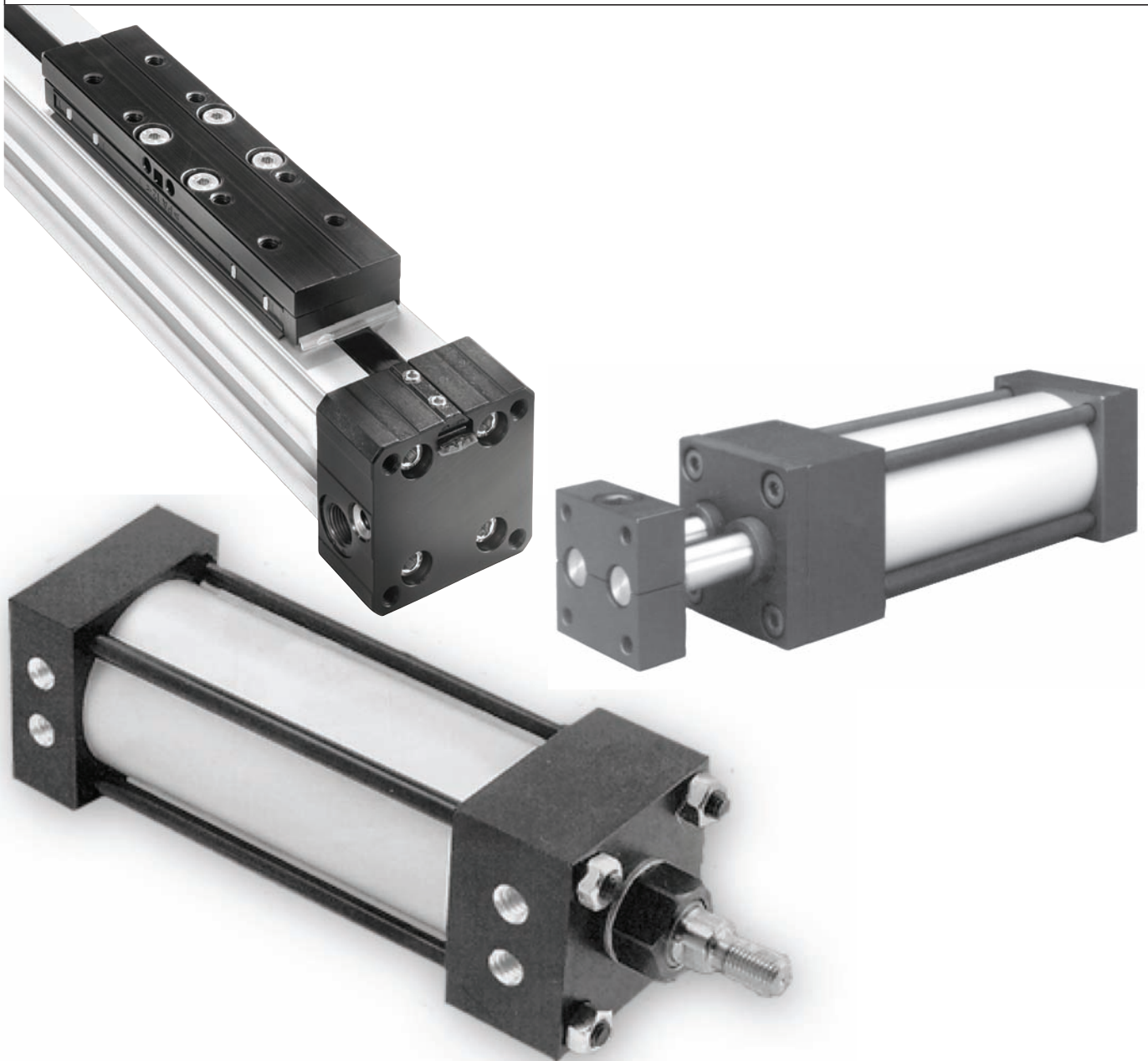


**EATON**

**Vickers**

**Pneumatic Cylinders  
Light Duty**

L Series



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# How to Order

## Standard Cylinders

Eaton has created an easy system for ordering Vickers™ Series VP/VN, ML, RL, BL or SL cylinders. This system has been developed to improve our service to you. The model code consists of sixteen alpha-numeric digits which fully describe the most common standard options offered on Series VP/VN, ML, RL, BL or SL cylinders.

To specify your Series VP/VN, ML, RL, BL or SL cylinder, review the following pages for a full description of each option available and select the desired code.

This model code system will:

- **Simplify the re-order process.**

Each Series VP/VN, ML, RL, BL or SL cylinder is assigned a sixteen digit model code. That code is unique to a particular cylinder description. That way, when you re-order your Series VP/VN, ML, RL, BL or SL cylinder, you're assured of exactly the same top quality cylinder design.

- **Improve identification.**

Every Series VP/VN, ML, RL, BL or SL cylinder has its 16 digit model code clearly labeled on the product. Each 16 digit code completely describes a specific cylinder. This allows seals and replacement components to be easily identified in the field.

- **Facilitate communications.**

This fully descriptive model code system allows you to work directly with your local Eaton sales engineer to identify and service your Vickers cylinder.

**NOTE**

See pages 4, 68, 89, 104 and 116 for a summary of model code options.

## Custom Cylinders

Although the model code has been arranged to cover the vast majority of available options, there will be occasions when you require an option which cannot be coded. When specifying such an option, enter an "X" for the appropriate item in the sixteen digit model code, then describe your requirements. For example, if you have an application which requires a custom thread on the end of the piston rod, enter an "X" for item 7. Then add a full description at the end of the model code, such as "With 3.25 inch total rod projection and M22 x 1.5 thread 1.375 inches long." The cylinder will then be given a unique five digit design number on receipt of order (as explained below).

## Replacement Cylinders

Every custom cylinder is assigned a unique design number. This number is contained in the last five digits of the 16 digit model code, and item 12 is always an alpha character. In other words, the "Stroke" and "Extra Rod Projection" locations (items 12 through 16) become the "Design Number" items for custom cylinders. When ordering a replacement cylinder, simply give the 16 digit model code or the five digit design number to your local Sales Representative.

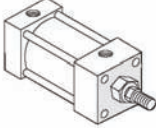
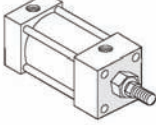
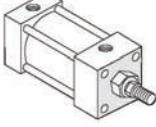

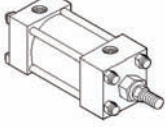

## Replacement Parts

Each design number is stored in a quick retrieval computerized storage system. This gives our field sales representatives rapid access to assist you in identifying and specifying genuine Vickers replacement parts.

## Warranty

Eaton is proud to offer a comprehensive two year warranty on the L Series pneumatic cylinders.

# L-Series Features and Benefits

Product Name/Description	Key Applications	Features/Benefits	
<b>Non-Lubricated Air/Hydraulic Cylinder</b> VP Series 	Packaging, bottling, machine tool	<ul style="list-style-type: none"> <li>• High strength steel design for robust performance</li> <li>• Superior cushion seal design for smoother, faster operation</li> </ul>	<ul style="list-style-type: none"> <li>• Wide range of standard options for faster response</li> </ul>
<b>Corrosion Resistant Air Cylinder (NFPA)</b> VN Series 	Packaging, bottling, machine tool	<ul style="list-style-type: none"> <li>• Unique hybrid aluminum/stainless combination for ultimate corrosion protection at a better price</li> </ul>	<ul style="list-style-type: none"> <li>• Better performance &amp; protection than competitive aluminum products</li> </ul>
<b>ISO 6431/VDMA 24562 Air Cylinder</b> ML Series 	Packaging, bottling, material handling, machine tool, auto assembly, commercial laundry	<ul style="list-style-type: none"> <li>• ISO 6431/VDMA 24562 dimensionally interchangeable</li> <li>• Tie rod design with smooth body</li> </ul>	<ul style="list-style-type: none"> <li>• Broad standard options for flexibility</li> <li>• Collar nut design for bolt-on mountings</li> <li>• Fast product delivery</li> </ul>
<b>Rodless Air Cylinder</b> RL Series 	Paper mill, textiles, material handling, packaging, transfer lines	<ul style="list-style-type: none"> <li>• Unique sealing system with higher pressure rating in industry</li> <li>• Lightweight, space saving design built at 50% space of conventional cylinders</li> </ul>	<ul style="list-style-type: none"> <li>• Long strokes without rod buckling risk; high load carrying capability</li> <li>• Simple, cost-effective guide options</li> <li>• Designed for serviceability</li> </ul>
<b>Stainless Steel Air Cylinder (NFPA)</b> SL Series 	Food processing, medical, packaging, milking parlors, automatic car washes	<ul style="list-style-type: none"> <li>• NFPA tie rod dimensionally interchangeable</li> <li>• Superior corrosion resistance for tough environments</li> </ul>	<ul style="list-style-type: none"> <li>• Robust design with non-metallic piston wear band, composite bearing insert, and stainless steel rod cartridge</li> </ul>
<b>Non-Rotating Cylinders (NFPA)</b> BL Series 	Machine tool, fixturing, clamping, packaging	<ul style="list-style-type: none"> <li>• NFPA interchangeable</li> <li>• Twin rod design for non-rotating, anti-torque applications</li> </ul>	



# Series VP/VN Features

## Wiper Seal

Urethane wiper seal keeps contaminants from getting into cylinder by aggressively wiping foreign materials from the piston rod, enhancing the rod seal life.

## Head/Cap

Precision machined from alloy aluminum, then black anodized for corrosion resistance in Series VP, and electroless nickel plated for Series VN option.

## Adjustable Captive Cushion Adjusting Screw

One-piece stainless steel cushion screw with fine threads is held captive by a stainless steel press-in retaining washer. This allows for safe and precise adjustment of the cushion without inadvertent removal.

## Cylinder Body

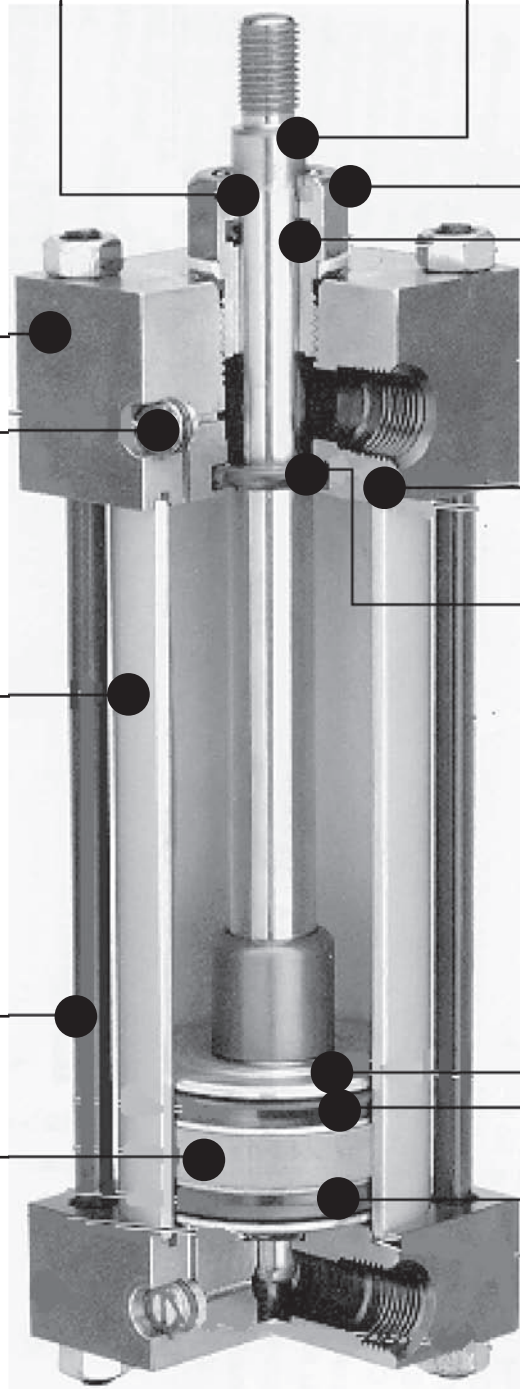
High-strength aluminum alloy tubing is clear anodized on the O.D. and hard anodic coated on the I.D., resulting in a smooth, file hard (60RC), corrosion and score resistant surface finish for extended seal life in Series VP. Stainless steel tubing is used in Series VN option.

## Tie Rods

High-strength steel in Series VP, and stainless steel for Series VN option, maintains uniform compression on body end seals.

## Wear Ring

Reinforced Teflon® compounded with polyphenylene sulfide provides supreme wear and excellent bearing support.



## Piston Rod

Hard chrome plated high-tensile carbon steel, ground and polished in Series VP, and stainless steel for Series VN option.

## Rod Bearing

Externally removable threaded steel bearing cartridge with black oxide finish in Series VP, or stainless steel for Series VN option, both with an oil-impregnated sintered iron rod bearing.

## Rod Seal

Nitrile lip-type seal is pressure energized and wear compensating for durability and long life.

## O-Ring Body Seal

Nitrile material is standard, with Viton® optional.

## Super Cushion Seals

Advanced design features a unique, one-piece, compound seal of nitrile\* captured within a precision machined groove. Linear and radial "float" of the cushion seals eliminates misalignment. Super Cushions provide exceptionally fast "out of cushion" stroke reversal. (Head and Cap Cushions are optional on 1-1/2 thru 8 inch bore cylinders.) \*Nitrile seals on the 5/8" & 1" rod diameter. For rod sizes 1-3/8" and larger, urethane seals are standard.

## Piston

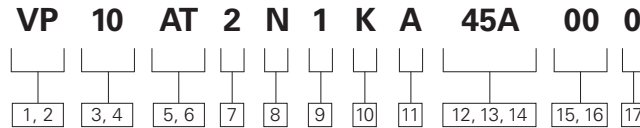
Machined solid aluminum alloy, light-weight for low inertia, yet strong. (Threaded and installed with high strength threadlocker adhesive.)

## Piston Seals

Long-wearing nitrile cup seals.

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

# Series VP/VN Model Code



**1, 2 Series (ANSI B93, 15/ NFPA)**

**VP** – Non-lubricated air/hydraulic cylinder  
**VN** – Corrosion resistant air cylinder

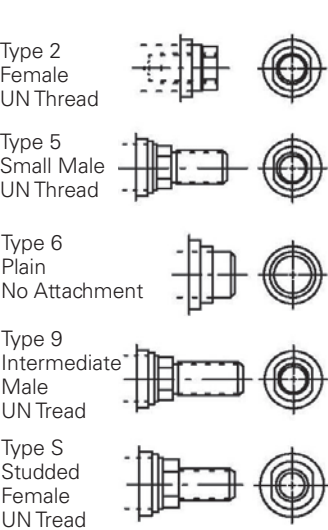
**3, 4 Mounting Style**

Code	Style 1-1/2 thru 8" Bore	ANSI Code
01	Side lug	MS2
02	Side tapped	MS4
03	End lug	MS7
07	Head rectangular flange	MF1
08	Head square	ME3
10	Cap fixed clevis	MP1
12	Cap rectangular flange	MF2
13	Cap square	ME4
16	Cap trunnion	MT2
17	Head trunnion	MT1
18	Sleeve nut for tapped face	–
21	Cap extended tie rod	MX2
22	Head extended tie rod	MX3
23	Both ends extended tie rod	MX1
24	No mounts MX0	–
41	Double rod, no mounts	–
45	Angle	MS1
48	Detachable eye	MP4
50	Detachable clevis	MP2
<b>3/4 thru 1-1/8 Bore</b>		
01	Bolt thru	MS8
02	Tapped	MS9
07	Head rectangular flange	MF1
12	Cap rectangular flange	MF2
18	Head tapped face	MR1
20	Threaded nose	MNR1
24	No mounts	MX0
25	Double rod w/bolt thru	–
47	Fixed eye	MP3
48	Detachable eye	MP4
50	Detachable clevis	MP2

**5, 6 Bore and Rod Diameter**

Code	Bore	Rod
AT	3/4	5/16
1A	1-1/8	3/8
1B	1-1/8	1/2
CC	1-1/2	5/8
CE	1-1/2	1
DC	2	5/8
DE	2	1
EC	2-1/2	5/8
EE	2-1/2	1
GE	3-1/4	1
GH	3-1/4	1-3/8
HE	4	1
HH	4	1-3/8
KE	5	1
KH	5	1-3/8
LH	6	1-3/8
LL	6	1-3/4
MH	7	1-3/8
ML	7	1-3/4
NH	8	1-3/8
NL	8	1-3/4

**7 Rod End Types**



**8 Seal Options**

**N** – Standard  
**T** – Viton®

**9 Port Options**

**1** – Standard  
**2** – Oversized (NFPA)

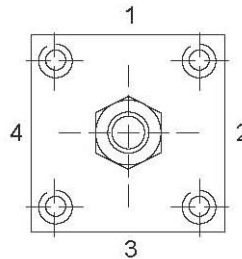
**10 Port Locations**

Positions are numbers as shown in item 6.

Code	Head	Cap
K	1	1
R	2	2
W	3	3
4	4	4

**11 Cushion Location**

Cushions are located as shown below when viewing cylinder from head end (mounting end of double rod cylinders). “–” in table indicates no cushion.



Code	Head	Cap
A	–	–
B	–	1
C	–	2
D	–	3
E	–	4
F	1	–
G	2	–
H	3	–
J	4	–
K	1	1

**12, 13, 14 Cylinder Stroke**

Items 12 and 13 indicate stroke length from 00 inches through 99 inches.

Item 14 indicates fraction of an inch per the following codes:

Code	Fraction	Code	Fraction
0	0	8	1/2
1	1/16	9	9/16
2	1/8	A	5/8
3	3/16	B	11/16
4	1/4	C	3/4
5	5/16	D	13/16
6	3/8	E	7/8
7	7/16	F	5/16

**15, 16 Extra Rod Projection**

Item 15 indicates inches from 0 thru 9.

Item 16 indicates fraction of an inch per the following codes:

Code	Fraction	Code	Fraction
0	0	8	1/2
1	1/16	9	9/16
2	1/8	A	5/8
3	3/16	B	11/16
4	1/4	C	3/4
5	5/16	D	13/16
6	3/8	E	7/8
7	7/16	F	15/16

– OR –

**Proximity Switch Magnet**

**PN** – Magnet Not Required (No Proximity Switch Option)

**PK** – Magnet Furnished to Operate Hall Effect or Reed Type Switch

**17 Custom**

**X** – Custom Modification

# Series VP/VN Cylinder Features

1-1/2 – 8 inch Bores

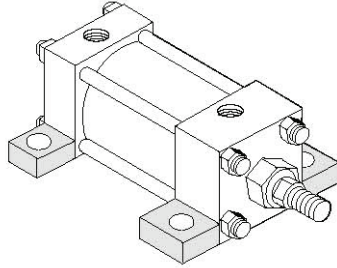
## Available Mountings

The variety of standard ANSI/NFPA mountings available in 1-1/2"-8" bore Series VN/VP gives you a broad selection to match the proper mount to your application. Eaton offers rigid mounts (including side lug mounts, flange mounts, and extended tie rod mounts) and swivel mounts (including clevis mounts and trunnion mounts). A guide to proper mount selection is provided on pages 8 through 41. For custom mounts, enter "XX" for model code positions 3 and 4, and give a detailed description with drawings. Series VN/VP cylinders are available in all mounting styles listed.

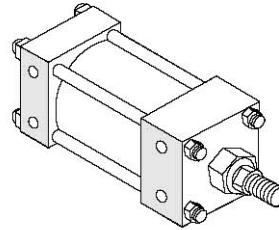
## Selecting the Proper Mounting

Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified. Note: In the mounting information, some mounts have been down-rated to minimize deflection. For applications where the motion is linear and parallel to the cylinder rod motion, a rigid mount is recommended. For curvilinear motion, a swivel mount should be chosen. The specifics of each application dictate the correct mounting style.

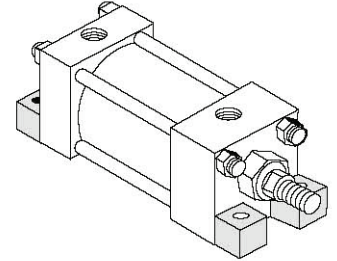
**Code 01 (MS2)  
Side Lug**



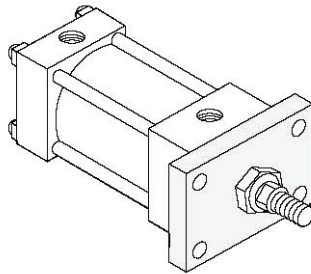
**Code 02 (MS4)  
Tapped**



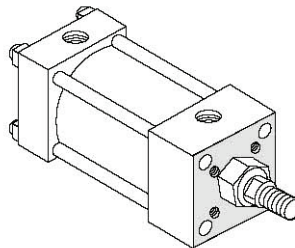
**Code 03 (MS7)  
End Lug**



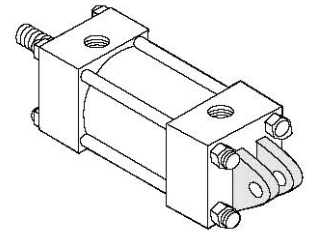
**Code 07 (MF1)  
Head Rectangular Flange**



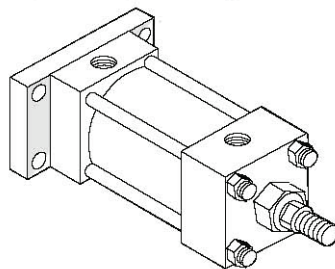
**Code 08 (ME3)  
Head Square**



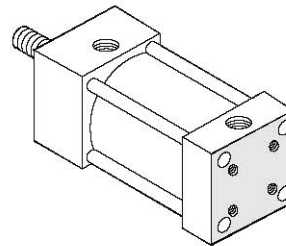
**Code 10 (MP1)  
Cap Fixed Clevis**



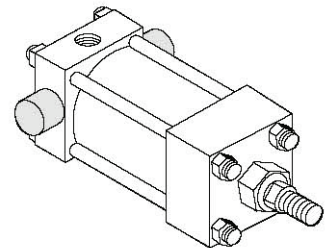
**Code 12 (MF2)  
Cap Rectangular Flange**



**Code 13 (ME4)  
Cap Square**



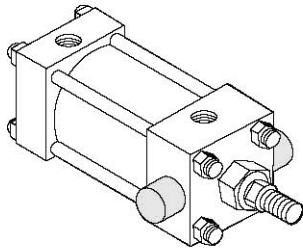
**Code 16 (MT2)  
Cap Trunnion**



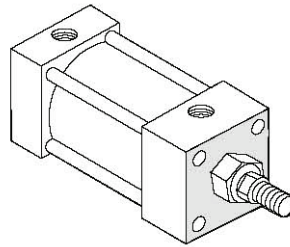
# Series VP/VN Mounting Style

1-1/2 – 8 inch Bores

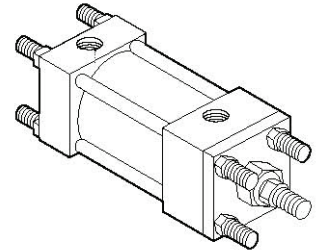
**Code 17 (MT2)  
Head Trunnion**



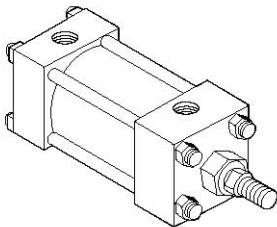
**Code 18 Sleeve Nut  
Construction for Tapped  
Faces**



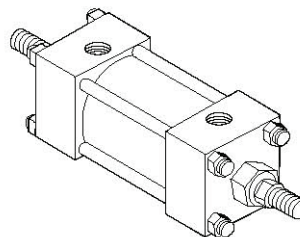
**Codes 21 (MX2) Cap, 22  
(MX3) head, 23 (MX1)  
Extended Tie Rod**



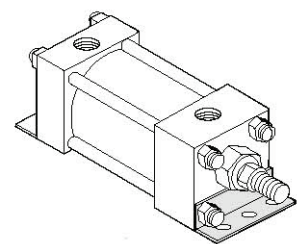
**Code 24 (MX0)  
No Mounts**



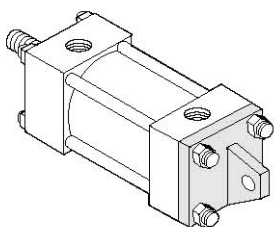
**Double Rod  
Code 41 (MX0)  
No Mounts**



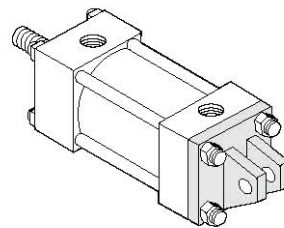
**Code 45 (MS1)  
Angle**



**Code 48 (MP4)  
Cap Detachable Eye**



**Code 50 (MP2)  
Cap Detachable Clevis**





# Series VP/VN Mounting Style:

3/4 & 1-1/8 inch Bores

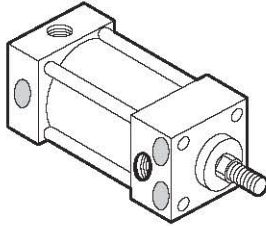
## Available Mountings

The variety of standard ANSI/NFPA mountings available in 3/4"-1/8" bore Series VN/VP gives you a broad selection to match the proper mount to your application. Eaton offers rigid mounts (including side lug mounts, flange mounts, and extended tie rod mounts) and swivel mounts (including clevis mounts and trunnion mounts). A guide to proper mount selection is provided on pages 47 through 54. For custom mounts, enter "XX" for model code positions 3 and 4, and give a detailed description with drawings. Series VN/VP cylinders are available in all mounting styles listed.

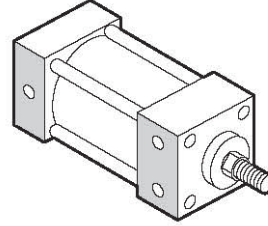
## Selecting the Proper Mounting

Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified. Note: In the mounting information, some mounts have been down-rated to minimize deflection. For applications where the motion is linear and parallel to the cylinder rod motion, a rigid mount is recommended. For curvilinear motion, a swivel mount should be chosen. The specifics of each application dictate the correct mounting style.

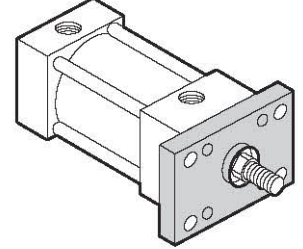
**Code 01 (MS8)  
Bolt Thru**



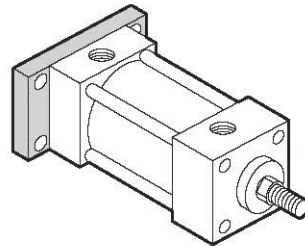
**Code 02 (MS9)  
Tapped**



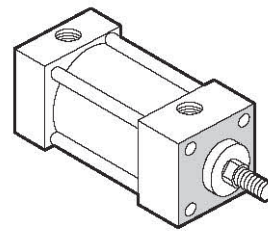
**Code 07 (MF1)  
Head Rectangular Flange**



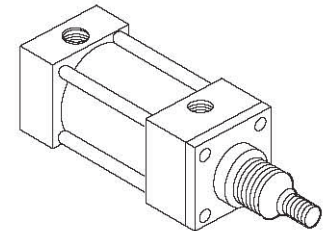
**Code 12 (MF2)  
Cap Rectangular Flange**



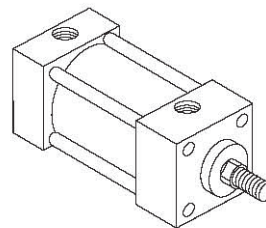
**Code 18 (MR1)  
Head Tapped Face**



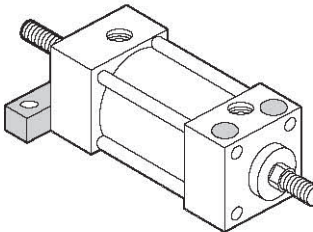
**Code 20 (MNR1)  
Threaded Nose Mounts**



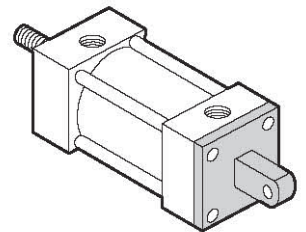
**Code 24 (MX0)  
No Mounts**



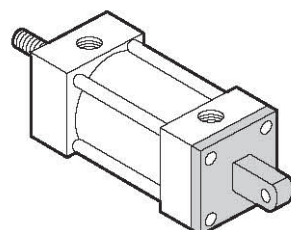
**Code 25 Double Rod,  
Bolt Thru**



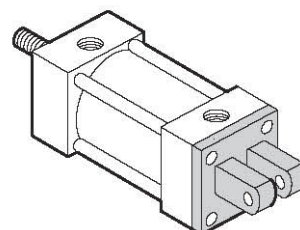
**Code 47 (MP3)  
Fixed Eye**



**Code 48 (MP4)  
Detachable Eye**



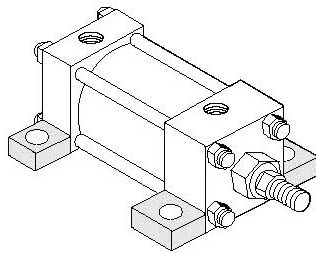
**Code 50 (MP2)  
Detachable Clevis**



# Series VP/VN Mounting Styles and Installation Dimensions

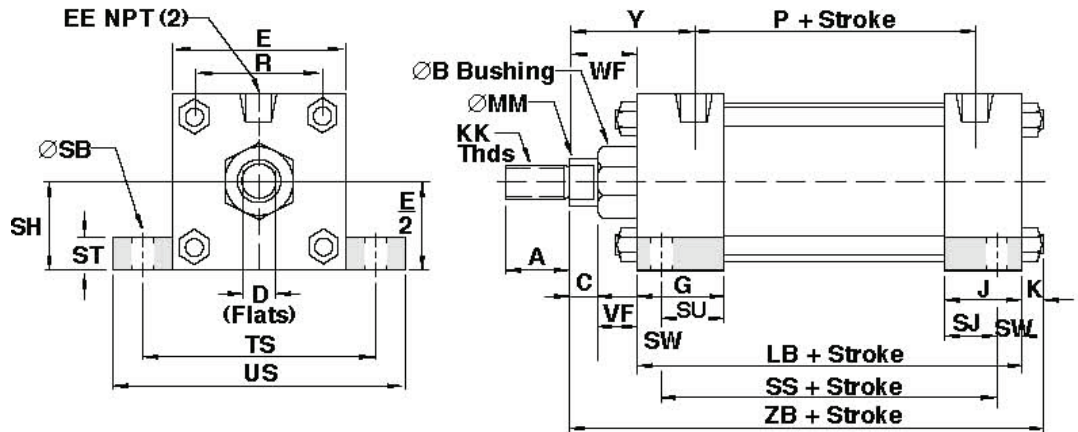
## Code 01 Side Lug Mounts (ANSI MS2)

Side lug mounts are for moving loads along a flat guided surface as in a carriage along rails.



The mounting surface should be flat and parallel to the centerline of the piston rod.

The load should be guided to transverse along the centerline of the piston rod. The frame on which the cylinder is mounted must be sufficiently rigid to resist bending moments.



### NOTE

Limit operating pressure to 400 psi (27 bar) non-shock hydraulic for minimum deflection. For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

With unsupported loads, the bearing must absorb more force. For these applications, the larger available rod is recommended, and stop tubes should be considered.

# Series VP/VN Mounting Styles and Installation Dimensions

## Code 01 Side Lug Mounts (ANSI MS2)

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
B +.000 -.002	Std.	1.124	(28.55)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.499	(38.08)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14	
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12	
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.813	(12.70)
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14	
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12	
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)
K		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16	
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14	
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)
R		1.428	(36.27)	1.838	(46.68)	2.192	(55.67)	2.758	(70.05)
SB		.438	(11.11)	.438	(11.11)	.438	(11.11)	.563	(14.29)
SH		1.000	(25.40)	1.250	(31.75)	1.500	(38.10)	1.875	(47.63)
SJ		.625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19.05)
SS		2.875	(73.03)	2.875	(73.03)	3.000	(76.20)	3.250	(82.55)
ST		.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)
SU		1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.250	(31.75)
SW		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
TS		2.750	(69.85)	3.250	(82.55)	3.750	(95.25)	4.750	(120.65)
US		3.500	(88.90)	4.000	(101.60)	4.500	(114.30)	5.750	(146.05)
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
XS	Std.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.875	(47.63)
	O.S.	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)	2.125	(53.98)
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)
ZB	Std.	4.875	(123.83)	4.938	(125.41)	5.063	(128.59)	6.000	(152.40)
	O.S.	5.250	(133.35)	5.313	(134.94)	5.438	(138.11)	6.250	(158.75)

All dimensions in inches (mm)



# Series VP/VN- Mounting Styles and Installation Dimensions

## Code 01 Side Lug Mounts (ANSI MS2)

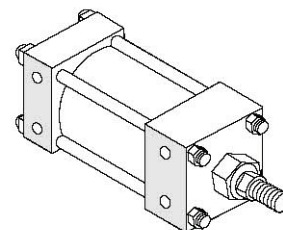
4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.813	(12.70)	.813	(12.70)	1.125	(15.88)	1.125	(15.88)	1.125	(15.88)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	7.500	(190.50)	8.500	(215.90)
.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1 - 14		1 - 14		1-3/8 - 12		1-3/8 - 12		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12		1-3/4 - 12		1-3/4 - 12	
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.375	(9.53)	.438	(11.11)	.438	(11.11)	.563	(14.29)	.563	(14.29)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)	5.125	(130.18)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
3.323	(84.40)	4.101	(104.16)	4.879	(123.92)	5.639	(145.54)	6.442	(163.63)
.563	(14.29)	.813	(20.64)	.813	(20.64)	.813	(20.64)	.813	(20.64)
2.250	(57.15)	2.750	(69.85)	3.250	(82.55)	3.750	(95.25)	4.250	(107.95)
.750	(19.05)	.813	(20.64)	.813	(20.64)	.813	(20.64)	.813	(20.64)
.750	(19.05)	.813	(20.64)	.813	(20.64)	.813	(20.64)	.813	(20.64)
.750	(19.05)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.250	(31.75)	1.063	(26.99)	1.313	(33.34)	1.313	(33.34)	1.313	(33.34)
.500	(12.70)	.688	(17.46)	.688	(17.46)	.688	(17.46)	.688	(17.46)
5.500	(139.70)	6.875	(174.63)	7.875	(200.03)	8.875	(225.43)	9.875	(250.83)
6.500	(165.10)	8.250	(209.55)	9.250	(234.95)	10.250	(260.35)	11.250	(285.75)
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)
1.875	(47.63)	2.062	(52.37)	2.313	(58.74)	2.313	(58.74)	2.313	(58.74)
2.125	(53.98)	2.313	(58.74)	2.562	(65.07)	2.562	(65.07)	2.562	(65.07)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)
6.000	(152.40)	6.313	(160.34)	7.063	(179.39)	7.313	(185.74)	7.313	(185.74)
6.250	(158.75)	6.563	(166.69)	7.313	(185.74)	7.563	(192.09)	7.563	(192.09)

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions

Tapped mounts are for moving loads along a flat guided surface as in a carriage along rails. The mounting surface should be flat and parallel to the centerline of the piston rod.

The load should be guided to traverse along the centerline of the piston rod. The frame on which the cylinder is mounted must be sufficiently rigid to resist bending moments.



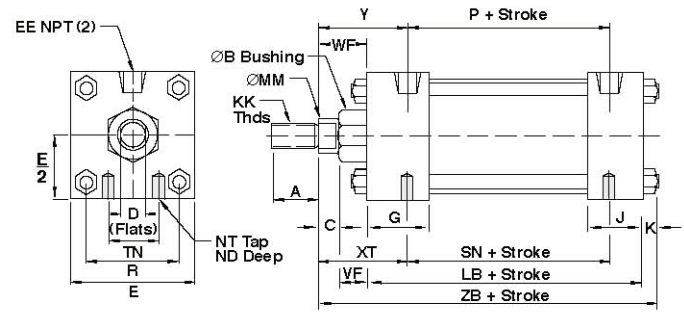
## Code 02 Tapped Mounts

(ANSI MS4)

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
B +.000 -.002	Std.	1.124	(28.55)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.499	(38.08)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14	
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12	
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.813	(20.64)
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14	
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12	
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)
K		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16	
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14	
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
ND		.375	(9.53)	.375	(9.53)	.500	(12.70)	.750	(19.05)
NT		1/4 - 20		5/16 - 18		3/8 - 18		1/2 - 13	
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)
R		1.428	(36.27)	1.838	(46.68)	2.192	(55.67)	2.758	(70.05)
SN		2.250	(57.15)	2.250	(57.15)	2.375	(60.33)	2.625	(66.68)
TN		.625	(15.88)	.875	(22.23)	1.250	(31.75)	1.500	(38.10)
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
XT	Std.	1.938	(49.21)	1.938	(49.21)	1.938	(49.21)	2.438	(61.91)
	O.S.	2.313	(58.74))	2.313	(58.74))	2.313	(58.74))	2.688	(68.26)
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)
ZB	Std.	4.875	(123.83)	4.938	(125.41)	5.063	(128.59)	6.000	(152.40)
	O.S.	5.250	(133.35)	5.313	(134.94)	5.438	(138.11)	6.250	(158.75)

All dimensions in inches (mm)

# Series VP/VN- Mounting Styles and Installation Dimensions



## Code 02 Tapped Mounts

(ANSI MS4)

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.813	(12.70)	.813	(12.70)	1.125	(15.88)	1.125	(15.88)	1.125	(15.88)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	7.500	(190.50)	8.500	(215.90)
.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1 - 14		1 - 14		1-3/8 - 12		1-3/8 - 12		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12		1-3/4 - 12		1-3/4 - 12	
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.375	(9.53)	.438	(11.11)	.438	(11.11)	.563	(14.29)	.563	(14.29)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)	5.125	(130.18)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
.750	(19.05)	.938	(23.81)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1/2 - 13		5/8 - 11		3/4 - 10		3/4 - 10		3/4 - 10	
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
3.323	(84.40)	4.101	(104.16)	4.879	(123.92)	5.639	(145.54)	6.442	(163.63)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
2.063	(52.37)	2.688	(68.28)	3.250	(82.55)	3.500	(88.90)	4.500	(114.30)
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)
6.000	(152.40)	6.313	(160.34)	7.063	(179.39)	7.313	(185.74)	7.313	(185.74)
6.250	(158.75)	6.563	(166.69)	7.313	(185.74)	7.563	(192.09)	7.563	(192.09)

All dimensions in inches (mm)

### NOTE

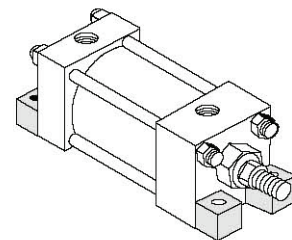
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

With unsupported loads, the bearing must absorb more force. For these applications, the larger available rod is recommended, and stop tubes should be considered.

# Series VP/VN Mounting Styles and Installation Dimensions

End lug mounts are for moving loads along a flat guided surface as in a carriage along rails. The mounting surface should be flat and parallel to the centerline of the piston rod.

The load should be guided to traverse along the centerline of the piston rod. The frame on which the cylinder is mounted must be sufficiently rigid to resist bending moments.



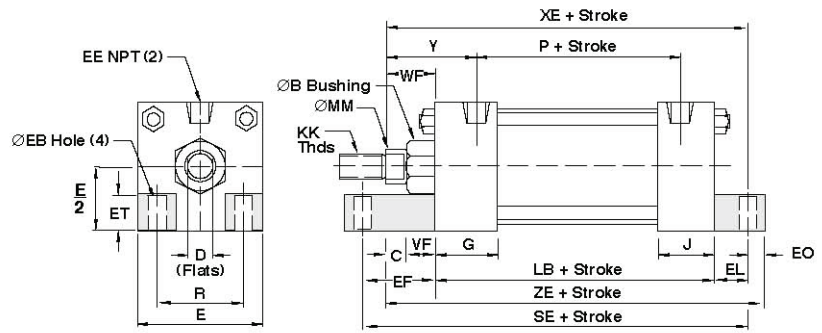
## Code 03 End Lug Mounts

(ANSI MS7)

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)		
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)	
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)	
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	
B	+0.002	Std.	1.124	(28.55)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	-0.002	O.S.	1.499	(38.08)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14		
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12		
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.813	(20.64)	
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)	
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	
EB		.313	(7.94)	.375	(9.53)	.375	(9.53)	.438	(11.11)	
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	
EF		1.125	(28.58)	1.313	(33.34)	1.438	(36.51)	1.500	(38.10)	
EL		.750	(19.05)	.938	(23.81)	1.063	(26.99)	.875	(22.23)	
EO		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)	
ET		.500	(12.70)	.750	(19.05)	.750	(19.05)	1.000	(25.40)	
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14		
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12		
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)	
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16		
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14		
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)	
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)	
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)	
R		1.428	(36.27)	1.838	(46.68)	2.192	(55.67)	2.758	(70.05)	
SE		5.500	(139.70)	5.875	(149.23)	6.250	(158.75)	6.625	(168.28)	
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)	
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)	
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	
XE	Std.	5.375	(136.53)	5.563	(141.29)	5.813	(147.64)	6.500	(165.10)	
	O.S.	5.750	(146.05)	5.938	(150.81)	6.188	(157.16)	6.750	(171.45)	
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)	
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)	
ZE	Std.	5.625	(142.88)	5.875	(149.23)	6.125	(155.58)	6.875	(174.63)	
	O.S.	6.000	(152.40)	6.250	(158.75)	6.500	(165.10)	7.125	(180.98)	

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions



## Code 03 End Lug Mounts

(ANSI MS7)

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.813	(12.70)	.813	(12.70)	1.125	(15.88)	1.125	(15.88)	1.125	(15.88)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	7.500	(190.50)	8.500	(215.90)
.438	(11.11)	.563	(14.29)	.563	(14.29)	.688	(17.46)	.688	(17.46)
.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1.625	(41.28)	1.688	(42.88)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
1.000	(25.40)	1.063	(26.99)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)
.375	(9.53)	.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)
1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	2.063	(52.39)
1 - 14		1 - 14		1-3/8 - 12		1-3/8 - 12		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12		1-3/4 - 12		1-3/4 - 12	
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)	5.125	(130.18)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
3.323	(84.40)	4.101	(104.16)	4.879	(123.92)	5.639	(145.54)	6.442	(163.63)
6.875	(174.63)	7.250	(184.15)	7.750	(196.85)	8.000	(203.20)	8.000	(203.20)
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)
6.625	(168.28)	6.938	(176.21)	7.625	(193.68)	7.875	(200.03)	7.875	(200.03)
6.875	(174.63)	7.188	(182.56)	7.875	(200.03)	8.125	(206.38)	8.125	(206.38)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)
7.000	(177.80)	7.438	(188.91)	8.125	(206.38)	8.500	(215.90)	8.500	(215.90)
7.250	(184.15)	7.688	(195.26)	8.375	(212.73)	8.750	(222.25)	8.750	(222.25)

All dimensions in inches (mm)

### NOTE

Limit operating pressure to 400 psi (27 bar) non-shock hydraulic for minimum deflection.

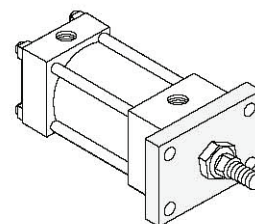
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

With unsupported loads, the bearing must absorb more force. For these applications, the larger available rod is recommended, and stop tubes should be considered.

# Series VP/VN Mounting Styles and Installation Dimensions

These mounts are ideal for straight line force transfer applications in which the cylinder is used in tension (pulling). The mounting surface should be flat and the rod end cartridge should be piloted into it.

The frame on which the cylinder is mounted must be sufficiently rigid to resist bending moments.

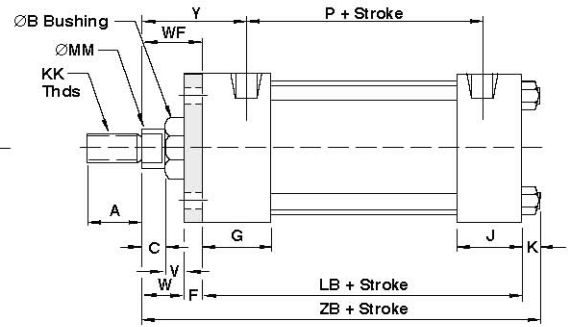
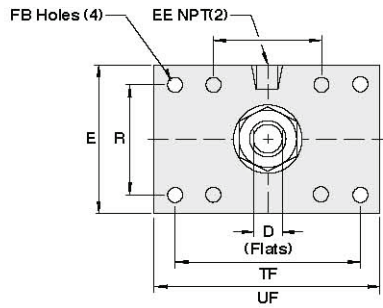


## Code 07 Head Rectangular Flange Mounts (ANSI MF1)

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
B +.000 -.002	Std.	1.124	(28.55)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.499	(38.08)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14	
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12	
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.813	(12.70)
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
F		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
FB		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
FF	Std.	5/8 - 18	5/8 - 18	5/8 - 18	1 - 14	1 - 14	1 - 14	1-3/8 - 12	
	O.S.	1 - 14	1 - 14	1 - 14	1-3/8 - 12	1-3/8 - 12	1-3/8 - 12	1-3/4 - 12	
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)
K		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16	
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14	
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)
R		1.428	(36.27)	1.838	(46.68)	2.192	(55.67)	2.758	(70.05)
TF		2.750	(69.85)	3.375	(85.73)	3.875	(98.43)	4.688	(119.06)
UF		3.375	(85.73)	4.125	(104.78)	4.625	(117.48)	5.500	(139.70)
V	Std.	.250	(6.35)	.250	(6.35)	.250	(6.35)	.250	(6.35)
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.375	(9.53)
W	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19.05)
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)
ZB	Std.	4.875	(123.83)	4.938	(125.41)	5.063	(128.59)	6.000	(152.40)
	O.S.	5.250	(133.35)	5.313	(134.94)	5.438	(138.11)	6.250	(158.75)

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions



## Code 07 Head Rectangular Flange Mounts (ANSI MF1)

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)
.500	(12.70)	.500	(12.70)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)
7/8 - 14		7/8 - 14		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12	
.813	(12.70)	.813	(12.70)	1.125	(15.88)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)
.500	(12.70)	.500	(12.70)	.750	(19.05)
.500	(12.70)	.500	(12.70)	.750	(19.05)
.500	(12.70)	.500	(12.70)	.750	(19.05)
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)
.438	(11.11)	.438	(11.11)	1.500	(38.10)
3/4 - 16		3/4 - 16		1 - 14	
1 - 14		1 - 14		1-1/4 - 12	
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)
3.323	(84.40)	4.101	(104.16)	4.879	(123.92)
5.438	(138.11)	6.625	(168.28)	7.625	(193.68)
6.250	(158.75)	7.625	(193.68)	8.625	(219.08)
.250	(6.35)	.250	(6.35)	.250	(6.35)
.375	(9.53)	.375	(9.53)	.375	(9.53)
.750	(19.05)	.750	(19.05)	.875	(22.23)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)
6.000	(152.40)	6.313	(160.34)	7.063	(179.39)
6.250	(158.75)	6.563	(166.69)	7.313	(185.74)

All dimensions in inches (mm)

### NOTE

For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

The force of the load should be perpendicular to the mounting surface and parallel to the centerline of the piston rod. For eccentric loads, the larger of the two available rods in each bore size is recommended. Stop tubes should also be considered.



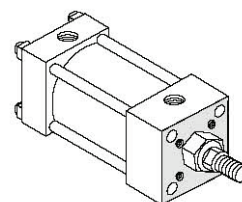
# Series VP/VN- Mounting Styles and Installation Dimensions

These mounts are ideal for straight line force transfer applications in which the cylinder is used in tension (pulling).

The mounting surface should be flat, and the rod end

cartridge should be piloted into it.

The frame on which the cylinder is mounted must be sufficiently rigid to resist bending moments.



## Code 08 Head Square Mounts (ANSI ME3)

DIMENSION		7" BORE (177.80)		8" BORE (203.20)	
Rod	Std.	1-3/8"	(34.93)	1-3/8"	(34.93)
	O.S.	1-3/4"	(44.45)	1-3/4"	(44.45)
A	Std.	1.625	(41.28)	1.625	(41.28)
	O.S.	2.000	(50.80)	2.000	(50.80)
B +.000 -.002	Std.	1.625	(41.28)	1.625	(41.28)
	O.S.	2.000	(50.80)	2.000	(50.80)
C	Std.	.625	(15.88)	.625	(15.88)
	O.S.	.750	(19.05)	.750	(19.05)
CC	Std.	1-1/4 - 12		1-1/4 - 12	
	O.S.	1-1/2 - 12		1-1/2 - 12	
D	Std.	1.125	(15.88)	1.125	(15.88)
	O.S.	1.500	(38.10)	1.500	(38.10)
E		7.500	(190.50)	8.500	(215.90)
EB		.688	(17.46)	.688	(17.46)
EE		.750	(19.05)	.750	(19.05)
FF	Std.	1-3/8 - 12		1-3/8 - 12	
	O.S.	1-3/4 - 12		1-3/4 - 12	
G		2.000	(50.80)	2.000	(50.80)
J		1.500	(38.10)	1.500	(38.10)
K		.563	(14.29)	.563	(14.29)
KK	Std.	1 - 14		1 - 14	
	O.S.	1-1/4 - 12		1-1/4 - 12	
LB		5.125	(130.18)	5.125	(130.18)
MM	Std.	1.375	(34.93)	1.375	(34.93)
	O.S.	1.750	(44.45)	1.750	(44.45)
P		3.250	(82.55)	3.250	(82.55)
R		5.639	(145.54)	6.442	(163.63)
TE		6.750	(171.45)	7.570	(192.27)
VF	Std.	1.000	(25.40)	1.000	(25.40)
	O.S.	1.125	(28.58)	1.125	(28.58)
Y	Std.	2.813	(71.44)	2.813	(71.44)
	O.S.	3.063	(77.79)	3.063	(77.79)
ZB	Std.	7.313	(185.74)	7.313	(185.74)
	O.S.	7.563	(192.09)	7.563	(192.09)

All dimensions in inches (mm)

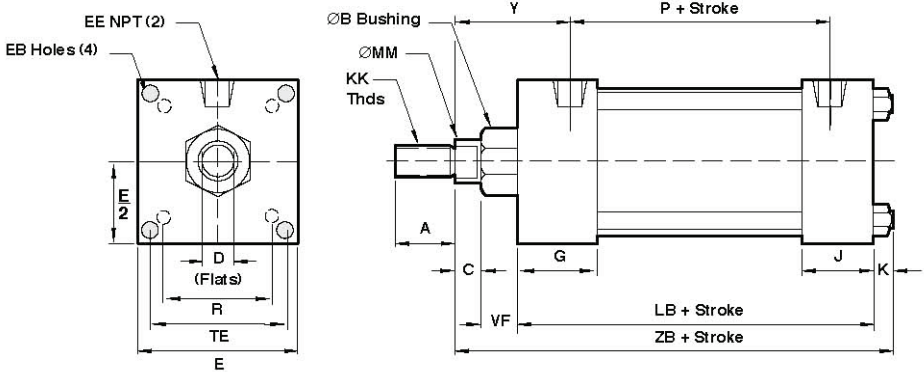
### NOTE

For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

The force of the load should be perpendicular to the mounting surface and parallel to the centerline of the piston rod. For eccentric loads, the larger of the two available rods in each bore size is recommended. Stop tubes should also be considered.

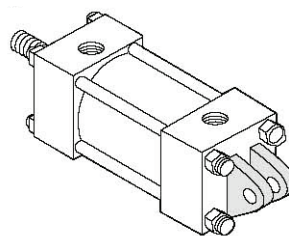
# Series VP/VN Mounting Styles and Installation Dimensions

## Code 08 Head Square Mounts (ANSI ME3)



# Series VP/VN Mounting Styles and Installation Dimensions

These mounts can be used both in compression (push) and tension (pull). Care must be exercised to prevent rod buckling in compression applications with long strokes.



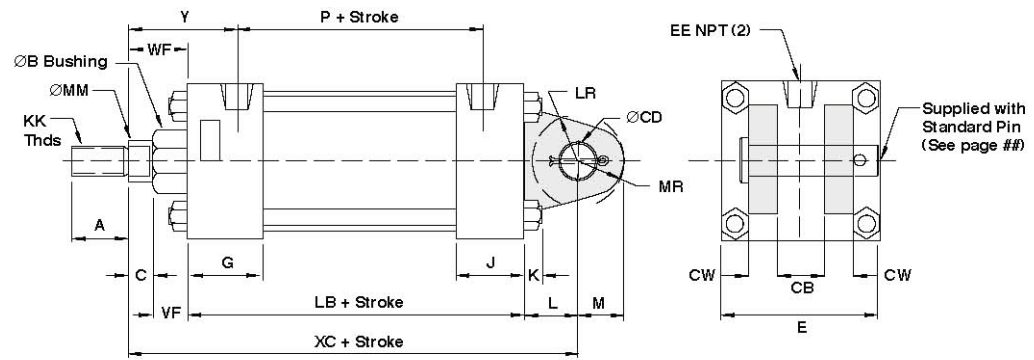
## Code 10 Fixed Clevis

(MP1)

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
B +.000 -.002	Std.	1.124	(28.55)	1.124	(28.55)	1.124	(28.55)	1.499	(38.08)
	O.S.	1.499	(38.08)	1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
CB		.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14	
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12	
CD		.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)
CW		.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.813	(12.70)
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14	
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12	
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16	
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14	
L		.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)
LR		.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)
M		.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
MR		.625	(15.88)	.625	(15.88)	.625	(15.88)	.938	(23.81)
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
XC	Std.	5.375	(136.53)	5.375	(136.53)	5.500	(139.70)	6.875	(174.63)
	O.S.	5.750	(146.05)	5.750	(146.05)	5.875	(149.23)	7.125	(180.98)
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions



## Code 10 Fixed Clevis (MP1)

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.499	(38.08)	1.499	(38.08)	1.999	(50.78)	1.999	(50.78)	1.999	(50.78)
1.999	(50.78)	1.999	(50.78)	2.374	(60.30)	2.374	(60.30)	2.374	(60.30)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.750	(19.05)	.750	(19.05)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
.813	(12.70)	.813	(12.70)	1.125	(15.88)	1.125	(15.88)	1.125	(15.88)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	7.500	(190.50)	8.500	(215.90)
.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1 - 14		1 - 14		1-3/8 - 12		1-3/8 - 12		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12		1-3/4 - 12		1-3/4 - 12	
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)	5.125	(130.18)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.750	(19.05)	.750	(19.05)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
.938	(23.81)	.938	(23.81)	1.188	(30.16)	1.188	(30.16)	1.188	(30.16)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)
6.875	(174.63)	7.125	(180.98)	8.125	(206.38)	8.250	(209.55)	8.250	(209.55)
7.125	(180.98)	7.375	(187.33)	8.375	(212.73)	8.500	(215.90)	8.500	(215.90)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)

All dimensions in inches (mm)

### NOTE

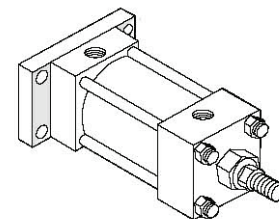
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

The centerline of the machine member that attaches to the swivel pin must be perpendicular to the centerline of the piston rod and the curved path must be in one place only. Any misalignment will cause excess side loading on the bearing and piston. This could lead to premature failure.

