13	1.63	2.00
CA	1.50	2.06	2.81	3.44
CB	.75	1.25	1.50	2.00
CD	.50	.75	1.00	1.38
CD1	.44	.75	–	–
CE	1.50	2.38	3.13	4.13
CH	1.00	1.25	1.50	2.00
CW	.50	.63	.75	1.00
ER	.72	1.06	1.00	1.38
HP	.156	.156		
KK1	7/16-20	3/4-16	1-14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



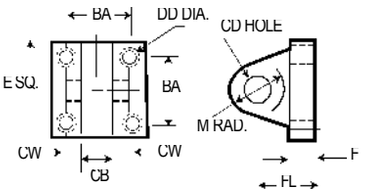
Pivot Pin



Use for Both Pins



Eye Bracket*



Clevis Bracket*

*** These accessory brackets attach to mating cylinder mounts. See Cylinder Mounting Dimensions on page 129.**

Ordering

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.

Include dashes (–). Dashes are significant.

A N T X X – X X X X X X X X

ACTUATORS
All actuators begin with A

SERIES (N)
All Provenair Cylinders are Series N

TYPE
T Tank

BORE SIZE
Q 1- 1/2" **W** 3-1/4"
S 2" **4** 4"
T 2- 1/2"
ENTER X IN THIS POSITION

TANK STYLE
A Air / Oil **T** Air Reservoir

SEALS
B Buna-N **V** Viton

SIGHT GLASS LOCATION
X = None **A** = 1 **B** = 2 **C** = 4
(**X** must be used with Tank Style T)

PORT LOCATION **MS4 mounts: Port locations other than "A", call factory.**
A H1, C1 (Std.) **D** H1, C4 **G** H2, C2 **U** H4, C4
B H1, C2 **F** H2, C1 **J** H2, C4

MOUNT
A MS1 **B** MS4 **L** MS7 **X** No Mount

STROKE
Whole Inches
00 = 0 in
01 = 1 in
02 = 2 in
03 = 3 in
04 = 4 in
05 = 5 in
06 = 6 in
to to
99 = 99 in

Fractions
0 = 0 in
1 = 1/8 in
2 = 1/4 in
3 = 3/8 in
4 = 1/2 in
5 = 5/8 in
6 = 3/4 in
7 = 7/8 in

Note:
Maximum stroke 99 7/8", for longer strokes consult factory.

Style T
Minimum stroke 2".

Style A
Note: Sight glass (required)
Minimum 5" stroke.

Sight glass available in Style A only

Air/Oil Tank 250 P.S.I.

Air Reservoir

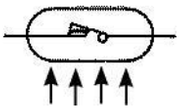
Volume and Dimensional information see page 55

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.

N.O.



Mag. Field **Hall Effect Switches**

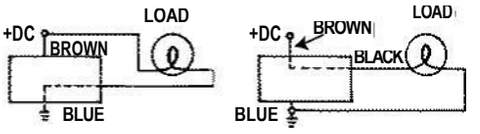
Switch Mounting Brackets

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.

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.

Sinking **Sourcing**



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.

Technical Information:

1. Do not exceed specification, permanent damage to the sensor may occur.
2. 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.
3. 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.
4. 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.
5. Keep sensors away from stray magnetic field to prevent malfunctions.
6. 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).

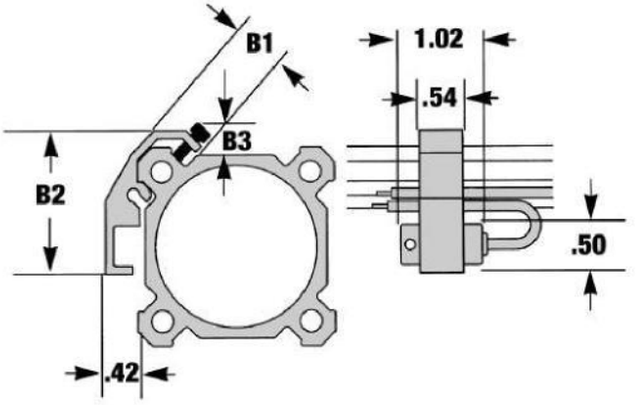
Switch Specifications

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		
	–			–			5 - 100mA @ 5V		
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 information see page

