Warning, Offer of Sale

⚠ WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users h aving technical expertise. It is important that you analyze all aspects of your application including consequences of any failure, and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated on the separate page of this document entitled “Offer of Sale”.

Parker Hannifin Corporation
Pneumatic Division
Wadsworth, Ohio
www.parker.com/pneumatics

SR/SRM Series
SRD/SRDM Series

Stainless Steel Body Air Cylinders

Contents

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C086

D

Stainless Steel Piston Rods
Corrosion resistant stainless steel is now the standard piston rod material for all bore sizes up to and including 1.50 inch bore at no additional cost. The only exception to the stainless steel standard is when a hollow rod or non-rotating hexagonal rod option is specified. Stainless steel is also the standard material on block, trunnion and KDX mounts.

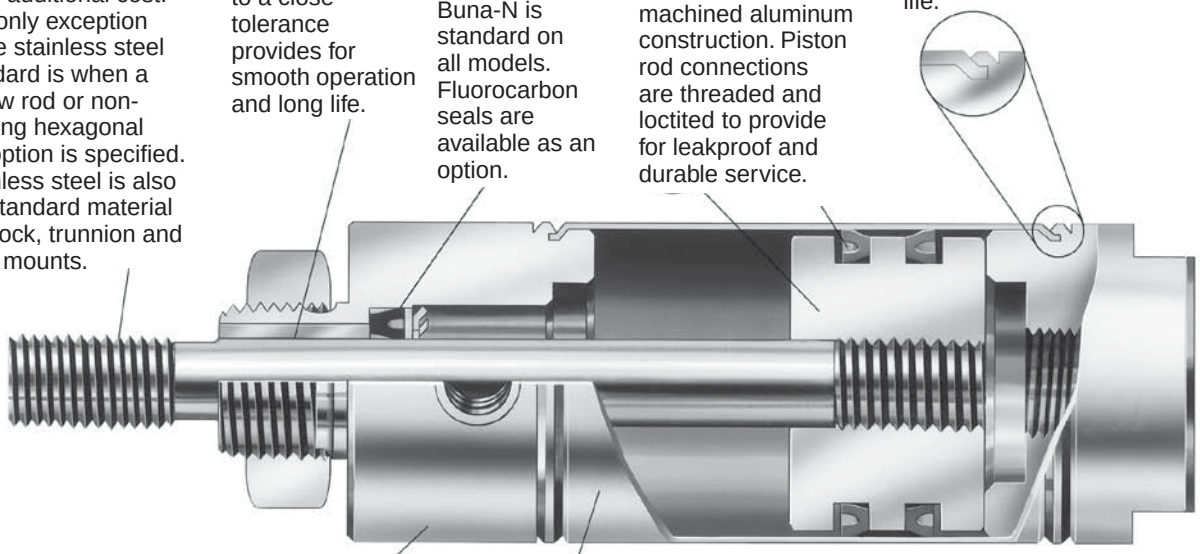
Pre-Lubrication
All SR Series cylinders are factory prelubricated for use with or without added lubrication.

Rod Bushings
Oil impregnated bronze, reamed to a close tolerance provides for smooth operation and long life.

Seals
All piston and rod seals are of a lipseal construction. Buna-N is standard on all models. Fluorocarbon seals are available as an option.

Piston Body
Pistons are precision machined aluminum construction. Piston rod connections are threaded and loctited to provide for leakproof and durable service.

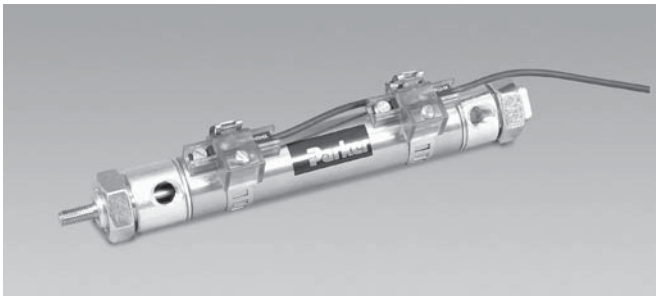
Unitized Construction
Precision double-rolled unitized construction provides durable, leak-proof service and long life.



Heads and Caps
Aluminum construction with precision machining provides a smooth break away. The tube-to-head connection is a strong double rolled construction.

Cylinder Tube
Type 304 stainless steel, polished to a micro-inch finish on the I.D. provides low friction and long life.
A matte finish on the O.D. provides smudge resistance.

Twelve Bore Sizes – 5/16" thru 3". SR Series cylinders are designed to be dimensionally interchangeable with other major stainless steel cylinders.



SRM Series

The SRM Series air cylinder can be ordered with reed or solid state sensors that are easily adjustable anywhere on the cylinder body, with no special mounting rail required. NItrile-barium particle composite surrounds the entire piston diameter for non-contact sensing.

Sensors are compatible with Programmable Controllers; an LED indicator is also standard. A shielded cable is standard, and can be extended to 32 feet maximum by the user.

SRD/SRDM Series

SRD/SRDM Series cylinders are designed to withstand a wide range of operating environments to tolerate moisture and many types of lubricants and solvents. The cylinders have a Delrin® (acetal resin) head and cap, an anodized aluminum piston, stainless steel cylinder tube and stainless steel piston rod. Stainless steel accessories are available.

Delrin® is a registered trademark of Dupont. For detailed information regarding the properties of Delrin, contact Dupont.

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C086

How To Order SR Series Air Cylinders

1.06	C		D	SR	B	V				C	2.00

Bore Size [1]

.31	5/16"
.44	7/16"
.56	9/16"
.75	3/4"
.88	7/8"
1.06	1-1/16"
1.25	1-1/4"
1.50	1-1/2"
1.75	1-3/4"
2.00	2"
2.50	2-1/2"
3.00	3"

Cushion Head [2]
Use "C" only when cushion head is required.

Double Rod
Use "K" only when double rod is required.
Available on DX and DXH mounting only.

Mounting [1]
N, NR, NRP, P, R, RP, D, DP, DXP, DX, DXH, A, RA, AP, AR, BRN, BRR, BFD, BRD, BFN, BFR, TRN, TRR, TFD, TRD, TFN or TFR.

Series

SR	Standard Cylinder
SRM	With Magnetic Piston
SRD	With Delrin Caps
SRDM	With Delrin Caps and Magnetic Piston

Piston

Blank	No Bumpers
B	With Bumpers [3]

Seals

Blank	Standard Seals
V	Fluorocarbon Seals [4]
W	Rod Wiper

Special
Use "S" only if special modifications are required, except piston rod end.

Non-Standard Rod
Specify Y for stainless steel piston rod.
Stainless steel is standard on all bore sizes up to and including 1.50" Bore.

Non-Standard PIston Rod
Use "3" only when special piston rod end is required.
Specify CC, LE and A Dimensions (See below.)

Cushion Cap [2]
Use "C" only when cushion cap is required.

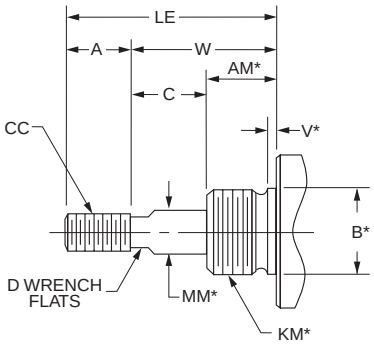
Stroke
Specify in inches.

1 Bore sizes and mounting styles are limited by series. See table on next page for availability.
2 Cushions not available on SRD/SRDM series.
3 Bumpers may increase cylinder length. See page D37 for adders.
4 Fluorocarbon seals not available on SRM or SRDM series.

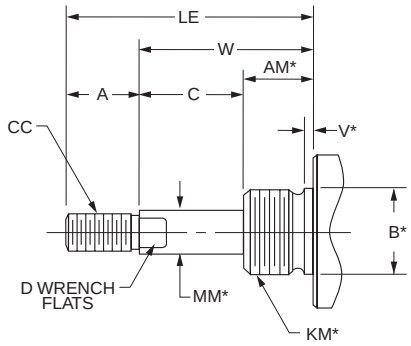
Non-Standard Rods

For non-standard rod dimensions, or undersized rod end threads, put a "3" in model number and describe the rod using the letters shown in the drawing. Specify CC, LE and A dimensions.

Full Diameter Rod End Threads



Undersized Rod End Threads



*Requires an S designation in model number.

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Available Mounting Styles

Mount Style	Description	Bore Size (Reference Notes 1 & 2 for availability)												Max. Stroke (in.)	Page
		5/16" (1,2)	7/16" (1,2)	9/16"	3/4"	7/8" (1,2)	1-1/16"	1-1/4" (2)	1-1/2"	1-3/4" (2)	2"	2-1/2" (2)	3" (1,2)		
N (2)	Nose mount, spring return	●	●	●	●	●	●	●	●	●	▲	—	—	6" (3)	D7
NR (2)	Nose mount, spring return, hex rod (non-rotating)	—	●	●	●	●	●	●	●	●	—	—	—	6"	D8
NRP (2)	Pivot and nose mount, spring return, hex rod (non-rotating)	—	●	●	●	●	●	●	●	●	—	—	—	6"	D9
P (2)	Pivot mount, spring return	●	●	●	●	●	●	●	●	●	▲	—	—	6"	D10
R (2)	Nose mount, spring extended	●	●	●	●	●	●	●	●	●	▲	—	—	6"	D11
RP (2)	Pivot and nose mount, spring extend	●	●	●	●	●	●	●	●	—	▲	—	—	6"	D12
D	Nose mount, double acting	●	●	●	●	●	●	●	●	●	●	●	●	12"	D13
DP (2)	Pivot and nose mount, double acting, pivot pin	—	●	—	●	—	●	—	●	—	—	—	—	12"	D14
DXP	Pivot and nose mount, double acting, no pivot pin	●	●	●	●	●	●	●	●	●	●	●	●	See Note 4	D15
DX	Threaded both ends, double acting	—	See DXP	See DXP	See DXP	See DXP	See DXP	See DXP	●	—	See DXP	—	—	32"	D16
KDX	Threaded both ends, double acting, double rod	—	●	●	●	●	●	●	●	●	●	●	●	See Note 5	D17
KDXH (2)	Threaded both ends, double rod, hollow rod	—	—	—	—	—	●	●	●	●	●	—	—	12"	D18
A (1,2)	Nose mount, spring return, head adjustable stroke	—	—	—	●	—	●	—	●	—	—	—	—	6"	D19
RA (1,2)	Nose mount, spring extend, cap adjustable stroke	—	—	—	●	—	●	—	●	—	—	—	—	6"	D20
AP (1,2)	Pivot mount, spring return, head adjustable stroke	—	—	—	●	—	●	—	●	—	—	—	—	6"	D21
AR (1,2)	Air reservoirs	—	—	—	●	—	●	—	●	—	●	—	—	12"	D34
BRN (2)	Rear block mount, single acting,	—	●	—	●	—	●	—	●	—	—	—	—	6"	D22
BRR (2)	Rear block mount, single acting, spring return	—	—	—	●	—	●	—	●	—	—	—	—	6"	D23
BFD (2)	Front block mount, double acting	●	●	—	●	—	●	—	●	—	—	—	—	12"	D24
BRD (2)	Rear block mount, double acting	—	●	—	●	—	●	—	●	—	—	—	—	12"	D25
BFN (2)	Front block mount, single acting spring return	—	●	—	●	—	●	—	●	—	—	—	—	6"	D26
BFR (2)	Front block mount, single acting spring extend	—	—	—	●	—	●	—	●	—	—	—	—	6"	D27
TRN (2)	Rear trunnion mount, single acting, spring return	—	●	—	●	—	●	—	●	—	—	—	—	6"	D28
TRR (2)	Rear trunnion mount, single acting spring extend	—	—	—	●	—	●	—	●	—	—	—	—	6"	D29
TFD (2)	Front trunnion mount, double acting	—	●	—	●	—	●	—	●	—	—	—	—	12"	D30
TRD (2)	Rear trunnion mount, double acting	—	●	—	●	—	●	—	●	—	—	—	—	12"	D31
TFN (2)	Front trunnion mount, single acting spring return	—	●	—	●	—	●	—	●	—	—	—	—	6"	D32
TFR (2)	Front trunnion mount, single acting spring extend	—	—	—	●	—	●	—	●	—	—	—	—	6"	D33

▲ Recommended maximum stroke is 4" in models N, P, R & RP.
1 Not available on SRM (magnetic piston) cylinders.
2 Not available on SRD/DM (Delrin caps) cylinders.
3 Recommended maximum stroke is 4" for 5/16" bore models.
4 Max stroke 12" for bore sizes under 3/4"; 32" for bore sizes 3/4" and up.
5 Max stroke 6" for bore sizes under 3/4"; 12" for bore sizes 3/4" and up.

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Standard Specifications

- 304 stainless steel cylinder body.
- Aluminum heads and caps.
- Stainless steel piston rods are standard up to 1.50" bore.
- Nominal pressure rating 250 psi for SR and SRM
  100 psi for SRD/SRDM
- Standard temperature -10°F to +165°F for SR
  +14°F to +140°F for SRM
  +32°F to +160°F for SRD/SRDM

In line with our policy of continuing product improvement, the specifications in this catalog are subject to change without notice.

- Twelve bore sizes — 5/16" through 3" (see table for SRM and SRD/DM exclusions).
- 28 standard mounting styles (not all available on SRM and SRD/SRDM – see table on previous page).
- Single and double acting
- Bumpers
- Adjustable cushions
- Rod wipers

For additional mounting styles please consult factory.

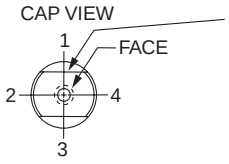
For detailed information regarding the properties of Delrin® contact Dupont.

Port Locations

Mounting Style	Standard Head Port Location	Standard Cap Port Location	Standard Vent Location
AR	Face	Face	None
BFR	2	None	2
BFN	None	Face	2
BRD	2	2	None
BFD	2	Face	None
BRR	2	None	2
BRN	None	2	2
TFR	1	None	1
TFN	None	Face	1
TRD	1	1	None
TFD	1	Face	None
TRR	1	None	1
TRN	None	1	1
AP	None	2	2
RA	2	None	2
A	None	Face	2
KDXH	2	2	None
KDX	2	2	None
DX	2	2	None
DXP	2	2	None
DP	2	2	None
D	2	Face	None
RP	2	None	2
R	2	None	2
P	None	2	2
NRP	None	2	2
NR	None	Face	2
N	None	Face	2

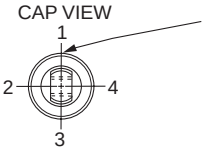
End View of Mountings for Port Location

Mounting Styles N, NR, D, R, AR



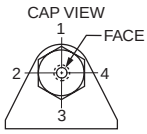
Standard location for cushion adjustment needle when cushions are specified on D mounts.

Mounting Styles P, RP, DXP, NRP, DP, AP

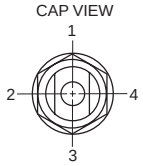


Standard location for cushion adjustment needle when cushions are specified on DXP mounts.

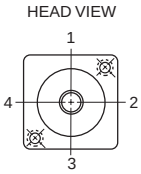
Mounting Style A



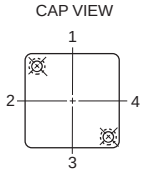
Mounting Style RA



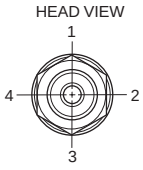
Mounting Styles BFD, BFN, BFR



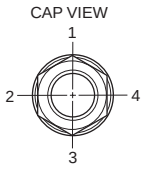
Mounting Styles BRN, BRR, BRD



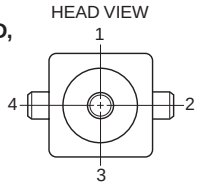
Mounting Styles KDXH, KDX



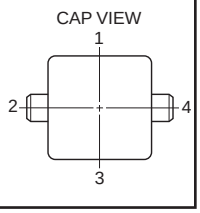
Mounting Style DX



Mounting Styles TFD, TFN, TFR



Mounting Styles TRN, TRR, TRD



Cylinders will have ports at these locations unless otherwise specified.

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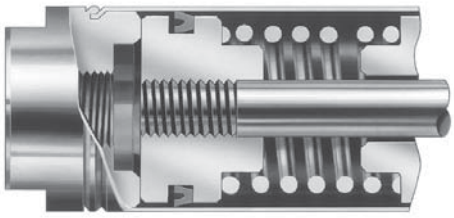
Port Size — Rod Diameter — Spring Force Data

Bore Size	Port Size	Rod Diameter (or Hex)	Force Factor		Spring Return (lbs)		Spring Extend (lbs)	
			Push	Pull	Normal	Extended	Normal	Extended
.31 (5/16")	#10-32	1/8"	0.08	0.06	0.5	1	0.5	1
.44 (7/16")	#10-32	3/16"	0.15	0.12	1	2	1	2
.56 (9/16")	#10-32	3/16"	0.25	0.22	2	4	2	4
.75 (3/4")	1/8 NPTF	1/4"	0.44	0.39	3	6	3	6
.88 (7/8")	1/8 NPTF	1/4"	0.60	0.55	3	6	3	6
1.06 (1-1/16")	1/8 NPTF	5/16"*	0.89	0.81	3†	6†	7.5	15
1.25 (1-1/4")	1/8 NPTF	7/16"	1.23	1.08	7.5	15	7.5	15
1.50 (1-1/2")	1/8 NPTF	7/16"	1.77	1.62	6†	12†	9	18
1.75 (1-3/4")	1/4 NPTF	1/2"	2.40	2.21	11	24	11	24
2.00 (2")	1/4 NPTF	5/8"	3.14	2.84	15	30	15	30
2.50 (2-1/2")	1/4 NPTF	5/8"	4.91	4.60	N/A	N/A	N/A	N/A
3.00 (3")	3/8 NPTF	3/4"	7.07	6.63	N/A	N/A	N/A	N/A

* Non-rotating version uses $^3/_8$" hex.

† Block mount and trunnion mount spring return lbs. equals spring extend lbs.

Springs — shot peened music wire for high cycle life. Spring spacers are provided for every one inch of stroke (1/2" for 5/16" and 7/16" bores) to insure uniform spring rate and prevent spring failure.



Option Availability

Option	Bumpers	Fluorocarbon Seals	Rod Wipers	Cushions	Delrin® End Caps
Bumpers	—	◆	◆	X	◆
Fluorocarbon Seals	—	—	X	S	◆
Rod Wiper	—	—	—	◆	◆
Cushions	—	—	—	—	X

◆ = Available Options
S = Available as Special
X = Not Available

Delrin® is a registered trademark of Dupont.

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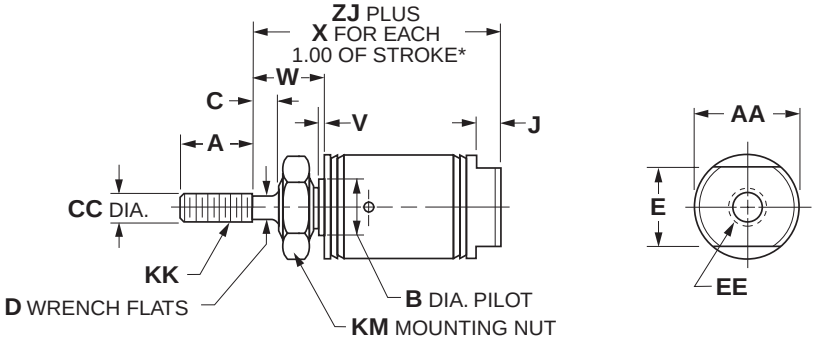
Mounting Style N
Nose Mount, Spring Return

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.



