



DB
SB
AOT



Pressure Boosters Air-Oil Tanks

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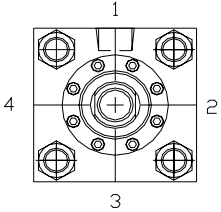
Dual Booster
Single Booster
Air-Oil Tanks
5 Mounts
Steel Construction

BOOSTER MODEL CODE

DB	MX1	5"	12"	2"	S	P	S
1	2	3	4	5	6	7	8

1 Model Series	SB Single Pressure Booster DB Dual Pressure Booster AOT Air-Oil Tank
2 Mounting Style (Pages 7-48)	MS1 Angle Foot MS2 Side Lugs MS4 Side Tapped MS7 Foot Lug MX0 No Mount MX1 Extended Both Ends MX2 Extended Cap End MX3 Extended Head End
3 Bore Size (3.25" - 14")	
4 Stroke or Tank Length (.001" - 12")	
5 Ram Diameter (.625" - 8")*	

*Not Required for Air-Oil Tanks

6 Port Styles	S SAE N NPT	
7 Seals	P Polyurethane B Nitrile V Viton	
8 Specials	Air Bleeds Drainbacks Bronze Bushings Electroless Nickel Plated Integral Tank Indicator switches Mixed Mounting Styles Special, Rotated, or Oversize Ports Stainless Steel Ram	

How to Select a Booster and Air/Oil Tanks

Application Information

- Total work cylinder stroke
 - Low-pressure advance stroke and force
 - High-pressure stroke and force
 - Return stroke force
- Available input pressure, air or liquid
- Speed of operation required
- Length of high-pressure piping to be used

Work Cylinder Selection

Work cylinder bore size depends on forces required and booster input and output pressure.

High-Pressure Fluid Volume Requirement

Multiply the work cylinder piston area in square inches times the length of stroke in inches over which high pressure is required. Make allowance for compression of high-pressure fluid.

Booster Sizing

Determine the booster ratio for your application. This is the ratio of the available input pressure and the output operating pressure required for the application.

$$\text{Booster Ratio} = \text{Output Pressure} / \text{Input Pressure}$$

Booster Principles and When Should Boosters Be Used

A booster is a fluid power component which utilizes a source of fluid under pressure to produce a higher pressure. The input and output fluid may be air, oil or water. The input fluid is usually air and the output fluid usually is oil. JIT Boosters are an economical and space saving method for converting a large volume at low pressure to small volume at high pressure. Boosters are best suited for applications that require intermittent high pressure utilizing low pressure air. Boosters and cylinder combinations are not intended for rapid cycling with high pressures.

Example Application: Clamp a fixture into position for a work application. With only shop air readily available, an air cylinder will not exert the force required to hold the fixture in position. This is an ideal application for a booster and hydraulic cylinder. With a booster system, the hydraulic cylinder can be controlled in its clamping action far better than can an air cylinder and by using a Dual Pressure Booster (Model DB), the clamping cylinder will travel rapidly toward the fixture, under light pressure, and then will, at the end of its travel, exert high pressure just as it clamps.

Cost: Boosters eliminate the need for pumps and their associated components. When an application requires higher pressures, using a booster system is the cost effective solution compared to a complete pump system.

Long Holding Times: Boosters maintain continuous pressure indefinitely without the loss of energy and utilizing only shop air. Hydraulic power units waste power and generate heat while being in continual operation to maintain required operating pressure.

Extreme High Pressures: Pressures up to 50,000 psi can be obtained with special boosters. For an inexpensive way of achieving high pressures, a booster is the best solution.

Booster Applications

High Pressure from Shop Air

Boosters are used to convert low pressure shop air into high pressure hydraulic to supply applications where greater forces are required.

Fluid Transfer

Fluids that are difficult or impossible to transfer with a pump can be delivered through a valve-booster combination. Depending on the type of medium, boosters can be produced with special metals such as stainless steel.

Testing

Testing of manufactured parts for physical strength, leaks or burst rating. A hydraulic cylinder will give a precise, high pressure force for mechanical testing, and a booster can be lined up directly to test for leaks.

