



IR ARO®

Pneumatic Cylinders and Accessories

Get in the
Z  **ONE**

Developing Specifications

Calculating the Proper Bore Size

A cylinder's bore size determines the force it will produce at a given supply pressure. The weight of the load or the clamping force required will largely determine the force requirements of the cylinder, and hence, the bore size required. But before determining the appropriate bore size you must compensate for air pressure drop, packing friction and load variations using the following computation:

A) Compensating for Pressure Drop - Decrease the line pressure value by 15 p.s.i. This compensates for pressure drop in the system.

Operating pressure (psig) = Line pressure (psig) less 15 (psig pressure drop)

Example: If the line pressure is 95 (psig), subtract 15 (psig) to obtain 80 (psig) operating pressure (for sizing purposes).

B) Compensating for Packing Friction - Before you begin selecting a cylinder you already know the weight of the load you must move or the clamping force you must apply. Multiply this force or load value by 1.25. This compensates for packing friction and load variations. (If speed is of concern for your application, multiply the force value by 2.0.)

Force required (in pounds) = 1.25 x load (or required clamping force)

Example: If cylinder must move 100 pound load, multiplying 100 pounds by 1.25 = 125 pounds force required.

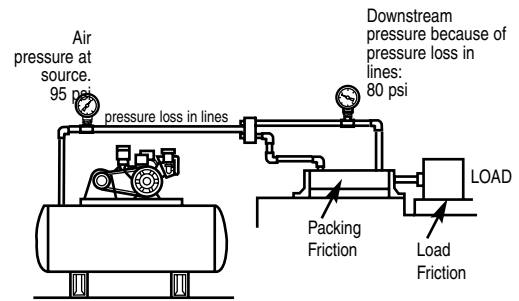
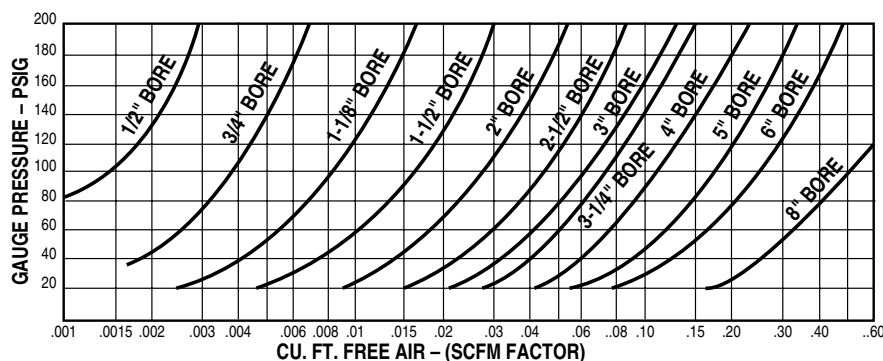
Now, at the top of the chart on page 81, find the column with the operating pressure calculated in "A" above (in this example, 80 psig). Go down that column until you find the force requirement calculated in "B", above (or the next higher value). Note that the force values in bold type represent the extend force while those in standard type represent retract force (retract force is lower because the rod reduces the effective piston area). Choose the appropriate value, then go to the Cylinder Bore column to find the bore requirements for your application.

Now that you know the cylinder bore size that will produce the force required for your application, go to page 82 to determine rod size requirements.

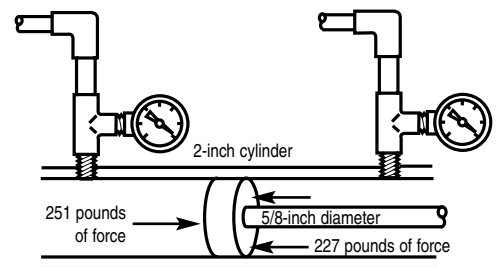
Air consumption for each cylinder bore size can be found in the chart below.

Cylinder Air Consumption

To calculate the air consumption of a cylinder, multiply the total inches of stroke (extend plus retract) by the cycles per minute times the SCFM factor from the chart below. To find the SCFM factor, find your gauge pressure in the left hand column. Next, find your cylinder bore size in the chart. Where the two intersect, read down to the SCFM factor at the bottom of the chart.



This illustration shows a pressure loss of 15 PSI through the airlines and points out friction factors, both of which must be compensated for.



Given equal pressure on both sides of a piston, the surface area on the extend side will provide greater force.

Bore Selection Sizes

EFFECTIVE PISTON AREA X OPERATING PRESSURE = FORCE

CYLINDER BORE (INCHES)	ROD DIAMETER (INCHES)	EFFECTIVE PISTON AREA (SQ. IN.)	OPERATING PRESSURE (PSI)										
			20	40	60	70	80	90	100	110	125	150	200
Selecting Bore Size													
7/16	3/16	.15 .123	3 2.5	6 4.9	9 7.4	10 8.6	12 9.8	13 11	15 12.3	16 13.5	18 15.4	22 18.5	30 24.6
1/2	3/16	.196 .169	4 3	8 7	12 10	14 12	16 14	18 15	20 17	22 19	25 21	29 25	39 34
	1/4	.147	3	6	9	10	12	13	15	16	18	22	29
9/16	3/16	.25 .23	5 4.5	10 8.9	15 13.4	17 15.6	20 17.8	22 20	25 22	27 29.5	31 27.9	37 33.5	50 44.6
3/4	1/4	.442 .393	9 8	18 16	27 24	31 28	35 31	40 35	44 39	49 43	55 49	66 59	88 79
7/8	1/4	.604 .553	12 11	24 22	36 33	42 38	48 44	54 49	60 55	66 60	75 69	90 82	120 110
1-1/16	5/16	.890 .810	18 16	36 32	53 49	62 57	71 65	80 73	89 81	98 89	111 101	134 122	178 162
1-1/8	5/16	.994 .917	20 18	40 37	60 55	70 64	80 73	89 83	99 92	109 101	124 115	149 138	199 183
	3/8	.884	18	35	53	62	71	80	88	97	110	133	177
1-1/4	7/16	1.227 1.077	25 22	49 43	74 65	88 75	98 86	110 97	123 108	135 118	153 135	184 162	245 215
1-1/2	7/16	1.767 1.617	35 32	71 65	106 97	124 113	141 129	159 146	177 162	194 178	221 202	265 243	353 323
	1/2	1.571	31	63	94	110	126	141	157	173	196	236	314
	5/8	1.460	29	58	88	102	117	131	146	161	183	219	292
	1	1.325	27	53	80	93	106	119	133	146	166	199	265
1-3/4	1/2	2.405 2.209	48 44	96 88	144 133	168 155	192 177	216 199	240 221	265 243	301 276	361 331	481 442
2	5/8	3.142 2.835	63 57	126 113	189 170	220 198	251 227	283 255	314 284	346 312	393 354	471 425	628 567
	1	2.700	54	108	162	189	216	243	270	297	338	405	540
2-1/2	5/8	4.910 4.602	98 92	196 184	295 276	344 322	393 368	442 414	491 460	540 506	614 575	737 690	982 920
	3/4	4.470	89	179	268	313	358	402	447	492	559	671	894
	1	4.123	82	165	247	289	330	371	412	454	515	618	825
3	3/4	7.069 6.6268	141 133	283 265	424 398	495 464	566 530	636 596	707 663	778 729	884 828	1060 994	1414 1325
3-1/4	1	8.296 7.510	166 150	332 300	498 451	581 526	664 601	747 676	830 751	913 826	1037 939	1244 1127	1659 1502
	1-3/8	6.810	136	272	409	477	545	613	681	749	851	1021	1362
4	1	12.566 11.781	251 236	503 471	754 707	880 825	1005 942	1131 1060	1257 1178	1382 1296	1571 1473	1885 1767	2513 2356
	13/8	11.081	222	443	665	776	886	997	1108	1219	1385	1662	2216
5	1	19.635 18.850	393 377	785 754	1178 1131	1374 1320	1571 1508	1767 1697	1964 1885	2160 2074	2454 2356	2945 2828	3927 3770
	1-3/8	18.150	363	726	1089	1271	1452	1634	1815	1996	2269	2723	3630
6	1-3/8	28.274 16.789	565 536	1131 1072	1696 1607	1979 1875	2262 2143	2545 2411	2827 2679	3110 2947	3534 3349	4241 4018	5655 5358
	13/4	25.870	517	1035	1552	1811	2070	2328	2587	2846	3234	3881	5174
8	1-3/8	50.260 48.770	1005 975	2010 1951	3016 2926	3518 3414	4021 3902	4523 4489	5026 4877	5529 5365	6283 6096	7539 7316	10052 9754
	1-3/4	47.820	956	1913	2869	3347	3826	4304	4782	5260	5978	7173	9564
10	1-3/4	78.54 76.14	1571 1523	3142 3046	4712 4568	5497 5330	6283 6091	7068 6853	7854 7614	8639 8375	9818 9518	11781 11421	15708 15228

VALUES IN BOLD TYPE REPRESENT EXTEND FORCE. Other values represent retract force (piston area, less area of piston rod). Check series order information for available rod diameters in each series.

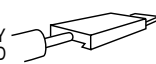
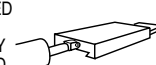
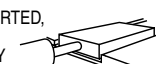
Rod Diameter

A) use the stroke factor table to find the proper multiplier based on the mounting configuration and rod end connection used.

B) Multiply your required working stroke length by the factor you found from the stroke factor table in Step A. Note: if you require a rod or thread extension in your application (Longer than standard) add the extra length(s) to your required working stroke length and then multiply by the stroke factor found in Step A, the result of this arithmetic is the "L" Value.

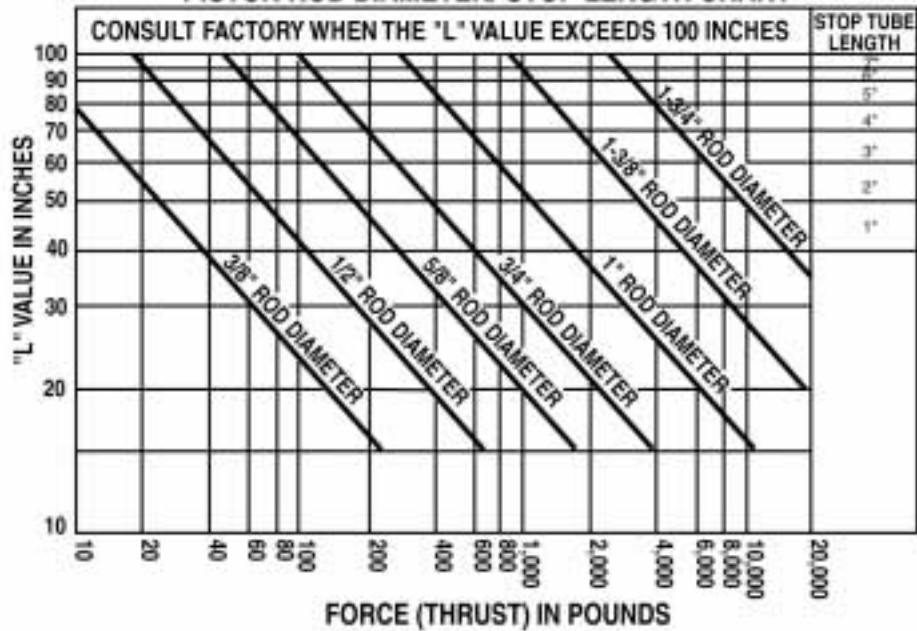
C) Use the piston rod diameter/ stop length chart to complete your cylinder specification. Find the approximate "L" value (determined in Steps A & B) on the left side of the chart. At the bottom of the chart, find the force (thrust) required for your cylinder. Reference the bore selection sizes table on the previous page to determine bore size, rod diameter or force at various PSI. Find the intersection of the "L" value (Horizontal) line with the force in pounds (Vertical) line. The intersection should be on, or to-the-left of the diagonal (rod diameter) line. The diagonal (rod diameter) line indicates the correct piston rod diameter for your application. Note: If your "L" value-force lines intersect above, or to-the-right of a diagonal line, find a cylinder with the next larger piston rod diameter to avoid premature cylinder wear or failure.

STROKE FACTOR

ROD END CONNECTION	CYLINDER RIGIDLY MOUNTED		CYLINDER PIVOT MOUNTED		
	L-MOUNTS, SIDE-TAPPED SIDE END LUGS	FRONT OR REAR FLANGE MOUNTING NUTS	FRONT-MOUNTED TRUNNION	CENTER-MOUNTED TRUNNION	CLEVIS EYE. OR REAR-MOUNTED TRUNNION
FIXED AND RIGIDLY GUIDED 	0.50	0.50	N/A	N/A	N/A
PIVOTED AND RIGIDLY GUIDED 	0.71	0.71	1.00	1.50	2.00
SUPPORTED, NOT RIGIDLY GUIDED 	1.00	1.00	N/A	N/A	N/A

NOTE: Remember, long, slim piston rods may buckle when subjected to a heavy push load.

PISTON ROD DIAMETER/ STOP LENGTH CHART



NOTE: When a stop tube is needed, a minimum 2" length is required on all Economair cylinders with Lip packings, and in 4", 5", 6" and 8" Provenair cylinders.

Stop Tube Requirements

Available in Economair & Provenair Only

Occasionally, an application will require a stop tube. Stop tube length is determined by "L" value. If your "L" value (from Step B) is 40 or greater, find the correct stop tube length for your cylinder on the right side of the piston rod diameter/stop length chart. The recommended stop-tube length is shown above the "L" value line.

Note: If "L" value is 39, no stop tube is required. If "L" value is 40-49, a 1" stop tube is recommended. If "L" value is 50-59, a 2" stop tube is recommended, etc.

Options

Additional options required will help determine which cylinder series will be selected:

Stainless steel piston rods are beneficial in corrosive environments. Stainless steel rods are standard on Micro-Air and Silverair Series. Stainless Steel rods are options on Economair and Provenair Series.

Cylinder cushions are designed to reduce the shock experienced at the end of the stroke by reducing piston speed the last fraction of an inch of stroke. Cylinder cushions are available in Economair and Provenair Series, only.

Packing shape and material affect cylinder performance:

- **O-Ring packings** are good, general purpose packings, but they require more breakaway force than other packing shapes.
- **O-Ring - Low Friction packings** provide the effective sealing characteristics of Buna N with the low friction characteristics of Teflon®. This design is effective where the cylinder must operate at low pressures.
- **U-Cup packings** offer low breakaway friction and better sealing characteristics at low pressure than O-Ring packings. U-cups are wear compensating seals; they offer longer wear life than O-rings.
- **U-Cup - Self Lube (“Slippery Seals”) packings** are ideal in applications where air line lubrication cannot be used. This packing design helps reduce cylinder “chatter” in low pressure applications and it offers the same sealing characteristics as Buna N.

Packing Characteristics

	MATERIAL	SEALING CHARACTERISTICS	FRICTION CHARACTERISTICS	TEMPERATURE TOLERANCE	AVAILABILITY
O-RING	Teflon over Buna N O-Ring Seal	Good	Medium	0° to 180° F	Economair
O-RING	Buna N	Good	High	0° to 180° F	Micro-Air, Economair
O-RING	Viton®	Good	High	Up to 300° F	Micro-Air, Economair
U-CUP-SELF-LUBE (“Slippery Seals”)	Nitrile	Very Good	Low	0° to 180° F	Economair, Provenair
U-CUP	Buna N	Very Good	Medium	0° to 180° F	Silverair, Economair, Provenair
U-CUP	Viton	Very Good	Medium	Up to 300° F	Silverair, Economair, Provenair

NOTE: When applying rod cylinders, there must be no side load or bending stress at any point along the rod. Applications which induce side load and/or bending stress will damage packings, bushings, piston barrels, piston rods and cushion bosses. When metal parts are damaged, seal and packing replacement is an inadequate repair. The elastomers will quickly become damaged. Inspect and replace all worn or damaged parts when rebuilding cylinders.

Teflon® and Viton® are registered trademarks of the E.I. DuPont Company.

Features

Series 01

Micro-Air Cylinders are ideal for small part positioning, clamping and ejecting. Also they're the perfect choice for applications where small bore, medium duty, repairable cylinders are preferred. Prelubed, they're suitable for operations without externally applied lubrication.

- Micro-Air Cylinders are repairable. Service kits are available to extend the useable life of the cylinder.
- Micro-Air Cylinders operate on air pressure to 200 p.s.i. (14 bar). A tough little cylinder that can handle the pressures!
- Superior performance over a wide temperature range – 0° to 180° F (-18° to 82° C), even to 300° F (149° C) when Viton seals are used (consult factory).
- Micro-Air Cylinders have superior wear characteristics, thanks to the hard coated aluminum tubing I.D. In addition to an internal hardness of 60 Rockwell C, the barrel has an internal finish of 16 microinches or better.
- Micro-Air Cylinders are equipped with Series 303 stainless steel piston rods for corrosion resistance. Also, the ground and polished finish on the rods minimizes friction, providing longer packing life.
- Micro-Air Cylinders provide greater durability than disposable cylinders.



Performance Specifications

- Bore Sizes:** 1/2", 3/4", and 1-1/8"
Maximum Output Force: 199 pounds (1-1/8" bore)
Standard Operating Temperature range: 0° to 180° F (-18° to 82° C)
Viton Seals Models: For high heat applications. Consult factory.

Range of mounting styles and attachable mounts/ accessories to meet nearly any application requirement.

Ordering

01 **XX** - **X0** **XX** - 0 **XX**

BORE SIZE

51	1/2 in
76	3/4 in.
18	1-1/8 in.

STROKE LENGTH

WHOLE INCHES	FRACTIONS
0	= 0 in
1	= 1 in
2	= 2 in
3	= 3 in
4	= 4 in
5	= 5 in
6	= 6 in
	0 = None
	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

CYLINDER TYPE

- 10** Double Acting, Double End Mount - use with **09** or **19** Mounting Styles
- 50** Double Acting, Nose Mount - use with **29** Mounting Style

MOUNTING STYLE

- 09** Basic - No Mounts - use with **Type 10** Double Acting, Double End Mount Cylinder
- 19** Rear Pivot Mount - use with **Type 10** Double Acting, Double End Mount Cylinder
- 29** Rear Port - use with **Type 50** Double Acting, Nose Mount Cylinder

(1/2" Increments, 1/2" through 6")

Maximum stroke length - 6-7/8-inches. Consult factory for the other stroke requirements.