Bore	SR	SRM	Std. Strokes (in)	Max Stroke (in)	SS Rod Std
5/16"	●		1/2, 1, 1-1/2, 2, 2-1/2, 3, 4	4	✓
7/16"	●		1/2, 1, 1-1/2, 2, 2-1/2, 3, 4	6	✓
9/16"	●	●	1/2, 1, 1-1/2, 2, 3, 4	6	✓
3/4"	●	●	1/2, 1, 1-1/2, 2, 3, 4	6	✓
7/8"	●		1/2, 1, 1-1/2, 2, 3, 4	6	✓
1-1/16"	●	●	1/2, 1, 1-1/2, 2, 3, 4	6	✓
1-1/4"	●	●	1/2, 1, 2, 3, 4	6	✓
1-1/2"	●	●	1/2, 1, 2, 3, 4	6	✓
1-3/4"	●	●	1/2, 1, 1-1/2, 2, 2-1/2, 3, 4	6	
2"	●	●	–	4	

Bore	A	AA	B	C	CC	D	E	EE	J	KK	KM	V	W	X	ZJ	
															SR	SRM
5/16"	0.38	0.36	–	–	0.125	–	0.36	#10-32	–	#5-40 UNC	1/4-28	0	0.25	0.75**	1.12	–
7/16"	0.50	0.50	0.374	–	0.188	–	0.38	#10-32	0.19	#10-32 UNF	3/8-24	0.05	0.31	0.94**	1.31	–
9/16"	0.50	0.62	0.437	–	0.188	–	0.50	#10-32	0.19	#10-32 UNF	7/16-20	0.06	0.38	1.62	1.53	1.76
3/4"	0.50	0.81	0.499	–	0.250	–	0.62	1/8 NPTF	0.19	1/4-28 UNF	1/2-20	0.09	0.44	1.69	1.50	1.75
7/8"	0.50	0.93	0.624	–	0.250	–	0.62	1/8 NPTF	0.19	1/4-28 UNF	5/8-18	0.09	0.50	1.56	1.84	–
1-1/16"	0.50	1.12	0.624	0.12	0.312	0.25	0.88	1/8 NPTF	0.19	5/16-24 UNF	5/8-18	0.09	0.62	1.56	2.06	2.31
1-1/4"	0.75	1.34	0.749	0.25	0.437	0.38	0.88	1/8 NPTF	0.25	7/16-20 UNF	3/4-16	0.09	0.88	1.81	2.66	2.78
1-1/2"	0.75	1.56	0.749	0.25	0.437	0.38	0.88	1/8 NPTF	0.25	7/16-20 UNF	3/4-16	0.09	0.88	1.69	2.44	2.69
1-3/4"	0.88	1.84	1.031	0.38	0.500	7/16	1.25	1/4 NPTF	0.25	1/2-20 UNF	1-14	0.09	0.75	2.0	2.97	3.09
2"	0.88	2.08	1.374	0.38	0.625	0.50	1.25	1/4 NPTF	0.31	1/2-20 UNF	1-1/4-12	0.12	1.19	–	▲	▲

▲ 5.66" for 1" stroke; 7.66" for 2" stroke; 8.91" for 3" stroke; 11.84" for 4" stroke.

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract a half inch.

** For each 0.50" of stroke

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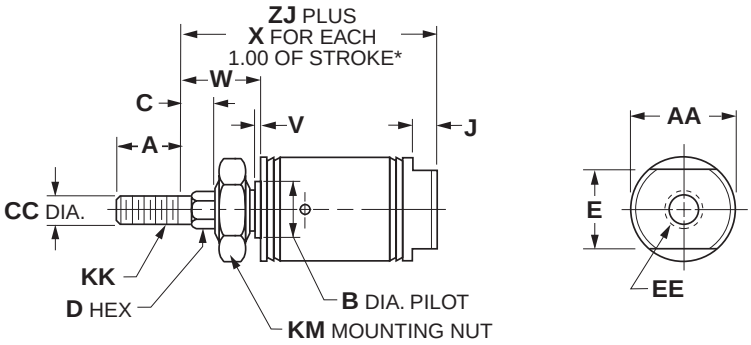
D

Mounting Style NR
Nose Mount, Spring Return, Hex Rod

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.



Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
7/16"	●		1/2, 1, 1-1/2, 2, 3, 4	6	✓
9/16"	●	●	1/2, 1, 1-1/2, 2, 3, 4	6	✓
3/4"	●	●	1/2, 1, 1-1/2, 2, 3, 4	6	✓
7/8"	●		1/2, 1, 1-1/2, 2, 3, 4	6	✓
1-1/16"	●	●	1/2, 1, 1-1/2, 2, 3, 4	6	✓
1-1/4"	●	●	1, 2, 3, 4	6	✓
1-1/2"	●	●	1/2, 1, 2, 3, 4	6	✓
1-3/4"	●	●	1/2, 1, 1-1/2, 2, 2-1/2, 3, 4	6	

Bore	A	AA	B	C	CC	D	E	EE	J	KK	KM	V	W	X	ZJ	
															SR	SRM
7/16"	0.50	–	0.374	0.25	0.188	3/16	–	#10-32	0.19	#10-32 UNF	3/8-24	0.05	0.56	0.94	1.56	–
9/16"	0.50	–	0.437	0.25	0.188	3/16	–	#10-32	0.19	#10-32 UNF	7/16-20	0.06	0.62	1.62	1.78	2.03
3/4"	0.50	–	0.499	0.25	0.250	1/4	–	1/8 NPTF	0.19	1/4-28 UNF	1/2-20	0.09	0.69	1.69	1.75	2.00
7/8"	0.50	–	0.624	0.25	0.250	1/4	–	1/8 NPTF	0.19	1/4-28 UNF	5/8-18	0.09	0.75	1.56	2.09	–
1-1/16"	0.50	1.12	0.624	0.25	0.312	3/8	0.88	1/8 NPTF	0.19	5/16-24 UNF	5/8-18	0.09	0.75	1.56	2.19	2.44
1-1/4"	0.88	1.34	0.749	0.25	0.437	7/16	0.88	1/8 NPTF	0.25	7/16-20 UNF	3/4-16	0.09	0.88	1.81	2.66	2.78
1-1/2"	0.88	1.56	0.749	0.38	0.437	7/16	0.88	1/8 NPTF	0.25	7/16-20 UNF	3/4-16	0.09	1.00	1.69	2.56	2.81
1-3/4"	0.88	1.84	1.031	0.38	0.500	1/2	1.25	1/4 NPTF	0.25	1/2-20 UNF	1-14	0.09	1.12	2.0	3.03	3.15

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

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Mounting Style NRP
Pivot & Nose Mount, Spring Return, Hex Rod

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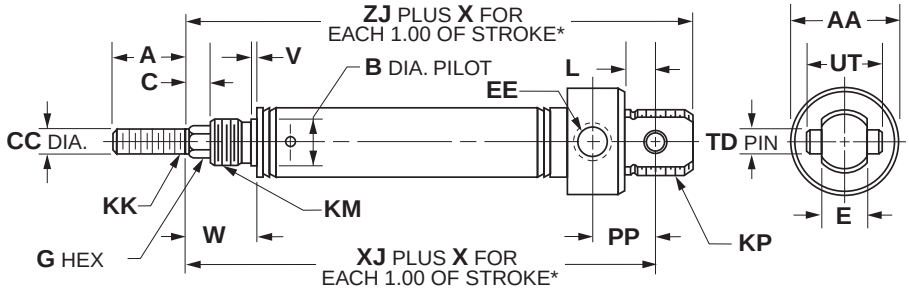
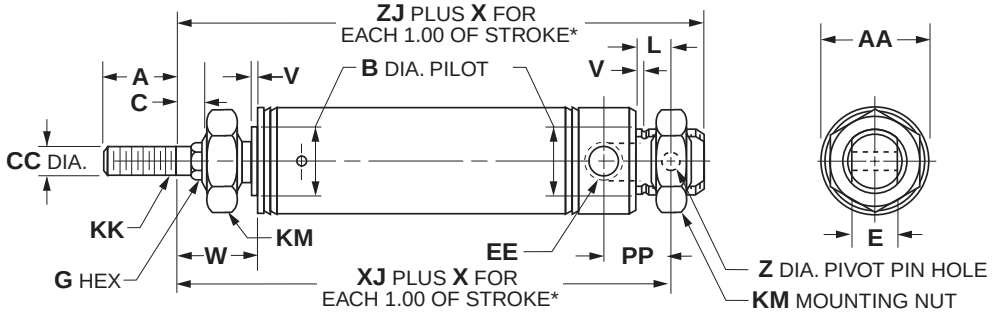


Bore Sizes
7/16" * 3/4"



Bore Sizes
9/16" *
7/8" *
11/16" *
11/4"
11/2" *
13/4"

*No Mounting Nuts

Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std	A	AA	B	C	CC	E	EE
7/16"	●		1/2, 1, 1-1/2, 2, 3, 4	6	✓	0.50	0.74	0.374	0.25	0.188	0.31	#10-32
9/16"	●	●	1/2, 1, 1-1/2, 2, 3, 4	6	✓	0.50	0.62	0.437	0.25	0.188	0.31	#10-32
3/4"	●	●	1, 2, 3, 4	6	✓	0.50	0.86	0.499	0.25	0.250	0.38	1/8 NPTF
7/8"	●		1, 2, 3, 4	6	✓	0.50	0.93	0.624	0.25	0.250	0.38	1/8 NPTF
1-1/16"	●	●	1, 2, 3, 4	6	✓	0.50	1.12	0.624	0.25	0.312	0.38	1/8 NPTF
1-1/4"	●	●	1, 2, 3, 4	6	✓	0.88	1.34	0.749	0.25	0.437	0.50	1/8 NPTF
1-1/2"	●	●	1, 2, 3, 4	6	✓	0.88	1.56	0.749	0.38	0.437	0.62	1/8 NPTF
1-3/4"	●	●	1/2, 1, 1-1/2, 2, 2-1/2, 3, 4	6		0.88	1.84	1.031	0.38	0.500	0.62	1/4 NPTF

Bore	G HEX	KK	KM	KP	L	PP	TD	UT	V	W	X	XJ		Z	ZJ	
												SR	SRM		SR	SRM
7/16"	3/16	#10-32 UNF	3/8-24	7/16-20 UNF	0.25	0.44	0.156	0.50	0.05	0.56	0.94	2.00	–	–	2.25	–
9/16"	3/16	#10-32 UNF	7/16-20	7/16-20 UNF	0.25	0.38	–	–	0.06	0.62	1.62	2.06	2.31	0.157	2.25	2.50
3/4"	1/4	1/4-28 UNF	1/2-20	5/8-18 UNF	0.34	0.62	0.250	0.75	0.09	0.69	1.69	2.53	2.78	–	2.81	3.06
7/8"	1/4	1/4-28 UNF	5/8-18	5/8-18 UNF	0.34	0.62	0.250	0.75	0.09	0.75	1.56	2.72	–	–	3.00	–
1-1/16"	3/8	5/16-24 UNF	5/8-18	5/8-18 UNF	0.34	0.62	0.250	0.75	0.09	0.75	1.56	2.78	3.03	–	3.06	3.31
1-1/4"	7/16	7/16-20 UNF	3/4-16	–	0.41	0.78	0.251	–	0.09	0.88	1.81	3.38	3.50	0.251	3.78	3.91
1-1/2"	7/16	7/16-20 UNF	3/4-16	–	0.50	0.81	0.375	1.00	0.09	1.00	1.69	3.25	3.50	–	3.62	3.87
1-3/4"	1/2	1/2-20 UNF	1-14	–	0.50	1.12	0.376	0.62	0.09	1.12	2.0	4.09	4.21	0.376	4.59	4.71

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

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Mounting Style P
Pivot Mount, Spring Return

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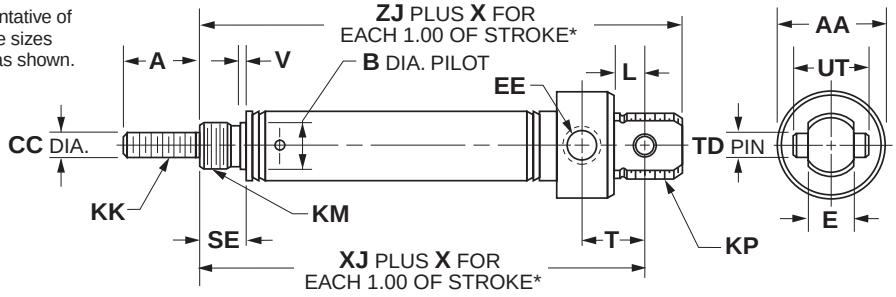
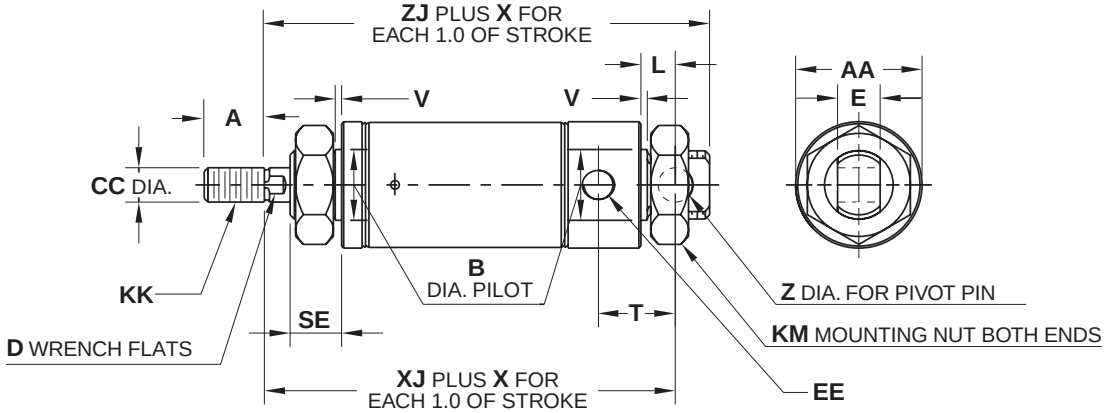


Bore Sizes
5/16"*
7/16"
3/4"

*With Mounting Nuts



Bore Sizes
9/16"*
7/8"*
1-1/16"*
1-1/4"
1-1/2"*
1-3/4"
2" *

*No Mounting Nuts

Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std	A	AA	B	CC	D	E	EE
5/16"	●		1/2, 1, 1-1/2, 2, 3, 4	4	✓	0.38	0.39	–	0.125	–	0.25	#10-32
7/16"	●		1/2, 1, 1-1/2, 2, 3, 4	6	✓	0.50	0.74	0.374	0.188	–	0.31	#10-32
9/16"	●	●	1/2, 1, 1-1/2, 2, 3, 4	6	✓	0.50	0.62	0.437	0.188	–	0.31	#10-32
3/4"	●	●	1/2, 1, 1-1/2, 2, 3, 4	6	✓	0.50	0.86	0.499	0.250	–	0.38	1/8 NPTF
7/8"	●		1/2, 1, 1-1/2, 2, 3, 4	6	✓	0.50	0.93	0.624	0.250	–	0.38	1/8 NPTF
1-1/16"	●	●	1/2, 1, 1-1/2, 2, 3, 4	6	✓	0.50	1.12	0.624	0.312	0.25	0.38	1/8 NPTF
1-1/4"	●	●	1, 2, 3, 4	6	✓	0.75	1.34	0.749	0.437	0.38	0.50	1/8 NPTF
1-1/2"	●	●	1, 2, 3, 4	6	✓	0.75	1.56	0.749	0.437	0.38	0.62	1/8 NPTF
1-3/4"	●	●	1/2, 1, 1-1/2, 2, 2-1/2, 3, 4	6		0.88	1.84	1.031	0.500	7/16	0.62	1/4 NPTF
2"	●	●	–	4		0.88	2.08	1.374	0.625	0.50	0.75	1/4 NPTF

Bore	KK	KM	KP	L	SE	T	TD	UT	V	X	XJ		Z	ZJ	
											SR	SRM		SR	SRM
5/16"	#5-40 UNC	3/8-24	–	0.34	0.25	0.34	–	–	–	0.75	1.52	–	0.125	1.68	–
7/16"	#10-32 UNF	3/8-24	7/16-20 UNF	0.25	0.31	0.44	0.156	0.50	0.05	0.94	1.75	–	–	2.00	–
9/16"	#10-32 UNF	7/16-20	7/16-20 UNF	0.25	0.38	0.38	–	–	0.06	1.62	1.81	2.06	0.157	2.00	2.25
3/4"	1/4-28 UNF	1/2-20	5/8-18 UNF	0.34	0.44	0.62	0.250	0.75	0.09	1.69	2.28	2.53	–	2.56	2.81
7/8"	1/4-28 UNF	5/8-18	5/8-18 UNF	0.34	0.50	0.62	0.250	0.75	0.09	1.56	2.47	–	–	2.75	–
1-1/16"	5/16-24 UNF	5/8-18	5/8-18 UNF	0.34	0.50	0.62	0.250	0.75	0.09	1.56	2.66	2.91	–	2.94	3.19
1-1/4"	7/16-20 UNF	3/4-16	–	0.41	0.63	0.78	–	–	0.09	1.81	3.38	3.91	0.251	3.78	3.50
1-1/2"	7/16-20 UNF	3/4-16	–	0.50	0.63	0.81	0.375	1.00	0.09	1.81	3.12	3.37	–	3.50	3.75
1-3/4"	1/2-20 UNF	1-14	–	0.50	0.75	1.12	–	–	0.09	2.0	4.03	4.15	0.376	4.53	4.65
2"	1/2-20 UNF	1-1/4-12	–	0.56	0.81	1.03	–	–	0.12	–	■	✷	–	▲	◆

■ 6.34" for 1" stroke, 8.34" for 2" stroke, 9.59" for 3" stroke, 12.53" for 4" stroke*

▲ 6.78" for 1" stroke, 8.78" for 2" stroke, 10.03" for 3" stroke, 12.97" for 4" stroke*

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract a half inch.

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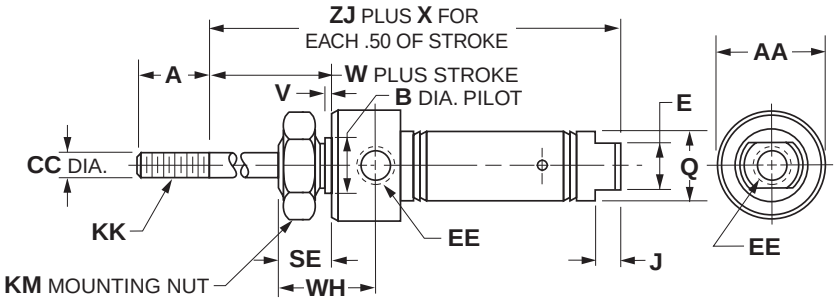
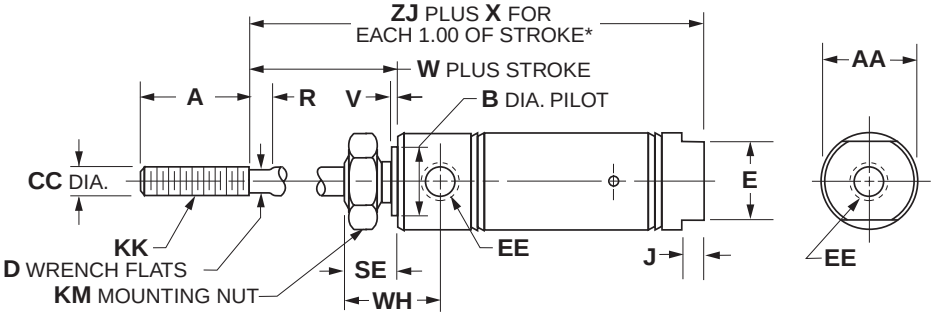
Mounting Style R
Nose Mount, Spring Extended

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.