High Pressures

Extremely high pressures, up to 50,000 psi, can be achieved with special boosters. Such high pressures would be impossible with an ordinary hydraulic rotary pump.

Liquid Injection

High pressure injection of liquids into high pressure gas lines or containers.

Holding Pressures

Long holding pressures can be readily maintained without drawing power or generating heat. A booster can maintain accurate pressure levels under static conditions for an indefinite time.

Booster Advantages

Save Space & Weight

In many applications, booster driven cylinders can replace an extremely large, low pressure air cylinder with a small, efficient, high pressure hydraulic cylinder. A booster, air-oil tank and cylinder can be mounted directly on the equipment itself to reduce required circuitry, overall weight, and total space required.

Lower Cost

A booster system is less expensive than an overall hydraulic system with its pump-motor requirements. They also require only a fraction of the air of a direct air cylinder installation. Hydraulic requirements are also much smaller to operate a give function.

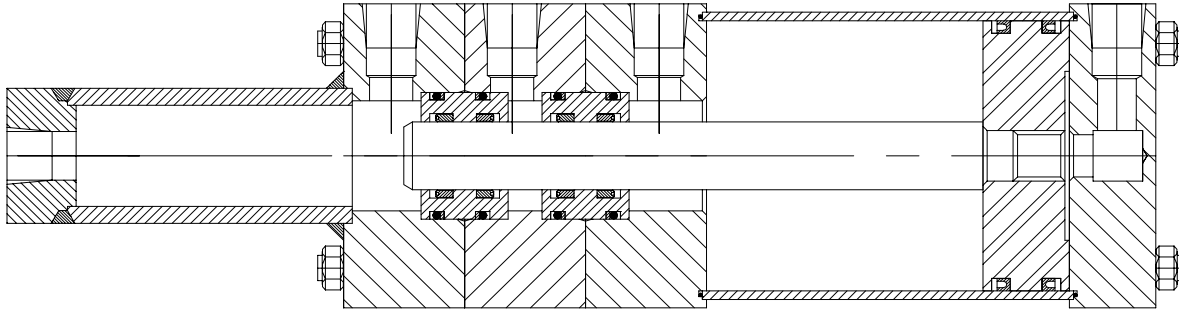
Smoother and Efficient Power

Though usually air-actuated, boosters give work cylinders the smooth, powerful, and controlled motion of hydraulics. Compared to air boosters provide a smoother stroke, efficient power, and increased force.

Designed By Industry - For Industry

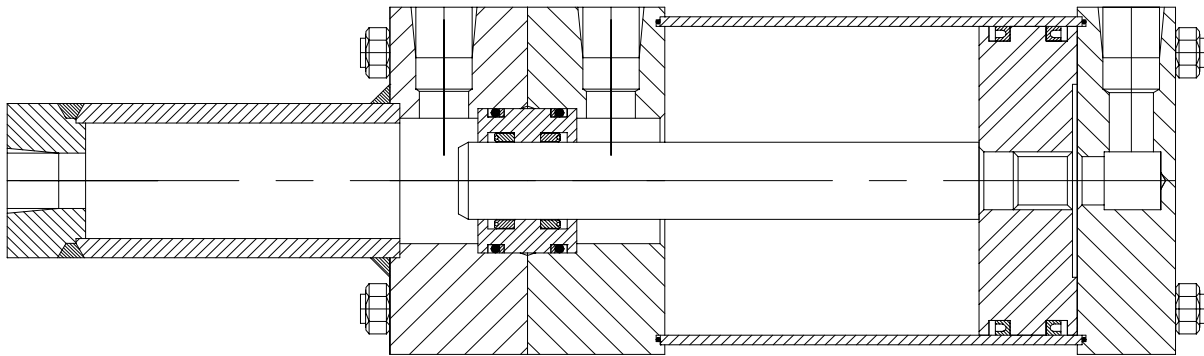
Dual Pressure Booster - Model DB

Single or integral dual pressure, self bleeding with output pressures to 5000 psi. When using BH series boosters, circuit pressure is multiplied as the ram enters the secondary high pressure chamber. When the booster is installed at a point higher than the work cylinder and the air-oil tank higher than the booster, any air in the circuit will move automatically to the air-oil tanks and bleed into the atmosphere.