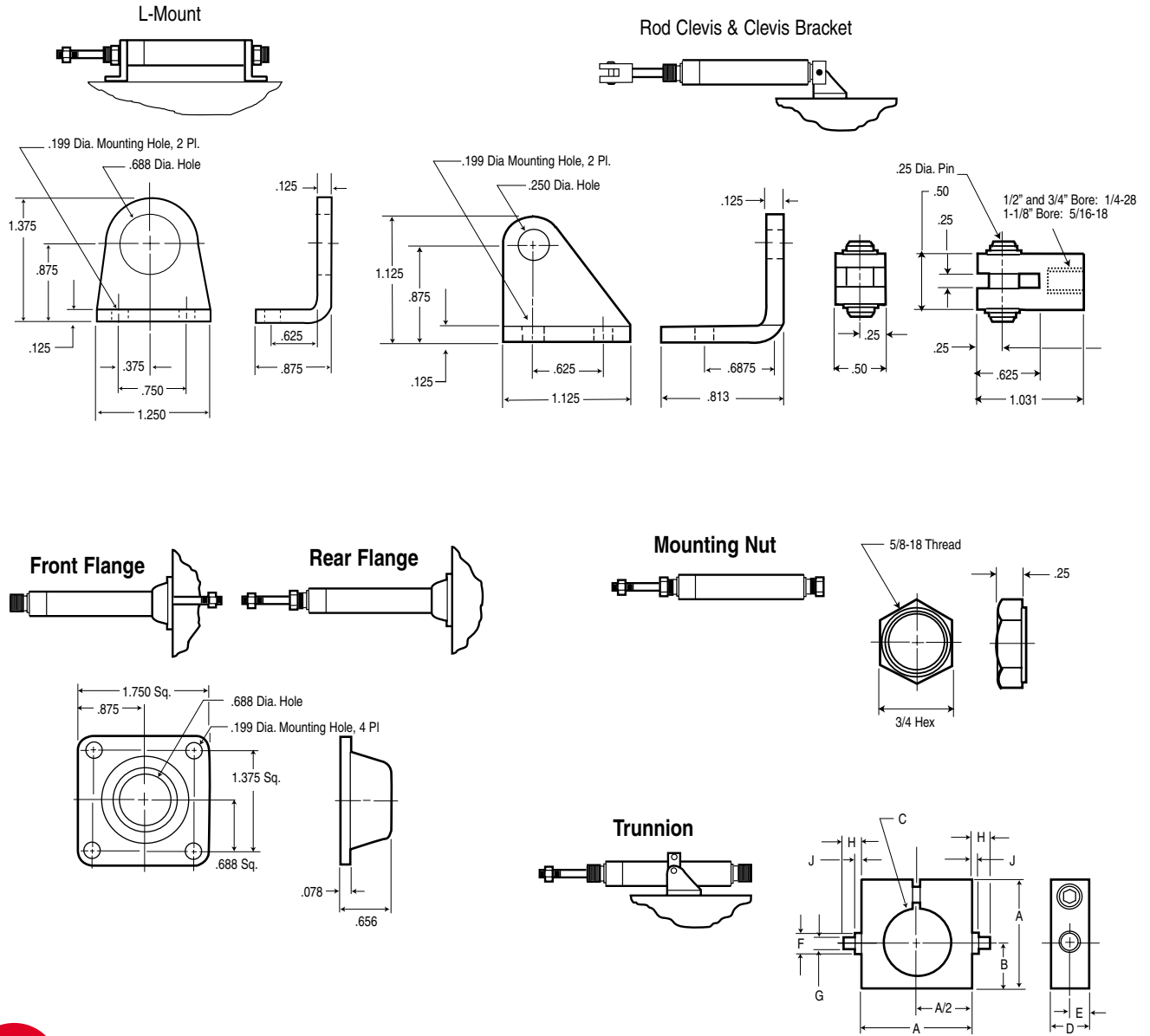
Mounts must be ordered separately. See page 85.

To order a cylinder with Viton seals, consult the factory.

NOTE: Highlighted selections denote most popular models.

Dimensional Data

Series 01



Ordering

Mounting Kit

	Cylinder Bore (Inches)		
	1/2	3/4	1-1/8
L-MOUNTS (2 Qty) *	20515	20515	20515
FLANGE MOUNT *	20516	20516	20516
MOUNTING NUT (2 Qty)	20514	20514	20514
CLEVIS BRACKET	20519	20519	20519
TRUNNION	20522	20523	20524
TRUNNION BRACKETS	20561	20561	-
ROD CLEVIS	20517	20517	20518

* NOTE: Mounting nuts included.

Trunnion Dimensions

Reference	Cylinder Bore (Inches)		
	1/2	3/4	1-1/8
A	1.50	1.50	2.25
B	.625	.625	.875
C Dia.	.703	.953	1.391
D	.500	.500	.750
E	.250	.250	.375
F Dia.	-	-	.563
G Dia. ± .002	.250	.250	.437
H ± .010	.250	.250	.438
J	-	-	.0625

* 20561 Trunnion Bracket Kit (right and left brackets) is used for 20522 and 20523 Trunnions. Reference Clevis bracket dimensions.

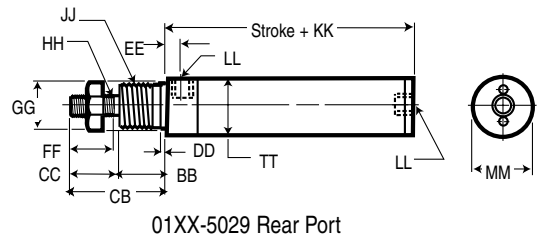
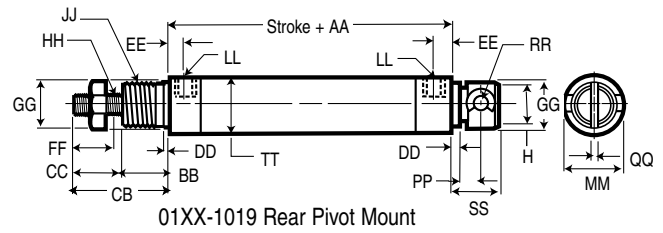
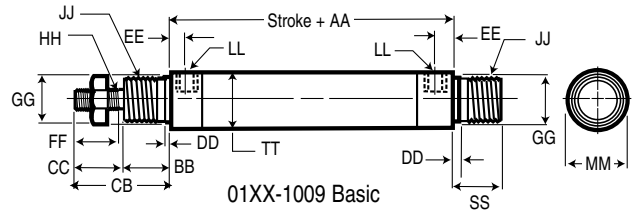
Dimensional Data

Series 01

Reference	CYLINDER BORE (INCHES)		
	1/2	3/4	1-1/8
Rod Diameter	1/4	1/4	5/16
AA	2.438	2.438	2.688
BB	.625	.625	.625
CC	.750	.750	.750
CB	1.375	1.375	1.375
DD	.047	.047	.047
EE	.281	.281	.281
FF*	.719	.719	.719
GG (± .002)	.682	.682	.682
HH	1/4-28 UNF	1/4-28 UNF	5/16-18 UNC
H	.625	.625	.625
JJ (UNF-2A)	5/8-18	5/8-18	5/8-18
KK	2	2	2
LL (NPTF)	1/8-27	1/8-27	1/8-27
MM	.787	.912	1.350**
PP	.375	.375	.375
QQ (SLOT) ± .002	.130	.130	.130
RR (PIN)	.250	.250	.250
SS	.625	.625	.625
TT DIA.	.700	.950	1.375

* Note: FF shows total thread, including run out.

** On rear head only of 5029 dimension is 1.291.



Features

Series S

Silverair round cylinders are designed for application in OEM and MRO applications where a disposable, light duty cylinder is preferred. Prelubed, they're suitable for operations without externally applied lubrication. Constructed of stainless steel and aluminum, they stand up to the attack of corrosive environments.

- Silverair cylinders feature stainless steel (Series 304) barrels. Drawn and polished internal diameters have superior lube-holding characteristics for a low friction surface that gives smooth performance and outstanding cycle life.
- Piston rods are centerless ground and polished Series 303 stainless steel, providing smooth rod movement.
- Lightweight aluminum heads feature full flow ports for maximum air flow and smooth response.
- Piston rod threads are roll formed to provide superior strength and durability.
- U-cup design on piston seals provides continuous cylinder barrel contact, minimizes blow-by and offers longer seal life than O-ring piston seals.
- The oil-permeated bronze rod bushing is precision ball sized for reduced friction and increased cylinder life.
- Return springs on single-acting cylinders are made from a high tensile alloy for exceptional performance and long service life.
- Silverair cylinders are prelubricated, so they're ideal in applications where external lubrication can't be supplied.



Performance Specifications

Bore Sizes:	1/2", 3/4", 1-1/16", 1-1/4", 1-1/2", 2" and 2-1/2"
Air Pressure:	to 200 p.s.i. (14 bar)
Operating Temperature Range:	-40° to 160° F (18° to 82° C)
Maximum Output Force:	982 pounds (2-1/2-inch bore cylinder)
Viton Seals Models:	For high heat applications. Consult factory.

Range of mounting styles and attachable mounts/ accessories covers wide range of application requirements.

Magnetic pistons available for use with Hall Effect or Reed Switches.

Ordering

See following page.

Ordering

Include dashes. Dashes are significant.

S X XX - X X X X - XXX

SERIES

S Stainless Steel

CYLINDER TYPE

- S** Single Acting, Spring Return (Not available on 25 bore size)
- D** Double Acting
- R** Single Acting, Spring Extend (Not available on 25 bore size)
- H** Single Acting, Hex Rod (Non-rotating rod) (Spring return only)
Not available on 14, 17, 20 or 25 bore sizes

BORE SIZE

- 05** 1/2 in
- 07** 3/4 in.
- 11** 1-1/16 in.
- 14** 1-1/4 in. (Not available on type SH)
- 15** 1-1/2 in.
- 17** 1-3/4 in. (Not available on type SH)
- 20** 2 in. (Not available on type SH)
- 25** 2-1/2 in. (Not available on type SS, SR or SH)

MOUNTING STYLE

- B** Block Mount (Available on 05, 07, 11 and 15 bore sizes only)
(Not available on type SH)
- D** Double Rod End (Double Acting Only)
- N** Nose Mount
- P** Universal Mount (Pivot or Double End)

Silverair attachable mounts must be ordered separately.
See page 89.

Note A: Bumpers

- Not available with magnetic piston option.
- Standard on double rod ends.
- Do not affect external dimensions.

Note B: Wearstrip is standard on double-acting nose mount, universal mount and block front mount of 5" or more of stroke. Also on single acting, spring extend cylinders with 3" or more of stroke. Not available on 1/2" bore cylinders.

Note : Highlighted selections denote most popular models.

STROKE LENGTH

WHOLE INCHES	FRACTIONS
00 = 0 in	0 = None
01 = 1 in	1 = 1/8 in
02 = 2 in	2 = 1/4 in
03 = 3 in	3 = 3/8 in
04 = 4 in	4 = 1/2 in
05 = 5 in	5 = 5/8 in
06 = 6 in	6 = 3/4 in
10 = 10 in	7 = 7/8 in
etc.	

For recommended maximum stroke lengths, per type, see pages 91 through 97.

(1/2" Increments, 1/2" through 6")

WEARSTRIP (Note B)

- 4** None (standard)
- W** Wearstrip

PACKING

- B** Buna N
- V** Viton

MAGNET/ BUMPERS (Note A)

- 4** No Bumpers, no magnet
- B** Bumpers
- M** Magnetic Piston (Not available in 1/2" bore or for single-acting cylinders).

For switch information, see page 98.

Ordering

Series S (Mounting Kits)

		CYLINDER BORE (INCHES)							
		1/2	3/4	1-1/16	1-1/4	1-1/2	1-3/4	2	2-1/2
L-MOUNT (Single Acting)									
Order Mounting Nut below.									
118108-05	118108-07	118108-11	118108-14	118108-14	118108-17	118108-20	118108-25		
L-MOUNT (Double Acting)									
Order Mounting Nut below.									
118108-50	118108-11	118108-11	118108-14	118108-14	118108-17	118108-20	118108-25		
MOUNTING NUT (Single Acting*)									
118109-05	118109-07	118109-11	118109-14	118109-14	118109-17	118109-20	118109-25		
MOUNTING NUT (Double Acting)									
118109-50	118109-11	118109-11	118109-14	118109-14	118109-17	118109-20	118109-25		
PIVOT BRACKET (Pivot Pin Included)									
117523-05	117523-07	117523-07	117523-14	117523-15	117523-15	117523-20	117523-20		
ROD CLEVIS (Pivot Pin Included)									
117555-05	117555-07	117555-11	117555-14	117555-14	117555-17	117555-17	117555-17		
PIVOT PINS (Standard Equipment)									
Pin									
118119-05	118119-07	118119-07	118119-14	118119-15	118119-15	118119-20	-		
Retainer									
118592-05	118592-05	118592-05	118592-05	118592-15	118592-15	118592-15	-		
Optional Press Fit Pin									
118121-05	118121-07	118121-07	118121-14	118121-15	118121-15	-	-		

~ FOR DOUBLE END MOUNTING OF SINGLE-ACTING CYLINDERS, ORDER THE FOLLOWING:

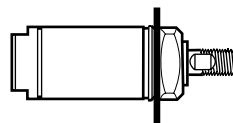
1/2-inch bore One 118108-05 L-Mount and one 118109-05 Nut for rear mounting thread. One 118108-50 L-Mount and one 118109-50 Nut for front mounting thread.

3/4-inch bore Two 118108-07 L-Mounts, one 118109-07 Nut for rear mounting thread and one 118109-11 Nut for front mounting thread.

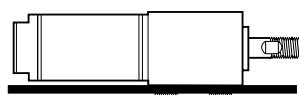
NOTE: Silverair accessories are bright zinc plated steel.



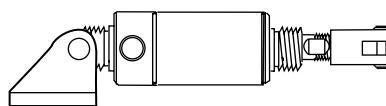
L-Mount



Mounting Nut



Block Front Mount

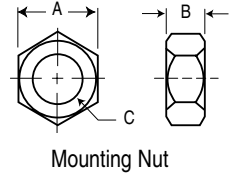
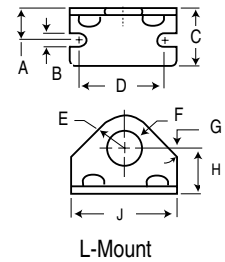


Pivot Bracket and Rod Clevis

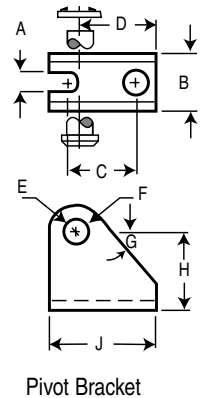
Dimensional Data

Series S (Mounting Kit)

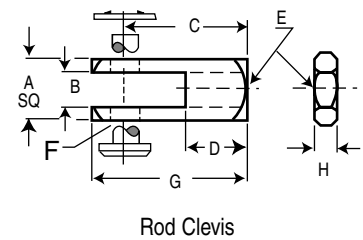
Dim Ref	CYLINDER BORE (INCHES)									
	1/2 Single Acting	1/2 Double Acting	3/4 Single Acting	3/4 Double Acting	1-1/16 All Types	1-1/4 All Types	1-1/2 All Types	1-3/4 All Types	2 All Types	2-1/2 All Types
L-MOUNT BRACKET										
A	.31	.31	.44	.56	.56	.75	.75	.94	1.00	1.00
B	.19	.19	.19	.27	.27	.28	.28	.34	.34	.34
C	.62	.62	.75	1.00	1.00	1.50	1.50	1.50	1.62	1.62
D	1.00	1.00	1.25	1.50	1.50	1.89	1.89	2.25	2.25	2.88
E	.37	.37	.40	.56	.56	.75	.75	.88	1.00	1.25
F	.38	.44	.50	.63	.63	.76	.76	1.04	1.38	1.50
G	56°	56°	45°	45°	45°	49°	49°	52°	60°	63°
H	.57	.57	.69	.81	.81	1.00	1.00	1.25	1.50	1.75
J	1.38	1.38	1.63	1.88	1.88	2.50	2.50	3.00	3.00	3.75
MOUNTING NUT										
A	.56	.68	.75	.93	.93	1.12	1.12	1.50	1.85	2.06
B	.22	.25	.31	.37	.37	.42	.42	.56	.50	.50
C	3/8-24	7/16-20	1/2-20	5/8-18	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12	1-3/8-12



Dim Ref	CYLINDER BORE (INCHES)							
	1/2 All Types	3/4 All Types	1-1/16 All Types	1-1/4 All Types	1-1/2 All Types	1-3/4 All Types	2 All Types	2-1/2 All Types
PIVOT BRACKET								
A	.20	.26	.26	.32	.39	.39	.45	.45
B	.52	.65	.65	.77	.96	.96	1.20	1.20
C	.43	.75	.75	.75	1.00	1.00	1.00	1.00
D	.54	.87	.87	.94	1.25	1.25	1.43	1.43
E	.22	.31	.31	.31	.38	.38	.38	.38
F	.16	.26	.26	.26	.38	.38	.38	.38
G	50°	53°	53°	53°	52°	52°	48°	48°
H	.64	.87	.87	1.06	1.37	1.37	1.68	1.68
J	.75	1.19	1.19	1.25	1.63	1.63	1.81	1.81



ROD CLEVIS								
A	.38	.50	.50	.75	.75	.75	.75	.75
B	.19	.25	.25	.38	.38	.38	.38	.38
C	.75	.94	.94	1.30	1.30	1.30	1.30	1.30
D	.38	.50	.50	.75	.75	.75	.75	.75
E	10-32	1/4-28	5/16-24	7/16-20	7/16-20	1/2-20	1/2-20	1/2-20
F	.19	.25	.25	.38	.38	.38	.38	.38
G	.94	1.20	1.20	1.70	1.70	1.70	1.70	1.70
H	.12	.16	.16	.25	.25	.31	.31	.31



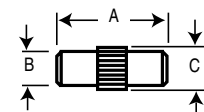
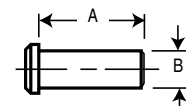
PIVOT PIN

As supplied with Pivot Bracket:

A	.69	.81	.81	.94	1.13	1.13	1.44	1.44
B	.15	.25	.25	.25	.37	.37	.37	.37

For press fit into pivot hole:

A	.50	.75	.75	.87	1.12	1.12	-	-
B	.15	.24	.24	.24	.37	.37	-	-
C	.17	.26	.26	.26	.39	.39	-	-



Pivot Pins

Performance Specifications

Series S (Spring Return, Nose Mount)

Model SSXX-N4B4-XXX (Max. Stroke - 4 inches)

Bore sizes: 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2", 1-3/4", 2"
Hex Mounting Nut: Standard (except on 2-inch models).
Options: Wearstrip (except on 1/2-inch bore), bumper, Viton
Accessories: L-mount, rod clevis
Notes: No rod bushing on 1/2-inch models - front head is hard anodized.