Bore Sizes
5/16"
7/16"
3/4"



Bore Sizes
9/16"
7/8"
1-1/16"
1-1/4"
1-1/2"
1-3/4"
2" *

*No Mounting Nut

Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std	A	AA	B	CC	D	E
5/16"	●		1/2, 1, 1-1/2, 2, 2-1/2, 3	4	✓	0.38	0.50 SQ.	–	0.125	–	–
7/16"	●		1/2, 1, 1-1/2, 2, 3	6	✓	0.50	0.74	0.437	0.188	–	0.38
9/16"	●	●	1/2, 1, 1-1/2, 2, 3	6	✓	0.50	0.62	0.437	0.188	–	0.50
3/4"	●	●	1/2, 1, 2, 3, 4	6	✓	0.50	0.86	0.624	0.250	–	–
7/8"	●		1/2, 1, 2, 3, 4	6	✓	0.50	0.93	0.624	0.250	–	–
1-1/16"	●	●	1/2, 1, 1-1/2, 2, 3, 4	6	✓	0.50	1.12	0.624	0.312	0.25	–
1-1/4"	●	●	1, 2, 3, 4	6	✓	0.75	1.34	0.749	0.437	0.38	–
1-1/2"	●	●	1, 2, 3, 4	6	✓	1.25	1.56	0.749	0.437	0.38	0.88
1-3/4"	●	●	1/2, 1, 1-1/2, 2, 2-1/2, 3, 4	6		0.88	1.84	1.031	0.500	7/16	–
2"	●	●	–	4		0.88	2.08	1.374	0.625	0.50	–

Bore	EE	J	KK	KM	Q	R	SE	V	W	WH	X	ZJ	
												SR	SM
5/16"	#10-32	–	#5-40 UNC	3/8-24	0.36	–	0.31	–	0.31	0.47	1.25	1.49	–
7/16"	#10-32	0.19	#10-32 UNF	7/16-20	0.50	–	0.38	0.05	0.38	0.72	1.44	1.94	–
9/16"	#10-32	0.19	#10-32 UNF	7/16-20	0.62	–	0.38	0.05	0.38	0.78	2.62	2.00	2.25
3/4"	1/8 NPTF	–	1/4-28 UNF	5/8-18	0.81	–	0.50	0.09	0.50	0.97	2.69**	2.31	2.56
7/8"	1/8 NPTF	–	1/4-28 UNF	5/8-18	–	–	0.50	0.09	0.50	0.97	2.56	2.31	–
1-1/16"	1/8 NPTF	–	5/16-24 UNF	5/8-18	–	0.12	0.50	0.09	0.62	1.06	2.81	2.62	2.87
1-1/4"	1/8 NPTF	–	7/16-20 UNF	3/4-16	–	0.25	0.62	0.09	0.88	1.38	2.81	3.47	3.60
1-1/2"	1/8 NPTF	0.25	7/16-20 UNF	3/4-16	–	0.25	0.62	0.09	0.88	1.25	3.00	3.19	3.44
1-3/4"	1/4 NPTF	–	1/2-20 UNF	1-14	–	–	0.75	0.09	1.06	1.63	3.0	4.03	4.15
2"	1/4 NPTF	–	1/2-20 UNF	1-1/4-12	–	0.38	0.81	0.12	1.19	1.47	–	▲	◆

▲ 7.11" for 1" stroke, 10.11" for 2" stroke, 12.34" for 3" stroke, 16.34" for 4" stroke.*

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

** For each 1.00" of stroke.

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Mounting Style RP
Pivot and Nose Mount, Spring Extended

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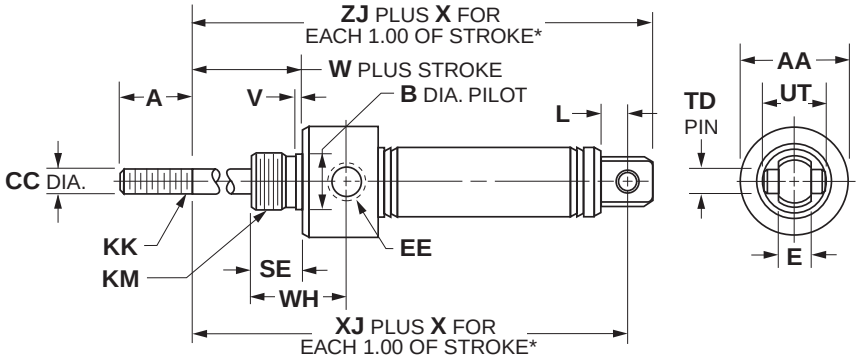
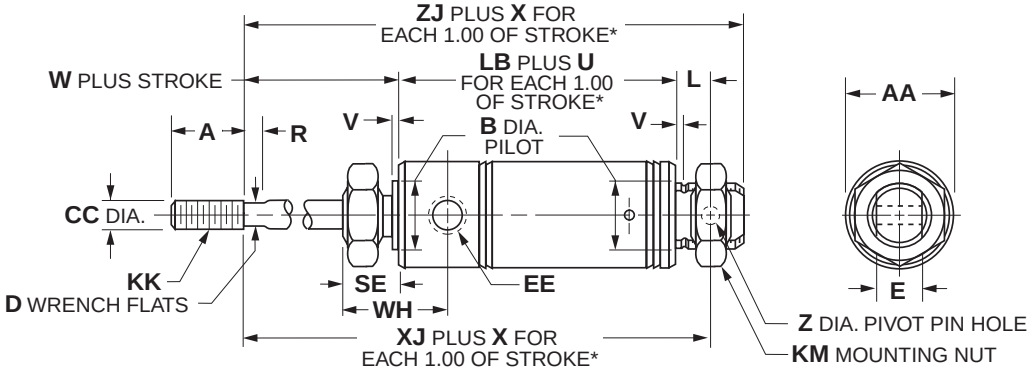


Bore Sizes
5/16"*
7/16"
3/4"

*With Mounting Nuts



Bore Sizes
9/16"*
7/8"*
1-1/16"*
1-1/4"
1-1/2"*
1-3/4"
2" *

*No Mounting Nuts

Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std	A	AA	B	CC	D	E	EE	KK
5/16"	●		1/2, 1, 1-1/2, 2, 2-1/2, 3	4	✓	0.38	0.50 SQ.	–	0.125	–	0.25	#10-32	#5-40 UNC
7/16"	●		1/2, 1, 1-1/2, 2, 3	6	✓	0.50	0.74	0.437	0.188	–	0.31	#10-32	#10-32 UNF
9/16"	●	●	1/2, 1, 1-1/2, 2, 3	6	✓	0.50	0.62	0.437	0.188	–	0.31	#10-32	#10-32 UNF
3/4"	●	●	1/2, 1, 2, 3, 4	6	✓	0.50	0.86	0.624	0.250	–	0.38	1/8 NPTF	1/4-28 UNF
7/8"	●		1/2, 1, 2, 3, 4	6	✓	0.50	0.93	0.624	0.250	–	0.38	1/8 NPTF	1/4-28 UNF
1-1/16"	●	●	1/2, 1, 1- 1/2, 2, 3, 4	6	✓	0.50	1.12	0.624	0.312	0.25	0.38	1/8 NPTF	5/16-24 UNF
1-1/4"	●	●	1, 2, 3, 4	6	✓	0.75	1.34	0.749	0.437	0.38	0.50	1/8 NPTF	7/16-20 UNF
1-1/2"	●	●	1, 2, 3, 4	6	✓	1.25	1.56	0.749	0.437	0.38	0.62	1/8 NPTF	7/16-20 UNF
2"	●	●	–	4		.88	2.08	1.374	0.625	0.50	0.75	1/4 NPTF	1/2-20 UNF

Bore	KM	L	LB	R	SE	TD	U	UT	V	W	WH	X	XJ		Z	ZJ	
													SR	SRM		SR	SRM
5/16"	3/8-24	0.19	–	–	0.31	–	–	–	–	0.31	0.47	1.25	1.88	–	–	2.04	–
7/16"	7/16-20	0.25	–	–	0.38	0.156	–	0.50	0.05	0.38	0.72	1.44	2.38	–	–	2.62	–
9/16"	7/16-20	0.25	–	–	0.38	–	–	–	0.06	0.38	0.78	2.62	2.28	2.53	0.157	2.47	2.72
3/4"	5/8-18	0.34	–	–	0.50	0.250	–	0.75	0.09	0.50	0.97	2.69	2.44	2.69	–	2.72	2.97
7/8"	5/8-18	0.34	–	–	0.50	0.250	–	0.75	0.09	0.50	0.97	2.56	2.63	–	–	2.91	–
1-1/16"	5/8-18	0.34	–	0.12	0.50	0.250	–	0.75	0.09	0.62	1.06	2.81	2.78	3.03	–	3.06	3.31
1-1/4"	3/4-16	0.41	2.47	0.25	0.62	–	1.81	–	0.09	0.88	1.38	2.81	3.78	3.91	0.251	4.16	4.28
1-1/2"	3/4-16	0.50	–	0.25	0.62	0.375	–	1.00	0.09	0.88	1.25	3.00	3.88	4.13	–	4.25	4.50
2"	1-1/4 -12	0.56	–	0.38	0.81	–	–	–	0.12	1.19	1.47	–	■	✷	0.376	▲	◆

■ 8.05" for 1" stroke, 11.05" for 2" stroke, 13.28" for 3" stroke, 17.28" for 4" stroke*

▲ 8.50" for 1" stroke, 11.50" for 2" stroke, 13.72" for 3" stroke, 17.72" for 4" stroke*

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

Parker Hannifin Corporation
Pneumatic Division
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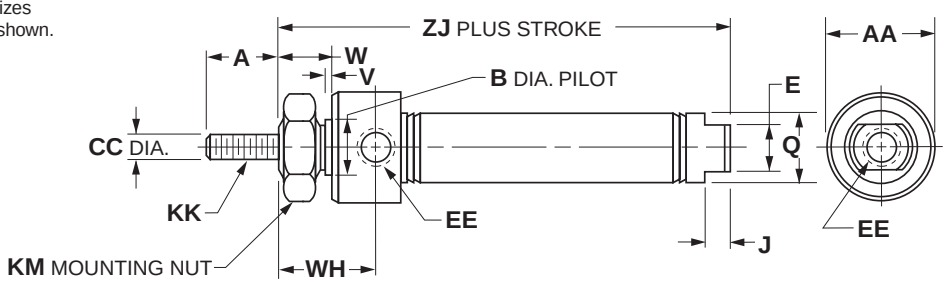
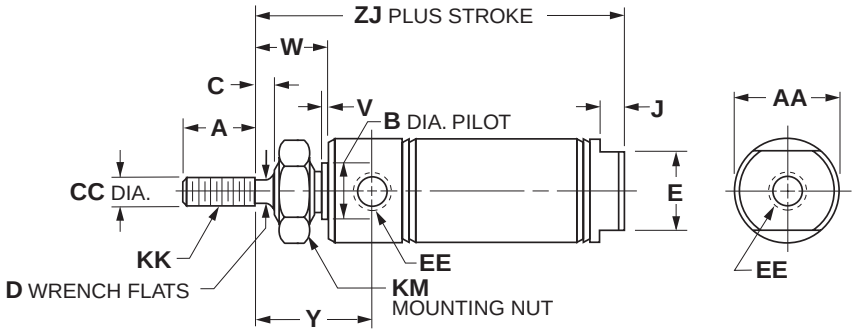
C086

Mounting Style D
Nose Mount, Double Acting

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.



Bore Sizes
5/16"
7/16"
3/4"



Bore Sizes
9/16"
7/8"
1-1/16"
1-1/4"
1-1/2"
1-3/4"
2" *
2-1/2" *
3" *

*No Mounting Nuts

Bore	SR	SRM	SRD SRDM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std	A	AA	B	C	CC
5/16"	●			1/2, 1, 1-1/2, 2, 2-1/2, 3, 4	4	✓	0.38	0.50 SQ.	–	–	0.125
7/16"	●			1/2, 1, 1-1/2, 2, 3, 4	12	✓	0.50	0.74	0.437	–	0.188
9/16"	●	●	●	1/2, 1, 1-1/2, 2, 3, 4	12	✓	0.50	0.62	0.437	–	0.188
3/4"	●	●	●	1/2, 1, 2, 2-1/2, 3, 4, 5, 6, 8, 10	12	✓	0.50	0.86	0.624	–	0.250
7/8"	●			1/2, 1, 2, 3, 4, 5, 6	12	✓	0.50	0.93	0.624	–	0.250
1-1/16"	●	●	●	1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6, 8, 10, 12	12	✓	0.50	1.12	0.624	0.12	0.312
1-1/4"	●	●		1, 2, 3, 4, 5, 6	12	✓	0.75	1.34	0.749	0.25	0.437
1-1/2"	●	●	●	1/2, 1, 2, 3, 4, 5, 6, 8, 10, 12	12	✓	0.75	1.56	0.749	0.25	0.437
1-3/4"	●	●		1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6	12		0.88	1.84	1.031	0.31	0.500
2"	●	●	●	–	12		0.88	2.08	1.374	0.38	0.625
2-1/2"	●	●		–	12		0.88	2.62	1.500	0.38	0.625
3"	●			–	12		1.25	3.16	1.630	0.38	0.750

Bore	D	E	EE	J	KK	KM	Q	V	W	WH	Y	ZJ	
												SR	SRM
5/16"	–	–	#10-32	–	#5-40 UNC	3/8-24	0.36	–	0.31	0.47	–	1.64	–
7/16"	–	0.38	#10-32	0.19	#10-32 UNF	7/16-20	0.50	0.05	0.38	0.72	–	2.12	–
9/16"	–	0.50	#10-32	0.19	#10-32 UNF	7/16-20	–	0.06	0.38	0.78	–	2.28	2.53
3/4"	–	0.62	1/8 NPTF	0.19	1/4-28 UNF	5/8-18	0.81	0.09	0.50	0.97	–	2.97	2.97
7/8"	–	0.62	1/8 NPTF	0.19	1/4-28 UNF	5/8-18	–	0.09	0.50	0.97	–	2.94	–
1-1/16"	0.25	0.88	1/8 NPTF	0.19	5/16-24 UNF	5/8-18	–	0.09	0.62	–	1.19	3.25	3.41
1-1/4"	0.38	0.88	1/8 NPTF	0.25	7/16-20 UNF	3/4-16	–	0.09	0.88	–	1.62	4.00	4.03
1-1/2"	0.38	0.88	1/8 NPTF	0.25	7/16-20 UNF	3/4-16	–	0.09	0.88	–	1.50	3.69	3.94
1-3/4"	7/16	1.25	1/4 NPTF	0.25	1/2-20 UNF	1-14	–	0.09	1.06	1.63	–	4.69	4.69
2"	0.50	1.25	1/4 NPTF	0.31	1/2-20 UNF	1-1/4-12	–	0.12	1.19	–	1.84	4.69	4.97
2-1/2"	1/2	1.75	1/4 NPTF	0.31	1/2-20 UNF	1-3/8-12	–	0.13	1.19	–	1.84	4.69	4.69
3"	5/8	2.00	3/8 NPTF	0.31	5/8-18 UNF	1-1/2-12	–	0.19	1.38	–	2.09	5.25	–

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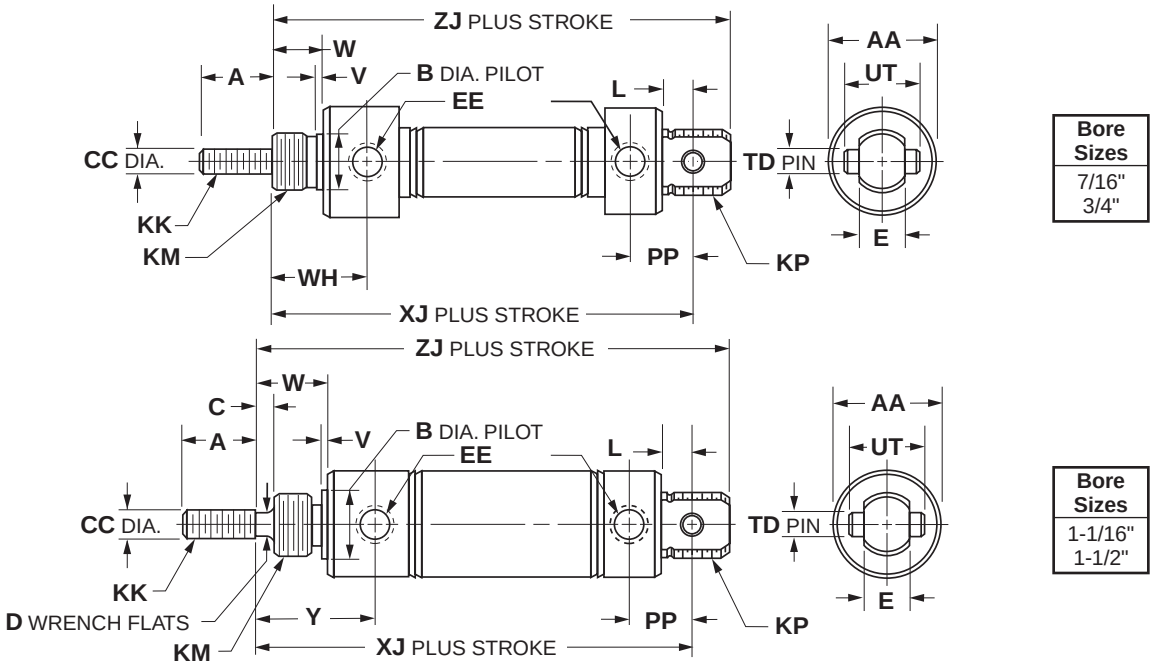
D

Mounting Style DP
Pivot and Nose Mount, Double Acting, Pivot Pin

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.



Bore Sizes
7/16"
3/4"

Bore Sizes
1-1/16"
1-1/2"

Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod	A	AA	B	CC	D	E
7/16"	●		1/2, 1, 1-1/2, 2, 3, 4	12	✓	0.50	0.74	0.437	0.188	–	0.31
3/4"	●	●	1/2, 1, 2, 2-1/2, 3, 4, 5, 6, 8, 10	12	✓	0.50	0.86	0.624	0.250	–	0.38
1-1/16"	●	●	1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6, 8, 10, 12	12	✓	0.50	1.12	0.624	0.312	0.25	0.38
1-1/2"	●	●	1, 2, 3, 4, 5, 6, 8, 10, 12	12	✓	0.75	1.56	0.749	0.437	0.38	0.62

Bore	EE	KK	KM	KP	L	PP	TD	UT	V	W	WH	XJ		Y	ZJ	
												SR	SRM		SR	SRM
7/16"	#10-32	#10-32 UNF	7/16-20	7/16-20 UNF	0.25	0.44	0.156	0.50	0.05	0.38	0.72	2.56	–	–	2.81	–
3/4"	1/8 NPTF	1/4-28 UNF	5/8-18	5/8-18 UNF	0.34	0.62	0.250	0.75	0.09	0.50	0.97	3.75	3.75	–	4.03	4.03
1-1/16"	1/8 NPTF	5/16-24 UNF	5/8-18	5/8-18 UNF	0.34	0.62	0.250	0.75	0.09	0.62	–	3.84	4.00	1.19	4.12	4.28
1-1/2"	1/8 NPTF	7/16-20 UNF	3/4-16	–	0.50	0.81	0.375	1.00	0.09	0.87	–	4.38	4.63	1.50	4.75	5.00

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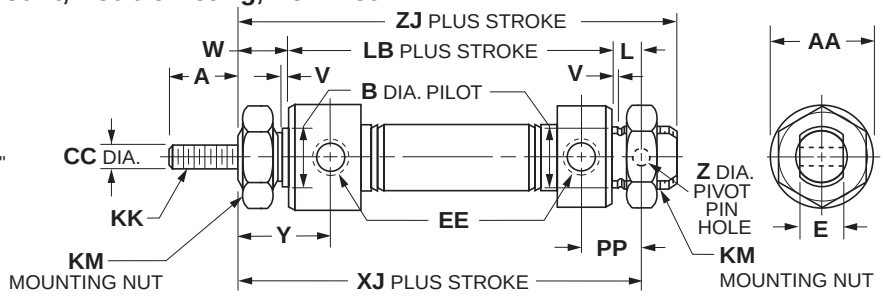
Mounting Style DXP

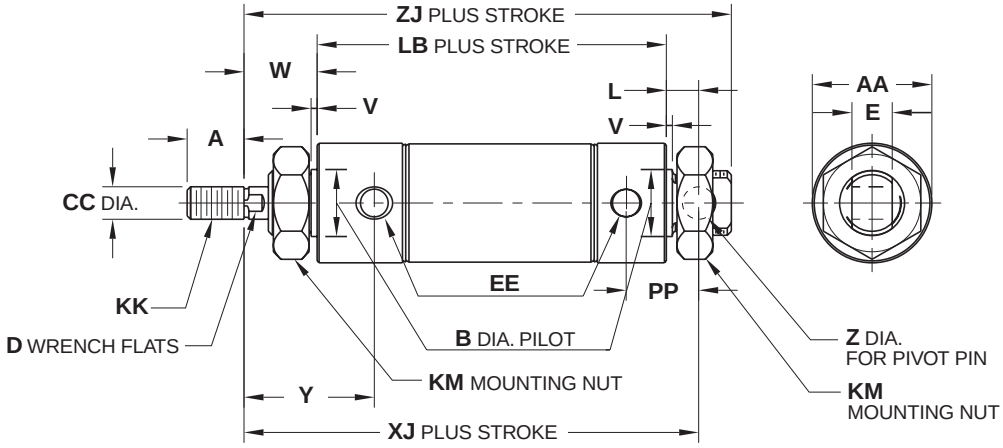
Pivot & Nose Mount, Double Acting, No Pivot Pin

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.