Single Pressure Booster - Model SB

Single pressure boosters are used when high pressure output is required during the entire working stroke. Because of the simpler design, SB Series boosters are not self bleeding and more care must be taken when installing to bleeding out the air. SB series boosters consist of a driving piston, a high pressure ram and a single high pressure chamber.



Accumulator Applications of Model SB Boosters

BA Series boosters can be used as an accumulator to eliminate the need for high pressure nitrogen. Air pressure regulation of the input air eliminates change in accumulator output pressure as the position of the high pressure ram changes. The ram stroke may be used with allowance to avoid bottoming in either direction.

Booster Specifications

Bore Sizes: 3.25" through 14.00"

Pressure Rating: 5000 psi

Heavy Duty Booster Gland Bearing

Unitized gland bearing is machined from gray iron for maximum support and wear resistance. The gland bearing is piloted into a precision head to ensure concentricity.

Booster Barrel

Heavy wall DOM steel tubing is honed to a micro finish bore. DOM tube processing insures straighter and more concentric barrels while providing greater impact resistance for durability and long life.

Superior Sealing Systems

Booster sealing system has been designed to provide optimum performance across broad velocities, pressure and temperature ranges with a variety of fluids.

Booster Nozzles

Heavy duty steel nozzles are externally removable when replacing seals without disturbing booster assembly or tie-rod torque.

Booster Selection Chart

Output Pressures based on 100 psi input

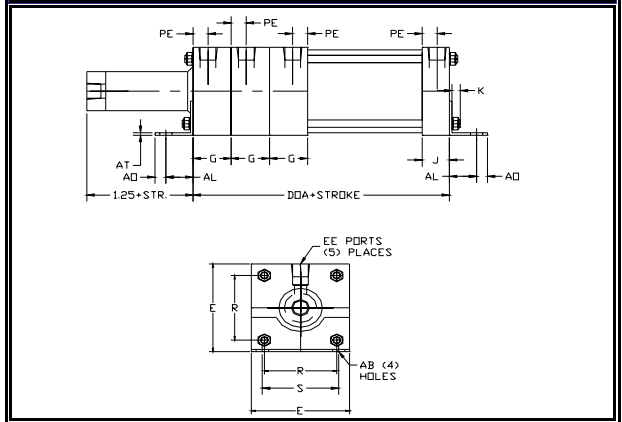
Ram Diameter & Area	Stroke	Usable Volume (cu. in.)		5" Bore Pressure Output	6" Bore Pressure Output	8" Bore Pressure Output	10" Bore Pressure Output	12" Bore Pressure Output	14" Bore Pressure Output
		SB Series	DB Series						
5/8" .3068 sq.in.	6"	1.84	1.23	6480 psi					
	7"	2.15	1.53						
	8"	2.45	1.84						
	9"	2.76	2.15						
	10"	3.07	2.45						
	11"	3.37	2.76						
12"	3.68	3.07							
1" .7854 sq.in.	6"	4.71	3.14	2531 psi	3638 psi	6450 psi			
	7"	5.50	3.93						
	8"	6.28	4.71						
	9"	7.07	5.50						
	10"	7.85	6.28						
	11"	8.64	7.07						
12"	9.42	7.85							
1 3/8" 1.4849 sq.in.	6"	8.91	5.94	1339 psi	1924 psi	3412 psi	5322 psi		
	7"	10.39	7.42						
	8"	11.88	8.91						
	9"	13.36	10.31						
	10"	14.85	11.88						
	11"	16.33	13.36						
12"	17.82	14.85							
1 3/4" 2.405 sq.in.	6"	14.43	9.62	827 psi	1188 psi	2106 psi	3286 psi	4727 psi	
	7"	16.84	12.03						
	8"	19.24	14.43						
	9"	21.65	16.84						
	10"	24.05	19.24						
	11"	26.46	21.65						
12"	28.86	24.05							
2" 3.1416 sq.in.	6"	18.85	12.57	633 psi	909 psi	1613 psi	2516 psi	3619 psi	4922 psi
	7"	21.99	15.71						
	8"	25.13	18.85						
	9"	28.27	21.99						
	10"	31.42	25.13						
	11"	34.56	28.27						
12"	37.70	31.47							
2 1/2" 4.9087 sq.in.	6"	29.45	19.63	405 psi	582 psi	1032 psi	1610 psi	2316 psi	3150 psi
	7"	34.36	24.54						
	8"	39.27	29.45						
	9"	44.18	34.36						
	10"	49.09	39.27						
	11"	54.00	44.18						
12"	58.90	49.09							
3" 7.0686 sq.in.	6"	42.41	28.27	281 psi	404 psi	717 psi	1118 psi	1608 psi	2188 psi
	7"	49.48	35.34						
	8"	56.55	42.41						
	9"	63.62	49.48						
	10"	70.69	56.55						
	11"	77.75	63.62						
12"	84.82	70.69							