# Series VP/VN Mounting Styles and Installation Dimensions

These mounts are ideal for straight line force transfer applications in which the cylinder is used in compression (pushing), as in push presses. For tension applications (pulling), a head rectangular mount is more appropriate.

The frame on which the cylinder is mounted must be sufficiently rigid to resist bending moments.

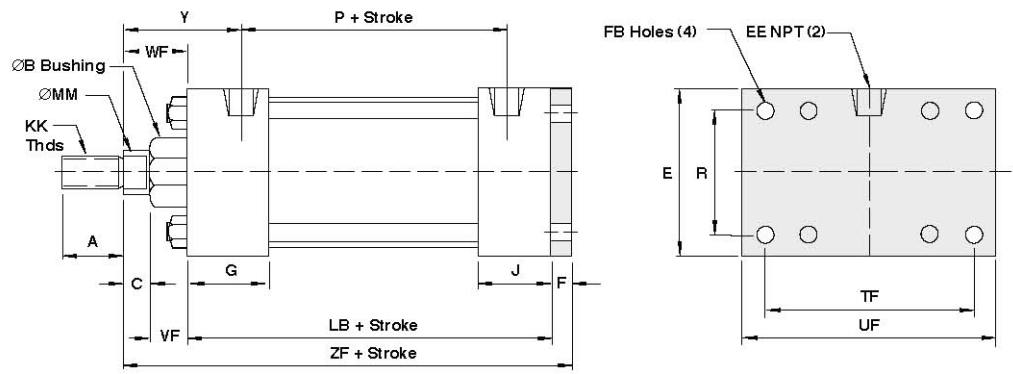


## Code 12 Cap Rectangular Flange Mounts (ANSI MF2)

DIMENSION		1 1/2" BOR (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
B +.000									
	Std.	1.124	(28.55)	1.124	(28.55)	1.124	(28.55)	1.499	(38.08)
	O.S.	1.499	(38.08)	1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
CB		.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14	
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12	
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.813	(20.64)
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
F		.375	(9.53)	.375	(9.53)	.375	(9.53)	.625	(15.88)
FB		.313	(7.94)	.375	(9.53)	.375	(9.53)	.438	(11.11)
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14	
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12	
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)
K		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16	
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14	
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)
R		1.428	(36.27)	1.838	(46.68)	2.192	(55.67)	2.758	(70.05)
TF		2.750	(69.85)	3.375	(85.73)	3.875	(98.43)	4.687	(119.05)
UF		3.375	(85.73)	4.125	(104.78)	4.625	(117.48)	5.500	(139.70)
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)
ZF	Std.	5.000	(127.00)	5.000	(127.00)	5.125	(130.18)	6.250	(158.75)
	O.S.	5.375	(136.53)	5.375	(136.53)	5.500	(139.70)	6.500	(165.10)

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions



## Code 12 Cap Rectangular Flange Mounts (ANSI MF2)

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)
1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
1.999	(50.78)	1.999	(50.78)	2.374	(60.30)
.500	(12.70)	.500	(12.70)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)
7/8 - 14		7/8 - 14		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12	
.813	(12.70)	.813	(12.70)	1.125	(15.88)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)
.500	(12.70)	.500	(12.70)	.750	(19.05)
.625	(15.88)	.625	(15.88)	.750	(19.05)
.438	(11.11)	.563	(14.29)	.563	(14.29)
1 - 14		1 - 14		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12	
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)
.375	(9.53)	.438	(11.11)	.438	(11.11)
3/4 - 16		3/4 - 16		1 - 14	
1 - 14		1 - 14		1-1/4 - 12	
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)
3.323	(84.40)	4.101	(104.16)	4.879	(123.93)
5.438	(138.11)	6.625	(168.28)	7.625	(193.68)
6.250	(158.75)	7.625	(193.68)	8.625	(219.08)
.875	(22.23)	.875	(22.23)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)
6.250	(158.75)	6.500	(165.10)	7.375	(187.33)
6.500	(165.10)	6.750	(171.45)	7.625	(193.68)

All dimensions in inches (mm)

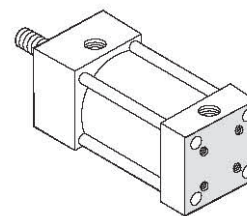
### NOTE

For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.  
Cap rectangular mounts are recommended for heavy duty applications.

# Series VP/VN Mounting Styles and Installation Dimensions

These mounts are ideal for straight line force transfer applications in which the cylinder is used in compression (pushing). The mounting surface should be flat and the rod end cartridge should be piloted into it.

The frame on which the cylinder is mounted must be sufficiently rigid to resist bending moments.



## Code 13 Cap Square Mounts

(ANSI ME4)

DIMENSION		7" BORE (177.80)		8" BORE (203.20)	
Rod	Std.	1-3/8"	(34.93)	1-3/8"	(34.93)
	O.S.	1-3/4"	(44.45)	1-3/4"	(44.45)
A	Std.	1.625	(41.28)	1.625	(41.28)
	O.S.	2.000	(50.80)	2.000	(50.80)
B +.000 -.002	Std.	1.625	(41.28)	1.625	(41.28)
	O.S.	2.000	(50.80)	2.000	(50.80)
C	Std.	.625	(15.88)	.625	(15.88)
	O.S.	.750	(19.05)	.750	(19.05)
CC	Std.	1-1/4 - 12		1-1/4 - 12	
	O.S.	1-1/2 - 12		1-1/2 - 12	
D	Std.	1.125	(15.88)	1.125	(15.88)
	O.S.	1.500	(38.10)	1.500	(38.10)
E		7.500	(190.50)	8.500	(215.90)
EB		.688	(17.46)	.688	(17.46)
EE		.750	(19.05)	.750	(19.05)
FF	Std.	1-3/8 - 12		1-3/8 - 12	
	O.S.	1-3/4 - 12		1-3/4 - 12	
G		2.000	(50.80)	2.000	(50.80)
J		1.500	(38.10)	1.500	(38.10)
K		.563	(14.29)	.563	(14.29)
KK	Std.	1 - 14		1 - 14	
	O.S.	1-1/4 - 12		1-1/4 - 12	
LB		5.125	(130.18)	5.125	(130.18)
MM	Std.	1.375	(34.93)	1.375	(34.93)
	O.S.	1.750	(44.45)	1.750	(44.45)
P		3.250	(82.55)	3.250	(82.55)
R		5.639	(145.54)	6.442	(163.63)
TE		6.750	(171.45)	7.570	(192.27)
VF	Std.	1.000	(25.40)	1.000	(25.40)
	O.S.	1.125	(28.58)	1.125	(28.58)
Y	Std.	2.813	(71.44)	2.813	(71.44)
	O.S.	3.063	(77.79)	3.063	(77.79)
ZB	Std.	7.313	(185.74)	7.313	(185.74)
	O.S.	7.563	(192.09)	7.563	(192.09)

All dimensions in inches (mm)

### NOTE

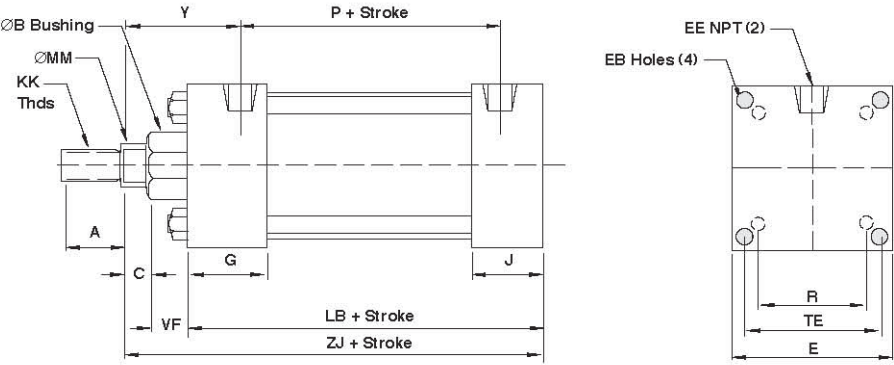
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

The force of the load should be perpendicular to the mounting surface and parallel to the centerline of the piston rod. For eccentric loads, the larger of the two available rods in each bore size is recommended. Stop tubes should also be considered.



# Series VP/VN Mounting Styles and Installation Dimensions

## Code 13 Cap Square Mounts (ANSI ME4)

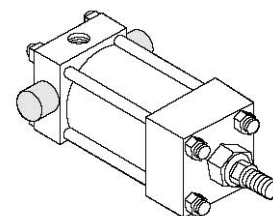


# Series VP/VN Mounting Styles and Installation Dimensions

These mounts are for applications in which the machine member travels in a curved path in one plane.

The mount can be used both in compression (push) and tension (pull) applications. When used in compression

applications, head trunnion mounts provide a longer maximum stroke than cap trunnion mounts.

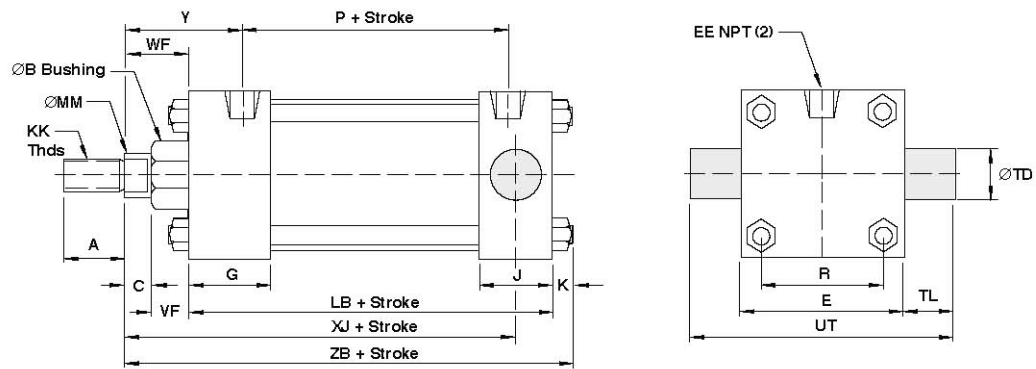


## Code 16 Cap Trunnion Mounts (ANSI MT2)

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
B +.000 -.002	Std.	1.124	(28.55)	1.124	(28.55)	1.124	(28.55)	1.499	(38.08)
	O.S.	1.499	(38.08)	1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14	
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12	
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.875	(22.23)
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.125	(28.58)
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14	
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12	
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)
K		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16	
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14	
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)
R		1.428	(36.27)	1.838	(46.68)	2.192	(55.67)	2.758	(70.05)
TD +.000 - .001		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
TL		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
UT		4.000	(101.60)	4.500	(114.30)	5.000	(127.00)	5.750	(146.05)
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
XJ	Std.	4.125	(104.78)	4.125	(104.78)	4.250	(107.95)	5.000	(127.00)
	O.S.	5.750	(146.05)	5.750	(146.05)	5.875	(149.23)	7.125	(180.98)
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)
ZB	Std.	4.875	(123.83)	4.938	(125.41)	5.063	(128.59)	6.000	(152.40)
	O.S.	5.250	(133.35)	5.313	(134.94)	5.438	(138.11)	6.250	(158.75)

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions



## Code 16 Cap Trunnion Mounts (ANSI MT2)

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.499	(38.08)	1.499	(38.08)	1.999	(50.78)	1.999	(50.78)	1.999	(50.78)
1.999	(50.78)	1.999	(50.78)	2.374	(60.30)	2.374	(60.30)	2.374	(60.30)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.875	(22.23)	.875	(22.23)	1.125	(15.88)	1.125	(15.88)	1.125	(15.88)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	7.500	(190.50)	8.500	(215.90)
.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1 - 14		1 - 14		1-3/8 - 12		1-3/8 - 12		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12		1-3/4 - 12		1-3/4 - 12	
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.375	(9.53)	.438	(11.11)	.438	(11.11)	.563	(14.29)	.563	(14.29)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)	5.125	(130.18)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
3.323	(84.40)	4.101	(104.16)	4.879	(123.92)	5.730	(145.54)	6.435	(163.44)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
6.500	(165.10)	7.500	(190.50)	9.250	(234.95)	10.250	(260.35)	11.250	(285.75)
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)
5.250	(133.35)	5.500	(139.70)	6.125	(155.58)	6.250	(158.75)	6.250	(158.75)
7.125	(180.98)	7.375	(187.33)	8.375	(212.73)	8.500	(215.90)	8.500	(215.90)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)
3.000	(152.40)	6.313	(160.34)	7.063	(179.39)	7.313	(185.74)	7.313	(185.74)
3.250	(158.75)	6.563	(166.69)	7.313	(185.74)	7.563	(192.09)	7.563	(192.09)

All dimensions in inches (mm)

### NOTE

For strokes in excess of 30 inches, see "Stop tube selection" on page 45.

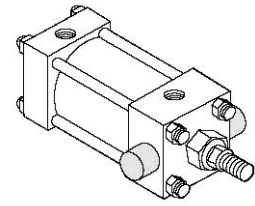
The frame on which the cylinder is mounted must be sufficiently rigid to resist bending moments.

# Series VP/VN Mounting Styles and Installation Dimensions

These mounts are for applications in which the machine member travels in a curved path in one plane.

The mount can be used both in compression (push) and tension (pull) applications. When used in compression

applications, head trunnion mounts provide a longer maximum stroke than cap trunnion mounts.

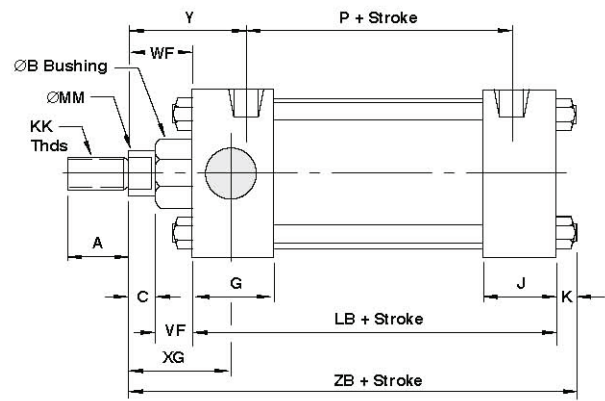
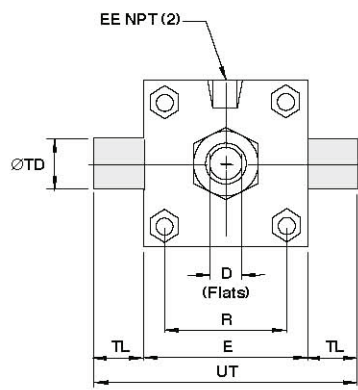


## Code 17 Head Trunnion Mounts (ANSI MT1)

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
+.000									
-.002B	Std.	1.124	(28.55)	1.124	(28.55)	1.124	(28.55)	1.499	(38.08)
	O.S.	1.499	(38.08)	1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14	
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12	
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.875	(22.23)
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.125	(28.58)
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14	
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12	
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)
K		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16	
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14	
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)
R		1.428	(36.27)	1.838	(46.68)	2.192	(55.67)	2.758	(70.05)
TD +.000 -.001		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
TL		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
UT		4.000	(101.60)	4.500	(114.30)	5.000	(127.00)	5.750	(146.05)
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
XJ	Std.	4.125	(104.78)	4.125	(104.78)	4.250	(107.95)	5.000	(127.00)
	O.S.	5.750	(146.05)	5.750	(146.05)	5.875	(149.23)	7.125	(180.98)
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)
ZB	Std.	4.875	(123.83)	4.938	(125.41)	5.063	(128.59)	6.000	(152.40)
	O.S.	5.250	(133.35)	5.313	(134.94)	5.438	(138.11)	6.250	(158.75)

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions



## Code 17 Head Trunnion Mounts (ANSI MT1)

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.499	(38.08)	1.499	(38.08)	1.999	(50.78)	1.999	(50.78)	1.999	(50.78)
1.999	(50.78)	1.999	(50.78)	2.374	(60.30)	2.374	(60.30)	2.374	(60.30)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.875	(22.23)	.875	(22.23)	1.125	(15.88)	1.125	(15.88)	1.125	(15.88)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	7.500	(190.50)	8.500	(215.90)
.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1 - 14		1 - 14		1-3/8 - 12		1-3/8 - 12		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12		1-3/4 - 12		1-3/4 - 12	
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.375	(9.53)	.438	(11.11)	.438	(11.11)	.563	(14.29)	.563	(14.29)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)	5.125	(130.18)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
3.323	(84.40)	4.101	(104.16)	4.879	(123.92)	5.730	(145.54)	6.435	(163.44)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
6.500	(165.10)	7.500	(190.50)	9.250	(234.95)	10.250	(260.35)	11.250	(285.75)
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)
5.250	(133.35)	5.500	(139.70)	6.125	(155.58)	6.250	(158.75)	6.250	(158.75)
7.125	(180.98)	7.375	(187.33)	8.375	(212.73)	8.500	(215.90)	8.500	(215.90)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)
6.000	(152.40)	6.313	(160.34)	7.063	(179.39)	7.313	(185.74)	7.313	(185.74)
6.250	(158.75)	6.563	(166.69)	7.313	(185.74)	7.563	(192.09)	7.563	(192.09)

All dimensions in inches (mm)

### NOTE

For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

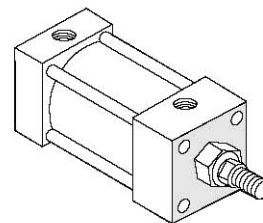
It is recommended that rigidly mounted pillow blocks with bearings at least as long as the trunnion pins be used. The pillow blocks should be installed as close to the shoulder of the trunnion as possible.

# Series VP/VN Mounting Styles and Installation Dimensions

These mounts are for straight line force transfer applications in which the cylinder is used in tension (pulling).

The mounting surface should be flat and the rod end cartridge should be piloted into it.

The frame on which the cylinder is mounted must be sufficiently rigid to resist bending moments.



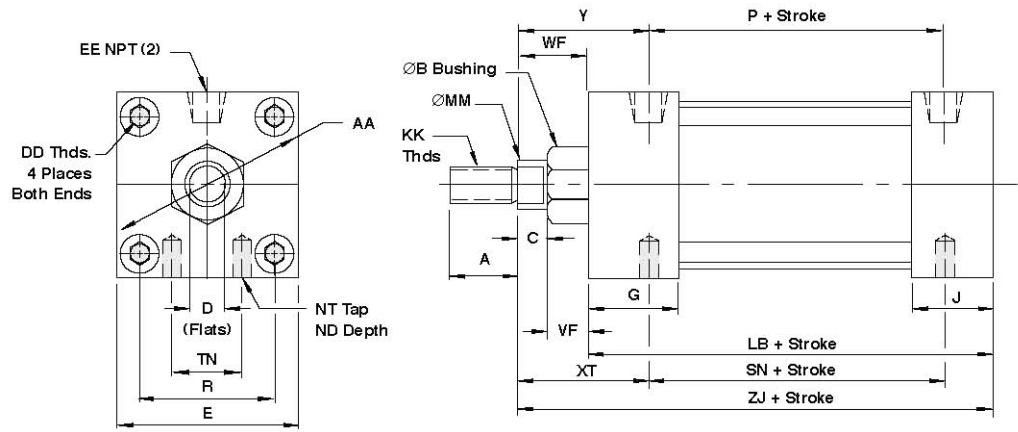
16 Sleeve Nut Construction  
Basic Cylinder Side Tapped (Universal)

## Code 18 Sleeve Nut, for Tapped Face Mounts

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)		
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)	
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)	
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	
AA		2.020	(51.31)	2.600	(66.04)	3.100	(78.74)	3.900	(99.06)	
B	+ .000									
	-.002	Std.	1.124	(28.55)	1.124	(28.55)	1.124	(28.55)	1.499	(38.08)
		O.S.	1.499	(38.08)	1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14		
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12		
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.813	(20.64)	
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)	
DD		1/4 - 28		5/16 - 24		5/16 - 24		3/8 - 24		
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14		
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12		
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)	
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16		
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14		
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)	
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)	
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	
NT	1/4 - 20	5/16 - 18	3/8 - 16	1/2 - 13	1/2 - 13	5/8 - 11	3/4 - 10			
ND		.375	(9.53)	.375	(9.53)	.500	(12.70)	.750	(19.05)	
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)	
R		1.428	(36.27)	1.838	(46.68)	2.192	(55.67)	2.758	(70.05)	
SN		2.250	(57.15)	2.250	(57.15)	2.375	(60.33)	2.625	(66.68)	
TN		.625	(15.88)	.875	(22.23)	1.250	(31.75)	1.500	(38.10)	
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)	
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)	
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	
XT	Std.	1.938	(49.21)	1.938	(49.21)	1.938	(49.21)	2.438	(61.91)	
	O.S.	2.313	(58.74)	2.313	(58.74)	2.313	(58.74)	2.688	(68.26)	
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)	
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)	
ZJ	Std.	4.625	(117.48)	4.625	(117.48)	4.750	(120.65)	5.625	(142.88)	
	O.S.	5.000	(127.00)	5.000	(127.00)	5.125	(130.18)	5.875	(149.23)	

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions



## Code 18 Sleeve Nut, for Tapped Face Mounts

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)
4.700	(119.38)	5.800	(147.32)	6.900	(175.26)
1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
1.999	(50.78)	1.999	(50.78)	2.374	(60.30)
.500	(12.70)	.500	(12.70)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)
7/8 - 14		7/8 - 14		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12	
.813	(20.64)	.813	(20.64)	1.125	(15.88)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)
3/8 - 24		1/2 - 20		1/2 - 20	
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)
.500	(12.70)	.500	(12.70)	.750	(19.05)
1 - 14		1 - 14		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12	
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)
3/4 - 16		3/4 - 16		1 - 14	
1 - 14		1 - 14		1-1/4 - 12	
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)
.750	(19.05)	.938	(23.81)	1.125	(28.58)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)
3.323	(84.40)	4.101	(104.16)	4.879	(123.92)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)
2.063	(52.39)	2.688	(68.26)	3.250	(82.55)
.875	(22.23)	.875	(22.23)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)
5.625	(142.88)	5.625	(142.88)	6.625	(168.28)
5.875	(149.23)	5.875	(149.23)	6.875	(174.63)

All dimensions in inches (mm)

### NOTE

For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

The force of the load should be perpendicular to the mounting surface and parallel to the centerline of the piston rod. For eccentric loads, the larger of the two available rods in each bore size is recommended. Stop tubes should also be considered.

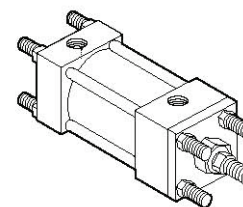


# Series VP/VN Mounting Styles and Installation Dimensions

These mounts are for straight line force transfer applications. Both ends extended tie rod mounts are suited for tension and compression applications or applications where additional hardware is to be attached to cylinders.

which the cylinder is mounted must be sufficiently rigid to resist bending moments.

Once fitted into the application framework, the nuts which are provided should be torqued to the values listed in the right column table.



## Codes 21 Cap (MX2), 22 Head (MX3), & 23 Both Ends (MX1) Extended Tie Rod Mounts

The mounting surface should be flat and the frame on

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
B +.000 -.002	Std.	1.124	(28.55)	1.124	(28.55)	1.124	(28.55)	1.499	(38.08)
	O.S.	1.499	(38.08)	1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
BB		1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.375	(34.93)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14	
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12	
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.875	(22.23)
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)
DD		1/4 - 28		5/16 - 24		5/16 - 24		3/8 - 24	
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
F		.375	(9.53)	.375	(9.53)	.375	(9.53)	.625	(15.88)
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14	
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12	
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)
K		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16	
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14	
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)
R		1.428	(36.27)	1.838	(46.68)	2.192	(55.67)	2.758	(70.05)
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)
ZB	Std.	4.875	(123.83)	4.938	(125.41)	5.063	(128.59)	6.000	(152.40)
	O.S.	5.250	(133.35)	5.313	(134.94)	5.438	(138.11)	6.250	(158.75)

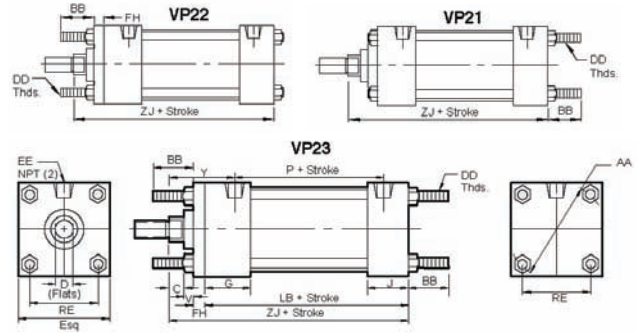
\*\*BB dimension on 8 bore is from the head.

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions

## Recommended Torques for Tightening Tie Rods

CYLINDER BORE	SERIES VP STEEL TIE ROD	SERIES VN STAINLESS TIE ROD
1-1/2"	6.6 ft. lbs.	3.75 ft. lbs.
2"	11 ft. lbs.	7.5 ft. lbs.
2-1/2"	13 ft. lbs.	7.5 ft. lbs.
3-3/4"	20 ft. lbs.	14 ft. lbs.
4"	24 ft. lbs.	14 ft. lbs.
5"	40 ft. lbs.	33 ft. lbs.
6"	48 ft. lbs.	33 ft. lbs.
7" & 8"	100 ft. lbs.	65 ft. lbs.



Codes 21 Cap (MX2), 22 Head (MX3), & 23 Both Ends (MX1)  
Extended Tie Rod Mounts

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.499	(38.08)	1.499	(38.08)	1.999	(50.78)	1.999	(50.78)	1.999	(50.78)
1.999	(50.78)	1.999	(50.78)	2.374	(60.30)	2.374	(60.30)	2.374	(60.30)
1.375	(34.93)	1.813	(46.04)	1.813	(46.04)	2.313	(58.74)	2.313	(58.74)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)**
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.875	(22.23)	.875	(22.23)	1.125	(15.88)	1.125	(15.88)	1.125	(15.88)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
3/8 - 24		1/2 - 20		1/2 - 20		5/8 - 18		5/8 - 18	
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	7.500	(190.50)	8.500	(215.90)
.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1 - 14		1 - 14		1-3/8 - 12		1-3/8 - 12		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12		1-3/4 - 12		1-3/4 - 12	
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.375	(9.53)	.438	(11.11)	.438	(11.11)	.563	(14.29)	.563	(14.29)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)	5.125	(130.18)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
3.323	(84.40)	4.101	(104.16)	4.879	(123.92)	5.730	(145.54)	6.442	(163.63)
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)
6.000	(152.40)	6.313	(160.34)	7.063	(179.39)	7.313	(185.74)	7.313	(185.74)
6.250	(158.75)	6.563	(166.69)	7.313	(185.74)	7.563	(192.09)	7.563	(192.09)

\*\*BB dimension on 8 bore is from the head.

All dimensions in inches (mm)

### NOTE

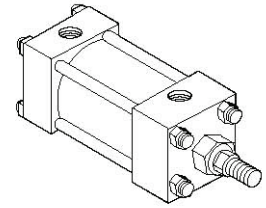
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

The force on the rod should be perpendicular to the mounting surface and coincide with the centerline of the piston rod. For eccentric loads, the larger of the two available rods in each bore size is recommended. Stop tubes should also be considered.

# Series VP/VN Mounting Styles and Installation Dimensions

The basic cylinder is often used by customers who have designed their own method of mounting. These mounting methods may include custom made mounting flanges, machining into the end caps, and clamping mechanisms to

secure the cylinder. Consult Eaton engineering when using the cylinder in this fashion.



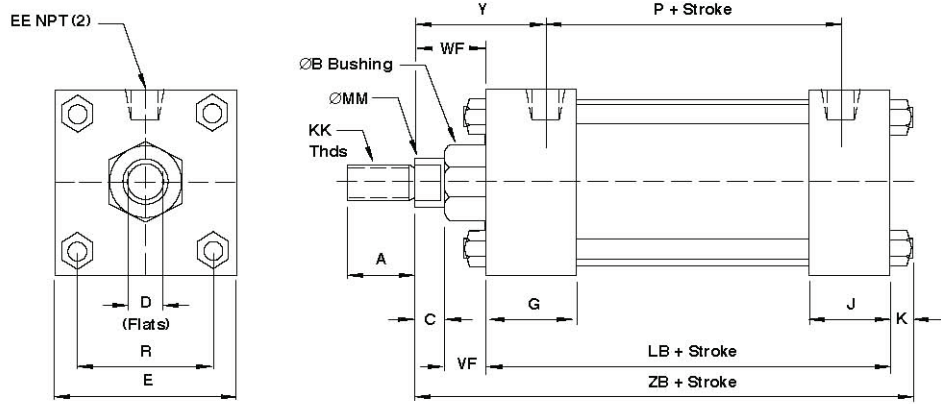
## Code 24 No Mount Cylinder

(ANSI MX0)

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)		
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)	
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)	
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	
B +.000										
	-.002	Std.	1.124	(28.55)	1.124	(28.55)	1.124	(28.55)	1.499	(38.08)
		O.S.	1.499	(38.08)	1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14		
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12		
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.875	(22.23)	
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)	
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14		
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12		
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)	
K		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)	
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16		
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14		
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)	
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)	
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)	
R		1.428	(36.27)	1.838	(46.68)	2.192	(55.67)	2.758	(70.05)	
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)	
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)	
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)	
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)	
ZB	Std.	4.875	(123.83)	4.938	(125.41)	5.063	(128.59)	6.000	(152.40)	
	O.S.	5.250	(133.35)	5.313	(134.94)	5.438	(138.11)	6.250	(158.75)	

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions



## Code 24 No Mount Cylinder (ANSI MX0)

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.499	(38.08)	1.499	(38.08)	1.999	(50.78)	1.999	(50.78)	1.999	(50.78)
1.999	(50.78)	1.999	(50.78)	2.374	(60.30)	2.374	(60.30)	2.374	(60.30)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.875	(22.23)	.875	(22.23)	1.125	(15.88)	1.125	(15.88)	1.125	(15.88)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	7.500	(190.50)	8.500	(215.90)
.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1 - 14		1 - 14		1-3/8 - 12		1-3/8 - 12		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12		1-3/4 - 12		1-3/4 - 12	
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.375	(9.53)	.438	(11.11)	.438	(11.11)	.563	(14.29)	.563	(14.29)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)	5.125	(130.18)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
3.323	(84.40)	4.101	(104.16)	4.879	(123.92)	5.730	(145.54)	6.442	(163.63)
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)
6.000	(152.40)	6.313	(160.34)	7.063	(179.39)	7.313	(185.74)	7.313	(185.74)
6.250	(158.75)	6.563	(166.69)	7.313	(185.74)	7.563	(192.09)	7.563	(192.09)

All dimensions in inches (mm)

### NOTE

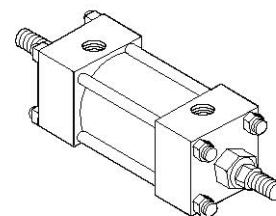
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

# Series VP/VN Mounting Styles and Installation Dimensions

Double rod cylinders are specified when equal displacement is desired on both sides of the piston, or when the application is such that another function can be performed simultaneously with a second rod. The single

rod mount application data is also applicable to double rod cylinders.

Rod and pilot related dimensions are typical for both ends.

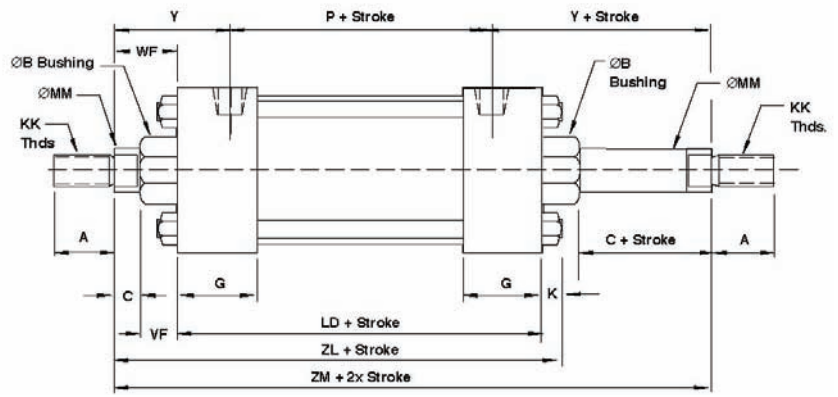
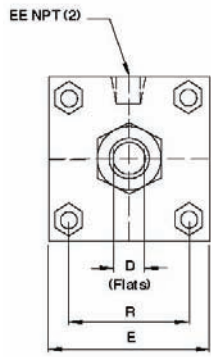


## Code 41 Double Rod, No Mount

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
B	+.000								
	-.002								
Std.		1.124	(28.55)	1.124	(28.55)	1.124	(28.55)	1.499	(38.08)
	O.S.	1.499	(38.08)	1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14	
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12	
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.875	(22.23)
	O.S.	.875	(22.23)	.813	(20.64)	.813	(20.64)	1.125	(28.58)
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14	
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12	
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)
K		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16	
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14	
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)
R		1.428	(36.27)	1.838	(46.68)	2.192	(55.67)	2.758	(70.05)
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)
ZL	Std.	5.375	(136.53)	5.438	(138.11)	5.563	(141.29)	6.500	(165.10)
	O.S.	6.125	(155.58)	6.125	(155.58)	6.250	(158.75)	7.500	(190.50)
ZM	O.S.	6.875	(174.63)	6.875	(174.63)	7.000	(177.80)	8.000	(203.20)

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions



**Code 41 Double Rod,  
No Mount**

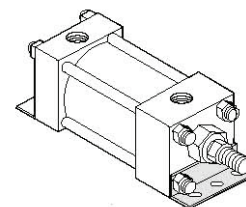
4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.499	(38.08)	1.499	(38.08)	1.999	(50.78)	1.999	(50.78)	1.999	(50.78)
1.999	(50.78)	1.999	(50.78)	2.374	(60.30)	2.374	(60.30)	2.374	(60.30)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.875	(22.23)	.875	(22.23)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	7.500	(190.50)	8.500	(215.90)
.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1 - 14		1 - 14		1-3/8 - 12		1-3/8 - 12		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12		1-3/4 - 12		1-3/4 - 12	
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.375	(9.53)	.438	(11.11)	.438	(11.11)	.563	(14.29)	.563	(14.29)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)	5.125	(130.18)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
3.323	(84.40)	4.101	(104.16)	4.879	(123.92)	5.730	(145.54)	6.442	(163.63)
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)
6.500	(165.10)	6.813	(174.04)	7.563	(192.09)	7.813	(198.44)	7.813	(198.44)
7.500	(190.50)	7.500	(190.50)	8.750	(222.25)	8.875	(225.43)	8.875	(225.43)
8.000	(203.20)	8.000	(203.20)	9.250	(234.95)	9.375	(238.13)	9.375	(238.13)

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions

Angle mounts are for moving loads along a flat guided surface as in a carriage along rails. The mounting surface should be flat and parallel to the centerline of the piston rod.

The load should be guided to traverse along the centerline of the piston rod. The frame on which the cylinder is mounted must be sufficiently rigid to resist bending moments.



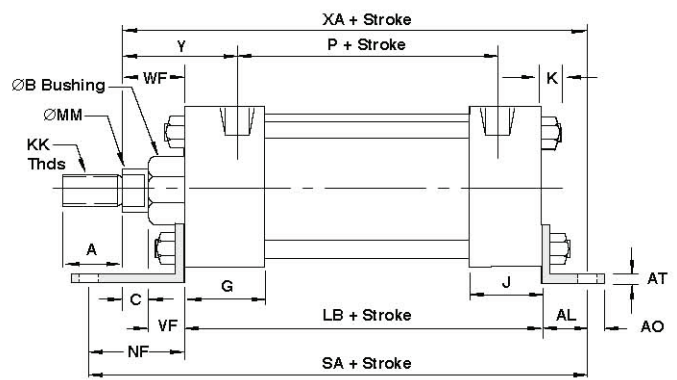
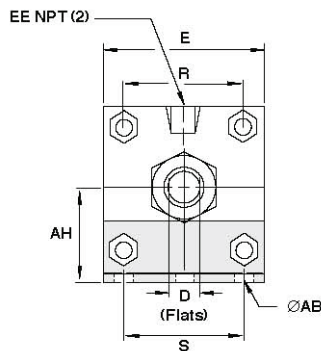
## Code 45 Angle Mounts (ANSI MS1)

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
AB		.438	(11.11)	.438	(11.11)	.438	(11.11)	.563	(14.29)
AH		1.188	(30.16)	1.438	(36.51)	1.625	(41.28)	1.938	(49.21)
AL		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)
AO		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
AT		.125	(3.18)	.125	(3.18)	.125	(3.18)	.125	(3.18)
+.000									
-.002B	Std.	1.124	(28.55)	1.124	(28.55)	1.124	(28.55)	1.499	(38.08)
	O.S.	1.499	(38.08)	1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14	
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12	
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.813	(20.64)
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14	
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12	
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)
K		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16	
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14	
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
NF		1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.875	(47.63)
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)
R		1.428	(36.27)	1.838	(46.68)	2.192	(55.67)	2.758	(70.05)
S		1.250	(31.75)	1.750	(44.45)	2.250	(57.15)	2.750	(69.85)
SA		6.000	(152.40)	6.000	(152.40)	6.125	(155.58)	7.375	(187.33)
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
XA	Std.	5.625	(142.88)	5.438	(138.11)	5.750	(146.05)	6.875	(174.63)
	O.S.	6.000	(152.40)	6.000	(152.40)	6.125	(155.58)	7.125	(180.98)
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)

All dimensions in inches (mm)



# Series VP/VN Mounting Styles and Installation Dimensions



## Code 45 Angle Mounts (ANSI MS1)

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
.563	(14.29)	.688	(17.46)	.813	(20.64)	.813	(20.64)	.813	(20.64)
2.250	(57.15)	2.750	(69.85)	3.250	(82.55)	3.750	(95.25)	4.250	(107.95)
1.250	(31.75)	1.375	(34.93)	1.375	(34.93)	1.813	(46.04)	1.813	(46.04)
.500	(12.70)	.625	(15.88)	.625	(15.88)	.688	(17.46)	.688	(17.46)
.125	(3.18)	.187	(4.75)	.187	(4.75)	.250	(6.35)	.250	(6.35)
1.499	(38.08)	1.499	(38.08)	1.999	(50.78)	1.999	(50.78)	1.999	(50.78)
1.999	(50.78)	1.999	(50.78)	2.374	(60.30)	2.374	(60.30)	2.374	(60.30)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.813	(20.64)	.813	(20.64)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	7.500	(190.50)	8.500	(215.90)
.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1 - 14		1 - 14		1-3/8 - 12		1-3/8 - 12		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12		1-3/4 - 12		1-3/4 - 12	
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.375	(9.53)	.438	(11.11)	.438	(11.11)	.563	(14.29)	.563	(14.29)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)	5.125	(130.18)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
1.875	(47.63)	2.000	(50.80)	2.125	(53.98)	1.813	(46.04)	1.813	(46.04)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
3.323	(84.40)	4.101	(104.16)	4.879	(123.92)	5.730	(145.54)	6.442	(163.63)
3.500	(88.90)	4.250	(107.95)	5.250	(133.35)	6.125	(155.58)	7.125	(180.98)
7.375	(187.33)	7.875	(200.03)	8.500	(215.90)	8.750	(222.25)	8.750	(222.25)
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)
3.875	(174.63)	7.250	(184.15)	8.000	(203.20)	8.562	(217.47)	8.562	(217.47)
7.125	(180.98)	7.500	(190.50)	8.250	(209.55)	8.813	(223.84)	8.813	(223.84)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)

All dimensions in inches (mm)

### NOTE

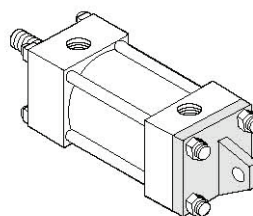
Limit operating pressure to 400 psi (27 bar) non-shock hydraulic for minimum deflection.

For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

For applications with unsupported loads, the bearing must absorb more force. The larger available rod is recommended, and stop tubes should be considered.

# Series VP/VN Mounting Styles and Installation Dimensions

These mounts can be used both in compression (push) and tension (pull). Care must be exercised to prevent rod buckling in compression applications with long strokes.

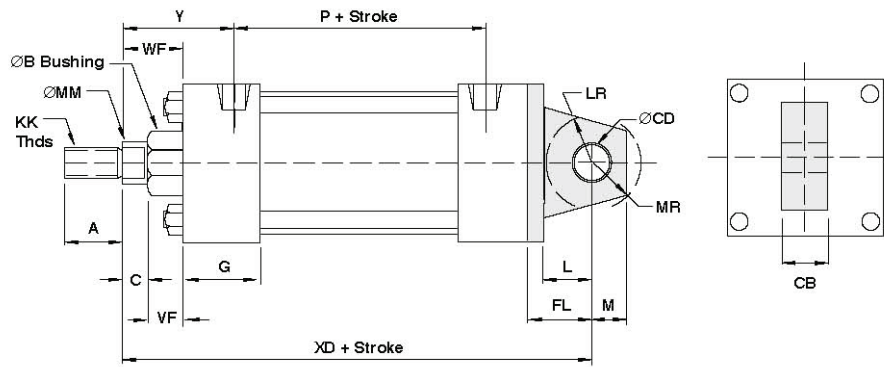


## Code 48 Detachable Eye Mounts (MP4)

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)		
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)	
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)	
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	
B +.000										
	-.002	Std.	1.124	(28.55)	1.124	(28.55)	1.124	(28.55)	1.499	(38.08)
		O.S.	1.499	(38.08)	1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	
CB		.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)	
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14		
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12		
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.813	(20.64)	
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)	
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14		
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12		
FL		1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.875	(47.63)	
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)	
K		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)	
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16		
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14		
L		.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)	
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)	
LR		.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)	
M		.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)	
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)	
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	
MR		.625	(15.88)	.625	(15.88)	.625	(15.88)	.938	(23.81)	
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)	
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)	
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)	
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	
XD	Std.	5.750	(146.05)	5.750	(146.05)	5.875	(149.23)	7.500	(190.50)	
	O.S.	6.125	(155.58)	6.125	(155.58)	6.250	(158.75)	7.750	(196.85)	
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)	
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)	

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions



## Code 48 Detachable Eye Mounts (MP4)

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.499	(38.08)	1.499	(38.08)	1.999	(50.78)	1.999	(50.78)	1.999	(50.78)
1.999	(50.78)	1.999	(50.78)	2.374	(60.30)	2.374	(60.30)	2.374	(60.30)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.813	(20.64)	.813	(20.64)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	7.500	(190.50)	8.500	(215.90)
.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1 - 14		1 - 14		1-3/8 - 12		1-3/8 - 12		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12		1-3/4 - 12		1-3/4 - 12	
1.875	(47.63)	1.875	(47.63)	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.375	(9.53)	.438	(11.11)	.438	(11.11)	.563	(14.29)	.563	(14.29)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)	5.125	(130.18)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.750	(19.05)	.750	(19.05)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
.938	(23.81)	.938	(23.81)	1.188	(30.16)	1.188	(30.16)	1.188	(30.16)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)
7.500	(190.50)	7.750	(196.85)	8.875	(225.43)	9.000	(228.60)	9.000	(228.60)
7.750	(196.85)	8.000	(203.20)	9.125	(231.78)	9.250	(234.95)	9.250	(234.95)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)

All dimensions in inches (mm)

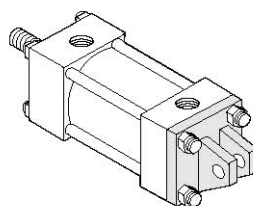
### NOTE

For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

The centerline of the machine member that attaches to the swivel pin must be perpendicular to the centerline of the piston rod and the curved path must be in one place only. Any misalignment will cause excess side loading on the bearing and piston. This could lead to premature failure.

# Series VP/VN Mounting Styles and Installation Dimensions

These mounts can be used both in compression (push) and tension (pull). Care must be exercised to prevent rod buckling in compression applications with long strokes.

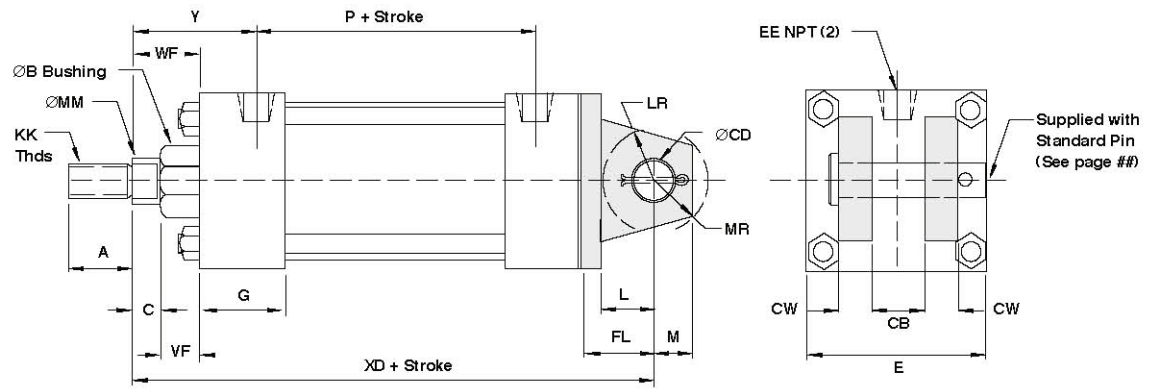


## Code 50 Detachable Clevis (MP2)

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
B	+ .000								
	-.002	Std.	1.124	(28.55)	1.124	(28.55)	1.124	(28.55)	1.499
	O.S.	1.499	(38.08)	1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
CB		.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14	
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12	
CD		.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)
CW		.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.813	(20.64)
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)
EE		.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
FF	Std.	5/8 - 18		5/8 - 18		5/8 - 18		1 - 14	
	O.S.	1 - 14		1 - 14		1 - 14		1-3/8 - 12	
FL		1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.875	(47.63)
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)
K		.250	(6.35)	.313	(7.94)	.313	(7.94)	.375	(9.53)
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16	
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14	
L		.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)
LR		.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)
M		.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)
MM	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	1.000	(25.40)
	O.S.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
MR		.625	(15.88)	.625	(15.88)	.625	(15.88)	.938	(23.81)
P		2.313	(58.74)	2.313	(58.74)	2.438	(61.91)	2.625	(66.68)
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)
WF	Std.	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)
	O.S.	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.625	(41.28)
XD	Std.	5.750	(146.05)	5.750	(146.05)	5.875	(149.23)	7.500	(190.50)
	O.S.	6.125	(155.58)	6.125	(155.58)	6.250	(158.75)	7.750	(196.85)
Y	Std.	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)	2.438	(61.91)
	O.S.	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.688	(68.26)

All dimensions in inches (mm)

# Series VP/VN Mounting Styles and Installation Dimensions



## Code 50 Detachable Clevis (MP2)

4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.499	(38.08)	1.499	(38.08)	1.999	(50.78)	1.999	(50.78)	1.999	(50.78)
1.999	(50.78)	1.999	(50.78)	2.374	(60.30)	2.374	(60.30)	2.374	(60.30)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.750	(19.05)	.750	(19.05)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
.813	(20.64)	.813	(20.64)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	7.500	(190.50)	8.500	(215.90)
.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)
1 - 14		1 - 14		1-3/8 - 12		1-3/8 - 12		1-3/8 - 12	
1-3/8 - 12		1-3/8 - 12		1-3/4 - 12		1-3/4 - 12		1-3/4 - 12	
1.875	(47.63)	1.875	(47.63)	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)
1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.375	(9.53)	.438	(11.11)	.438	(11.11)	.563	(14.29)	.563	(14.29)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)	5.125	(130.18)
1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
.750	(19.05)	.750	(19.05)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)
1.375	(34.93)	1.375	(34.93)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
.938	(23.81)	.938	(23.81)	1.188	(30.16)	1.188	(30.16)	1.188	(30.16)
2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.55)	3.250	(82.55)
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.375	(34.93)	1.375	(34.93)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	1.875	(47.63)	1.875	(47.63)	1.875	(47.63)
7.500	(190.50)	7.750	(196.85)	8.875	(225.43)	9.000	(228.60)	9.000	(228.60)
7.750	(196.85)	8.000	(203.20)	9.125	(231.78)	9.250	(234.95)	9.250	(234.95)
2.438	(61.91)	2.438	(61.91)	2.813	(71.44)	2.813	(71.44)	2.813	(71.44)
2.688	(68.26)	2.688	(68.26)	3.063	(77.79)	3.063	(77.79)	3.063	(77.79)

All dimensions in inches (mm)

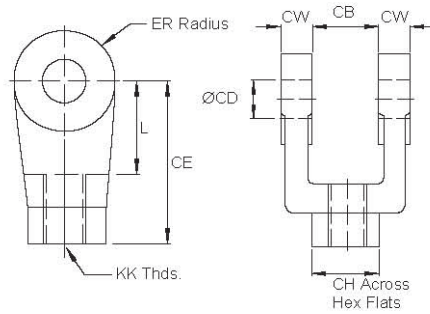
### NOTE

For strokes in excess of 30 inches, see "Stop Tube Selection" on page 45.

The centerline of the machine member that attaches to the swivel pin must be perpendicular to the centerline of the piston rod and the curved path must be in one place only. Any misalignment will cause excess side loading on the bearing and piston. This could lead to premature failure.