Model SHXX-N4B4-XXX (Max. Stroke - 4 inches)

Nonrotating
Bore sizes: 1/2", 3/4", 1-1/16", 1-1/2"
Hex Mounting Nut: Standard
Options: Wearstrip (except on 1/2-inch bore)
Accessories: L-mount, rod clevis
Notes: No rod bushing - front head is hard anodized.

Series S (Spring Return, Universal Mount)

Model SSXX-P4B4-XXX (Max. Stroke - 4 inches)

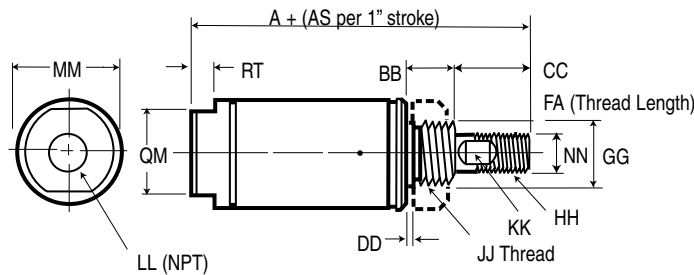
Bore sizes: 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2", 1 3/4", 2"
Options: Wearstrip (except on 1/2-inch bore), bumper, Viton
Accessories: Pivot bracket, rod clevis, L-mount, mounting nut. Order mounting nuts as required.
Notes: No rod bushing on 1/2-inch models - front head is hard anodized.

Model SHXX-P4B4-XXX (Max. Stroke - 4 inches)

Nonrotating
Bore sizes: 1/2", 3/4", 1-1/16", 1-1/2"
Options: Wearstrip (except on 1/2-inch bore), bumper, Viton
Accessories: Pivot bracket, rod clevis, L-mount, mounting nut. Order mounting nuts as required.
Notes: No rod bushing - front head is hard anodized.

Dimensional Data

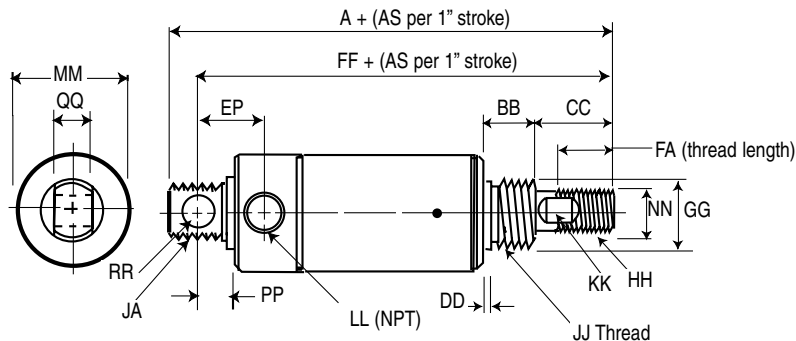
Series S (Spring Return, Nose Mount)



Spring Forces

Bore Size	Spring Force (lbs.)	
	Normal	Actuated
1/2"	1	2
3/4"	1.5	5
1-1/16"	4	8
1-1/4"	7	14
1-1/2"	6	12
1-3/4"	12	24
2"	15	30

Series S (Spring Return, Universal Mount)



Dimensional Data

Series S

Dim Code	Cylinder Description	CYLINDER BORE (INCHES)						
		1/2	3/4	1-1/16	1-1/4	1-1/2	1-3/4	2
SINGLE ACTING								
A	SSXX-N4B4-XXX	1.81	2.00	2.56	3.41	3.19	3.85	4.17
A	SHXX-N4B4-XXX	2.06	2.25	2.68	–	3.44	–	–
A	SSXX-P4B4-XXX	2.50	3.06	3.44	4.50	4.25	5.41	5.54
A	SHXX-P4B4-XXX	2.75	3.31	3.56	–	4.50	–	–
AS	SSXX-N4B4-XXX	1.88	1.69	1.56	1.81	1.69	2.00	2.00
AS	SHXX-N4B4-XXX	1.88	1.69	1.56	–	1.69	–	–
AS	SSXX-P4B4-XXX	1.88	1.69	1.56	1.81	1.69	2.00	2.00
AS	SHXXP4B4-XXX	1.88	1.69	1.56	–	1.69	–	–
BB	SSXX-N4B4-XXX	.31	.44	.50	.62	.62	.75	.81
BB	SHXX-N4B4-XXX	.31	.44	.50	–	.62	–	–
BB	SSXX-P4B4-XXX	.31	.44	.50	.62	.62	.75	.81
BB	SHXXP4B4-XXX	.31	.44	.50	–	.62	.75	.81
CC	SSXX-XXXX-XXX	.50	.50	.62	1.00	1.00	1.19	–
CC	SHXX-XXXX-XXX	.75	.75	.75	–	1.25	–	–
DD	All Types	.04	.07	.07	.07	.07	.09	.12
EP	All Types	.42	.66	.62	.91	.81	.98	1.00
FA	All Types	.50	.50	.50	.50	.75	.88	.88
FF	SSXX-X4B4-XXX	4.50	2.77	3.16	4.14	3.88	4.91	5.11
GG	All Types	.375	.500	.625	.750	.750	1.03	1.375
HH	All Types	10-32	1/4-28	5/16-24	7/16-20	7/16-20	1/2-20	1/2-20
JA	SSXX-N4B4-XXX	7/16-20	5/8-18	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12
JA	SHXX-N4B4-XXX	3/8-24	5/8-18	5/8-18	–	3/4-16	–	–
JJ	All Types	3/8-24	1/2-20	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12
KK	Wrench Flat	None	None	.25	.38	.38	.44	.50
LL	All Types	10-32	1/8	1/8	1/8	1/8	1/4	1/4
MM	All Types	.56	.81	1.12	1.31	1.55	1.81	2.07
NN	Standard Rod	.187	.250	.312	.437	.437	.500	.625
NN	Hex Flats	.187	.250	.375	–	.437	–	–
PP	All Types	.25	.34	.34	.41	.50	.50	.57
QM	All Types	.37	.62	.87	.87	.82	1.25	1.25
QQ	All Types	.31	.38	.38	.50	.62	.62	.75
RR	All Types	.16	.25	.25	.25	.38	.38	.38
RT	All Types	.12	.16	.25	.18	.25	.25	.31

Performance Specifications

Series S (Spring Extend, Nose Mount)

Model SRXX-N4B4-XXX (Max. Stroke - 4 inches)

Bore sizes: 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2", 1-3/4", 2"
Hex Mounting Nut: Standard
Options: Bumper, Viton
Accessories: Rod clevis, L-mount
Wearstrip: Not available on 1/2-inch bore.
 Standard with 3 inches of stroke, or more (optional on shorter strokes).
Notes: No rod bushing on 1/2-inch models - front head is hard anodized.

Series S (Spring Extend, Universal Mount)

Model SRXX-P4B4-XXX (Max. Stroke - 4 inches)

Bore sizes: 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2", 1-3/4", 2"
Options: Bumper, Viton
Accessories: Pivot bracket, rod clevis, L-mount, mounting nut.
Wearstrip: Not available on 1/2-inch bore.
 Standard with 3 inches of stroke, or more (optional on shorter strokes).
Notes: No rod bushing on 1/2-inch models - front head is hard anodized.

Series S (Block Front Mount - Spring Extend or Spring Return)

Model SSXX-B4B4-XXX (Spring Return) (Max. Stroke - 4 inches)

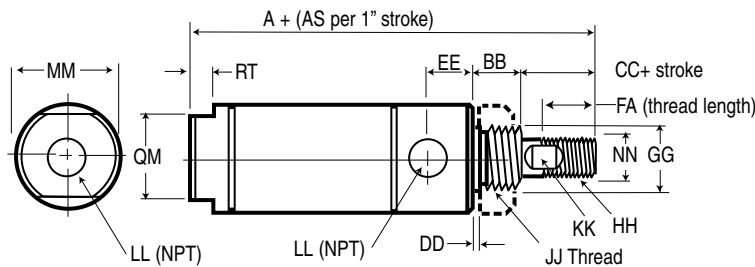
Bore sizes: 1/2", 3/4", 1-1/16"
Options: Wearstrip (except on 1/2-inch bore), bumpers, Viton.
Accessories: Rod clevis
Notes: No rod bushing on 1/2-inch models - front head is hard anodized.

Model SRXX-B4B4-XXX (Spring Extend, Illustrated) (Max. Stroke - 4 inches)

Bore Sizes: 1/2", 3/4", 1-1/16"
Options: Bumpers, Viton
Accessories: Rod clevis
Wearstrip: Not available on 1/2-inch bore.
 Standard with 3 inches of stroke, or more (optional on shorter strokes).
Notes: No rod bushing on 1/2-inch models - front head is hard anodized.

Dimensional Data

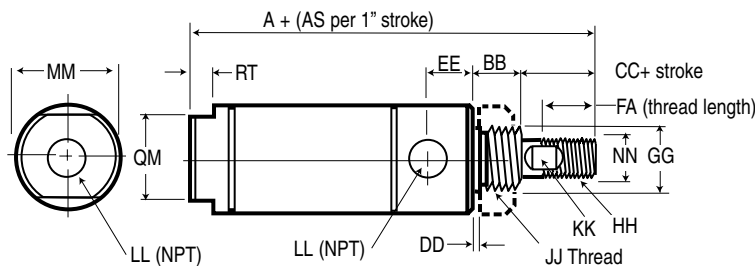
Series S (Spring Extend, Nose Mount)



Spring Forces

Bore Size	Spring Force (lbs.)	
	Normal	Actuated
1/2"	1	2
3/4"	1.5	5
1-1/16"	4	8
1-1/4"	7	14
1-1/2"	6	12
1-3/4"	12	24
2"	15	30

Series S (Spring Extend, Universal Mount)

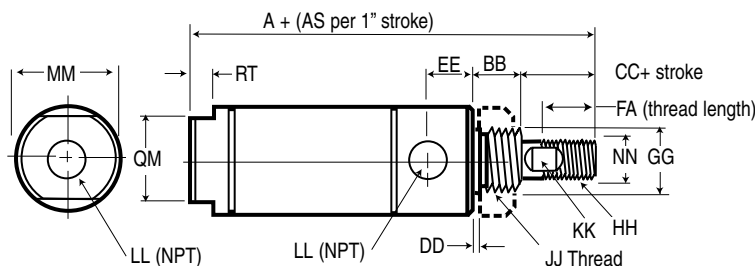


* TT - Two thru holes drilled and counterbored on port side for cap screw size listed.

** TW - Above thru holes tapped on opposite side for additional mounting option.

† Mounting hole locations for 1/2-inch models.

Series S (Block Front Mount - Spring Extend or Spring Return)



Dimensional Data

Series S

Dim Code	Cylinder Description	CYLINDER BORE (INCHES)						
		1/2	3/4	1-1/16	1-1/4	1-1/2	1-3/4	2
SINGLE ACTING								
A	SRXX-N4B4-XXX	2.42	2.78	3.28	4.25	4.00	5.03	5.11
A	SRXX-P4B4-XXX	3.12	3.84	4.15	5.33	5.06	6.59	6.48
A	SSXX-B4B4-XXX	2.42	3.34	4.28	-	5.00	-	-
A	SRXX-B4B4-XXX	2.42	3.34	4.28	-	5.18	-	-
AS	SRXX-N4B4-XXX	1.44	2.69	2.56	2.81	2.69	3.00	3.00
AS	SRXX-P4B4-XXX	1.44	2.69	2.56	2.81	2.69	3.00	3.00
AS	SSXX-B4B4-XXX	1.88	1.69	1.56	-	1.69	-	-
AS	SRXX-B4B4-XXX	2.88	2.69	2.56	-	2.69	-	-
BB	All Types	.41	.50	.50	.62	.62	.75	.81
BC	Bolt Circle Dia.	.75	1.00	1.25	-	1.75	-	-
BT	Threaded Hole	8-32(2)	10-32(2)	10-32(2)	-	1/4-20	-	-
CC	SRXX-N4B4-XXX	.50	.50	.62	1.00	1.00	1.19	1.25
CC	SRXX-P4B4-XXX	.50	.50	.62	1.00	1.00	1.19	1.25
CC	SRXX-B4B4-XXX	.50	1.06	1.12	-	1.50	-	-
CC	SSXX-B4B4-XXX	.50	1.06	1.12	-	1.50	-	-
DD	Block Front Mount	.06	.09	.09	-	.12	-	-
DD	All Others	.04	.07	.07	.07	.07	.09	.12
E	Block Front Mount	.75	1.00	1.25	-	1.75	-	-
EE	All Types	.37	.48	.52	.69	.62	.72	.69
EP	SRXX-P4B4-XXX	.42	.66	.62	.91	.81	.98	1.00
FA	Block Front	.50	.75	.75	-	1.25	-	-
FA	All Others	.50	.50	.50	.50	.75	.88	.88
FF	SRXX-P4B4-XXX	5.76	3.55	3.87	4.97	4.69	6.09	6.05
FM	Block Front Mount	.31	.48	.72	-	1.00	-	-
GG	Block Front Mount	.437	.625	.750	-	1.00	-	-
GG	SRXX-XXXX-XXX	.437	.625	.625	.750	.750	1.03	1.375
HH	All Types	10-32	1/4-28	5/16-24	7/16-20	7/16-20	1/2-20	1/2-20
JA	SRXX-P4B4-XXX	7/16-20	5/8-18	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12
JJ	All Types	7/16-20	5/8-18	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12
KK	Wrench Flat	None	None	.25	.38	.38	.44	.50
LL	Block Front Mount	10-32	1/8	1/8	1/8	1/4	-	-
LL	All Others	10-32	1/8	1/8	1/8	1/8	1/4	1/4
MM	All Types	.62	.88	1.12	1.31	1.55	1.81	2.07
NN	All Types	.187	.250	.312	.437	.437	.500	.625
PM	Block Front Mount	.44	.51	.54	-	.66	-	-
PP	SRXX-P4B4-XXX	.25	.34	.34	.41	.50	.50	.57
QM	All Types	.37	.62	.87	.87	.82	1.25	1.25
QQ	SRXX-P4B4-XXX	.31	.38	.38	.50	.62	.62	.75
RR	SRXX-P4B4-XXX	.16	.25	.25	.25	.38	.38	.38
RT	All Types	.12	.16	.25	.18	.25	.25	.31
TN	Block Front Mount	.44	.62	.81	-	1.12	-	-
TT	Block Front Mount	8-32	10-32	10-32	-	1/4-20	-	-
TW	Block Front Mount	-	1/4-20	1/4-20	-	5/16-18	-	-

Performance Specifications

Series S (Nose Mount)

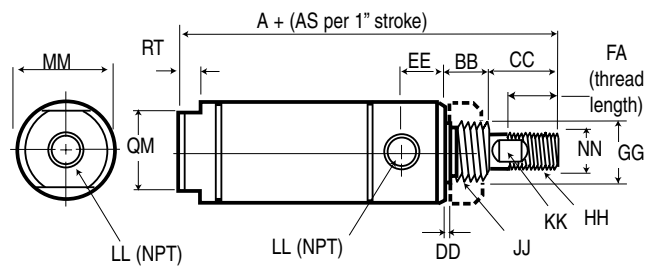
Model SDXX-N4B4-XXX (Max. Stroke -12 inches)
Bore sizes: 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2", 1-3/4", 2, 2-1/2"
Hex Mounting Nut: Standard (Except on 2- and 2-1/2-inch models).
Options: Bumpers, Viton, Internal magnet
Accessories: L-mount, rod clevis
Wearstrip: Not available on 1/2-inch bore. Standard with 5 inches of stroke, or more (optional on shorter strokes).
Notes: No rod bushing on 1/2-inch models - front head is hard anodized.

Series S (Universal Mount)

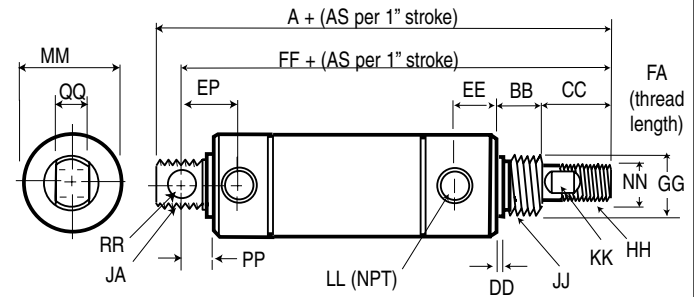
Model SDXX-P4B4-XXX (Max. Stroke - 12 inches)
Bore sizes: 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2", 1-3/4", 2", 2-1/2"
Options: Bumpers, Viton, Internal magnet
Accessories: Pivot bracket, rod clevis, L-mount, mounting nut
Wearstrip: Not available on 1/2-inch bore. Standard with 5 inches of stroke, or more (optional on shorter strokes).
Notes: No rod bushing on 1/2-inch models - front head is hard anodized.