NOTE: Strokes over 12" must be supported at both ends.



Bore Sizes
5/16"
7/16"
3/4"



Bore Sizes
9/16"*
7/8"
1-1/16"
1-1/4"
1-1/2"
1-3/4"
2" *
2-1/2" *
3" *

*No Mounting Nuts

Bore	SR	SRM	SRD SRDM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std	A	AA	B	CC	D	E
5/16"	●			1/2, 1, 1-1/2, 2, 2-1/2, 3, 4	4	✓	0.38	0.50 SQ.	–	0.125	–	0.25
7/16"	●			1/2, 1, 1-1/2, 2, 3, 4	12	✓	0.50	0.74	0.437	0.188	–	0.31
9/16"	●	●	●	1/2, 1, 1-1/2, 2, 3, 4	12	✓	0.50	0.62	0.437	0.188	–	0.31
3/4"	●	●	●	1, 2, 3, 4, 5, 6, 8, 10	32	✓	0.50	0.86	0.624	0.250	–	0.38
7/8"	●			1, 2, 3, 4, 5, 6, 8, 10	32	✓	0.50	0.93	0.624	0.250	–	0.38
1-1/16"	●	●	●	1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6, 8, 10, 12	32	✓	0.50	1.12	0.624	0.312	0.25	0.38
1-1/4"	●	●		1, 2, 3, 4, 5, 6, 7, 8, 10, 12	32	✓	0.75	1.34	0.749	0.437	0.38	0.50
1-1/2"	●	●	●	–	32	✓	0.75	1.56	0.749	0.437	0.38	0.62
1-3/4"	●	●		1, 2, 3, 4, 5, 6, 8, 10, 12	32		0.88	1.84	1.031	0.500	7/16	0.62
2"	●	●	●	–	32		0.88	2.08	1.374	0.625	0.50	0.75
2-1/2"	●	●		–	32		0.88	2.62	1.500	0.625	1/2	0.75
3"	●			–	32		1.25	3.16	1.630	0.750	5/8	0.88

Bore	EE	KK	KM	L	LB	PP	V	W	XJ		Y	Z	ZJ	
									SR	SRM			SR	SRM
5/16"	#10-32	#5-40 UNC	3/8-24	0.19	–	0.34	–	0.31	2.03	–	–	0.125	2.19	–
7/16"	#10-32	#10-32 UNF	7/16-20	0.25	1.94	0.44	0.05	0.38	2.56	–	0.72	0.157	2.81	–
9/16"	#10-32	#10-32 UNF	7/16-20	0.25	–	0.38	0.06	0.38	2.56	2.81	0.78	0.157	2.75	3.00
3/4"	1/8 NPTF	1/4-28 UNF	5/8-18	0.34	2.91	0.62	0.09	0.50	3.75	3.75	0.97	0.251	4.03	4.03
7/8"	1/8 NPTF	1/4-28 UNF	5/8-18	0.34	–	0.62	0.09	0.50	3.56	–	0.97	0.251	3.84	–
1-1/16"	1/8 NPTF	5/16-24 UNF	5/8-18	0.34	–	0.62	0.09	0.62	3.84	–	1.19	0.251	4.12	4.28
1-1/4"	1/8 NPTF	7/16-20 UNF	3/4-16	0.41	–	0.78	0.09	0.88	4.72	4.75	1.62	0.251	5.12	5.16
1-1/2"	1/8 NPTF	7/16-20 UNF	3/4-16	0.50	–	0.81	0.09	0.88	4.38	4.63	1.50	0.376	4.75	5.00
1-3/4"	1/4 NPTF	1/2-20 UNF	1-14	0.50	4.19	1.12	0.09	1.06	5.75	5.75	1.94	0.376	6.25	6.25
2"	1/4 NPTF	1/2-20 UNF	1-1/4-12	0.56	–	1.03	0.12	1.19	5.62	5.91	–	0.376	6.06	6.34
2-1/2"	1/4 NPTF	1/2-20 UNF	1-3/8-12	0.56	–	1.03	0.13	1.19	5.62	5.62	1.84	0.376	6.06	6.06
3"	3/8 NPTF	5/8-18 UNF	1-1/2-12	0.81	–	1.34	0.19	1.38	6.50	–	2.09	0.500	7.12	–

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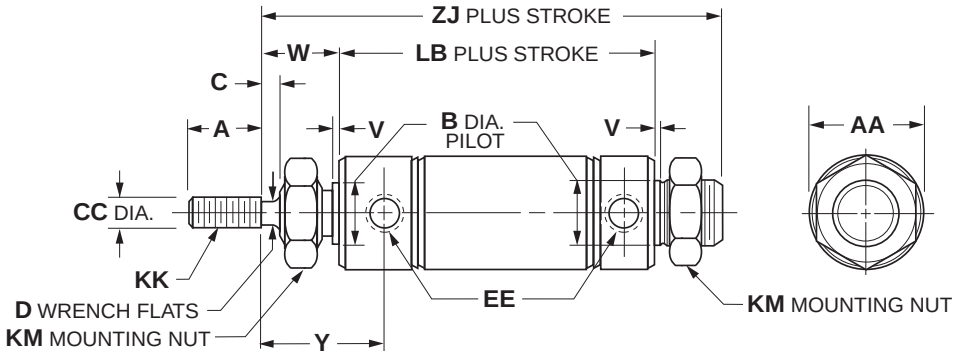
D

Mounting Style DX
Threaded Both Ends, Double Acting

Drawing represents 1-1/2" bore size. For other sizes, reference art for DXP on previous page.



Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
7/16" *	●		1/2, 1, 1-1/2, 2, 3, 4	12	✓
9/16" *	●	●	1/2, 1, 1-1/2, 2, 3, 4	12	✓
3/4" *	●	●	1, 2, 3, 4, 5, 6, 8, 10	32	✓
7/8" *	●	●	1, 2, 3, 4, 5, 6, 8, 10	32	✓
1-1/16" *	●	●	1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6, 8, 10, 12	32	✓
1-1/4" *	●	●	1, 2, 3, 4, 5, 6, 7, 8, 10, 12	32	✓
1-1/2"	●	●	1, 2, 3, 4, 5, 6, 8, 10, 12	32	✓
2" *	●	●	–	32	

Bore	A	AA	B	C	CC	D	EE	KK	KM	LB		V	W	Y	ZJ	
										SR	SRM				SR	SRM
7/16" *	0.50	0.74	0.437	–	0.188	–	#10-32	#10-32 UNF	7/16-20	1.94		0.05	0.38	0.72	2.81	
9/16" *	0.50	0.62	0.437	–	0.188	–	#10-32	#10-32 UNF	7/16-20	–		0.06	0.38	0.78	2.75	
3/4" *	0.50	0.86	0.624	–	0.250	–	1/8 NPTF	1/4-28 UNF	5/8-18	2.91		0.09	0.50	0.97	4.03	
7/8" *	0.50	0.93	0.624	–	0.250	–	1/8 NPTF	1/4-28 UNF	5/8-18	–		0.09	0.50	0.97	3.84	
1-1/16" *	0.50	1.12	0.624	0.12	0.312	0.25	1/8 NPTF	5/16-24 UNF	5/8-18	–		0.09	0.62	1.19	4.12	
1-1/4" *	0.75	0.34	0.749	0.25	0.437	0.38	1/8 NPTF	7/16-20 UNF	3/4-16	–		0.09	0.88	1.62	5.12	
1-1/2"	0.75	1.56	0.749	0.25	0.437	0.38	1/8 NPTF	7/16-20 UNF	3/4-16	3.00		0.09	0.88	1.50	4.50	
2" *	0.88	2.08	1.374	0.38	0.625	0.50	1/4 NPTF	1/2-20 UNF	1-1/4-12	–		0.12	1.19	–	6.06	

* Available upon request.
Please consult factory.

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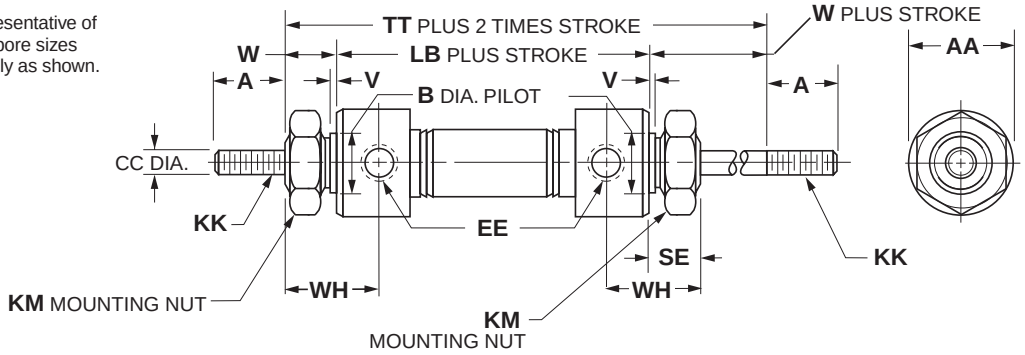
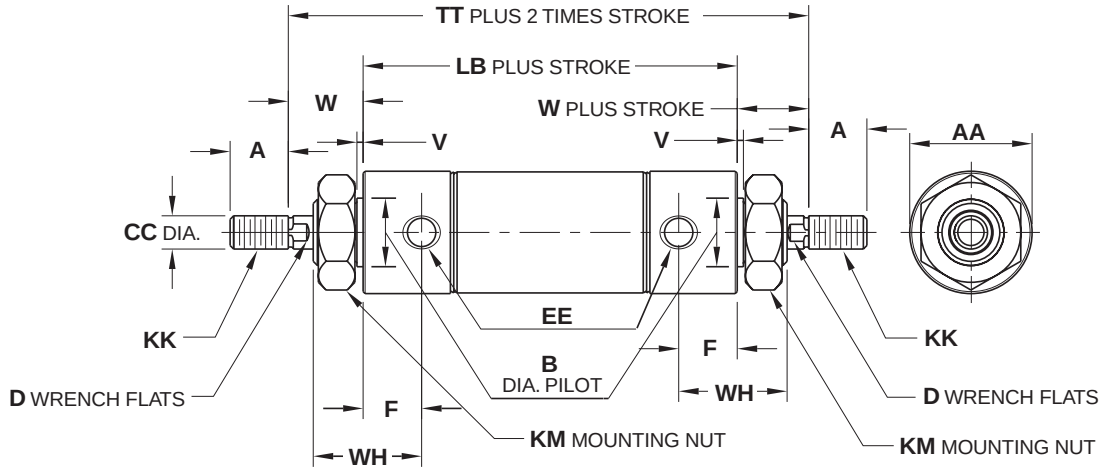
Mounting Style KDX
Threaded Both Ends, Double Acting, Double Rod

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.



Bore Sizes
7/16"
3/4"



Bore Sizes
9/16"
7/8"
1-1/16"
1-1/4"
1-1/2"
1-3/4"
2" *
2-1/2" *
3" *

*No Mounting Nut

Bore	SR	SRM	SRD SRDM	Std. Stroke (in)	Max Stroke (in)	SS Rod	A	AA	B	CC
7/16"	●			1/2, 1, 1-1/2, 2, 3, 4	6	✓	0.50	0.74	0.437	0.188
9/16"	●	●	●	1/2, 1, 1-1/2, 2, 3, 4	6	✓	0.50	0.62	0.437	0.188
3/4"	●	●	●	1, 2, 3, 4, 5, 6	12	✓	0.50	0.86	0.624	0.250
7/8"	●			1, 2, 3, 4, 6	12	✓	0.50	0.93	0.624	0.250
1-1/16"	●	●	●	1, 2, 3, 4, 5, 6	12	✓	0.50	1.12	0.624	0.312
1-1/4"	●	●		1, 2, 3, 4, 5, 6	12	✓	0.75	1.34	0.749	0.437
1-1/2"	●	●	●	1, 2, 3, 4, 5, 6	12	✓	0.75	1.56	0.749	0.437
1-3/4"	●	●		1, 2, 3, 4, 5, 6	12	✓	0.88	1.84	1.031	0.500
2"	●	●	●	–	12	✓	0.88	2.08	1.374	0.625
2-1/2"	●	●		–	18	✓	0.88	2.62	1.500	0.625
3"	●			–	12	✓	1.25	3.16	1.630	0.750

Bore	D	EE	F	KK	KM	LB		SE	TT		V	W	WH
						SR	SRM		SR	SRM			
7/16"	–	#10-32	0.34	#10-32 UNF	7/16-20	2.06	–	0.38	2.81	–	0.05	0.38	0.72
9/16"	–	#10-32	0.40	#10-32 UNF	7/16-20	2.19	2.44	0.38	2.94	3.19	0.06	0.38	0.78
3/4"	–	1/8 NPTF	0.47	1/4-28 UNF	5/8-18	3.00	3.00	0.50	4.00	4.00	0.09	0.50	0.97
7/8"	–	1/8 NPTF	0.47	1/4-28 UNF	5/8-18	2.91	–	0.50	3.91	–	0.09	0.50	0.97
1-1/16"	0.25	1/8 NPTF	0.56	5/16-24 UNF	5/8-18	2.75	3.28	0.50	4.00	4.53	0.09	0.62	1.19
1-1/4"	0.38	1/8 NPTF	0.75	7/16-20 UNF	3/4-16	3.81	3.84	0.63	5.56	5.59	0.09	0.88	1.62
1-1/2"	0.38	1/8 NPTF	0.62	7/16-20 UNF	3/4-16	3.38	3.63	0.63	5.12	5.38	0.09	0.88	1.50
1-3/4"	7/16	1/4 NPTF	0.88	1/2-20 UNF	1-14	4.44	4.44	0.75	6.56	6.56	0.09	1.06	1.63
2"	0.50	1/4 NPTF	0.65	1/2-20 UNF	1-1/4-12	4.19	4.47	–	6.56	6.84	0.12	1.19	1.84
2-1/2"	1/2	1/4 NPTF	0.65	1/2-20 UNF	1-3/8-12	4.19	4.19	–	6.56	6.56	0.13	1.19	1.84
3"	5/8	3/8 NPTF	0.71	5/8-18 UNF	1-1/2-12	4.56	–	–	7.31	–	0.19	1.38	1.72

Parker Hannifin Corporation
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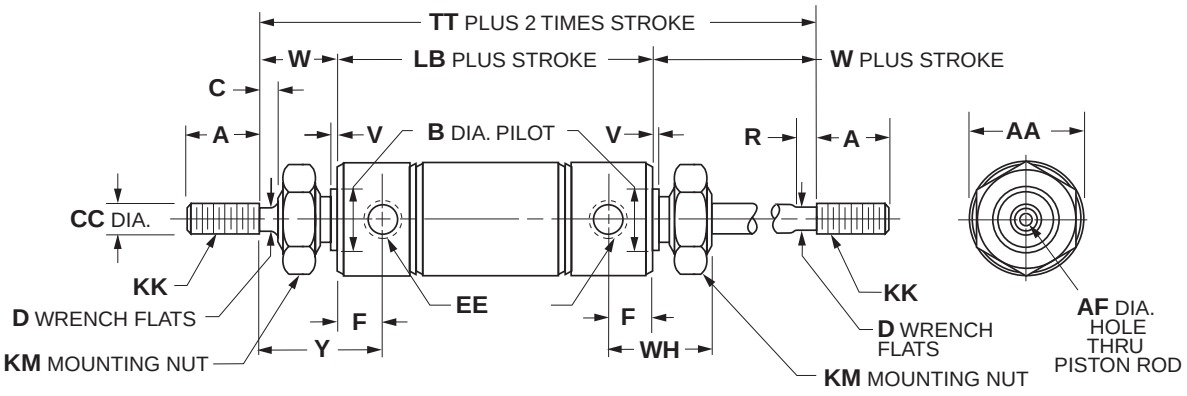
Mounting Style KDXH
Threaded Both Ends, Double Rod, Hollow Rod

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.

D



Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod	A	AA	AF	B	C	CC
1-1/16"	●	●	1, 2, 3, 4, 5, 6	12	N/A	0.50	1.12	0.187	0.624	0.12	0.312
1-1/4"	●	●	1, 2, 3, 4, 5, 6	12	N/A	0.75	1.34	0.250	0.749	0.25	0.437
1-1/2"	●	●	1, 2, 3, 4, 5, 6	12	N/A	0.75	1.56	0.250	0.749	0.25	0.437
1-3/4"	●	●	1, 2, 3, 4, 5, 6	12	N/A	0.88	1.84	0.328	1.031	0.38	0.500

Bore	D	EE	F	KK	KM	LB		R	TT		V	W	WH	Y
						SR	SRM		SR	SRM				
1-1/16"	0.25	1/8 NPTF	0.56	5/16-24 UNF	5/8-18	2.75	3.28	0.12	4.00	4.53	0.09	0.62	1.06	1.19
1-1/4"	0.38	1/8 NPTF	0.75	7/16-20 UNF	3/4-16	3.81	3.84	0.25	5.56	5.59	0.09	0.88	1.38	1.62
1-1/2"	0.38	1/8 NPTF	0.62	7/16-20 UNF	3/4-16	3.38	3.63	0.25	5.12	5.38	0.09	0.88	1.25	1.50
1-3/4"	7/16	1/4 NPTF	0.88	1/2-20 UNF	1-14	4.44	4.44	–	6.56	6.56	0.09	1.06	1.63	1.63

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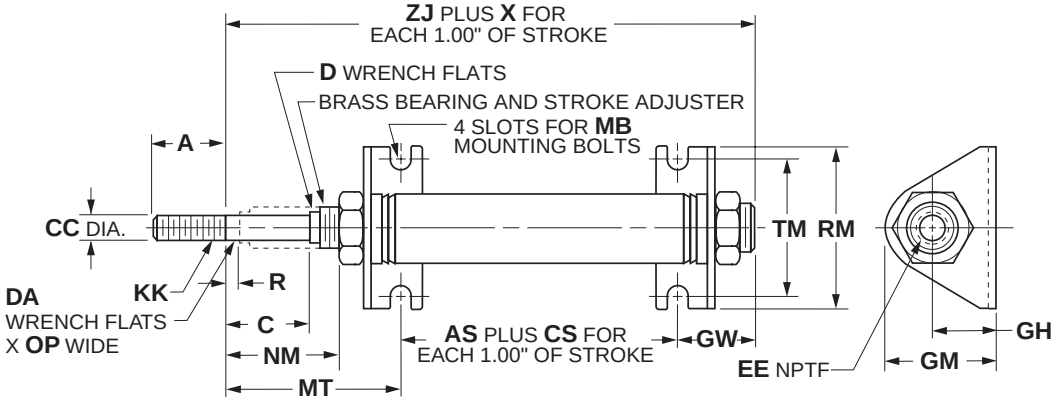
Mounting Style A
Nose Mount, Spring Return, Head Adjustable Stroke

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.