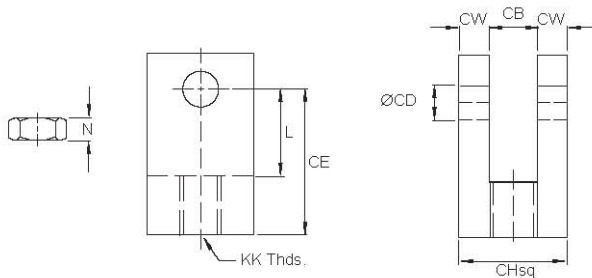
# Series VP/VN Accessories for 1-1/2 thru 8 inch Bore Cylinders

## NFPA Rod Clevis



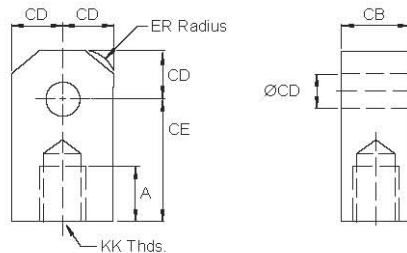
	VP62008A	VP62008B	VP6200CA	VP62010A	VP62016A
CB	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.000 (50.80)
CD	.500 (12.70)	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (60.33)
CE	1.500 (38.10)	1.500 (38.10)	2.375 (60.33)	3.125 (79.38)	4.125 (104.78)
CH	1.000 (25.40)	1.000 (25.40)	1.250 (31.75)	1.500 (38.10)	2.000 (50.80)
CW	.500 (12.70)	.500 (12.70)	.625 (15.88)	.750 (19.05)	1.000 (25.40)
ER	.500 (12.70)	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (60.33)
KK	7/16-20	1/2-20	3/4-16	1-14	1-1/4-12
L	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.125 (53.98)

## Small Rod Clevis & Jam Nut



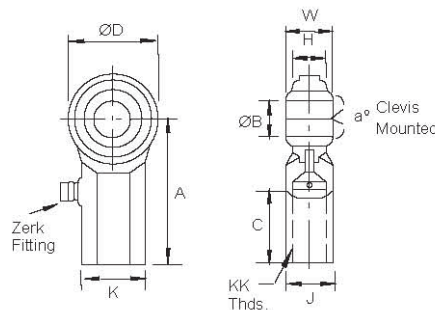
	VP62008C	VP6200CC
CB	.500 (12.70)	.750 (19.05)
CD	.500 (12.70)	.750 (19.05)
CE	1.375 (34.93)	1.750 (44.45)
CH	1.000 (25.40)	1.500 (38.10)
CW	.250 (6.35)	.375 (9.53)
KK	1/2-20	3/4-16
L	.750 (19.05)	1.000 (25.40)
N	.375 (9.53)	.500 (12.70)

## NFPA Rod Eye



	VP60008A	VP60008C	VP6000CA	VP60010A	VP60016A
CB	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.000 (50.80)
CD	.500 (12.70)	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (60.33)
CE	1.500 (38.10)	1.500 (38.10)	2.375 (60.33)	3.125 (79.38)	4.125 (104.78)
ER	.500 (12.70)	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (60.33)
L	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.125 (53.98)

## Spherical Rod Eye

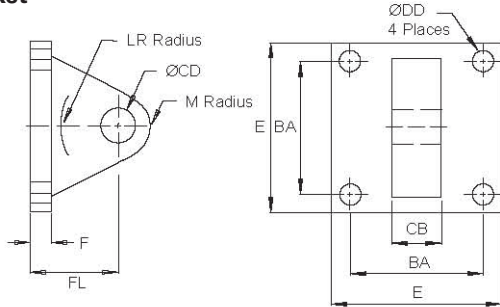


	VP62008C	VP6200CC	VP60010B
Bore	1-1/2 & 2-1/2	3-1/4, 4 & 5	6 & 8
a° Misalign. Angle	12	14	14
A	± .015	2.125 (53.98)	2.875 (73.03)
B	+ .0025 / - .0005	.500 (12.70)	.750 (19.05)
C	+ .062 / - .031	1.062 (26.97)	1.562 (39.67)
D	± .010	1.312 (33.32)	1.750 (44.45)
H	REF.	.453 (11.51)	.593 (15.06)
J	± .010	.750 (19.05)	1.000 (25.40)
K	± .010	.875 (22.23)	1.125 (28.58)
KK	UNF-2B	1/2-20	3/4-16
W	+ .000 / - .005	.625 (15.88)	.875 (22.23)



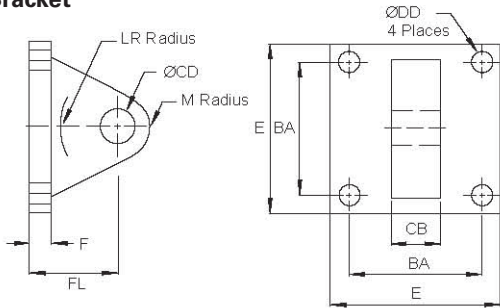
# Series VP/VN Accessories for 1-1/2 thru 8 inch Bore Cylinders

## NFPA Eye Bracket



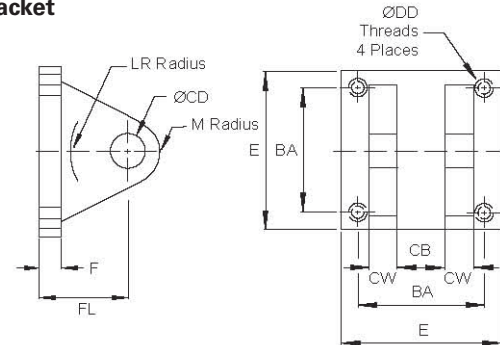
	VP62008A	VP62008B	VP6200CA	VP62010A
BA	1.625 (41.28)	2.562 (65.07)	3.250 (82.55)	3.812 (96.82)
CB	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.000 (50.80)
CD	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (60.33)
DD	.406 (10.31)	.531 (13.49)	.656 (16.66)	.656 (16.66)
E	2.500 (63.50)	3.500 (88.90)	4.500 (114.30)	5.000 (127.00)
F	.375 (9.53)	.625 (15.88)	.750 (19.05)	.875 (22.23)
FL	1.125 (28.58)	1.875 (47.63)	2.250 (57.15)	3.000 (76.20)
LR	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.125 (53.98)

## Alternate Eye Bracket



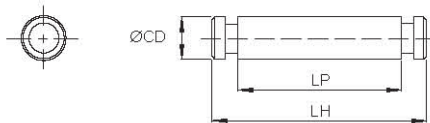
	VP78008B	VP78008C	VP78008D	VP7800CB	VP7800CC
BA	1.437 (36.50)	1.844 (46.84)	2.187 (55.55)	2.937 (74.60)	3.562 (90.47)
CB	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.250 (31.75)
CD	.500 (12.70)	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)
DD	.281 (7.14)	.343 (8.71)	.343 (8.71)	.469 (11.91)	.469 (11.91)
E	2.000 (50.80)	2.500 (63.50)	3.000 (76.20)	3.750 (95.25)	4.500 (114.30)
F	.375 (9.53)	.375 (9.53)	.375 (9.53)	.500 (12.70)	.500 (12.70)
FL	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)	1.750 (44.45)	1.750 (44.45)
LR	.562 (14.27)	.562 (14.27)	.562 (14.27)	1.000 (25.40)	1.000 (25.40)
M	.625 (15.88)	.625 (15.88)	.625 (15.88)	.875 (22.23)	.875 (22.23)

## NFPA Clevis Bracket



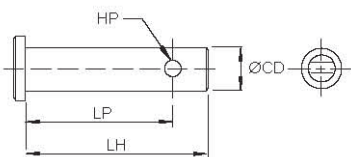
	VP61008A	VP6100CA	VP61010A
BA	1.625 (41.28)	2.562 (65.07)	3.250 (82.55)
CB	.750 (19.05)	1.250 (31.75)	1.500 (38.10)
CD	.500 (12.70)	.750 (19.05)	1.000 (25.40)
CW	.500 (12.70)	.625 (15.88)	.750 (19.05)
DD	3/8 - 24	1/2 - 20	5/8 - 18
E	2.500 (63.50)	3.500 (88.90)	4.500 (114.30)
F	.375 (9.53)	.625 (15.88)	.750 (19.05)
FL	1.125 (28.58)	1.875 (47.63)	2.250 (57.15)
LR	.750 (19.05)	1.250 (31.75)	1.500 (38.10)
M	.500 (12.70)	.812 (20.62)	1.000 (25.40)

## NFPA Pin



	VP83008A	VP8300CA	VP83010A
CD	.500 (12.70)	.750 (19.05)	1.000 (25.40)
LH	2.219 (56.36)	3.125 (79.38)	3.750 (95.25)
LP	1.875 (47.63)	2.750 (69.85)	3.250 (82.55)

## Alternate Eye Bracket



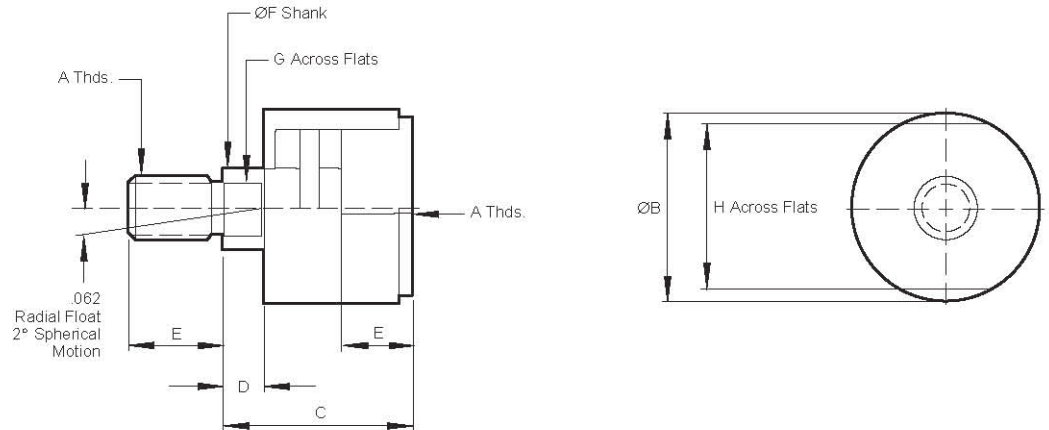
	VP83008B	VP83008C	VP83008CB	VP8300CC	VP83010B	VP83016B
CD	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)	1.000 (25.40)	1.375 (34.93)
HP	.156 (3.96)	.156 (3.96)	.156 (3.96)	.156 (3.96)	.203 (5.16)	.250 (6.35)
LH	1.421 (36.09)	2.250 (57.15)	2.000 (50.80)	3.000 (76.20)	3.500 (88.90)	5.000 (127.00)
LP	1.266 (32.16)	2.093 (53.16)	1.843 (46.81)	2.843 (72.21)	3.297 (83.74)	4.500 (114.30)

All dimensions in inches (mm)



# Series VP/VN Rod Alignment Coupler

The Rod Alignment Coupler allows 1/16 inch of radial float and 2 inches of spherical movement. This prevents cylinder binding due to misalignment thus extending bearing and seal life, and permits greater tolerance between the centerline of the cylinder and mating part for simplified installation.



	<b>7756A- 1/4-28</b>	<b>7756A- 5/16-24</b>	<b>7756A- 3/8-24</b>	<b>7756A- 7/16-20</b>	<b>7756A- 1/2-20</b>	<b>7756A- 5/8-18</b>	<b>7756A- 3/4-16</b>	<b>7756A- 7/8-14</b>	<b>7756A- 1-14</b>	<b>7756A- 1-1/4-12</b>	<b>7756A- 1-1/2-12</b>	<b>7756A- 1-3/4-12</b>
A	1/4-28	5/16-24	3/8-24	7/16-20	1/2-20	5/8-18	3/4-16	7/8-14	1-14	1-1/4-12	1-1/2-12	1-3/4-12
B	.875 (22.23)	.875 (22.23)	.875 (22.23)	1.250 (31.75)	1.250 (31.75)	1.250 (31.75)	1.750 (44.45)	1.750 (44.45)	2.500 (63.50)	2.500 (63.50)	3.250 (82.50)	3.250 (82.50)
C	1.250 (31.75)	1.250 (31.75)	1.250 (31.75)	2.000 (50.80)	2.000 (50.80)	2.000 (50.80)	2.312 (58.72)	2.312 (58.72)	2.937 (74.60)	2.937 (74.60)	4.375 (111.13)	4.375 (111.13)
D	.250 (6.35)	.250 (6.35)	.250 (6.35)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.812 (20.62)	.812 (20.62)
E	.625 (15.88)	.625 (15.88)	.625 (15.88)	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.125 (28.58)	1.125 (28.58)	1.625 (41.28)	1.625 (41.28)	2.250 (57.15)	2.250 (57.15)
F	.312 (7.92)	.312 (7.92)	.375 (9.53)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.969 (24.61)	.969 (24.61)	1.375 (34.93)	1.375 (34.93)	1.750 (44.45)	1.750 (44.45)
G	.187 (4.75)	.250 (6.35)	.312 (7.92)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.812 (20.62)	.812 (20.62)	1.156 (29.36)	1.156 (29.36)	1.500 (38.10)	1.500 (38.10)
H	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)	1.500 (38.10)	1.500 (38.10)	2.250 (57.15)	2.250 (57.15)	3.000 (76.20)	3.000 (76.20)
Max Pull lbs. (kg)	1,500 (680)	2,075 (941)	2,075 (941)	2,500 (1134)	3,500 (1588)	4,750 (2155)	8,500 (3856)	9,750 (4423)	16,000 (7258)	19,500 (8845)	33,500 (15196)	33,500 (15196)

## NOTE

A Rod Alignment Coupler is not recommended for unguided loads.

# Series VP/VN Optional Rod Ends for 1-1/2 thru 8 inch Bore Cylinders

## Rod End Types

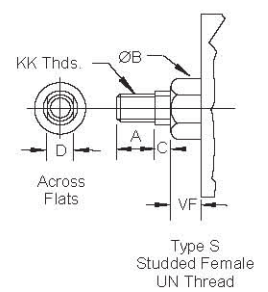
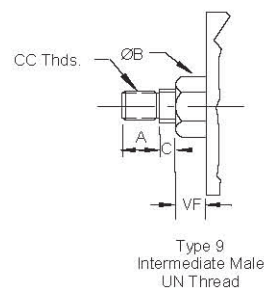
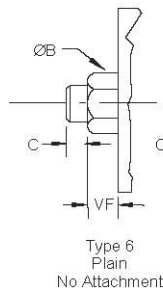
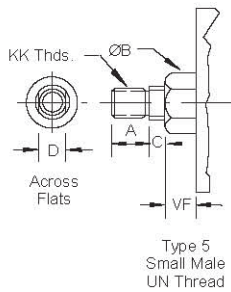
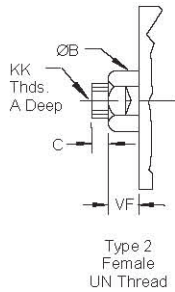
In addition to selecting the correct bore, you must specify the appropriate rod size and rod end configuration for your application.

Five different inch rod end configurations are available. If a custom design is required, contact your local Eaton sales engineer, and define your requirements.

DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)		
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)	
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)	
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	
B +.000	- .002	Std.	1.124	(28.55)	1.124	(28.55)	1.124	(28.55)	1.499	(38.08)
		O.S.	1.499	(38.08)	1.499	(38.08)	1.499	(38.08)	1.999	(50.78)
C	Std.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	
	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	
CC	Std.	1/2 - 20		1/2 - 20		1/2 - 20		7/8 - 14		
	O.S.	7/8 - 14		7/8 - 14		7/8 - 14		1-1/4 - 12		
D	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.813	(20.64)	
	O.S.	.813	(20.64)	.813	(20.64)	.813	(20.64)	1.125	(28.58)	
KK	Std.	7/16 - 20		7/16 - 20		7/16 - 20		3/4 - 16		
	O.S.	3/4 - 16		3/4 - 16		3/4 - 16		1 - 14		
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)	
	O.S.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)	

All dimensions in inches (mm)

# Series VP/VN Optional Rod Ends for 1-1/2 thru 8 inch Bore Cylinders

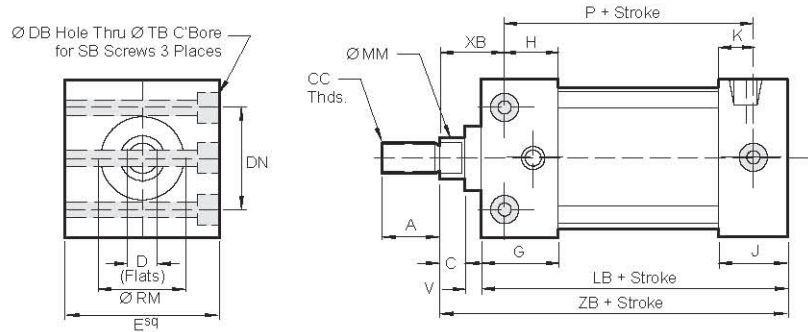
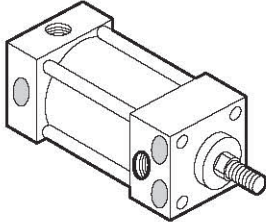


<b>4" BORE (101.60)</b>		<b>5" BORE (127.00)</b>		<b>6" BORE (152.40)</b>		<b>7" BORE (177.80)</b>		<b>8" BORE (203.20)</b>	
1"	(25.40)	1"	(25.40)	1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/8"	(34.93)
1-3/8"	(34.93)	1-3/8"	(34.93)	1-3/4"	(44.45)	1-3/4"	(44.45)	1-3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)
1.499	(38.08)	1.499	(38.08)	1.999	(50.78)	1.999	(50.78)	1.999	(50.78)
1.999	(50.78)	1.999	(50.78)	2.374	(60.30)	2.374	(60.30)	2.374	(60.30)
.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)
.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)
7/8 - 14		7/8 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
1-1/4 - 12		1-1/4 - 12		1-1/2 - 12		1-1/2 - 12		1-1/2 - 12	
.813	(20.64)	.813	(20.64)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)
1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
3/4 - 16		3/4 - 16		1 - 14		1 - 14		1 - 14	
1 - 14		1 - 14		1-1/4 - 12		1-1/4 - 12		1-1/4 - 12	
.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)
1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)

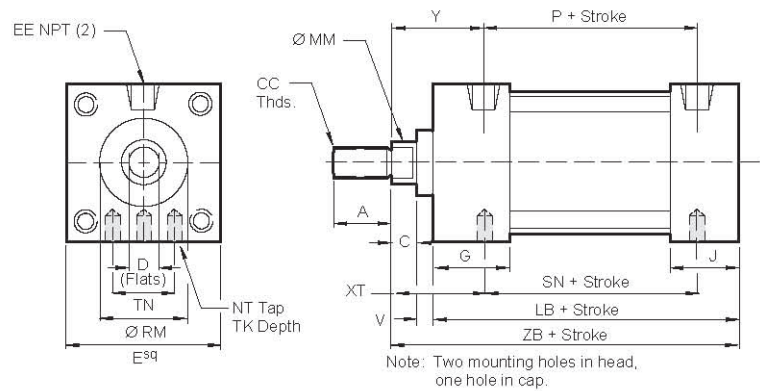
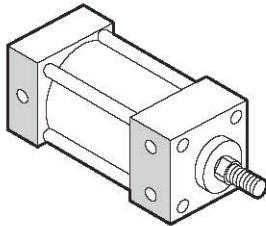
All dimensions in inches (mm)

# Series VP/VN 3/4 & 1-1/8 inch Bore Cylinders and Mounts

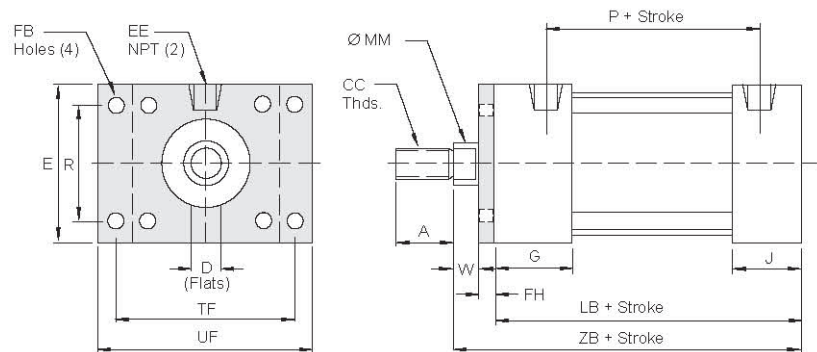
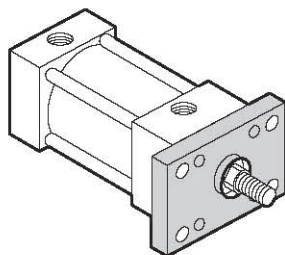
## Code 01 Bolt Thru Mounts (ANSI MS8)



## Code 02 Tapped Mounts (ANSI MS9)



## Code 07 Head Rectangular Flange Mounts (ANSI MF1)



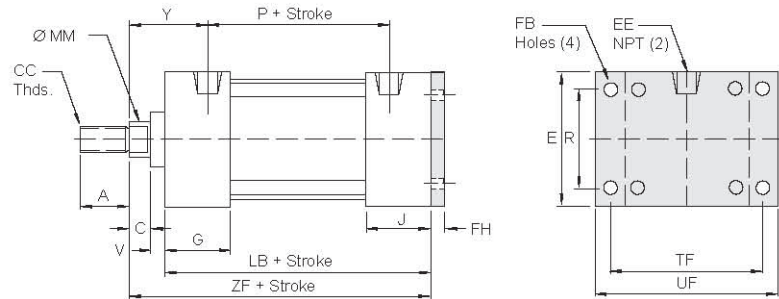
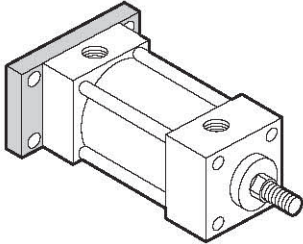
# Series VP/VN 3/4 & 1-1/8 inch Bore Cylinders and Mounts

DIMENSION		01 BOLT THRU MOUNTS (MS8)		02 SIDETAPPED MOUNTS (MS4)		07 HEAD RECT. FLANGE MOUNTS (MF1)	
		3/4"	1-1/8"	3/4"	1-1/8"	3/4"	1-1/8"
Rod	Std.	.312 (7.92)	.375 (9.53)	.312 (7.92)	.375 (9.53)	.312 (7.92)	.375 (9.53)
	O.S.	-	.500 (12.70)	-	.500 (12.70)	-	.500 (12.70)
A	Std.	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)
	O.S.	-	.750 (19.05)	-	.750 (19.05)	-	.750 (19.05)
C		.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)
CC	Std.	1/4 - 28	3/8 - 24	1/4 - 28	3/8 - 24	1/4 - 28	3/8 - 24
	O.S.	-	1/2 - 20	-	1/2 - 20	-	1/2 - 20
D	Std.	.250 (6.35)	.312 (7.92)	.250 (6.35)	.312 (7.92)	.250 (6.35)	.312 (7.92)
	O.S.	-	.437 (11.10)	-	.437 (11.10)	-	.437 (11.10)
DB		.172 (4.37)	.203 (5.16)	-	-	-	-
DN		.625 (15.88)	1.000 (25.40)	-	-	-	-
E		1.000 (25.40)	1.500 (38.10)	1.000 (25.40)	1.500 (38.10)	-	-
EE		.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	-	-
FB		-	-	-	-	.219 (5.56)	.219 (5.56)
FH		-	-	-	-	.250 (6.35)	.250 (6.35)
G		.875 (22.23)	.875 (22.23)	.875 (22.23)	.875 (22.23)	.875 (22.23)	.875 (22.23)
H		.687 (17.45)	.625 (15.88)	-	-	-	-
J		.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)
K		.375 (9.53)	.375 (9.53)	-	-	-	-
LB		2.250 (57.15)	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)
MM	Std.	.307 (7.80)	.307 (7.80)	.307 (7.80)	.307 (7.80)	.307 (7.80)	.307 (7.80)
	O.S.	-	.495 (12.57)	-	.495 (12.57)	-	.495 (12.57)
NT		-	-	8 - 32	10 - 32	-	-
P		-	-	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)
R		-	-	-	-	.500 (12.70)	1.000 (25.40)
RM	Std.	.562 (14.27)	.750 (19.05)	.562 (14.27)	.750 (19.05)	-	-
	O.S.	-	1.000 (25.40)	-	1.000 (25.40)	-	-
SB		#8	#10	-	-	-	-
SN		-	-	1.812 (46.02)	1.750 (44.45)	-	-
TB		.281 (7.14)	.328 (8.33)	-	-	-	-
TF		-	-	-	-	1.500 (38.10)	2.000 (56.80)
TK		-	-	.187 (4.87)	.250 (6.35)	-	-
TN		-	-	.625 (15.88)	1.000 (25.40)	-	-
UF		-	-	-	-	2.000 (56.80)	2.500 (63.50)
V		.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)
XT		-	-	.562 (14.27)	.625 (15.88)	-	-
W		-	-	-	-	.125 (3.18)	.125 (3.18)
XB		.562 (14.27)	.625 (15.88)	-	-	-	-
Y		-	-	.938 (23.83)	.938 (23.83)	.938 (23.83)	.938 (23.83)
ZB		-	-	2.625 (66.68)	2.625 (66.68)	2.625 (66.68)	2.625 (66.68)

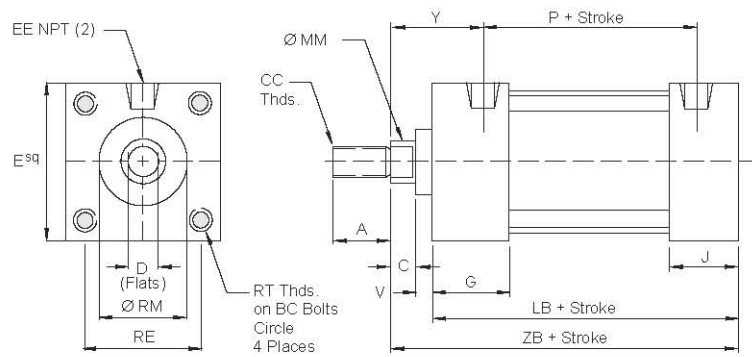
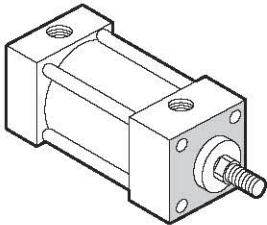
All dimensions in inches (mm)

# Series VP/VN 3/4 & 1-1/8 inch Bore Cylinders and Mounts

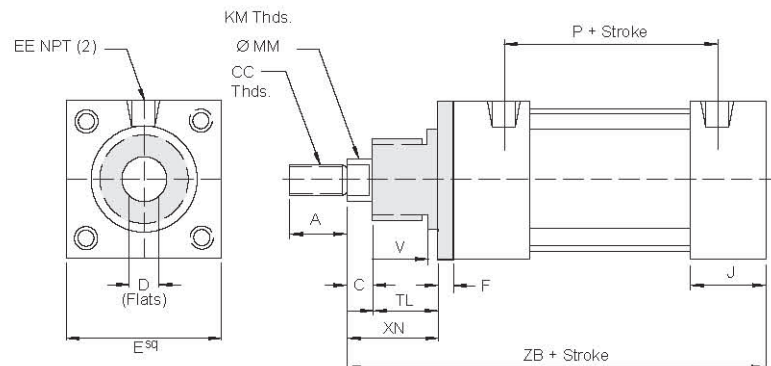
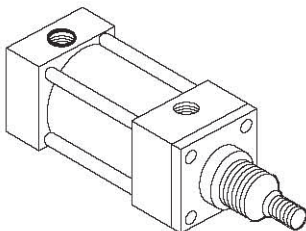
## Code 12 Cap Rectangular Flange Mounts (ANSI MF2)



## Code 18 Head Tapped Face Mounts (ANSI MR1)



## Code 20 Threaded Nose Mounts (ANSI MNR1)



# Series VP/VN 3/4 & 1-1/8 inch Bore Cylinders and Mounts

DIMENSION		12 CAP. RECT. FLANGE MOUNTS (MF2)		18 HEAD TAPPED FACE MOUNTS (MR1)		20 THREADED NOSE MOUNTS (MNR1)	
		3/4"	1-1/8"	3/4"	1-1/8"	3/4"	1-1/8"
Rod	Std.	.312 (7.92)	.375 (9.53)	.312 (7.92)	.375 (9.53)	.312 (7.92)	.375 (9.53)
	O.S.	-	.500 (12.70)	-	.500 (12.70)	-	.500 (12.70)
A	Std.	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)
	O.S.	-	.750 (19.05)	-	.750 (19.05)	-	.750 (19.05)
C		.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)
CC	Std.	1/4 - 28	3/8 - 24	1/4 - 28	3/8 - 24	1/4 - 28	3/8 - 24
	O.S.	-	1/2 - 20	-	1/2 - 20	-	1/2 - 20
D	Std.	-	-	.250 (6.35)	.312 (7.92)	.250 (6.35)	.312 (7.92)
	O.S.	-	-	-	.437 (11.10)	-	.437 (11.10)
E		1.000 (25.40)	1.500 (38.10)	1.000 (25.40)	1.500 (38.10)	1.000 (25.40)	1.500 (38.10)
EE		.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)
F		-	-	-	-	.250 (6.35)	.250 (6.35)
FB		.219 (5.56)	.219 (5.56)	-	-	-	-
FH		.250 (6.35)	.250 (6.35)	-	-	-	-
G		.875 (22.23)	.875 (22.23)	.875 (22.23)	.875 (22.23)	.875 (22.23)	.875 (22.23)
J		.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)
KM		-	-	-	-	5/8 - 18	1 - 14
LB		2.250 (57.15)	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)
MM	Std.	.307 (7.80)	.370 (9.40)	.307 (7.80)	.370 (9.40)	.307 (7.80)	.370 (9.40)
	O.S.	-	.495 (12.57)	-	.495 (12.57)	-	.495 (12.57)
P		1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)
R		.500 (12.70)	1.000 (25.40)	-	-	-	-
RE		.750 (19.05)	1.125 (28.58)	.750 (19.05)	1.125 (28.58)	-	-
RM	Std.	-	-	.625 (15.88)	.750 (19.05)	.625 (15.88)	1.062 (26.97)
	O.S.	-	-	-	-	-	-
RT		-	-	8 - 32	10 - 32	-	-
TF		1.500 (38.10)	2.000 (50.80)	-	-	-	-
TL		-	-	-	-	.625 (15.88)	.875 (22.23)
UF		2.000 (50.80)	2.500 (63.50)	-	-	-	-
V		.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)
XN		-	-	-	-	.875 (22.23)	1.125 (28.58)
Y		.938 (23.83)	.938 (23.83)	.938 (23.83)	.938 (23.83)	.938 (23.83)	.938 (23.83)
ZB		-	-	2.625 (66.68)	2.625 (66.68)	3.375 (85.73)	3.625 (92.08)
ZF		2.875 (73.03)	2.875 (73.03)	-	-	-	-

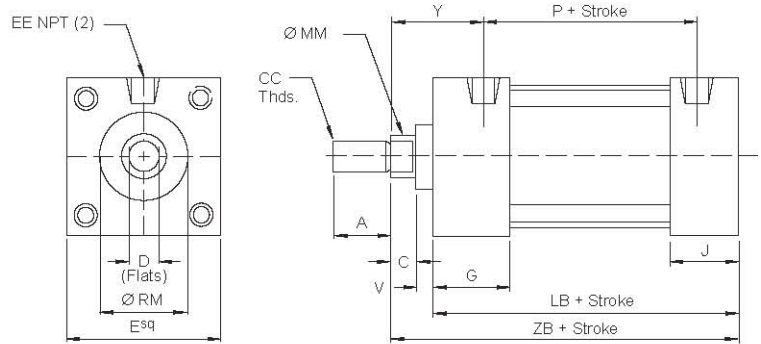
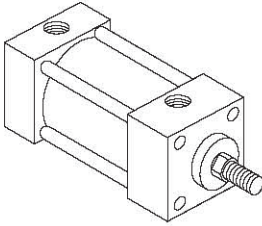
All dimensions in inches (mm)



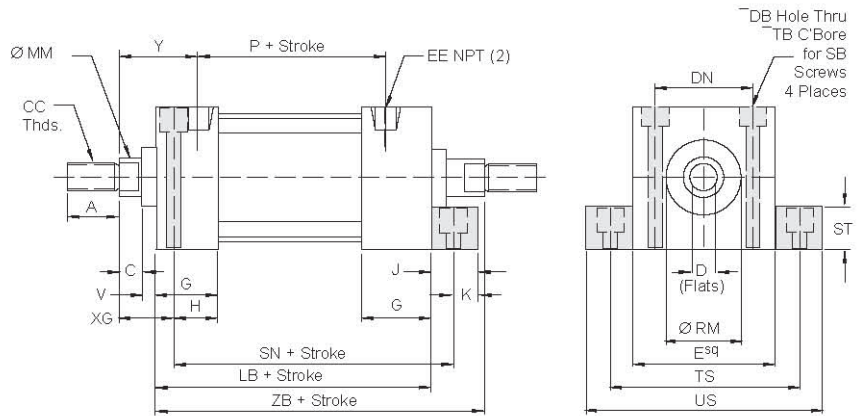
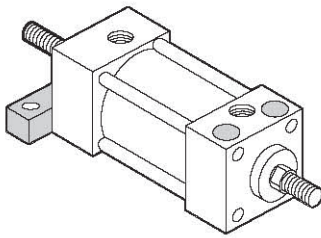
# Series VP/VN 3/4 & 1-1/8 inch Bore Cylinders and Mounts

## Code 24 No Mounts

(ANSI MX0)

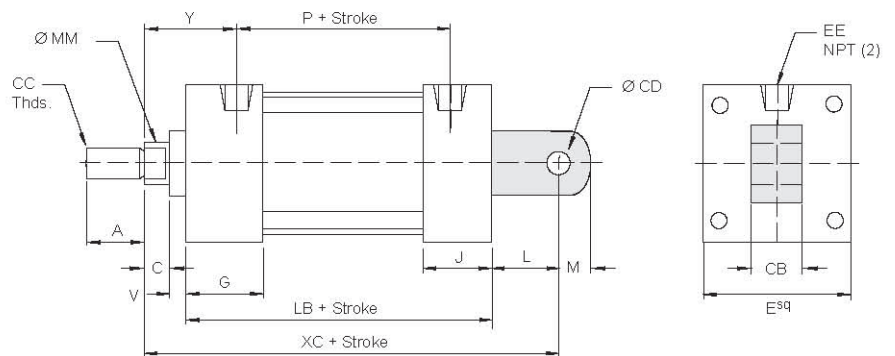
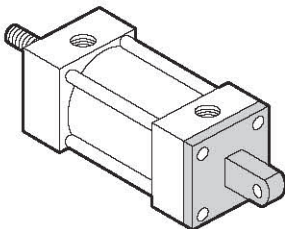


## Code 25 Double Rod, Bolt Thru Mounts



## Code 47 Fixed Eye Mounts

(ANSI MP3)



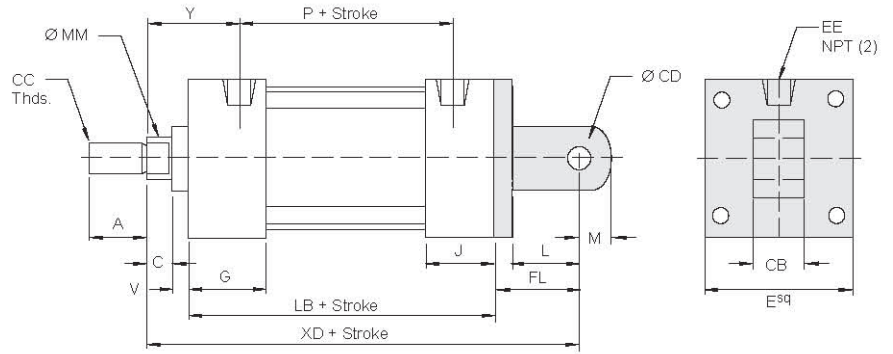
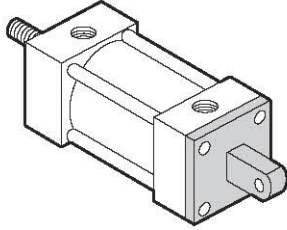
# Series VP/VN 3/4 & 1-1/8 inch Bore Cylinders and Mounts

DIMENSION		24 NO MOUNT (MX0)		25 DOUBLE ROD BOLT THRU MOUNTS (MS8)		47 FIXED EYE MOUNTS (MP3)	
		3/4"	1-1/8"	3/4"	1-1/8"	3/4"	1-1/8"
Rod	Std.	.312 (7.92)	.375 (9.53)	.312 (7.92)	.375 (9.53)	.312 (7.92)	.375 (9.53)
	O.S.	-	.500 (12.70)	-	.500 (12.70)	-	.500 (12.70)
A	Std.	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)
	O.S.	-	.750 (19.05)	-	.750 (19.05)	-	.750 (19.05)
C		.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)
CB		-	-	-	-	.250 (6.35)	.375 (9.53)
CC	Std.	1/4 - 28	3/8 - 24	1/4 - 28	3/8 - 24	1/4 - 28	3/8 - 24
	O.S.	-	1/2 - 20	-	1/2 - 20	-	1/2 - 20
CD		-	-	-	-	.250 (6.35)	.375 (9.53)
D	Std.	.250 (6.35)	.312 (7.92)	.250 (6.35)	.312 (7.92)	.250 (6.35)	-
	O.S.	-	.437 (11.10)	-	.437 (11.10)	-	-
DB		-	-	.172 (4.37)	.203 (5.16)	-	-
DN		-	-	.625 (15.88)	1.000 (25.40)	-	-
E		1.000 (25.40)	1.500 (38.10)	1.000 (25.40)	1.500 (38.10)	1.000 (25.40)	1.500 (38.10)
EE		.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)
G		.875 (22.23)	.875 (22.23)	.875 (22.23)	.875 (22.23)	.875 (22.23)	.875 (22.23)
H		-	-	.687 (17.45)	.625 (15.88)	-	-
J		.625 (15.88)	.625 (15.88)	.500 (12.70)	.500 (12.70)	.625 (15.88)	.625 (15.88)
K		-	-	.250 (6.35)	.250 (6.35)	-	-
L		-	-	-	-	.437 (11.10)	.437 (11.10)
LB		2.250 (57.15)	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)
M		-	-	-	-	.250 (6.53)	.375 (9.53)
MM	Std.	.307 (7.80)	.370 (9.40)	.307 (7.80)	.370 (9.40)	.307 (7.80)	.370 (9.40)
	O.S.	-	.495 (12.57)	-	.495 (12.57)	-	.495 (12.57)
P		1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)
RM	Std.	.562 (14.27)	.750 (19.05)	.625 (15.88)	.750 (19.05)	-	-
	O.S.	-	1.000 (25.40)	-	1.000 (25.40)	-	-
SB		-	-	#8	#10	-	-
SD		-	-	2.562 (65.07)	2.500 (63.50)	-	-
ST		-	-	.375 (9.53)	.375 (9.53)	-	-
TB		-	-	.281 (7.14)	.328 (8.33)	-	-
TS		-	-	1.375 (34.93)	1.875 (47.63)	-	-
US		-	-	1.750 (44.45)	2.250 (57.15)	-	-
V		.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)
XC		-	-	-	-	3.062 (77.77))	3.062 (77.77))
XG		-	-	.562 (14.27)	.625 (15.88)	-	-
Y		.938 (23.83)	.938 (23.83)	.938 (23.83)	.938 (23.83)	.938 (23.83)	.938 (23.83)
ZB		2.625 (66.68)	2.625 (66.68)	3.250 (82.55)	3.250 (82.55)	-	-

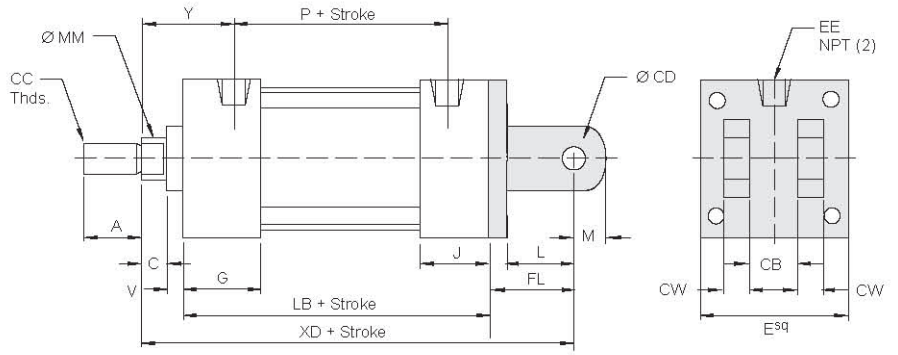
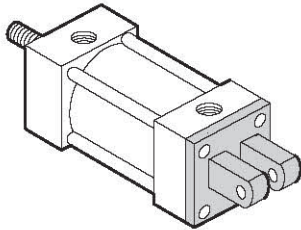
All dimensions in inches (mm)

# Series VP/VN 3/4 & 1-1/8 inch Bore Cylinders and Mounts

## Code 48 Detachable Eye Mounts (ANSI MP4)



## Code 50 Detachable Clevis Mounts (ANSI MP2)



# Series VP/VN 3/4 & 1-1/8 inch Bore Cylinders and Mounts

DIMENSION		48 DETACHABLE EYE MOUNTS (MP4)		50 DETACHABLE CLEVIS MOUNTS (MP2)	
		3/4"	1-1/8"	3/4"	1-1/8"
Rod	Std.	.312 (7.92)	.375 (9.53)	.312 (7.92)	.375 (9.53)
	O.S.	-	.500 (12.70)	-	.500 (12.70)
A	Std.	.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)
	O.S.	-	.750 (19.05)	-	.750 (19.05)
C		.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)
CB		.250 (6.35)	.375 (9.53)	.250 (6.35)	.375 (9.53)
CC	Std.	1/4 - 28	3/8 - 24	1/4 - 28	3/8 - 24
	O.S.	-	1/2 - 20	-	1/2 - 20
CD		.250 (6.35)	.375 (9.53)	.250 (6.35)	.375 (9.53)
D	Std.	.250 (6.35)	.312 (7.92)	-	-
	O.S.	-	.437 (11.10)	-	-
E		1.000 (25.40)	1.500 (38.10)	1.000 (25.40)	1.500 (38.10)
EE		.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)
FL		.937 (23.80)	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)
G		.875 (22.23)	.875 (22.23)	.875 (22.23)	.875 (22.23)
J		.625 (15.88)	.625 (15.88)	.625 (15.88)	.625 (15.88)
L		.437 (11.10)	.625 (15.88)	.625 (15.88)	.625 (15.88)
LB		2.250 (57.15)	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)
M		.250 (6.35)	.375 (9.53)	.250 (6.35)	.375 (9.53)
MM	Std.	.307 (7.80)	.370 (9.40)	.307 (7.80)	.370 (9.40)
	O.S.	-	.495 (12.57)	-	.495 (12.57)
P		1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)
V		.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)
XD		3.562 (90.47)	3.750 (95.25)	3.750 (95.25)	3.750 (95.25)
Y		.938 (23.83)	.938 (23.83)	.938 (23.83)	.938 (23.83)

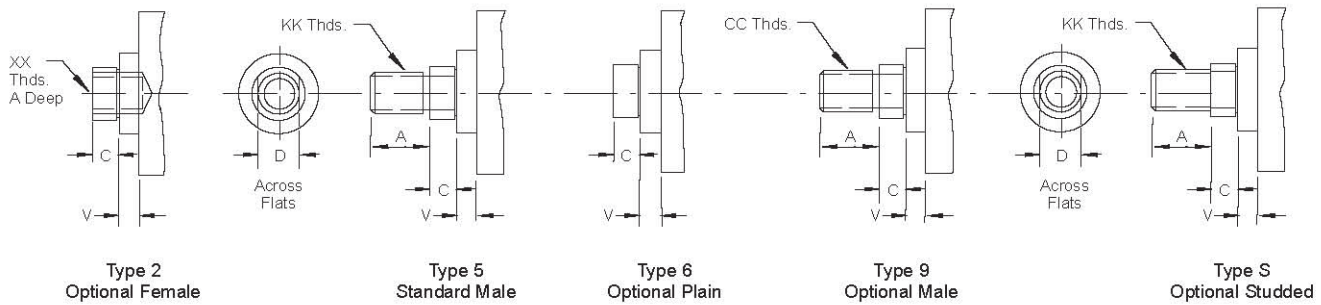
All dimensions in inches (mm)

# Series VP/VN Rod Ends for 3/4 & 1-1/8 inch Bore Cylinders

## Rod End Types

In addition to selecting the correct bore, you must specify the appropriate rod size and rod end configuration for your application.

Three different inch rod end configurations are available. If a custom design is required, contact your local Eaton sales engineer, and define your requirements.

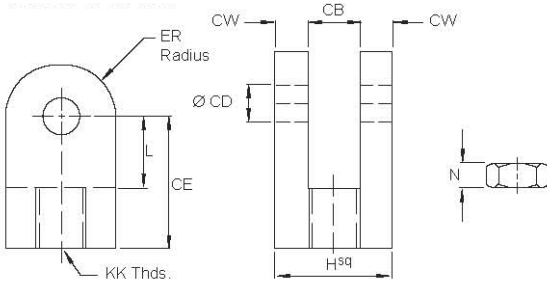


DIMENSION		STANDARD & OPTIONAL ROD ENDS	
		3/4"	1-1/8"
Rod	Std.	.312 (7.92)	.375 (9.53)
	O.S.	-	.500 (12.70)
A	Std.	.625 (15.88)	.625 (15.88)
	O.S.	-	.750 (19.05)
C		.250 (6.35)	.250 (6.35)
CC	Std.	5/16 - 24	3/8 - 24
	O.S.	-	1/2 - 20
D	Std.	.250 (6.35)	.312 (7.92)
	O.S.	-	.437 (11.10)
KK	Std.	1/4 - 28	5/16 - 24
	O.S.	-	7/16 - 20
V		.125 (3.18)	.125 (3.18)
XX	Std.	10 - 32	1/4 - 28
	O.S.	-	3/8 - 24

All dimensions in inches (mm)

# Series VP/VN Accessories for 3/4 & 1-1/8 inch Bore Cylinders

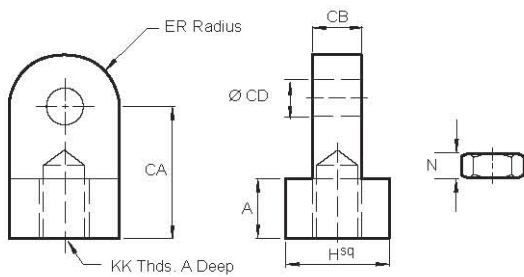
## Rod Clevis



	3/4 VP62004A*	VP62004B*	1-1/8 VP62006A*	VP62006B*
CB	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
CD	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
CE	.812 (20.60)	.812 (20.60)	.875 (22.23)	.875 (22.23)
CW	.125 (3.18)	.125 (3.18)	.187 (4.75)	.187 (4.75)
ER	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
H	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)
KK	1/4 – 28	5/16 – 24	3/8 – 24	1/2 – 20
L	.500 (12.70)	.500 (12.70)	.500 (12.70)	.500 (12.70)
N	.156 (3.96)	.187 (4.75)	.219 (5.56)	.312 (7.92)

\*Includes Jam Nut

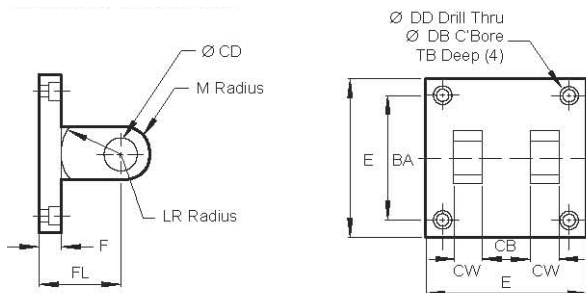
## Rod Eye



	3/4 VP60004A*	VP60004B*	1-1/8 VP60006A*	VP60006B*
A	.312 (7.92)	.312 (7.92)	.437 (11.10)	.437 (11.10)
CA	.750 (19.05)	.750 (19.05)	.875 (22.23)	.875 (22.23)
CB	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
CD	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
ER	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
H	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)
KK	1/4 – 28	5/16 – 24	3/8 – 24	1/2 – 20
N	.156 (3.96)	.187 (4.75)	.219 (5.56)	.312 (7.92)

\*Includes Jam Nut

## Clevis Bracket

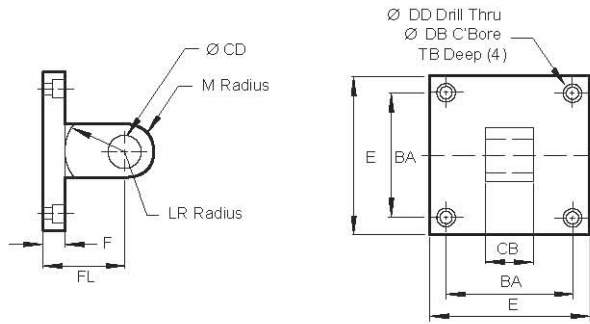


	3/4 VP61004A	1-1/8 VP61006A
BA	.750 (19.05)	1.125 (28.58)
CB	.250 (6.35)	.375 (9.53)
CD	.250 (6.35)	.375 (9.53)
CW	.250 (6.35)	.250 (6.35)
DB	.250 (6.35)	.328 (8.33)
DD	.156 (3.96)	.203 (5.16)
E	1.000 (25.40)	1.500 (38.10)
F	.500 (12.70)	.500 (12.70)
FL	1.125 (28.58)	1.125 (28.58)
LR	.437 (11.10)	.625 (15.88)
M	.250 (6.35)	.375 (9.53)
TB	.125 (3.18)	.250 (6.53)

All dimensions in inches (mm)

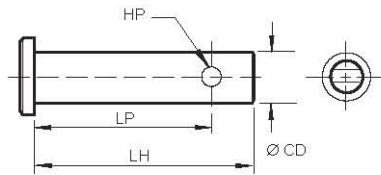
# Series VP/VN Accessories for 3/4 & 1-1/8 inch Bore Cylinders

## Eye Bracket



	3/4 VP78004A	1-1/8 VP78006A
BA	.750 (19.05)	1.125 (28.58)
CB	.250 (6.35)	.375 (9.53)
CD	.250 (6.35)	.375 (9.53)
DB	.250 (6.35)	.328 (8.33)
DD	.156 (3.96)	.203 (5.16)
E	1.000 (25.40)	1.500 (38.10)
F	.500 (12.70)	.500 (12.70)
FL	.937 (23.80)	1.125 (28.58)
LR	.437 (11.10)	.625 (15.88)
M	.250 (6.35)	.375 (9.53)
TB	.125 (3.18)	.250 (6.53)

## Clevis Pin



	3/4 VP83004B	VP83004C	1-1/8 VP83006B	VP83006C
CD	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
HP	.094 (2.39)	.094 (2.39)	.156 (3.96)	.156 (3.96)
LH	.750 (19.05)	1.000 (25.40)	1.094 (27.79)	1.250 (31.75)
LP	.656 (16.66)	.906 (23.01)	.937 (23.80)	1.032 (26.21)
Use	VP62004A	VP78004A	VP62006A	VP78006A
w/	VP620048	VP61004A	VP62006B	VP61006A
	-	VP60004A	-	VP60006A

All dimensions in inches (mm)



# Series VP/VN Switches for 3/4 thru 8 inch Bore Cylinders

Eaton utilizes a magnetically operated, non-contact sensing system consisting of a magnet in the piston, and a sensing switch clamped to the cylinder tie rod.

One or more switches may be mounted to provide an indication of piston position.

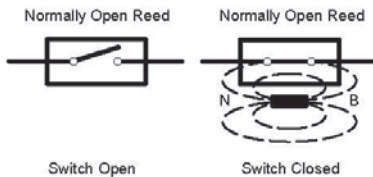
Switches use vinyl molded cable, and are supplied with

adjustable mounting brackets allowing the switches to be securely positioned anywhere along the range of piston travel.

LED indicator lights facilitate installation and troubleshooting.

## Reed Switch Working Principle

Reed switch sensors contain hermetically sealed reed elements (mechanical contacts) which are open in their normal state. When a magnetic field moves within proximity of the switch, magnetism is induced into the leads and forces the contacts to close.



## Application Recommendations and Precautions

To provide maximum reliability:

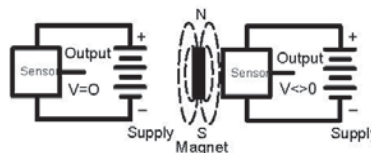
1. Always stay within the specifications and power rating limitations of the unit installed.
2. Primary and control circuit wiring should not be mixed in the same conduit.

Motors will produce high pulses that will be introduced into the control wiring if the wiring is carried in the same conduit.

3. Never connect the switch without a load present. The switch will be destroyed.
4. Some electrical loads may be capacitive. Capacitive loading may occur due to distributed capacity in cable runs over 25 feet. Use switch Model PS7-24 whenever capacitive loading may occur.

## Hall Effect/Magnetostrictive Working Principle

The solid state (no moving parts) magnetostrictive sensor responds to a parallel magnetic pole by providing a digital signal to the output control circuit. This technique enables the sensing of weak magnetic fields, with no limit to the maximum strength of the magnetic field.



In order to obtain optimum performance and long life, magnetically operated limit switches should not be subjected to:

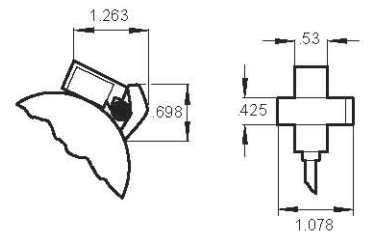
- (1) strong magnetic fields,
- (2) extreme temperature, and
- (3) excessive ferrous filing or chip buildup.

Improper wiring may damage or destroy the switch. The wiring diagram, along with the listed power ratings, must be carefully observed before connecting power to the switch.

Lower power switches are designed for signaling electronic circuits. Do not use on relay loads or with incandescent bulbs. Resistive loads only.

## Switch and Mounting Bracket Dimensions

PS8-2 Series

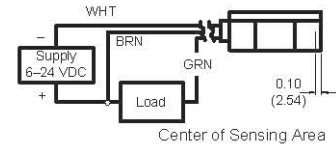
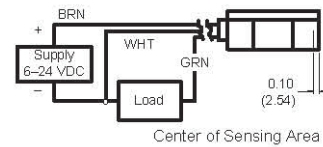
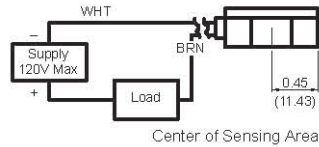


# Series VP/VN Specifications: 3/4 thru 2-1/2 inch Bores

\*Metal Oxide Varistor surge Suppression. Note: All PS7 and PS\* Series Switches are supplied with 9 foot leads.

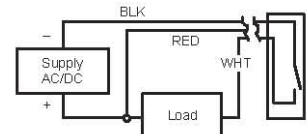
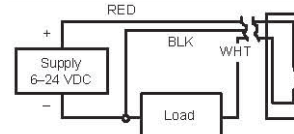
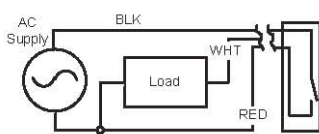
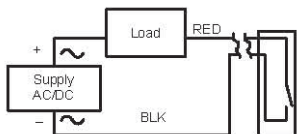
Switch Model	PS8-2-04 Reed	PS8-2-31 Hall	PS8-2-32 Hall
Bore Sizes	3/4 thru 2-1/2	3/4 thru 2-1/2	3/4 thru 2-1/2
Switch Type	Reed Switch *MOV & Light	Hall Effect & Light, Sourcing PNP	Hall Effect & Light, Sinking PNP
Function	SPST Normally Open	Normally Open	Normally Open
Switching Voltage	5-120 VDC/VAC 50/60 Hz	6-24 VDC	6-24 VDC
Switching Current	.5 Amp Max .005 Amp Min	.5 Amp Max	.5 Amp Max
Switching Power	10 VA	12 Watts Max	12 Watts Max
Max Voltage Drop	3.5 Volts	.5 Volts	.5 Volts
Magnetic Sensitivity	85 Gauss	85 Gauss	85 Gauss
Enclosure Classification	NEMA 6 & CSA Approved	NEMA 6 & CSA Approved	NEMA 6 & CSA Approved
Temperature Range	-22_F to +176_F	-22_F to +176_F	-22_F to +176_F

## Wiring Diagrams



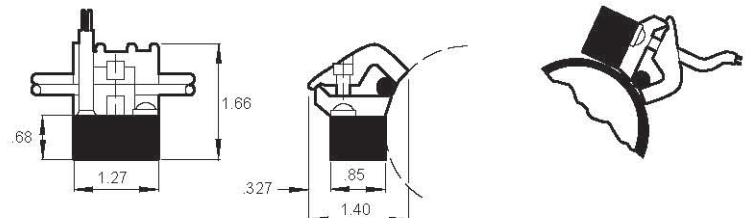
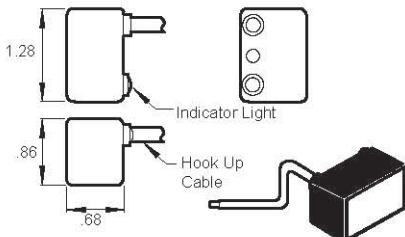
# Specifications: 2 thru 8 inch Bores

PS7-04 Reed	PS7-24 Reed	PS7-31 Hall	PS7-32 Hall
2 1/2 thru 8 1/2	2 1/2 thru 8 1/2	2 1/2 thru 8 1/2	2 1/2 thru 8 1/2
Reed Switch *MOV & Light	Reed Switch *MOV & Light, 3 Wire	Hall Effect & Light, Sourcing PNP	Hall Effect & Light, Sinking PNP
Normally Open	Normally Open	Normally Open	Normally Open
5-240 VDC/VAC 50/60 Hz	24-240 VAC 50/60 Hz	6-24 VAC	6-24 VAC
1 Amp Max	4 Amp Max 50 Amp Inrush	1 Amp Max	1 Amp Max
30 Watts Max	100 Watts Max	24 Watts Max	24 Watts Max
3 Volts	N/A	.5 Volts	.5 Volts
85 Gauss	85 Gauss	85 Gauss	85 Gauss
Parallel	Parallel	Parallel	Parallel
NEMA 6 & CSA Approved	NEMA 6 & CSA Approved	NEMA 6 & CSA Approved	NEMA 6 & CSA Approved
-22_F to +176_F	-22_F to +176_F	-22_F to +176_F	-22_F to +176_F



Note: For 8 1/2 inch bore add 9 to part number. Example: PS7-9-04

## PS7 Series



# Series VP/VN Technical Information

## Operating Temperatures:

A Seal Code -40\_F to 200\_F  
(-40\_C to 93\_C)  
T Seal Code -20\_F to 400\_F  
(-29\_C to 204\_C)

## Operating Pressure:

250 psig air (17.2 bar)  
400 psig hydraulic (27.6 bar)  
Bore Sizes: 3/4", 1-1/8",  
1-1/2", 2", 2-1/2", 3-1/4", 4",  
5", 6", 8"

Note: 3/4" and 1-1/8" bores  
are not rated for hydraulic  
service.

## Supply:

Filtered compressed air to  
250 psi Petroleum based  
hydraulic fluid to 400 psi

## Lubrication:

None required  
Eaton's Vickers™ Pneumatic  
Cylinders are rated for "no  
lube added" service. All  
internal components are  
lubricated at time of  
assembly with a Teflon®  
based grease.