Dimensional Data

Series S (Nose Mount)



Series S (Universal Mount)



Dim Code	Cylinder Description	CYLINDER BORE (INCHES)							
		1/2	3/4	1-1/16	1-1/4	1-1/2	1-3/4	2	2-1/2
DOUBLE ACTING									
A	SDXX-N4B4-XXX	2.62	3.47	3.75	4.75	4.44	5.57	5.56	5.56
A	SDXX-P4B4-XXX	3.31	4.54	4.62	5.83	5.50	7.13	6.93	6.93
AS	All Types	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
BB	All Types	.41	.50	.50	.62	.62	.75	.81	.81
CC	All Types	.50	.50	.62	1.00	1.00	1.19	1.25	1.25
DD	All Types	.04	.07	.07	.07	.07	.09	.12	.12
EE	All Types	.37	.48	.52	.69	.62	.72	.69	.69
EP	SDXX-P4B4-XXX	.42	.66	.62	.91	.81	.98	1.0	1.0
FA	All Types	.50	.50	.50	.75	.75	.88	.88	.88
FF	SDXX-P4B4-XXX	6.12	4.25	4.34	5.47	5.12	6.63	6.50	6.50
GG	All Types	.437	.625	.625	.750	.750	1.030	1.50	1.50
HH	All Types	10-32	1/4-28	5/16-24	7/16-20	7/16-20	1/2-20	1/2-20	1/2-20
JJ	All Types	7/16-20	5/8-18	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12	1-3/8-12
KK	All Types	None	None	.25	.38	.38	.44	.50	.50
LL	All Types	10-32	1/8	1/8	1/8	1/8	1/4	1/4	1/4
MM	All Types	.62	.88	1.12	1.31	1.55	1.81	2.07	2.62
NN	All Types	.187	.250	.312	.437	.437	.500	.625	.625
PP	SDXX-P4B4-XXX	.25	.34	.34	.41	.50	.50	.57	.57
QM	SDXX-N4B4-XXX	.37	.62	.87	.87	.87	1.25	1.25	1.75
QQ	SDXX-P4B4-XXX	.31	.38	.38	.50	.62	.62	.75	.75
RR	SDXX-P4B4-XXX	.16	.25	.25	.25	.38	.38	.38	.38
RT	SDXX-N4B4-XXX	.12	.16	.25	.18	.25	.25	.31	.31



Performance Specifications

Series S (Double Rod End, Double End Mount)

Model SDXX-D4B4-XXX (Max. Stroke - 12 inches)

- Bore sizes:** 1/2", 3/4", 1-1/16", 1-1/4", 1-1/2", 1-3/4", 2", 2-1/2"
Hex Mounting Nut: Standard (except on 2 and 2-1/2 inch models) and bumpers.
Options: Viton, wearstrip.
Accessories: L-mount, rod clevis, mounting nut (2-, 2-1/2-inch models)
Notes: No rod bushing on 1/2-inch models - heads are hard anodized.

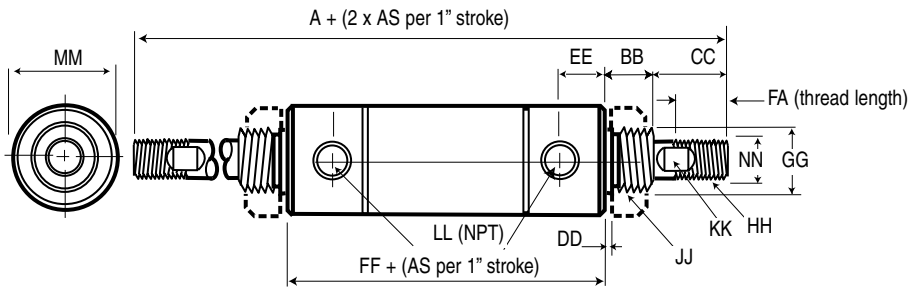
Series S (Block Front Mount)

Model SDXX-B4B4-XXX (Max. Stroke - 12 inches)

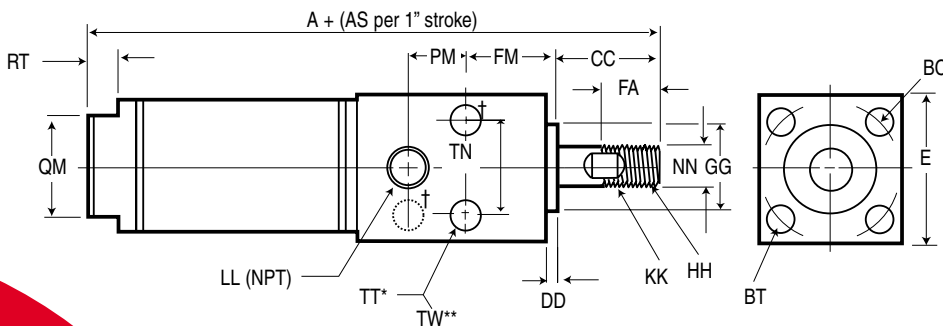
- Bore sizes:** 1/2", 3/4", 1-1/16"
Options: Internal magnet, bumpers, Viton, wearstrip
Accessories: Rod clevis
Wearstrip: Not available on 1/2-inch bore.
 Standard with 5 inches of stroke, or more (optional on shorter strokes).
Notes: No rod bushing on 1/2-inch models - front head is hard anodized.
 Wearstrip not available on 1/2-inch bore
 Wearstrip is standard with 5 inches of stroke, or more (optional on shorter strokes).

Dimensional Data

Series S (Double Rod End, Double End Mount)



Series S (Block Front Mount)



* TT - Two thru holes drilled and counterbored on port side for cap screw size listed.
 ** TW - Above thru holes tapped on opposite side for additional mounting option.
 † Mounting hole locations for 1/2-inch models.

Dimensional Data

Dim Code	Cylinder Description	CYLINDER BORE (INCHES)							
		1/2	3/4	1-1/16	1-1/4	1-1/2	1-3/4	2	2-1/2
DOUBLE ACTING									
A	SDXX-D4B4-XXX	3.88	5.03	5.32	6.83	6.63	8.57	8.31	8.31
A	Block Front Mount	2.62	4.03	4.75	–	5.44	–	–	–
AS	Block Front Mount	1.00	1.00	1.00	–	1.00	–	–	–
AS	SDXX-D4B4-XXX	.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00
BB	SDXX-D4B4-XXX	.41	.50	.50	.62	.62	.75	.81	.81
BC	Bolt Circle Dia.	.75	1.00	1.25	–	1.75	–	–	–
BT	Threaded Hole	8-32	10-32	10-32	–	1/4-20	–	–	–
CC	Block Front Mount	.50	1.06	1.12	–	1.50	–	–	–
CC	SDXX-D4B4-XXX	.50	.50	.62	1.00	1.00	1.19	1.25	1.25
DD	Block Front Mount	.06	.09	.09	–	.12	–	–	–
DD	SDXX-D4B4-XXX	.04	.07	.07	.07	.07	.09	.12	.12
E	Block Front Mount	.75	1.00	1.25	–	1.75	–	–	–
EE	SDXX-D4B4-XXX	.37	.48	.52	.69	.62	.72	.69	.69
FA	Block Front Mount	.50	.75	.75	–	1.25	–	–	–
FA	SDXX-D4B4-XXX	.50	.50	.50	.75	.75	.88	.88	.88
FF	SDXX-D4B4-XXX	2.07	3.03	3.07	3.58	3.39	4.69	4.19	4.19
FM	Block Front Mount	.31	.48	.72	–	1.00	–	–	–
GG	Block Front Mount	.437	.625	.750	–	1.00	–	–	–
GG	SDXX-D4B4-XXX	.437	.625	.625	.750	.750	1.030	1.50	1.50
HH	All Types	10-32	1/4-28	5/16-24	7/16-20	7/16-20	1/2-20	1/2-20	1/2-20
JJ	SDXX-D4B4-XXX	7/16-20	5/8-18	5/8-18	3/4-16	3/4-16	1-14	1-1/4-12	1-3/8-12
KK	All Types	None	None	.25	.38	.38	.44	.50	.50
LL	All Types	10-32	1/8	1/8	1/8	1/8	1/4	1/4	1/4
MM	SDXX-D4B4-XXX	.62	.88	1.12	1.31	1.55	1.81	2.07	2.62
NN	All Types	.187	.250	.312	.437	.437	.500	.625	.625
PM	Block Front Mount	.44	.51	.54	–	.66	–	–	–
QM	Block Front Mount	.37	.62	.87	–	.87	–	–	–
RT	Block Front Mount	.12	.16	.25	–	.25	–	–	–
TN	Block Front Mount	.44	.62	.81	–	1.12	–	–	–
TT	Block Front Mount	8-32	10-32	10-32	–	1/4-20	–	–	–
TW	Block Front Mount	–	1/4-20	1/4-20	–	5/16-18	–	–	–

Features

Series S (Hall Effect Switches)

Hall Effect Sensors are typically used in conjunction with computers, programmable controllers or other solid state devices to sense and process cylinder rod proximity. The solid state circuitry in this sinking switch (NPN) provides clean, fast output without "bounce." The 300 mW power capability restricts its use to low power loads. One switch kit fits all Silverair cylinders for reduced and simplified inventory. 3/8 inch effective area per switch. For two switches, a minimum of 1-inch stroke is recommended.

Series S (Reed Switches)

Epoxy encapsulated reed switches are ideal for harsh environments. One switch kit fits all Silverair cylinders for reduced and simplified inventory. 50 watt reed is common in all sensors. Model 117045-300 lights up during reed engagement in low voltage applications. Model 117045-500 lights up over wide voltage range. Model 117045-100 is a basic sensor with no LED.



Performance Specifications

Series S (Hall Effect Switches)

Input Voltage:	5 to 24 VDC
Input Current:	25 mA maximum
Output Voltage Drop:	0.4 VDC maximum
Output Current:	330 mA maximum
Power Dissipation:	300 mW maximum
Temperature Range:	-20° to 185°F (-29° to 85°C)

Series S (Reed Switches)

Contacts:	Normally open
Contact Rating:	50 W maximum
Switching Current:	1 A maximum
Initial Contact Resistance:	1 Ohm
Minimum Break Down Voltage:	225 VDC, 275 VAC
Temperature Range:	-40° to 200°F (-40° to 93°C)

Ordering

Series S (Hall Effect Switches)

<u>Model No.</u>	<u>Description</u>
118123-100	w/LED, 5-24 VDC, 24 inch leads (includes 118124 Mounting Kit)
118123-200	w/LED, 5-24 VDC, 144 inch leads (includes 118124 Mounting Kit)

Series S (Reed Switches)

One 118124 Mounting Kit is included with each Reed Switch

<u>Model No.</u>	<u>Description</u>
117045-100	No LED, 120 VAC or 200 VDC max., 24 inch leads
117045-200	No LED, 120 VAC or 200 VDC max., 144 inch leads
117045-300	w/LED, 5-24 VAC/DC max., 24 inch leads
117045-400	w/LED, 5-24 VAC/DC max., 144 inch leads
117045-500	w/LED, 120 VAC or 200 VDC max., 24 inch leads
117045-600	w/LED, 120 VAC or 200 VDC max., 144 inch leads

Features

Series S (Stainless Steel Volume Chambers)

Volume chambers are used wherever there is the need to accumulate or store a volume of air or vacuum, such as a time delay in a circuit.

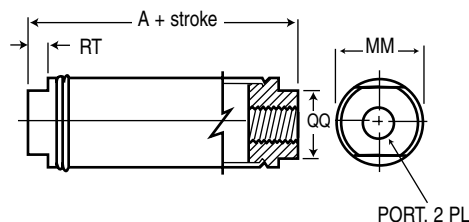
- Stainless steel body and aluminum endcaps offer excellent corrosion resistance in adverse environments.
- Available in lengths up to 24 inches, at 1/8-inch increments, providing a capability to meet very specific pneumatic accumulator applications.

Performance Specifications

Operating Pressures: 0 - 200 PSIG (14 bar)
Temperatures Ranges: -40° to 160°F, ambient (-40° to 71°C)
Operation: Compressed air or with vacuum

Dimensional Data

Reference	CYLINDER BORE (INCHES)			
	3/4	1-1/16	1-1/2	2
A	1.91	2.18	2.26	2.81
MM	.81	1.11	1.55	2.07
QQ	.62	.88	.88	1.25
RT	.16	.25	.25	.32
PORT	.125	.125	.125	.25



Ordering

11811 X - X X X

BORE SIZE

5	3/4 inch
6	1-1/16 inch
7	1-1/2 inch
8	2 inch

CHAMBER LENGTH

(1" Increments, 1" through 4")

WHOLE INCHES	FRACTIONS
00 = 0 in	0 = None
01 = 1 in	1 = 1/8 in
02 = 2 in	2 = 1/4 in
03 = 3 in	3 = 3/8 in
04 = 4 in	4 = 1/2 in
05 = 5 in	5 = 5/8 in
06 = 6 in	6 = 3/4 in
10 = 10 in	7 = 7/8 in
etc.	

- Under 1" stroke, use 00 and fraction designation.

Example: 1/2" stroke = 004

Note: Highlighted selections denotes most popular models.

VOLUME CHART

VOLUME (ci)	CYLINDER BORE			
	3/4"	1-1/16"	1-1/2"	2"
Add per 1.0 inch of length	.44	.89	1.77	3.14
Basic Volume (add to total)	.41	.92	1.80	4.44

Get in the
ZONE
 IRO

Features

Series 23, 24, & 28

Economair round cylinders are medium to heavy-duty units that can be installed anywhere that a repairable cylinder is desired. Prelubed, they're suitable for operation without externally applied lubrication. Unique endcap retention design provides a concentric assembly, resulting in a service life superior to tie rod cylinder construction.

- Cylinder heads are high tensile strength aluminum alloy, retained by a feed ring wire, a simple design that eliminates excess cylinder weight and bulk.
- The barrel I.D. is hard-coated aluminum with a Rockwell C60 hardness. A finish of 16 microinches or better insures low friction and smooth operation.
- Piston rod is ground and polished, hard-chrome plated steel for minimum friction and maximum packing life. Optional 303 stainless steel is excellent for corrosion resistance and washdown applications (303 stainless steel is standard on 1-1/8-inch bore cylinders).
- Adjustable cushions provide excellent control of cylinder deceleration. Full range adjustability (except fixed cushions on 1-1/8-inch bore).
- High grade, self-lubricating bronze rod bearing reduces friction and promotes smooth operation.
- Piston seal selection insures job-matched performance - Buna N O-ring, Low Friction U-cup and self-lubricating packings available.
- Wear compensating rod wiper protects internal seals and parts from dirt, grit and debris.
- NPTF dry seal pipe threads on ports.
- Optional self-lubricating U-cup seals reduce drag and promote extra cylinder life.
- Cylinder is repairable so instead of buying complete new units, repair kits can be used.



U-cup and Magnetic Piston Options

Performance Specifications

Bore Sizes:	1-1/8", 1-1/2", 2", 2-1/2", 3" and 4"
Maximum Output Force:	2,513 pounds (4-inch bore).
Air Pressure:	To 200 p.s.i. (14 bar). May be operated hydraulically (200 p.s.i., nonshock).
Operating Temperature Range:	0° to 180° F (-18° to 82° C).
Seals:	Viton seals available for high heat applications. Consult factory.
Notes:	Wide range of mounting styles and attachable mounting hardware/ accessories allows cylinders to be applied in nearly any pneumatic application.

Ordering

Series 23, 24, & 28

Include dashes (-). The dashes are significant.

2X XX - X X X9 - XXX

SERIES NO.

- 23 Noncushioned
- 24 Cushioned, Both Ends
- 28 Magnetic Piston, Cushioned Both Ends

BORE SIZE

- 18 1-1/8 in
- 15 1-1/2 in
- 20 2 in
- 25 2-1/2 in
- 30 3 in
- 40 4 in

CYLINDER TYPE

- 1 Double Acting, Rear Tang
 - 5 Double Acting, No Rear Tang
 - 2 Double Acting, Double Rod
- NOTE: Not Available in Series 28

Economair mounts must be ordered separately, see below.

(1" Increments, 1" through 10" plus 1 1/2", 2 1/2" and 3 1/2")

STROKE LENGTH

WHOLE INCHES	FRACTIONS
00 = 0 in	0 = 0 in
01 = 1 in	1 = 1/8 in
02 = 2 in	2 = 1/4 in
03 = 3 in	3 = 3/8 in
04 = 4 in	4 = 1/2 in
05 = 5 in	5 = 5/8 in
06 = 6 in	6 = 3/4 in
↑ ↓	7 = 7/8 in
to	
99	99 in

OPTIONS

- 09 Standard Rod
- 89 303 Stainless Steel Rod Standard on 1-1/8" bore cylinder.

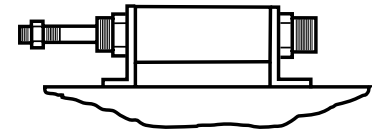
PACKING

- 0 O-Ring, Nitrile
 - 2 O-Ring, Low Friction
 - 3 O-Ring, Viton
 - 4 Lip, Nitrile (pneumatic)
 - 5 Lip, Self-Lubricating (low friction)
 - 6 Lip, Viton
- Not available in Series 28
- These packings add one inch to cylinder length.
- Viton not available in Series 28

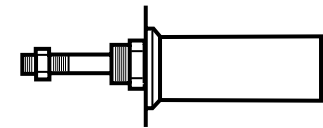
NOTE: Highlighted selections denote most popular models.

Mounts

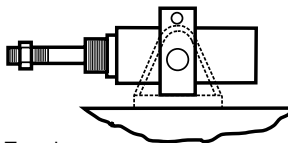
	CYLINDER BORE (INCHES)					
	1-1/8	1-1/2	2	2-1/2	3	4
L-Mount (2 qty.)	20533	20534	20534	20535	20535	20536
Flange Mount	20537	20538	20538	20539	20539	20540
Clevis Bracket	20546	20547	20547	20548	20548	20549
Mounting Nut (2 qty.)	20529	20530	20530	20531	20531	20532
Trunnion	20524	20556	20557	20558	20559	20560
Alum. Rod Clevis	-	20542	20543	20544	20544	20545
Steel Rod Clevis	20541	115906	115907	115908	115908	115909



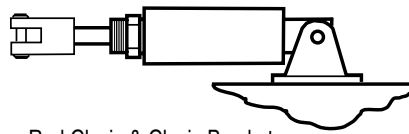
L-Mount



Flange Mount



Trunnion



Rod Clevis & Clevis Bracket



Mounting Nut

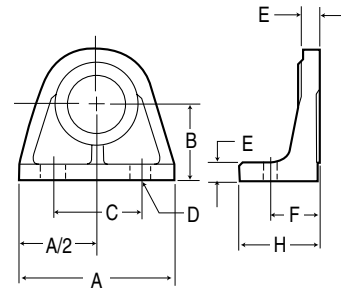
NOTE: Order cylinder, rod clevis and clevis bracket separately. Every Economair Cylinder includes rod nut. Trunnion Mount does not include pillow block.