Provenair® - Dimensional Data

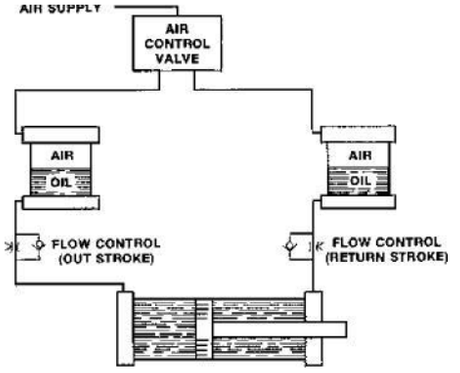
Dimensional Data



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



Typical Air Oil Circuit

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

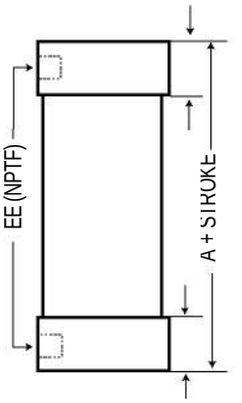
Style T or A

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

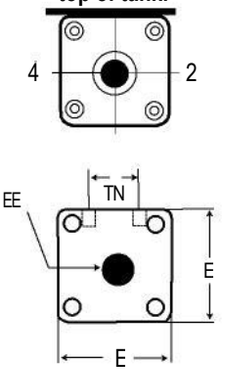
Divide (V) by factor from chart above to determine stroke (enter stroke value into model number).

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

Tank Dimensions



Determine port and sight glass locations looking at top of tank.



Fill Port available in Style A only

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 & Valve/Cylinder Manifold

Ordering

Repair Kits (Single Rod End Rod Bushings Provenair Series)

	Cylinder Bore Size (Inches)								
1-1/2		2	2	2-1/2	2-1/2	3-1/4	3-1/4	4	4
Rod Diameter	5/8	5/8	1	5/8	1	1	1-3/8	1	1-3/8
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

	Cylinder Bore Size (Inches)								
5		5	6	6	8	8	10	10	
Rod Diameter	–	1	1-3/8	1-3/8	1-3/4	1-3/8	1-3/4	1-3/4	2
Series AN Bushing	–	115074	115075	115075	115076	115075	115076	115076	114130
Series SN Bronze Bushing	–	114172	114173	114172	114173	114173	114174	114174	114175

Order two kits for double rod end cylinders.

Micro-Air Series 01 (Seal Kits)

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

Seal Kits (Economair Series)

Cylinder Model Number

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 and 3) Using number from cylinder label, construct proper kit number as directed below.

Only these numbers are used.

Order Kit No.:

RK 24 20 - 1 3

PACKING

CYLINDER TYPE
If 1, 3, 4, 5, 6, or 7, **write 1.**
If 2, **write 2.**

Take packing identifier from model number: **0, 2, 3, 4, 5, 6, or 8**

BORE SIZE
Take bore size from model number: **18, 15, 20, 25, 30 or 40.**

SERIES NUMBER
If 23, (Noncushion), **write 23**
If 24 (Cushion), 27 (Cushion, Pin Actuated), or 28 (Cushion, Magnetic) **write 24**

For All Models Write in RK

Reciprocating Assembly (Economair Series)

Cylinder Model Number

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 and 3) Using number from cylinder label, construct proper assembly number as directed below.

Only these numbers are used.

Order Assembly No.:

RA 24 20 - 2 0 8 - X X X

CYLINDER TYPE
If 1, 3, 4, 5, 6, or 7, **write 1.**
If 2, **write 2.**

BORE SIZE
Take bore size from model number: ~~18, 15,~~

SERIES NUMBER
If 23, (Noncushion), **write 23**
If 24 (Cushion), 27 (Cushion, Pin Actuated), **write 24**
If 28 (Magnetic), **write 24**

STROKE
Take packing identifier from model number: **if 0 or 3 write 0**
if 2, write 2
if 4, 5 or 6 write 4

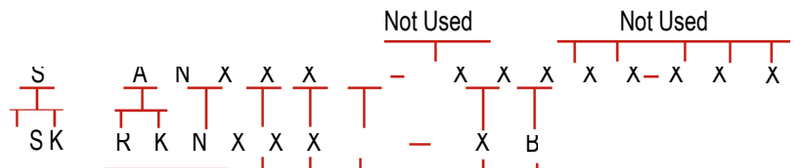
PACKING

ROD MATERIAL
P A C K I N G
0 Standard Chrome
8 Stainless Steel

For All ~~Models~~ Write in RA

EXAMPLE RECIPROCATING ASSEMBLY MODEL NUMBER: **R A 2 4 2 0 - 2 0 8 - 0 4 0**
Supplies a stainless steel rod with 2" O-ring piston for a double rod end, 4" stroke.

Repair Kits



Cylinder Model Number

Repair Kit Model Number

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.

Repair Kit Designators

S or R and K for Repair Kit, N for Provenair.