## Series VP Materials:

Head and End Caps:  
anodized aluminum  
Body: aluminum, clear  
anodized O.D., hard coat  
anodized I.D.  
Rod: hard chrome plated steel  
Piston: solid aluminum alloy  
Rod Bearing: cast iron,  
Teflon® coated  
Seals: urethane rod seal and  
wiper, nitrile piston seals  
Tie Rods: steel

## Alternate Series VN Materials:

Body: stainless steel  
Rod: stainless steel  
Rod Bearing: stainless steel  
Tie Rods: stainless steel

## Side Loading:

Cylinders are specifically  
designed to push and pull.  
Side loading of the piston  
rod should be avoided to  
ensure maximum operating  
performance and life.  
Care should be taken during  
installation to properly align  
the load to be moved with  
the center line of the cylinder.  
The use of a rod alignment  
coupler (see page 45) is  
strongly recommended  
whenever possible.

# Series VP/VN Technical Information

## Cylinder Weights

In pounds (kilograms)

### MOUNTING CODE

BORE INCH (MM)	ROD INCH (MM)	MOUNTING CODE									
		02, 24, 18		07		12, 13		23			
1 1/2"	(38.10)	5/8"	(15.88)	1.9	(.86)	2.6	(1.18)	2.7	(.23)	2.1	(.95)
2"	(50.80)	5/8"	(15.88)	2.8	(1.27)	3.9	(.77)	4.0	(1.81)	3.1	(1.41)
		1"	(25.40)	3.4	(1.54)	4.4	(2.00)	4.6	(2.09)	3.7	(1.68)
2 1/2"	(63.50)	5/8"	(15.88)	3.9	(.77)	5.3	(2.40)	5.5	(2.49)	4.1	(1.86)
		1"	(25.40)	4.5	(2.04)	5.9	(2.68)	6.1	(2.77)	4.7	(2.13)
3 1/4"	(82.55)	1"	(25.40)	7.3	(3.31)	10.8	(4.90)	11.1	(5.03)	7.7	(3.49)
		1 3/8"	(34.93)	8.2	(3.72)	11.5	(5.22)	12.1	(5.49)	8.7	(3.95)
4"	(101.60)	1"	(25.40)	9.8	(4.45)	14.8	(6.71)	15.1	(6.85)	10.2	(4.63)
		1 3/8"	(34.93)	10.8	(4.90)	15.5	(7.03)	16.1	(7.30)	11.2	(5.08)
5"	(127.00)	1"	(25.40)	15.1	(6.85)	22.7	(10.30)	23.1	(10.48)	16.1	(7.30)
		1 3/8"	(34.93)	16.2	(7.35)	23.5	(10.66)	24.1	(10.93)	17.2	(7.80)
6"	(152.40)	1 3/8"	(34.93)	23.5	(16.19)	35.6	(16.15)	36.3	(16.47)	24.5	(11.11)
		1 3/4"	(44.45)	24.8	(11.27)	36.9	(16.77)	37.6	(17.09)	25.8	(11.73)
7"	(177.80)	1 3/8"	(34.93)	32.1	(14.56)	32.1	(14.56)	32.1	(14.56)	33.4	(15.15)
		1 3/4"	(44.45)	33.4	(15.18)	33.4	(15.18)	33.4	(15.18)	34.7	(15.77)
8"	(203.20)	1 3/8"	(34.93)	40.0	(18.14)	40.0	(18.14)	40.0	(18.14)	41.3	(18.73)
		1 3/4"	(44.45)	47.3	(21.50)	41.3	(18.77)	41.3	(18.77)	42.6	(19.36)

All dimensions in inches (mm). All weights in pounds (kilograms).

Listed are the average breakaway pressures in psi for all Series VN/VP Cylinders.

If your application requires a lower breakaway pressure than indicated for a particular bore size, consult the factory.

## Breakaway Pressures in PSI (bar)

BORE	A SEALS		T SEALS	
	EXTEND	RETRACT	EXTEND	RETRACT
3/4"	9 (.62)	10 (.69)	5 (.35)	6 (.41)
1 1/8"	6 (.41)	7 (.48)	3 (.21)	4 (.28)
1 1/2", 2", 2 1/2"	6 (.41)	7 (.48)	3 (.21)	4 (.28)
3 1/4", 4"	4 (.28)	5 (.35)	2 (.14)	3 (.21)
5", 6", 8"	3 (.21)	4 (.28)	1 (.07)	2 (.14)

Note: Breakaway pressures were established with the cylinders mounted horizontally and no load on the piston rod.

# Series VP/VN Technical Information

<b>MOUNTING CODE</b>									
<b>01, 16, 17</b>	<b>45</b>	<b>10</b>	<b>03</b>	<b>08, 13, 50, 47</b>	<b>15, 48, 11</b>	<b>ADD PER INCH OF STROKE</b>			
2.5 (1.13)	2.3 (1.04)	2.8 (1.27)	2.5 (1.13)	3.0 (1.36)	2.8 (1.27)	0.18	(.08)		
3.5 (1.59)	3.3 (1.50)	4.0 (1.81)	3.8 (1.72)	4.2 (1.91)	3.9 (1.77)	0.21	(.10)		
4.1 (1.86)	3.9 (1.77)	4.6 (2.09)	4.4 (2.00)	4.8 (2.18)	4.5 (2.04)	0.35	(.16)		
4.6 (2.09)	4.4 (2.00)	5.3 (2.40)	5.3 (2.40)	5.5 (2.49)	5.3 (2.40)	0.23	(.10)		
5.2 (2.36)	5.1 (2.31)	5.9 (2.68)	6.0 (2.72)	6.1 (2.77)	5.9 (2.68)	0.38	(.17)		
8.9 (4.04)	8.2 (3.72)	11.1 (5.03)	9.7 (4.40)	11.8 (5.35)	11.4 (5.17)	0.42	(.19)		
9.9 (4.50)	9.2 (4.17)	12.1 (5.49)	10.7 (4.85)	12.8 (5.80)	12.4 (5.62)	0.63	(.29)		
11.5 (5.22)	10.9 (4.94)	14.8 (6.71)	13.3 (6.03)	15.5 (7.03)	15.2 (6.89)	0.45	(.20)		
12.5 (5.67)	11.9 (5.40)	15.8 (7.17)	14.3 (6.49)	16.5 (7.48)	16.2 (7.35)	0.66	(.30)		
18.7 (8.48)	17.6 (7.98)	22.2 (10.07)	20.8 (9.43)	22.8 (10.34)	22.5 (10.21)	0.51	(.23)		
19.7 (8.94)	18.6 (8.44)	23.2 (10.52)	21.9 (9.93)	23.9 (10.84)	23.5 (10.70)	0.73	(.33)		
27.3 (12.38)	26.6 (12.07)	35.7 (10.66)	32.1 (14.56)	37.0 (16.78)	36.3 (16.47)	0.77	(.35)		
28.3 (12.86)	27.9 (12.68)	35.2 (15.97)	33.4 (15.18)	38.3 (17.41)	37.6 (17.09)	1.03	(.47)		
33.5 (15.20)	36.8 (16.69)	36.5 (16.59)	32.1 (14.56)	48.9 (22.18)	48.2 (21.86)	1.00	(.45)		
34.8 (15.82)	38.1 (17.32)	37.0 (16.82)	33.4 (15.18)	50.2 (22.82)	49.5 (22.50)	1.26	(.57)		
41.4 (18.78)	45.7 (20.73)	43.0 (19.50)	40.0 (18.14)	60.5 (27.44)	59.7 (27.08)	1.06	(.48)		
42.7 (19.41)	47.0 (21.36)	44.3 (20.14)	41.3 (18.77)	61.8 (28.09)	61.0 (27.73)	1.32	(.60)		

All dimensions in inches (mm). All weights in pounds (kilograms).

# Series VP/VN Technical Information

## Piston Rod Diameter Selection:

Applications requiring long extend (push) strokes may require oversized piston rod diameters to prevent buckling. To determine the correct rod diameter for your application, follow these simple steps:

1. Select the force from the **Cylinder Force and Volume Chart** that is required for your application.

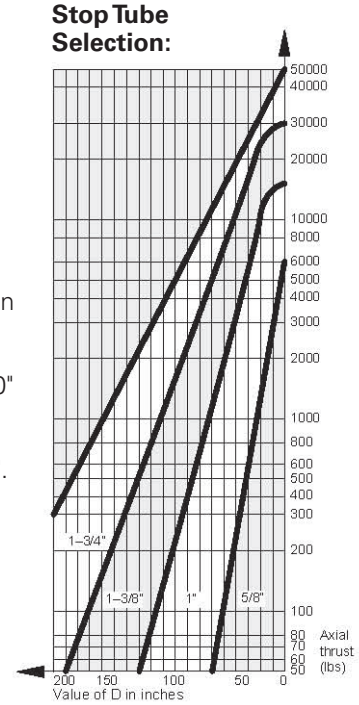
$$\text{Force} = \text{Piston Surface Area} \times \text{Operating Pressure}$$

2. From the **Cylinder Mounting Diagrams** select the mounting style being used.

3. With the piston rod fully extended, calculate the value of D (in inches) using the formula shown or the cylinder mounting diagram selected in step #2.
4. Locate the value of D (in inches) at the bottom of the **Selection Chart**. Enter the chart at this point and move vertically upward until intersecting with the horizontal line representing the required thrust which was selected in step #1. The band within which these lines intersect represents the minimum recommended piston rod diameter.

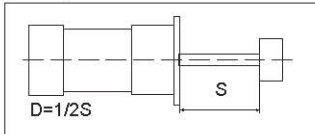
## Stop Tube Selection:

Stop tubes enhance the transverse load carrying capability of a long stroke cylinder by increasing the distance between the piston and rod bearing at full extension. When the value of D (calculated from the piston rod diameter selection instructions above) is less than 40", a stop tube is not required. However, if D is 40" or more, 1" of stop tube is recommended for every 10" (or fraction thereof) over 40".

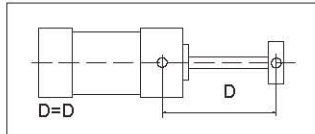


## Cylinder Mounting Diagrams

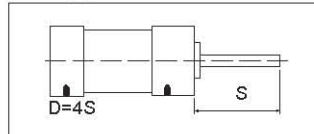
Firmly Guided Rod End



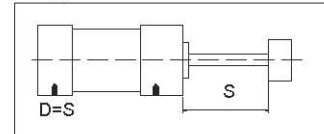
Head Trunnion



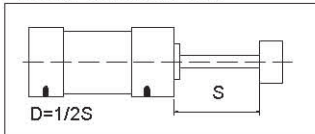
Unsupported Rod End



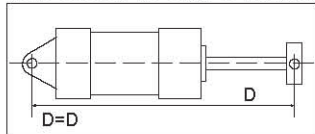
Supported Rod End



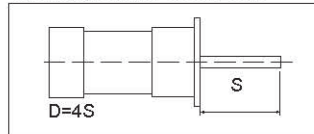
Firmly Guided Rod



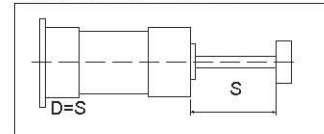
Cap Clevis or Cap Trunnion



Unsupported Rod End



Supported Rod End



# Series VP/VN Technical Information

## Stop Tubes

As the stroke of a cylinder increases, the resultant loads on the piston rod become greater. To keep these bearing loads from exceeding design limitations and to obtain optimum life from a cylinder, stop tubes should be specified according to the following procedure:

**SPECIFY ONE INCH OF STOP TUBE FOR EACH 10 INCHES (OR FRACTION THEREOF) OF STROKE IN EXCESS OF THE MAXIMUM LISTED IN THE FOLLOWING TABLE.**

### Maximum Stroke Permissible Without Stop Tube

BORE DIAMETER	PIVOT MOUNT CYLINDER (CLEVIS & TRUNNION)	RIGID MOUNT CYLINDER (WITHOUT ROD SUPPORT)	RIGID MOUNT CYLINDER (WITH ROD SUPPORT)
1-1/2" & 2"	24"	30"	48"
2-1/2" to 4"	30"	38"	48"
5" to 8"	36"	40"	48"

### Stop Tube Design

Three typical stop tube designs are illustrated below.

#### Design A

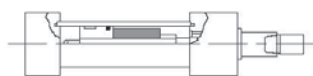
Used for cylinders non-cushioned on the rod.



**Stop Tube**

#### Design B

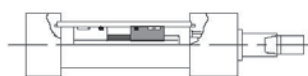
Used for cushioned hydraulic cylinders.



**Stop Spacer**

#### Design C

The best choice for a cylinder with an exceptionally long stop tube requirement. Note that the piston's effective bearing area is doubled. In addition to gaining the normal increased minimum distance between bearing points.



**Double Piston with Spacer**



# Series VP/VN Technical Information

## Cylinder Force and Volume Charts

Extend Forces in pounds (newtons)

BORE	PISTON AREA IN <sup>2</sup> (CM <sup>2</sup> )		PSI (BAR)										VOL. CU. FT. (CM <sup>3</sup> ) DISPLACEMENT PER STROKE INCH			
			40 (3)		60 (4)		80 (6)		100 (7)		150 (10)			200 (14)		
1-1/2"	1.77	(11.40)	71	(315)	106	(472)	142	(629)	177	(786)	266	(1179)	353	(1570)	.00102	(29)
2"	3.14	(20.27)	126	(559)	189	(839)	251	(1119)	314	(1398)	471	(2097)	628	(2793)	.00182	(52)
2-1/2"	4.91	(31.67)	196	(874)	295	(1311)	393	(1748)	491	(2185)	737	(3277)	982	(4368)	.00284	(80)
3-1/4"	8.30	(53.32)	332	(1477)	498	(2215)	664	(2953)	830	(3692)	1245	(5538)	1659	(7379)	.00480	(136)
4"	12.57	(81.07)	503	(2237)	754	(3355)	1005	(4473)	1257	(5592)	1886	(8388)	2513	(11178)	.00727	(206)
5"	19.64	(126.71)	785	(3491)	1178	(5240)	1571	(6988)	1964	(8736)	2946	(13104)	3928	(17472)	.01137	(322)
6"	28.27	(182.39)	1130	(5026)	1696	(7544)	2262	(10061)	2827	(12574)	4240	(18860)	5654	(25149)	.01837	(520)
8"	50.26	(324.26)	2010	(8940)	3015	(13411)	4020	(17881)	5026	(22356)	7539	(33533)	10052	(44711)	.02227	(631)

## Deduct these Forces for Retract Strokes

BORE	PISTON AREA IN <sup>2</sup> (CM <sup>2</sup> )		PSI (BAR)										VOL. CU. FT. (CM <sup>3</sup> ) DISPLACEMENT PER STROKE INCH			
			40 (3)		60 (4)		80 (6)		100 (7)		150 (10)			200 (14)		
5/8"	.307	(1.98)	12	(53)	18	(80)	25	(111)	31	(138)	46	(205)	61	(271)	.00018	(5)
1"	.785	(5.06)	31	(138)	47	(209)	63	(280)	70	(351)	118	(525)	157	(698)	.00045	(13)
1-3/8"	1.485	(9.58)	59	(262)	89	(396)	119	(529)	118	(525)	222	(997)	297	(1321)	.00086	(24)
1-3/4"	2.404	(15.51)	95	(423)	144	(641)	192	(854)	240	(1068)	360	(1601)	480	(2135)	.00139	(39)

# Series ML Features and Benefits

## Series ML Cylinders >125mm Bore

### A. Tie Rod Nuts

Heavy duty steel (zinc plated) sleeve nuts.

### B. Cushioning

Heavy duty cushioning with fine adjustment is standard.

### C. Piston Rod

High performance, high-strength, ground and polished 303 stainless steel, hard-chrome plated for excellent protection against wear.

### D. Cushion Sleeves

Smooth operating polyamide cushion sleeves.

### E. Tube

Precision aluminum tube ideally suited for air service. Anodized corrosion resistant surface.

### F. Rod Seal Wiper

The combination seal/wiper design is molded from tough abrasion resistant materials for long life and ease of maintenance.

### G. Bearing

Heavy duty long wearing nylon rod bearing.

### H. Cushion Seal

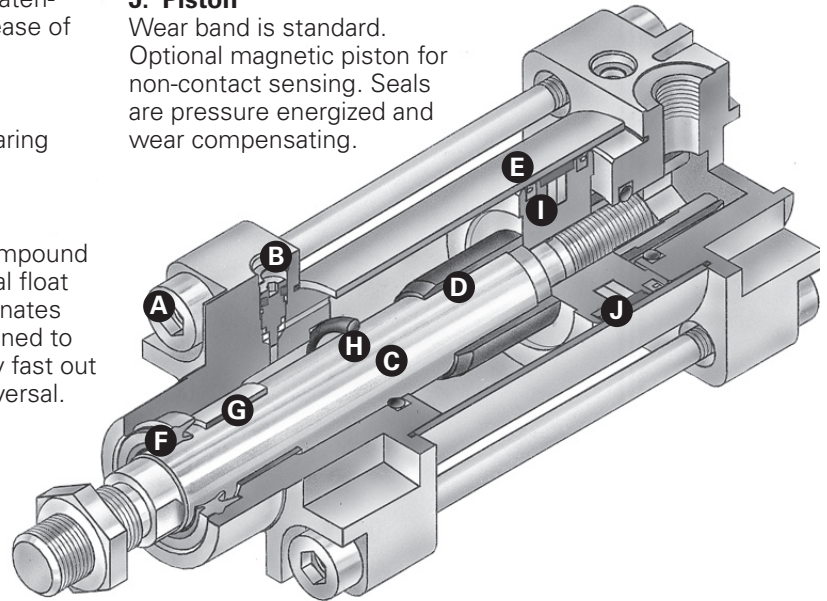
One piece, nitrile compound seal. Linear and radial float of cushion seal eliminates misalignment. Designed to provide exceptionally fast out of cushion stroke reversal.

### I. Piston Seals

Durable lip type

### J. Piston

Wear band is standard. Optional magnetic piston for non-contact sensing. Seals are pressure energized and wear compensating.



## Series ML Cylinders <125mm Bore

### A. Tie Rod Nuts

Heavy duty steel (zinc plated) sleeve nuts.

### B. Cushioning

Heavy duty cushioning with fine adjustment is standard.

### C. Piston Rod

High performance, high-strength, ground and polished 303 stainless steel, hard-chrome plated for excellent protection against wear.

### D. Cushion Sleeves

Smooth operating polyamide cushion sleeves.

### E. Tube

Precision aluminum profile tube with enclosed tie rods. Clear coat anodized corrosion resistant surface.

### F. Rod Seal Wiper

The combination seal/wiper design is molded from tough abrasion resistant materials for long life and ease of maintenance.

### G. Bearing

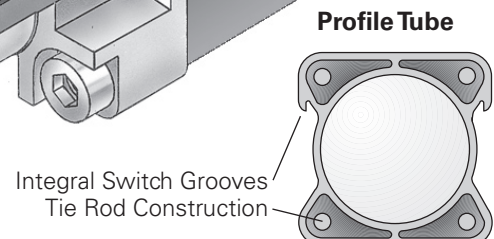
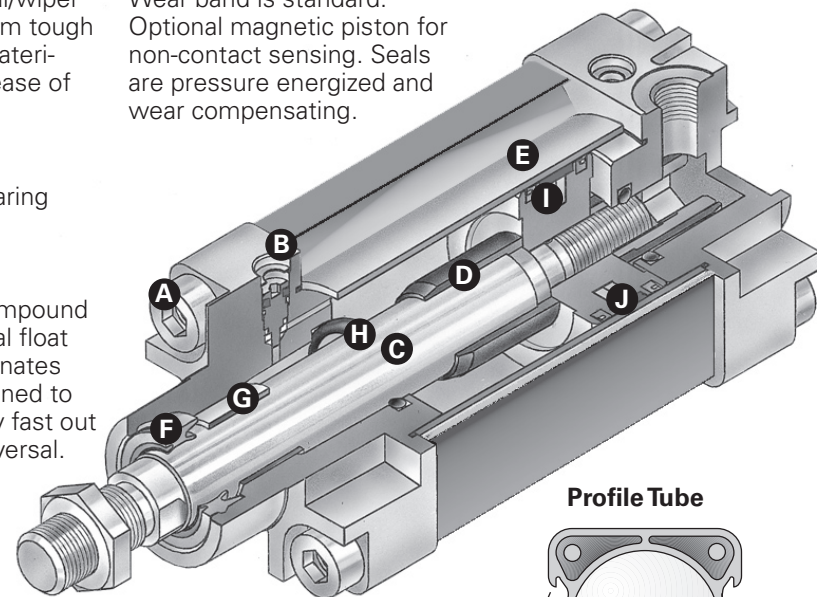
Heavy duty long wearing nylon rod bearing.

### H. Cushion Seal

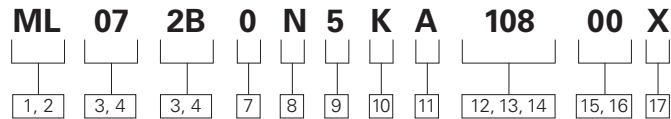
One piece, nitrile compound seal. Linear and radial float of cushion seal eliminates misalignment. Designed to provide exceptionally fast out of cushion stroke reversal.

### J. Piston

Wear band is standard. Optional magnetic piston for non-contact sensing. Seals are pressure energized and wear compensating.



# Series ML Model Code



## 1, 2 Series

**ML\*** – ISO 6431 /VDMA 24562

## 3, 4 Mounting Styles

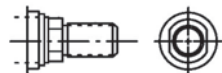
07 – Head Rectangular Flange	MF1
12 – Cap Rectangular Flange	MF2
16 – Cap Trunnion	MT5/6
17 – Head Trunnion	MT1
18 – Sleeve Nut for Tapped Face	-
24 – No Mounts	-
23 – Both Ends Extended Tie Rod	MX1
45 – Angle	MS1
48 – Cap Detachable Eye	MP4
50 – Cap Detachable Clevis	MP2
XX – Custom	

## 5, 6 Bore and Rod Size Combinations

Code	Bore(mm)	Rod(mm)
<b>2B</b>	32	12
<b>CD</b>	40	16
<b>DF</b>	50	20
<b>EF</b>	63	20
<b>GH</b>	80	25
<b>HH</b>	100	25
<b>KK</b>	125	32
<b>LM</b>	160	40
<b>NM</b>	200	40
<b>RP</b>	250	50
<b>8R</b>	320	63

## 7 Rod End Type

**Code Type**  
**0** Intermediate Male Metric



## 8 Seal Options

**N** – Normal Hydraulic \*  
**L** – Low Friction  
**T** – High Temperature  
**U** – Ultra Cushioning Seal\*\*

\* Hydraulic seal option only available through 100mm bore

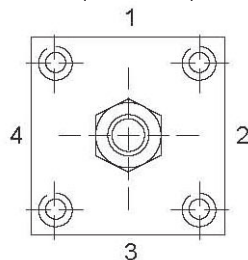
## 9 Port Options

**5** – NPTF Standard  
**7** – BSPPL

## 10 Port Locations

Positions are numbers as shown in picture below.

Code	Head	Cap
K	1	1



## 11 Cushion Location

Cushions are located as shown below when viewing cylinder from head end

Code	Head	Cap
A	0	0
B	0	1
F	1	0
K	1	1

## 12, 13, 14 Cylinder Stroke

For stroke length from 001 999mm, indicated number in mm in positions 12-14

For stroke lengths from 1000-3000mm, use the following guidelines. For position 12, you will use the code below. Positions 13, 14 will describe the mm between levels below. For instance, for a stroke length of 1050mm, position 12 would be A, positions 13, 14 would be 50 (Code: A50). For a stroke length of 1960mm, position 12 would be K, position 13, 14 would be 60 (Code: K60).

<b>A</b>	1000
<b>B</b>	1100
<b>C</b>	1200
<b>D</b>	1300
<b>E</b>	1400
<b>F</b>	1500
<b>G</b>	1600
<b>H</b>	1700
<b>J</b>	1800
<b>K</b>	1900
<b>L</b>	2000
<b>M</b>	2100
<b>N</b>	2200
<b>P</b>	2300
<b>Q</b>	2400
<b>R</b>	2500
<b>S</b>	2600
<b>T</b>	2700
<b>U</b>	2800
<b>V</b>	2900
<b>W</b>	3000

## 15, 16 Extra Rod Projection

Positions 15, 16 indicate extra rod projection in millimeters (mm), use 0-99 for this option.

– OR –

## Proximity Switch Magnet

**PK** – Magnet Furnished to operate Hall Effect or Reed Type Switch

– OR –

## Rod Boot

**MN** – Neoprene

– OR –

## Rod Material Options

**RT** – Stainless Steel 300 Series

## 17 Custom

**X** – Custom Modification

\* Cylinders <125mm bore have profile design, cylinders >125mm bore have tie rod design.

\*\* Available in 40, 50, 63, 80mm bore cylinders

# Series ML

## Mounting Style: 32-320mm Bores

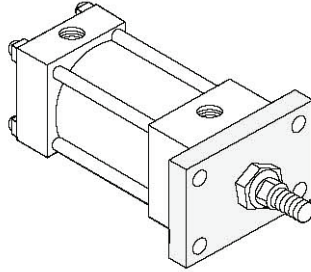
### Available Mountings

The variety of standard DIN ISO 6431 /VDMA 24562 mountings available in the ML gives you a broad selection to match the proper mount to your application. Eaton offers rigid mounts (including extended tie rod mounts) and swivel mounts (including clevis and trunnion mounts). A guide to proper mount selection is provided on pages 72 through 88. For custom mounts, enter "XX" for model code positions 3 and 4, and give a detailed description with drawings. Series ML cylinders are available in all mounting styles listed.

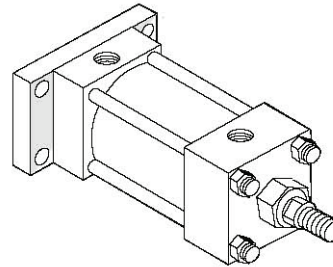
### Selecting the Proper Mounting

Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified. Note: In the mounting information, some mounts have been downrated to minimize deflection. For applications where the motion is linear and parallel to the cylinder rod motion, a rigid mount is recommended. For curvilinear motion, a swivel mount should be chosen. The specifics of each application dictate the correct mounting style.

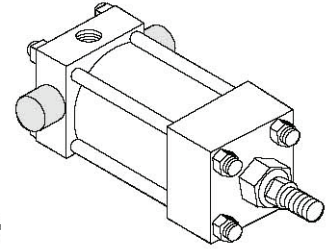
**Code 07 Head Rectangular Flange (DIN ISO 6431 / VDMA 24562 Part 2, MF1)**



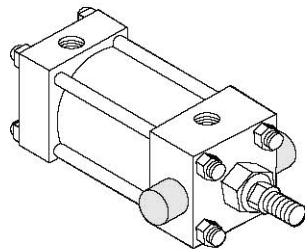
**Code 12 Cap Rectangular Flange (DIN ISO 6431 / VDMA 24562 Part 2, MF2)**



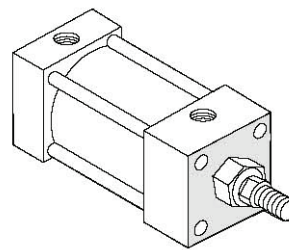
**Code 16 Cap Trunnion (VDMA 24562 Part 2, MT5/6)**



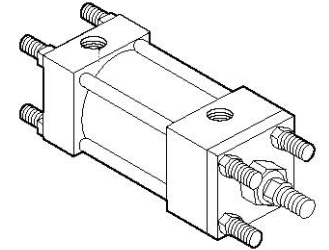
**Code 17 Head Trunnion (VDMA 24562 Part 2, MT5/6)**



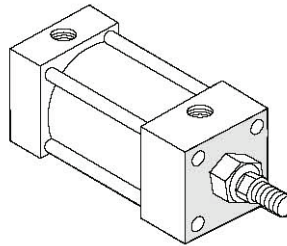
**Code 18 Sleeve Nut Construction for Tapped Face**



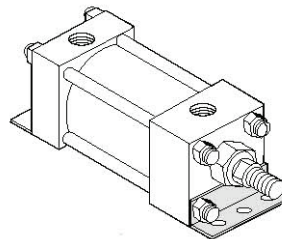
**Code 23 Extended Tie Rod (DIN ISO 6431, MX1)**



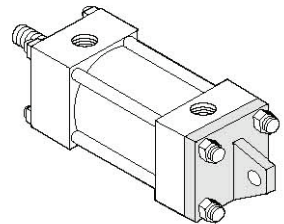
**Code 24 No Mounts**



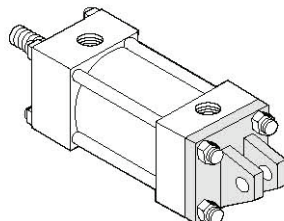
**Code 45 Angle (DIN ISO 6431, VDMA 24562 Part 2, MS1)**



**Code 48 Cap Detachable Eye (DIN ISO 6431, VDMA 24562 Part 2, MP4)**



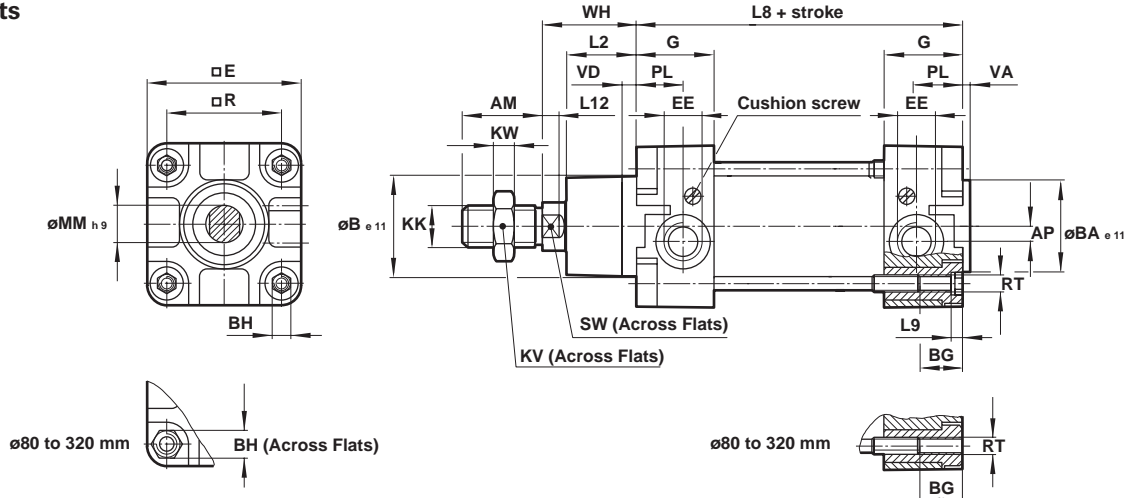
**Code 50 Cap Detachable Clevis (DIN ISO 6431, VDMA 24562 Part 2, MP2)**



# Series ML Mounting Styles and Installation Dimensions

32-320mm bore sizes

## Code 24 – No Mounts



BORE	AM	AP	B	BA	BG	BH	E	EE	G	KK	KV	KW	L2	L8	L9
32	0.87 (22)	0.14 (3.5)	1.18 (30)	1.18 (30)	0.71 (18)	0.24 (6)	1.85 (47)	G 1/8 (1/8"NPT)	1.08 (27.5)	M10x1.25	0.67 (17)	0.20 (5)	0.79 (20)	3.70 (94)	0.16 (4)
40	0.94 (24)	0.18 (4.5)	1.38 (35)	1.38 (35)	0.71 (18)	0.24 (6)	2.09 (53)	G 1/4 (1/4"NPT)	1.26 (32)	M12x1.25	0.75 (19)	0.24 (6)	0.87 (22)	4.13 (105)	0.16 (4)
50	1.26 (32)	0.24 (6)	1.57 (40)	1.57 (40)	0.71 (18)	0.31 (8)	2.56 (65)	G 1/4 (1/4"NPT)	1.22 (31)	M16x1.5	0.94 (24)	0.31 (8)	1.06 (27)	4.17 (106)	0.20 (5)
63	1.26 (32)	0.39 (10)	1.77 (45)	1.77 (45)	0.69 (17.5)	0.31 (8)	2.95 (75)	G 3/8 (3/8"NPT)	1.30 (33)	M16x1.5	0.94 (24)	0.31 (8)	1.14 (29)	4.76 (121)	0.20 (5)
80	1.57 (40)	0.33 (8.5)	1.77 (45)	1.77 (45)	0.85 (21.5)	0.75 (19)	3.74 (95)	G 3/8 (3/8"NPT)	1.30 (33)	M20x1.5	1.18 (30)	0.39 (10)	1.30 (33)	5.04 (128)	–
100	1.57 (40)	0.35 (9)	2.17 (55)	2.17 (55)	0.85 (21.5)	0.75 (19)	4.53 (115)	G 1/2 (1/2"NPT)	1.46 (37)	M20x1.5	1.18 (30)	0.39 (10)	1.42 (36)	5.43 (138)	–
125	2.13 (54)	0.39 (10)	2.36 (60)	2.36 (60)	1.26 (32)	0.94 (24)	5.51 (140)	G 1/2 (1/2"NPT)	1.81 (46)	M27x2	1.61 (41)	0.53 (13.5)	1.77 (45)	6.30 (160)	–
160	2.83 (72)	0.71 (18)	2.56 (65)	2.56 (65)	1.12 (28.5)	1.26 (32)	7.22 (183.5)	G 3/4 (3/4"NPT)	1.97 (50)	M36x2	2.17 (55)	0.71 (18)	2.28 (58)	7.09 (180)	–
200	2.83 (72)	0.71 (18)	2.95 (75)	2.95 (75)	1.12 (28.5)	1.26 (32)	8.82 (224)	G 3/4 (3/4"NPT)	1.97 (50)	M36x2	2.17 (55)	0.71 (18)	2.64 (67)	7.09 (180)	–
250	3.31 (84)	0.89 (22.5)	3.54 (90)	3.54 (90)	1.38 (35)	1.42 (36)	11.02 (280)	G 1 (1"NPT)	2.28 (58)	M42x2	2.56 (65)	0.83 (21)	3.15 (80)	7.87 (200)	–
320	3.78 (96)	0.89 (22.5)	4.33 (110)	4.33 (110)	1.18 (30)	1.81 (46)	13.78 (350)	G 1 (1"NPT)	2.36 (60)	M48x2	2.95 (75)	0.94 (24)	3.54 (90)	8.66 (220)	–

BORE	L12	MM	PL	R	RT	SW	VA	VD	WH	8000		P/8000		PV/8000	
										WEIGHT AT ZERO STROKE	WEIGHT PER 25MM IN	WEIGHT AT ZERO STROKE	WEIGHT PER 25MM IN	WEIGHT AT ZERO STROKE	WEIGHT PER 25MM IN
										LBS (KG)	LBS (KG)	LBS (KG)	LBS (KG)	LBS (KG)	LBS (KG)
32	0.24 (6)	0.47 (12)	0.51 (13)	1.26 (32.5)	M 6	0.39 (10)	0.12 (3)	0.24 (6)	1.02 (26)	1.12 (0.51)	0.13 (0.06)	1.12 (0.51)	0.13 (0.06)	1.41 (0.64)	0.13 (0.06)
40	0.26 (6.5)	0.63 (16)	0.59 (15)	1.50 (38)	M 6	0.51 (13)	0.14 (3.5)	0.24 (6)	1.18 (30)	1.76 (0.80)	0.18 (0.08)	1.76 (0.80)	0.18 (0.08)	2.09 (0.95)	0.18 (0.08)
50	0.31 (8)	0.79 (20)	0.73 (18.5)	1.83 (46.5)	M 8	0.67 (17)	0.14 (3.5)	0.24 (6)	1.46 (37)	2.93 (1.33)	0.26 (0.12)	2.93 (1.33)	0.26 (0.12)	3.33 (1.51)	0.26 (0.12)
63	0.31 (8)	0.79 (20)	0.75 (19)	2.22 (56.5)	M 8	0.67 (17)	0.16 (4)	0.24 (6)	1.46 (37)	3.97 (1.80)	0.29 (0.13)	3.97 (1.80)	0.29 (0.13)	4.63 (2.10)	0.29 (0.13)
80	0.39 (10)	0.98 (25)	0.75 (19)	2.83 (72)	M 10	0.87 (22)	0.16 (4)	0.24 (6)	1.81 (46)	7.17 (3.25)	0.44 (0.20)	7.17 (3.25)	0.44 (0.20)	8.27 (3.75)	0.44 (0.20)
100	0.39 (10)	0.98 (25)	0.71 (18)	3.50 (89)	M 10	0.87 (22)	0.16 (4)	0.24 (6)	2.01 (51)	10.61 (4.81)	0.51 (0.23)	10.61 (4.81)	0.51 (0.23)	12.37 (5.61)	0.51 (0.23)
125	0.51 (13)	1.26 (32)	0.79 (20)	4.33 (110)	M 12	1.06 (27)	0.24 (6)	0.61 (15.5)	2.56 (65)	17.64 (8.00)	0.73 (0.33)	17.64 (8.00)	0.73 (0.33)	–	–
160	0.63 (16)	1.57 (40)	0.83 (21)	5.51 (140)	M 16	1.42 (36)	0.16 (4)	0.59 (15)	3.15 (80)	32.85 (14.9)	1.21 (0.55)	–	–	–	–
200	0.63 (16)	1.57 (40)	0.83 (21)	6.89 (175)	M 16	1.42 (36)	0.20 (5)	0.59 (15)	3.74 (95)	47.85 (21.7)	1.32 (0.60)	–	–	–	–
250	0.79 (20)	1.97 (50)	1.14 (29)	8.66 (220)	M 20	1.61 (41)	0.28 (7)	0.51 (13)	4.13 (105)	71.88 (32.6)	2.03 (0.92)	–	–	–	–
320	0.94 (24)	2.48 (63)	1.18 (30)	10.63 (270)	M 24	2.17 (55)	0.28 (7)	0.51 (13)	4.72 (120)	131.86 (59.8)	3.22 (1.46)	–	–	–	–

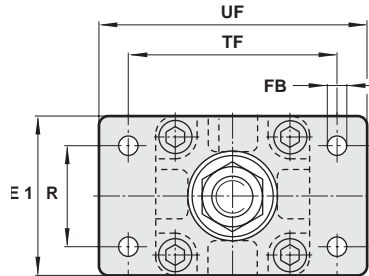
Dimensions in inches (mm)



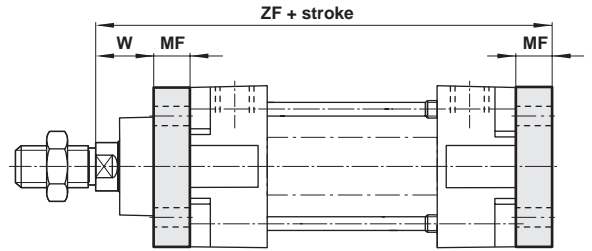
# Series ML Mounting Styles and Installation Dimensions

32-320mm bore sizes

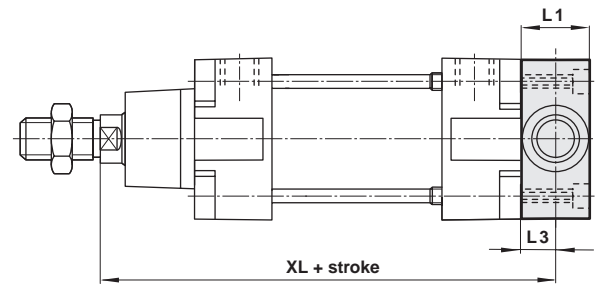
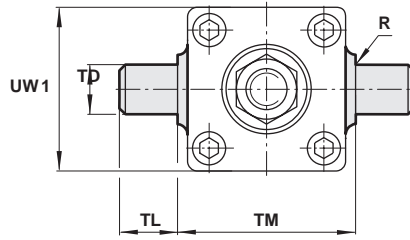
**Code 07 – Head Rectangular Flange (DIN ISO 6431 / VDMA 24562 Part 2, MF1)**



**Code 12 – Cap Rectangular Flange (DIN ISO 6431 / VDMA 24562 Part 2, MF2)**



**Code 16 – Cap Trunnion (VDMA 24562 Part 2, MT5/6)**



BORE	E1	FB	MF	R	TF	UF	W	ZF	WEIGHT* CODE 07, 12
32	1.97 (50)	0.28 (7)	0.39 (10)	1.26 (32)	2.52 (64)	3.15 (80)	0.63 (16)	5.12 (130)	0.55 (0.25)
40	2.17 (55)	0.35 (9)	0.39 (10)	1.42 (36)	2.83 (72)	3.54 (90)	0.79 (20)	5.71 (145)	0.77 (0.35)
50	2.56 (65)	0.35 (9)	0.47 (12)	1.77 (45)	3.54 (90)	4.33 (110)	0.98 (25)	6.10 (155)	1.54 (0.70)
63	2.95 (75)	0.35 (9)	0.47 (12)	1.97 (50)	3.94 (100)	4.92 (125)	0.98 (25)	6.69 (170)	1.76 (0.80)
80	3.94 (100)	0.47 (12)	0.63 (16)	2.48 (63)	4.96 (126)	6.06 (154)	1.18 (30)	7.48 (190)	2.98 (1.35)
100	4.72 (120)	0.55 (14)	0.63 (16)	2.95 (75)	5.91 (150)	7.32 (186)	1.38 (35)	8.07 (205)	4.85 (2.20)
125	5.51 (140)	0.63 (16)	0.79 (20)	3.54 (90)	7.09 (180)	8.82 (224)	1.77 (45)	9.65 (245)	3.75 (1.70)
160	7.09 (180)	0.71 (18)	0.79 (20)	4.53 (115)	9.06 (230)	11.02 (280)	2.36 (60)	11.02 (280)	6.84 (3.10)
200	8.66 (220)	0.87 (22)	0.98 (25)	5.31 (135)	10.63 (270)	12.60 (320)	2.76 (70)	11.81 (300)	10.14 (4.60)
250	11.02 (280)	1.02 (26)	0.98 (25)	6.50 (165)	12.99 (330)	15.55 (395)	3.15 (80)	12.99 (330)	16.32 (7.40)
320	13.78 (350)	1.30 (33)	1.18 (30)	7.87 (200)	15.75 (400)	18.70 (475)	3.54 (90)	14.57 (370)	29.99 (13.6)

BORE	L1	L3	R	TD	TL	TM	UW 1	XL	WEIGHT* CODE 16
32	0.63 (16)	0.31 (8)	0.04 (1)	0.47 (12)	0.47 (12)	1.97 (50)	1.97 (50)	5.04 (128)	0.44 (0.20)
40	0.79 (20)	0.39 (10)	0.06 (1.6)	0.63 (16)	0.63 (16)	2.48 (63)	2.17 (55)	5.71 (145)	0.84 (0.38)
50	0.94 (24)	0.47 (12)	0.06 (1.6)	0.63 (16)	0.63 (16)	2.95 (75)	2.56 (65)	6.10 (155)	1.32 (0.60)
63	0.94 (24)	0.47 (12)	0.06 (1.6)	0.79 (20)	0.79 (20)	3.54 (90)	2.95 (75)	6.69 (170)	2.43 (1.10)
80	1.10 (28)	0.55 (14)	0.06 (1.6)	0.79 (20)	0.79 (20)	4.33 (110)	3.94 (100)	7.40 (188)	4.19 (1.90)
100	1.50 (38)	0.75 (19)	0.08 (2)	0.98 (25)	0.98 (25)	5.20 (132)	4.72 (120)	8.19 (208)	7.72 (3.50)
125	1.97 (50)	0.98 (25)	0.08 (2)	0.98 (25)	0.98 (25)	6.30 (160)	5.71 (145)	9.84 (250)	14.33 (6.50)
160	—	—	0.10 (2.5)	1.26 (32)	1.26 (32)	7.87 (200)	—	—	—
200	—	—	0.10 (2.5)	1.26 (32)	1.26 (32)	9.84 (250)	—	—	—
250	—	—	0.13 (3.2)	1.57 (40)	1.57 (40)	12.60 (320)	—	—	—
320	—	—	0.13 (3.2)	1.97 (50)	1.97 (50)	15.75 (400)	—	—	—

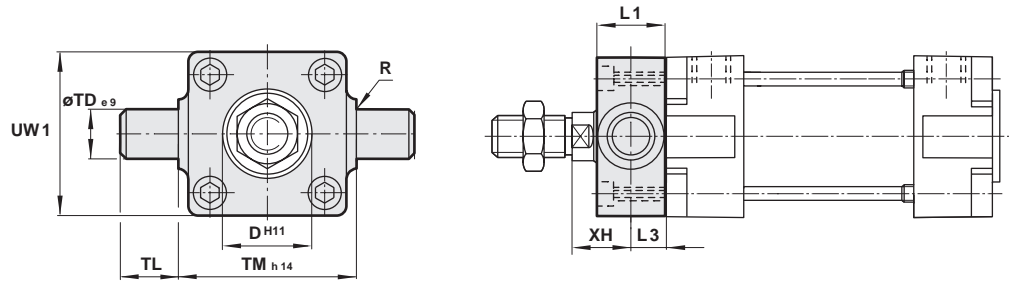
\*All weights in pounds (Kilograms)

Dimensions in inches (mm)

# Series ML Mounting Styles and Installation Dimensions

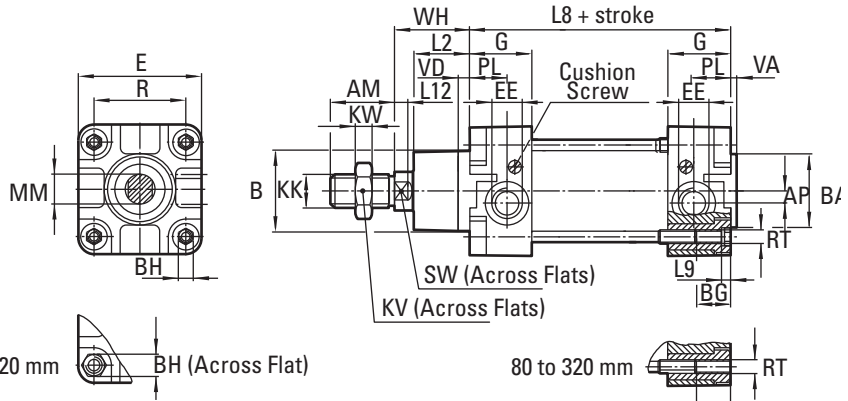
32-320mm bore sizes

## Code 17 – Head Trunnion (VDMA 24562 Part 2, Style MT5/6)



BORE	D	L1	L3	R	TD	TL	TM	UW 1	XH	WEIGHT* CODE 17
32	1.18 (30)	0.63 (16)	0.31 (8)	0.04 (1)	0.47 (12)	0.47 (12)	1.97 (50)	1.97 (50)	0.71 (18)	0.44 (0.20)
40	1.38 (35)	0.79 (20)	0.39 (10)	0.06 (1.6)	0.63 (16)	0.63 (16)	2.48 (63)	2.17 (55)	0.79 (20)	0.84 (0.38)
50	1.57 (40)	0.94 (24)	0.47 (12)	0.06 (1.6)	0.63 (16)	0.63 (16)	2.95 (75)	2.56 (65)	0.98 (25)	1.32 (0.60)
63	1.77 (45)	0.94 (24)	0.47 (12)	0.06 (1.6)	0.79 (20)	0.79 (20)	3.54 (90)	2.95 (75)	0.98 (25)	2.43 (1.10)
80	1.77 (45)	1.10 (28)	0.55 (14)	0.06 (1.6)	0.79 (20)	0.79 (20)	4.33 (110)	3.94 (100)	1.26 (32)	4.19 (1.90)
100	2.17 (55)	1.50 (38)	0.75 (19)	0.08 (2)	0.98 (25)	0.98 (25)	5.20 (132)	4.72 (120)	1.26 (32)	7.72 (3.50)
125	2.36 (60)	1.97 (50)	0.98 (25)	0.08 (2)	0.98 (25)	0.98 (25)	6.30 (160)	5.71 (145)	1.57 (40)	14.33 (6.50)
160	—	—	—	0.10 (2.5)	1.26 (32)	1.26 (32)	7.87 (200)	—	—	—
200	—	—	—	0.10 (2.5)	1.26 (32)	1.26 (32)	9.84 (250)	—	—	—
250	—	—	—	0.13 (3.2)	1.57 (40)	1.57 (40)	12.60 (320)	—	—	—
320	—	—	—	0.13 (3.2)	1.97 (50)	1.97 (50)	15.75 (400)	—	—	—

\*All Weights in Pounds (Kilograms)



## Code 18 – Sleeve Nut Construction for Tapped Face

BORE	AM	AP	B	BA	BG	BH	E	EE	G	KK	KV	KW	L2	BG	L8	L9
32	0.87 (22)	0.14 (3.5)	1.18 (30)	1.18 (30)	0.71 (18)	0.24 (6)	1.85 (47)	G 1/8 (1/8"NPT)	1.08 (27.5)	M10x1.25	0.67 (17)	0.20 (5)	0.79 (20)	3.70 (94)	0.16 (4)	
40	0.94 (24)	0.18 (4.5)	1.38 (35)	1.38 (35)	0.71 (18)	0.24 (6)	2.09 (53)	G 1/4 (1/4"NPT)	1.26 (32)	M12x1.25	0.75 (19)	0.24 (6)	0.87 (22)	4.13 (105)	0.16 (4)	
50	1.26 (32)	0.24 (6)	1.57 (40)	1.57 (40)	0.71 (18)	0.31 (8)	2.56 (65)	G 1/4 (1/4"NPT)	1.22 (31)	M16x1.5	0.94 (24)	0.31 (8)	1.06 (27)	4.17 (106)	0.20 (5)	
63	1.26 (32)	0.39 (10)	1.77 (45)	1.77 (45)	0.69 (17.5)	0.31 (8)	2.95 (75)	G 3/8 (3/8"NPT)	1.30 (33)	M16x1.5	0.94 (24)	0.31 (8)	1.14 (29)	4.76 (121)	0.20 (5)	
80	1.57 (40)	0.33 (8.5)	1.77 (45)	1.77 (45)	0.85 (21.5)	0.75 (19)	3.74 (95)	G 3/8 (3/8"NPT)	1.30 (33)	M20x1.5	1.18 (30)	0.39 (10)	1.30 (33)	5.04 (128)	—	
100	1.57 (40)	0.35 (9)	2.17 (55)	2.17 (55)	0.85 (21.5)	0.75 (19)	4.53 (115)	G 1/2 (1/2"NPT)	1.46 (37)	M20x1.5	1.18 (30)	0.39 (10)	1.42 (36)	5.43 (138)	—	
125	2.13 (54)	0.39 (10)	2.36 (60)	2.36 (60)	1.26 (32)	0.94 (24)	5.51 (140)	G 1/2 (1/2"NPT)	1.81 (46)	M27x2	1.61 (41)	0.53 (13.5)	1.77 (45)	6.30 (160)	—	
160	2.83 (72)	0.71 (18)	2.56 (65)	2.56 (65)	1.12 (28.5)	1.26 (32)	7.22 (183.5)	G 3/4 (3/4"NPT)	1.97 (50)	M36x2	2.17 (55)	0.71 (18)	2.28 (58)	7.09 (180)	—	
200	2.83 (72)	0.71 (18)	2.95 (75)	2.95 (75)	1.12 (28.5)	1.26 (32)	8.82 (224)	G 3/4 (3/4"NPT)	1.97 (50)	M36x2	2.17 (55)	0.71 (18)	2.64 (67)	7.09 (180)	—	
250	3.31 (84)	0.89 (22.5)	3.54 (90)	3.54 (90)	1.38 (35)	1.42 (36)	11.02 (280)	G 1 (1"NPT)	2.28 (58)	M42x2	2.56 (65)	0.83 (21)	3.15 (80)	7.87 (200)	—	
320	3.78 (96)	0.89 (22.5)	4.33 (110)	4.33 (110)	1.18 (30)	1.81 (46)	13.78 (350)	G 1 (1"NPT)	2.36 (60)	M48x2	2.95 (75)	0.94 (24)	3.54 (90)	8.66 (220)	—	

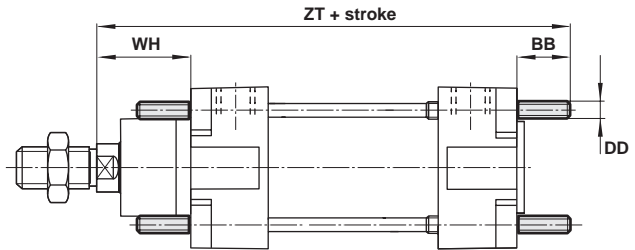
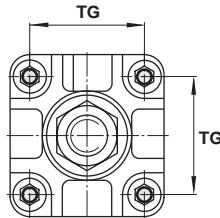
BORE	L12	MM	PL	R	RT	SW	VA	VD	WH	8000		P/8000		PV/8000	
										WEIGHT AT ZERO STROKE LBS(KG)	WEIGHT PER 25MM IN LBS(KG)	WEIGHT AT ZERO STROKE LBS(KG)	WEIGHT PER 25MM IN LBS(KG)	WEIGHT AT ZERO STROKE LBS(KG)	WEIGHT PER 25MM IN LBS(KG)
32	0.24 (6)	0.47 (12)	0.51 (13)	1.26 (32.5)	M 6	0.39 (10)	0.12 (3)	0.24 (6)	1.02 (26)	1.12 (0.51)	0.13 (0.06)	1.12 (0.51)	0.13 (0.06)	1.41 (0.64)	0.13 (0.06)
40	0.26 (6.5)	0.63 (16)	0.59 (15)	1.50 (38)	M 6	0.51 (13)	0.14 (3.5)	0.24 (6)	1.18 (30)	1.76 (0.80)	0.18 (0.08)	1.76 (0.80)	0.18 (0.08)	2.09 (0.95)	0.18 (0.08)
50	0.31 (8)	0.79 (20)	0.73 (18.5)	1.83 (46.5)	M 8	0.67 (17)	0.14 (3.5)	0.24 (6)	1.46 (37)	2.93 (1.33)	0.26 (0.12)	2.93 (1.33)	0.26 (0.12)	3.33 (1.51)	0.26 (0.12)
63	0.31 (8)	0.79 (20)	0.75 (19)	2.22 (56.5)	M 8	0.67 (17)	0.16 (4)	0.24 (6)	1.46 (37)	3.97 (1.80)	0.29 (0.13)	3.97 (1.80)	0.29 (0.13)	4.63 (2.10)	0.29 (0.13)
80	0.39 (10)	0.98 (25)	0.75 (19)	2.83 (72)	M 10	0.87 (22)	0.16 (4)	0.24 (6)	1.81 (46)	7.17 (3.25)	0.44 (0.20)	7.17 (3.25)	0.44 (0.20)	8.27 (3.75)	0.44 (0.20)
100	0.39 (10)	0.98 (25)	0.71 (18)	3.50 (89)	M 10	0.87 (22)	0.16 (4)	0.24 (6)	2.01 (51)	10.61 (4.81)	0.51 (0.23)	10.61 (4.81)	0.51 (0.23)	12.37 (5.61)	0.51 (0.23)
125	0.51 (13)	1.26 (32)	0.79 (20)	4.33 (110)	M 12	1.06 (27)	0.24 (6)	0.61 (15.5)	2.56 (65)	17.64 (8.00)	0.73 (0.33)	17.64 (8.00)	0.73 (0.33)	—	—
160	0.63 (16)	1.57 (40)	0.83 (21)	5.51 (140)	M 16	1.42 (36)	0.16 (4)	0.59 (15)	3.15 (80)	32.85 (14.9)	1.21 (0.55)	—	—	—	—
200	0.63 (16)	1.57 (40)	0.83 (21)	6.89 (175)	M 16	1.42 (36)	0.20 (5)	0.59 (15)	3.74 (95)	47.85 (21.7)	1.32 (0.60)	—	—	—	—
250	0.79 (20)	1.97 (50)	1.14 (29)	8.66 (220)	M 20	1.61 (41)	0.28 (7)	0.51 (13)	4.13 (105)	71.88 (32.6)	2.03 (0.92)	—	—	—	—
320	0.94 (24)	2.48 (63)	1.18 (30)	10.63 (270)	M 24	2.17 (55)	0.28 (7)	0.51 (13)	4.72 (120)	131.86 (59.8)	3.22 (1.46)	—	—	—	—