Dimensional Data

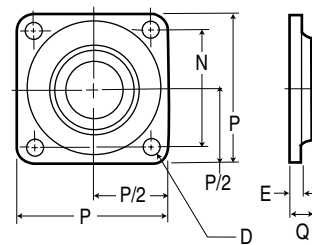
Series 23, 24, & 28

Reference	CYLINDER BORE (INCHES)					
	1-1/8	1-1/2	2	2-1/2	3	4
Rod dia.	0.38	0.50	0.63	0.75	0.75	1.00
A	1.625	3.00	3.00	4.00	4.00	5.00
B	1.281	1.50	1.50	2.00	2.00	2.625
C	1.0	1.688	1.688	2.25	2.25	3.00
D-dia*	.250	.250	.250	.375	.375	.438
E	.250	.313	.313	.375	.375	.438
F	.625	.906	.906	1.219	1.219	1.469
G	.375	.500	.500	.625	.625	.750
H	1.00	1.531	1.531	2.094	2.094	2.531
J	.750	1.00	1.00	1.25	1.25	1.188
K	.375	.469	.469	.781	.781	.781
L-HEX	1.0625	1.438	1.438	2.0625	2.0625	2.50
M-dia.	1.25	1.75	1.75	2.438	2.438	2.938
N	2.00	2.50	2.50	3.375	3.375	4.00
P	2.50	3.25	3.25	4.50	4.50	5.188
Q	.688	.594	.594	.719	.719	.844
R	1.219	1.750	1.750	2.375	2.375	3.00
S	.313	.313	.313	.375	.375	.438
T	2.250	3.00	3.00	4.00	4.00	5.00
U	1.75	2.25	2.25	3.00	3.00	3.75
V	1.75	2.25	2.25	2.688	2.688	3.375
W	1.406	1.75	1.75	2.0625	2.0625	2.625
X	.750	1.00	1.00	1.25	1.25	1.50
Y-dia.*	.250	.3125	.3125	.438	.4375	.625
Z	.656	.688	.688	.875	.875	1.063
ZZ	.3125	.375	.375	.500	.500	.625
TA	3.125	4.125	4.125	5.375	5.625	7.125
TB	2.250	3.00	3.00	3.75	4.25	5.50
TC-dia.	.438	.500	.500	.750	.750	.750
TD	2.00	2.625	3.125	4.00	4.500	5.750
TE	.875	1.125	1.375	1.875	2.125	2.688
TF	.750	1.250	1.250	1.50	1.50	1.50
TG-dia.*	.250	.3125	.3125	.4375	.4375	.500
TH-Thd.	3/8-16	1/2-13	5/8-11	3/4-10	3/4-10	1-8
TK	-	2.0625	2.0625	2.50	2.50	3.250
TL	-	.875	.875	1.00	1.00	1.325
TM	-	1.0625	1.0625	1.438	1.438	1.938
TN	-	1.813	1.00	1.813	1.813	1.50

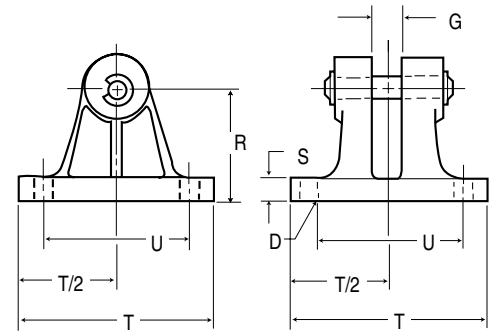
*Bolt or pin diameter



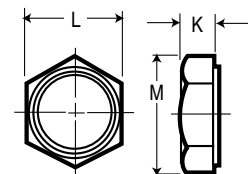
L-Type



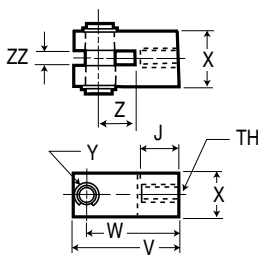
Flange



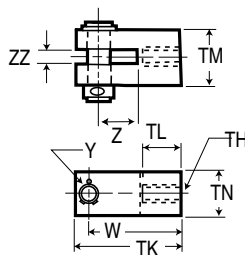
Clevis Bracket



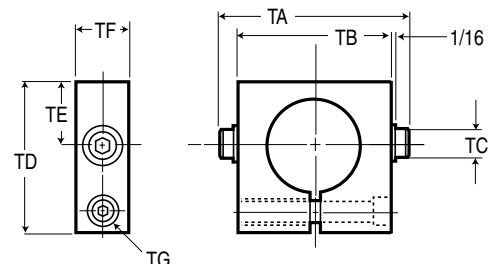
Mounting Nut



Steel Rod Clevis



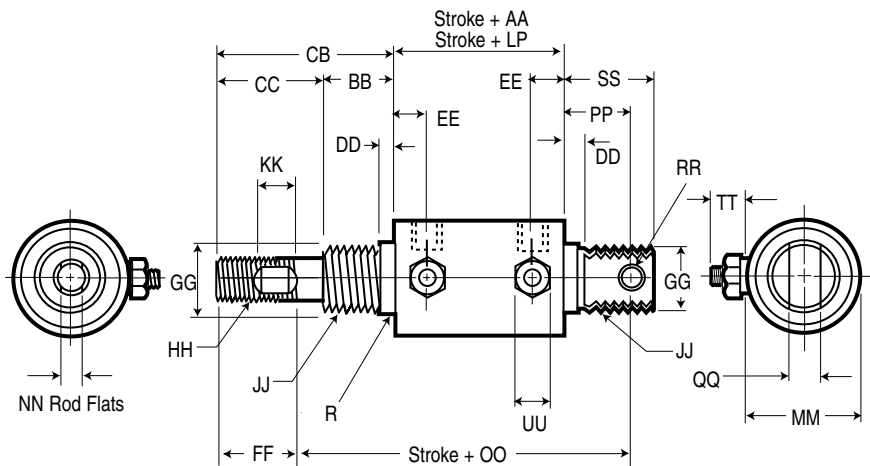
Aluminum Rod Clevis



Trunnion

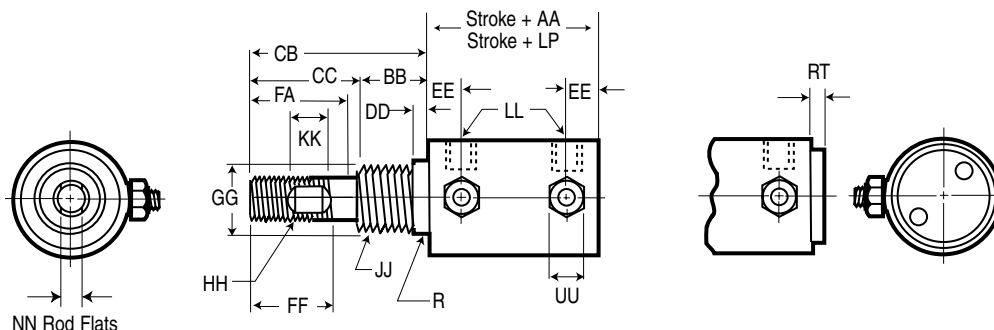
Dimensional Data

Series 23, 24, & 28 (Double Acting with Tang)



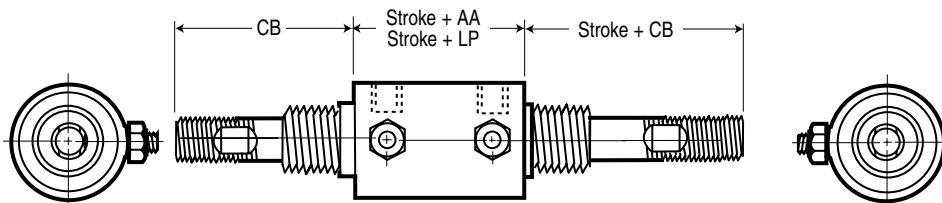
AA = Double acting with O-ring or low friction packing.
 LP = Double acting with U cup packing.

(Double Acting, No Tang)

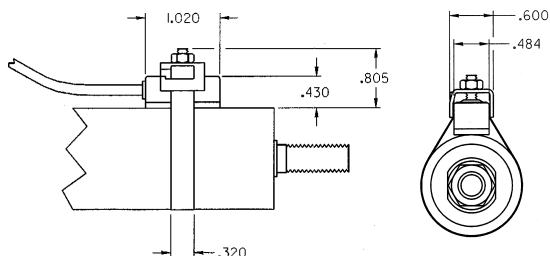


AA = Double acting with O-ring or low friction packing.
 LP = Double acting with U cup packing.

(Double Acting, Double Ended)



(Switch Bracket)



Dimensional Data

Series 23, 24, & 28

CYLINDER BORE INCHES

Dimensional Reference	1-1/8	1-1/2	2	2-1/2	3	4
Rod Diameter	.38	.50	.63	.75	.75	1.00
Stroke Factor AA*	2.031	2.625	2.625	2.875	2.875	4.00
Stroke Factor LP**	3.031	3.625	3.625	3.875	3.875	5.00
BB	.750	1.00	1.00	1.250	1.250	1.250
CB	1.750	2.438	2.438	2.938	2.938	3.500
CC	1.00	1.438	1.438	1.688	1.688	2.250
DD	.125	.219	.219	.344	.344	.406
EE	.422	.516	.516	.563	.563	.813
FA	.781	1.156	1.156	1.375	1.375	1.750
FF^	.875	1.250	1.250	1.50	1.50	1.875
(± .002) GG	.748	1.057	1.057	1.432	1.432	1.777
(UNC-2A) HH	3/8-16	1/2-13	5/8-11	3/4-10	3/4-10	1-8
JJ	3/4-16 UNF-2A	1-1/16-18 UNEF-2A	1-1/16-18 UNEF-2A	1-3/8-12 UNF-2A	1-3/8-12 UNF-2A	1-3/4-12 UN-2A
KK	.313	.500	.500	.500	.500	.500
(NPTF) LL	1/8-27	1/4-18	1/4-18	3/8-18	3/8-18	1/2-14
MM	1.375	1.750	2.250	2.750	3.250	4.250
NN	.313	.406	.500	.625	.625	.875
OO	3.594	4.688	4.688	5.688	5.688	7.063
PP	.688	.875	.875	1.375	1.375	1.438
QQ	.375	.500	.500	.625	.625	.750
(RAD.) R	.016	.016	.016	.094	.094	.094
RR	.250	.313	.313	.438	.438	.500
RT	-	.172	-	.438	.438	.438
SS	.969	1.25	1.25	2.00	2.00	2.188
TT	-	.438	.438	.438	.438	.438
UU	-	.500	.500	.500	.625	.625

* Double acting with O-ring or low friction packing
 ** Double acting with U-cup packing
 ^ FF shows total thread, including run out.

For more information on Position Sensors (Switches) see page 114.



NOTE: Order bracket and switch separately.

Switches (Specifications / Ordering)

Switch

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)						5 - 100mA @ 5V		
				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.		

Switch Mounting Brackets

Bore	Model Number
1-1/8"	119897-18
1-1/2"	119897-15
2"	119897-20
2-1/2"	119897-25
3"	119897-30
4"	119897-40

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 Teflon® 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 select from three types of attachable position sensors.

- Tie bolt construction eliminates rod binding and tie rod torque problems. (Series AN and TN, 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 and TN)
- Optional oversized rods available to provide extra column strength. (Series AN and SN)
- Optional slippery seals enhance smooth operation and are self-lubricating. (STD. Series TN)
- Available in 1-1/2", 2", 2-1/2", 3-1/4" and 4" bore sizes with extruded barrel (as shown). (Series AN and TN)
- 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:** 1/2", 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:** 1/2", 2", 2-1/2", 3-1/4", 4", 5", 6", and 8"
- Rod Bushing:** Bronze
- Rod Wiper:** Teflon®
- 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 Teflon)
Double rod ends

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

Retained cushion adjustment needles



Lightweight aluminum body resists dents.

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



Aluminum NFPA

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

Include dashes (-). Dashes are significant.

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: Not available in 3-1/4, 5, 6, 8 or 10" bores.
- M 1" Note: Not available in 1-1/2, 6, 8 or 10" bore.
- P 1 3/8" Note: Not available in 1-1/2, 2, 2-1/2 or 10" bores.
- Q 1 3/4" Note: Not available in 1-1/2, 2, 2-1/2, 3-1/4, 4 or 5" bores.
- S 2" Note: Not available in 1-1/2, 2, 2-1/2, 3-1/4, 4, 5, 6 or 8" bores.

ROD STYLE

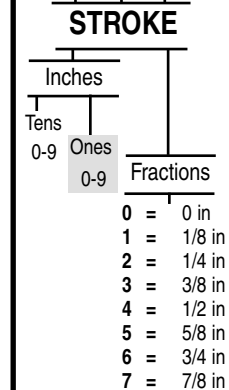
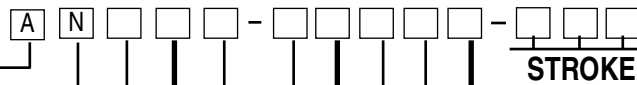
A	Chrome, Std Male (KK ₁)	K	S.S., Female (KK ₁)
B	Chrome, Intermed. Male(KK ₂)	L	S.S., No Threads
C	Chrome, Full Male (CC)	1	KK ₁ Chrome, Studded
D	Chrome, Female (KK ₁)	2	KK ₂ Chrome, Studded
F	Chrome, No Threads	3	CC Chrome, Studded
G	S.S., Standard Male (KK ₁)	4	KK ₁ SS, Studded
H	S.S., Intermediate 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:
Maximum stroke 99 7/8",
for longer strokes consult
factory. Stroke lengths 20"
and longer may require
stop tubes, see page 82.

MOUNT

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

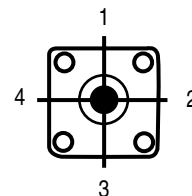
A	MS1	P	MT1
B	MS4**	Q	MX1
C	MP1**	T	MX2
D	MP2**	U	MX3
F	MF1/ME3**	X	No Mount
H	MF2/ME4**	1	FMB*
K	MP4*	2	FMC*
L	MS7*	3	FMH*
M	MT2		

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.

Note: Highlighted selections denotes most popular models.

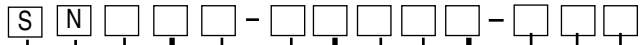
See pages 111-117 for Dimensional Drawings

Ordering

Stainless Steel NFPA

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

Include dashes (-). Dashes are significant.



ACTUATORS

Stainless Steel actuators begin with A

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

NOTE: All SN Series Cylinders 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"		

ROD DIAMETER

- K 5/8" Note: Not available in 3-1/4, 4, 5, 6, or 8" bores.
- M 1" Note: Not available in 1-1/2, 6, or 8" bores.
- P 1 3/8" Note: Not available in 1-1/2, 2, or 2-1/2" bores.
- Q 1 3/4" Note: Not available in 1-1/2, 2, 2-1/2, 3-1/4, 4 or 5" bores.

ROD STYLE

- G S.S., Standard Male (KK₁)
- H S.S., Intermediate Male (KK₂)
- J S.S., Full Male (CC)
- K S.S., Female (KK₁)
- 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: Teflon Wiper Std.

CUSHIONS

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

STROKE

Inches		Fractions
Tens	Ones	
0-9	0-9	
		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 82.

MOUNT

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

- A MS1
- 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

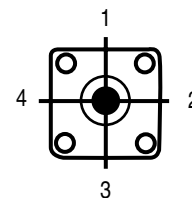
PORT LOCATION

(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

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

See pages 111-117 for Dimensional Drawings



Determine port location looking at rod end of cylinder.

Mounting Data

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

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

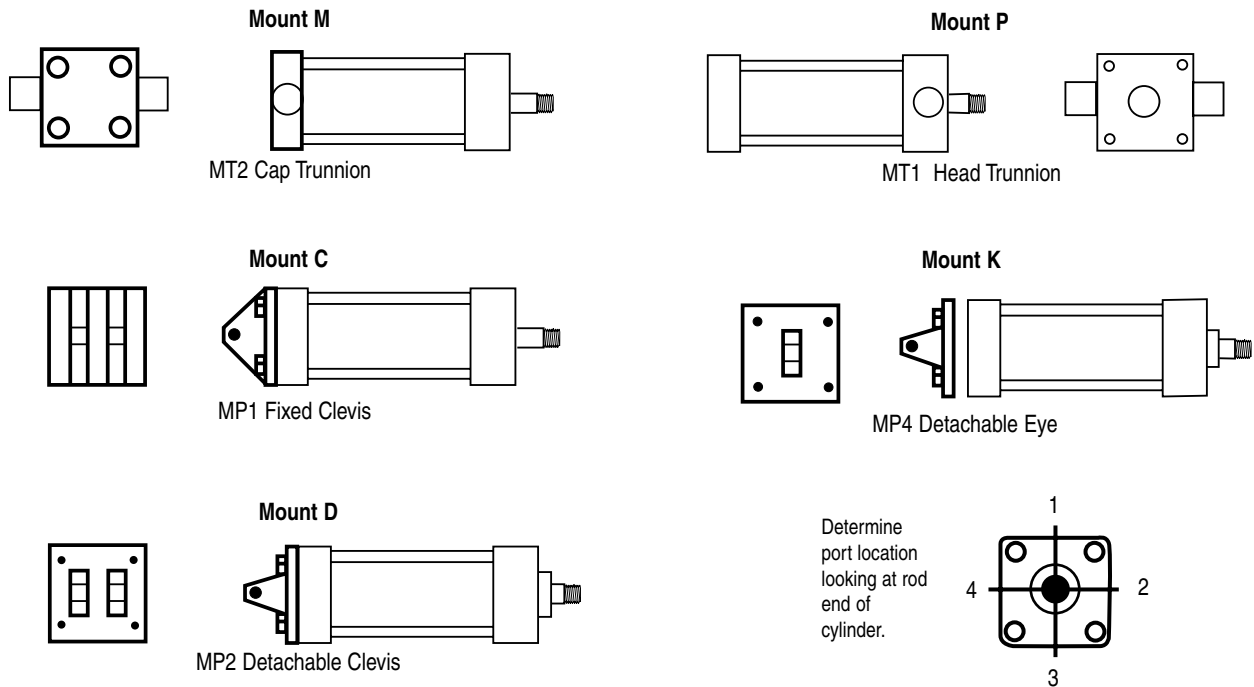
Above kits include all necessary hardware to complete mounting to Provenair cylinders.
Above kits do not fit Series 38/39 cylinders.

* 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



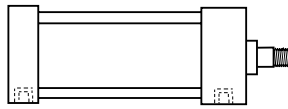
NOTE: Not all mounts are available on stainless steel models.