Bore	SR	SRM	Std. Stroke	Max Stroke (in)	SS Rod Std
3/4"	●		Stroke adjustment in 1" increments to 3": 1" stroke adjusts 0-1" 2" stroke adjusts 1-2" 3" stroke adjusts 2-3"	6	✓
1-1/16"	●			6	✓
1-1/2"	●			6	✓

Bore	A	AS	C	CC	CS	D	EE	GH	GM	GW
3/4"	0.50	–	1.19	0.250	1.69	–	1/8 NPTF	0.81	1.38	0.88
1-1/16"	0.50	0.32	1.25	0.312	1.56	0.25	1/8 NPTF	0.81	1.38	0.93
1-1/2"	0.75	0.19	1.25	0.437	2.00	0.62	1/8 NPTF	1.00	1.78	1.25

Bore	KK	MB	MT	NM	OP	R	RM	TM	X	ZJ
3/4"	1/4-28 UNF	0.250	2.38	1.44	–	0.19	1.88	1.50	1.69	3.12
1-1/16"	5/16-24 UNF	0.250	2.38	1.44	0.12	0.25	1.88	1.50	1.56	3.63
1-1/2"	7/16-20 UNF	0.250	2.56	1.50	–	0.25	2.50	1.88	2.00	4.00

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D

Mounting Style RA
Nose Mount, Spring Return, Cap Adjustable Stroke

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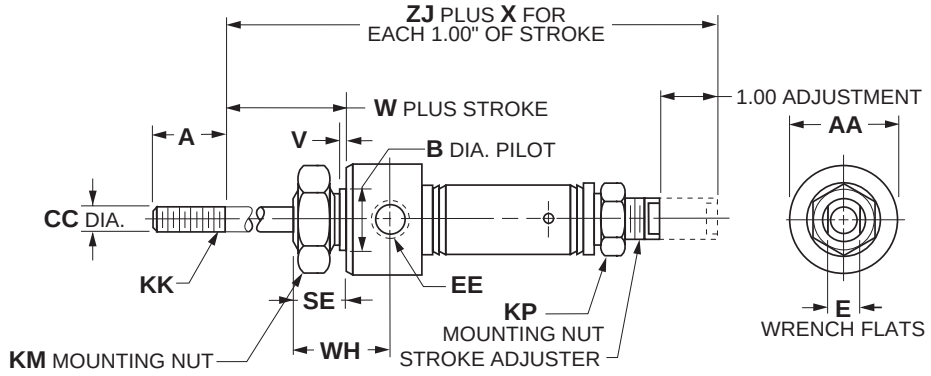
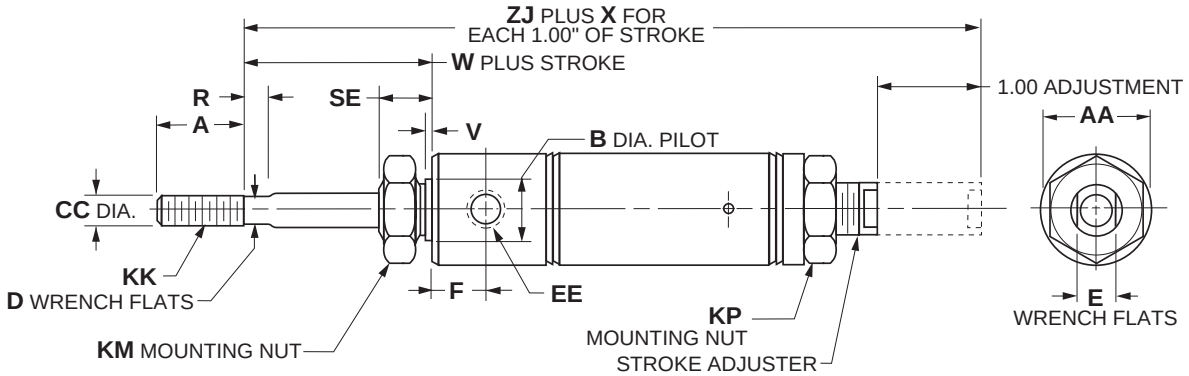


Bore Sizes
3/4"



Bore Sizes
1-1/16"
1-1/2"

Bore	SR	SRM	Std. Stroke	Max Stroke (in)	SS Rod Std
3/4"	●		Stroke adjustment in 1" increments to 3":	6	✓
1-1/16"	●		1" stroke adjusts 0-1"	6	✓
1-1/2"	●		2" stroke adjusts 1-2"	6	✓
			3" stroke adjusts 2-3"		

Bore	A	AS	AA	B	CC	D	E	EE	F
3/4"	0.50	1.69	0.86	0.624	0.250	–	0.34	1/8 NPTF	–
1-1/16"	0.50	0.32	1.12	0.624	0.312	0.25	0.50	1/8 NPTF	0.56
1-1/2"	1.25	0.19	1.56	0.749	0.437	0.38	0.62	1/8 NPTF	0.62

3/4"	KK	KM	SE	R	V	W	WH	X	ZJ
1-1/16"	1/4-28 UNF	5/8-18	0.50	–	0.09	0.53	0.97	2.69	3.78
1-1/2"	5/16-24 UNF	5/8-18	0.50	0.12	0.09	0.50	–	2.56	4.03
1-1/2"	7/16-20 UNF	3/4-16	0.62	0.25	0.09	0.88	–	2.00	5.81

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Mounting Style AP
Pivot Mount, Spring Return, Head Adjustable Stroke

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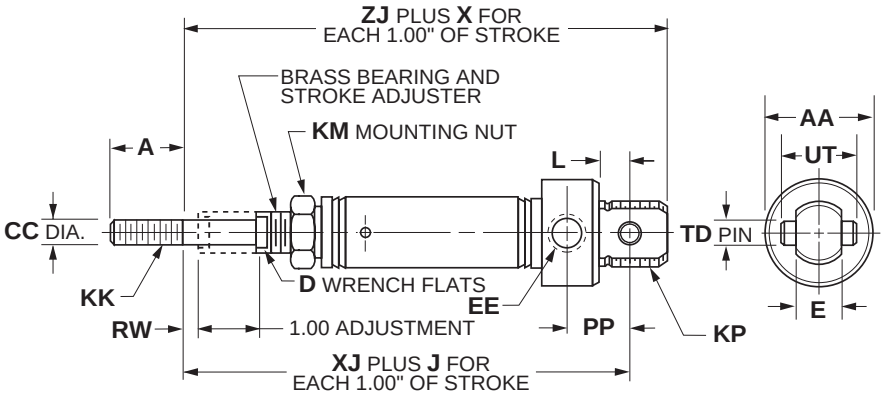
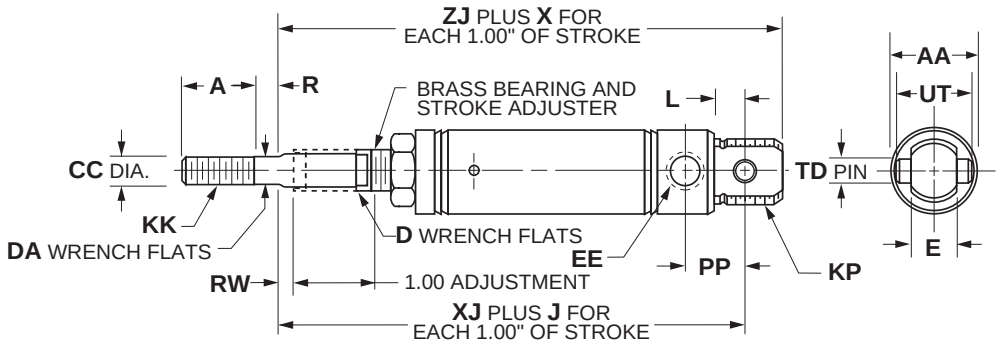


Bore Sizes
3/4"



Bore Sizes
1-1/16"
1-1/2"

Bore	SR	SRM	Std. Stroke	Max Stroke (in)	SS Rod Std
3/4"	●		Stroke adjustment in 1" increments to 3": 1" stroke adjusts 0-1" 2" stroke adjusts 1-2" 3" stroke adjusts 2-3"	6	✓
1-1/16"	●			6	✓
1-1/2"	●			6	✓

Bore	A	AA	CC	D	DA	E	EE	J	KK
3/4"	0.50	0.86	0.250	0.34	–	0.38	1/8 NPTF	1.69	1/4-28 UNF
1-1/16"	0.50	1.12	0.312	0.50	0.25	0.38	1/8 NPTF	1.56	5/16-24 UNF
1-1/2"	0.75	1.56	0.437	0.62	0.38	0.62	1/8 NPTF	2.00	7/16-20 UNF

Bore	KM	KP	L	OP	PP	R	RW	TD	UT	X	XJ	ZJ
3/4"	7/16-20	5/8-18 UNF	0.34	–	0.62	0.19	0.19	0.250	0.75	1.69	3.65	3.93
1-1/16"	–	5/8-18 UNF	0.34	0.25	0.62	0.12	0.25	0.250	0.75	1.56	3.97	4.25
1-1/2"	3/4-16	–	0.50	–	0.81	0.25	0.25	0.375	1.00	2.00	4.31	4.69

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Mounting Style BRN
Rear Block Mount, Single Acting, Spring Return

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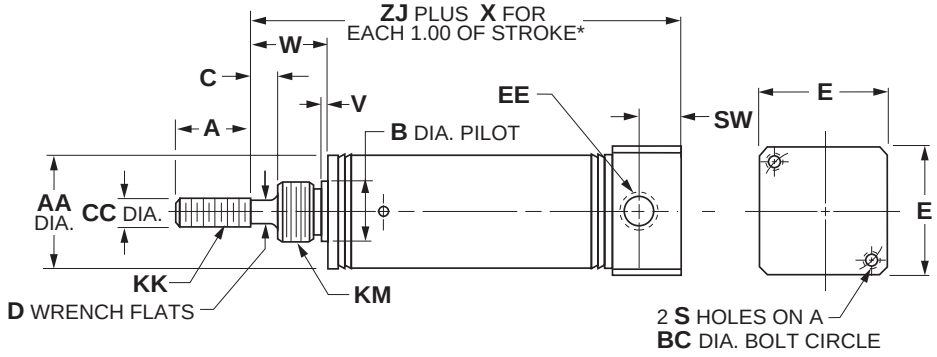
D



Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
7/16"	●		1/2, 1, 2, 3, 4	6	✓
3/4"	●	●	1, 2, 3, 4	6	✓
1-1/16"	●	●	1, 2, 3, 4	6	✓
1-1/2"	●	●	1, 2, 3, 4	6	✓

Bore	A	AA	B	C	CC	D	E	EE
7/16"	0.50	0.5	0.374	–	0.188	–	0.75	#10-32
3/4"	0.75	0.81	0.499	0.25	0.250	0.22	1.00	1/8 NPTF
1-1/16"	0.75	1.12	0.624	0.38	0.312	0.25	1.25	1/8 NPTF
1-1/2"	1.25	1.56	0.749	0.25	0.437	0.38	1.75	1/4 NPTF

Bore	KK	KM	SW	V	W	X	ZJ	
							SR	SRM
7/16"	#10-32 UNF	3/8-24	0.38	0.05	0.31	0.94	1.62	–
3/4"	1/4-28 UNF	1/2-20	0.44	0.09	0.62	1.69	2.31	2.56
1-1/16"	5/16-24 UNF	5/8-18	0.44	0.09	0.88	1.81	2.81	3.06
1-1/2"	7/16-20 UNF	3/4-16	0.62	0.09	0.88	2.00	3.06	3.31

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

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Mounting Style BRR
Rear Block Mount, Single Acting, Spring Extend

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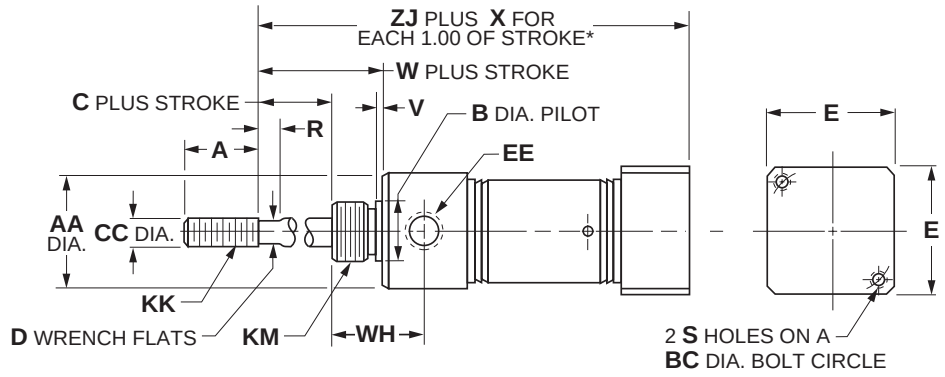

Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
3/4"	●	●	1, 2, 3, 4	6	✓
1-1/16"	●	●	1, 2, 3, 4	6	✓
1-1/2"	●	●	1, 2, 3, 4	6	✓

Bore	A	AA	B	BC	C	CC	D	E	EE
3/4"	0.75	0.86	0.624	1.00	0.25	0.250	0.22	1.00	1/8 NPTF
1-1/16"	0.75	1.12	0.624	1.25	0.38	0.312	0.25	1.25	1/8 NPTF
1-1/2"	1.25	1.56	0.749	1.75	0.25	0.437	0.38	1.75	1/4 NPTF

Bore	KK	KM	R	S	V	W	WH	X	ZJ	
									SR	SRM
3/4"	1/4-28 UNF	5/8-18	0.25	#10-32 UNF	0.09	0.75	0.97	2.69	3.22	3.47
1-1/16"	5/16-24 UNF	5/8-18	0.25	#10-32 UNF	0.09	0.88	1.06	2.81	3.53	3.78
1-1/2"	7/16-20 UNF	3/4-16	0.25	1/4-20 UNC	0.09	0.88	1.25	3.00	3.88	4.13

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

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Mounting Style BFD
Front Block Mount, Double Acting

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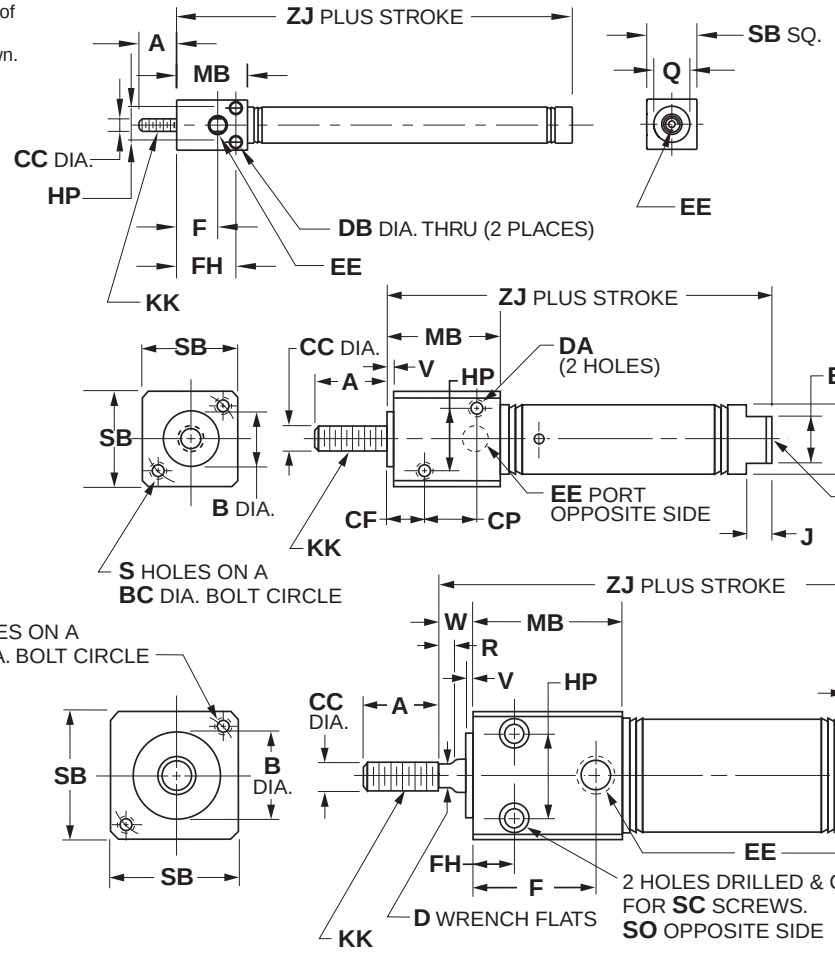

Bore Sizes
5/16"

Bore Sizes
7/16"

Bore Sizes
3/4"
1-1/16"
1-1/2"

Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std	A	AA	B	BC	CC
5/16"	●		1/2, 1, 1-1/2, 2, 2-1/2, 3, 4	4	✓	0.38	–	–	–	0.125
7/16"	●		1/2, 1, 1-1/2, 2, 3, 4	12	✓	0.50	0.50	0.437	0.75	0.188
3/4"	●	●	1/2, 1, 2, 3, 4, 5, 6	12	✓	0.75	0.81	0.624	1.00	0.250
1-1/16"	●	●	1, 2, 3, 4, 5, 6	12	✓	0.75	1.12	0.750	1.25	0.312
1-1/2"	●	●	1, 2, 3, 4, 5, 6	12	✓	1.25	1.56	1.00	1.75	0.437

Bore	CF	CP	D	DA	DB	E	EE	F	FH	HP	J
5/16"	–	–	–	–	0.11	–	#10-32	0.41	0.59	0.34	–
7/16"	0.31	0.44	–	#8-32	–	0.38	#10-32	–	0.31	0.44	0.19
3/4"	–	–	0.22	–	–	0.62	1/8 NPTF	0.88	0.38	0.62	0.19
1-1/16"	–	–	0.25	–	–	0.88	1/8 NPTF	1.16	0.62	0.81	0.19
1-1/2"	–	–	0.38	–	–	0.88	1/4 NPTF	1.53	0.88	1.12	0.25

Bore	KK	MB	Q	R	S	SB	SC	SO	V	W	ZJ	
											SR	SRM
5/16"	#5-40 UNC	0.71	0.36	–	–	0.50 SQ	–	–	–	–	1.72	–
7/16"	#10-32 UNF	0.88	–	–	#8-32 UNC	0.75	–	–	0.062	–	2.12	–
3/4"	1/4-28 UNF	1.12	–	–	#10-32 UNF	1.00	#10-32	1/4-20 UNC	0.093	0.34	3.22	3.22
1-1/16"	5/16-24 UNF	1.41	–	0.25	#10-32 UNF	1.25	#10-32	1/4-20 UNC	0.093	0.47	3.75	3.91
1-1/2"	7/16-20 UNF	1.88	–	–	1/4-20 UNC	1.75	1/4-20	5/16-18 UNC	0.125	0.38	4.19	4.44

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Mounting Style BRD
Rear Block Mount, Double Acting

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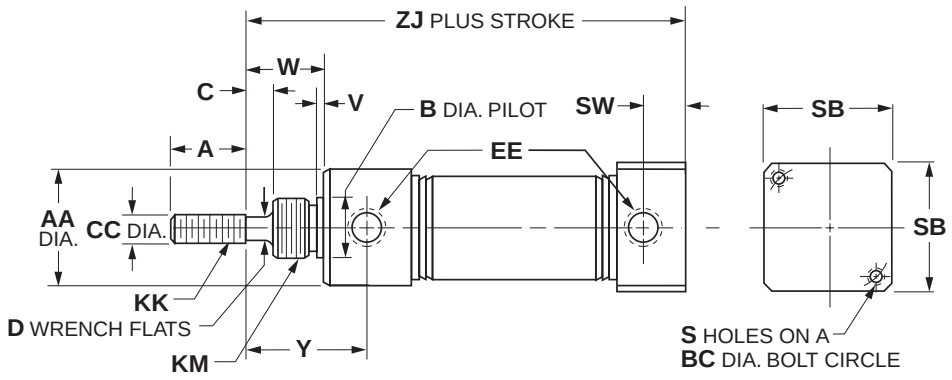

Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
7/16"	●		1/2, 1, 2, 3, 4	12	✓
3/4"	●	●	1, 2, 3, 4, 5, 6	12	✓
1-1/16"	●	●	1, 2, 3, 4	12	✓
1-1/2"	●	●	1, 2, 3, 4, 5, 6	12	✓