Standard DB Series Duel Pressure Booster Mounts

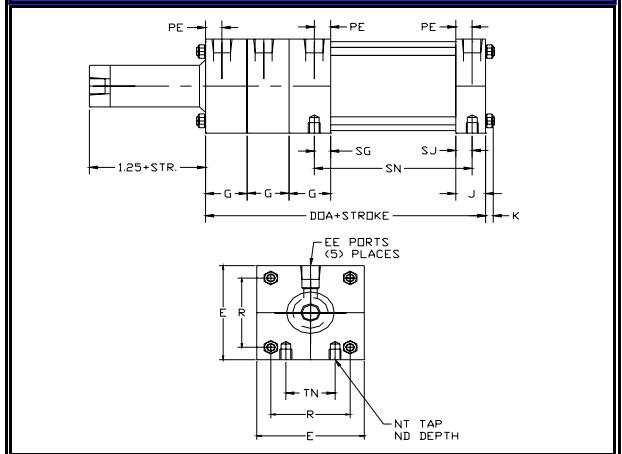
DB Series Booster Mounting Dimensions

	3.25"	4"	5"	6"	8"	10"	12"	14"
AA	3.90	4.70	5.80	6.90	9.10	11.20	13.30	15.40
AB	0.56	0.56	0.56	0.81	0.81	1.06	1.06	1.31
AL	1.25	1.25	1.38	1.38	1.81	2.13	2.13	2.44
AO	0.50	0.50	0.63	0.63	0.69	0.88	0.88	1.06
AT	0.13	0.13	0.19	0.19	0.25	0.25	0.38	0.38
BB	1.38	1.38	1.81	1.81	2.31	2.69	2.69	3.19
PE	0.69	0.69	0.70	0.81	0.82	1.00	1.00	1.19
DOA	7.75	7.75	8.00	9.00	9.13	10.88	11.38	13.63
DD	.375-24	.375-24	.50-20	.50-20	.625-18	.75-16	.75-16	.875-14
E	3.75	4.50	5.50	6.50	8.50	10.63	12.75	14.75
EE(NPT)	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25
EE(SAE)	#8	#8	#8	#12	#12	#16	#16	#20
G	1.75	1.75	1.75	2.00	2.00	2.25	2.25	2.75
J	1.25	1.25	1.25	1.50	1.50	2.00	2.00	2.25
K	0.38	0.38	0.50	0.50	0.63	0.75	0.75	0.88
NT	.50-13	.50-13	.625-11	.75-10	.75-10	1.0-8	1.0-8	1.25-7
R	2.76	3.32	4.10	4.88	6.44	7.92	9.40	10.90
SB	0.56	0.56	0.81	0.81	0.81	1.06	1.06	1.31
SN	2.63	2.63	2.88	3.13	3.25	4.13	4.63	5.50
SS	3.25	3.25	3.13	3.63	3.75	4.63	5.13	5.88
ST	0.75	0.75	1.00	1.00	1.00	1.25	1.25	1.50
SU	1.25	1.25	1.56	1.56	1.56	2.00	2.00	2.50
SW	0.50	0.50	0.69	0.69	0.69	0.88	0.88	1.13
SG	0.69	0.69	0.69	0.81	0.81	1.00	1.00	1.19
ND	0.50	0.50	0.63	0.75	0.75	1.00	1.00	1.75
TN	1.50	2.06	2.69	3.25	4.50	5.50	7.25	8.38
TS	4.75	5.50	6.88	7.88	9.88	12.38	14.50	17.00
US	5.75	6.50	8.25	9.25	11.25	14.13	16.25	19.25