Mounting Data

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

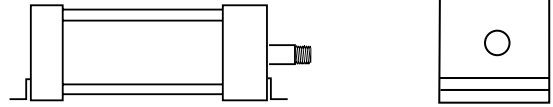
Factory Installed Mounts

Mount B



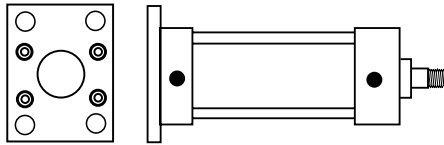
MS4 Side Tapped

Mount A

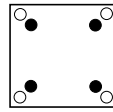


MS1 Side End Angle

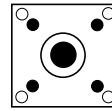
Mount H



MF2 Cap. Rec. Flange

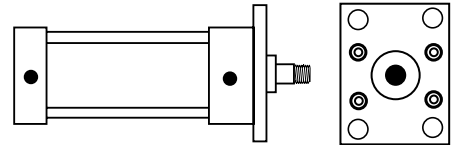


ME4 8" Bore



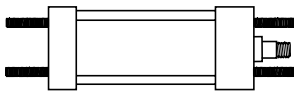
ME3 8" Bore

Mount F



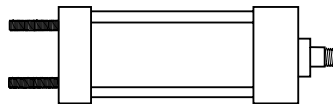
MF1 Head Rec. Flange

Mount Q



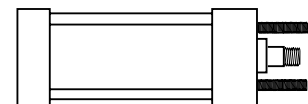
MX1 Cap and Head Ext. Tie Rod

Mount T



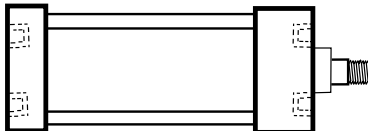
MX2 Cap Ext. Tie Rod

Mount U



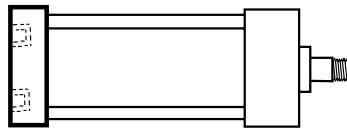
MX3 Head Ext. Tie Rod

Mount 1



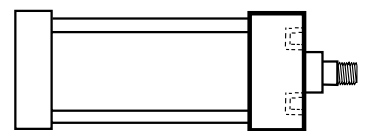
FMB Female Tap Both Ends

Mount 2



FMC Female Tap Cap

Mount 3



FMH Female Tap 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)

Dimensional Data

Series AN, SN (Rod End)

		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
		ROD DIAMETER (INCHES)						
		5/8	1	1	1-3/8	1	1-3/8	1-3/4

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

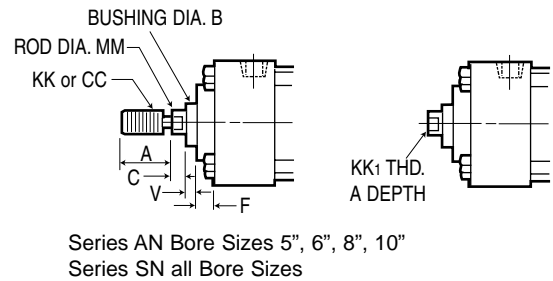
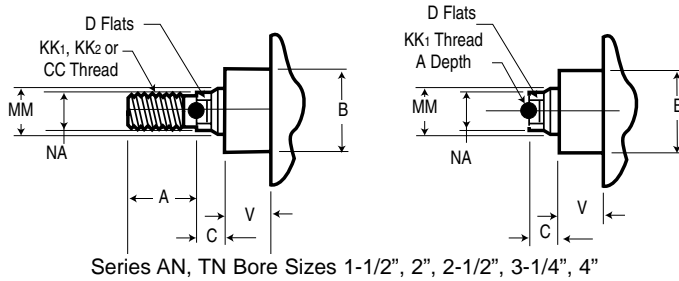
	7/16"-20	3/4"-16	3/4"-16	1"-14	3/4"-16	1"-14	1-1/4"-12	1-1/4"-12
KK1 THD. (M OR F)	7/16"-20	3/4"-16	3/4"-16	1"-14	3/4"-16	1"-14	1-1/4"-12	1-1/4"-12
KK2 THD. (MALE)	1/2"-20	7/8"-14	7/8"-14	1-1/4"-12	7/8"-14	1-1/4"-12	1-1/4"-12	1-1/2"-12
CC (MALE)	5/8"-18	1"-14	1"-14	1-3/8"-12	1"-14	1-3/8"-12	1-3/4"-12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

Selection of oversize piston rod affects the following dimensions.

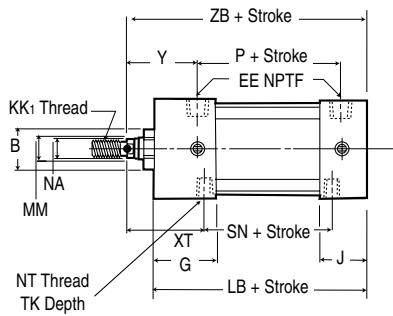
ZB	XC	V
ZC	XD	W
ZD	XE	WF
ZE	XG	C
ZF	XJ	V
ZL	XS	LA
ZM	XT	

See rod end dimensions.

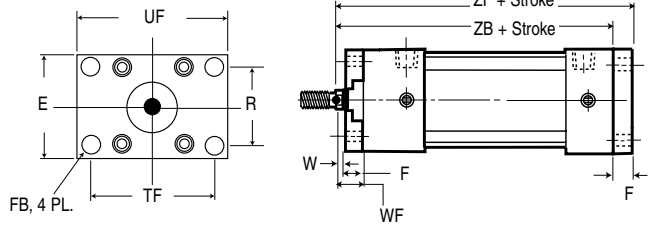
* (.50 on 10")



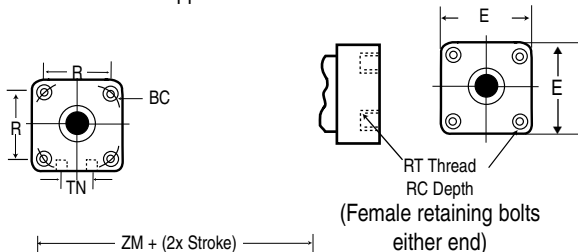
Series AN, SN (With Standard Rod)



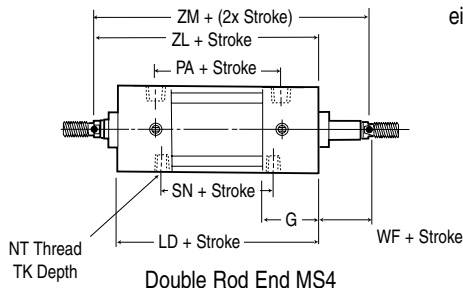
Side Tapped MS4



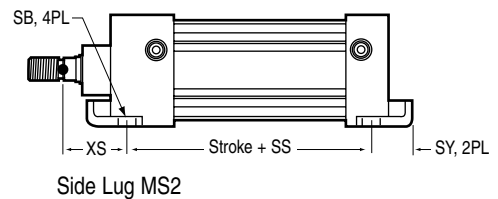
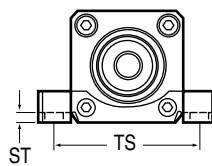
Rect. Flange - Head-MF1, Cap-MF2



Head Trunnion MT1
Cap Trunnion MT2



Double Rod End MS4



Side Lug MS2

Dimensional Data

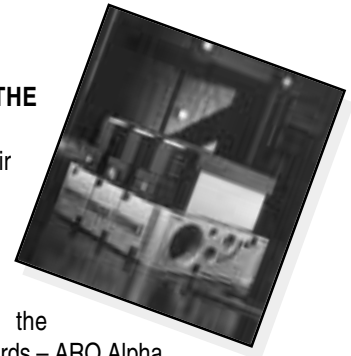
Series AN, SN (1-1/2" Thru 4" Bore w/standard rod)

	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
KK ₁ (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
UT	4.00	4.50	5.00	5.75	6.50
W	.62	.62	.62	.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.

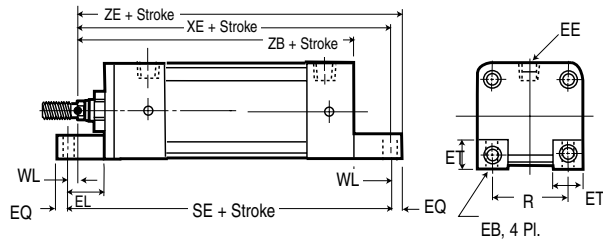
MEETING THE STANDARDS.

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.

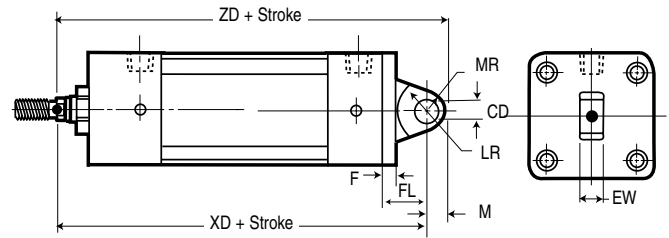


Dimensional Data

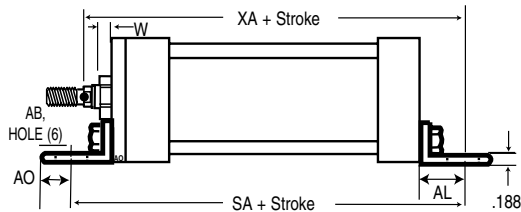
Series AN, SN (1-1/2" Thru 10" Bore w/standard rod)



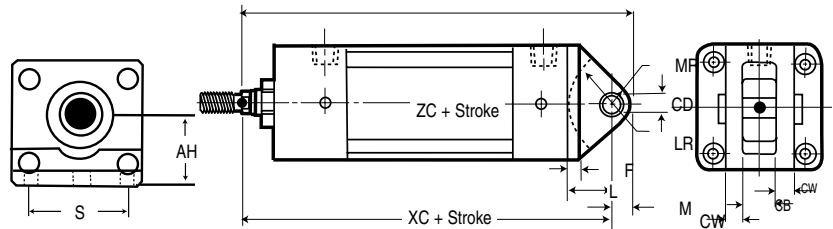
Side End Lugs MS7



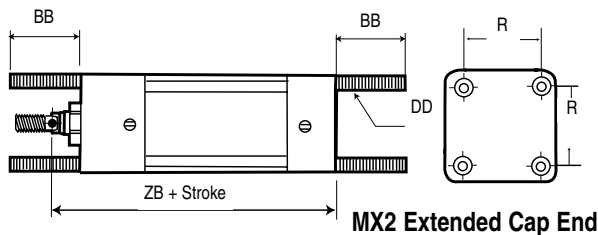
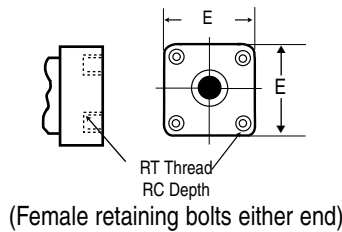
Detachable Eye MP4



Angle Mount MS1



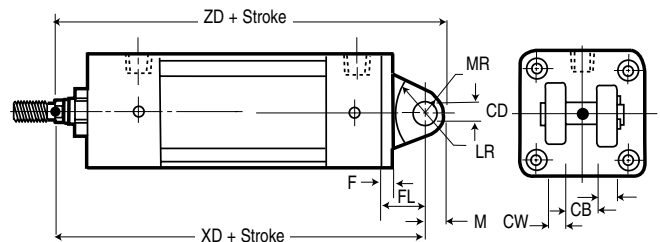
Fixed Clevis MP1



Tie Rod Mounts

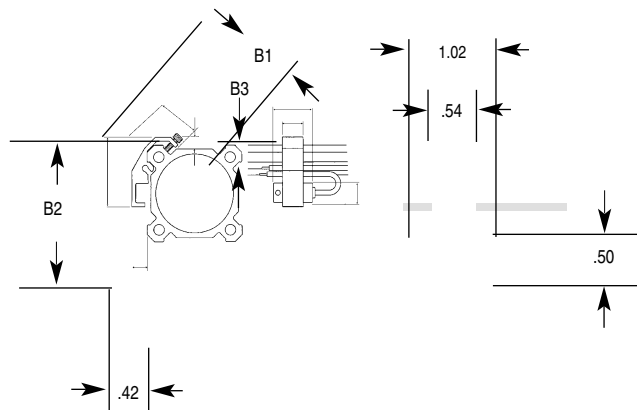
MX1 Extended Both Ends

MX3 Extended Head End



Detachable Clevis MP2

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



Provenair® Switch Mounting Bracket

Dimensional Data

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

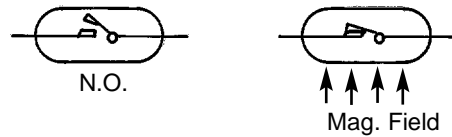
	CYLINDER BORE (INCHES)				
	1-1/2	2	2-1/2	3-1/4	4
AB	.38	.38	.38	.50	.50
AH	1.18	1.44	1.62	1.94	2.25
AL	1.00	1.00	1.00	1.25	1.25
AO	.38	.38	.38	.50	.50
BB	1.00	1.13	1.13	1.38	1.38
CB	.75	.75	.75	1.25	1.25
CD	.50	.50	.50	.75	.75
CW	.50	.50	.50	.63	.63
DD	1/4-28	5/16-24	5/16-24	3/8-24	3/8-24
E	2.00	2.50	3.00	3.75	4.50
EB	.28	.34	.34	.38	.38
EE (NPTF)	3/8-18	3/8-18	3/8-18	1/2-14	1/2-14
EL	.75	.94	1.06	.88	1.00
EQ	.25	.31	.31	.38	.38
ET	.56	.69	.81	1.00	1.19
EW	.75	.75	.75	1.25	1.25
F	.38	.38	.38	.63	.63
KK1 (Thread)	7/16-20	7/16-20	7/16-20	3/4-16	3/4-16
FL	1-1/8	1-1/8	1-1/8	1-7/8	1-7/8
L	3/4	3/4	3/4	1-1/4	1-1/4
LR	3/4	3/4	3/4	1-1/4	1-1/4
M	5/8	5/8	5/8	7/8	7/8
MR	.47	.50	.50	.75	.75
R	1.43	1.84	2.19	2.76	3.32
S	1.25	1.75	2.25	2.75	3.50
SA	6.00	6.00	6.12	7.38	7.38
SE	5.50	5.88	6.25	6.63	6.88
W*	.62	.62	.62	.75	.75
WL	.14	.33	.45	.13	.25
XA	5.62	5.62	5.75	6.88	6.88
XC*	5.38	5.38	5.50	6.88	6.88
XD*	5.75	5.75	5.88	7.50	7.50
XE*	5.38	5.56	5.81	6.50	6.63
ZB*	4.63	4.63	4.75	5.63	5.63
ZC*	5.84	5.88	6.00	7.63	7.63
ZD*	6.22	6.25	6.38	8.25	8.25
ZE*	5.63	5.84	6.13	6.88	7.00

* Oversize piston rod option affects these dimensions.

Position Sensors (Switches)

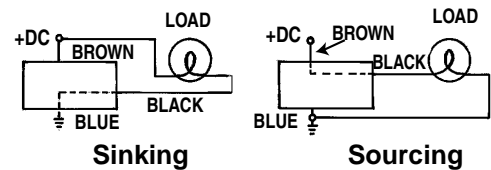
Reed Switches

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.

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.

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			5 - 100mA @ 5V		
				14 - 200mA @ 24V			10 - 200mA @ 12V		
				-			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.		

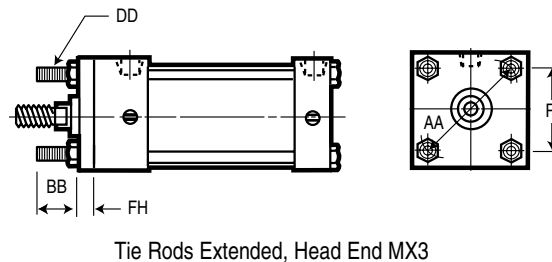
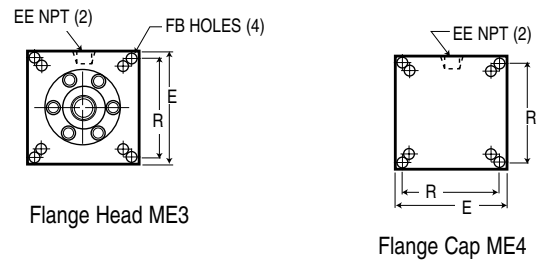
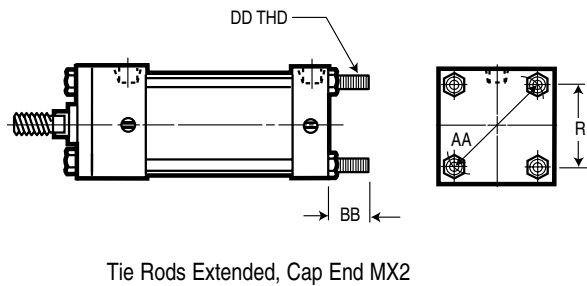
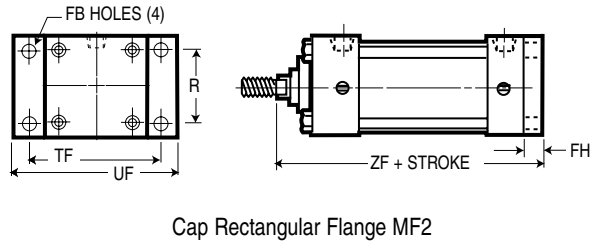
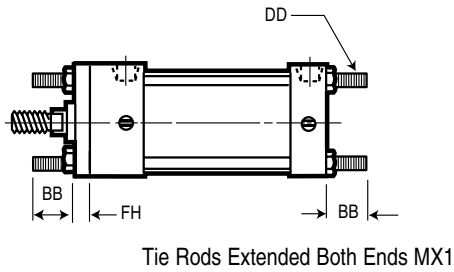
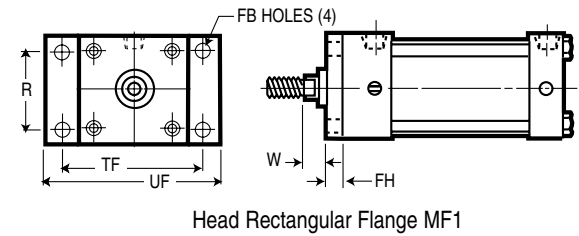
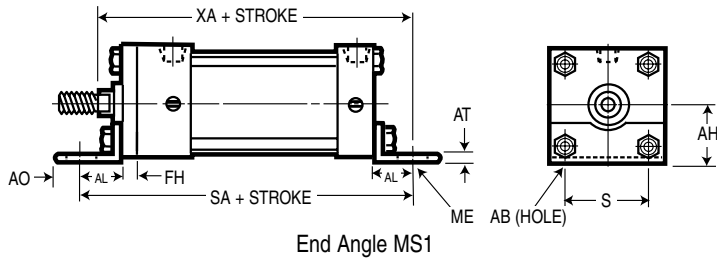
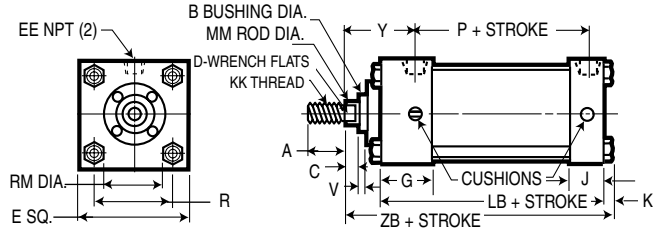
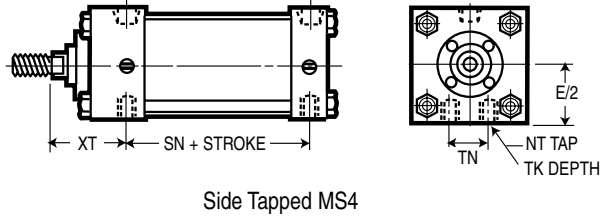