Bore	A	AA	B	BC	C	CC	D	EE	KK
7/16"	0.50	0.74	0.437	0.75	–	0.188	–	#10-32	#10-32 UNF
3/4"	0.75	0.86	0.624	1.00	0.25	0.250	0.22	1/8 NPTF	1/4-28 UNF
1-1/16"	0.75	1.12	0.624	1.25	0.38	0.312	0.25	1/8 NPTF	5/16-24 UNF
1-1/2"	1.25	1.56	0.749	1.75	0.25	0.437	0.38	1/4 NPTF	7/16-20 UNF

Bore	KM	S	SB	SW	V	W	Y	ZJ	
								SR	SRM
7/16"	7/16-20 UNF	#8-32 UNC	0.75	0.38	0.05	0.43	0.72	2.44	–
3/4"	5/8-18 UNF	#10-32 UNF	1.00	0.44	0.09	0.75	1.22	3.78	3.78
1-1/16"	5/8-18 UNF	#10-32 UNF	1.25	0.44	0.09	0.88	1.44	4.00	4.16
1-1/2"	3/4-16 UNF	1/4-20 UNC	1.75	0.62	0.09	0.88	1.47	4.38	4.63

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Mounting Style BFN
Front Block Mount, Single Acting, Spring Return

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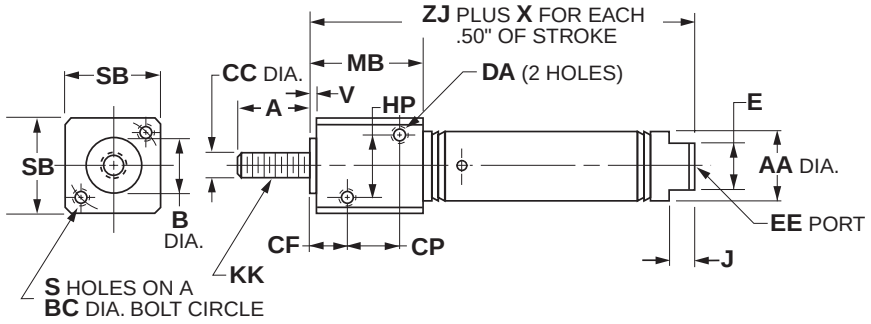
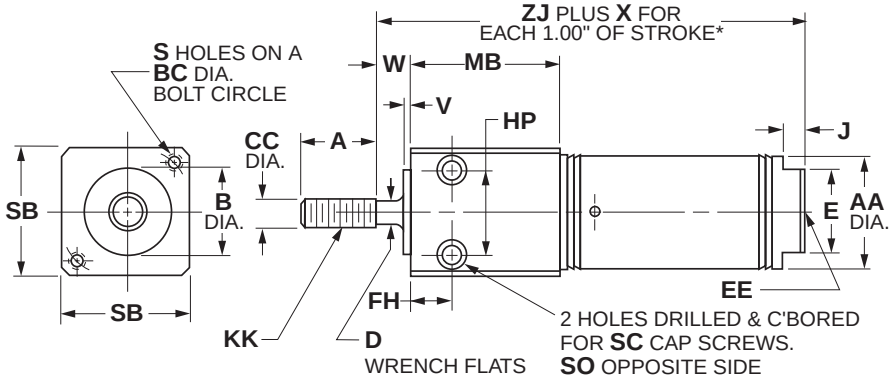
D

Bore Sizes
7/16"



Bore Sizes
3/4"
1-1/16"
1-1/2"



Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
7/16"	●		1/2, 1, 1-1/2, 2, 3	6	✓
3/4"	●	●	1/2, 1, 2, 3, 4	6	✓
1-1/16"	●	●	1, 2, 3, 4	6	✓
1-1/2"	●	●	1, 2, 3, 4	6	✓

Bore	A	AA	B	BC	CC	CF	CP	D	DA	E	EE	FH
7/16"	0.50	0.50	0.437	0.75	0.188	0.31	0.44	–	#8-32 UNC	0.38	#10-32	0.31
3/4"	0.75	0.81	0.624	1.00	0.250	–	–	0.22	–	0.62	1/8 NPTF	0.38
1-1/16"	0.75	1.12	0.750	1.25	0.312	–	–	0.25	–	0.88	1/8 NPTF	0.62
1-1/2"	1.25	1.56	1.00	1.75	0.437	–	–	0.38	–	0.88	1/4 NPTF	0.88

Bore	HP	J	KK	MB	S	SB	SC	SO	V	W	X	ZJ	
												SR	SRM
7/16"	0.44	0.19	#10-32 UNF	0.88	#8-32 UNC	0.75	–	–	0.062	–	0.94	1.94	–
3/4"	0.62	0.19	1/4-28 UNF	1.12	#10-32 UNF	1.00	#10-32	1/4-20 UNC	0.093	0.34	1.69	2.66	2.91
1-1/16"	0.81	0.19	5/16-24 UNF	1.41	#10-32 UNF	1.25	#10-32	1/4-20 UNC	0.093	0.47	1.81	3.38	3.63
1-1/2"	1.12	0.25	7/16-20 UNF	1.88	1/4 UNC	1.75	1/4-20	5/16-18 UNC	0.125	0.38	2.00	3.69	3.94

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

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Mounting Style BFR
Front Block Mount, Single Acting, Spring Extend

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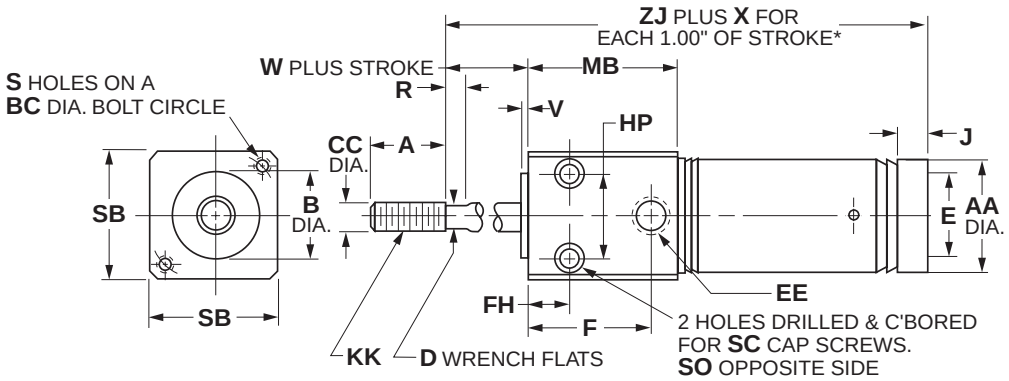

Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
3/4"	●	●	1, 2, 3, 4	6	✓
1-1/16"	●	●	1, 2, 3, 4	6	✓
1-1/2"	●	●	1, 2, 3, 4	6	✓

Bore	A	AA	B	BC	CC	D	E	EE	F	FH	HP	J
3/4"	0.75	0.81	0.624	1.00	0.250	0.22	–	1/8 NPTF	0.88	0.38	0.62	0.19
1-1/16"	0.75	1.12	0.750	1.25	0.312	0.25	–	1/8 NPTF	1.16	0.62	0.81	–
1-1/2"	1.25	1.56	1.00	1.75	0.437	0.38	0.88	1/4 NPTF	1.53	0.88	1.12	0.25

Bore	KK	MB	R	S	SB	SC	SO	V	W	X	ZJ	
											SR	SRM
3/4"	1/4-28 UNF	1.12	0.25	#10-32 UNF	1.00	#10-32	1/4-20 UNC	0.093	0.34	2.69	2.56	2.81
1-1/16"	5/16-24 UNF	1.41	0.25	#10-32 UNF	1.25	#10-32	1/4-20 UNC	0.093	0.47	2.81	3.12	3.37
1-1/2"	7/16-20 UNF	1.88	0.25	1/4-20 UNC	1.75	1/4-20	5/16-18 UNC	0.125	0.38	3.00	3.69	3.94

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

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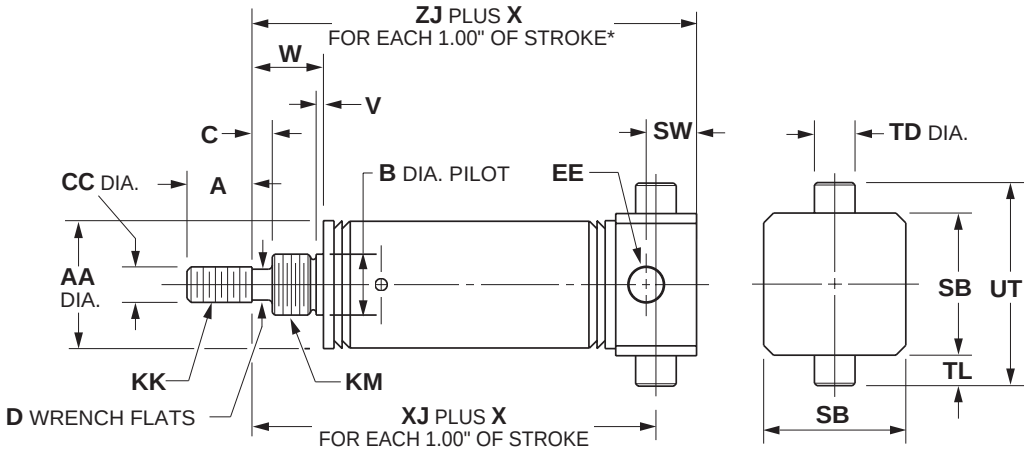
D

Mounting Style TRN
Rear Trunnion Mount, Single Acting, Spring Return

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.



Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
7/16"	●		1/2, 1, 2, 3, 4	6	✓
3/4"	●	●	1, 2, 3, 4	6	✓
1-1/16"	●	●	1, 2, 3, 4	6	✓
1-1/2"	●	●	1, 2, 3, 4	6	✓

Bore	A	AA	B	C	CC	D	EE	KK	KM
7/16"	0.50	0.50	0.374	–	0.188	–	#10-32	#10-32 UNF	3/8-24 UNF
3/4"	0.75	0.81	0.499	0.25	0.250	0.22	1/8 NPTF	1/4-28 UNF	1/2-20 UNF
1-1/16"	0.75	1.12	0.624	0.38	0.312	0.25	1/8 NPTF	5/16-24 UNF	5/8-18 UNF
1-1/2"	1.25	1.56	0.749	0.25	0.437	0.38	1/4 NPTF	7/16-20 UNF	3/4-16 UNF

Bore	SB	SW	TD	TL	UT	V	W	X	XJ		ZJ	
									SR	SRM	SR	SRM
7/16"	0.75	0.38	0.374	0.50	1.25	0.05	0.32	0.94**	1.38	–	1.62	–
3/4"	1.00	0.44	0.500	0.38	1.75	0.09	0.62	1.69	1.94	2.19	2.31	2.56
1-1/16"	1.25	0.44	0.500	0.38	2.00	0.09	0.88	1.81	2.44	2.69	2.81	3.06
1-1/2"	1.75	0.62	0.500	0.38	2.50	0.09	0.88	2.00	2.56	2.81	3.06	3.31

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

** For each 0.50" of stroke.

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Mounting Style TRR
Rear Trunnion Mount, Single Acting, Spring Extend

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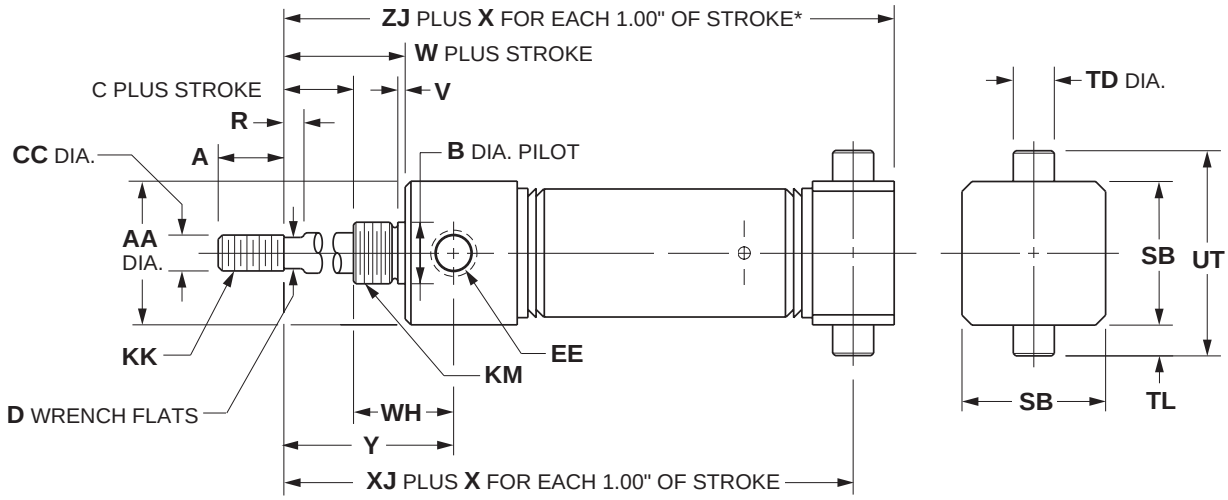

Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
3/4"	●	●	1, 2, 3, 4	6	✓
1-1/16"	●	●	1, 2, 3, 4	6	✓
1-1/2"	●	●	1, 2, 3, 4	6	✓

Bore	A	AA	B	C	CC	D	EE	KK	KM
3/4"	0.75	0.86	0.624	0.25	0.250	0.22	1/8 NPTF	1/4-28 UNF	1/2-20 UNF
1-1/16"	0.75	1.12	0.624	0.38	0.312	0.25	1/8 NPTF	5/16-24 UNF	5/8-18 UNF
1-1/2"	1.25	1.56	0.749	0.25	0.437	0.38	1/4 NPTF	7/16-20 UNF	3/4-16 UNF

Bore	R	SB	TD	TL	UT	V	W	WH	X	XJ		ZJ	
										SR	SRM	SR	SRM
3/4"	0.25	1.00	0.500	0.38	1.75	0.09	0.75	0.72	2.69	2.85	3.10	3.22	3.47
1-1/16"	0.25	1.25	0.500	0.38	2.00	0.09	0.88	0.68	2.81	3.15	3.40	3.53	3.78
1-1/2"	0.25	1.75	0.500	0.38	2.50	0.09	0.88	1.25	3.00	3.38	3.63	3.88	4.13

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

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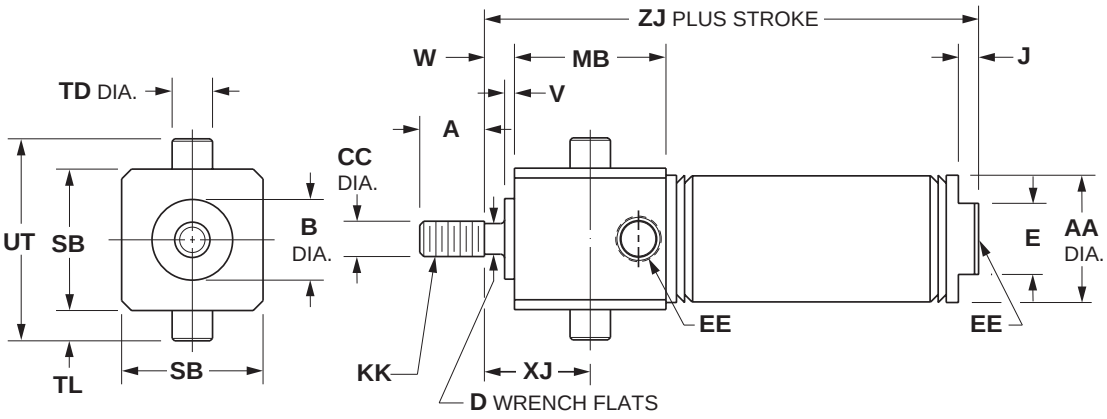
C086

Mounting Style TFD
Front Trunnion Mount, Double Acting

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.

D



Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
7/16"	●		1/2, 1, 1-1/2, 2, 3, 4	12	✓
3/4"	●	●	1, 2, 3, 4, 5, 6	12	✓
1-1/16"	●	●	1, 2, 3, 4, 5, 6	12	✓
1-1/2"	●	●	1, 2, 3, 4, 5, 6	12	✓

Bore	A	AA	B	CC	D	E	EE	J	KK
7/16"	0.50	0.50	0.437	0.188	–	0.38	#10-32	0.19	#10-32 UNF
3/4"	0.75	0.81	0.624	0.250	0.22	0.62	1/8 NPTF	0.19	1/4-28 UNF
1-1/16"	0.75	1.12	0.750	0.312	0.25	0.88	1/8 NPTF	0.19	5/16-24 UNF
1-1/2"	1.25	1.56	1.000	0.437	0.38	0.88	1/4 NPTF	0.25	7/16-20 UNF

Bore	MB	SB	TD	TL	UT	V	W	XJ	ZJ	
									SR	SRM
7/16"	0.88	0.75	0.374	0.250	1.25	0.062	–	0.31	2.12	–
3/4"	1.12	1.00	0.500	0.38	1.75	0.093	0.34	0.69	3.22	3.22
1-1/16"	1.41	1.25	0.500	0.38	2.00	0.093	0.47	1.09	3.75	3.91
1-1/2"	1.88	1.75	0.500	0.38	2.50	0.125	0.38	1.31	4.19	4.44

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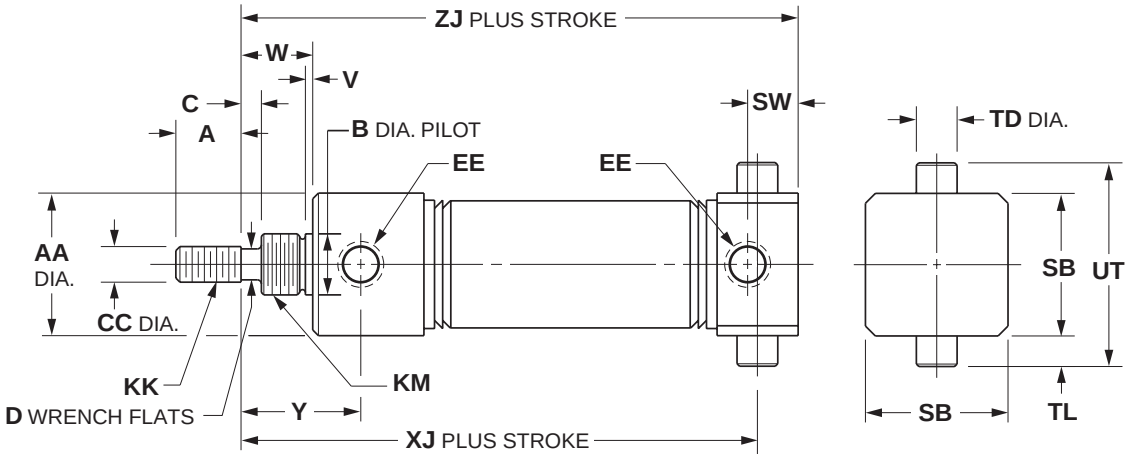
Mounting Style TRD
Rear Trunnion Mount, Double Acting

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.



Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
7/16"	●		1/2, 1, 1-1/2, 2, 3, 4	12	✓
3/4"	●	●	1, 2, 3, 4, 5, 6	12	✓
1-1/16"	●	●	1, 2, 3, 4	12	✓
1-1/2"	●	●	1, 2, 3, 4, 5, 6	12	✓

Bore	A	AA	B	C	CC	D	EE	KK	KM
7/16"	0.50	0.74	0.437	–	0.188	–	#10-32	#10-32 UNF	7/16-20 UNF
3/4"	0.75	0.86	0.624	0.25	0.250	0.22	1/8 NPTF	1/4-28 UNF	5/8-18 UNF
1-1/16"	0.75	1.12	0.624	0.38	0.312	0.25	1/8 NPTF	5/16-24 UNF	5/8-18 UNF
1-1/2"	1.25	1.56	0.749	0.25	0.437	0.38	1/4 NPTF	7/16-20 UNF	3/4-16 UNF

Bore	SB	SW	TD	TL	UT	V	W	XJ		Y	ZJ	
								SR	SRM		SR	SRM
7/16"	0.75	0.38	0.374	0.25	1.25	0.05	0.38	2.19	–	0.72	2.44	–
3/4"	1.00	0.44	0.500	0.38	1.75	0.09	0.75	3.41	3.41	1.22	3.78	3.78
1-1/16"	1.25	0.44	0.500	0.38	2.00	0.09	0.88	3.62	3.62	1.44	4.00	4.16
1-1/2"	1.75	0.62	0.500	0.38	2.50	0.09	0.88	3.88	4.13	1.47	4.38	4.63

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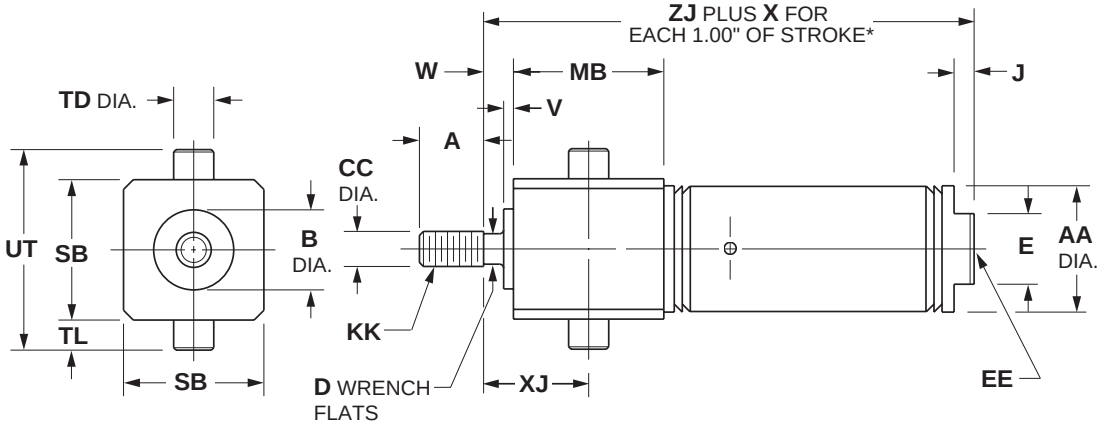
D

Mounting Style TFN
Front Trunnion Mount, Single Acting, Spring Return

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.



Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
7/16"	●		1/2, 1, 1-1/2, 2, 3	6	✓
3/4"	●	●	1/2, 1, 2, 3, 4	6	✓
1-1/16"	●	●	1, 2, 3, 4	6	✓
1-1/2"	●	●	1, 2, 3, 4	6	✓

Bore	A	AA	B	CC	D	E	EE	J	KK
7/16"	0.50	0.50	0.437	0.188	–	0.38	#10-32	0.19	#10-32 UNF
3/4"	0.75	0.81	0.624	0.250	0.22	0.62	1/8 NPTF	0.19	1/4-28 UNF
1-1/16"	0.75	1.12	0.750	0.312	0.25	0.88	1/8 NPTF	0.19	5/16-24 UNF
1-1/2"	1.25	1.56	1.000	0.437	0.38	0.88	1/4 NPTF	0.25	7/16-20 UNF

Bore	MB	SB	TD	TL	UT	V	W	X	XJ	ZJ	
										SR	SRM
7/16"	0.88	0.75	0.374	0.25	1.25	0.062	0	0.94**	0.31	1.94	–
3/4"	1.12	1.00	0.500	0.38	1.75	0.093	0.34	1.69	0.69	2.66	2.91
1-1/16"	1.41	1.25	0.500	0.38	2.00	0.093	0.47	1.81	1.09	3.38	3.63
1-1/2"	1.88	1.75	0.500	0.38	2.50	0.125	0.38	2.00	1.31	3.69	3.94

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

** For each 0.50" of stroke

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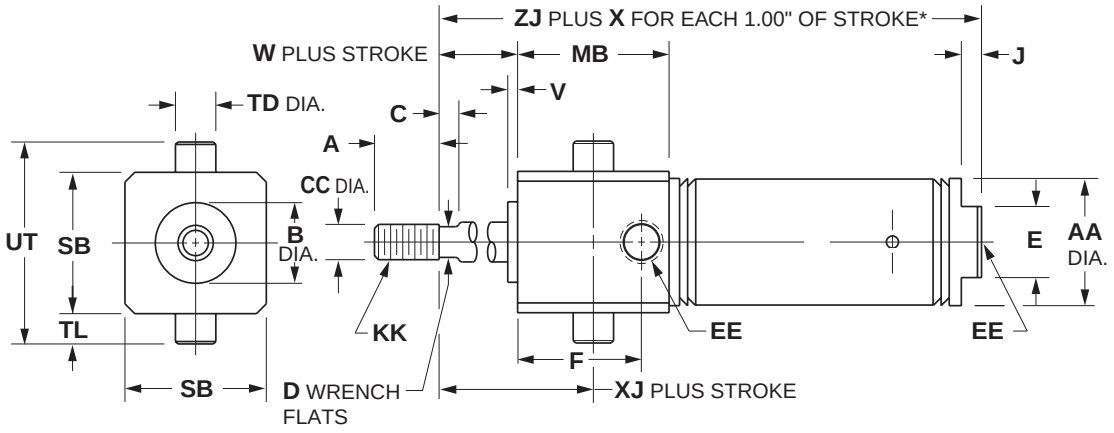
Mounting Style TFR
Front Trunnion Mount, Single Acting, Spring Extend

Drawings are representative of cylinders. Certain bore sizes may not look exactly as shown.



Bore	SR	SRM	Std. Stroke (in)	Max Stroke (in)	SS Rod Std
3/4"	●	●	1, 2, 3, 4	6	✓
1-1/16"	●	●	1, 2, 3, 4	6	✓
1-1/2"	●	●	1, 2, 3, 4	6	✓

Bore	A	AA	B	C	CC	D	E	F	EE	J
3/4"	0.75	0.81	0.624	0.25	0.250	0.22	0	0.88	1/8 NPTF	–
1-1/16"	0.75	1.12	0.750	0.25	0.312	0.25	0	1.16	1/8 NPTF	–
1-1/2"	1.25	1.56	1.000	0.25	0.437	0.38	0.88	–	1/4 NPTF	0.25

Bore	KK	MB	SB	TD	TL	UT	V	W	X	XJ	ZJ	
											SR	SRM
3/4"	1/4-28 UNF	1.12	1.00	0.500	0.38	1.75	0.093	0.34	2.69	0.69	2.56	2.81
1-1/16"	5/16-24 UNF	1.41	1.25	0.500	0.38	2.00	0.093	0.47	2.81	1.09	3.12	3.37
1-1/2"	7/16-20 UNF	1.88	1.75	0.500	0.38	2.50	0.125	0.38	3.00	1.31	3.69	3.94

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

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Air Reservoirs

Air Reservoirs installed can significantly reduce the pulsation of a system. In addition air reservoirs can be used as a means to store energy. Caution should always be used when storing energy. Air reservoirs if installed in the correct location and sized correctly can temporarily increase the flow of an actuator or cylinder.
As always never exceed the rated pressure of the cylinder.

How To Order SR Series Air Reservoirs

.75	AR	SR	2.00

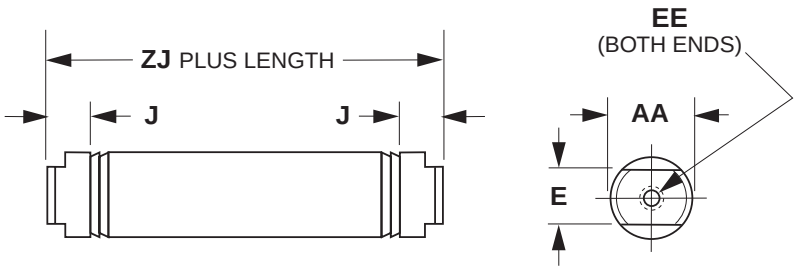
Bore Size*	
.75	3/4"
1.06	1-1/16"
1.50	1-1/2"
2.00	2"
2.50	2-1/2"
3.00	3"

Mounting	
AR	Air Reservoir

Length
Specify in inches.
See table below.

Bore	Standard Lengths	Max Length	Volume (in^3)
3/4"	1" increments to 4"	32"	0.39 plus 0.44 per inch length
1-1/16"	1" increments to 8"	32"	0.99 plus 0.89 per inch length
1-1/2"	1" increments to 16"	32"	1.91 plus 1.77 per inch length
2"	1" increments to 16"	32"	4.22 plus 3.14 per inch length
2-1/2"	1" increments to 16"	32"	7.04 plus 4.91 per inch length
3"	1" increments to 16"	32"	9.90 plus 7.07 per inch length

Dimensions



Bore	AA	E	EE	J	ZJ
3/4"	0.813	0.625	1/8" NPTF	0.19	1.938
1-1/16"	1.125	0.88	1/8" NPTF	0.19	2.375
1-1/2"	1.56	0.88	1/8" NPTF	0.250	2.250
2"	2.08	1.25	1/4" NPTF	0.312	2.875
2-1/2"	2.62	1.75	1/4" NPTF	0.312	2.875
3"	3.16	2.00	3/8" NPTF	0.312	3.190

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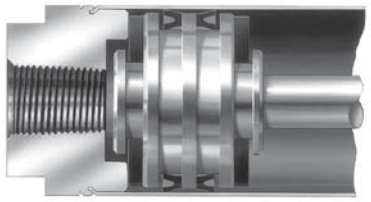
Bumpers

Bumpers are available at extra cost except where noted as standard. Add the following dimensions to the overall cylinder length by bore



SR Bumper Adder

Cylinder Type	SR Series Bore Size											
	5/16"	7/16"	9/16"	3/4"	7/8"	1-1/16"	1-1/4"	1-1/2"	1-3/4"	2"	2-1/2"	3"
Spring Return	*	0.062"	0.062"	0.125"	*	0.125"	*	**	*	0.125"	N/A	N/A
Spring Extend	*	0.125"	0.062"	0.125"	*	0.125"	*	**	*	0.125"	N/A	N/A
Double Acting	*	0.188"	0.125"	**	*	0.125"	*	0.125"	*	0.250"	0.250"	N/A
K-type	N/A	0.250"	0.125"	**	*	0.500"	*	0.125"	*	0.250"	0.250"	N/A

*Bumpers are furnished as standard and do not affect overall length. **Bumpers do not affect overall length.

SRM Bumper Adder

Cylinder Type	SRM Series Bore Size							
	9/16"	3/4"	1-1/16"	1-1/4"	1-1/2"	1-3/4"	2"	2-1/2"
Spring Return	0.062"	0.125"	0.125"	0.125"	0.125"	*	0.125"	N/A
Spring Extend	0.062"	0.125"	0.125"	0.125"	0.125"	*	0.125"	N/A
Double Acting	0.125"	0.250"	0.250"	0.250"	0.250"	*	0.250"	0.250"
K-type	0.125"	0.312"	0.250"	0.250"	0.250"	*	0.250"	0.250"

Fluorocarbon Seals

Available on all bore sizes at extra cost. Not available on SRM or SRDM series.

Stainless Steel Piston Rods

Corrosion resistant stainless steel is the standard piston rod material for all bore sizes up to and including 1-1/2 inch bore at no additional cost. The only exception to the stainless steel standard is when a hollow rod, KDXH option is specified. Stainless steel is also the standard material on block, trunnion, hex/non-rotating and KDX mounts. Stainless steel is available on other sizes for an additional charge.

Rod Wiper

SR/SRM Series cylinders can be fitted with a rod wiper that is specially designed to prevent contaminants from clinging to the piston rod and damaging the piston rod seal. Available in 3/4", 1-1/16", and 1-1/2" bores, the piston rod wiper can be added to the SR/SRM and SRD/SRDM series.

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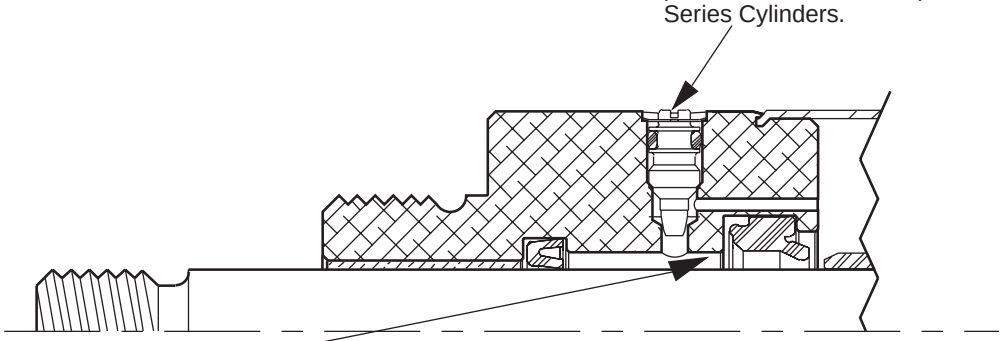
C086

Adjustable Cushion Option

Cushions can be selected on nine bore sizes, ranging from 0.75" bore to 3.0" bore with mounting styles D, front nose mount, and DXP, rear pivot mount. Adjustable cushions are not available with double rod SR Series cylinders.

Cushion Adjusting Needle Valves

The fine-thread cushion needle valves make precise adjustment quick and easy. The needle valve is fully captured to allow for safe cushion adjustment while cylinder is pressurized. The brass needle valves are corrosion resistant. The standard position for needle valve adjustments is position 1, 90° from the port. See port location table for SR Series Cylinders.



Check Seal Cushion

The “Check Seal” system offers excellent cushioning efficiency and long cushion seal life. This seal is specifically designed for cushion applications and has a long proven history in our products. Extensive side by side testing of the check seal in SR Series cylinders significantly outlasted and outperformed competitors’ o-ring shaped seals.

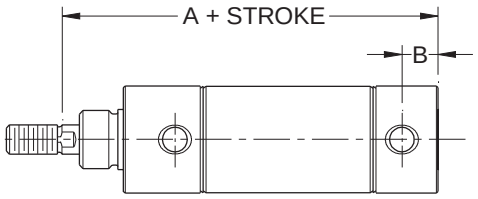
The Check Seal’s unique geometry exhibits the dynamic sealing capabilities of a lipseal. As the cushion sleeve enters the Check Seal at the end of stroke, the Check Seal blocks the air from exhausting directly through the port and forces the air through the adjustable needle valve orifice. The exhaust airflow is precisely metered to control the desired rate of deceleration of the cylinder piston.

During stroke reversal, the check valve action of the Check Seal induces a fast out-of-cushion response. The Check Seal floats forward in the retainer groove as the cushion sleeve exits the Cushion Seal, thereby creating a path for maximum air flow around the Check Seal to access the piston face. The quick response of the Check Seal design yields faster cycle times and increased productivity.

Critical Mounting Dimensions for SR Series and SRM Cylinders with Adjustable Cushions

In most cases, cylinder mounting dimensions are not affected when cushions are specified. Standard catalog dimensions apply when cushions are specified at either end of a DXP mount and when specified at the head end only of a D mount. **The only exception to standard catalog dimensions is when a cushion is specified on the cap end or both ends of a D mount**. Please consult Table A for the critical mounting dimensions on D mount SR and SRM cylinders with cushions both ends or cushions cap end only.

Table B shows the cushion lengths for SR and SRM cylinders.



D Mount

Table A:
Critical Mounting Dimensions for D Mount SR and SRM Cylinders with Cushions Both Ends or Cushions Cap End Only.

Bore Size	SR Dimensions		SRM Dimensions	
	A + Stroke	B	A + Stroke	B
.75	3.40	0.28	3.40	0.28
.88	3.25	0.28	N/A	N/A
1.06	3.49	0.28	3.65	0.28
1.25	4.31	0.38	4.34	0.38
1.50	4.12	0.31	4.37	0.31
1.75	5.25	0.42	5.25	0.42
2.00	5.06	0.47	5.34	0.47
2.50	5.06	0.47	5.06	0.47
3.00	5.69	0.53	N/A	N/A

Table B:
Cushion Lengths for SR and SRM Cylinders.

Bore Size	Head	Cap
.75	0.750	0.625
.88	0.750	0.625
1.06	0.750	06.25
1.25	0.750	0.625
1.50	0.750	0.625
1.75	0.875	0.625
2.00	0.875	0.750
2.50	0.875	0.750
3.00	0.875	1.000

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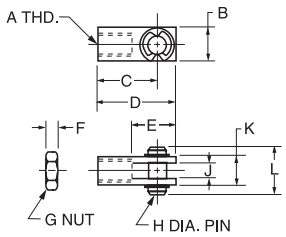
C086

Piston Rod Clevis

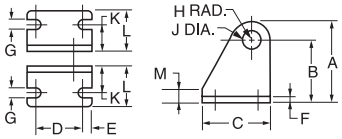
Assembly includes pin and (2) Retainer Rings and (1) Jam Nut.



Part Number	Bore	A	B	C	D	E	F	G	H	J	K	L
L071300025	5/16	#5-40	.31	.44	.56	.38	.11	#5-40	.12	.13	.31	.50
L071300100 L077130100*	7/16, 9/16	#10-32	.38	.75	.94	.56	.12	#10-32	.19	.19	.38	.56
L071300200 L077130200*	3/4, 7/8	1/4-28	.50	.94	1.19	.68	.16	1/4-28	.25	.25	.50	.69
L071300300 L077130300*	1-1/16	5/16-24	.50	.94	1.19	.68	.19	5/16-24	.25	.25	.50	.69
L071300400 L077130400*	1-1/4, 1-1/2	7/16-20	.75	1.31	1.69	.94	.25	7/16-20	.38	.38	.75	1.03
L071300500 L077130500*	1-3/4, 2, 2-1/2	1/2-20	.75	1.31	1.69	.94	.31	1/2-20	.38	.38	.75	1.03
L071300600	3	5/8-18	1.00	2.25	2.75	1.50	.38	5/8-18	.50	.50	1.00	1.38

* Stainless Steel for use with SRD/SRDM cylinders.

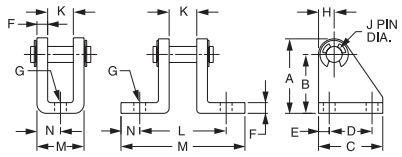
Pivot Brackets



Part Number	Bore	A	B	C	D	E	F	G	H	J	K	L	M
L071310100	7/16	.76	.56	.75	.50	.12	.06	.19	.20	.160	.28	.50	.12
L071310200	3/4, 7/8, 1-1/16	1.19	.88	1.12	.75	.19	.12	.27	.31	.255	.44	.81	.25
L071310300	1-1/2	1.75	1.38	1.50	1.00	.25	.12	.27	.38	.380	.62	1.00	.25

Pivot Bracket Assembly

Assembly includes pin and (2) Retainer Rings.



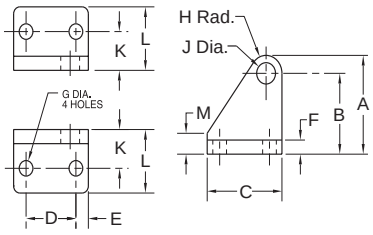
5/16" Bore Only

Part Number	Bore	A	B	C	D	E	F	G	H	J	K	L	M	N
L071320025	5/16	.53	.40	.62	.38	.12	.04	16	.12	.12	.26	–	.36	.18
L071320100 L077150100*	7/16, 9/16	.76	.56	.75	.50	.12	.06	.19	.19	.156	.34	.91	1.34	.22
L071320200 L077150200*	3/4, 7/8, 1-1/16	1.18	.88	1.12	.75	.19	.12	.27	.30	.250	.38	1.25	2.00	.38
L071320300	1-1/4	1.18	.88	1.12	.75	.19	.12	27	.30	.250	.50	1.38	2.14	.38
L071320400 L077150400*	1-1/2, 1-3/4	1.75	1.38	1.50	1.00	.25	.25	.27	.37	.375	.62	2.00	2.88	.44
L071320500 L077150500*	2, 2-1/2	1.75	1.38	1.50	1.00	.25	.25	.27	.37	.375	.75	2.12	3.00	.44
L071320600	3	2.25	1.75	1.75	1.25	.25	.25	.27	50	.50	.88	2.62	3.88	.62

* Stainless Steel for use with SRD/SRDM cylinders.