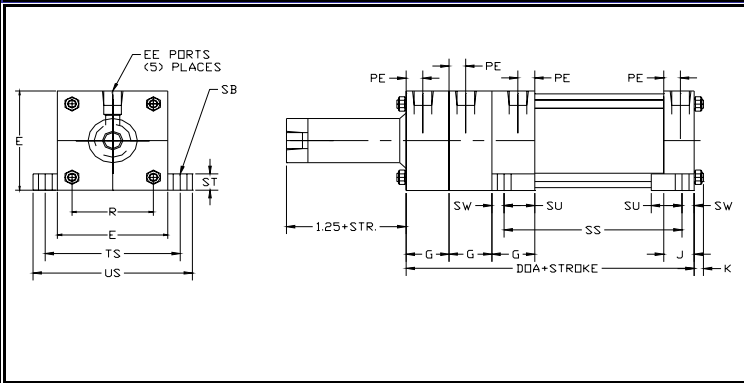
Front Foot Mount MS7



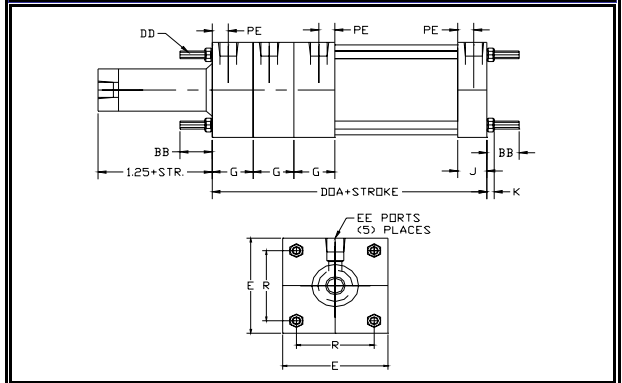
Side Tapped Mount MS4



Side Lug Mount MS2



Tie Rod Mounts MX0, MX1, MX2, MX3

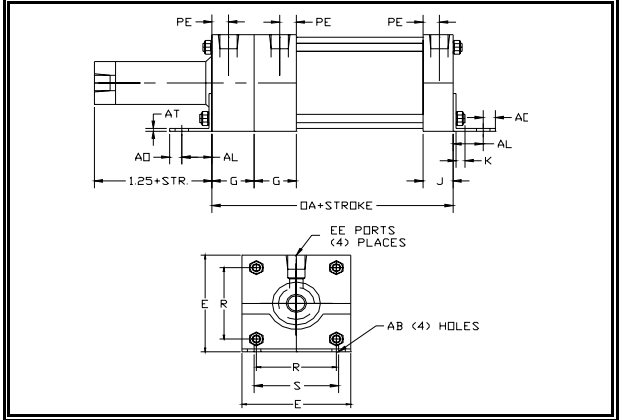


Standard SB Series Single Pressure Booster Mounts

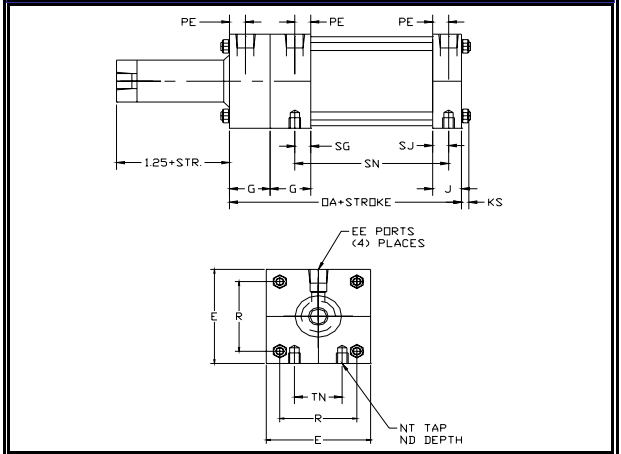
SB Series Booster Mounting Dimensions

	3.25"	4"	5"	6"	8"	10"	12"	14"
AA	3.90	4.70	5.80	6.90	9.10	11.20	13.30	15.40
AB	0.56	0.56	0.56	0.81	0.81	1.06	1.06	1.31
AL	1.25	1.25	1.38	1.38	1.81	2.13	2.13	2.44
AO	0.50	0.50	0.63	0.63	0.69	0.88	0.88	1.06
AT	0.13	0.13	0.19	0.19	0.25	0.25	0.38	0.38
BB	1.38	1.38	1.81	1.81	2.31	2.69	2.69	3.19
PE	0.69	0.69	0.70	0.81	0.82	1.00	1.00	1.19
OA	6.00	6.00	6.25	7.00	7.13	8.63	9.13	10.88
DD	.375-24	.375-24	.50-20	.50-20	.625-18	.75-16	.75-16	.875-14
E	3.75	4.50	5.50	6.50	8.50	10.63	12.75	14.75
EE(NPT)	0.50	0.50	0.50	0.75	0.75	1.00	1.00	1.25
EE(SAE)	#8	#8	#8	#12	#12	#16	#16	#20
G	1.75	1.75	1.75	2.00	2.00	2.25	2.25	2.75
J	1.25	1.25	1.25	1.50	1.50	2.00	2.00	2.25
K	0.38	0.38	0.50	0.50	0.63	0.75	0.75	0.88
NT	.50-13	.50-13	.625-11	.75-10	.75-10	1.0-8	1.0-8	1.25-7
R	2.76	3.32	4.10	4.88	6.44	7.92	9.40	10.90
SB	0.56	0.56	0.81	0.81	0.81	1.06	1.06	1.31
SN	2.63	2.63	2.88	3.13	3.25	4.13	4.63	5.50
SS	3.25	3.25	3.13	3.63	3.75	4.63	5.13	5.88
ST	0.75	0.75	1.00	1.00	1.00	1.25	1.25	1.50
SU	1.25	1.25	1.56	1.56	1.56	2.00	2.00	2.50
SW	0.50	0.50	0.69	0.69	0.69	0.88	0.88	1.13
SG	0.69	0.69	0.69	0.81	0.81	1.00	1.00	1.19
ND	0.50	0.50	0.63	0.75	0.75	1.00	1.00	1.75
TN	1.50	2.06	2.69	3.25	4.50	5.50	7.25	8.38
TS	4.75	5.50	6.88	7.88	9.88	12.38	14.50	17.00
US	5.75	6.50	8.25	9.25	11.25	14.13	16.25	19.25