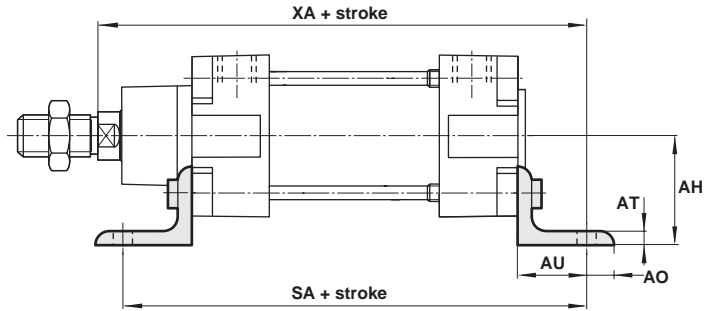
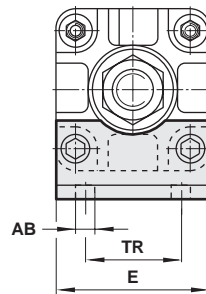
# Series ML Mounting Styles and Installation Dimensions

32-320mm bore sizes

## Code 23 – Extended Tie Rod (DIN ISO 6431, MX1)



## Code 45 – Angle (DIN ISO 6431, VDMA 24562 Part 2, MS1)



BORE	AB	AH	AO	AT	AU	BB	DD	E	SA
32	0.28 (7)	1.26 (32)	0.31 (8)	0.16 (4)	0.94 (24)	0.67 (17)	M 6	1.89 (48)	5.59 (142)
40	0.35 (9)	1.42 (36)	0.35 (9)	0.16 (4)	1.10 (28)	0.67 (17)	M 6	2.09 (53)	6.34 (161)
50	0.35 (9)	1.77 (45)	0.39 (10)	0.20 (5)	1.26 (32)	0.91 (23)	M 8	2.52 (64)	6.69 (170)
63	0.35 (9)	1.97 (50)	0.47 (12)	0.20 (5)	1.26 (32)	0.91 (23)	M 8	2.91 (74)	7.28 (185)
80	0.47 (12)	2.48 (63)	0.75 (19)	0.20 (5)	1.61 (41)	1.10 (28)	M 10	3.86 (98)	8.27 (210)
100	0.55 (14)	2.80 (71)	0.75 (19)	0.20 (5)	1.61 (41)	1.10 (28)	M 10	4.53 (115)	8.66 (220)
125	0.63 (16)	3.54 (90)	0.79 (20)	0.35 (9)	1.77 (45)	1.34 (34)	M 12	5.51 (140)	9.84 (250)
160	0.71 (18)	4.53 (115)	0.79 (20)	0.31 (8)	2.36 (60)	1.65 (42)	M 16	7.09 (180)	11.81 (300)
200	0.87 (22)	5.31 (135)	1.18 (30)	0.35 (9)	2.76 (70)	1.65 (42)	M 16	8.66 (220)	12.60 (320)
250	1.02 (26)	6.50 (165)	1.38 (35)	0.39 (10)	2.95 (75)	1.97 (50)	M 20	11.02 (280)	13.78 (350)
320	1.30 (33)	7.87 (200)	1.77 (45)	0.63 (16)	3.35 (85)	2.36 (60)	M 24	13.78 (350)	15.35 (390)

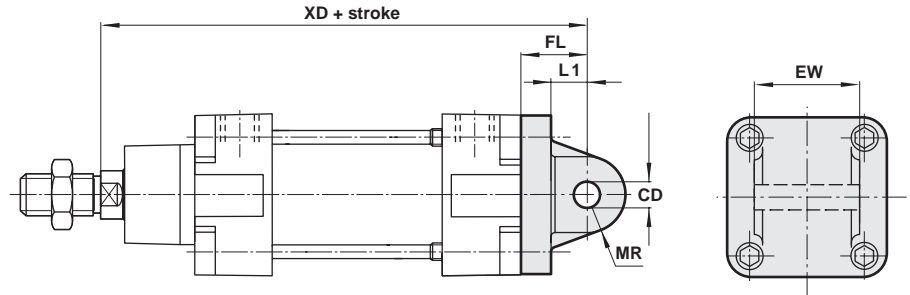
BORE	TG	TR	WH	XA	ZT	WEIGHT* CODE 23	WEIGHT* CODE 45
32	1.28 (32.5)	1.26 (32)	1.02 (26)	5.67 (144)	5.39 (137)	0.04 (0.02)	0.33 (0.15)
40	1.50 (38)	1.42 (36)	1.18 (30)	6.42 (163)	5.98 (152)	0.04 (0.02)	0.40 (0.18)
50	1.83 (46.5)	1.77 (45)	1.46 (37)	6.89 (175)	6.54 (166)	0.11 (0.05)	0.66 (0.30)
63	2.22 (56.5)	1.97 (50)	1.46 (37)	7.48 (190)	7.13 (181)	0.11 (0.05)	0.86 (0.39)
80	2.83 (72)	2.48 (63)	1.81 (46)	8.46 (215)	7.95 (202)	0.18 (0.08)	1.76 (0.80)
100	3.50 (89)	2.95 (75)	2.01 (51)	9.06 (230)	8.54 (217)	0.18 (0.08)	2.09 (0.95)
125	4.33 (110)	3.54 (90)	2.56 (65)	10.63 (270)	10.20 (259)	0.31 (0.14)	5.29 (2.40)
160	5.51 (140)	4.53 (115)	3.15 (80)	12.60 (320)	11.89 (302)	0.68 (0.31)	7.72 (3.50)
200	6.89 (175)	5.31 (135)	3.74 (95)	13.58 (345)	12.48 (317)	0.68 (0.31)	11.58 (5.25)
250	8.66 (220)	6.50 (165)	4.13 (105)	14.96 (380)	13.98 (355)	2.03 (0.92)	20.95 (9.50)
320	10.63 (270)	7.87 (200)	4.72 (120)	16.73 (425)	15.75 (400)	3.22 (1.46)	48.51 (22.0)

\*All weights in pounds (Kilograms)  
Dimensions in inches (mm)

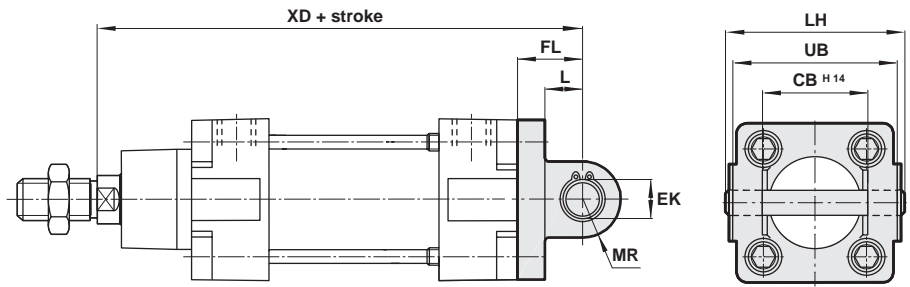
# Series ML Mounting Styles and Installation Dimensions

32-320mm bore sizes

## Code 48 – Cap Detachable Eye (DIN ISO 6431, VDMA 24562 Part 2, MP4)



## Code 50 – Cap Detach- able Clevis (DIN ISO 6431, VDMA 24562 Part 2, MP2)






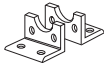





BORE	CD	EW	FL	L1	MR	XD	WEIGHT* CODE 48
32	0.39 (10)	1.02 (25.8)	0.87 (22)	0.51 (13)	0.35 (9)	5.59 (142)	0.20 (0.09)
40	0.47 (12)	1.09 (27.8)	0.98 (25)	0.63 (16)	0.47 (12)	6.30 (160)	0.24 (0.11)
50	0.47 (12)	1.25 (31.7)	1.06 (27)	0.67 (17)	0.47 (12)	6.69 (170)	0.37 (0.17)
63	0.63 (16)	1.56 (39.7)	1.26 (32)	0.87 (22)	0.59 (15)	7.48 (190)	0.53 (0.24)
80	0.63 (16)	1.96 (49.7)	1.42 (36)	0.87 (22)	0.59 (15)	8.27 (210)	0.82 (0.37)
100	0.79 (20)	2.35 (59.7)	1.61 (41)	1.06 (27)	0.79 (20)	9.06 (230)	1.30 (0.59)
125	0.98 (25)	2.74 (69.7)	1.97 (50)	1.30 (33)	0.98 (25)	10.83 (275)	7.06 (3.20)
160	1.18 (30)	3.53 (89.7)	2.17 (55)	1.40 (35.5)	1.18 (30)	12.40 (315)	13.45 (6.10)
200	1.18 (30)	3.53 (89.7)	2.36 (60)	1.46 (37)	1.18 (30)	13.19 (335)	14.99 (6.80)










BORE	CB	EK	FL	L	LH	MR	UB	XD	WEIGHT* CODE 50
32	1.02 (26)	0.39 (10)	0.87 (22)	0.51 (13)	2.05 (52)	0.35 (9)	1.77 (45)	5.59 (142)	0.24 (0.11)
40	1.10 (28)	0.47 (12)	0.98 (25)	0.63 (16)	2.36 (60)	0.47 (12)	2.05 (52)	6.30 (160)	0.35 (0.16)
50	1.26 (32)	0.47 (12)	1.06 (27)	0.67 (17)	2.68 (68)	0.47 (12)	2.36 (60)	6.69 (170)	0.49 (0.22)
63	1.57 (40)	0.63 (16)	1.26 (32)	0.87 (22)	3.11 (79)	0.59 (15)	2.76 (70)	7.48 (190)	0.75 (0.34)
80	1.97 (50)	0.63 (16)	1.42 (36)	0.87 (22)	3.90 (99)	0.59 (15)	3.54 (90)	8.27 (210)	1.19 (0.54)
100	2.36 (60)	0.79 (20)	1.61 (41)	1.06 (27)	4.69 (119)	0.79 (20)	4.33 (110)	9.06 (230)	1.98 (0.90)
125	2.76 (70)	0.98 (25)	1.97 (50)	1.22 (31)	5.47 (139)	0.98 (25)	5.12 (130)	10.83 (275)	5.95 (2.70)
160	3.54 (90)	1.18 (30)	2.17 (55)	1.40 (35.5)	7.13 (181)	1.18 (30)	6.69 (170)	12.40 (315)	9.48 (4.30)
200	3.54 (90)	1.18 (30)	2.36 (60)	1.41 (36)	7.13 (181)	1.18 (30)	6.69 (170)	13.19 (335)	13.45 (6.10)
250	4.33 (110)	1.57 (40)	2.76 (70)	1.77 (45)	8.60 (218)	1.57 (40)	7.87 (200)	14.76 (375)	41.90 (19.0)
320	4.72 (120)	1.77 (45)	3.15 (80)	1.97 (50)	9.37 (238)	1.77 (45)	8.66 (220)	16.54 (420)	67.25 (30.5)



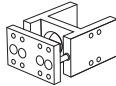
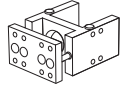

\*All weights in pounds (Kilograms)

Dimensions in inches (mm)

# Series ML Cylinder Accessories

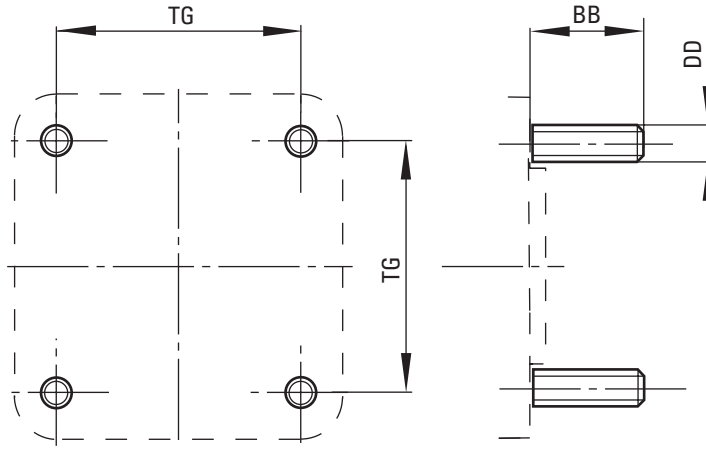
	<b>TIE ROD STUDS</b>	<b>PISTON ROD SWIVEL</b>	<b>FLANGE MOUNTING PLATE</b>	<b>FOOT MOUNTING</b>	<b>REAR CLEVIS MOUNT TYPE 1</b>	<b>REAR CLEVIS MOUNT TYPE 2</b>	<b>PISTON ROD CLEVIS MOUNTING</b>	<b>FRONT OR REAR DETACHABLE TRUNNION MOUNTING</b>	<b>CENTER TRUNNION MOUNTING</b>
									
32	ML/8032/35	ML/8025/38	ML/86012A	ML/8032/21	ML/61012A	ML/61M012A	ML62012A	ML/84012A	ML84M012A
40	ML/8032/35	ML/8040/38	ML/86016A	ML/8040/21	ML/61016A	ML/61M016A	ML62016A	ML/84016A	ML84M016A
50	ML/8050/35	ML/8050/38	ML/86020A	ML/8050/21	ML/61020A	ML/61M020A	ML62020A	ML/84020A	ML84M020A
63	ML/8050/35	ML/8050/38	ML/86025A	ML/8063/21	ML/61025A	ML/61M025A	ML62025A	ML/84025A	ML84M032A
80	ML/8080/35	ML/8080/38	ML/86032A	ML/8080/21	ML/61032A	ML/61M032A	ML62032A	ML/84032A	ML84M032A
100	ML/8080/35	ML/8080/38	ML/86040A	ML/8100/21	ML/61040A	ML/61M040A	ML62040A	ML/84040A	ML84M040A
125	ML/8125/35	ML/8125/38	ML/86050A	ML/8125/21	ML/61050A	ML/61M050A	ML62050A	ML/84050A	ML84M050A
160	ML/8160/35	ML/8160/38	ML/86064A	ML/8160/21	ML/61064A	ML/61M064A	ML62064A	–	ML84M064A
200	ML/8160/35	ML/8160/38	ML/86080A	ML/8200/21	ML/61080A	ML/61M080A	ML62080A	–	ML84M080A
250	ML/8250/35	–	ML/86100A	ML/8250/21	ML/61100A	ML/61M100A	ML62100A	–	ML84M100A
320	ML/8320/35	–	ML/86128A	ML/8320/21	ML/61128A	ML/61M128A	ML62128A	–	ML84M128A

	<b>REAR HINGE MOUNT TYPE 1</b>	<b>FRONT HINGE MOUNTING</b>	<b>REAR EYE MOUNTING</b>	<b>TRUNNION SUPPORT MOUNTING</b>	<b>NARROW HINGE</b>	<b>WIDE HINGE</b>	<b>UNIVERSAL PISTON ROD-EYE</b>	<b>ADJUSTABLE CENTER TRUNNION</b>	<b>REAR HINGE MOUNT TYPE 2</b>
									
32	ML/8032/24	ML/8032/26	ML/78012A	ML/8032/26	ML/P19931	ML/P19493	ML/60010A	ML/84N012A	ML/8032/43
40	ML/8040/24	ML/8040/26	ML/78016A	ML/8040/26	ML/P19932	ML/P19494	ML/60016A	ML/84N016A	ML/8040/43
50	ML/8050/24	ML/8050/26	ML/78020A	ML/8040/26	ML/P19933	ML/P19495	ML/60020A	ML/84N020A	ML/8050/43
63	ML/8063/24	ML/8063/26	ML/78025A	ML/8063/26	ML/P19934	ML/P19496	ML/60020A	ML/84N025A	ML/8063/43
80	ML/8080/24	ML/8080/26	ML/78032A	ML/8063/26	ML/P19935	ML/P19497	ML/60032A	ML/84N032A	ML/8080/43
100	ML/8100/24	ML/8100/26	ML/78040A	ML/8100/26	ML/P19936	ML/P19498	ML/60032A	ML/84N040A	ML/8100/43
125	ML/8125/24	ML/8125/26	ML/78050A	ML/8100/26	ML/P19937	ML/P19499	ML/60050A	ML/84N050A	ML/8125/43
160	ML/8160/24	ML/8160/26	ML/78064A	ML/8160/26	ML/P19938	ML/P19679	ML/60064A	ML/84N064A	ML/8160/43
200	ML/8200/24	ML/8200/26	ML/78080A	ML/8160/26	ML/P19939	ML/P19683	ML/60064A	ML/84N080A	ML/8200/43
250	ML/8250/24	–	–	–	–	ML/P19446	ML/60100A	–	–
320	ML/8320/24	–	–	–	–	ML/P19447	ML/60128A	–	–

	<b>UNIVERSAL REAR-EYE</b>	<b>SWIVEL HINGE</b>	<b>GUIDE BLOCKS</b>	<b>GUIDE BLOCKS</b>	<b>LOCKING UNIT (PASSIVE)</b>
					
32	ML/8032/33	ML/P40310	ML/8032/51/*	ML/8032/61/*	ML/8032/59
40	ML/8040/33	ML/P40311	ML/8040/51/*	ML/8040/61/*	ML/8040/59
50	ML/8050/33	ML/P40312	ML/8050/51/*	ML/8050/61/*	ML/8050/59
63	ML/8063/33	ML/P40313	ML/8063/51/*	ML/8063/61/*	ML/8063/59
80	ML/8080/33	ML/P40314	ML/8080/51/*	ML/8080/61/*	ML/8080/59
100	ML/8100/33	ML/P40315	ML/8100/51/*	ML/8100/61/*	ML/8100/59
125	ML/8125/33	ML/P71355	–	–	ML/8125/59
160	ML/8160/33	ML/P71356	–	–	–
200	ML/8200/33	ML/P71357	–	–	–
250	–	–	–	–	–
320	–	–	–	–	–

# Series ML Cylinder Accessories

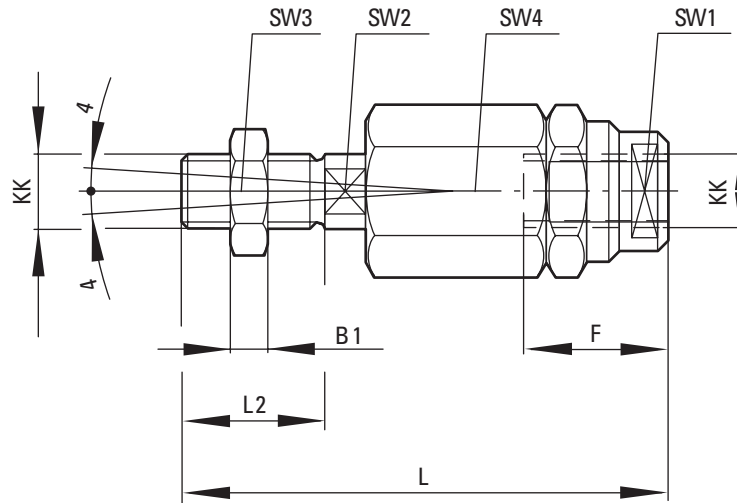
## Tie Rod Studs mounting – A ISO 6431



BORE	BB	DD	TG
32	.67 (17)	M6	1.28 (32.5)
40	.67 (17)	M6	1.50 (38)
50	.91 (23)	M8	1.83 (46.5)
63	.91 (23)	M8	2.22 (56.5)
80	1.10 (28)	M10	2.83 (72)
100	1.10 (28)	M10	3.50 (89)
125	1.34 (34)	M12	4.33 (110)
160	1.65 (42)	M16	5.51 (140)
200	1.65 (42)	M16	6.89 (175)
250	1.97 (50)	M20	8.66 (220)
320	2.36 (60)	M24	10.63 (270)

Dimensions in inches (mm)

## Piston rod swivel mounting

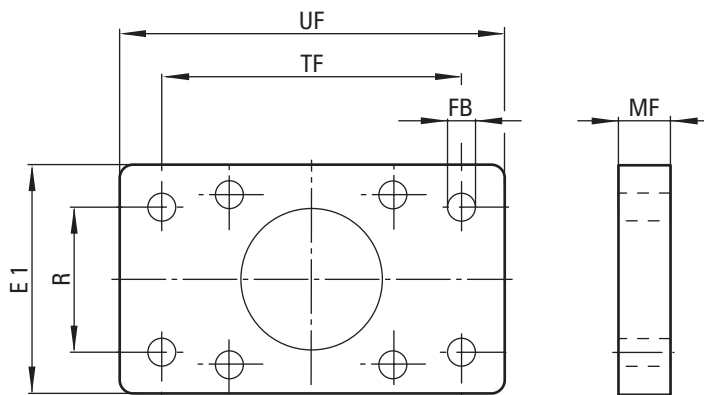


BORE	B1	F	KK	L2	SW 1	SW 2	SW 3	SW 4
32	0.20 (5)	1.02 (26)	M 10 x 1.25	0.79 (20)	0.75 (19)	0.47 (12)	0.67 (17)	1.18 (30)
40	0.24 (6)	1.02 (26)	M 12 x 1.25	0.94 (24)	0.75 (19)	0.47 (12)	0.75 (19)	1.18 (30)
50	0.31 (8)	1.34 (34)	M 16 x 1.5	1.26 (32)	1.18 (30)	0.75 (19)	0.94 (24)	1.65 (42)
63	0.31 (8)	1.34 (34)	M 16 x 1.5	1.26 (32)	1.18 (30)	0.75 (19)	0.94 (24)	1.65 (42)
80	0.39 (10)	1.65 (42)	M 20 x 1.5	1.57 (40)	1.18 (30)	0.75 (19)	1.18 (30)	1.65 (42)
100	0.39 (10)	1.65 (42)	M 20 x 1.5	1.57 (40)	1.18 (30)	0.75 (19)	1.18 (30)	1.65 (42)
125	0.53 (13.5)	1.57 (40)	M 27 x 2	2.13 (54)	1.57 (40)	0.94 (24)	1.61 (41)	2.17 (55)
160	0.71 (18)	3.07 (78)	M 36 x 2	2.83 (72)	1.97 (50)	1.42 (36)	2.17 (55)	2.95 (75)
200	0.71 (18)	3.07 (78)	M 36 x 2	2.83 (72)	1.97 (50)	1.42 (36)	2.17 (55)	2.95 (75)
250	—	—	M 42 x 2	—	—	—	—	—
320	—	—	M 48 x 2	—	—	—	—	—

Dimensions in inches (mm)

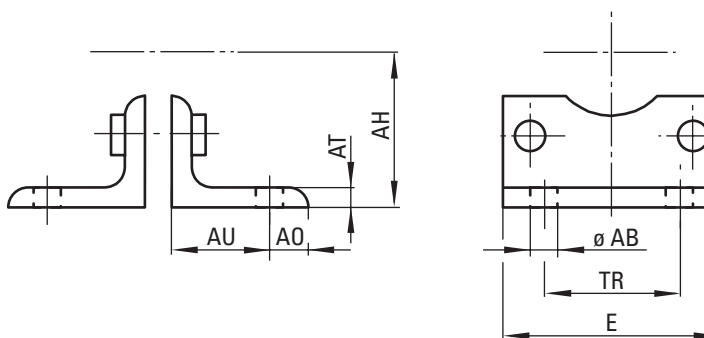
# Series ML Cylinder Accessories

## Rear or Front flange Mounting – ISO 6431 and VDMA 24562 Part 2



BORE	E1	FB	MF	R	TF	UF
32	1.97 (50)	0.28 (7)	0.39 (10)	1.26 (32)	2.52 (64)	3.15 (80)
40	2.17 (55)	0.35 (9)	0.39 (10)	1.42 (36)	2.83 (72)	3.54 (90)
50	2.56 (65)	0.35 (9)	0.47 (12)	1.77 (45)	3.54 (90)	4.33 (110)
63	2.95 (75)	0.35 (9)	0.47 (12)	1.97 (50)	3.94 (100)	4.92 (125)
80	03.94 (100)	0.47 (12)	0.63 (16)	2.48 (63)	4.96 (126)	6.06 (154)
100	4.72 (120)	0.55 (14)	0.63 (16)	2.95 (75)	5.91 (150)	7.32 (186)
125	5.51 (140)	0.63 (16)	0.79 (20)	3.54 (90)	7.09 (180)	8.82 (224)
160	7.09 (180)	0.71 (18)	0.79 (20)	4.53 (115)	9.06 (230)	11.02 (280)
200	08.66 (220)	0.87 (22)	0.98 (25)	5.31 (135)	10.63 (270)	12.60 (320)
250	11.02 (280)	1.02 (26)	0.98 (25)	6.50 (165)	12.99 (330)	15.55 (395)
320	13.78 (350)	1.30 (33)	1.18 (30)	7.87 (200)	15.75 (400)	18.70 (475)

## Foot mounting – ISO 6431 and VDMA 24562 Part 2

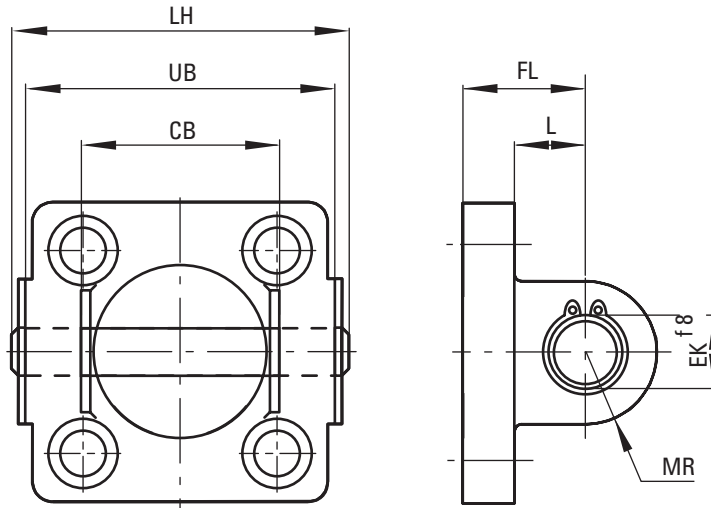


BORE	AB	AH	AO	AT	AU	E	TR
32	.28 (7)	1.26 (32)	.31 (8) [11]	.16 (4)	.94 (24)	1.89 (48)	1.26 (32)
40	.35 (9)	1.42 (36)	.35 (9) [12]	.16 (4) [5]	1.1 (28)	2.09 (53)	1.42 (36)
50	.35 (9)	1.77 (45)	.39 (10) [13]	.2 (5)	1.26 (32)	2.52 (64)	1.77 (45)
63	.35 (9)	1.97 (50)	.47 (12) [13]	.2 (5)	1.26 (32)	2.91 (74)	1.97 (50)
80	.47 (12)	2.48 (63)	.75 (19)	.2 (5) [6]	1.61 (41)	3.86 (98)	2.48 (63)
100	.55 (14)	2.8 (71)	.75 (19)	.2 (5) [6]	1.61 (41)	4.53 (115)	2.95 (75)
125	.63 (16)	3.54 (90)	.79 (20) [25]	.35 (9) [7]	1.77 (45)	5.51 (140)	3.54 (90)
160	.71 (18)	4.53 (115)	.79 (20)	.31 (8)	2.36 (60)	7.09 (180)	4.53 (115)
200	.87 (22)	5.31 (135)	1.18 (30)	.35 (9)	2.76 (70)	8.66 (220)	5.31 (135)
250	1.02 (26)	6.5 (165)	1.38 (35)	.39 (10)	2.95 (75)	11.02 (280)	6.5 (165)
320	1.30 (33)	7.87 (200)	1.77 (45)	.63 (16)	3.25 (85)	13.78 (350)	7.87 (200)

Dimensions in inches (mm)

# Series ML Cylinder Accessories

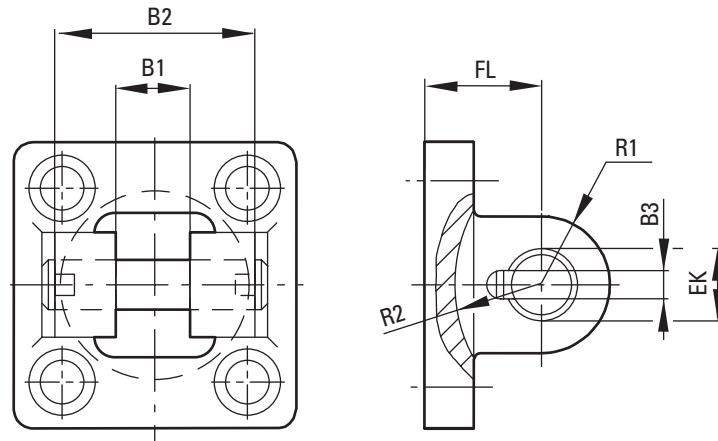
## Rear Clevis Mount – Type 1 ISO 6431 and VDMA 24562



BORE	CB	EK	FL	L	LH	MR	UB
32	1.02 (26)	.39 (10)	.87 (22)	.51 (13)	2.05 (52)	.35 (9)	1.77 (45)
40	1.10 (28)	.47 (12)	.98 (25)	.63 (16)	2.36 (60)	.47 (12)	2.05 (52)
50	1.26 (32)	.47 (12)	1.06 (27)	.67 (17)	2.68 (68)	.47 (12)	2.36 (60)
63	1.57 (40)	.63 (16)	1.26 (32)	.87 (22)	3.12 (79)	.59 (15)	2.76 (70)
80	1.97 (50)	.63 (16)	1.42 (36)	.87 (22)	3.9 (99)	.59 (15)	3.54 (90)
100	2.36 (60)	.79 (20)	1.61 (41)	1.06 (27)	4.69 (119)	.79 (20)	4.31 (110)
125	2.76 (70)	.98 (25)	1.97 (50)	1.22 (31)	*5.47 (139)	.98 (25)	5.12 (130)
160	3.54 (90)	1.18 (30)	2.17 (55)	1.4 (35.5)	7.13 (181)	1.18 (30)	6.69 (170)
200	3.54 (90)	1.18 (30)	2.36 (60)	1.42 (36)	7.13 (181)	1.18 (30)	6.69 (170)
250	4.31 (110)	1.57 (40)	2.76 (70)	1.77 (45)	8.58 (218)	1.57 (40)	7.87 (200)
320	4.72 (120)	1.77 (45)	3.15 (80)	1.97 (50)	9.37 (238)	1.77 (45)	8.66 (220)

Dimensions in inches (mm)

## Rear Clevis Mount – Type 2 VDMA 24562

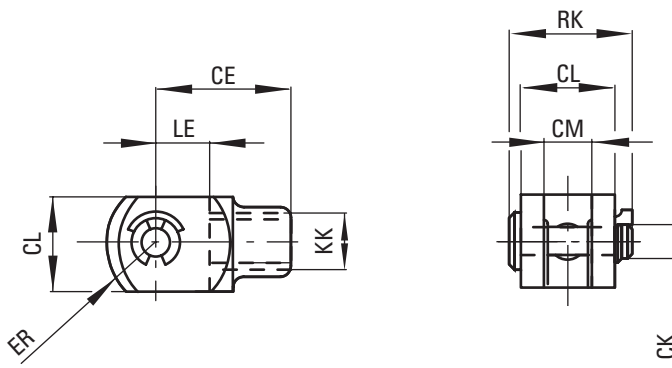


BORE	B1	B2	B3	EK	FL	R1	R2
32	.55 (14)	1.34 (34)	.14 (3.3)	.39 (10)	.87 (22)	.43 (11)	.67 (17)
40	.63 (16)	1.57 (40)	.18 (4.3)	.47 (12)	.98 (25)	.47 (12)	.79 (20)
50	.83 (21)	1.77 (45)	.18 (4.3)	.63 (16)	1.06 (27)	.57 (14.5)	.87 (22)
63	.83 (21)	2.01 (51)	.18 (4.3)	.63 (16)	1.26 (32)	.71 (18)	.98 (25)
80	.98 (25)	2.56 (65)	.18 (4.3)	.79 (20)	1.42 (36)	.87 (22)	1.18 (30)
100	.98 (25)	2.95 (75)	.26 (6.3)	.79 (20)	1.61 (41)	.87 (22)	1.26 (32)
125	1.46 (37)	3.82 (97)	.26 (6.3)	1.18 (30)	1.97 (50)	1.18 (30)	1.65 (42)
160	1.69 (43)	4.8 (122)	.26 (6.3)	1.38 (35)	2.17 (55)	1.42 (36)	1.81 (46)
200	1.69 (43)	4.8 (122)	.26 (6.3)	1.38 (35)	2.36 (60)	1.5 (38)	1.93 (49)

Dimensions in inches (mm)

# Series ML Cylinder Accessories

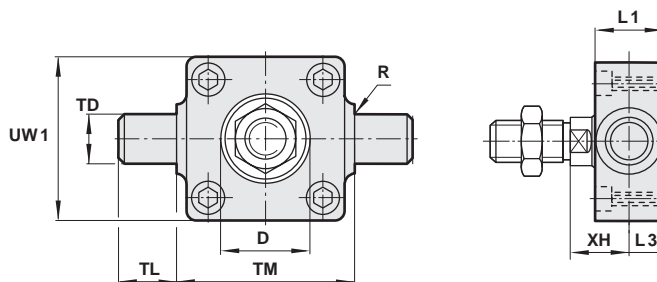
## Piston rod clevis mounting ISO 8140



BORE	CE	CK	CL	CM	ER	KK	LE	RK
32	1.57 (40)	0.39 (10)	0.79 (20)	0.39 (10)	0.63 (16)	M10x1.25	0.79 (20)	1.10 (28)
40	1.89 (48)	0.47 (12)	0.94 (24)	0.47 (12)	0.75 (19)	M12x1.25	0.94 (24)	1.26 (32)
50	2.52 (64)	0.63 (16)	1.26 (32)	0.63 (16)	0.98 (25)	M16x1.5	1.26 (32)	1.63 (41.5)
63	2.52 (64)	0.63 (16)	1.26 (32)	0.63 (16)	0.98 (25)	M16x1.5	1.26 (32)	1.63 (41.5)
80	3.15 (80)	0.79 (20)	1.57 (40)	0.79 (20)	1.26 (32)	M20x1.5	1.57 (40)	1.97 (50)
100	3.15 (80)	0.79 (20)	1.57 (40)	0.79 (20)	1.26 (32)	M20x1.5	1.57 (40)	1.97 (50)
125	4.33 (110)	1.18 (30)	2.17 (55)	1.18 (30)	1.77 (45)	M27x2	2.13 (54)	2.44 (62)
160	5.67 (144)	1.38 (35)	2.76 (70)	1.38 (35)	2.24 (57)	M36x2	2.83 (72)	3.74 (95)
200	5.67 (144)	1.38 (35)	2.76 (70)	1.38 (35)	2.24 (57)	M36x2	2.83 (72)	3.74 (95)
250	6.61 (168)	1.57 (40)	3.35 (85)	1.57 (40)	2.68 (68)	M42x2	3.31 (84)	4.17 (106)
320	7.56 (192)	1.97 (50)	3.78 (96)	1.97 (50)	3.35 (85)	M48x2	3.78 (96)	4.76 (121)

Dimensions in inches (mm)

## Front or rear detachable trunnion mounting VDMA 24562 Part 2



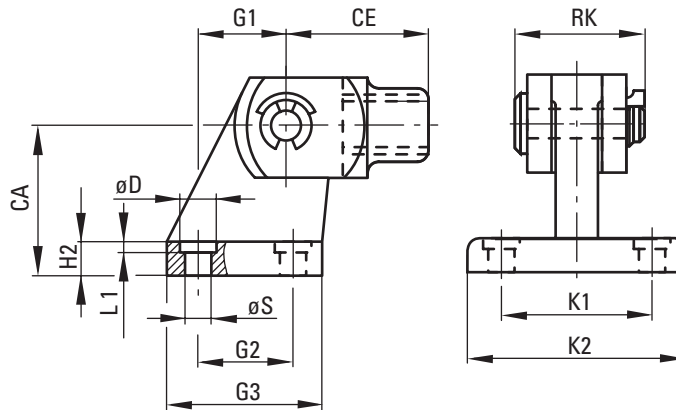
BORE	D	L1	L3	R	TD	TL	TM	UW	XH
32	1.18 (30)	0.63 (16)	0.31 (8)	0.04 (1)	0.47 (12)	0.47 (12)	1.97 (50)	1.97 (50)	0.71 (18)
40	1.38 (35)	0.79 (20)	0.39 (10)	0.06 (1.6)	0.63 (16)	0.63 (16)	2.48 (63)	2.17 (55)	0.79 (20)
50	1.57 (40)	0.94 (24)	0.47 (12)	0.06 (1.6)	0.63 (16)	0.63 (16)	2.95 (75)	2.56 (65)	0.98 (25)
63	1.77 (45)	0.94 (24)	0.47 (12)	0.06 (1.6)	0.79 (20)	0.79 (20)	3.54 (90)	2.95 (75)	0.98 (25)
80	1.77 (45)	1.10 (28)	0.55 (14)	0.06 (1.6)	0.79 (20)	0.79 (20)	4.33 (110)	3.94 (100)	1.26 (32)
100	2.17 (55)	1.50 (38)	0.75 (19)	0.08 (2)	0.98 (25)	0.98 (25)	5.20 (132)	4.72 (120)	1.26 (32)
125	2.36 (60)	1.97 (50)	0.98 (25)	0.08 (2)	0.98 (25)	0.98 (25)	6.30 (160)	5.71 (145)	1.57 (40)
160	—	—	—	0.10 (2.5)	1.26 (32)	1.26 (32)	7.87 (200)	—	—
200	—	—	—	0.10 (2.5)	1.26 (32)	1.26 (32)	9.84 (250)	—	—
250	—	—	—	0.13 (3.2)	1.57 (40)	1.57 (40)	12.60 (320)	—	—
320	—	—	—	0.13 (3.2)	1.97 (50)	1.97 (50)	15.75 (400)	—	—

Dimensions in inches (mm)



# Series ML Cylinder Accessories

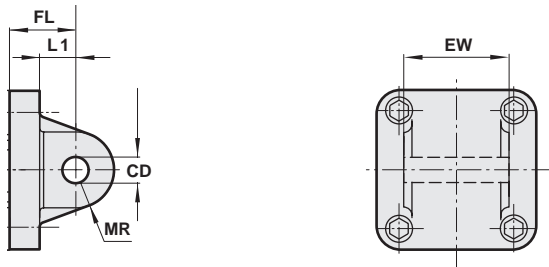
## Front hinge mounting



BORE	CA	CE	D	G1	G2	G3	H2	K1	K2	L1	RK	S
32	1.26 (32)	1.57 (40)	0.43 (11)	0.83 (21)	0.71 (18)	1.22 (31)	0.31 (8)	1.50 (38)	2.01 (51)	0.06 (1.6)	1.10 (28)	0.26 (6.6)
40	1.42 (36)	1.89 (48)	0.43 (11)	0.94 (24)	0.87 (22)	1.38 (35)	0.39 (10)	1.61 (41)	2.13 (54)	0.06 (1.6)	1.26 (32)	0.26 (6.6)
50	1.77 (45)	2.52 (64)	0.59 (15)	1.30 (33)	1.18 (30)	1.77 (45)	0.47 (12)	1.97 (50)	2.56 (65)	0.06 (1.6)	1.63 (41.5)	0.35 (9)
63	1.97 (50)	2.52 (64)	0.59 (15)	1.46 (37)	1.38 (35)	1.97 (50)	0.47 (12)	2.05 (52)	2.64 (67)	0.06 (1.6)	1.63 (41.5)	0.35 (9)
80	2.48 (63)	3.15 (80)	0.71 (18)	1.85 (47)	1.57 (40)	2.36 (60)	0.55 (14)	2.60 (66)	3.39 (86)	0.10 (2.5)	1.97 (50)	0.43 (11)
100	2.80 (71)	3.15 (80)	0.71 (18)	2.17 (55)	1.97 (50)	2.76 (70)	0.59 (15)	2.99 (76)	3.78 (96)	0.10 (2.5)	1.97 (50)	0.43 (11)
125	3.54 (90)	4.33 (110)	0.79 (20)	2.76 (70)	2.36 (60)	3.54 (90)	0.79 (20)	3.70 (94)	4.88 (124)	0.13 (3.2)	2.44 (62)	0.55 (14)
160	4.53 (115)	5.67 (144)	0.79 (20)	3.82 (97)	3.46 (88)	4.96 (126)	0.98 (25)	4.65 (118)	6.14 (156)	0.16 (4)	3.74 (95)	0.55 (14)
200	5.31 (135)	5.67 (144)	0.94 (24)	4.13 (105)	3.54 (90)	5.12 (130)	1.18 (30)	4.80 (122)	6.38 (162)	0.16 (4)	3.74 (95)	0.71 (18)
250	—	6.61 (168)	—	—	—	—	—	—	—	—	4.17 (106)	—
320	—	7.56 (192)	—	—	—	—	—	—	—	—	4.76 (121)	—

Dimensions in inches (mm)

## Rear eye mounting – ISO 6431 and VDMA 24562 Part 2

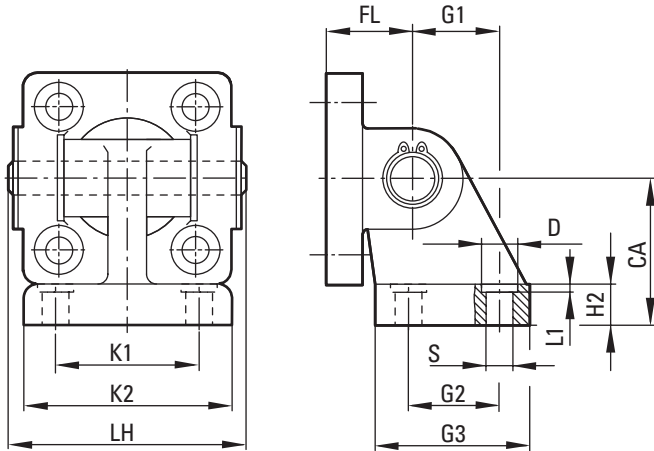


BORE	CD	EW	FL	L1	MR
32	0.39 (10)	1.02 (25.8)	0.87 (22)	0.51 (13)	0.35 (9)
40	0.47 (12)	1.09 (27.8)	0.98 (25)	0.63 (16)	0.47 (12)
50	0.47 (12)	1.25 (31.7)	1.06 (27)	0.67 (17)	0.47 (12)
63	0.63 (16)	1.56 (39.7)	1.26 (32)	0.87 (22)	0.59 (15)
80	0.63 (16)	1.96 (49.7)	1.42 (36)	0.87 (22)	0.59 (15)
100	0.79 (20)	2.35 (59.7)	1.61 (41)	1.06 (27)	0.79 (20)
125	0.98 (25)	2.74 (69.7)	1.97 (50)	1.30 (33)	0.98 (25)
160	1.18 (30)	3.53 (89.7)	2.17 (55)	1.40 (35.5)	1.18 (30)
200	1.18 (30)	3.53 (89.7)	2.36 (60)	1.46 (37)	1.18 (30)

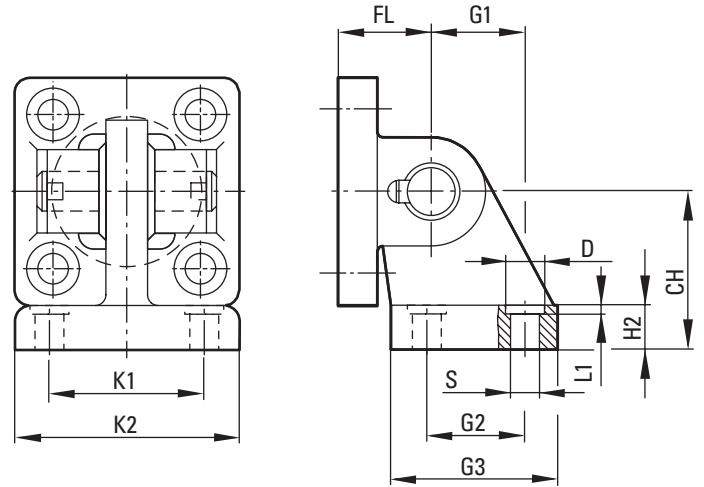
Dimensions in inches (mm)

# Series ML Cylinder Accessories

**Rear Hinge Mount – Type 1  
VDMA 24562 Part 2**



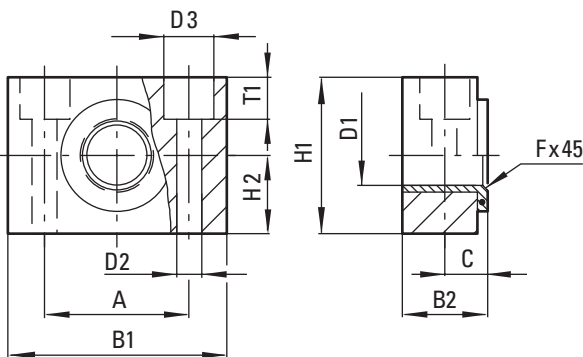
**Rear Hinge Mount – Type 2  
VDMA 24562 Part 2**



BORE	CA	CH	D	FL	G1	G2	G3	H2	K1	K2	L1	LH	S
32	1.26 (32)	1.26 (32)	.43 (11)	.87 (22)	.83 (21)	.71 (18)	1.22 (31)	.31 (8)	1.5 (38)	2.01 (51)	.06 (1.6)	2.05 (52)	.26 (6.6)
40	1.42 (36)	1.42 (36)	.43 (11)	.98 (25)	.94 (24)	.87 (22)	1.38 (35)	.39 (10)	1.61 (41)	2.13 (54)	.06 (1.6)	2.36 (60)	.26 (6.6)
50	1.77 (45)	1.77 (45)	.59 (15)	1.06 (27)	1.3 (33)	1.18 (30)	1.77 (45)	.47 (12)	1.97 (50)	2.56 (65)	.06 (1.6)	2.68 (68)	.35 (9)
63	1.97 (50)	1.97 (50)	.59 (15)	1.26 (32)	1.46 (37)	1.38 (35)	1.97 (50)	.47 (12)	2.05 (52)	2.64 (67)	.06 (1.6)	3.11 (79)	.35 (9)
80	2.48 (63)	2.48 (63)	.71 (18)	1.42 (36)	1.85 (47)	1.57 (40)	2.36 (60)	.55 (14)	2.6 (66)	3.39 (86)	.1 (2.5)	3.9 (99)	.43 (11)1
100	2.8 (71)	2.8 (71)	.71 (18)	1.61 (41)	2.17 (55)	1.97 (50)	2.76 (70)	.59 (15)	2.99 (76)	3.78 (96)	.1 (2.5)	4.69 (119)	.43 (11)
125	3.54 (90)	3.54 (90)	.79 (20)	1.97 (50)	2.76 (70)	2.36 (60)	3.54 (90)	.79 (20)	3.7 (94)	4.88 (124)	.12 (3.2)	5.47 (139)	.55 (14)
160	4.53 (115)	4.53 (115)	.79 (20)	2.17 (55)	3.82 (97)	3.46 (88)	4.96 (126)	.98 (25)	4.65 (118)	6.14 (156)	.16 (4)	7.13 (181)	.55 (14)
200	5.31 (135)	5.31 (135)	.94 (24)	2.36 (60)	4.13 (105)	3.54 (90)	5.12 (130)	1.18 (30)	4.8 (122)	6.38 (162)	.16 (4)	7.13 (181)	.71 (18)
250*	6.50 (165)	–	1.3 (3)3	2.76 (70)	5.04 (128)	4.33 (110)	6.3 (160)	1.38 (35)	5.91 (150)	7.87 (200)	.08 (2)	8.58 (218)	.87 (22)
320*	7.87 (200)	–	1.57 (40)	3.15 (80)	5.91 (150)	4.8 (122)	7.31 (186)	1.57 (40)	6.69 (170)	9.21 (234)	.08 (2)	9.37 (238)	1.02 (26)

Dimensions in inches (mm)

**Trunnion support  
mounting  
(Swivel bearing)**



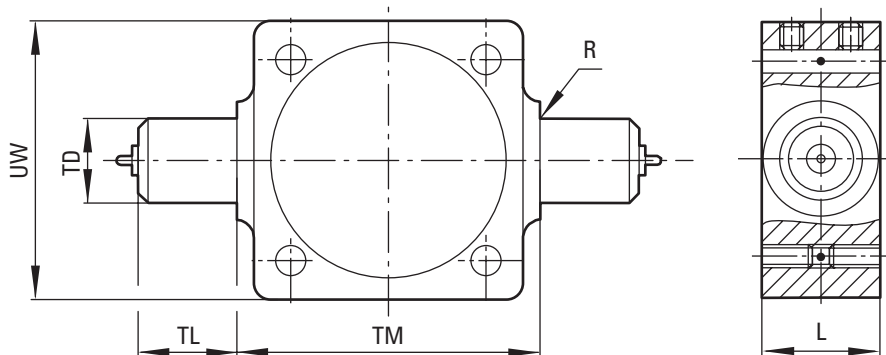
BORE	A	B1	B2	C	D2	D3	FX45°	H1	H2	T1
32	1.26 (32)	1.81 (46)	.71 (18)	.41 (10.5)	.26 (6.6)	.43 (11)	.04 (1)	1.18 (30)	.59 (15)	.27 (6.8)
40	1.42 (36)	2.17 (55)	.83 (21)	.47 (12)	.35 (9)	.59 (15)	.06 (1.6)	1.42 (36)	.71 (18)	.35 (9)
50	1.42 (36)	2.17 (55)	.83 (21)	.47 (12)	.35 (9)	.59 (15)	.06 (1.6)	1.42 (36)	.71 (18)	.35 (9)
63	1.65 (42)	2.56 (65)	.91 (23)	.51 (13)	.43 (11)	.71 (18)	.06 (1.6)	1.57 (40)	.79 (20)	.43 (11)
80	1.65 (42)	2.56 (65)	.91 (23)	.51 (13)	.43 (11)	.71 (18)	.06 (1.6)	1.57 (40)	.79 (20)	.43 (11)
100	1.97 (50)	2.95 (75)	1.12 (28.5)	.63 (16)	.55 (14)	.79 (20)	.08 (2)	1.97 (50)	.98 (25)	.51 (13)
125	1.97 (50)	2.95 (75)	1.12 (28.5)	.63 (16)	.55 (14)	.79 (20)	.08 (2)	1.97 (50)	.98 (25)	.51 (13)
160	2.36 (60)	3.62 (92)	1.54 (39)	.85 (21.5)	.71 (18)	1.02 (26)	.10 (2.5)	2.36 (60)	.98 (25)	.61 (15.5)
200	2.36 (60)	3.62 (92)	1.54 (39)	.85 (21.5)	.71 (18)	1.02 (26)	.10 (2.5)	2.36 (60)	.98 (25)	.61 (15.5)

Dimensions in inches (mm)

# Series ML Cylinder Accessories

Center trunnion  
mounting –  
(for tie rod types)

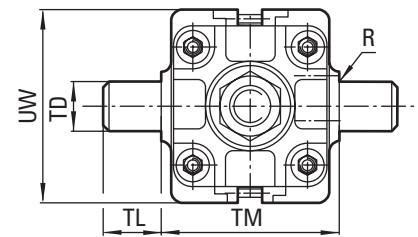
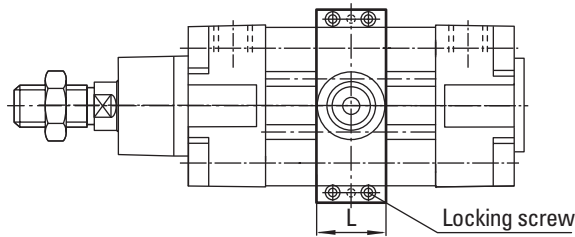
ISO 6431 and VDMA  
24562 Part 2



BORE	L	R	TD	TL	TM	UW	TORQUE IN. LB.
32	.79 (20)	.04 (1)	.47 (12)	.47 (12)	1.97 (50)	1.97 (50)	53.1
40	.94 (24)	.06 (1.6)	.63 (16)	.63 (16)	2.48 (63)	2.28 (58)	53.1
50	1.10 (28)	.06 (1.6)	.63 (16)	.63 (16)	2.95 (75)	2.76 (70)	53.1
63	1.10 (28)	.06 (1.6)	.79 (20)	.79 (20)	3.54 (90)	3.15 (80)	88.5
80	1.10 (28)	.06 (1.6)	.79 (20)	.79 (20)	4.33 (110)	3.94 (100)	88.5
100	1.50 (38)	.08 (2)	.98 (25)	.98 (25)	5.20 (132)	4.96 (126)	132.75
125	1.97 (50)	.08 (2)	.98 (25)	.98 (25)	6.30 (160)	5.99 (152)	221.25
160	1.97 (50)	.10 (2.5)	1.26 (32)	1.26 (32)	7.87 (200)	7.56 (192)	354
200	1.97 (50)	.10 (2.5)	1.26 (32)	1.26 (32)	9.84 (250)	9.45 (240)	354
250	2.36 (60)	.12 (3.2)	1.57 (40)	1.57 (40)	12.60 (320)	12.52 (318)	–
320	2.76 (70)	.12 (3.2)	1.97 (50)	1.97 (50)	15.75 (400)	15.75 (400)	–

Dimensions in inches (mm)