SR Series Trunnion Brackets

Select brackets for SR Series Trunnion Mount Cylinders from the table below.
(Note: Trunnion Brackets are ordered as a separate item from the cylinder.)



Part Number	Bore Sizes	A	B	C	D	E	F	G	H	J	K	L	M
L076600100	7/16	1.75	1.38	1.50	1	.25	.25	.27	.38	.375	.69	1.12	.37
L076600200	3/4, 11/16, 1-1/2	1.75	1.38	1.50	1	.25	.25	.27	.38	.500	.69	1.12	.37

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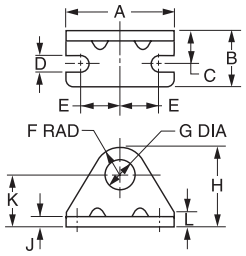
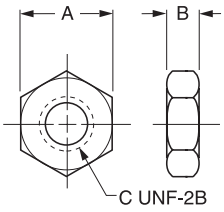
Foot Brackets



Part Number	Bore	A	B	C	D	E	F	G	H	J	K	L
L073790016	5/16	1.00	.37	.25	.13	.37	.31	.25	.75	.06	.44	.12
L073790023	5/16	1.00	.37	.25	.13	.37	.31	.38	.75	.06	.44	.12
L073790024	7/16	1.38	.62	.31	.19	.50	.31	.38	.88	.07	.56	.12
L073790028 **L077160028***	7/16, 9/16	1.38	.62	.38	.19	.50	.38	.44	.94	.09	.56	.12
L073790032	3/4	1.62	.75	.44	.19	.62	.41	.50	1.09	.10	.69	.19
L073790040 **L077160040***	3/4, 7/8, 1-1/16	1.88	1.00	.56	.27	.75	.56	.63	1.38	.12	.81	.25
L073790048 **L077160048***	1-1/4, 1-1/2	2.50	1.50	.75	.27	.94	.75	.75	1.75	.12	1.00	.38
L073790102	1-3/4	3.00	1.50	.87	.35	1.12	.91	1.03	2.16	.19	1.25	.50
L073790124 **L077160124***	2	3.12	1.62	1.00	.34	1.12	1.00	1.38	2.50	.25	1.50	.62
L073790132	2-1/2	3.75	1.62	1.00	.35	1.44	1.25	1.51	3.00	.25	1.75	.75
L073790140	3	4.37	1.62	1.00	.35	1.75	1.25	1.64	3.14	.25	1.89	.89

* Stainless Steel for use with SRD/SRDM cylinders.

Mounting Nut



Part Number	Bore	A	B	C
L073800200	5/16	.44	.16	1/4-28
L073800400	5/16, 7/16	.56	.22	3/8-24
L073800500 **L077170500***	7/16, 9/16	.69	.25	7/16-20
L073800600	3/4	.75	.31	1/2-20
L073800800 **L077170800***	3/4, 7/8, 1-1/16	.94	.38	5/8-18
L073800900 **L077170900***	1-1/4, 1-1/2	1.12	.42	3/4-16
L073801100	1-3/4	1.50	.55	1-14
L073801200 **L077171200***	2	1.88	.50	1-1/4-12
L073801400	2-1/2	2.06	.78	1-3/8-12
L073801500	3	2.25	.84	1-1/2-12

* Stainless Steel for use with SRD/SRDM cylinders.

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Safety Guide for Selecting and Using Hydraulic, Pneumatic Cylinders and Their Accessories

WARNING: ⚠ FAILURE OF THE CYLINDER, ITS PARTS, ITS MOUNTING, ITS CONNECTIONS TO OTHER OBJECTS, OR ITS CONTROLS CAN RESULT IN:

- **Unanticipated or uncontrolled movement of the cylinder or objects connected to it.**
- **Falling of the cylinder or objects held up by it.**
- **Fluid escaping from the cylinder, potentially at high velocity.**

THESE EVENTS COULD CAUSE DEATH OR PERSONAL INJURY BY, FOR EXAMPLE, PERSONS FALLING FROM HIGH LOCATIONS, BEING CRUSHED OR STRUCK BY HEAVY OR FAST MOVING OBJECTS, BEING PUSHED INTO DANGEROUS EQUIPMENT OR SITUATIONS, OR SLIPPING ON ESCAPED FLUID.

Before selecting or using Parker (The Company) cylinders or related accessories, it is important that you read, understand and follow the following safety information. Training is advised before selecting and using The Company's products.

1.0 General Instructions

1.1 Scope – This safety guide provides instructions for selecting and using (including assembling, installing, and maintaining) cylinder products. This safety guide is a supplement to and is to be used with the specific Company publications for the specific cylinder products that are being considered for use.

1.2 Fail Safe – Cylinder products can and do fail without warning for many reasons. All systems and equipment should be designed in a fail-safe mode so that if the failure of a cylinder product occurs people and property won't be endangered.

1.3 Distribution – Provide a free copy of this safety guide to each person responsible for selecting or using cylinder products. Do not select or use The Company's cylinders without thoroughly reading and understanding this safety guide as well as the specific Company publications for the products considered or selected.

1.4 User Responsibility – Due to very wide variety of cylinder applications and cylinder operating conditions, The Company does not warrant that any particular cylinder is suitable for any specific application. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The hydraulic and pneumatic cylinders outlined in this catalog are designed to The Company's design guidelines and do not necessarily meet the design guideline of other agencies such as American Bureau of Shipping, ASME Pressure Vessel Code etc. The user, through its own
analysis and testing, is solely responsible for:

- Making the final selection of the cylinders and related accessories.
- Determining if the cylinders are required to meet specific design requirements as required by the Agency(s) or industry standards covering the design of the user's equipment.
- Assuring that the user's requirements are met, OSHA requirements are met, and safety guidelines from the applicable agencies such as but not limited to ANSI are followed and that the use presents no health or safety hazards.
- Providing all appropriate health and safety warnings on the equipment on which the cylinders are used.

1.5 Additional Questions – Call the appropriate Company technical service department if you have any questions or require any additional information. See the Company publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2.0 Cylinder and Accessories Selection

2.1 Seals – Part of the process of selecting a cylinder is the selection of seal compounds. Before making this selection, consult the "seal information page(s)" of the publication for the series of cylinders of interest.

The application of cylinders may allow fluids such as cutting fluids, wash down fluids etc. to come in contact with the external area of the cylinder. These fluids may attack the piston rod wiper and or the primary seal and must be taken into account when selecting and specifying seal compounds.

Dynamic seals will wear. The rate of wear will depend on many operating factors. Wear can be rapid if a cylinder is mis-aligned or if the cylinder has been improperly serviced. The user must take seal wear into consideration in the application of cylinders.

2.2 Piston Rods – Possible consequences of piston rod failure or separation of the piston rod from the piston include, but are not limited to are:

- Piston rod and or attached load thrown off at high speed.
- High velocity fluid discharge.
- Piston rod extending when pressure is applied in the piston retract mode.

Piston rods or machine members attached to the piston rod may move suddenly and without warning as a consequence of other conditions occurring to the machine such as, but not limited to:

- Unexpected detachment of the machine member from the piston rod.
- Failure of the pressurized fluid delivery system (hoses, fittings, valves, pumps, compressors) which maintain cylinder position.
- Catastrophic cylinder seal failure leading to sudden loss of pressurized fluid.
- Failure of the machine control system.

Follow the recommendations of the "Piston Rod Selection Chart and Data" in the publication for the series of cylinders of interest. The suggested piston rod diameter in these charts must be followed in order to avoid piston rod buckling.

Piston rods are not normally designed to absorb bending moments or loads which are perpendicular to the axis of piston rod motion. These additional loads can cause the piston rod to fail. If these types of additional loads are expected to be imposed on the piston rod, their magnitude should be made known to our engineering department.

The cylinder user should always make sure that the piston rod is securely attached to the machine member.

On occasion cylinders are ordered with double rods (a piston rod extended from both ends of the cylinder). In some cases a stop is threaded on to one of the piston rods and used as an external stroke adjuster. On occasions spacers are attached to the machine member connected to the piston rod and also used as a stroke adjuster. In both cases the stops will create a pinch point and the user should consider appropriate use of guards. If these external stops are not perpendicular to the mating contact surface, or if debris is trapped between the contact surfaces, a bending moment will be placed on the piston rod, which can lead to piston rod failure. An external stop will also negate the effect of cushioning and will subject the piston rod to impact loading. Those two (2) conditions can cause piston rod failure. Internal stroke adjusters are available with and without cushions. The use of external stroke adjusters should be reviewed with our engineering department.

The piston rod to piston and the stud to piston rod threaded connections are secured with an anaerobic adhesive. The strength of the adhesive decreases with increasing temperature. Cylinders which can be exposed to temperatures above +250°F (+121°C) are to be ordered with a non studded piston rod and a pinned piston to rod joint.

2.3 Cushions – Cushions should be considered for cylinder applications when the piston velocity is expected to be over 4 inches/second.

Cylinder cushions are normally designed to absorb the energy of a linear applied load. A rotating mass has considerably more energy than the same mass moving in a linear mode. Cushioning for a rotating mass application should be review by our engineering department.

2.4 Cylinder Mountings – Some cylinder mounting configurations may have certain limitations such as but not limited to minimum stroke for side or foot mounting cylinders or pressure de-ratings for certain mounts. Carefully review the catalog for these types of restrictions.

Always mount cylinders using the largest possible high tensile alloy steel socket head cap screws that can fit in the cylinder mounting holes and torque them to the manufacturer's recommendations for their size.

2.5 Port Fittings – Hydraulic cylinders applied with meter out or deceleration circuits are subject to intensified pressure at piston rod end.

The rod end pressure is approximately equal to:

$$\frac{\text{operating pressure x effective cap end area}}{\text{effective rod end piston area}}$$

Contact your connector supplier for the pressure rating of individual connectors.

3.0 Cylinder and Accessories Installation and Mounting

3.1 Installation

3.1.1 – Cleanliness is an important consideration, and cylinders are shipped with the ports plugged to protect them from contaminants entering the ports. These plugs should not be removed until the piping is to be installed. Before making the connection to the cylinder ports, piping should be thoroughly cleaned to remove all chips or burrs which might have resulted from threading or flaring operations.

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3.1.2 – Cylinders operating in an environment where air drying materials are present such as fast-drying chemicals, paint, or weld splatter, or other hazardous conditions such as excessive heat, should have shields installed to prevent damage to the piston rod and piston rod seals.

3.1.3 – Proper alignment of the cylinder piston rod and its mating component on the machine should be checked in both the extended and retracted positions. Improper alignment will result in excessive rod gland and/or cylinder bore wear. On fixed mounting cylinders attaching the piston rod while the rod is retracted will help in achieving proper alignment.

3.1.4 – Sometimes it may be necessary to rotate the piston rod in order to thread the piston rod into the machine member. This operation must always be done with zero pressure being applied to either side of the piston. Failure to follow this procedure may result in loosening the piston to rod-threaded connection. In some rare cases the turning of the piston rod may rotate a threaded piston rod gland and loosen it from the
cylinder head. Confirm that this condition is not occurring. If it does, re-tighten the piston rod gland firmly against the cylinder head.

For double rod cylinders it is also important that when attaching or detaching the piston rod from the machine member that the torque be applied to the piston rod end of the cylinder that is directly attaching to the machine member with the opposite end unrestrained. If the design of the machine is such that only the rod end of the cylinder opposite to where the rod attaches to the machine member can be rotated, consult the factory for further instructions.

3.2 Mounting Recommendations

3.2.1 – Always mount cylinders using the largest possible high tensile alloy steel socket head screws that can fit in the cylinder mounting holes and torque them to the manufacturer's recommendations for their size.

3.2.2 – Side-Mounted Cylinders – In addition to the mounting bolts, cylinders of this type should be equipped with thrust keys or dowel pins located so as to resist the major load.

3.2.3 – Tie Rod Mounting – Cylinders with tie rod mountings are recommended for applications where mounting space is limited. The standard tie rod extension is shown as BB in dimension tables. Longer or shorter extensions can be supplied. Nuts used for this mounting style should be torqued to the same value as the tie rods for that bore size.

3.2.4 – Flange Mount Cylinders – The controlled diameter of the rod gland extension on head end flange mount cylinders can be used as a pilot to locate the cylinders in relation to the machine. After alignment has been obtained, the flanges may be drilled for pins or dowels to prevent shifting.

3.2.5 – Trunnion Mountings – Cylinders require lubricated bearing blocks with minimum bearing clearances. Bearing blocks should be carefully aligned and rigidly mounted so the trunnions will not be subjected to bending moments. The rod end should also be pivoted with the pivot pin in line and parallel to axis of the trunnion pins.

3.2.6 – Clevis Mountings – Cylinders should be pivoted at both ends with centerline of pins parallel to each other. After cylinder is mounted, be sure to check to assure that the cylinder is free to swing through its working arc without interference from other machine parts.

4.0 Cylinder and Accessories Maintenance, Troubleshooting and Replacement

4.1 Storage – At times cylinders are delivered before a customer is ready to install them and must be stored for a period of time. When storage is required the following procedures are recommended.

4.1.1 – Store the cylinders in an indoor area which has a dry, clean and noncorrosive atmosphere. Take care to protect the cylinder from both internal corrosion and external damage.

4.1.2 – Whenever possible cylinders should be stored in a vertical position (piston rod up). This will minimize corrosion due to possible condensation which could occur inside the cylinder. This will also minimize seal damage.

4.1.3 – Port protector plugs should be left in the cylinder until the time of installation.

4.1.4 – If a cylinder is stored full of hydraulic fluid, expansion of the fluid due to temperature changes must be considered. Installing a check valve with free flow out of the cylinder is one method.

4.1.5 – When cylinders are mounted on equipment that is stored outside for extended periods, exposed unpainted surfaces, e.g. piston rod, must be coated with a rust-inhibiting compound to prevent corrosion.

4.2 Cylinder Trouble Shooting

4.2.1 – **External Leakage**

4.2.1.1 – Rod seal leakage can generally be traced to worn or damaged seals. Examine the piston rod for dents, gouges or score marks, and replace piston rod if surface is rough.

Rod seal leakage could also be traced to gland wear. If clearance is excessive, replace rod bushing and seal. Rod seal leakage can also be traced to seal deterioration. If seals are soft or gummy or brittle, check compatibility of seal material with lubricant used if air cylinder, or operating fluid if hydraulic cylinder. Replace with seal material, which is compatible with these fluids. If the seals are hard or have lost elasticity, it is usually due to exposure to temperatures in excess of 165°F. (+74°C). Shield the cylinder from the heat source to limit temperature to 350°F. (+177°C.) and replace with fluorocarbon seals.

4.2.1.2 – Cylinder body seal leak can generally be traced to loose tie rods. Torque the tie rods to manufacturer's recommendation for that bore size.

Excessive pressure can also result in cylinder body seal leak. Determine maximum pressure to rated limits. Replace seals and retorque tie rods as in paragraph above. Excessive pressure can also result in cylinder body seal leak. Determine if the pressure rating of the cylinder has been exceeded. If so, bring the operating pressure down to the rating of the cylinder and have the tie rods replaced.

Pinched or extruded cylinder body seal will also result in a leak. Replace cylinder body seal and retorque as in paragraph above.

Cylinder body seal leakage due to loss of radial squeeze which shows up in the form of flat spots or due to wear on the O.D. or I.D. – Either of these are symptoms of normal wear due to high cycle rate or length of service. Replace seals as per paragraph above.

4.2.2 – **Internal Leakage**

4.2.2.1 – Piston seal leak (by-pass) 1 to 3 cubic inches per minute leakage is considered normal for piston ring construction. Virtually no static leak with lipseal type seals on piston should be expected. Piston seal wear is a usual cause of piston seal leakage. Replace seals as required.

4.2.2.2 – With lipseal type piston seals excessive back pressure due to over-adjustment of speed control valves could be a direct cause of rapid seal wear. Contamination in a hydraulic system can result in a scored cylinder bore, resulting in rapid seal wear. In either case, replace piston seals as required.

4.2.2.3 – What appears to be piston seal leak, evidenced by the fact that the cylinder drifts, is not always traceable to the piston. To make sure, it is suggested that one side of the cylinder piston be pressurized and the fluid line at the opposite port be disconnected. Observe leakage. If none is evident, seek the cause of cylinder drift in other component parts in the circuit.

4.2.3 – **Cylinder Fails to Move the Load**

4.2.3.1 – Pneumatic or hydraulic pressure is too low. Check the pressure at the cylinder to make sure it is to circuit requirements.

4.2.3.2 – Piston Seal Leak – Operate the valve to cycle the cylinder and observe fluid flow at valve exhaust ports at end of cylinder stroke. Replace piston seals if flow is excessive.

4.2.3.3 – Cylinder is undersized for the load – Replace cylinder with one of a larger bore size.

4.3 Erratic or Chatter Operation

4.3.1 – Excessive friction at rod gland or piston bearing due to load misalignment – Correct cylinder-to-load alignment.

4.3.2 – Cylinder sized too close to load requirements – Reduce load or install larger cylinder.

4.3.3 – Erratic operation could be traced to the difference between static and kinetic friction. Install speed control valves to provide a back pressure to control the stroke.

4.4 Cylinder Modifications, Repairs, or Failed Component – Cylinders as shipped from the factory are not to be disassembled and or modified. If cylinders require modifications, these modifications must be done at company locations or by The Company's certified facilities. The Cylinder Division Engineering Department must be notified in the event of a mechanical fracture or permanent deformation of any cylinder component (excluding seals). This includes a broken piston rod, tie rod, mounting accessory or any other cylinder component. The notification should include all operation and application details. This information will be used to provide an engineered repair that will prevent recurrence of the failure.

It is allowed to disassemble cylinders for the purpose of replacing seals or seal assemblies. However, this work must be done by strictly following all the instructions provided with the seal kits.

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1. Terms and Conditions. Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is expressly conditioned on Buyer's assent to these Terms and Conditions and to the terms and conditions found on-line at www.parker.com/saleterms/. Seller objects to any contrary or additional term or condition of Buyer's order or any other document issued by Buyer.

2. Price Adjustments; Payments. Prices stated on the reverse side or preceding pages of this document are valid for 30 days. After 30 days, Seller may change prices to reflect any increase in its costs resulting from state, federal or local legislation, price increases from its suppliers, or any change in the rate, charge, or classification of any carrier. The prices stated on the reverse or preceding pages of this document do not include any sales, use, or other taxes unless so stated specifically. Unless otherwise specified by Seller, all prices are F.O.B. Seller's facility, and payment is due 30 days from the date of invoice. After 30 days, Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. Delivery Dates; Title and Risk; Shipment. All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon tender to the carrier at Seller's facility (i.e., when it's on the truck, it's yours). Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's changes in shipping, product specifications or in accordance with Section 13, herein.

4. Warranty. Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of twelve months from the date of delivery to Buyer or 2,000 hours of normal use, whichever occurs first. This warranty is made only to Buyer and does not extend to anyone to whom Products are sold after purchased from Seller. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

5. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 60 days after delivery or, in the case of an alleged breach of warranty, within 30 days after the date within the warranty period on which the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for any amount due to Seller from Buyer) must be commenced within thirteen months from the date of tender of delivery by Seller or, for a cause of action based upon an alleged breach of warranty, within thirteen months from the date within the warranty period on which the defect is or should have been discovered by Buyer.

6. LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. **IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.**

7. Contingencies. Seller shall not be liable for any default or delay in performance if caused by circumstances beyond the reasonable control of Seller.

8. User Responsibility. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

9. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

10. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

11. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer.

12. Improper use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

13. Cancellations and Changes. Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

14. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

15. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of the agreement. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

16. Waiver and Severability. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

17. Termination. This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may by written notice immediately terminate this agreement for the following: (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custodian for all or any part of Buyer's property (b) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by a third party (c) an assignment for the benefit of creditors, or (d) the dissolution or liquidation of the Buyer.

18. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both parties expressly agree in writing to arbitrate the dispute.

19. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

20. Taxes. Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of Products.

21. Equal Opportunity Clause. For the performance of government contracts and where dollar value of the Products exceed $10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRAA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated.

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