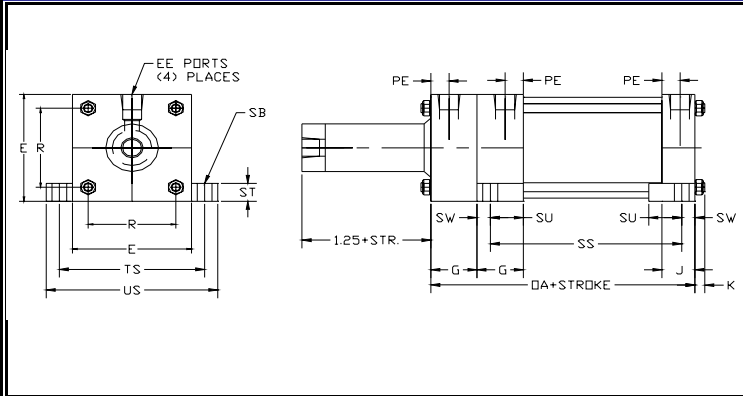
Front Foot Mount MS7



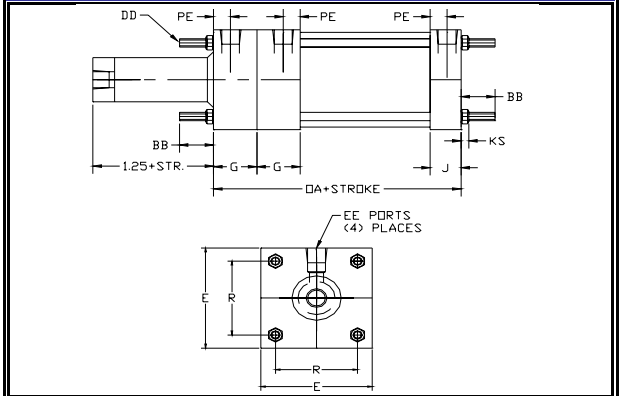
Side Tapped Mount MS4



Side Lug Mount MS2



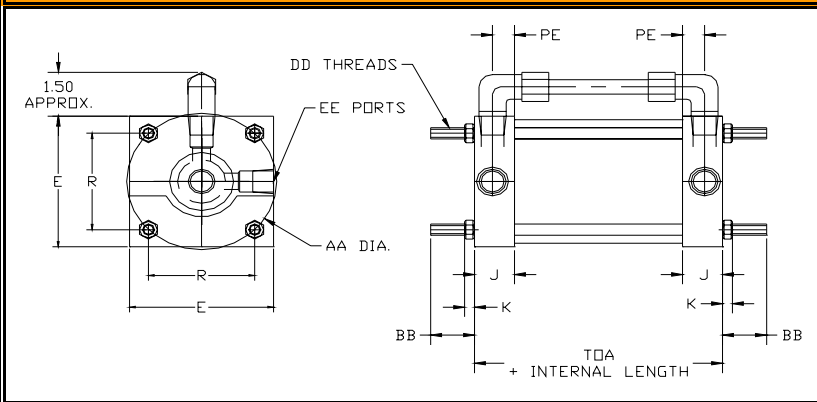
Tie Rod Mounts MX0, MX1, MX2, MX3



AOT Series AIR/OIL TANKS

Tie Rod Mounts

MX0, MX1, MX2, MX3



Air-Oil Tank Features

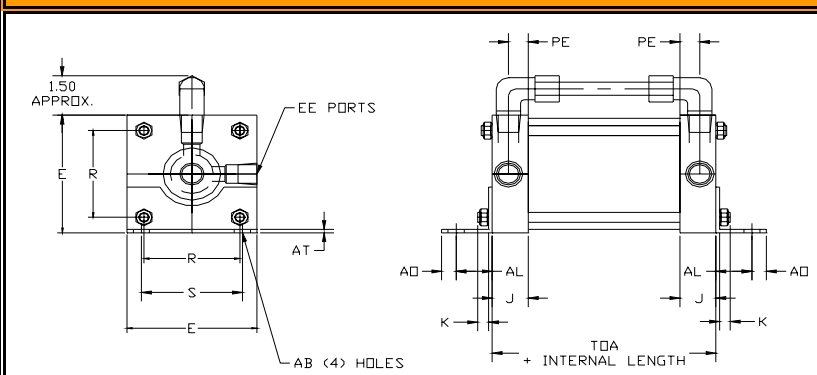
- High strength, solid steel, precision machined end caps with large fill and drain plugs for fast circuit filling
- Steel tubing sealed to each end cap with o-ring face seals
- Replaceable sight gauge allows you to continuously monitor reservoir levels
- Baffle system inside both end caps ensures rapid intake and discharge with minimum churning, foaming or aeration

ATO Series Air-Oil Tank Mounting Dimensions

Bore Size	Port Area	AA	AB	AL	AO	AT	BB	PE	DD	E	EE(NPT)	EE(SAE)	J	K	R	TOA