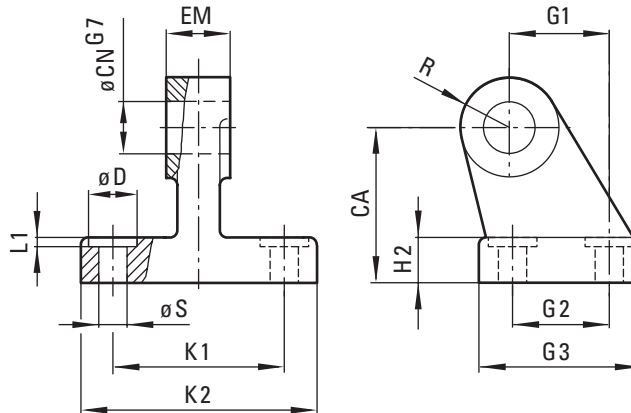
# Series ML Cylinder Accessories



## Adjustable center trunnion mounting – (for profile types) ISO 6431, VDMA 24562 Part 2

BORE	L	R	TD	TL	TM	UW	TORQUE IN. LB.
32	.79 (20)	.04 (1)	.47 (12)	.47 (12)	1.97 (50)	1.97 (50)	53.1
40	.94 (24)	.06 (1.6)	.63 (16)	.63 (16)	2.48 (63)	2.28 (58)	53.1
50	1.10 (28)	.06 (1.6)	.63 (16)	.63 (16)	2.95 (75)	2.76 (70)	53.1
63	1.10 (28)	.06 (1.6)	.79 (20)	.79 (20)	3.54 (90)	3.15 (80)	88.5
80	1.10 (28)	.06 (1.6)	.79 (20)	.79 (20)	4.33 (110)	3.94 (100)	88.5
100	1.50 (38)	.08 (2)	.98 (25)	.98 (25)	5.20 (132)	4.96 (126)	132.75
125	1.97 (50)	.08 (2)	.98 (25)	.98 (25)	6.30 (160)	5.99 (152)	221.25
160	1.97 (50)	.10 (2.5)	1.26 (32)	1.26 (32)	7.87 (200)	7.56 (192)	354
200	1.97 (50)	.10 (2.5)	1.26 (32)	1.26 (32)	9.84 (250)	9.45 (240)	354
250	2.36 (60)	.12 (3.2)	1.57 (40)	1.57 (40)	12.60 (320)	12.52 (318)	–
320	2.76 (70)	.12 (3.2)	1.97 (50)	1.97 (50)	15.75 (400)	15.75 (400)	–

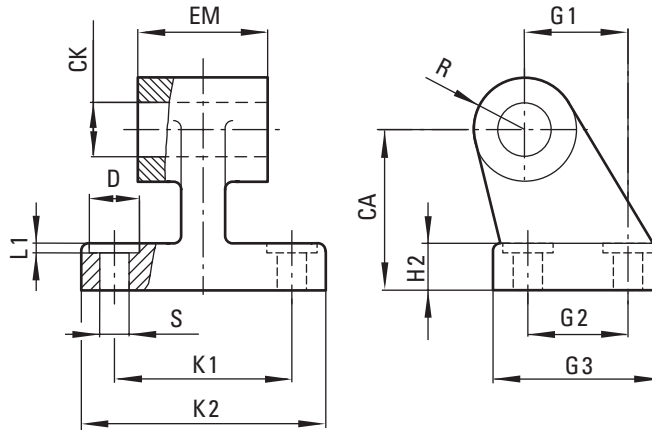
## Narrow hinge mounting



BORE	CA	CK	D	EM	G1	G2	G3	H2	K1	K2	S
32	1.26 (32)	0.39 (10)	0.43 (11)	1.02 (26)	0.83 (21)	0.71 (18)	1.22 (31)	0.31 (8)	1.50 (38)	2.01 (51)	0.26 (6.6)
40	1.42 (36)	0.47 (12)	0.43 (11)	1.10 (28)	0.94 (24)	0.87 (22)	1.38 (35)	0.39 (10)	1.61 (41)	2.13 (54)	0.26 (6.6)
50	1.77 (45)	0.47 (12)	0.59 (15)	1.26 (32)	1.30 (33)	1.18 (30)	1.77 (45)	0.47 (12)	1.97 (50)	2.56 (65)	0.35 (9)
63	1.97 (50)	0.63 (16)	0.59 (15)	1.57 (40)	1.46 (37)	1.38 (35)	1.97 (50)	0.47 (12)	2.05 (52)	2.64 (67)	0.35 (9)
80	2.48 (63)	0.63 (16)	0.71 (18)	1.97 (50)	1.85 (47)	1.57 (40)	2.36 (60)	0.55 (14)	2.60 (66)	3.39 (86)	0.43 (11)
100	2.80 (71)	0.79 (20)	0.71 (18)	2.36 (60)	2.17 (55)	1.97 (50)	2.76 (70)	0.59 (15)	3.00 (76)	3.78 (96)	0.43 (11)
125	3.54 (90)	0.98 (25)	0.79 (20)	2.76 (70)	2.76 (70)	2.36 (60)	3.54 (90)	0.79 (20)	3.70 (94)	4.88 (124)	0.55 (14)
160	4.53 (115)	1.18 (30)	0.79 (20)	3.54 (90)	3.82 (97)	3.46 (88)	4.96 (126)	0.98 (25)	4.65 (118)	6.14 (156)	0.55 (14)
200	5.31 (135)	1.18 (30)	0.94 (24)	3.54 (90)	4.13 (105)	3.54 (90)	5.12 (130)	1.18 (30)	4.80 (122)	6.38 (162)	0.71 (18)
250	6.50 (165)	1.57 (40)	1.30 (33)	4.33 (110)	5.04 (128)	4.33 (110)	6.30 (160)	1.38 (35)	5.91 (150)	7.87 (200)	0.87 (22)
320	7.87 (200)	1.77 (45)	1.57 (40)	4.72 (120)	5.91 (150)	4.80 (122)	7.32 (186)	1.57 (40)	6.69 (170)	9.21 (234)	1.02 (26)

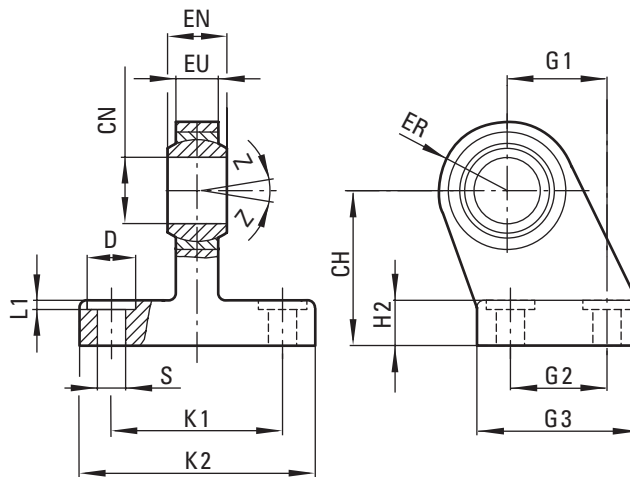
# Series ML Cylinder Accessories

## Wide hinge mounting VDMA 24562 Part 2



BORE	CA	CK	EM	G1	G2	G3	H2	K1	K2	L1	R	S
32	1.26 (32)	0.39 (10)	1.02 (26)	0.83 (21)	0.71 (18)	1.22 (31)	0.31 (8)	1.50 (38)	2.01 (51)	0.06 (1.6)	0.39 (10)	0.26 (6.6)
40	1.42 (36)	0.47 (12)	1.10 (28)	0.94 (24)	0.87 (22)	1.38 (35)	0.39 (10)	1.61 (41)	2.13 (54)	0.06 (1.6)	0.43 (11)	0.26 (6.6)
50	1.77 (45)	0.47 (12)	1.26 (32)	1.30 (33)	1.18 (30)	1.77 (45)	0.47 (12)	1.97 (50)	2.56 (65)	0.06 (1.6)	0.51 (13)	0.35 (9)
63	1.97 (50)	0.63 (16)	1.57 (40)	1.46 (37)	1.38 (35)	1.97 (50)	0.47 (12)	2.05 (52)	2.64 (67)	0.06 (1.6)	0.59 (15)	0.35 (9)
80	2.48 (63)	0.63 (16)	1.97 (50)	1.85 (47)	1.57 (40)	2.36 (60)	0.55 (14)	2.60 (66)	3.39 (86)	0.10 (2.5)	0.59 (15)	0.43 (11)
100	2.80 (71)	0.79 (20)	2.36 (60)	2.17 (55)	1.97 (50)	2.76 (70)	0.59 (15)	3.00 (76)	3.78 (96)	0.10 (2.5)	0.75 (19)	0.43 (11)
125	3.54 (90)	0.98 (25)	2.76 (70)	2.76 (70)	2.36 (60)	3.54 (90)	0.79 (20)	3.70 (94)	4.88 (124)	0.13 (3.2)	0.87 (22)	0.55 (14)
160	4.53 (115)	1.18 (30)	3.54 (90)	3.82 (97)	3.46 (88)	4.96 (126)	0.98 (25)	4.65 (118)	6.14 (156)	0.16 (4)	1.22 (31)	0.55 (14)
200	5.31 (135)	1.18 (30)	3.54 (90)	4.13 (105)	3.54 (90)	5.12 (130)	1.18 (30)	4.80 (122)	6.38 (162)	0.16 (4)	1.22 (31)	0.71 (18)
250	6.50 (165)	1.57 (40)	4.33 (110)	5.04 (128)	4.33 (110)	6.30 (160)	1.38 (35)	5.91 (150)	7.87 (200)	0.08 (2)	1.57 (40)	0.87 (22)
320	7.87 (200)	1.77 (45)	4.72 (120)	5.91 (150)	4.80 (122)	7.32 (186)	1.57 (40)	6.69 (170)	9.21 (234)	0.08 (2)	1.77 (45)	1.02 (26)

## Swivel hinge mounting VDMA 24562 Part 2



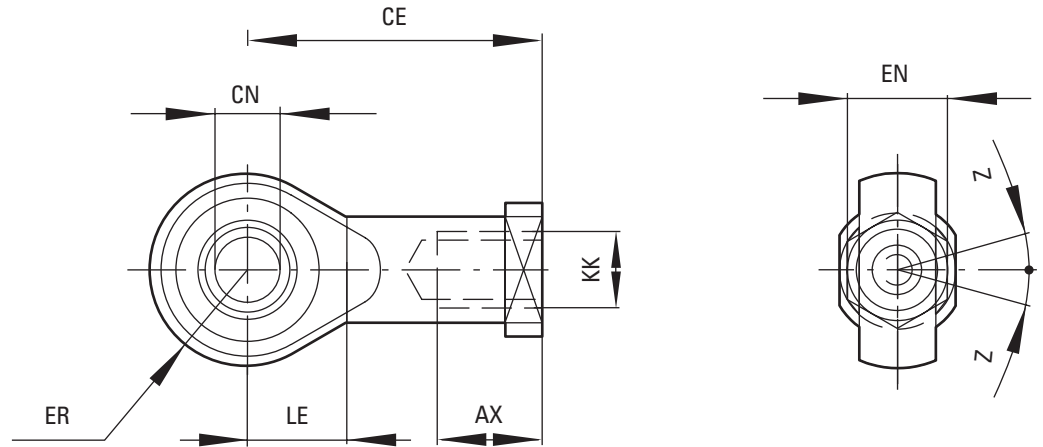
BORE	CH	CN	D	EN	ER	EU	G1	G2	G3	H2	K1	K2	L1	S
32	1.26 (32)	0.39 (10)	0.43 (11)	0.55 (14)	0.63 (16)	0.41 (10.5)	0.83 (21)	0.71 (18)	1.22 (31)	0.31 (8)	1.50 (38)	2.01 (51)	0.06 (1.6)	0.26 (6.6)
40	1.42 (36)	0.47 (12)	0.43 (11)	0.63 (16)	0.75 (19)	0.47 (12)	0.94 (24)	0.87 (22)	1.38 (35)	0.39 (10)	1.61 (41)	2.13 (54)	0.06 (1.6)	0.26 (6.6)
50	1.77 (45)	0.63 (16)	0.59 (15)	0.83 (21)	0.83 (21)	0.59 (15)	1.30 (33)	1.18 (30)	1.77 (45)	0.47 (12)	1.97 (50)	2.56 (65)	0.06 (1.6)	0.35 (9)
63	1.97 (50)	0.63 (16)	0.59 (15)	0.83 (21)	0.94 (24)	0.59 (15)	1.46 (37)	1.38 (35)	1.97 (50)	0.47 (12)	2.05 (52)	2.64 (67)	0.06 (1.6)	0.35 (9)
80	2.48 (63)	0.79 (20)	0.71 (18)	0.98 (25)	1.10 (28)	0.71 (18)	1.85 (47)	1.57 (40)	2.36 (60)	0.55 (14)	2.60 (66)	3.39 (86)	0.10 (2.5)	0.43 (11)
100	2.80 (71)	0.79 (20)	0.71 (18)	0.98 (25)	1.18 (30)	0.71 (18)	2.17 (55)	1.97 (50)	2.76 (70)	0.59 (15)	2.99 (76)	3.78 (96)	0.10 (2.5)	0.43 (11)
125	3.54 (90)	1.18 (30)	0.79 (20)	1.46 (37)	1.57 (40)	0.98 (25)	2.76 (70)	2.36 (60)	3.54 (90)	0.79 (20)	3.70 (94)	4.88 (124)	0.13 (3.2)	0.55 (14)
160	4.53 (115)	1.38 (35)	0.79 (20)	1.69 (43)	1.73 (44)	1.10 (28)	3.82 (97)	3.46 (88)	4.96 (126)	0.98 (25)	4.65 (118)	6.14 (156)	0.16 (4)	0.55 (14)
200	5.31 (135)	1.38 (35)	0.94 (24)	1.69 (43)	1.89 (48)	1.10 (28)	4.13 (105)	3.54 (90)	5.12 (130)	1.18 (30)	4.80 (122)	6.38 (162)	0.16 (4)	0.71 (18)

Dimensions in inches (mm)

# Series ML Cylinder Accessories

## Universal piston rod eye mounting –

DIN ISO 8139

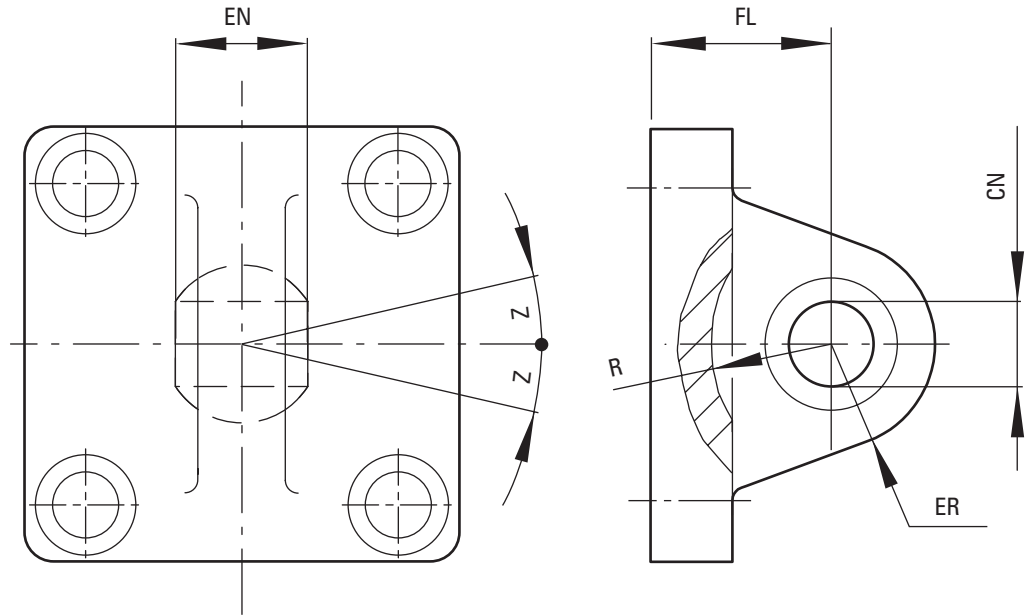


BORE	AX	CE	CN	EN	ER	KK	LE
32	0.79 (20)	1.69 (43)	0.39 (10)	0.55 (14)	0.55 (14)	M 10 x 1.25	0.59 (15)
40	0.87 (22)	1.97 (50)	0.47 (12)	0.63 (16)	0.63 (16)	M 12 x 1.25	0.67 (17)
50	1.10 (28)	2.52 (64)	0.63 (16)	0.83 (21)	0.83 (21)	M 16 x 1.5	0.87 (22)
63	1.10 (28)	2.52 (64)	0.63 (16)	0.83 (21)	0.83 (21)	M 16 x 1.5	0.87 (22)
80	1.30 (33)	3.03 (77)	0.79 (20)	0.98 (25)	0.98 (25)	M 20 x 1.5	1.02 (26)
100	1.30 (33)	3.03 (77)	0.79 (20)	0.98 (25)	0.98 (25)	M 20 x 1.5	1.02 (26)
125	2.01 (51)	4.33 (110)	1.18 (30)	1.46 (37)	1.38 (35)	M 27 x 2	1.42 (36)
160	2.20 (56)	4.92 (125)	1.38 (35)	1.69 (43)	1.57 (40)	M 36 x 2	1.61 (41)
200	2.20 (56)	4.92 (125)	1.38 (35)	1.69 (43)	1.57 (40)	M 36 x 2	1.61 (41)
250	2.36 (60)	5.59 (142)	1.57 (40)	1.93 (49)	1.77 (45)	M 42 x 2	1.81 (46)
320	2.56 (65)	6.30 (160)	1.97 (50)	2.36 (60)	2.28 (58)	M 48 x 2	2.32 (59)

Dimensions in inches (mm)

# Series ML Cylinder Accessories

## Universal rear eye mounting VDMA 24562 Part 2



<b>BORE</b>	<b>CN</b>	<b>EN</b>	<b>ER</b>	<b>FL</b>	<b>R</b>	<b>Z</b>	<b>LB</b>
32	.39 (10)	.55 (14)	.63 (16)	.87 (22)	.57 (14.5)	55° (13°)	0.33
40	.47 (12)	.63 (16)	.75 (19)	.98 (25)	.71 (18)	55° (13°)	0.55
50	.63 (16)	.83 (21)	.83 (21)	1.06 (27)	.75 (19)	55° (13°)	0.88
63	.63 (16)	.83 (21)	.94 (24)	1.26 (32)	.94 (24)	59° (15°)	1.21
80	.79 (20)	.98 (25)	1.1 (28)	1.42 (36)	.94 (24)	59° (15°)	1.98
100	.79 (20)	.98 (25)	1.18 (30)	1.61 (41)	1.14 (29)	59° (15°)	3.31
125	1.18 (30)	1.46 (37)	1.57 (40)	1.97 (50)	1.42 (36)	59° (15°)	5.95
160	1.38 (35)	1.69 (43)	1.73 (44)	2.17 (55)	1.61 (41)	61° (16°)	10.14
200	1.38 (35)	1.69 (43)	1.89 (48)	2.36 (60)	1.65 (42)	61° (16°)	16.10

Dimensions in inches (mm)



# Series ML Technical Information

## Operating Pressure

1 to 16 bar (14.5 to 232 psi)  
1 to 10 bar (14.5 to 145 psig)  
for ø250 mm and ø320 mm

## Operating Temperature

-20°C to +80°C max (-4°F to +176°F max)

[Consult Factory for use  
below +2°C (35°F)]

## Cylinder Diameters

32, 40, 50, 63, 80, 100,  
125, 160, 200, 250, 320 mm

## Materials for <125mm Bore

Anodized aluminum profile  
tube

## Materials for >125mm Bore

Anodized aluminum tube  
Pressure diecast aluminum  
end covers:

32 to 160 mm (gravity cast  
aluminum 200 to 320 mm)

Chrome plated stainless  
steel piston rod

Polyurethane piston rod seals:  
32 to 100 mm (nitrile rubber  
125 to 320 mm)

Polyurethane piston seals:  
32 to 100 mm (nitrile rubber  
125 to 320 mm)

Nitrile rubber O-rings

Tie Rod: High strength steel

## ML Series Pneumatic Cylinders

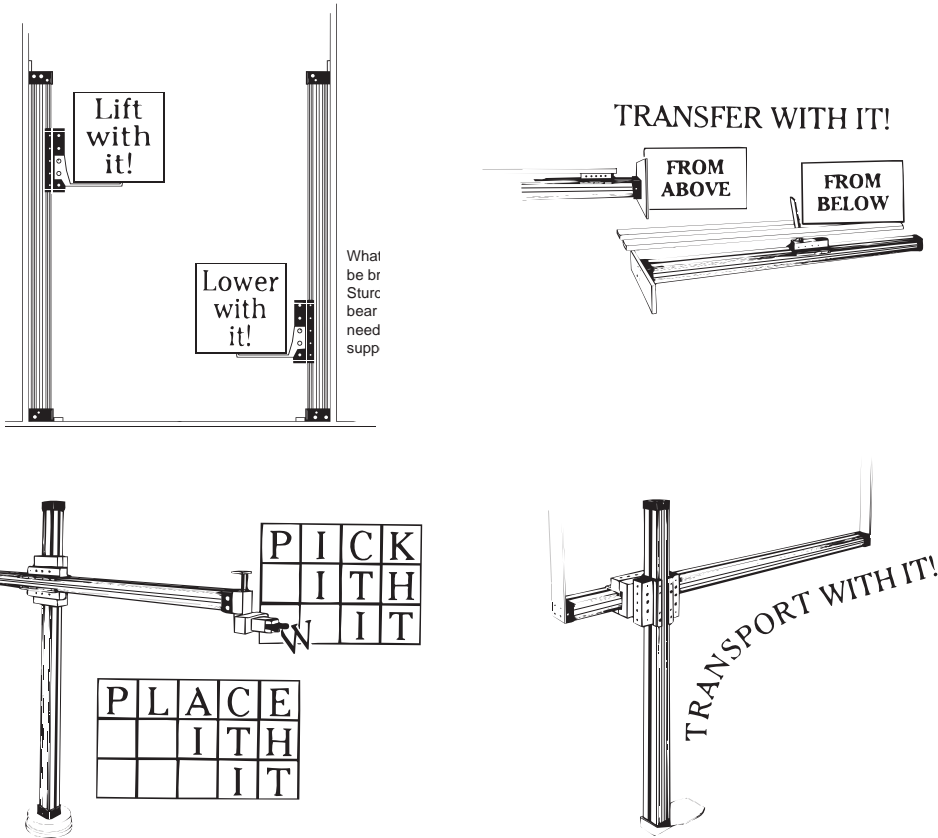
### Theoretical Forces | Cushioning | Air Consumption

BORE	THEORETICAL FORCES AT 6 BAR (LBS. AT 87 PSI)						AIR CONSUMPTION – LITERS/CM OF STROKE (CUBIC INCHES/INCH)					
	EXTEND LBS. FORCE (NEWTONS)		RETRACT LBS. FORCE (NEWTONS)		CUSHION LENGTH INCH (MM)		INITIAL CUSHION VOLUME INCHES <sup>3</sup> (CM <sup>3</sup> )		EXTEND INCH <sup>3</sup> (LITERS)		RETRACT INCH <sup>3</sup> (LITERS)	
32	108	(482)	93	(414)	.75	(19)	.75	(12.3)	8.7	(0.056)	7.5	(0.048)
40	169	(754)	142	(633)	.87	(22)	1.26	(20.7)	13.7	(0.088)	11.5	(0.074)
50	265	(1178)	222	(990)	.94	(24)	2.20	(36)	21.3	(0.137)	17.7	(0.114)
63	420	(1870)	378	(1680)	.94	(24)	3.90	(64)	33.9	(0.218)	30.3	(0.195)
80	678	(3016)	612	(2722)	1.06	(27)	7.08	(116)	54.4	(0.35)	49.8	(0.32)
100	1059	(4710)	993	(4416)	1.34	(34)	14.76	(242)	85.5	(0.55)	79.3	(0.51)
125	1656	(7363)	1547	(6882)	1.61	(41)	27.51	(451)	133.7	(0.86)	122.9	(0.79)
160	2713	(12064)	2543	(11310)	1.77	(45)	49.78	(816)	219.3	(1.41)	205.3	(1.32)
200	4236	(18840)	4068	(18090)	1.77	(45)	80.76	(1324)	342.1	(2.20)	326.6	(2.10)
250	6619	(29436)	6349	(28236)	2.36	(60)	176.9	(2900)	534.0	(3.44)	513.2	(3.30)
320	10846	(48228)	10634	(47292)	2.56	(65)	317.2	(5200)	875.6	(5.63)	841.4	(5.41)

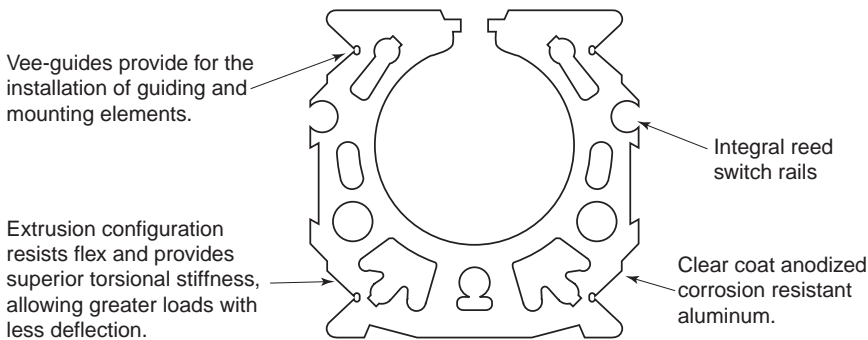
# Series RL Features

## Ultimate Flexibility

Eaton RL Series rodless pneumatic cylinders provide the ultimate in flexibility. Whether you need to lift, pick, stitch, silk screen, mold, or transport, the Series RL provides limitless possibilities.



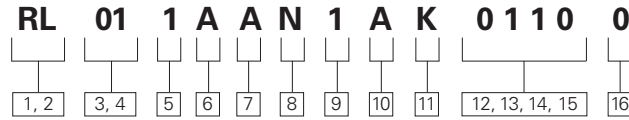
## The Extruded Tube of RL Series



## Features:

- Eaton RL rodless cylinders feature a sleek, compact design to provide more flexibility in tight spaces.
- The robust design eliminates the rod (so no buckling possibility) and provides non-rotating load carrying capability without expensive add ons.
- Smoother, consistent performance for precision and high speed applications.

# Series RL Model Code



**1, 2 Series**  
RL – Rodless Cylinders

**3, 4 Mounting Styles**  
01 – Side Lug Mount  
03 – End Lug Mount  
24 – No Mount

**5 Bore Size**

Code	Bore Size (mm)
1	16
A	20
B	25
2	32
C	40
D	50
E	63
G	80

**6 Carriage Type**

**Code Type**  
**A** Internally Guided Carriage



**B** Externally Guided Carriage



**C** Roller Guided Carriage



**D** Right Angle Mounting System (with externally guided carriage)



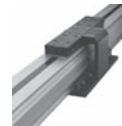
**E** Carriage Without Top Cover (with internally guided carriage)



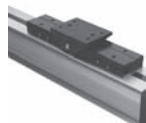
**F** Side Mounting Plate (with externally guided carriage)



**G** Carriage Mounting Plate (with internally guided carriage)



**H** Swinging Bridge Mounting (with internally guided carriage)



**7 Rod End Type**

**Code Type**  
**A** Standard

**8 Seal Options**

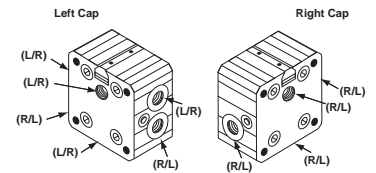
**N** – Normal, Standard

**9 Port Options**

1 – NPTF Standard  
7 – BSPPL

**10 Port Locations**

**A** – Standard Option (Multiple Port)



L/R – indicates air  
R/L – indicates air

**11 Cushion Location**

**K** – Adjustable Cushions (Both Ends)

**12, 13, 14, 15 Cylinder Stroke**

Specify length in millimeters (mm)

**16 Proximity Switch Magnet**

**P** – Magnet Furnished to operate Hall Effect or Reed Type Switch

# Series RL

## Mounting Style: 16-80 mm Bores

### Available Mountings

The variety of standard mountings available in the Series RL gives you a broad selection to match the proper mount to your application. Vickers offers side lug mounts, end lug mounts and no mounts. A guide to proper mount selection is provided on pages 91 through 92. For custom mounts, enter "XX" for model code positions 3 and 4, and give a detailed description with drawings. Series RL cylinders are available in all mounting styles listed.

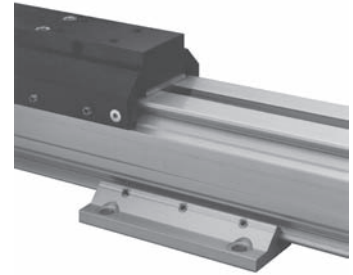
**Code 24  
No Mount**



**Code 03  
End Lug**



**Code 01  
Side Lug**

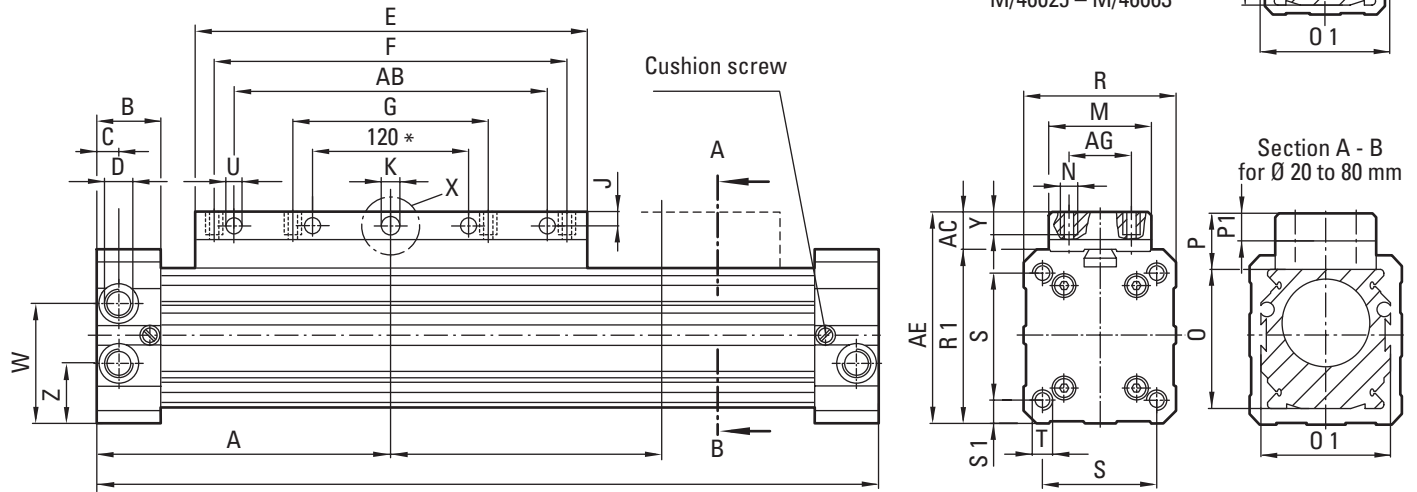


### Selecting the Proper Mounting

Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified. Note: In the mounting information, some mounts have been downrated to minimize deflection. For applications where the motion is linear and parallel to the cylinder rod motion, a rigid mount is recommended. The specifics of each application dictate the correct mounting style.

# Series RL Mounting Styles and Installation Dimensions

Code 24 – No Mount  
(Standard Cylinder)



\*For cylinder 80 mm

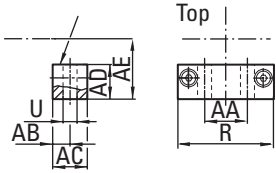
BORE	A	AB	AC	AE	AG	AO	B	C	D	E	F	G	J	K	L
16	2.46 (62.5)	—	0.28 (7)	1.50 (38)	0.31 (8)	/0.30 (7.5)	0.69 (18)	0.31 (08)	— M5	3.15 (80)	2.36 (60)	—	0.10 (2.5)	0.12 (3)	1.22 (31)
20	3.34 (85)	/2.36 (60)	0.55 (14)	2.13/2.32 (54/59)	0.71 (18)	/0.26 (6.5)	0.91 (23)	0.31 (08)	1/8 NPT G1/8	4.33 (110)	3.15 (80)	1.57 (40)	0.14/0.30 (3.5/7.5)	0.17 (4.2)	1.65 (42)
25	3.93 (100)	/2.76 (70)	0.47 (12)	2.36/2.66 (60/67.5)	0.79 (20)	/0.37 (9.5)	0.91 (23)	0.57 (14.5)	1/8 NPT G1/8	5.12 (130)	3.54 (90)	1.77 (45)	/0.20 (5)	0.18 (4.5)	2.05 (52)
32	4.72 (120)	/3.54 (90)	0.63 (16)	3.00/3.23 (76/82)	0.98 (25)	/0.61 (15.5)	1.06 (27)	0.41 (10.5)	1/4 NPT G1/4	6.30 (160)	4.72 (120)	2.36 (60)	/0.20 (5)	0.24 (6)	2.52 (64)
40	5.91 (150)	/4.72 (120)	0.60 (15)	3.54/3.84 (90/97.5)	0.98 (25)	/0.65 (16.5)	1.18 (30)	0.45 (11.5)	1/4 NPT G1/4	8.46 (215)	6.30 (160)	3.15 (80)	/0.20 (5)	0.24 (6)	3.11 (79)
50	7.09 (180)	/6.30 (160)	0.79 (20)	4.33/4.61 (110/117)	0.98 (25)	/0.94 (24)	1.38 (35)	0.55 (14)	3/8 NPT G3/8	9.84 (250)	7.48 (190)	3.74 (95)	/0.26 (6.5)	0.32 (8)	3.62 (92)
63	8.46 (215)	/7.48 (190)	0.79 (20)	4.92/5.39 (125/137)	0.98 (25)	/1.00 (25.5)	1.57 (40)	0.67 (17)	1/2 NPT G1/2	12.60 (320)	9.45 (240)	4.72 (120)	/0.30 (7.5)	0.32 (8)	4.33 (110)
80	10.23 (260)	9.45 (240)	0.94 (24)	6.06/6.50 (154/165)	0.98 (25)	/1.50 (38)	1.77 (45)	0.67 (17)	1/2 NPT G1/2	15.35 (390)	11.81 (300)	5.91 (150)	0.35/0.39 (9/10)	0.47 (12)	5.12 (130)

BORE	M	N	O	O1	P	P1	R	R1	S	S1	T	U	W	Y	Z
16	0.71 (18)	M3	0.98 (25)	1.26 (32)	0.47 (12)	—	1.06 (27)	1.22 (31)	0.63 (16)	0.22 (5.5)	M3x5 deep	—	—	0.16/0.20 (4/5)	0.63 (16.3)
20	1.06/1.06 (27/27)	M5	1.26 (32)	1.50 (38)	0.73 (18.5)	—	1.57 (40)	1.57 (40)	1.26 (32)	0.16 (4)	M5x12 deep	—	—	0.47 (12)	0.85 (21.5)
25	1.26/1.26 (32/32)	M5	1.57 (40)	1.77 (45)	0.63 (16)	0.30 (7.5)	1.89 (48)	1.89 (48)	1.46 (37)	0.22 (5.5)	M5x13 deep	—	1.30 (33)	0.28/0.47 (7/12)	0.67 (17)
32	1.77/1.77 (45/45)	M5	2.05 (52)	2.05 (52)	0.79 (20)	0.39 (10)	2.36 (60)	2.36 (60)	1.85 (47)	0.26 (6.5)	M6x15 deep	—	1.57 (40)	0.31/0.47 (8/12)	0.79 (20)
40	1.77/1.77 (45/45)	M6	2.56 (65)	2.56 (65)	0.79 (20)	0.39 (10)	2.95 (75)	2.95 (75)	2.28 (58)	0.33 (8.5)	M8x20 deep	—	1.97 (50)	0.31/0.47 (8/12)	0.98 (25)
50	1.97/1.97 (50/50)	M8	3.15 (80)	3.15 (80)	0.98 (25)	0.51 (13)	3.54 (90)	3.54 (90)	2.76 (70)	0.39 (10)	M8x25 deep	—	2.36 (60)	0.43/0.67 (11/17)	1.18 (30)
63	1.97/1.97 (50/50)	M8	3.74 (95)	3.74 (95)	0.98 (25)	0.55 (14)	4.13 (105)	4.13 (105)	3.31 (84)	0.41 (10.5)	M10x25 deep	—	2.76 (70)	0.43/0.79 (11/20)	1.38 (35)
80	1.97/1.97 (50/50)	M10	4.72 (120)	4.72 (120)	0.98 (29)	—	5.12 (130)	5.12 (130)	3.94 (100)	0.59 (15)	M12x25 deep	0.43 (11)	3.54 (90)	0.60/0.98 (15/25)	1.57 (40)

Dimensions in inches (mm)

# Series RL Mounting Styles and Installation Dimensions

## Code 03 – End Lug Mounts

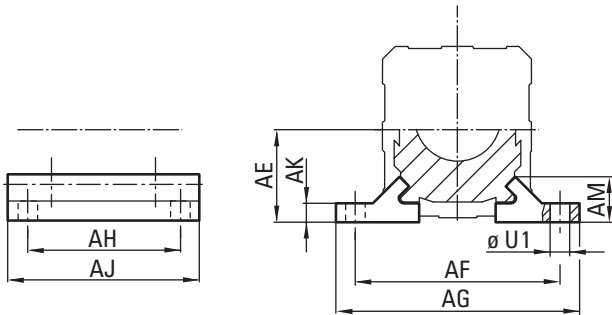


BORE	AA	AB	AC	AD	AE	R	U
16	0.63 (16)	0.39 (10)	0.59 (15)	0.12 (03)	0.63 (16)	1.06 (27)	0.22 (5.5)
20	0.67 (17)	0.20 (05)	0.39 (10)	0.39 (10)	0.85 (21.5)	1.57 (40)	0.22 (5.5)
25	0.71 (18)	0.28 (07)	0.59 (15)	0.53 (13.5)	0.94 (24)	1.89 (48)	0.28 (7)
32	1.02 (26)	0.43 (11)	0.87 (22)	0.65 (16.5)	1.20 (30.5)	2.36 (60)	0.35 (9)
40	1.18 (30)	0.43 (11)	0.87 (22)	0.77 (19.5)	1.48 (37.5)	2.95 (75)	0.35 (9)
50	1.65 (42)	0.47 (12)	0.98 (25)	0.94 (24)	1.77 (45)	3.54 (90)	0.43 (11)
63	1.89 (48)	0.51 (13)	0.98 (25)	1.08 (27.5)	2.13 (54)	4.13 (105)	0.51 (13)
80	2.52 (64)	0.49 (12.5)	0.98 (25)	1.38 (35)	2.76 (70)	5.12 (130)	0.55 (14)

End cover mounts for cylinders 25 to 80mm can be attached to give different distances AE. When used together with a center support mounting the word 'TOP' should be visible on the top face of the mount.

Dimensions in inches (mm)

## Code 01 – Side Lug Mounts

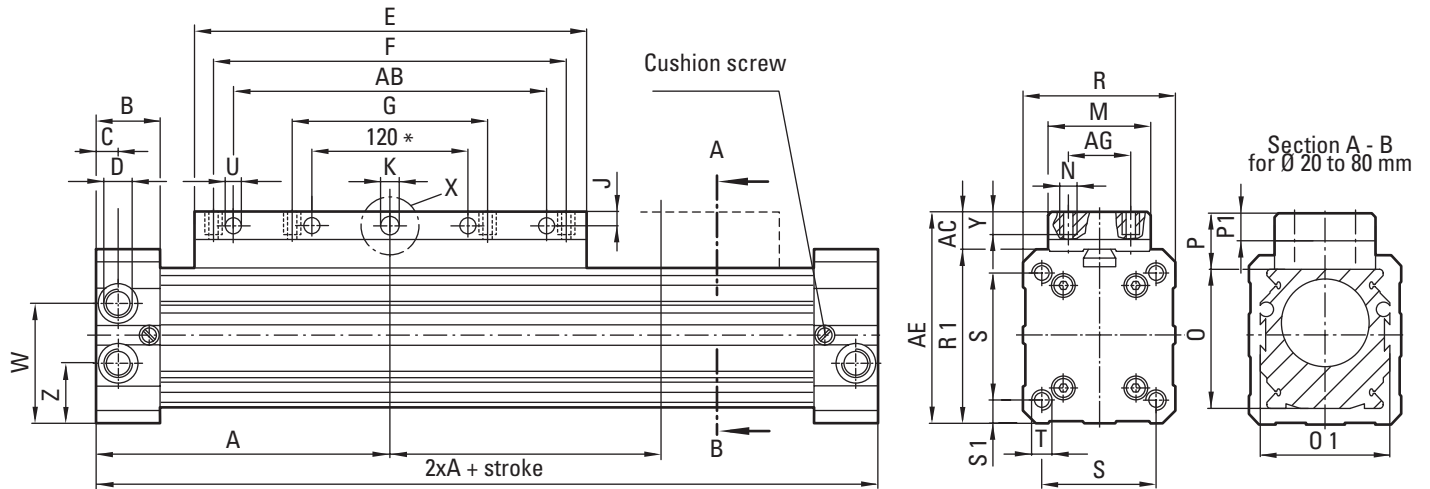


BORE	AE	AF	AG	AH	AJ	AK	AM	U
16	0.63 (16)	1.57 (40)	1.97 (50)	0.79 (20)	1.18 (30)	0.14 (3.5)	0.35 (9)	0.22 (5.5)
20	0.85 (21.5)	2.05 (52)	2.44 (62)	1.77 (45)	2.36 (60)	0.18 (5)	0.47 (12)	0.22 (5.5)
25	0.94 (24)	2.36 (60)	2.83 (72)	2.36 (60)	3.15 (80)	0.22 (5.5)	0.51 (13)	0.26 (6.6)
32	1.20 (30.5)	2.99 (76)	3.62 (92)	2.76 (70)	3.94 (100)	0.26 (6.5)	0.73 (18.5)	0.35 (9)
40	1.48 (37.5)	3.62 (92)	4.25 (108)	3.54 (90)	4.72 (120)	0.30 (7.5)	0.73 (18.5)	0.35 (9)
50	1.77 (45)	4.33 (110)	5.04 (128)	4.33 (110)	5.51 (140)	0.30 (7.5)	0.73 (18.5)	0.43 (11)
63	2.13 (54)	5.20 (132)	6.06 (154)	4.72 (120)	6.30 (160)	0.35 (9)	0.98 (25)	0.51 (13)
80	2.76 (70)	6.10 (155)	7.09 (180)	5.51 (140)	7.09 (180)	0.47 (12)	1.12 (28.5)	0.55 (14)

Dimensions in inches (mm)

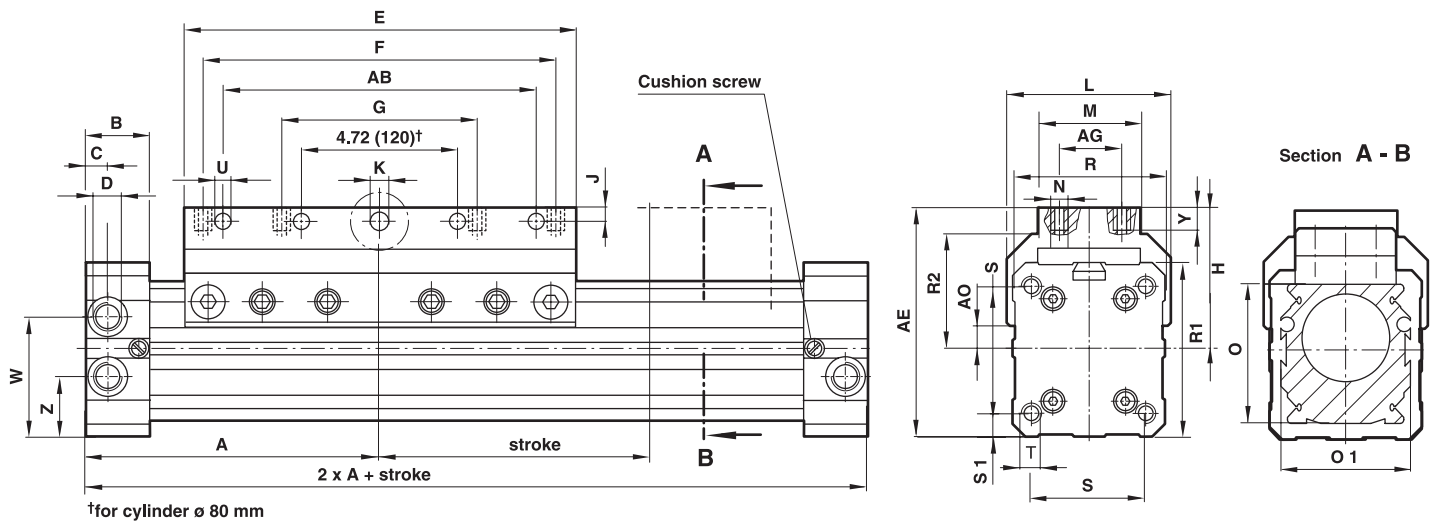
# Series RL Carriage Options

## Code A – Cylinder with Internal guide



\*For cylinder Ø 80 mm

## Code B – Cylinder with external guide



†for cylinder ø 80 mm



# Series RL Carriage Options

## Standard Cylinder, Externally Guided Carriage

internal guiding / external guiding

BORE	A	AB	AC	AE	AG	AO	B	C	D	E	F	G	J	K	L
16	2.46 (62.5)	–	0.28 (7)	1.50 (38)	0.31 (8)	/0.30 (7.5)	0.69 (18)	0.31 (08)	– M5	3.15 (80)	2.36 (60)	–	0.10 (2.5)	0.12 (3)	1.22 (31)
20	3.34 (85)	/2.36 (60)	0.55 (14)	2.13/2.32 (54/59)	0.71 (18)	/0.26 (6.5)	0.91 (23)	0.31 (08)	1/8 NPT G1/8	4.33 (110)	3.15 (80)	1.57 (40)	0.14/0.30 (3.5/7.5)	0.17 (4.2)	1.65 (42)
25	3.93 (100)	/2.76 (70)	0.47 (12)	2.36/2.66 (60/67.5)	0.79 (20)	/0.37 (9.5)	0.91 (23)	0.57 (14.5)	1/8 NPT G1/8	5.12 (130)	3.54 (90)	1.77 (45)	/0.20 (5)	0.18 (4.5)	2.05 (52)
32	4.72 (120)	/3.54 (90)	0.63 (16)	3.00/3.23 (76/82)	0.98 (25)	/0.61 (15.5)	1.06 (27)	0.41 (10.5)	1/4 NPT G1/4	6.30 (160)	4.72 (120)	2.36 (60)	/0.20 (5)	0.24 (6)	2.52 (64)
40	5.91 (150)	/4.72 (120)	0.60 (15)	3.54/3.84 (90/97.5)	0.98 (25)	/0.65 (16.5)	1.18 (30)	0.45 (11.5)	1/4 NPT G1/4	8.46 (215)	6.30 (160)	3.15 (80)	/0.20 (5)	0.24 (6)	3.11 (79)
50	7.09 (180)	/6.30 (160)	0.79 (20)	4.33/4.61 (110/117)	0.98 (25)	/0.94 (24)	1.38 (35)	0.55 (14)	3/8 NPT G3/8	9.84 (250)	7.48 (190)	3.74 (95)	/0.26 (6.5)	0.32 (8)	3.62 (92)
63	8.46 (215)	/7.48 (190)	0.79 (20)	4.92/5.39 (125/137)	0.98 (25)	/1.00 (25.5)	1.57 (40)	0.67 (17)	1/2 NPT G1/2	12.60 (320)	9.45 (240)	4.72 (120)	/0.30 (7.5)	0.32 (8)	4.33 (110)
80	10.23 (260)	9.45 (240)	0.94 (24)	6.06/6.50 (154/165)	0.98 (25)	/1.50 (38)	1.77 (45)	0.67 (17)	1/2 NPT G1/2	15.35 (390)	11.81 (300)	5.91 (150)	0.35/0.39 (9/10)	0.47 (12)	5.12 (130)

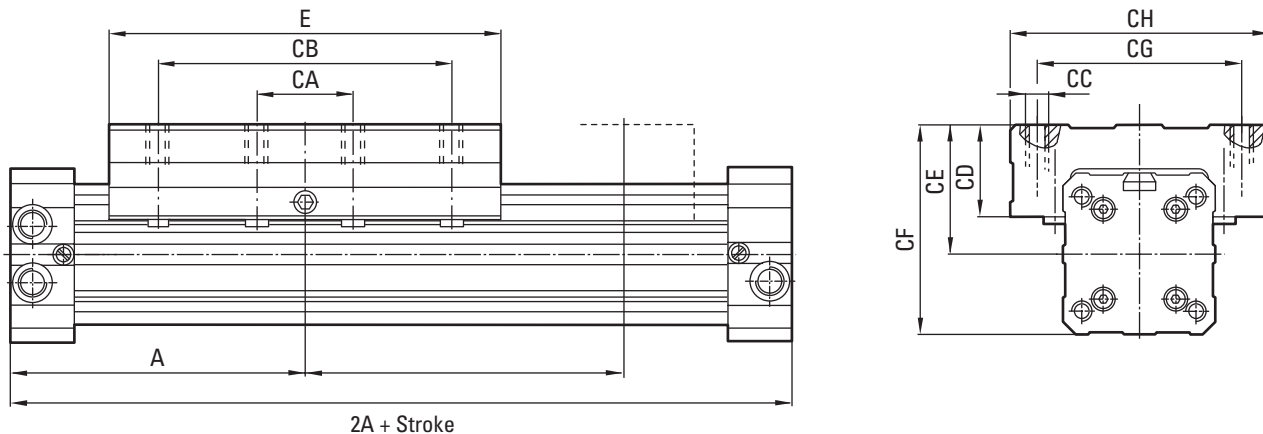
BORE	M	N	O	O1	P	P1	R	R1	R2	S	S1	T	U	W	Y	Z
16	0.71 (18)	M3	0.98 (25)	1.26 (32)	0.47 (12)	–	1.06 (27)	1.22 (31)	/0.73 (18.5)	0.63 (16)	0.22 (5.5)	M3x5 deep	–	–	0.16/0.20 (4/5)	0.63 (16.3)
20	1.06/1.06 (27/27)	M5	1.26 (32)	1.50 (38)	0.73 (18.5)	–	1.57 (40)	1.57 (40)	/0.94 (24)	1.26 (32)	0.16 (4)	M5x12 deep	–	–	0.47 (12)	0.85 (21.5)
25	1.26/1.26 (32/32)	M5	1.57 (40)	1.77 (45)	0.63 (16)	0.30 (7.5)	1.89 (48)	1.89 (48)	/1.34 (34)	1.46 (37)	0.22 (5.5)	M5x13 deep	–	1.30 (33)	0.28/0.47 (7/12)	0.67 (17)
32	1.77/1.77 (45/45)	M5	2.05 (52)	2.05 (52)	0.79 (20)	0.39 (10)	2.36 (60)	2.36 (60)	/1.67 (42.5)	1.85 (47)	0.26 (6.5)	M6x15 deep	–	1.57 (40)	0.31/0.47 (8/12)	0.79 (20)
40	1.77/1.77 (45/45)	M6	2.56 (65)	2.56 (65)	0.79 (20)	0.39 (10)	2.95 (75)	2.95 (75)	/1.95 (49.5)	2.28 (58)	0.33 (8.5)	M8x20 deep	–	1.97 (50)	0.31/0.47 (8/12)	0.98 (25)
50	1.97/1.97 (50/50)	M8	3.15 (80)	3.15 (80)	0.98 (25)	0.51 (13)	3.54 (90)	3.54 (90)	/2.30 (58.5)	2.76 (70)	0.39 (10)	M8x25 deep	–	2.36 (60)	0.43/0.67 (11/17)	1.18 (30)
63	1.97/1.97 (50/50)	M8	3.74 (95)	3.74 (95)	0.98 (25)	0.55 (14)	4.13 (105)	4.13 (105)	/2.68 (68)	3.31 (84)	0.41 (10.5)	M10x25 deep	–	2.76 (70)	0.43/0.79 (11/20)	1.38 (35)
80	1.97/1.97 (50/50)	M10	4.72 (120)	4.72 (120)	0.98 (29)	–	5.12 (130)	5.12 (130)	/3.20 (81)	3.94 (100)	0.59 (15)	M12x25 deep	0.43 (11)	3.54 (90)	0.60/0.98 (15/25)	1.57 (40)

Dimensions in inches (mm)

# Series RL Carriage Options

## Roller Guided Carriage

### Code C – Cylinders with precision roller guide



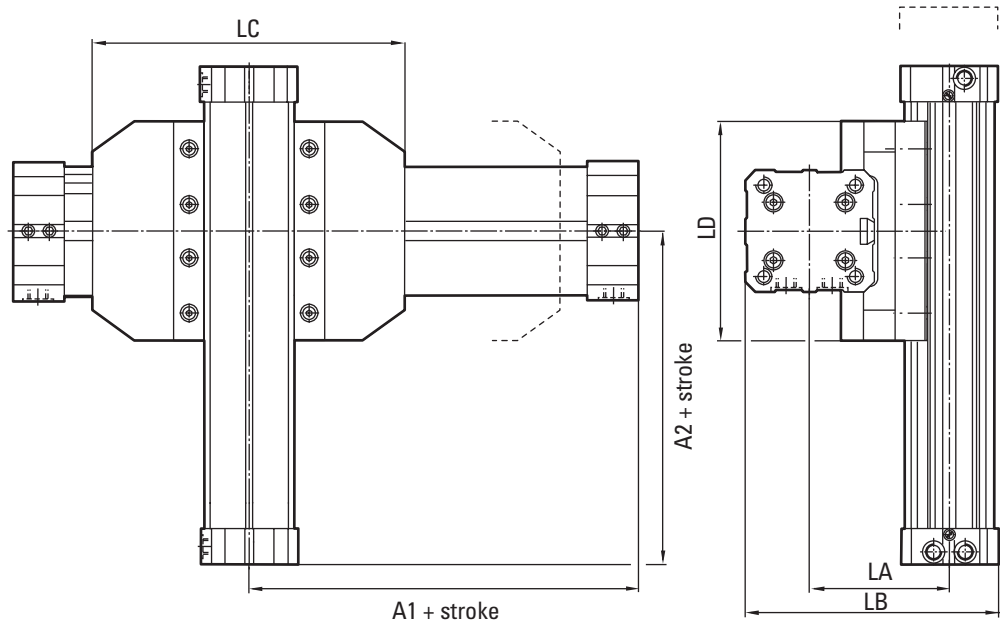
<b>BORE</b>	<b>A</b>	<b>CA</b>	<b>CB</b>	<b>CC</b>	<b>CD</b>	<b>CE</b>	<b>CF</b>	<b>CG</b>	<b>CH</b>	<b>E</b>
25	3.94	1.77	3.54	M6x14 deep	1.42	1.65	2.60	2.36	3.35	5.12
	(100)	(45)	(90)		(36)	(42)	(66)	(60)	(85)	(130)
32	4.72	2.36	4.72	M8x16 deep	1.50	1.97	3.15	2.95	3.86	6.30
	(120)	(60)	(120)		(38)	(50)	(80)	(75)	(98)	(160)
40	5.91	3.15	5.91	M8x16 deep	1.65	2.26	3.74	3.62	4.65	8.46
	(150)	(80)	(150)		(42)	(57.5)	(95)	(92)	(118)	(215)
50	7.09	3.54	7.09	M10x20 deep	1.73	2.64	4.41	3.94	5.20	9.84
	(180)	(90)	(180)		(44)	(67)	(112)	(100)	(132)	(250)
63	8.46	4.72	9.45	M10x20 deep	1.85	2.93	5.00	4.33	5.51	12.60
	(215)	(120)	(240)		(47)	(74.5)	(127)	(110)	(140)	(320)