Type

Double-Acting Single Rod = **A**
Double Acting Double Rod = **B**

Bore Size

1 1/2**Q** 2"**S** 2 1/2"**T** 3 1/4"**W** 4"**4** 5"**5** 6"**6** 8"**8** 10"**Y**

Rod Diameter

5/8"**K** 1"**M** 1-3/8"**P** 1 3/4"**Q** 2"**S**

Rod Style Not Used

Replacement Seals

Buna-N	**B**	Buna-N + Mag. Pist.	G (Use **B**)
Viton	**V**	Viton + Mag. Pist.	H (Use **V**)
Self-Lube	**S**	Self-Lube Slippery + Mag. Pist.	J (Use **S**)

Replacement Cushion Seals (All Seal Kits Use "B")

No Cushion Seals	**X**
Cushions Both Ends	**B**
Cushion Cap	**C**
Cushion Head	**H**

Port Location Not Used, Mounts Not Used, Stroke Not Used

EXAMPLE REPAIR KIT MODEL: **RKNAWM-VB**

Supplies all Viton seals for a single rod end, 3 1/4" bore, 1" diameter piston rod cylinder. Kit includes PTFE coated wearband and Viton cushion seals for both ends.

Cylinder Model Number

Reciprocating Assembly No.

Reciprocating Assembly designators

Type

Double-Acting Single Rod = **A**
Double Acting Double Rod = **B**

Bore Size

1 1/2**Q** 2"**S** 2 1/2"**T** 3 1/4"**W** 4"**4** 5"**5** 6"**6** 8"**8** 10"**Y**

Rod Diameter

5/8"**K** 1"**M** 1-3/8"**P** 1-3/4"**Q** 2"**S**

Rod Style

A	Chrome, Std Male (KK1)	**G**	S.S., Standard Male (KK1)
B	Chrome, Intermed. Male (KK2)	**H**	S.S., Intermediate Male (KK2)
C	Chrome, Full Male (CC)	**J**	S.S., Full Male (CC)
D	Chrome, Female (KK1)	**K**	S.S., Female (KK1)
F	Chrome, No Threads	**L**	S.S., No Threads

Seals Not Used

Replacement Cushioned or Non Cushioned

No Cushion Seals	**X**
Cushions Both Ends	**B**

Port Location Not Used, Mounts Not Used

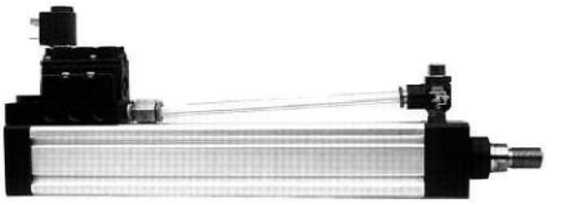
To order a reci[illegible] assembly, use the model number from the cylinder label. Provenair reciprocating assemblies start with the letters "RAN" or "RSN" and appear in the first three positions. Using the numbers from the cylinder label, construct the remainder of the reciprocating assembly number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

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.

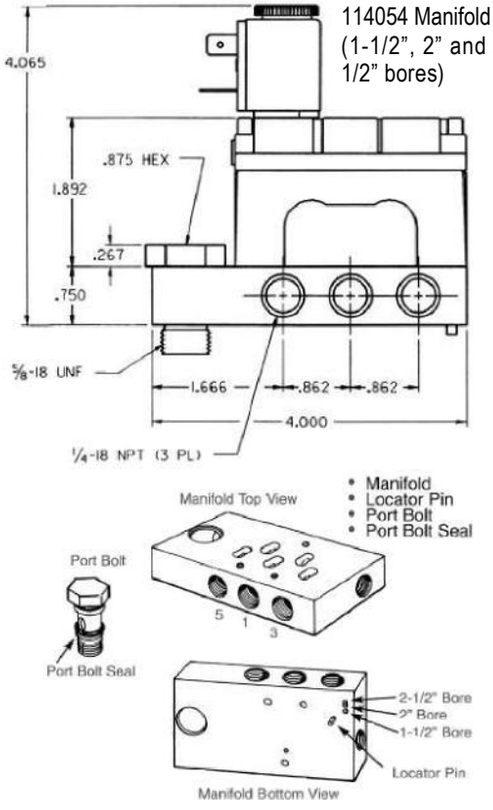
Valve/Cylinder Manifold

Features

- **Mount any Alpha subbase valve to any NFPA cylinder**
- **Obtain maximum cylinder response and speeds**
- **Provides “clean” valve mounting method**
- **Mounts at cap or head end of cylinder**
- **Operates any NFPA Cylinder up to 2-1/2” bore**
- **Any stroke length (Minimum 3”)**



Dimensional



114054 Manifold Kit (1-1/2”, 2” and 2-1/2” bores)