3.25	0.41	3.90	0.56	1.25	0.50	0.13	1.38	0.69	.375-24	3.75	0.50	#8	1.25	0.38	2.76	2.50
4.0	0.41	4.70	0.56	1.25	0.50	0.13	1.38	0.69	.375-24	4.50	0.50	#8	1.25	0.38	3.32	2.50
5.0	0.41	5.80	0.56	1.38	0.63	0.19	1.81	0.69	.50-20	5.50	0.50	#8	1.25	0.50	4.10	2.50
6.0	0.67	6.90	0.81	1.38	0.63	0.19	1.81	0.81	.50-20	6.50	0.75	#12	1.50	0.50	4.88	3.00
8.0	0.67	9.10	0.81	1.81	0.69	0.25	2.31	0.81	.625-18	8.50	0.75	#12	1.50	0.63	6.44	3.00
10.0	1.05	11.20	1.06	2.13	0.88	0.25	2.69	1.00	.75-16	10.63	1.00	#16	2.00	0.75	7.92	4.00
12.0	1.05	13.30	1.06	2.13	0.88	0.38	2.69	1.00	.75-16	12.75	1.00	#16	2.00	0.75	9.40	4.00
14.0	1.77	15.40	1.31	2.44	1.06	0.38	3.19	1.19	.875-14	14.75	1.25	#20	2.25	0.88	10.90	4.50

Front Foot Mount

MS7



Smooth Hydraulic Speed Control

JIT Air Oil Tanks offer a means of smooth hydraulic speed control of a cylinder from a shop air line source.