Dimensions in inches (mm)

# Series RL Carriage Options

## Right Angle Mounting System, Swinging Bridge

### Code D – Right angle mounting system

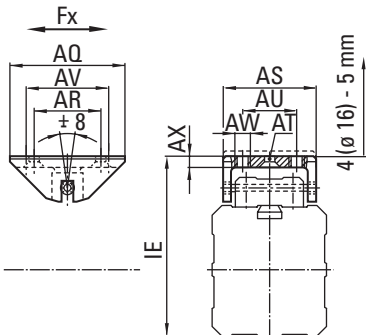


### Externally Guided Right Angle Mounting System

BORE	A1	A2	LA	LB	LC	LD
25	3.9 (100)	3.9 (100)	2.7 (69)	4.6 (117)	5.1 (130)	5.1 (130)
25						
32	4.7 (120)	4.7 (120)	3.3 (84)	5.7 (144)	6.3 (160)	6.3 (160)
32						
40	5.9 (150)	5.9 (150)	3.8 (97)	6.8 (172)	8.5 (215)	8.5 (215)
40						
50	7.1 (180)	7.1 (180)	4.6 (116)	8.1 (206)	9.8 (250)	9.8 (250)
50						

Dimensions in inches (mm)

### Code H – Swinging bridge



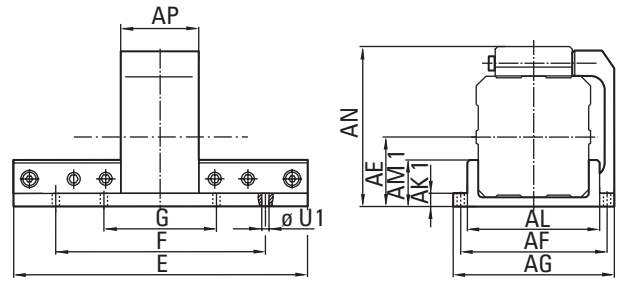
BORE	AQ	AR	AS	AT	AU	AV	AW	AX	IE	FX (N)
16	1.57 (40)	– –	1.02 (26)	– –	0.47 (12)	1.18 (30)	M4	0.16 (4)	1.89 +.16 (48 +4)	3.94 (100)
20	1.97 (50)	1.38 (35)	1.50 (38)	DIN74-Bm5	0.79 (20)	1.57 (40)	M5	0.20 (5)	2.58 +.20 (65.5 +5)	5.91 (150)
25	2.36 (60)	1.57 (40)	1.73 (44)	DIN74-Bm5	0.79 (20)	1.77 (45)	M5	0.20 (5)	2.76 +.20 (70 +5)	9.84 (250)
32	3.15 (80)	1.97 (50)	2.32 (59)	DIN74-Bm6	1.18 (30)	2.36 (60)	M6	0.22 (5.5)	3.48 +.20 (88.5 +5)	16.14 (410)
40	3.15 (80)	1.97 (50)	2.32 (59)	DIN74-Bm6	1.18 (30)	2.36 (60)	M6	0.22 (5.5)	4.04 +.20 (102.5 +5)	25.20 (640)
50	3.94 (100)	2.36 (60)	2.56 (65)	DIN74-Bm8	1.57 (40)	3.15 (80)	M8	0.26 (6.5)	4.88 +.20 (124 +5)	39.37 (1000)
63	3.94 (100)	2.36 (60)	2.56 (65)	DIN74-Bm8	1.57 (40)	3.15 (80)	M8	0.26 (6.5)	5.47 +.20 (139 +5)	59.06 (1500)
80	3.94 (100)	2.36 (60)	2.56 (65)	DIN74-Bm8	1.57 (40)	3.15 (80)	M8	0.26 (6.5)	6.63 +.20 (168.5 +5)	94.49 (2400)

Dimensions in inches (mm)

Note: Additional dimensions available as custom cylinders

# Series RL Carriage Options

## Carriage Plate Mounting, Side Mounting Plate

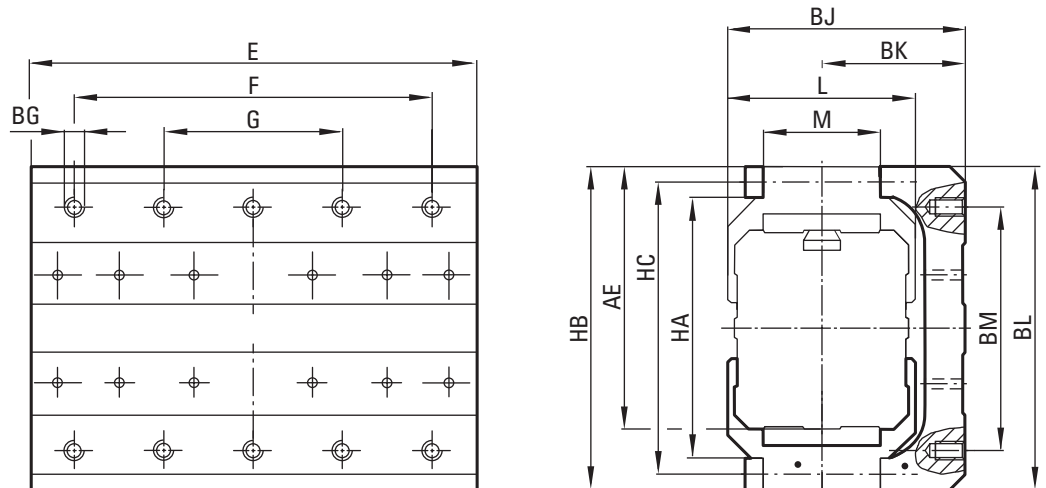


### Code G – Carriage plate mounting

BORE	AE	AF	AG	AK1	AL	AM1	AN	AP	E	F	G	U1
16	0.63 (16)	1.57 (40)	1.97 (50)	0.14 (3.5)	1.22 (31)	0.33 (8.5)	1.59 (40.5)	1.18 (30)	3.15 (80)	2.36 (60)	-	0.22 (5.5)
20	0.85 (21.5)	2.05 (52)	2.44 (62)	0.22 (5.5)	1.65 (42)	0.57 (14.5)	2.20 (56)	1.42 (36)	4.33 (110)	3.15 (80)	1.57 (5.5)	0.22 (06)
25	1.04 (26.5)	2.44 (62)	2.95 (75)	0.22 (5.5)	2.05 (52)	0.69 (17.5)	2.46 (62.5)	1.77 (45)	5.12 (130)	3.54 (90)	1.77 (45)	0.26 (6.6)
32	1.30 (33)	3.07 (78)	3.62 (92)	0.26 (6.5)	2.52 (64)	0.71 (18)	3.11 (79)	2.17 (55)	6.30 (160)	4.72 (120)	2.36 (60)	0.35 (09)
40	1.59 (40.5)	3.70 (94)	4.41 (112)	0.30 (7.5)	3.19 (81)	0.94 (24)	3.66 (93)	2.56 (65)	8.46 (215)	6.30 (160)	3.15 (80)	0.35 (09)
50	1.93 (49)	4.41 (112)	5.20 (132)	0.31 (08)	3.70 (94)	0.98 (25)	4.49 (114)	2.95 (75)	9.84 (250)	7.48 (190)	3.74 (95)	0.43 (11)
63	2.26 (57.5)	5.20 (132)	5.91 (150)	0.39 (10)	4.41 (112)	1.26 (32)	5.12 (130)	3.54 (90)	12.60 (320)	9.45 (240)	4.72 (120)	0.51 (13)
80	2.76 (70)	6.10 (155)	7.09 (180)	0.39 (10)	5.20 (132)	1.26 (32)	6.26 (159)	3.94 (100)	15.35 (390)	11.81 (300)	5.91 (150)	0.55 (14)

Dimensions in inches (mm)

### Code F – Side mounting plate




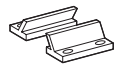




BORE	AE	BG	BJ	BK	BL	BM	E	F	G	HA	HB	HC	L	M
16	1.50 (38)	-	-	-	-	-	3.15 (80)	-	-	-	1.93 (49)	-	-	0.71 (18)
20	2.32 (59)	M5x10 deep	2.13 (54)	1.30 (33)	3.07 (78)	2.17 (55)	4.33 (110)	-	1.57 (40)	2.52 (64)	3.11 (79)	2.52 (64)	1.65 (42)	1.06 (27)
25	2.66 (67.5)	M5x10 deep	2.48 (63)	1.46 (37)	3.39 (86)	2.56 (65)	5.12 (130)	3.15 (80)	1.77 (45)	3.03 (77)	3.43 (87)	3.03 (77)	2.05 (52)	1.26 (32)
32	3.23 (82)	M5x12 deep	3.03 (77)	1.77 (45)	4.06 (103)	3.15 (80)	6.30 (160)	3.54 (90)	2.36 (60)	3.70 (94)	4.09 (104)	3.70 (94)	2.52 (64)	1.77 (45)
40	3.84 (97.5)	M6x12 deep	3.86 (98)	2.30 (58.5)	4.69 (119)	3.54 (90)	8.46 (215)	4.72 (120)	3.15 (80)	4.33 (110)	4.72 (120)	4.33 (110)	3.11 (79)	1.77 (45)
50	4.61 (117)	M6x15 deep	4.63 (117.5)	2.81 (71.5)	5.63 (143)	4.72 (120)	9.84 (250)	6.30 (160)	3.74 (95)	5.16 (131)	5.67 (144)	5.16 (131)	3.62 (92)	1.97 (50)
63	5.39 (137)	M8x20 deep	5.49 (139.5)	3.33 (84.5)	6.61 (168)	5.51 (140)	12.60 (320)	7.48 (190)	4.72 (120)	6.02 (153)	6.65 (169)	6.06 (154)	4.33 (110)	1.97 (50)
80	6.50 (165)	-	-	-	-	-	15.35 (390)	9.45 (240)	-	-	7.87 (200)	-	-	1.97 (50)

Dimensions in inches (mm)

# Series RL Accessories

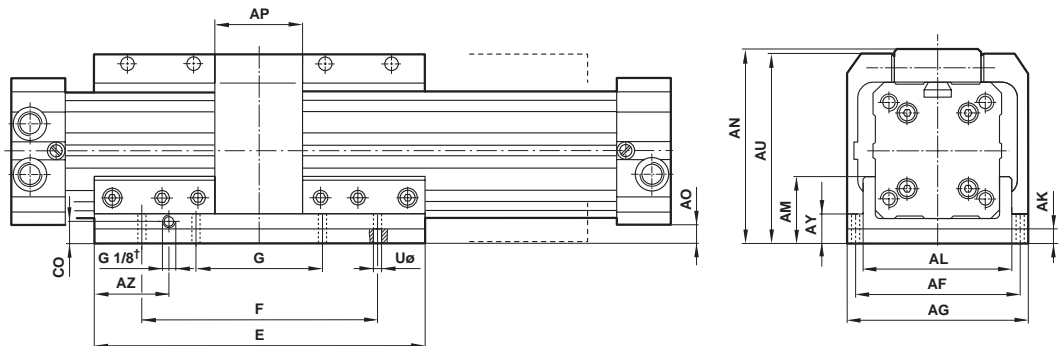
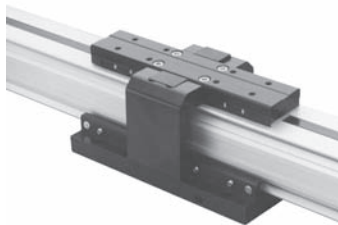
## Mountings

	END LUG MOUNT	SWINGING BRIDGE*	CARRIAGE MOUNTING PLATE*	CENTER SUPPORT	SECONDARY CARRIAGE**	SIDE MOUNTING PLATE**
						
<b>BORE</b>						
16	RL/46016/21	RL/46016/37	RL/46016/34	RL/46016/32	RL/46016/35	—
20	RL/46020/21	RL/46020/37	RL/46020/34	RL/46020/32	RL/46020/35	RL/46020/36
25	RL/46025/21	RL/46025/37	RL/46025/34	RL/46025/32	RL/46025/35	RL/46025/36
32	RL/46032/21	RL/46032/37	RL/46032/34	RL/46032/32	RL/46032/35	RL/46032/36
40	RL/46040/21	RL/46040/37	RL/46040/34	RL/46040/32	RL/46040/35	RL/46040/36
50	RL/46050/21	RL/46050/37	RL/46050/34	RL/46050/32	RL/46050/35	RL/46050/36
63	RL/46063/21	RL/46063/37	RL/46063/34	RL/46063/32	RL/46063/35	RL/46063/36
80	RL/46080/21	RL/46080/37	RL/46080/34	RL/46080/32	RL/46080/35	—

\* Suitable for internally guided models only. \*\* Suitable for external guided models only.

Dimensions in inches (mm)

## Active Holding Brake System



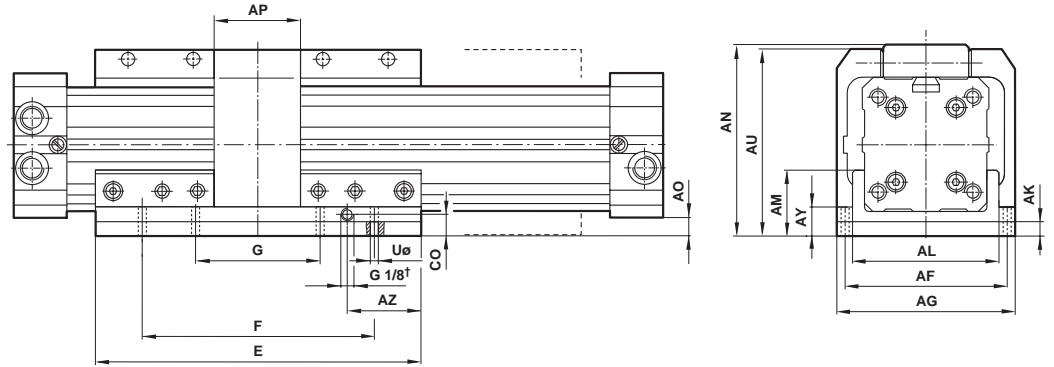
BORE	25 MM	32 MM	40 MM	50 MM	63 MM
NPT	RLC/46025B/L3/*	RLC/46032B/L3/*	RLC/46040B/L3/*	RLC/46050B/L3/*	RLC/46063B/L3/*
ISO	RLM/46025B/L3/*	RLM/46032B/L3/*	RLM/46040B/L3/*	RLM/46050B/L3/*	RLM/46063B/L3/*
AF	2.44 (62)	3.07 (78)	3.70 (94)	4.41 (112)	5.20 (132)
AG	2.95 (75)	3.62 (92)	4.41 (112)	5.20 (132)	5.91 (150)
AK	0.48 (12)	0.48 (12)	0.48 (12)	0.48 (12)	0.48 (12)
AL	2.05 (52)	2.52 (64)	3.19 (81)	3.70 (94)	4.41 (112)
AM	1.12 (28.5)	1.14 (29)	1.36 (34.5)	1.40 (35.5)	1.67 (42.5)
AN	2.89 (73.5)	3.54 (90)	4.07 (103.5)	4.90 (124.5)	5.53 (140.5)
AO	0.53 (13.5)	0.55 (14)	0.53 (13.5)	0.57 (14.5)	0.61 (15.5)
AP	1.77 (45)	2.17 (55)	2.56 (65)	2.95 (75)	3.54 (90)
AU	2.87 (73)	3.52 (89.5)	4.06 (103)	4.88 (124)	5.51 (140)
AY	0.65 (16.5)	0.69 (17.5)	0.71 (18)	0.73 (18.5)	0.81 (20.5)
AZ	1.18 (30)	1.28 (32.5)	2.07 (52.5)	2.56 (65)	4.53 (115)
CO	0.63 (16)	0.71 (18)	0.71 (18)	0.94 (24)	0.94 (24)
E	5.12 (130)	6.30 (160)	8.46 (215)	9.84 (250)	12.60 (320)
F	3.54 (90)	4.72 (120)	6.30 (160)	7.48 (190)	9.45 (240)
G	—	2.36 (60)	3.15 (80)	3.74 (95)	4.72 (120)
UØ	0.26 (6.6)	0.35 (9)	0.35 (9)	0.43 (11)	0.51 (13)

\* Stroke length (inches)

Dimensions in inches (mm)

# Series RL Accessories

## Passive Holding Brake System



BORE NPT ISO	25 MM RLC/46025B/L4/* RLM/46025B/L4/*	32 MM RLC/46032B/L4/* RLM/46032B/L4/*	40 MM RLC/46040B/L4/* RLM/46040B/L4/*	50 MM RLC/46050B/L4/* RLM/46050B/L4/*	63 MM RLC/46063B/L4/* RLM/46063B/L4/*
AF	2.44 (62)	3.07 (78)	3.70 (94)	4.41 (112)	5.20 (132)
AG	2.95 (75)	3.62 (92)	4.41 (112)	5.20 (132)	5.91 (150)
AK	0.39 (10)	0.47 (12)	0.47 (12)	0.71 (18)	0.71 (18)
AL	2.05 (52)	2.52 (64)	3.19 (81)	3.31 (84)	4.41 (112)
AM	1.52 (38.5)	1.61 (41)	1.83 (46.5)	2.11 (53.5)	2.38 (60.5)
AN	3.29 (83.5)	4.02 (102)	4.55 (115.5)	5.61 (142.5)	6.24 (158.5)
AO	0.93 (23.5)	1.02 (26)	1.00 (25.5)	1.28 (32.5)	1.32 (33.5)
AP	1.77 (45)	2.17 (55)	2.56 (65)	2.95 (75)	3.54 (90)
AU	3.27 (83)	4.00 (101.5)	4.53 (115)	5.59 (142)	6.22 (158)
AY	1.04 (26.5)	1.16 (29.5)	1.18 (30)	1.44 (36.5)	1.52 (38.5)
AZ	1.18 (30)	1.28 (32.5)	2.07 (52.5)	2.56 (65)	4.53 (115)
CO	0.63 (16)	0.71 (18)	0.71 (18)	0.94 (24)	0.94 (24)
E	5.12 (130)	6.30 (160)	8.46 (215)	9.84 (250)	12.60 (320)
F	3.54 (90)	4.72 (120)	6.30 (160)	7.48 (190)	9.45 (240)
G	—	2.36 (60)	3.15 (80)	3.74 (95)	4.72 (120)
UØ	0.26 (6.6)	0.35 (9)	0.35 (9)	0.43 (11)	0.51 (13)

\* Stroke length (inches)  
Dimensions in inches (mm)

# Series RL Technical Information

## Operating Temperature

-22° to 180°F\* (-30°C to 80°C)

\*With dewpoint of supply air less than ambient air temperature.

## Operating Pressure

16 mm: 22 to 150 psi  
(1.5 to 10 bar)

20 mm to 80 mm: 15 to 150 psi  
(1 to 10 bar)

<b>BORE SIZES:</b>	<b>AREA (SQ. IN.)</b>
16 mm bore — 0.63"	.31
20 mm bore — 0.79"	.49
25 mm bore — 0.98"	.75
32 mm bore — 1.26"	1.25
40 mm bore — 1.57"	1.94
50 mm bore — 1.97"	3.05
63 mm bore — 2.48"	4.83
80 mm bore — 3.15"	7.79

## Stroke lengths:

16 mm to 40 mm bore - to 28 ft. (8500 mm)

50 mm and 63 mm bore - to 23 ft. (7000)

80 mm bore - to 18 ft. (5500 mm)

**Supply Fluid:** Compressed air filtered to 50-microns and lubricated.

## Materials of Construction

Tube and Carriage: Anodized aluminum

End Caps: 16 mm - molded plastic end caps and yoke.  
20 mm - anodized aluminum end covers, molded plastic yoke.  
25 to 80 mm - anodized aluminum end caps and yoke.

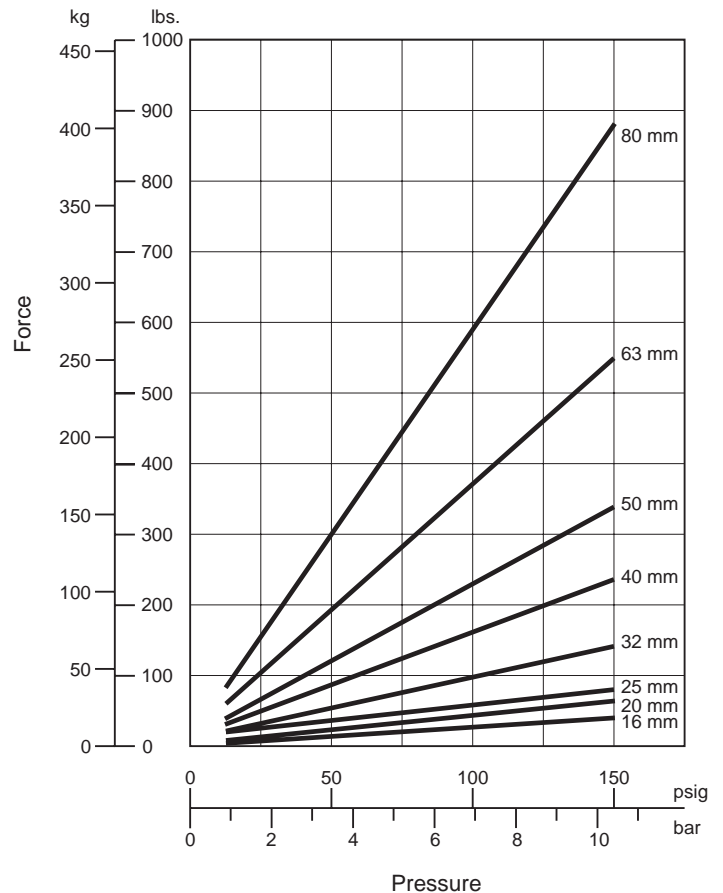
Seal Strips and Piston Seals: Polyurethane

Cover Strips: Polyamide

Guide Rails: UHMW Polymer

Seals: Nitrile rubber or Polyurethane

## THRUST – Based on 75% of Maximum Thrust



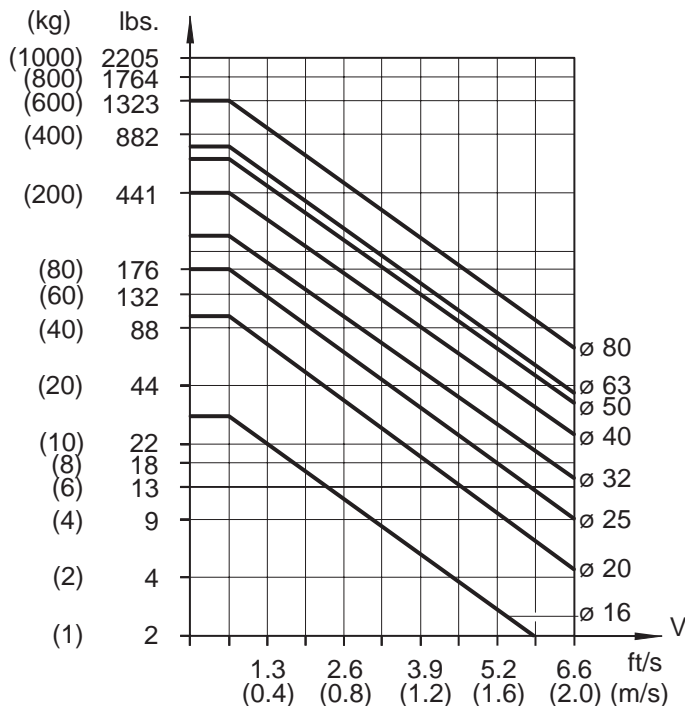


# Series RL Technical Information

## Cushioning Performance

The dynamic energy of a RL cylinder is caused by direct or partial external loads which must be absorbed by pneumatic cushioning. The cushioning ability depends to a large extent on the pneumatic circuit (e. g. counter pressure, pre-exhaust). The values given in the diagram were tested with an operation pressure of 87 psi (6 bar)

using a 5/2 control valve. When installed horizontally, depending upon the speed, dynamic energy can be absorbed by the cylinder. Whenever the values given in the diagram are exceeded, the transported mass must be cushioned by additional shock absorbers. These have to be located at the center of gravity of the mass.



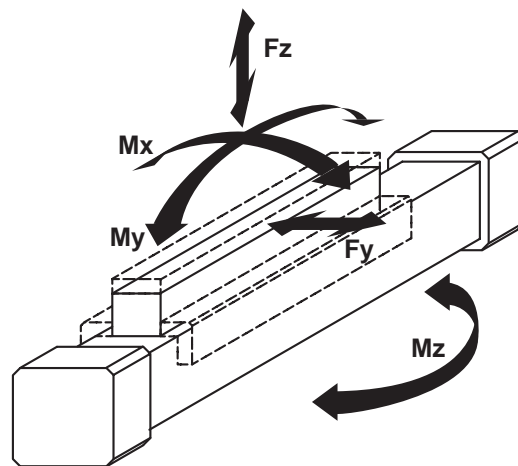
## Loading values for RL cylinders

The values given in the table below show the single forces in the directions Fy and Fz and the maximum moments Mx, My and Mz. All values are applicable only for speeds of max. 0.66 ft/s (0.2 m/s). A requirement for using these values is a constant movement (no jerking) of the mass over the whole stroke length of the cylinder. The reference point from which the moments for all cylinders should be calculated is the centerline of the piston.

### Total loads

When a Lintra cylinder has to take several loads and moments, an additional calculation is necessary using this formula:

$$\frac{M_x}{M_{x \max}} + \frac{M_y}{M_{y \max}} + \frac{M_z}{M_{z \max}} + \frac{F_y}{F_{y \max}} + \frac{F_z}{F_{z \max}} \leq 1$$



# Series RL Technical Information

## Cylinder Weights

### Cylinder with Internal Guide

BORE	MOUNTING CODES:		
	01 SIDE LUG	03 END LUG	24 NO MOUNT
16	.37 (0.17)	.37 (0.17)	.35 (0.16)
20	1.17 (0.53)	1.17 (0.53)	1.10 (0.50)
25	1.75 (0.81)	1.85 (2.74)	1.76 (0.80)
32	3.75 (1.70)	3.68 (1.67)	3.53 (1.60)
40	6.39 (2.90)	6.39 (2.90)	5.95 (2.70)
50	11.24 (5.10)	6.39 (2.90)	10.58 (4.80)
63	16.76 (7.60)	11.24 (5.10)	15.88 (7.20)
80	29.99 (13.60)	29.99 (13.60)	29.11 (13.20)

### Cylinder with Roller Carriage:

BORE	MOUNTING CODES:		
	01 SIDE LUG	03 END LUG	24 NO MOUNT
16	—	—	—
20	—	—	—
25	3.77 (1.71)	3.84 (1.74)	3.75 (1.70)
32	7.06 (3.20)	6.99 (3.17)	6.84 (3.10)
40	11.47 (5.20)	11.47 (5.20)	11.03 (5.00)
50	20.73 (9.40)	20.73 (9.40)	20.07 (9.10)
63	31.53 (14.30)	31.53 (14.30)	30.65 (13.90)
80	—	—	—

### Cylinder with External Guide

BORE	MOUNTING CODES:		
	01 SIDE LUG	03 END LUG	24 NO MOUNT
16	.42 (0.19)	.42 (0.19)	.40 (0.18)
20	1.39 (0.63)	1.39 (0.63)	1.32 (0.60)
25	2.00 (0.91)	2.07 (0.94)	1.98 (0.90)
32	3.97 (1.80)	3.90 (1.77)	3.75 (1.70)
40	6.83 (3.10)	6.83 (3.10)	6.39 (2.90)
50	11.46 (5.20)	11.46 (5.20)	10.80 (4.90)
63	17.86 (8.10)	17.86 (8.10)	16.98 (7.70)
80	30.43 (13.80)	30.43 (13.80)	29.55 (13.40)

### Cylinder with Right Angle Mounting

BORE	MOUNTING CODES:		
	01 SIDE LUG	03 END LUG	24 NO MOUNT
16	—	—	—
20	—	—	—
25	4.21 (1.91)	4.28 (1.94)	4.19 (1.90)
32	7.06 (3.20)	6.99 (3.17)	6.84 (3.10)
40	12.34 (5.60)	12.34 (5.60)	11.90 (5.40)
50	24.48 (8.70)	24.48 (8.70)	23.82 (8.40)
63	—	—	—

Cylinder weights lbs (kgs)

# Series BL Features

## Series BL Features / Benefits

### A. Piston Seals

Lip-type carboxylated nitrile incorporating Teflon® and other non-lube additives as integral parts of the compound. Extremely smooth stroke performance and “no lube added” operation results from reduced friction.

### B. Piston

Solid aluminum alloy, light-weight for low inertia, yet strong.

### C. Head/Cap

Precision machined from (6061-T6) solid aluminum bar, anodized for corrosion resistance

### D. Rod Wiper

Lip-type urethane aggressively wipes foreign material from piston rod.

### E. Rod Seals

Rounded lip-type carboxylated nitrile incorporating Teflon® and other non-lube additives as integral parts of the compound. Extremely smooth stroke performance and “no lube added” operation results from reduced friction. Rod Seal is pressure-energized and wear-compensating.

### F. Piston Rods

High-strength, hard-chrome plated, ground and polished steel.

### G. Ultra Cushion®

State-of-the-art design features a unique, one-piece, nitrile compound seal, captured within a precision machined groove. Linear and radial “float” of cushion seal eliminates misalignment. Ultra

Cushions provide exceptionally fast “out of cushion” stroke reversal. (Head and Cap Cushions are optional.)

### H. Adjustable Captive Cushion Needle

### I. Wear Strip

Teflon® and graphite composition for minimum friction, maximum wear and side load resistance. (Magnetic band under wear strip optional.)

### J. Tube

6063-T832 aluminum alloy ideally suited for air service. Tube is clear anodized on the O.D. and “hard anodic coated” on the I.D. resulting in a smooth, file-hard (60RC), corrosion-resistant and score-resistant surface finish.

### K. Tie Rods

High-strength steel maintains compression on tube end seals.

### L. Retainer

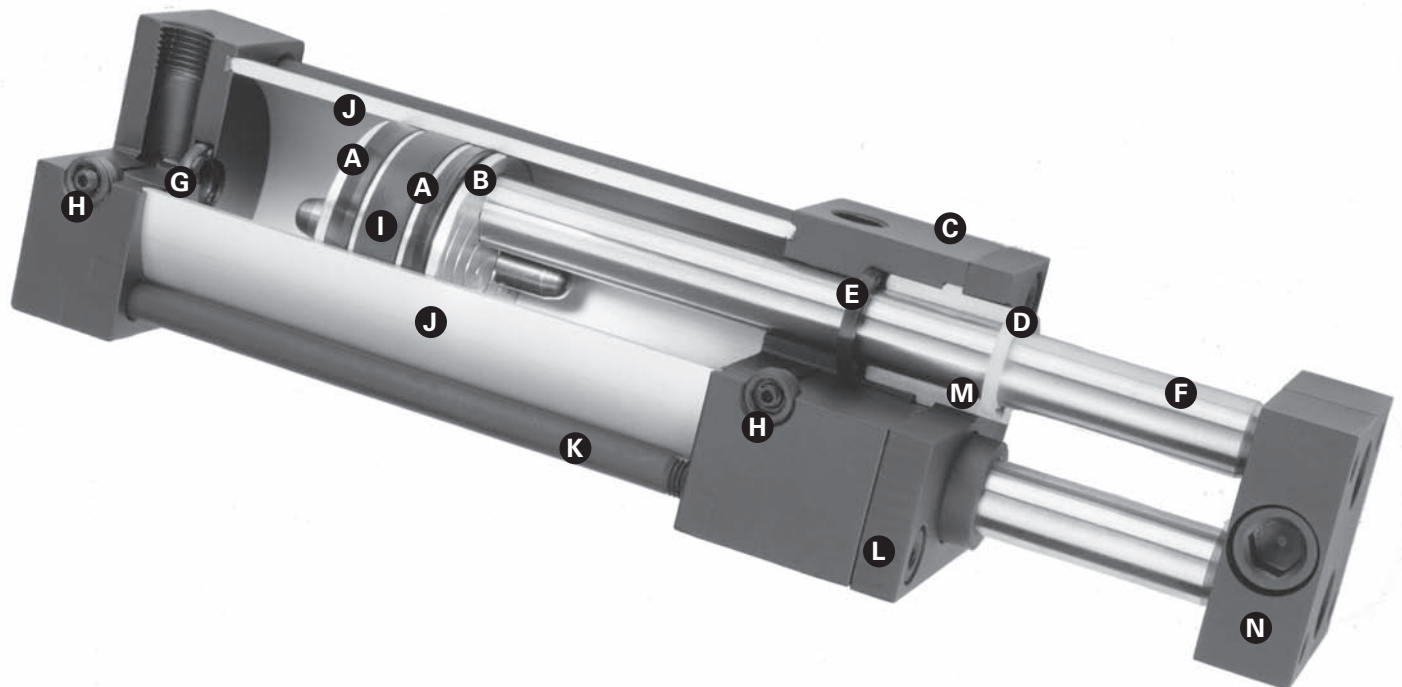
High-strength steel is used to retain rod bearings.

### M. Rod Bearings

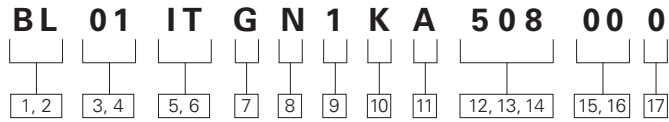
Machined from durable, close-grained cast iron, then completely coated with Teflon® to insure permanent lubrication and corrosion resistance.

### N. Tooling Plate

Machined from solid steel and notched for secure attachment. Modular and pilot adaptor plates are available to add to the tooling plate mounting. (Use of modular and pilot adapter plates adds to overall length.)



# Series BL Model Code



**1, 2 Series**

**BL** – Non-Rotating Cylinders

**3, 4 Mounting Styles**

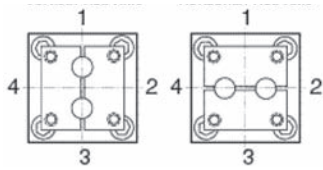
- 01** – Side Lug -
- 02** – Side Tapped MS4
- 07** – Head Rectangular Flange MF1
- 12** – Cap Rectangular Flange MF2
- 24** – No Mount MX0
- 25** – Double Rod, Side Lug -
- 26** – Double Rod, Tapped -
- 31** – Double Rod, Rectangular Flange -
- 41** – Double Rod, No Mount -
- 48** – Detachable Eye MP4
- 50** – Detachable Clevis MP2
- XX** – Custom

**5, 6 Bore and Rod Size Combinations**

Code	Bore(in)	Rod(in)
<b>IT</b>	1-1/8	5/16
<b>CA</b>	1-1/2	3/8
<b>DC</b>	2	5/8
<b>EC</b>	2-1/2	5/8
<b>GE</b>	3-1/4	1
<b>HE</b>	4	1

**7 Rod End Type**

- Code Type**
- G** Grooved Rod End Horizontal
  - V** Grooved Rod End Vertical



**8 Seal Options**

- N** – Normal, Standard
- T** – High Temperature

**9 Port Options**

- 1** – NPTF Standard

**10 Port Locations**

Code	Head	Cap
<b>K</b>	1	1
<b>R</b>	2	2
<b>W</b>	3	3
<b>4</b>	4	4

**11 Cushion Location**

Cushions are located as shown in Rod end type section when viewing cylinder from head end (mounting end of double rod cylinders). “-” in table indicates no cushion.

Code	Head	Cap
<b>A</b>	-	-
<b>B</b>	-	1
<b>C</b>	-	2
<b>D</b>	-	3
<b>E</b>	-	4
<b>F</b>	1	-
<b>G</b>	2	-
<b>H</b>	3	-
<b>J</b>	4	-
<b>K</b>	1	1
<b>R</b>	2	2
<b>S</b>	2	3
<b>T</b>	2	4
<b>V</b>	3	2
<b>W</b>	3	3
<b>Y</b>	3	4
<b>4</b>	4	4

**Double Rod Cylinders:**

“Head” = “Mounting End”  
“Cap” = Non-mounting End

\* Cushions not available on 1-1/8" bore

**12, 13, 14 Cylinder Stroke**

Items 12 and 13 indicate stroke length from 00 inches through 99 inches.

Item 14 indicates fraction of an inch per the following codes:

Code	Fraction	Code	Fraction
0	0	8	1/2
1	1/16	9	9/16
2	1/8	A	5/8
3	3/16	B	11/16
4	1/4	C	3/4
5	5/16	D	13/16
6	3/8	E	7/8
7	7/16	F	5/16

**15, 16 Extra Rod Projection**

Item 15 indicates inches from 0 thru 9.

Item 16 indicates fraction of an inch per the following codes:

Code	Fraction	Code	Fraction
0	0	8	1/2
1	1/16	9	9/16
2	1/8	A	5/8
3	3/16	B	11/16
4	1/4	C	3/4
5	5/16	D	13/16
6	3/8	E	7/8
7	7/16	F	15/16

– OR –

**Proximity Switch Magnet**

**PK** – Magnet Furnished to operate Hall Effect or Reed Type Switch

– OR –

**Rod Material Options**

**RT** – Stainless Steel 300 Series

– OR –

**Bronze Option**

**BS** – Bronze Scraper

**17 Custom**

**X** – Custom Modification

# Series BL Mounting Styles and Installation Dimensions

## Available Mountings

The variety of NFPA mountings available in the Series BL gives you a broad selection to match the proper mount to your application. Eaton offers rigid mounts (including side lug mounts and flange mounts) and swivel mounts (including clevis mounts). A guide to proper mount selection is provided on pages 106 through 111. For custom mounts, enter "XX" for model code positions 3 and 4, and give a detailed description with drawings. Series BL cylinders are available in all mounting styles listed.

## Selecting the Proper Mounting

Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified. Note: In the mounting information, some mounts have been downrated to minimize deflection. For applications where the motion is linear and parallel to the cylinder rod motion, a rigid mount is recommended. For curvilinear motion, a swivel mount should be chosen. The specifics of each application dictate the correct mounting style.

**Code 24 –  
No Mount (MXO)**



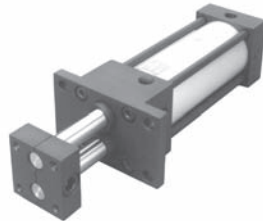
**Code 01 –  
Side Lug**



**Code 02 –  
Side Tapped (MS4)**



**Code 07 – Head  
Rectangular Flange (MF1)**



**Code 12 – Cap Rectangular  
Flange (MF2)**



**Code 48 –  
Detachable Eye (MP4)**



**Code 50 –  
Detachable Clevis (MP2)**



**Code 41 –  
Double Rod, No Mount**



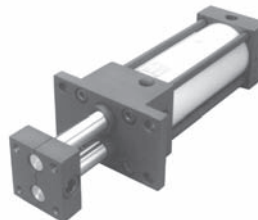
**Code 26  
Double Rod, Tapped with  
Side Tap (MS4)**



**Code 25  
Double Rod, Side Lug**



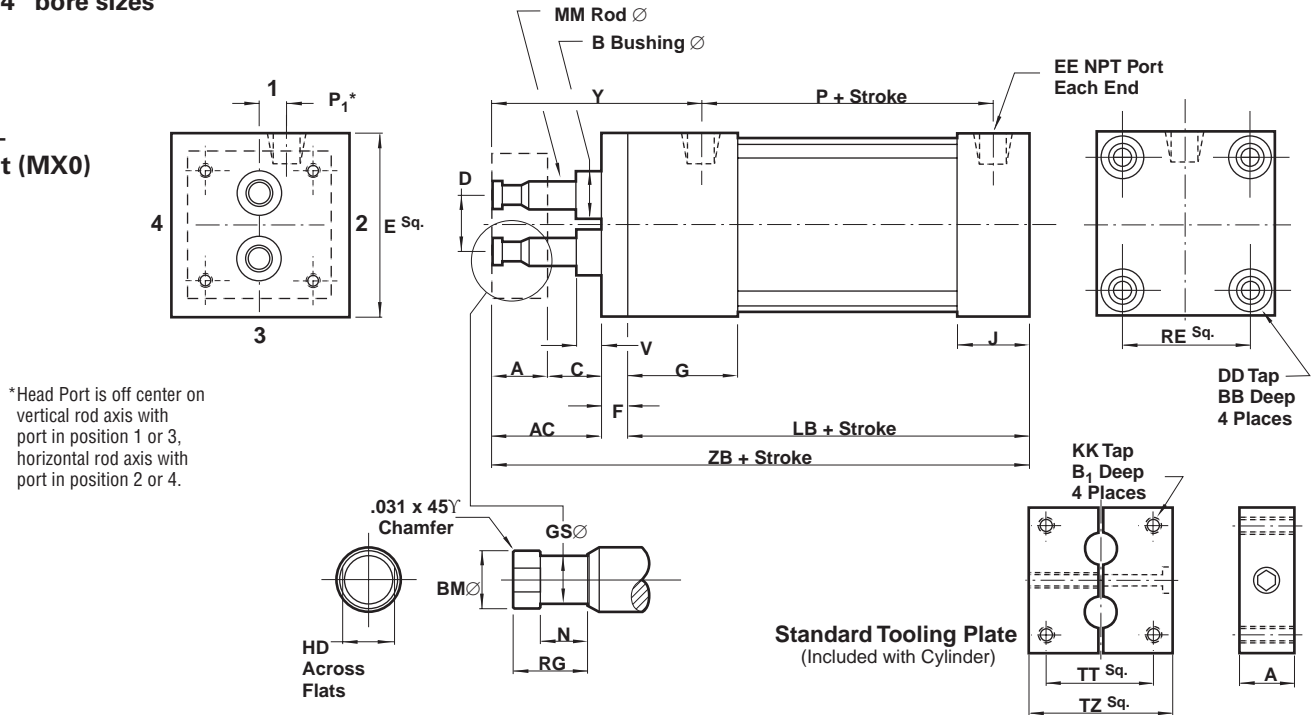
**Code 31 – Double Rod,  
Rectangular Flange with  
Code 12 Flange (MF1)**



# Series BL Mounting Styles and Installation Dimensions

1-1/8" to 4" bore sizes

Code 24 –  
No Mount (MX0)

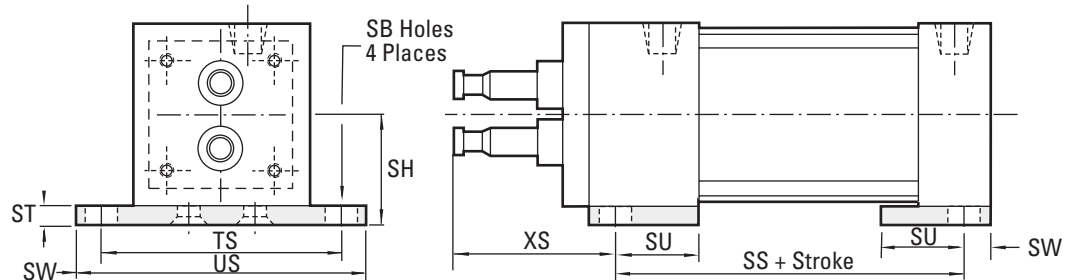


DIMENSION	.1-1/8" BORE (28.58)		.1-1/2" BORE (38.10)		.2" BORE (50.80)		.2-1/2" BORE (63.50)		.3-1/4" BORE (82.55)		.4" BORE (101.60)	
A	.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	1.250	(31.75)	1.250	(31.75)
AC	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)
B	N/A		.590	(14.99)	.900	(22.86)	.900	(22.86)	1.498	(38.05)	1.498	(38.05)
B1	.500	(12.70)	Thru		Thru		Thru		Thru		Thru	
BB	.188	(4.78)	.312	(7.92)	.312	(7.92)	.312	(7.92)	.437	(11.10)	.437	(11.10)
BM	.270	(6.86)	.330	(8.38)	.550	(13.97)	.550	(13.97)	.900	(22.86)	.900	(22.86)
C	.625	(15.88)	.875	(22.23)	.750	(19.05)	1.000	(25.40)	.500	(12.70)	.500	(12.70)
D	.627	(15.93)	.750	(19.05)	1.052	(26.72)	1.398	(35.51)	2.000	(50.80)	2.360	(59.94)
DD	10 – 32		1/4 – 28		5/16 – 24		5/16 – 24		3/8 – 24		3/8 – 24	
E	1.500	(38.10)	2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	4.500	(114.30)
EE	1/8		1/4		1/4		1/4		3/8		3/8	
F	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.625	(15.88)	.625	(15.88)
G	1.000	(25.4)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	1.750	(44.45)
GS	.190	(4.83)	.250	(6.35)	.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)
HD	.250	(6.35)	.312	(7.92)	.500	(12.70)	.500	(12.70)	.812	(20.62)	.812	(20.62)
J	.625	(15.88)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)	1.250	(31.75)
KK	6 – 32		10 – 32		1/4 – 28		5/16 – 24		3/8 – 24		3/8 – 24	
LB	2.250	(57.15)	3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)	4.250	(107.95)
MM	.312	(7.92)	.375	(9.53)	.625	(15.88)	.625	(15.88)	1.000	(25.40)	1.000	(25.40)
N	.400	(10.16)	.400	(10.16)	.526	(13.36)	.526	(13.36)	.784	(19.81)	.784	(19.81)
P	1.469	(37.31)	2.125	(53.98)	2.125	(53.98)	2.250	(57.15)	2.625	(66.68)	2.625	(66.68)
P1	.241	(6.12)	.303	(7.70)	.480	(12.19)	.635	(16.13)	.845	(21.46)	.875	(22.23)
RE	1.125	(28.58)	1.428	(36.27)	1.840	(46.74)	2.192	(55.68)	2.758	(70.05)	3.323	(84.40)
RG	.580	(14.73)	.580	(14.73)	.705	(17.91)	.705	(17.91)	1.205	(30.61)	1.205	(30.61)
TT	.750	(19.05)	1.125	(28.58)	1.430	(36.32)	1.840	(46.74)	1.790	(45.47)	3.440	(87.38)
TZ	1.250	(31.75)	1.500	(38.10)	2.000	(50.80)	2.500	(63.50)	3.250	(82.55)	4.000	(101.60)
V	N/A		.250	(6.35)	.250	(6.35)	.250	(6.35)	.250	(6.35)	.250	(6.35)
Y	2.031	(51.59)	2.875	(73.03)	2.875	(73.03)	3.125	(79.38)	3.437	(87.30)	3.437	(87.30)
ZB	3.750	(95.25)	5.500	(139.70)	5.500	(139.70)	5.875	(149.23)	6.625	(168.28)	6.625	(168.28)

# Series BL Mounting Styles and Installation Dimensions

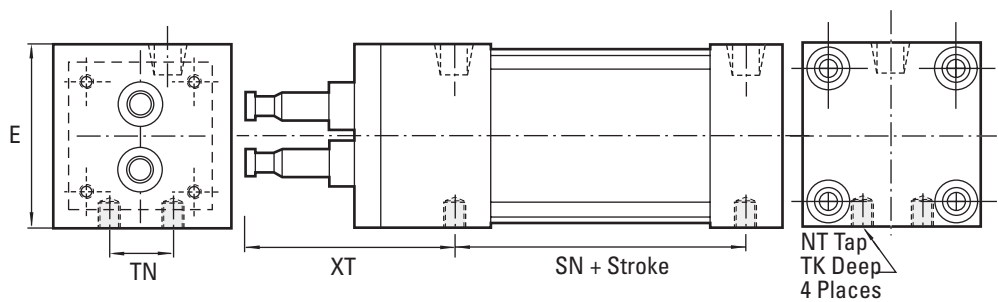
1-1/8" to 4" bore sizes

## Code 01 – Side Lug (not NFPA)



DIMENSION	.1-1/8" BORE (28.58)		.1-1/2" BORE (38.10)		.2" BORE (50.80)		.2-1/2" BORE (63.50)		.3-1/4" BORE (82.55)		.4" BORE (101.60)	
SH	1.000	(25.40)	1.250	(31.75)	1.500	(38.10)	1.875	(47.63)	2.375	(60.33)	2.750	(69.85)
SS	1.750	(44.45)	2.875	(73.03)	2.875	(73.03)	3.000	(76.20)	3.250	(82.55)	3.250	(82.55)
ST	.250	(6.35)	.250	(6.35)	.250	(6.35)	.375	(9.53)	.500	(12.70)	.500	(12.70)
SU	.750	(19.05)	1.125	(25.58)	1.125	(25.58)	1.125	(25.58)	1.250	(31.75)	1.250	(31.75)
SW	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.70)
TS	1.875	(47.63)	2.750	(69.85)	3.250	(82.55)	3.750	(95.25)	4.750	(120.65)	5.500	(139.70)
US	2.375	(60.33)	3.500	(88.90)	4.000	(101.60)	4.500	(114.30)	5.750	(146.05)	6.500	(165.10)
XS	1.750	(44.45)	2.250	(57.15)	2.250	(57.15)	2.500	(63.50)	2.875	(73.03)	2.875	(73.03)

## Code 02 – Side Tapped (MS4)



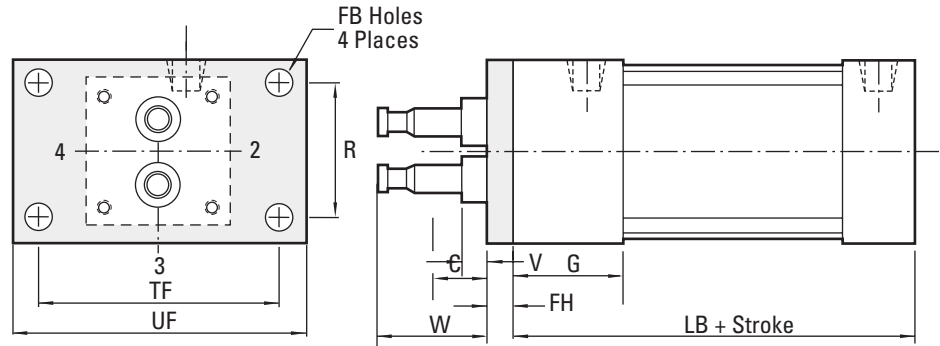
DIMENSION	.1-1/8" BORE (28.58)		.1-1/2" BORE (38.10)		.2" BORE (50.80)		.2-1/2" BORE (63.50)		.3-1/4" BORE (82.55)		.4" BORE (101.60)	
E	1.500	(38.10)	2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	4.500	(114.30)
NT	10 – 32		1/4 – 20		5/16 – 18		3/8 – 16		1/2 – 13		1/2 – 13	
SN	1.500	(38.10)	2.250	(57.15)	2.250	(57.15)	2.375	(60.33)	2.625	(66.68)	2.625	(66.68)
TK	.250	(6.35)	.375	(9.53)	.375	(9.53)	.625	(15.88)	.625	(15.88)	.750	(19.05)
TN	.500	(12.70)	.625	(15.88)	.875	(22.23)	1.250	(31.75)	1.500	(38.10)	2.063	(52.40)
XT	2.000	(50.80)	2.812	(71.42)	2.812	(71.42)	3.063	(77.80)	3.437	(87.30)	3.437	(87.30)



# Series BL Mounting Styles and Installation Dimensions

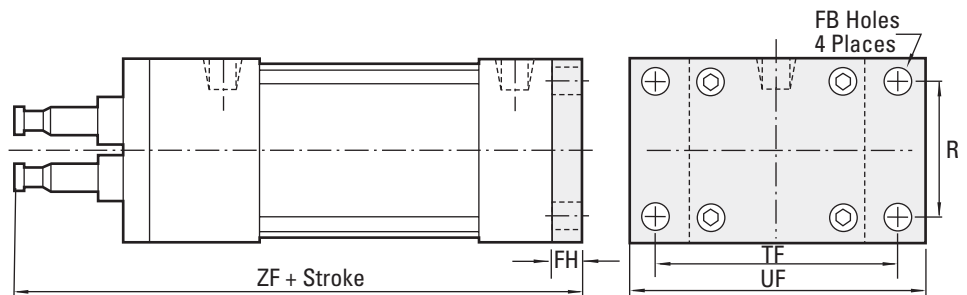
1-1/8" to 4" bore sizes

## Code 07 – Head Rectangular Flange (MF1)



DIMENSION	.1-1/8" BORE (28.58)	.1-1/2" BORE (38.10)	.2" BORE (50.80)	.2-1/2" BORE (63.50)	.3-1/4" BORE (82.55)	.4" BORE (101.60)
C	.625 (15.88)	.875 (22.23)	.750 (19.05)	1.000 (25.40)	.500 (12.70)	.500 (12.70)
FB	.219 (5.56)	.312 (7.92)	.375 (9.53)	.375 (9.53)	.437 (11.10)	.437 (11.10)
FH	.250 (6.35)	.375 (9.53)	.375 (9.53)	.375 (9.53)	.625 (15.88)	.625 (15.88)
G	1.000 (25.4)	1.500 (38.10)	1.500 (38.10)	1.500 (38.10)	1.750 (44.45)	1.750 (44.45)
LB	2.250 (57.15)	3.625 (92.08)	3.625 (92.08)	3.750 (95.25)	4.250 (107.95)	4.250 (107.95)
R	1.000 (25.40)	1.430 (36.32)	1.840 (46.74)	2.190 (55.63)	2.760 (70.10)	3.320 (84.33)
TF	2.000 (50.80)	2.750 (69.85)	3.375 (85.73)	3.875 (98.43)	4.688 (119.08)	5.437 (138.10)
UF	2.500 (63.50)	3.750 (95.25)	4.125 (104.78)	4.625 (117.48)	5.500 (139.70)	6.250 (158.75)
V	N/A	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)
W	1.250 (31.75)	1.500 (38.10)	1.500 (38.10)	1.750 (44.45)	1.750 (44.45)	1.750 (44.45)