Switch Mounting Brackets

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

Dimensional Data

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

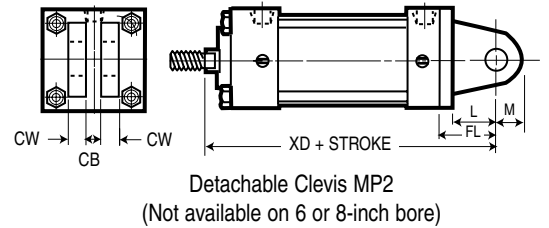
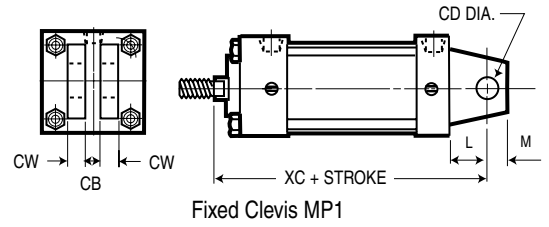


CYLINDERS

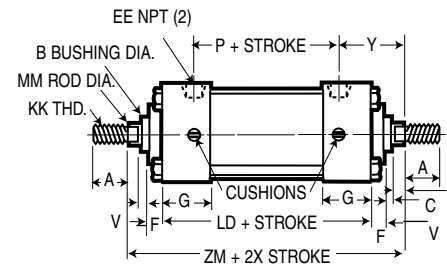
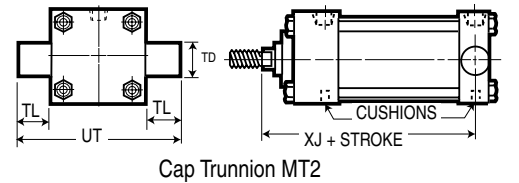
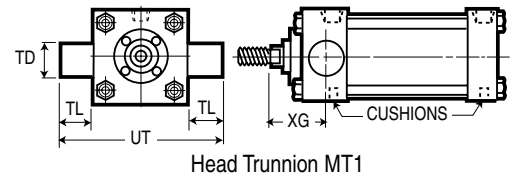
Dimensional Data

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	9.1	9.1	11.2
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	1-1/4-12	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	-
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



Cap Rectangular Flange MF2



* R Dimension on 8" bore.

Accessories

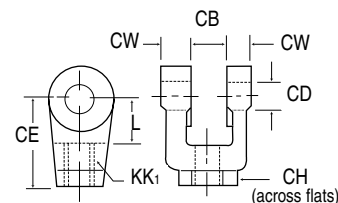
Series AN (5/8" thru 1-3/4" Rod)

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

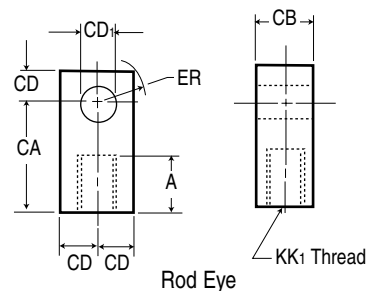
	ROD THREAD			
	7/16-20	3/4-16	1-14	1-1/4-12
ROD CLEVIS KIT (includes pin)	116183	116046	116049	116052
ROD EYE KIT	116184	116047	116050	116053
CLEVIS PIN	115299	115300	-	-
PIVOT PIN	-	-	116048	116051

Mating parts to rod end accessories and mounting brackets

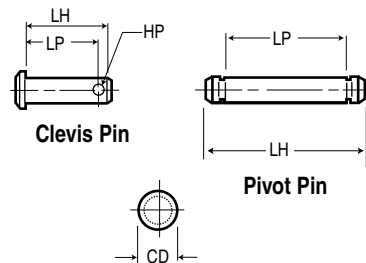
Clevis Bracket (Iron)	-	117206-5	117206-6	-
Eye Bracket (Iron)	-	117205-5	117205-6	-



Rod Clevis



Rod Eye



Clevis Pin

Pivot Pin

Use for Both Pins

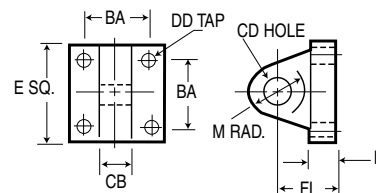
Dimensional Data

Rod Eye, Rod Clevis and Pin

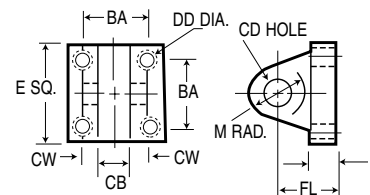
A	.75	1.13	1.63	2.00
CA	1.50	2.06	2.81	3.44
CB	.75	1.25	1.50	2.00
CD	.50	.75	1.00	1.38
CD1	.44	.75	-	-
CE	1.50	2.38	3.13	4.13
CH	1.00	1.25	1.50	2.00
CW	.50	.63	.75	1.00
ER	.72	1.06	1.00	1.38
HP	.156	.156	-	-
KK1	7/16-20	3/4-16	1-14	1 1/4-12
L	.75	1.25	1.50	2.13
LH	2.25	3.13	3.75	5.00
LP	2.1	2.75	3.25	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	-



Eye Bracket*



Clevis Bracket*

* These accessory brackets attach to mating cylinder mounts. See Cylinder Mounting Dimensions on page 116.

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.

Sight glass available in Style A only



Air/Oil Tank
250 P.S.I.



Air Reservoir

Include dashes (-). Dashes are significant.

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	B	H1, C2	F	H2, C1	J	H2, C4
(Std.)		D	H1, C4	G	H2, C2	U	H4, C4

MOUNT
A MS1 B MS4 L MS7 X No Mount

STROKE

Inches

Tens 0-9

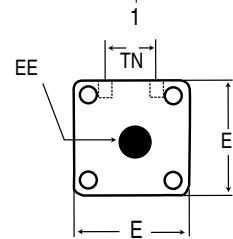
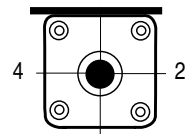
Ones 0-9

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.

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



Fill Port available in Style A only

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

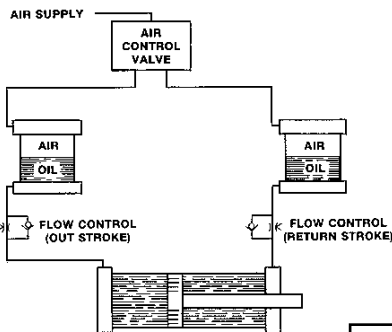
Style T or A

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.



Typical Air Oil Circuit

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	1.5	3.75	1/2-14
4	4"	2.505	1.19	2.06	4.5	1/2-14

Ordering

Repair Kits (Single Rod End Rod Bushings)

	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	

Order two kits for double rod end cylinders.

	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	

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.

Order Kit No.:

RK 24 20 - 1 3

For All Models Write in RK

SERIES NUMBER

If 23, (Noncushion), write 23

If 24 (Cushion), 27 (Cushion, Pin Actuated), or 28 (Cushion, Magnetic) write 24

BORE SIZE

Take bore size from model number:

18, 15, 20, 25, 30 or 40.

CYLINDER TYPE

If 1, 3, 4, 5, 6, or 7, write 1.

If 2, write 2.

PACKING

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

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.

Order Assembly No.:

RA 24 20 - 2 0 8 - X X X

For All Models Write in RA

SERIES NUMBER

If 23, (Noncushion), write 23

If 24 (Cushion), 27 (Cushion, Pin Actuated), write 24

If 25 (Bumper) or 29 (Bumper, Magnetic), write 25

If 28 (Magnetic), write 28

BORE SIZE

Take bore size from model number:

18, 15, 20, 25, 30 or 40.

CYLINDER TYPE

If 1, 3, 4, 5, 6, or 7, write 1.

If 2, write 2.

STROKE

PACKING

Take packing identifier from model number:

if 0 or 3 write 0

if 2, write 2

if 4, 5 or 6 write 4

ROD MATERIAL PACKING

0 Standard Chrome

8 Stainless Steel

EXAMPLE RECIPROCATING ASSEMBLY MODEL NUMBER:

RA 24 20 - 2 0 8 - 0 4 0

Supplies a stainless steel rod with 2" O-ring piston for a double rod end, 4" stroke.

Ordering

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" or "TKN" 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

EXAMPLE REPAIR KIT MODEL: **R K N A W M - V B**

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

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

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
Cushion Cap	C
Cushion Head	H

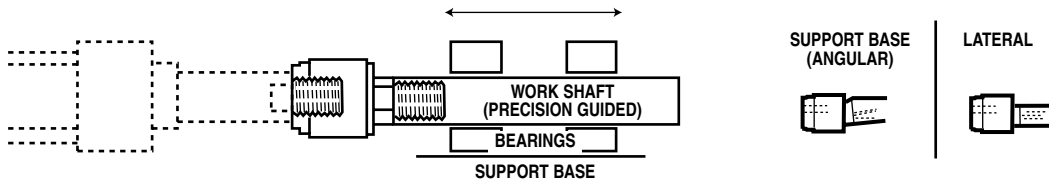
EXAMPLE RECIPROCATING ASSEMBLY MODEL: **R A N A S K - A H - 120**

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

Port Location Not Used, Mounts Not Used

Features

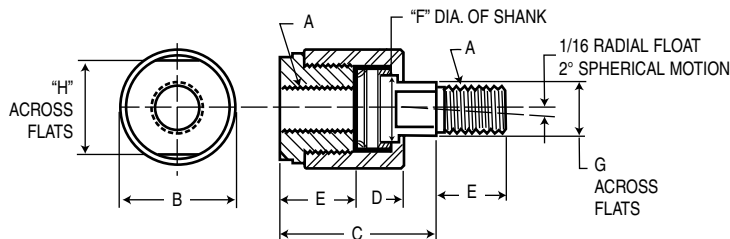
- Slide applications no longer require costly precision cylinder machining for mounting fixed or rigid guide.
- Friction due to misalignment is eliminated, increasing cylinder efficiency.
- An angular error of 2° and 1/16 inch lateral misalignment on push and pull stroke is compensated.
- Cylinder and component wear is reduced, providing increased reliability.
- Field alignment problems are rectified.
- All components are heat treated for improved corrosion resistance, wear resistance, and fatigue properties.



Ordering

Coupler Number	DIMENSIONS								Max. Pull At Yields (Pounds)
	A	B	C	D	E	F	G	H	
118683	3/8-16	.875	1.25	.25	.625	.313	.313	.75	5,000
118684	7/16-20	1.25	2.00	.50	.75	.625	.50	1.00	10,000
118685	1/2-20	1.25	2.00	.50	.75	.625	.50	1.00	14,000
118686	1/2-13	1.25	2.00	.50	.75	.625	.50	1.00	14,000
118687	5/8-18	1.25	2.00	.50	.75	.625	.50	1.00	19,000
118688	3/4-16	1.75	2.31	.50	1.125	.97	.813	1.50	34,000
118689	3/4-10	1.75	2.31	.50	1.125	.97	.813	1.50	34,000
118690	7/8-14	1.75	2.31	.50	1.125	.97	.813	1.50	39,000
118691	1-14	2.50	2.94	.50	1.625	1.375	1.16	2.25	64,000
118692	1-8	2.50	2.94	.50	1.625	1.375	1.16	2.25	64,000
118693	1-1/4-12	2.50	2.94	.50	1.625	1.375	1.16	2.25	78,000
118694	1-3/8-12	2.50	2.94	.50	1.625	1.375	1.16	2.25	78,000
118695	1-1/2-12	3.25	4.375	.812	2.25	1.375	1.50	3.00	134,000

Dimensional Data



Features

Proper conditioning of compressed air is essential to ensure maximum performance and service life for pneumatic power tools and equipment. The small initial investment for installation of air preparation units in an air line system will pay long-term dividends in increased productivity, consistent quality and decreased maintenance costs.

Ingersoll-Rand's extensive line of air line filters, regulators and lubricators, including individual units, piggyback and combos, have been designed to meet every air preparation requirement.

Filters

Ingersoll-Rand compressed air filters are designed to remove airborne solid and liquid contaminants which may plug small orifices and hinder performance, or cause excessive wear and premature equipment failure. Several filter elements are offered, including models with coalescing elements for removal of oil aerosols and particles down to .3 micron.

- Available pipe sizes from 1/8" thru 2" NPT

Regulators

Ingersoll-Rand air line regulators provide controlled, consistent air pressure as required for specific pneumatic equipment when connected to the complete compressed air system.

- Available pipe sizes from 1/8" thru 1-1/2" NPT
- Flows to 440 CFM
- Maximum Inlet pressures to 250 PSIG

F-R-L Product Selection

When selecting an FRL or individual filter, regulator and lubricator units, the air consumption of the tools or equipment to be serviced should be correlated with the flow capacity of the FRL. Please reference flow capacity chart below.

Series	Net Port Size	FLOW CAPACITY (CFM)					Pressure Range PSIG
		Filter (Particulate)	Filter (Coalescing)	Regulator	Piggy Back	Lubricator	
Module	1/8"	28	15	13	12	41	0-125
Air 1000	1/4"	38	17	13	12	60	0-125
Module/ Air 2000	1/4"	54	40	100	93	75	0-200
	3/8"	100	51	135	135	100	0-200
	1/2"	122	53	140	140	110	0-200
Super-Duty	3/4"	345	50	180	-	150	0-250
	1"	345	150	200	-	300	0-250



C28121-800



C28221-810



C28453-810

Ordering

Standard Filters

Designed to remove rust, scale, condensed water and other debris from compressed air lines which may cause wear and premature failure of tools, valves, cylinders and other pneumatic equipment.

Port Size	Model	Filter Element	Flow* cfm	Bowl	Bowl Size	Drain	Max. Inlet Pressure
1/8" & 1/4" Port - ARO Module/Air 1000 Series							
1/8"	F25111-200	20 Micron	28	Polycarbonate/Guard	1.0 oz.	Manual	200 PSIG
1/4"	F25121-200	20 Micron	38	Polycarbonate/Guard	1.0 oz.	Manual	200 PSIG
1/4" & 3/8" & 1/2" Port - ARO Module/Air 2000 Series							
1/4"	F25221-110	40 Micron	54	Metal w/sight glass	6.0 oz.	Manual	175 PSIG
3/8"	F25231-110	40 Micron	100	Metal w/sight glass	6.0 oz.	Manual	175 PSIG
1/2"	F25241-110	40 Micron	122	Metal w/sight glass	6.0 oz.	Manual	175 PSIG
3/4" & 1" Port - ARO Super-Duty Series							
3/4"	F25451-020	40 Micron	345	Metal w/sight glass	32 oz.	Manual	250 PSIG
1"	F25461-020	40 Micron	345	Metal w/sight glass	32 oz.	Manual	250 PSIG

* Air Flow is at 90 PSI Inlet and 5 PSI pressure drop.

Coalescing Filters

Designed for paint spraying, instrumentation, controls and other applications where the delivered air must be free of oil and fine particles. Effective in removing 99.9% of oil aerosols. Also effective in removing debris particles down to .3 micron. Recommended for use in conjunction with an upstream filter to maximize the life of replacement element.

Port Size	Model	Filter Element	Flow* cfm	Bowl	Bowl Size	Drain	Max. Inlet Pressure
1/8" & 1/4" Port - ARO Module/Air 1000 Series							
1/8"	F25111-300	Coalescing	15	Polycarbonate	1.0 oz.	Manual	200 PSIG
1/4"	F25121-300	Coalescing	17	Polycarbonate	1.0 oz.	Manual	200 PSIG
1/4" & 3/8" & 1/2" Port - ARO Module/Air 2000 Series							
1/4"	F25221-310	Coalescing	40	Metal w/sight glass	6.0 oz.	Manual	175 PSIG
3/8"	F25231-310	Coalescing	51	Metal w/sight glass	6.0 oz.	Manual	175 PSIG
1/2"	F25241-310	Coalescing	53	Metal w/sight glass	6.0 oz.	Manual	175 PSIG
3/4" & 1" Port - ARO Super-Duty Series							
3/4"	F25452-310	Coalescing	50	Metal w/sight glass	32 oz.	Manual	250 PSIG
1"	F25462-310	Coalescing	150	Metal w/sight glass	32 oz.	Manual	250 PSIG

* Air Flow is at 90 PSI Inlet and 5 PSI pressure drop.



F25121-200



F25221-110



F25451-020

Accessories

Part Number	Description	Part Number	Description
ARO Module/Air 1000 Series		ARO Module/Air 2000 Series	
29660-2	20 Micron Element	100031-1	40 Micron Element
29586	Coalescing Element	100032	Coalescing Element
104257	Service Kit	104068	Auto Drain Kit
104264	Auto Drain Kit	104204	Metal w/sight glass
104258	Polycarbonate Bowl	104176	Service Kit
104259	Composite Bowl	ARO Super/Duty Series	
		104119	40 Micron Element
		10423	Coalescing Element
		104116	Service Kit
		104068	Auto Drain
		104163	Sight Glass Kit

Ordering

Piggyback Filter/Regulators

Combined air filtration and regulation in a single, compact unit. Saves space for added system design flexibility. Piggyback Filter Regulators supplied with pressure gauge.