Tubing Option

Tanks are also available with glass wound filament fiberglass tubing. Because it is translucent, it provides a 360° visual oil level indication and eliminates the requirement of a sight glass.

Booster & Air-Oil Tank Combination

When using a booster with an intergal air-oil tank, savings are obtained in space, cost and installation time. Tanks are mounted directly on the booster, using a common end plate and tie-rods. Tanks should be the same bore as the booster. Due to the fact that air-oil tanks must always be used vertically, this combination is limited to a vertically mounted installation.

AOT Series Air-Oil Tanks

JIT Air-Oil Tanks are used as an economical method to supply a source of oil to any hydraulic circuit. Air-Oil Tank literally contains air on top of oil and serves several purposes in a booster system. Air Oil Tanks are used as a source of oil to compensate for any loss in the hydraulic system, provide hydraulic pressure to return the cylinder to its starting position, and provide an outlet for entrapped air in the hydraulic system. Air pressure is supplied from the same source used to operate the booster. A sight-gauge is mounted on the side so the level of oil in reserve can be observed. When required, hydraulic fluid may be added through a port in the top of the tank after shutting off air pressure.

Proper Air-Oil Tank Selection

Tanks should be sized large enough to replenish any hydraulic losses without the necessity of adding fluid frequently. In the Maximum Usage Capabilities chart below, select the tank size that is slightly greater than the total cylinder volume. When an Air-Oil Tank is used as a source of pressure to return the cylinder, its size must be in excess of the total cylinder displacement.

Sizing an Air/Oil Tank

1. Determine the volume of fluid displaced of the work cylinder
2. Determine the capacity of the bore and length equal to or greater than this volume. Suggested minimum length is 6"
3. Tank should be sized so the oil level does not change more than 6" per second
4. Selection should be based on economics, envelope dimensions and required port size
5. Check to see that the air/oil port size will give adequate speed

Maximum Usable Capacities - Cubic Inches

Bore Size	Tank Length (inches)							
	6	7	8	9	10	11	12	13
3.25	24.4	32.6	39.9	46.8	54.1	60.9	69.2	76.9
4.0	36.8	49.1	60.2	70.6	81.7	91.9	104.0	116.0
5.0	57.3	76.5	93.8	110.0	127.0	143.0	163.0	181.0
6.0	82.3	110.0	135.0	158.0	183.0	206.0	234.0	260.0
8.0	146.0	195.0	239.0	280.0	324.0	365.0	414.0	461.0
10.0	228.0	304.0	373.0	437.0	506.0	569.0	646.0	719.0
12.0	327.0	438.0	537.0	629.0	728.0	819.0	930.0	1035.0
14.0	445.0	595.0	730.0	855.0	990.0	1113.0	1265.0	1407.0

Bore Size	Tank Length (inches)							
	14	15	16	17	18	19	20	22
3.25	84.1	91.3	98.8	106.0	114.0	122.0	129.0	143.0
4.0	127.0	138.0	149.0	161.0	172.0	184.0	195.0	216.0
5.0	198.0	215.0	232.0	250.0	268.0	286.0	304.0	337.0
6.0	284.0	309.0	334.0	359.0	386.0	411.0	437.0	484.0
8.0	504.0	547.0	592.0	637.0	684.0	729.0	774.0	858.0
10.0	786.0	844.0	923.0	994.0	1067.0	1138.0	1208.0	1339.0
12.0	1130.0	1228.0	1328.0	1430.0	1535.0	1637.0	1737.0	1926.0
14.0	1537.0	1670.0	1806.0	1945.0	2088.0	2227.0	2363.0	2619.0