Port Size	Model	Pressure Range	Filter Element	Flow* cfm	Bowl	Bowl Size	Drain	Max. Inlet Pressure
1/8" & 1/4" Port - ARO Module/Air 1000 Series								
1/8"	P29112-600	5-125 PSIG	20 Micron	12	Polycarbonate/Guard	1.0 oz.	Manual	200 PSIG
1/4"	P29122-600	5-125 PSIG	20 Micron	12	Polycarbonate/Guard	1.0 oz.	Manual	200 PSIG
1/4" & 3/8" & 1/2" Port - ARO Module/Air 2000 Series								
1/4"	P29221-610	5-125 PSIG	40 Micron	93	Metal w/sight glass	6.0 oz.	Manual	175 PSIG
3/8"	P29231-610	5-125 PSIG	40 Micron	135	Metal w/sight glass	6.0 oz.	Manual	175 PSIG
1/2"	P29241-610	5-125 PSIG	40 Micron	140	Metal w/sight glass	6.0 oz.	Manual	175 PSIG

* Air Flow is at 90 PSI Inlet and 5 PSI pressure drop.



P29122-600

P29221-610

Accessories

ARO Module/Air 2000 FRL Components

A. Threaded Pipe Adapters - Model 104168 ()

Pipe adapters allow a single component or assembled combo to be removed for service without disturbing hard piping. Also allows for different pipe diameters (in and out) in the plumbing installation. Kit includes two adapters and two spacer kits.

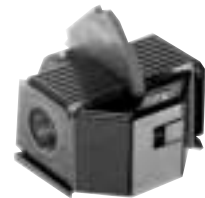
Port Size	Model
1/4"	104168-2
3/8"	104168-3
1/2"	104168-4
3/4"	104168-5



B. Safety Shutoff, Lockout Valve - Model 104174 ()

Exhaust-type safety shutoff valve can be used in either amodular arrangement, with out FRL's or as a stand alone unit. Should be installed upstream from the FRL, and is ideal for isolating and depressurizing a downstream unit requiring maintenance. Valve may be locked in the exhaust position.

Port Size	Model
1/4"	104174-2
3/8"	104174-3
1/2"	104174-4



104174-2

C. Modular Spacer Kit - Model 104167

One spacer kit is required to connect any two components or accessories. Kit includes the spacer block, two clamps and two O-rings. Fits all port sizes.

104167



D. T-Type Wall Mounting Bracket - Model 104171

T-Type Brackets provide heavy duty wall mounting of a single unit or multiple units in a modular arrangement. Kit includes a spacer, bracket and clamp.

104171



E. Modular Manifold Block - Model 104170

Provides four additional 1/4" NPT ports for greater circuit design flexibility. Kit includes manifold, two spacer kits and three hole plugs.



104170

F. Wall Mounting Kit - Model 104172

May be used to mount FRL combo units which include a regulator, "Piggyback" Filter/Regulator units, or individual regulators. Kit includes Model 29623 Bracket and Model 104173 Panel Mounting Nut. Bracket and Nut may be ordered individually.



104172

Ordering

Air Line Relieving Regulators

Provide controlled, consistent air pressure as required for specific pneumatic equipment connected to the compressed air system. Relieving models vent downstream overpressure. Available spring options enable convenient pressure range conversions as requirements change. Unit supplied with gauge.

Port Size	Model	Pressure Range	Flow* cfm	Gauge Port	Max. Inlet Pressure
1/8" & 1/4" Port - ARO Module/Air 1000 Series					
1/8"	R27111-600	0-125 PSIG	13	1/8"	250 PSIG
1/4"	R27121-600	0-125 PSIG	13	1/8"	250 PSIG
1/4" & 3/8" & 1/2" Port - ARO Module/Air Series					
1/4"	R27221-600	5-125 PSIG	105	1/4"	200 PSIG
3/8"	R27231-600	5-125 PSIG	106	1/4"	200 PSIG
1/2"	R27241-600	5-125 PSIG	125	1/4"	200 PSIG
1/2" & 3/4" & 1" Port - ARO Heavy-Duty Series					
1/2"	27344-600	5-125 PSIG	256	1/4"	250 PSIG
3/4"	27354-600	5-125 PSIG	287	1/4"	250 PSIG
1"	27364-600	5-125 PSIG	293	1/4"	250 PSIG

* Air Flow is at 90 PSI Inlet and 5 PSI pressure drop.



R27121-600



R27221-600



27354-600

Accessories

Air Line Relieving Regulators

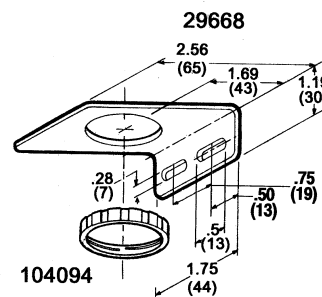
Part Number	Description
ARO Module/Air 1000 Series	
29846	Gauge, 0-15 PSIG
29863	Gauge, 0-60 PSIG
29850	Gauge, 0-160 PSIG
100095-160	Gauge, 0-150 PSIG
29668	Mounting Bracket
104094	Panel Mounting Nut
104255	Service Kit, Relieving Models
ARO Module/Air 2000 Series	
100067	Gauge, 0-160 PSIG
104172	Wall Mount Kit (Includes Bracket & Panel Nut)
104173	Panel Mounting Nut
104175	Tamper Resistant Kit
104178	Service Kit, Relieving Models
29728	Gauge, 0-160 PSIG
ARO Super-Duty Series	
100067	Gauge, 0-160 PSIG
100083	Gauge, 0-300 PSIG
104020	Service Kit
29077	Wall Mounting Bracket



29850



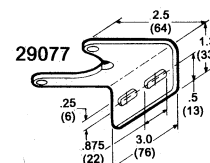
100067



104094



104172



29077

Ordering

Fog-Type Lubricators

Help ensure that pneumatic devices receive the required lubrication to maintain operating performance, reduce wear and prolong service life. They are designed to provide the correct amount of oil needed for most general applications in a pneumatic system, delivering a constant ratio of oil to CFM. Precise oil feed adjustment allows the proper oil delivery rate.

Lubricators should be installed close to the downstream application to ensure effective distribution of oil to the pneumatic components.

Port Size	Model	Flow* cfm	Bowl	Bowl Size	Max. Inlet Pressure
1/8" & 1/4" Port - ARO Module/Air 1000 Series					
1/8"	L26111-100	41	Polycarbonate/Guard	1.0 oz.	200 PSIG
1/4"	L26121-100	60	Polycarbonate/Guard	1.0 oz.	200 PSIG
1/4" & 3/8" & 1/2" Port - ARO Module/Air Series					
1/4"	L26221-110	75	Metal w/sight glass	6.0 oz.	175 PSIG
3/8"	L26231-110	100	Metal w/sight glass	6.0 oz.	175 PSIG
1/2"	L26241-110	110	Metal w/sight glass	6.0 oz.	175 PSIG
3/4" & 1" Port - ARO Super-Duty Series					
3/4"	L26451-110	190	Metal w/sight glass	32 oz.	250 PSIG
1"	L26461-110	200	Metal w/sight glass	32 oz.	250 PSIG

* Air Flow is at 90 PSI Inlet and 5 PSI pressure drop.



L26121-100



L26221-110



L26451-110

Accessories

Lubricator

Part Number	Description
ARO Module/Air 1000 Series	
104181	Service Kit
104260	Polycarbonate Bowl
104261	Composite Bowl
104262	Mounting Bracket
ARO Module/Air 2000 Series	
104176	Service Kit
104205	Metal Bowl w/sight Glass
ARO Super-Duty Series	
104023	Service Kit
104163	Sight Glass Kit

Air Line Lubricator Oil

ARO Lubricating Oil is recommended for use with pneumatic power tools, motors, valves, cylinders and hoists. It is specially formulated for use in air line lubricators. Proper and regular lubrication helps ensure longer, trouble-free operation by reducing wear, saving power and cutting equipment maintenance costs.

ARO Lubricating Oil is available in 1-quart containers and may be ordered by specifying part number 29665. (Available in cases of 12).

Viscosity: 100-200 S.S.U. @ 100°F (38° C) min.
aniline point of 200°F (93°C)

Class: II Lubricant

Approx. SEA No: Light SAE 10, non-detergent.



29665

Accessories

OSHA Approved Safety Blow Guns

Safety Blow Guns are designed to prevent pressure buildup above 29 PSIG if the nozzle is obstructed which meets OSHA requirement 29 CFR1910.242 (b).

Body	Model	Tip	Throttle	Max. Inlet Pressure	Temperature Range	Inlet NPT	Weight
Composite	8440	Standard	Lever	180 PSI	32° to 175° F	1/4"	2.7 oz.
Metal	8451-1	Standard	Lever	180 PSI	32° to 175° F	1/4"	2.7 oz.



8440



8451-1

Tool Suspension Balancer

Compact, rugged balancer features center-pull design for smooth performance. Adjustable spring tension to accommodate weight of suspended equipment. Adjustable cable clamp sets length of travel. Ideal for use with small to medium power tools, small fixtures, pendent stations and air hoses.

Model	Capacity	Working Cable Length	Dimensions	
			Hook to Hook	Width
7472	3 to 5 lbs.	8.0 ft.	10.5 in.	5.4 in.
7072	6 to 10 lbs.	8.0 ft.	14.0 in.	8.1 in.
7072-15	11 to 15 lbs.	8.0 ft.	14.0 in.	8.1 in.



7072 / 7072-15



7472

5 Year Warranty

IR/ARO warrants to the user purchaser of the ARO products depicted in this catalog that the products be free of defects in material and workmanship for a period of five (5) years from the date of purchase.

ARO will repair or replace, at its election, any product which is found upon its inspection to be defective during the period prescribed above. The product must be shipped prepaid to ARO factory or ARO Customer Service Center together with proof of purchase.

This warranty does not apply to failures or defects occurring as a result of abuse, misuse, negligent repairs, corrosion, erosion and normal wear and tear.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES (EXCEPT TITLE), EXPRESSED OR IMPLIED, AND THERE ARE NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE IS INTENDED OR MADE .

THE REMEDIES OF THE USER PURCHASER SET FORTH UNDER THE WARRANTY OUTLINED ABOVE ARE EXCLUSIVE AND THE TOTAL LIABILITY OF ARO WITH RESPECT TO THIS TRANSACTION, WHETHER BASED ON CONTRACT, WARRANTY, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE SHALL NOT EXCEED THE PURCHASE PRICE OF THE PRODUCT.

ARO SHALL IN NO EVENT BE LIABLE TO THE USER PURCHASER FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES ARISING OUT OF THIS TRANSACTION, OR ANY BREACH THEREOF, WHETHER OR NOT SUCH LOSS OR DAMAGE IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, INDEMNITY, STRICT LIABILITY OR OTHERWISE.

Warnings

Harmful Compressor Oils & Other Materials

Some oils used in air compressors contain chemicals harmful to Buna-N seals, if not adequately filtered at the compressor. The most common of these oils, in addition to other harmful material, are listed below.

COMPRESSOR OILS

Cellulube No. 150 & 220
Haskel No. 568-023
Houghton & Co. Oil No. 1120,
No. 1130, No. 1055

Houtosafe 1000
Kano Kroil
Keyston Penetrating Oil No. 2
& No. 500 Oils
Marvel Mystery Oil

COMPRESSOR OILS

Phrano
Pydraul AC
Sears Regular Motor Oil
Sinclair Oil "Lily White"

Skydrol
Tenneco Anderol No. 495

OTHER MATERIALS

Garlock No. 98403 (Polyurethane)
Parco No. 3106 (Neoprene)
Some Loctite Compounds
Stillman No. SR269-75
(Polyurethane)
Stillman No. SR513-70 (Neoprene)

CAUTION: Compounded oils containing graphite and fillers are not recommended for use with cylinders.

Air & Lubrication Requirement

AIR PRESSURE: Limited to 200 psig (14 bar) FILTRATION: 40 Micron. Proper moisture removal and filtration of contaminates will promote good service life and operation. Install an air regulator to control the operating pressure, insure smooth operation and conserve energy.

LUBRICATION: All valve components have been lubricated at the factory and can be operated without additional air line lubrication. Minimal lubrication may extend the life of the valve. 50 Series, E-Series and K-Series Valves use o-ring seals. For maximum performance and life expectancy, standard air line lubrication should be used. If air line cylinders or other air line devices, used in conjunction with ARO valve, require lubrication, be sure the lubricating oils used are compatible with the valve seals and are of sufficient viscosity to assure adequate lubrication. Aro recommends an oil lubricant with a viscosity of 100-200 SUS at 100° F and an airline point above 200° F.

NOTICE: The use of compound oils containing graphite filters, extremely low viscosities or other non-fluid lubricants is not recommended.

RECOMMENDED: Aro 29665 air line lubricator oil is available in one quart containers.

General Information

To obtain information or to receive technical literature for specific valves: contact ARO Customer Service at (800) 495-0276 or contact your nearest Aro distributor. Refer to the Service Kit Director for Valves and Cylinders form #9326-M, available from Aro. Selected parts are provided in kit form. The ARO Parts List/Service Instructions contain Repair Kit information and complete Service Parts information and are available upon request. Order Manuals as shown. The following Operator's Manuals are available.

Warning

The following are hazards or unsafe practices which could result in severe personal injury, death or substantial property damage. Heed the following. Use safeguards. Insure that provisions are made to prevent the valve from being accidentally operated (actuated.)

Hazardous Air Pressure. Shut off, disconnect and relieve any trapped air pressure from system before performing service or maintenance.

Hazardous Voltage. Do not attempt any service without disconnecting all electrical supply sources.

NOTICE: Genesis Series Valves must be grounded.

Do not use the valve as a safety device or to operate or control the operation of full revolution clutch systems or brake systems on power presses or similar equipment. These valves are not intended for such applications. Do not subject the valve to any condition that exceeds the limits set forth in the specifications for a particular valve model. Keep all hoses, electrical wiring, fittings and connections in good working condition. Damaged air pressure hoses, electrical wiring, or connections, could cause accidental valve operation (actuation). Only allow qualified technicians to install or maintain the valve system. It is necessary to have a thorough understanding of the operation and application of all valves being used in a particular system and how they interact with the other components of the system.

Operator's Manual

ALPHA SERIES
CAT SERIES
E SERIES
GENESIS SERIES
H SERIES
K SERIES
50 SERIES

Part Number

119999-015
119999-036
119999-034
119999-021
119999-037
119999-035
119999-045

- **Ingersoll-Rand Air Solutions:**
Air Compressors
- **Ingersoll-Rand Professional Tools:**
Hand Tools / Hoists
Zimmerman Material Handling



- **Fluid Handling**
ARO
McCartney Polyethylene (Waterjet)
- **Club Car**
Carry All Carts

www.ingersoll-rand.com

Check Out
These Other
IR Industrial
Productivity
Solutions



Ingersoll-Rand

P.O. Box 151 • One Aro Center
Bryan, Ohio 43506-0151

(419) 636-4242 • FAX (419) 633-1674

Fluid Handling: (Customer Service)
(419)633-1794 • FAX (419)633-1772

Fluid Power: (Customer Service)
(419)633-1796 • FAX (419)633-1774

Web: www.arozone.com

NORTH AMERICA

Canada

Ingersoll-Rand Canada Inc.
51 Worcester Road
Rexdale, Ontario M9W 4K2
PHONE: 1 (416) 213-4500
FAX: 1 (416) 213-4510

LATIN AMERICA

Latin America Headquarters

Ingersoll-Rand
Aro Division
730 N.W. 107 Ave., Suite 300
Miami, FL 33172-3107
PH: (305) 222-0812/559-0500
FAX: (305) 222-0864/559-7505

Brazil

Ingersoll-Rand do Brasil Ltda.
Av. Dr. Cardoso de Melo 1855
Cep. 04548-005 São Paulo S.P.
55 11 822 7400
PH: (55-11) 822-7400
FAX: (55-11) 866-4985

Chile

Ingersoll-Rand Chile, Ltda.
Nueva Tajamar 555
Oficina 1502
Santiago, Chile
PH: 56-2 339-7939
FAX: 56-2 339-7940

Mexico

Ingersoll-Rand, S.A. de C.V.
Blvd. Centro Industrial No.11
Industrial Puente de Vigas
54070 Tianepantla, Edo. Mex.
PH: (525) 3 90 40 21 Ext. 109
FAX: (525) 3 90 40 31

EUROPE

European Headquarters

Europe, Africa & Middle East
Ingersoll-Rand
Zone du Chêne Sorcier
B.P. 62
Les Clayes sous Bois
Cedex - France
PH: (33) 01 30 07 69 50
FAX: (33) 01 30 07 69 96

ASIA

Japan

Ingersoll-Rand Japan, Ltd.
Shin-Yokohama Square Bldg. 5F
3-12, Shin-Yokohama 2-chome
Kohoku-ku, Yokohama-shi
Kanagawa Pref. 222, Japan
PH: (81) 45-476-7801
FAX: (81) 45-476-7806

Singapore

Ingersoll-Rand S.E.A. Pte Ltd.
42, Benoi Road
Singapore 2262
PH: (65) 8611555
FAX: (65) 8610317

Australia

Ingersoll-Rand Australia, Ltd.
1 Hartnett Drive
Seaford, Vic 3198
PH: (61) 3 9554-1600
FAX: (61) 3 9554-1611

China / Hong Kong

Ingersoll-Rand Asia Pacific
23/F, 625 King's Road
North Point
Hong Kong
PH: (852) 2527-0183
FAX: (852) 2529-5976

Korea

Ingersoll-Rand Korea
Production Equipment Group
#1005, 10th Floor,
Guhsung Bldg,
541, Dohwa-Dong
Mapo-Ku, Seoul
Korea
PH: (82) 2-703-8461 / 3
FAX: (82) 2-3272-5894

Taiwan

Ingersoll-Rand Taiwan
12F-2, No. 79
Shin-Tai Wu Road
Sec. 1, Hsi-Chih Town
Taipei Hsien, Taiwan, R.O.C.
PH: 886-2-698-4858 Ext. 18
FAX: 886-2-698-9897



0020-M
1100

© 2000 IR/ARO