## Code 12 – Cap Rectangular Flange (MF2)

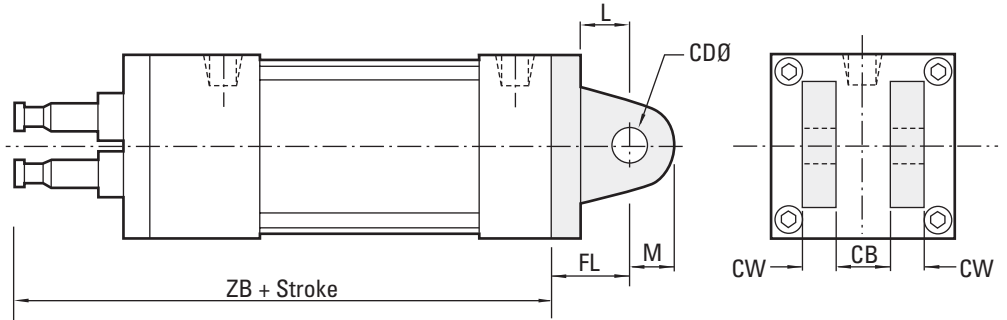


DIMENSION	.1-1/8" BORE (28.58)	.1-1/2" BORE (38.10)	.2" BORE (50.80)	.2-1/2" BORE (63.50)	.3-1/4" BORE (82.55)	.4" BORE (101.60)
FB	.219 (5.56)	.312 (7.92)	.375 (9.53)	.375 (9.53)	.437 (11.10)	.437 (11.10)
FH	.250 (6.35)	.375 (9.53)	.375 (9.53)	.375 (9.53)	.625 (15.88)	.625 (15.88)
R	1.000 (25.40)	1.430 (36.32)	1.840 (46.74)	2.190 (55.63)	2.760 (70.10)	3.320 (84.33)
TF	2.000 (50.80)	2.750 (69.85)	3.375 (85.73)	3.875 (98.43)	4.688 (119.08)	5.437 (138.10)
UF	2.500 (63.50)	3.750 (95.25)	4.125 (104.78)	4.625 (117.48)	5.500 (139.70)	6.250 (158.75)
ZB	3.750 (95.25)	5.500 (139.70)	5.500 (139.70)	5.875 (149.23)	6.625 (168.28)	6.625 (168.28)
ZF	4.000 (101.60)	5.875 (149.23)	5.875 (149.23)	6.250 (158.75)	7.250 (184.15)	7.250 (184.15)

# Series BL Mounting Styles and Installation Dimensions

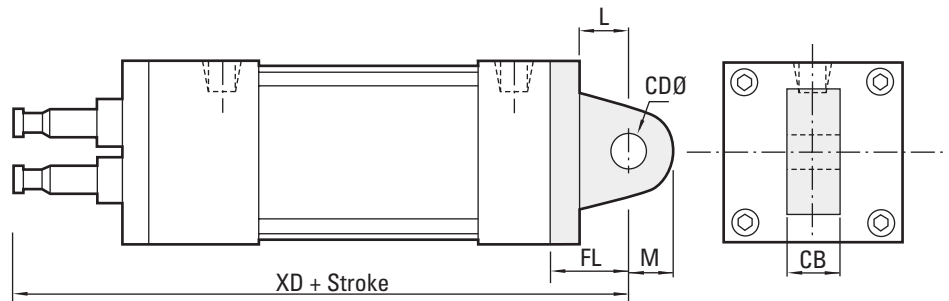
1-1/8" to 4" bore sizes

## Code 50 – Detachable Clevis (MP2)



DIMENSION	.1-1/8" BORE (28.58)		.1-1/2" BORE (38.10)		.2" BORE (50.80)		.2-1/2" BORE (63.50)		.3-1/4" BORE (82.55)		.4" BORE (101.60)	
CB	.375	(9.53)	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)	1.250	(31.75)
CD	.375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)
CW	.250	(6.35)	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)
FL	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.875	(47.63)	1.875	(47.63)
L	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)	1.250	(31.75)
M	.375	(9.53)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)	.875	(22.23)
ZB	3.750	(95.25)	5.500	(139.70)	5.500	(139.70)	5.875	(149.23)	6.625	(168.28)	6.625	(168.28)

## Code 48 – Detachable Eye (MP4)

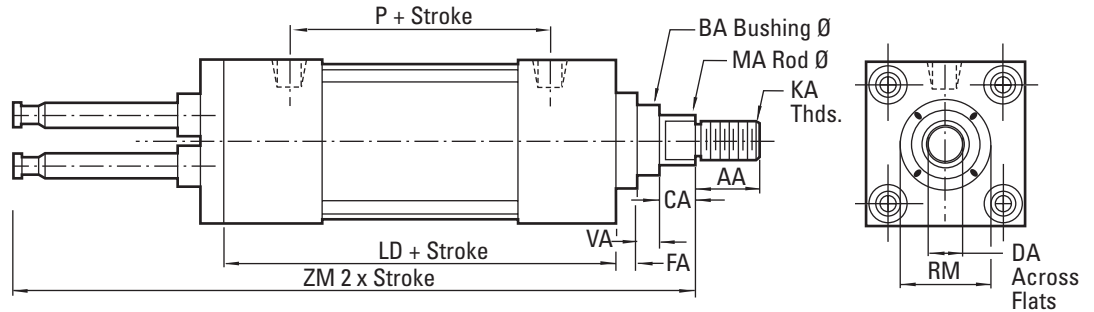


DIMENSION	.1-1/8" BORE (28.58)		.1-1/2" BORE (38.10)		.2" BORE (50.80)		.2-1/2" BORE (63.50)		.3-1/4" BORE (82.55)		.4" BORE (101.60)	
CB	.375	(9.53)	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)	1.250	(31.75)
CD	.375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)
FL	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.875	(47.63)	1.875	(47.63)
L	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)	1.250	(31.75)
M	.375	(9.53)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)	.875	(22.23)
XD	4.875	(123.83)	6.625	(168.28)	6.625	(168.28)	7.000	(177.80)	8.375	(212.73)	8.375	(212.73)

# Series BL Mounting Styles and Installation Dimensions

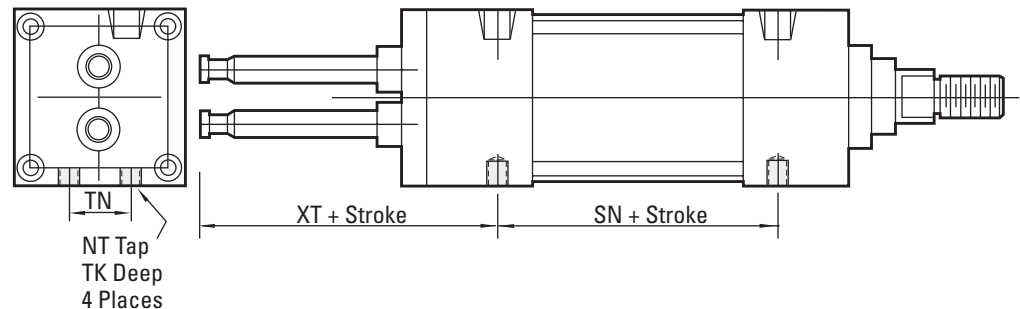
1-1/8" to 4" bore sizes

## Code 41 – Double Rod, No Mounts



DIMENSION		.1-1/8" BORE (28.58)	.1-1/2" BORE (38.10)	.2" BORE (50.80)	.2-1/2" BORE (63.50)	.3-1/4" BORE (82.55)	.4" BORE (101.60)
AA	Standard	.625 (15.88)	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.125 (28.58)	1.125 (28.58)
	Oversize	.750 (19.05)	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)	1.625 (41.28)	1.625 (41.28)
BA	Standard	N/A	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)	1.500 (38.10)	1.500 (38.10)
	Oversize	N/A	1.400 (35.56)	1.500 (38.10)	1.500 (38.10)	2.000 (50.80)	2.000 (50.80)
CA	Standard	.250 (6.35)	.375 (9.53)	.375 (9.53)	.375 (9.53)	.500 (12.70)	.500 (12.70)
	Oversize	.250 (6.35)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.625 (15.88)	.625 (15.88)
DA	Standard	.312 (7.92)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.812 (20.62)	.812 (20.62)
	Oversize	.437 (11.10)	.812 (20.62)	.812 (20.62)	.812 (20.62)	1.125 (28.58)	1.125 (28.58)
FA		.125 (3.18)	.375 (9.53)	.375 (9.53)	.375 (9.53)	.625 (15.88)	.625 (15.88)
KA	Standard	3/8 – 24	1/2 – 20	1/2 – 20	1/2 – 20	3/4 – 16	3/4 – 16
	Oversize	1/2 – 20	3/4 – 16	3/4 – 16	3/4 – 16	1 – 14	1 – 14
LD		†2.875 †(73.03)	4.125 (104.78)	4.125 (104.78)	4.250 (107.95)	4.750 (120.65)	4.750 (120.65)
MA	Standard	.375 (9.53)	.625 (15.88)	.625 (15.88)	.625 (15.88)	1.000 (25.40)	1.000 (25.40)
	Oversize	.500 (12.70)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.375 (34.93)	1.375 (34.93)
P		†1.844 †(46.84)	2.125 (53.98)	2.125 (53.98)	2.250 (57.15)	2.625 (66.68)	2.625 (66.68)
RM	Standard	.750 (19.05)	2.000sq (50.80)	2.000 (50.80)	2.000 (50.80)	2.625 (66.68)	2.625 (66.68)
	Oversize	1.000 (25.40)	2.000sq (50.80)	2.500sq (63.50)	3.000sq(76.20)	3.375 (85.73)	3.375 (85.73)
VA	Standard	N/A	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)
	Oversize	N/A	.500 (12.70)	.500 (12.70)	.500 (12.70)	.375 (9.53)	.375 (9.53)
ZM		4.625 (117.48)	7.000 (177.80)	7.000 (177.80)	7.375 (187.33)	8.500 (215.90)	8.500 (215.90)

## Code 26 – Double Rod, Tapped (MS4)

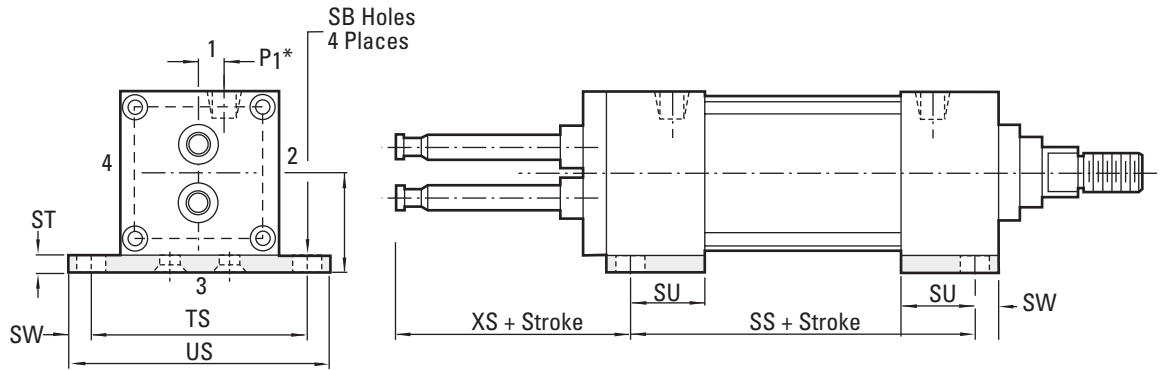


DIMENSION		.1-1/8" BORE (28.58)	.1-1/2" BORE (38.10)	.2" BORE (50.80)	.2-1/2" BORE (63.50)	.3-1/4" BORE (82.55)	.4" BORE (101.60)
NT		10 – 32	1/4 – 20	5/16 – 18	3/8 – 16	1/2 – 13	1/2 – 13
SN		1.875 (47.63)	2.250 (57.15)	2.250 (57.15)	2.375 (60.33)	2.625 (66.68)	2.625 (66.68)
TK		.250 (6.35)	.375 (9.53)	.375 (9.53)	.625 (15.88)	.625 (15.88)	.750 (19.05)
TN		.500 (12.70)	.625 (15.88)	.875 (22.23)	1.250 (31.75)	1.500 (38.10)	2.063 (52.40)
XT		2.000 (50.80)	2.812 (71.42)	2.812 (71.42)	3.063 (77.80)	3.437 (87.30)	3.437 (87.30)

# Series BL Mounting Styles and Installation Dimensions

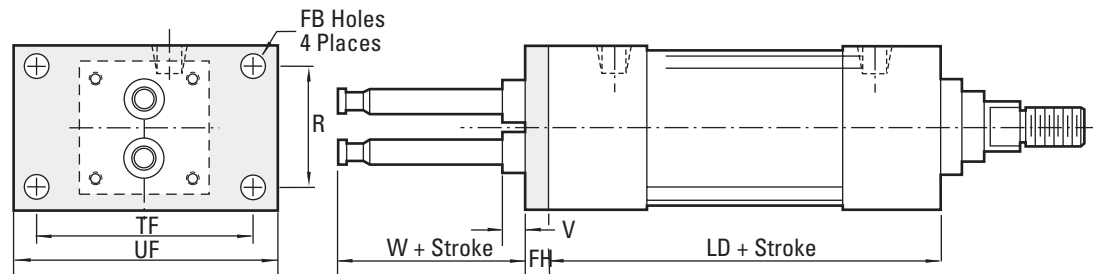
1-1/8" to 4" bore sizes

**Code 25 –  
Double Rod, Side Lug**



DIMENSION	.1-1/8" BORE (28.58)		.1-1/2" BORE (38.10)		.2" BORE (50.80)		.2-1/2" BORE (63.50)		.3-1/4" BORE (82.55)		.4" BORE (101.60)	
SB	.203	(5.16)	.437	(11.10)	.437	(11.10)	.437	(11.10)	.563	(14.30)	.563	(14.30)
SS	2.250	(57.15)	3.375	(85.73)	3.375	(85.73)	3.500	(88.90)	3.750	(95.25)	3.750	(95.25)
ST	.250	(6.35)	.250	(6.35)	.250	(6.35)	.375	(9.53)	.500	(12.70)	.500	(12.70)
SU	.750	(19.05)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.250	(31.75)	1.250	(31.75)
SW	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.70)
TS	1.875	(47.63)	2.750	(69.85)	3.250	(82.55)	3.750	(95.25)	4.750	(120.65)	5.500	(139.70)
US	2.375	(60.33)	3.500	(88.90)	4.000	(101.60)	4.500	(114.30)	5.750	(146.05)	6.500	(165.10)
XS	1.750	(44.50)	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.875	(73.03)	2.875	(73.03)

**Code 31 –  
Double Rod, Rectangular  
Flange (MF1)**

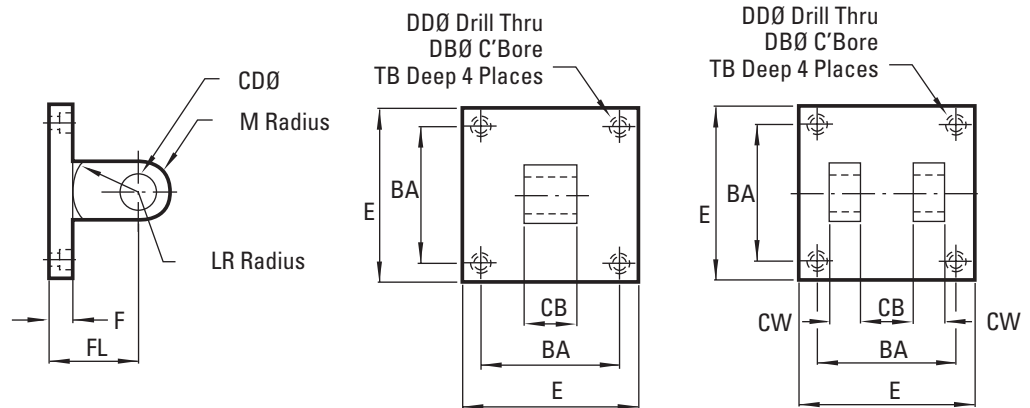


DIMENSION	.1-1/8" BORE (28.58)		.1-1/2" BORE (38.10)		.2" BORE (50.80)		.2-1/2" BORE (63.50)		.3-1/4" BORE (82.55)		.4" BORE (101.60)	
FB	.219	(5.56)	.312	(7.92)	.375	(9.53)	.375	(9.53)	.437	(11.10)	.437	(11.10)
FH	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.625	(15.88)	.625	(15.88)
LD	2.875	(73.03)	4.125	(104.78)	4.125	(104.78)	4.250	(107.95)	4.750	(120.65)	4.750	(120.65)
R	1.000	(25.40)	1.430	(36.32)	1.840	(46.74)	2.190	(55.63)	2.760	(70.10)	3.320	(84.33)
TF	2.000	(50.80)	2.750	(69.85)	3.375	(85.73)	3.875	(98.43)	4.688	(119.08)	5.437	(138.10)
TZ	1.250	(31.75)	1.500	(38.10)	2.000	(50.80)	2.500	(63.50)	3.250	(82.55)	4.000	(101.60)
UF	2.500	(63.50)	3.750	(95.25)	4.125	(104.78)	4.625	(117.48)	5.500	(139.70)	6.250	(158.75)
V	N/A		.250	(6.35)	.250	(6.35)	.250	(6.35)	.250	(6.35)	.250	(6.35)
W	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)

# Series BL Accessories

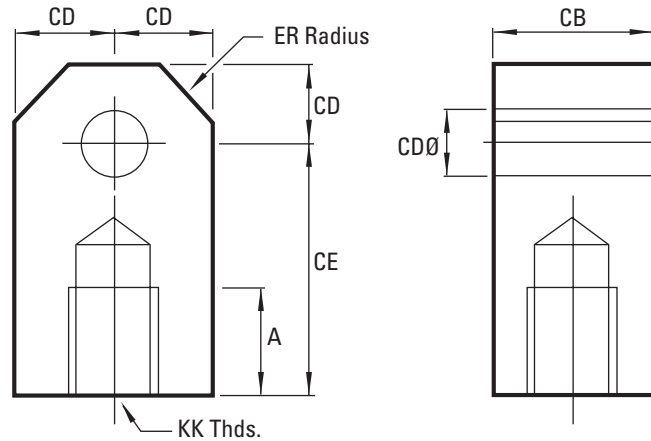
1-1/8" to 4" bore sizes

## 1-1/8" Bore Eye & Clevis Bracket



	<b>BL78006A</b>		<b>BL610006A</b>	
BA	1.125	(28.58)	1.150	(29.21)
CB	.375	(9.53)	.375	(9.53)
CD	.375	(9.53)	.375	(9.53)
CW	—		.250	(6.35)
DB	.328	(8.33)	.328	(8.33)
DD	.203	(5.16)	.203	(5.16)
E	1.500	(38.10)	1.500	(38.10)
F	.500	(12.70)	.500	(12.70)
FL	1.125	(28.58)	1.125	(28.58)
LR	.625	(15.88)	.625	(15.88)
M	.375	(9.53)	.375	(9.53)
TB	.312	(7.92)	.312	(7.92)

## Rod Eye



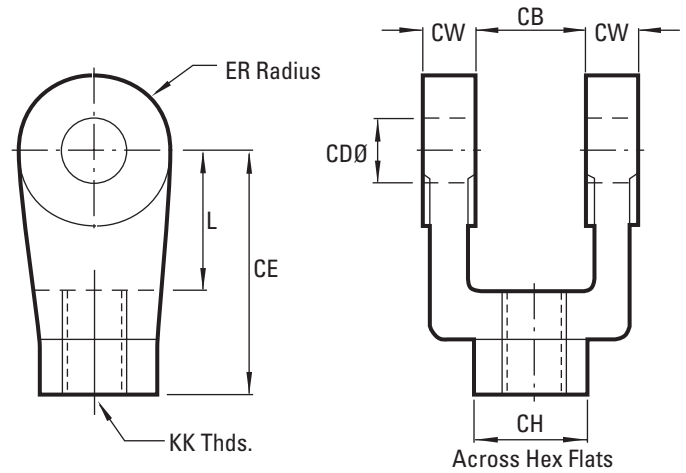
	<b>BL60008C</b>		<b>BL6000CA</b>		<b>BL600010A</b>	
CB	.750	(19.05)	1.250	(31.75)	1.500	(38.10)
CD	.500	(12.70)	.750	(19.05)	1.000	(25.40)
CE	1.500	(38.10)	2.062	(52.37)	2.812	(71.42)
ER	.562	(14.27)	.937	(23.80)	1.125	(28.58)
KK	1/2-20		3/4-16		1-14	

# Series BL Accessories

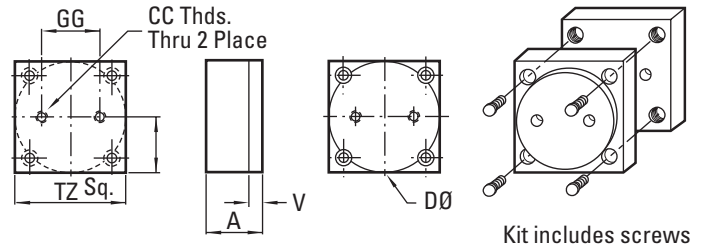
1-1/8" to 4" bore sizes

## Rod Clevis

	BL62008B		BL6200CA		BL62010A	
CB	.750	(19.05)	1.250	(31.75)	1.500	(38.10)
CD	.500	(12.70)	.750	(19.05)	1.000	(25.40)
CE	1.500	(38.10)	2.375	(60.33)	3.125	(79.38)
CH	1.000	(25.40)	1.250	(31.75)	1.500	(38.10)
CW	.500	(12.70)	.625	(15.88)	.750	(19.05)
ER	.500	(12.70)	.750	(19.05)	1.000	(25.40)
KK	1/2-20		3/4-16		1-14	
L	.750	(19.05)	1.250	(31.75)	1.500	(38.10)



## Pilot Adaptor Plate

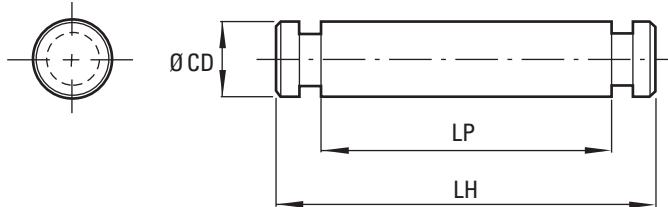


BORE	1-1/8" BL-171-225K		1-1/2" BL-171-03K		2" BL-171-04K		2-1/2" BL-171-05K		3/4" BL-171-065K		4" BL-171-08K	
A	.625	(15.88)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)	.875	(22.23)
CC	1/4-20	5/16-18	5/16-18	3/8-16	1/2-13	1/2-13						
D	1.260	(32.00)	1.575	(40.01)	1.969	(50.01)	2.480	(62.99)	3.150	(80.01)	3.937	(99.99)
GG	.750	(19.05)	.860	(21.84)	1.180	(29.97)	1.500	(38.10)	1.970	(50.04)	2.760	(70.10)
TZ	1.250	(31.75)	1.500	(38.10)	2.000	(50.80)	2.500	(63.50)	3.250	(82.55)	4.000	(101.60)
V	.160	(4.06)	.160	(4.06)	.200	(5.08)	.200	(5.08)	.200	(5.08)	.200	(5.08)
Y	.625	(15.88)	.750	(19.05)	1.000	(25.40)	1.250	(31.75)	1.625	(41.28)	2.000	(50.80)

# Series BL Accessories

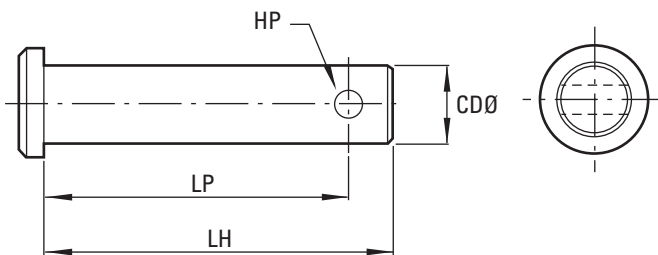
1-1/8" to 4" bore sizes

## NFPA Pin



	BL83008A		BL8300CA		BL83010A	
CD	.500	(12.70)	.750	(19.05)	1.000	(25.40)
LH	2.219	(56.36)	3.125	(79.38)	3.750	(95.25)
LP	1.875	(47.63)	2.750	(69.85)	3.250	(82.55)

## Standard Pin



	BL83006C		BL83008C		BL8300CC		BL83010B	
CD	.375	(9.53)	.500	(12.70)	.750	(19.05)	1.000	(25.40)
HP	.156	(3.96)	.156	(3.96)	.156	(3.96)	.203	(5.18)
LH	1.250	(31.75)	2.250	(57.15)	3.000	(76.20)	3.500	(88.90)
LP	1.032	(26.21)	2.093	(53.16)	2.843	(72.21)	3.297	(83.74)

## Switches

SWITCH MODEL	PS8-2-04 REED	PS8-2-31 HALL	PS8-2-32 HALL	PS7-04 REED	PS7-24 REED	PS7-31 HALL	PS7-32 HALL
Bore Sizes	1-1/8" - 2-1/2"	1-1/8" - 2-1/2"	1-1/8" - 2-1/2"	2" - 4"	2" - 4"	2" - 4"	2" - 4"
Switch Type	Reed Switch *MOV & Light	Hall Effect/Light, Sourcing PNP	Hall Effect/Light, Sinking NPN	Reed Switch *MOV & Light	Reed Switch *MOV & Light, 3 Wire	Hall Effect/Light, Sourcing PNP	Hall Effect/Light, Sinking NPN
Function	SPST NO	Normally Open	Normally Open	Normally Open	Normally Open	Normally Open	Normally Open
Switching Voltage	5-120 VDC/VAC	6-24 VDC	6-24 VDC	5-240 VDC/VAC	24-240 VAC	6-24 VDC	6-24 VDC
Switching Current	50/60 Hz	.5 Amp Max	.5 Amp Max	50/60 Hz	50/60 Hz	1 Amp Max	1 Amp Max
Switching Power	.5 Amp Max	.5 Amp Max	.5 Amp Max	1 Amp Max	4 Amp Max 50 Amp Inrush	1 Amp Max	1 Amp Max
Max Voltage Drop	10 VA	12 Watts Max	12 Watts Max	30 Watts Max	100 Watts Max	24 Watts Max	24 Watts Max
Magnetic Sensitivity	3.5 Volts	.5 Volts	.5 Volts	3 Volts	N/A	.5 Volts	.5 Volts
Enclosure Class	85 Gauss	85 Gauss	85 Gauss	85 Gauss	85 Gauss	85 Gauss	85 Gauss
Temperature Range	NEMA 6/CSA	NEMA 6/CSA	NEMA 6/CSA	NEMA 6/CSA	NEMA 6/CSA	NEMA 6/CSA	NEMA 6/CSA
	-22°F to +176°F	-22°F to +176°F	-22°F to +176°F	-22°F to +176°F	-22°F to +176°F	-22°F to +176°F	-22°F to +176°F

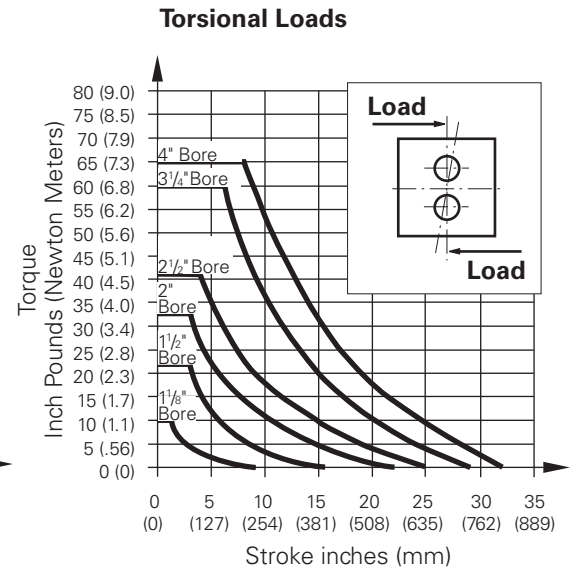
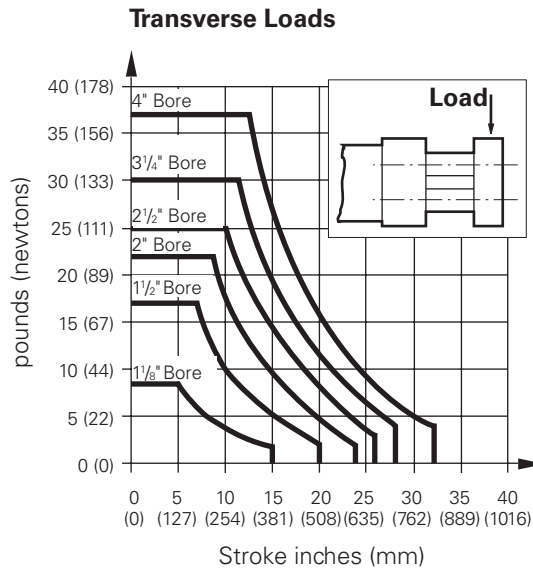


# Series BL Technical Information

The transverse and torsional load graphs shown are to be utilized as a guideline with respect to the maximum load and stroke of each bore size.

NOTE: For strokes or loads not listed consult factory.

Transverse or torsional loads placed on the cylinder will cause some deflection of the piston rods. Excessive deflection will adversely affect cylinder life and should be considered at the time of initial application design.



## Theoretical Extend and Retract Forces in pounds (newtons)



BORE	MOVEMENT	EFFECTIVE PISTON AREA IN <sup>2</sup> (CM <sup>2</sup> )	PSI (BAR)												CU FT (CM <sup>3</sup> ) DISPLACEMENT PER IN OF STROKE
			20 (1)	40 (3)	50 (3)	60 (4)	80 (6)	100 (7)	125 (9)	150 (10)					
1-1/8"	Extend	.99 (6.41)	20 (88)	40 (177)	50 (221)	60 (265)	80 (354)	99 (442)	124 (553)	149 (664)	.00058 (16)				
	Retract	.84 (5.43)	17 (75)	34 (150)	42 (187)	50 (225)	67 (299)	84 (374)	105 (468)	126 (561)	.00049 (14)				
1-1/2"	Extend	1.77 (11.40)	35 (157)	71 (315)	88 (393)	106 (472)	141 (629)	177 (786)	221 (983)	265 (1179)	.00102 (29)				
	Retract	1.55 (9.97)	31 (138)	62 (275)	77 (344)	93 (413)	124 (550)	155 (688)	193 (860)	232 (1032)	.00089 (25)				
2"	Extend	3.14 (20.27)	63 (280)	126 (559)	157 (699)	189 (839)	251 (1119)	314 (1398)	393 (1748)	471 (2097)	.00182 (52)				
	Retract	2.53 (16.31)	51 (225)	101 (450)	126 (562)	152 (675)	202 (900)	253 (1125)	316 (1406)	379 (1687)	.00146 (41)				
2-1/2"	Extend	4.91 (31.67)	98 (437)	196 (874)	245 (1092)	295 (1311)	393 (1748)	491 (2185)	614 (2731)	736 (3277)	.00284 (80)				
	Retract	4.30 (27.71)	86 (382)	172 (765)	215 (956)	258 (1147)	344 (1529)	430 (1911)	537 (2389)	644 (2867)	.00249 (71)				
3-1/4"	Extend	8.30 (53.32)	166 (738)	332 (1477)	415 (1846)	498 (2215)	664 (2953)	830 (3692)	1037 (4615)	1244 (5538)	.00480 (136)				
	Retract	7.51 (48.45)	150 (668)	300 (1337)	376 (1671)	451 (2005)	601 (2674)	751 (3342)	939 (4177)	1127 (5013)	.00435 (123)				
4"	Extend	12.57 (81.07)	251 (1118)	503 (2237)	628 (2796)	754 (3355)	1005 (4473)	1257 (5592)	1571 (6990)	1885 (8388)	.00727 (206)				
	Retract	11.78 (76.01)	236 (1049)	471 (2097)	589 (2621)	707 (3146)	943 (4194)	1178 (5243)	1473 (6553)	1767 (7864)	.00682 (193)				
<b>Extend Double Rod Forces</b>															
1-1/8"	Standard	.88 (5.69)	18 (79)	35 (157)	44 (196)	53 (235)	71 (314)	88 (392)	110 (491)	132 (589)	.00051 (14)				
	Oversize	.80 (5.15)	16 (71)	32 (142)	40 (178)	48 (213)	64 (284)	80 (355)	100 (444)	120 (533)	.00047 (13)				
1-1/2"	Standard	1.46 (9.42)	29 (130)	58 (260)	73 (325)	88 (390)	117 (520)	146 (650)	183 (812)	219 (975)	.00084 (24)				
	Oversize	.98 (6.34)	20 (87)	39 (175)	49 (218)	59 (262)	79 (350)	98 (437)	123 (546)	147 (655)	.00057 (16)				
2"	Standard	2.84 (18.29)	57 (252)	113 (505)	142 (631)	170 (757)	227 (1009)	284 (1262)	354 (1577)	425 (1892)	.00164 (46)				
	Oversize	2.36 (15.21)	47 (210)	94 (420)	118 (524)	141 (629)	189 (839)	236 (1049)	295 (1311)	354 (1573)	.00137 (39)				
2-1/2"	Standard	4.60 (29.69)	92 (410)	184 (819)	230 (1024)	276 (1229)	368 (1638)	460 (2048)	575 (2560)	690 (3072)	.00266 (75)				
	Oversize	4.12 (26.61)	82 (367)	165 (734)	206 (918)	247 (1101)	330 (1468)	412 (1835)	516 (2294)	619 (2753)	.00239 (68)				
3-1/4"	Standard	7.51 (48.46)	150 (668)	300 (1337)	376 (1671)	451 (2005)	601 (2674)	751 (3342)	939 (4178)	1127 (5014)	.00435 (123)				
	Oversize	6.81 (43.94)	136 (606)	272 (1212)	341 (1515)	409 (1819)	545 (2425)	681 (3031)	851 (3789)	1022 (4546)	.00394 (112)				
4"	Standard	11.78 (76.01)	236 (1049)	471 (2097)	589 (2621)	707 (3146)	942 (4194)	1178 (5243)	1473 (6553)	1767 (7864)	.00682 (193)				
	Oversize	11.08 (71.49)	222 (986)	443 (1972)	554 (2466)	665 (2959)	886 (3945)	1108 (4931)	1385 (6164)	1662 (7397)	.00641 (181)				

### Operating Temperatures:

-20°F to 200°F  
(-29°C to 93°C)

### Operating Pressure:

250 psig (17.2 bar)

### 1-1/8" Bore pressure rating

150 psi

### Bore Sizes:

1-1/8", 1-1/2", 2", 2-1/2", 3-1/4", 4"

### Supply:

Filtered compressed air to 250 psi (for hydraulic service consult factory.)

### Materials:

Head and end caps - anodized 6061-T6 aluminum

Tube: 6063-T832 aluminum, clear anodized O.D., hard coat anodized I.D.

Piston Rod: C1141 hard chrome plated steel

Piston: 2011-T451 aluminum

Rod Bearings: G2 Durabar cast iron, teflon coated

Seals: carboxylated nitrile

Tie Rods: 12L14 steel

# Series SL Features

## Series SL Features / Benefits

### A. Piston Seals

Lip-type nitrile seals are pressure energized and wear compensating. Their excellent lubrication retention characteristics lower seal friction and ensure long life.

### B. Piston

Solid aluminum alloy, light-weight for low inertia, yet strong.

### C. Head/Cap

Precision machined from solid corrosion-resistant 304 stainless steel bar.

### D. Rod Wiper

Lip-type urethane aggressively wipes foreign material from piston rod and enhances rod seal life.

### E. Rod Seals

Rounded lip-type urethane is pressure energized and wear compensating.

### F. Piston Rod

303 stainless steel, 40,000 PSI minimum yield, hard chrome plated, ground and polished.

### G. Ultra Cushion®

State-of-the-art design features a unique, one-piece, nitrile compound seal, captured within a precision machined groove. Linear and radial "float" of cushion seal eliminates misalignment. Ultra Cushions provide exceptionally fast "out of cushion" stroke reversal. (Head and Cap Cushions are optional.)

### H. Adjustable Captive Cushion Needle

Allows for safe and precise adjustment under pressure.

### I. Wear Strip

Teflon® and graphite composition for minimum friction, maximum wear and side load resistance. (Magnetic band under wear strip optional.)

### J. Tube

Corrosion-resistant 304 stainless steel.

### K. Tie Rods

High-strength 303 stainless steel maintains compression on tube end seals.

### L. Retainer

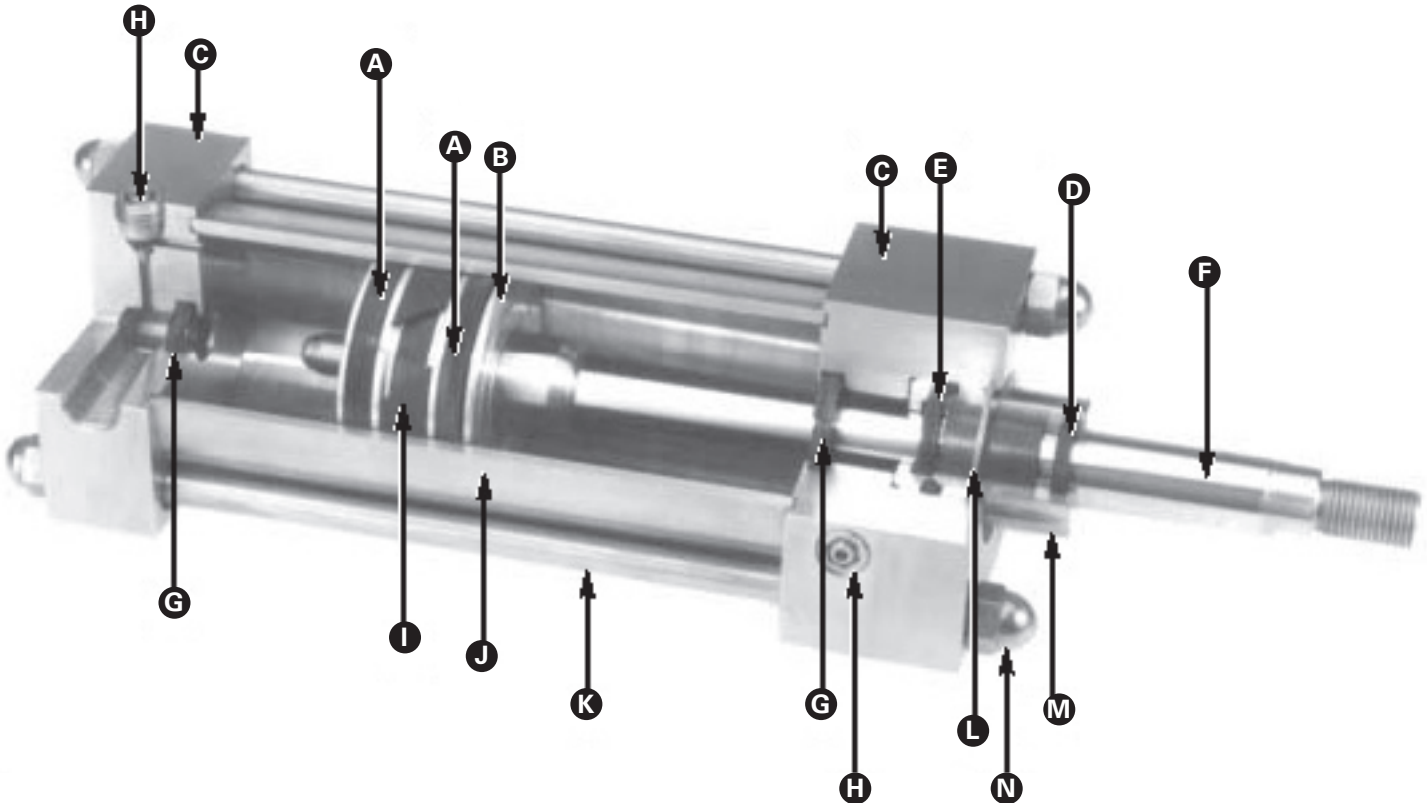
Stainless steel snap ring securely retains bushing in head.

### M. Rod Bearings

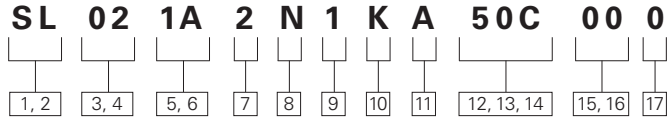
Machined from 304 stainless steel, with a Teflon® composite wear band insert that eliminates metal-to-metal contact.

### N. Acorn Nut

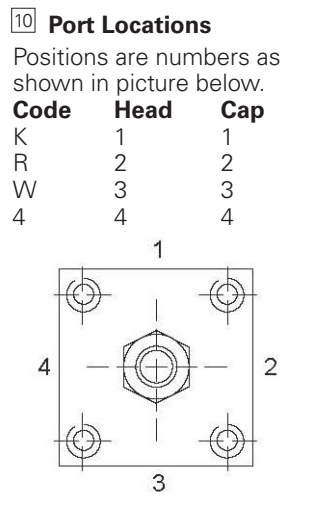
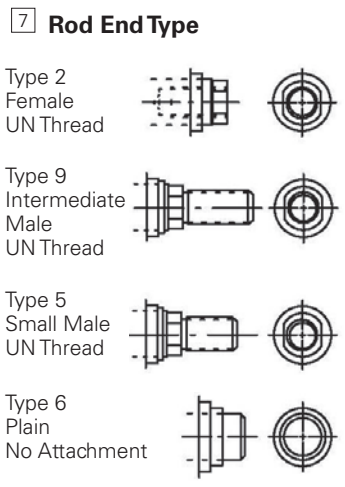
Tie rod threads are covered by stainless steel acorn nuts which eliminate another bacteria hiding place.



# Series SL Model Code



- 1, 2 Series**  
**SL** – Stainless Steel Pneumatic Cylinders
- 
- 3, 4 Mounting Styles**  
**1-1/2" thru 8" Bore**
- 02** – Side Tapped **MS4**
  - 07** – Head Rectangular Flange **MF1**
  - 08** – Head Square\* **ME3\***
  - 10** – Cap Fixed Clevis **MP1**
  - 12** – Cap Rectangular Flange **MF2**
  - 13** – Cap Square\* **ME4**
  - 16** – Cap Trunnion **MT2**
  - 17** – Head Trunnion **MT1**
  - 24** – No mounts **MX0**
  - XX** – Custom
- \* 8" bore only
- 1-1/8" Bore**
- 24** – No mounts **MX0**
  - 01** – Bolt Thru **MS8**
  - 12** – Cap Rectangular Flange **MF2**
  - 47** – Fixed Eye **MP3**
  - 02** – Tapped **MS9**
  - 18** – Head Tapped Face **MR1**
  - 41** – Double Rod, No Mounts **MX0**

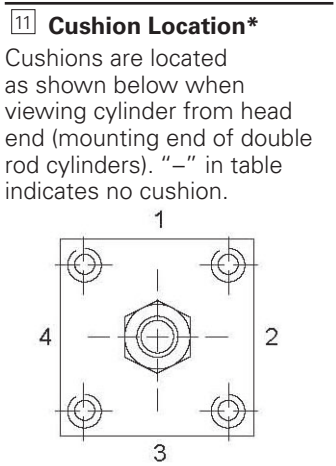


**12, 13, 14 Cylinder Stroke**  
 Items 12 and 13 indicate stroke length from 00 inches through 99 inches.  
 Item 14 indicates fraction of an inch per the following codes:

Code	Fraction	Code	Fraction
0	0	8	1/2
1	1/16	9	9/16
2	1/8	A	5/8
3	3/16	B	11/16
4	1/4	C	3/4
5	5/16	D	13/16
6	3/8	E	7/8
7	7/16	F	5/16

**8 Seal Options**  
**N** – Standard (Nitrile)

**9 Port Options**  
**1** – Standard  
**2** – Oversized (NFPA)



**15, 16 Extra Rod Projection**  
 Item 15 indicates inches from 0 thru 9.  
 Item 16 indicates fraction of an inch per the following codes:

Code	Fraction	Code	Fraction
0	0	8	1/2
1	1/16	9	9/16
2	1/8	A	5/8
3	3/16	B	11/16
4	1/4	C	3/4
5	5/16	D	13/16
6	3/8	E	7/8
7	7/16	F	15/16

**5, 6 Bore and Rod Size Combinations**

Code	Bore	Rod
<b>1A</b>	1-1/8"	3/8"
<b>1B</b>	1-1/8"	1/2"
<b>CC</b>	1-1/2"	5/8"
<b>CE</b>	1-1/2"	1"
<b>DC</b>	2"	5/8"
<b>DE</b>	2"	1"
<b>EC</b>	2-1/2"	5/8"
<b>EE</b>	2-1/2"	1"
<b>GE</b>	3-1/4"	1"
<b>GH</b>	3-1/4"	1-3/8"
<b>HE</b>	4"	1"
<b>HH</b>	4"	1-3/8"
<b>KE</b>	5"	1"
<b>KH</b>	5"	1-3/8"
<b>LH</b>	6"	1-3/8"
<b>LL</b>	6"	1-3/4"
<b>NH</b>	8"	1-3/8"
<b>NL</b>	8"	1-3/4"

Code	Head	Cap
<b>A</b>	-	-
<b>B</b>	-	1
<b>C</b>	-	2
<b>D</b>	-	3
<b>E</b>	-	4
<b>F</b>	1	-
<b>G</b>	2	-
<b>H</b>	3	-
<b>J</b>	4	-
<b>K</b>	1	1
<b>R</b>	2	2
<b>S</b>	2	3
<b>T</b>	2	4
<b>V</b>	3	2
<b>W</b>	3	3
<b>Y</b>	3	4
<b>4</b>	4	4

**- OR -**  
**PK** – Magnet Furnished to operate Hall Effect or Reed Type Switch

**17 Custom**  
**X** – Custom Modification

\* Not available in 1-1/8" Bore

# Series SL

## Mounting Styles:

### 1-1/2" – 8" Bore

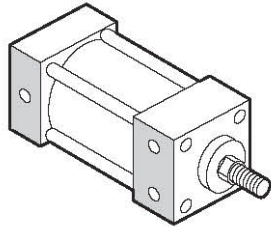
#### Available Mountings

The variety of standard NFPA mountings available in the 1 1/2"-8" bore Series SL gives you a broad selection to match the proper mount to your application. Eaton offers rigid mounts (including flange mounts) and swivel mounts (including clevis mounts). A guide to proper mount selection is provided on pages 122 through 126. For custom mounts, enter "XX" for model code positions 3 and 4, and give a detailed description with drawings. Series SL cylinders are available in all mounting styles listed.

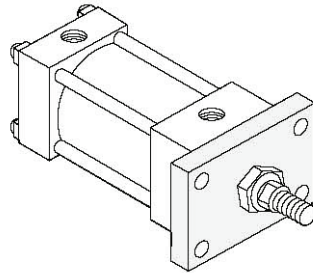
#### Selecting the Proper Mounting

Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified. Note: In the mounting information, some mounts have been down-rated to minimize deflection. For applications where the motion is linear and parallel to the cylinder rod motion, a rigid mount is recommended. For curvilinear motion, a swivel mount should be chosen. The specifics of each application dictate the correct mounting style.

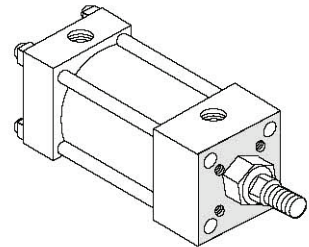
**Code 02 (MS4)  
Side Tap**



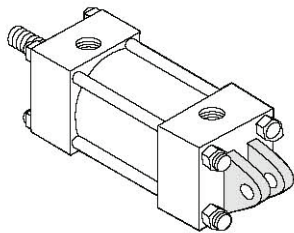
**Code 07 (MF1)  
Head Rectangular Flange**



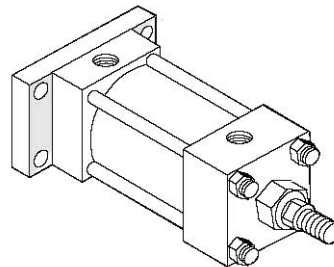
**Code 08 (ME3)  
Head Square**



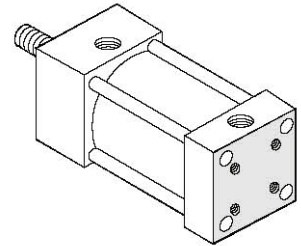
**Code 10 (MP1)  
Cap Fixed Clevis**



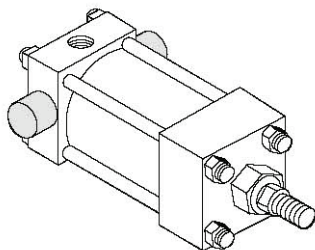
**Code 12 (MF2)  
Cap Rectangular Flange**



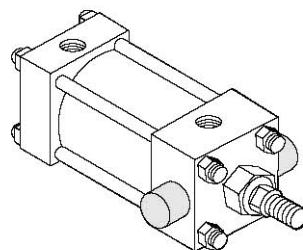
**Code 13 (ME4)  
Cap Square**



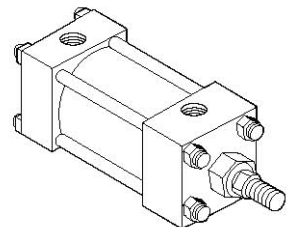
**Code 16 (MT2)  
Cap Trunnion**



**Code 17 (MT2)  
Head Trunnion**



**Code 24 (MX0)  
No Mounts**



# Series SL Mounting Styles: 1-1/8" Bore

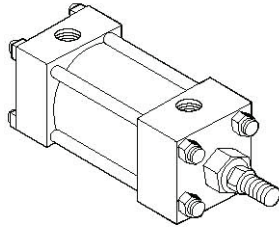
## Available Mountings

The variety of standard NFPA mountings available in the 1 1/8" bore Series SL gives you a broad selection to match the proper mount to your application. Eaton offers rigid mounts (including bolt-thru mounts and flange mounts). A guide to proper mount selection is provided on pages 122 through 126. For custom mounts, enter "XX" for model code positions 3 and 4, and give a detailed description with drawings. Series SL cylinders are available in all mounting styles listed.

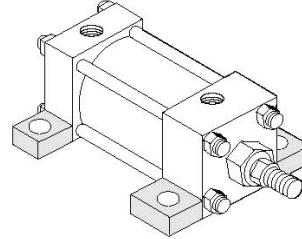
## Selecting the Proper Mounting

Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified. Note: In the mounting information, some mounts have been down-rated to minimize deflection. For applications where the motion is linear and parallel to the cylinder rod motion, a rigid mount is recommended. For curvilinear motion, a swivel mount should be chosen. The specifics of each application dictate the correct mounting style.

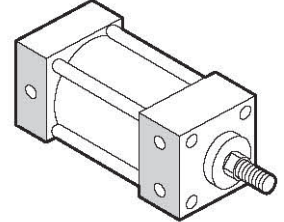
**Code 24 (MX0)  
No Mounts**



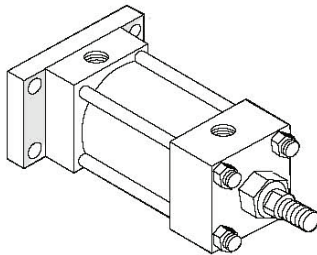
**Code 01 (MS8)  
Bolt Thru**



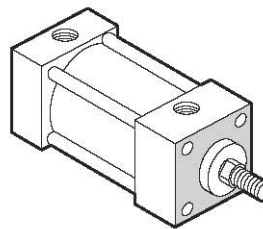
**Code 02 (MS9)  
Tapped**



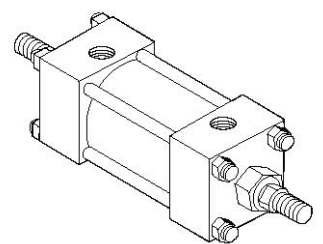
**Code 12 (MF2)  
Cap Rectangular Flange**



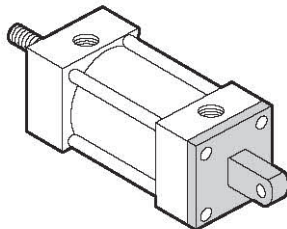
**Code 18 (MR1)  
Head Tapped Face**



**Code 41 (MX0)  
Double Rod, No Mounts**



**Code 47 (MP3)  
Fixed Eye**

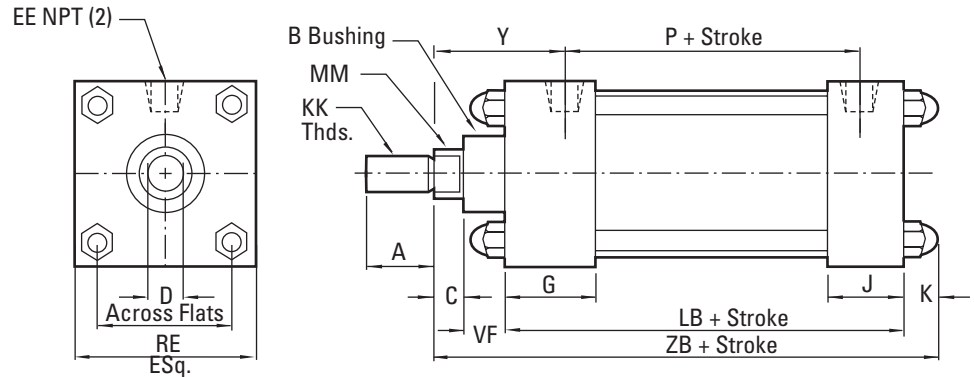




# Series SL Standard Cylinder

1-1/8" to 8" bore

## Standard Cylinder Dimensions



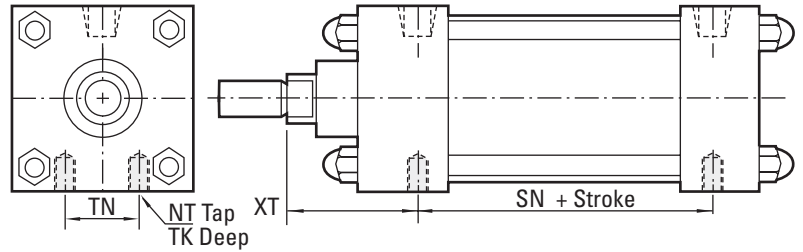
BORE		1-1/8"	1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"	8"
ø Rod (MM)	Std.	3/8"	5/8"	5/8"	5/8"	1"	1"	1"	1-3/8"	1-3/8"
	O.S.	1/2"	1"	1"	1"	1-3/8"	1-3/8"	1-3/8"	1-3/4"	1-3/4"
A	Std.	.625	0.75	0.75	0.75	1.125	1.125	1.125	1.625	1.625
	O.S.	.750	1.125	1.125	1.125	1.625	1.625	1.625	2.000	2.000
B +.000 -.002	Std.		1.125	1.125	1.125	1.500	1.500	1.500	2.000	2.000
	O.S.		1.500	1.500	1.500	2.000	2.000	2.000	2.375	2.375
C	Std.	.25	0.375	0.375	0.375	0.5	0.5	0.5	0.625	0.625
	O.S.	-	0.5	0.5	0.5	0.625	0.625	0.625	0.75	0.75
D	Std.	.312	0.5	0.5	0.5	0.812	0.812	0.812	1.125	1.125
	O.S.	.437	0.812	0.812	0.812	1.125	1.125	1.125	1.5	1.5
E		1.5	2	2.5	3	3.75	4.5	5.5	6.5	8.5
EE	Std.	.125	0.25	0.25	0.25	0.375	0.375	0.375	0.5	0.5
	O.S.	-	0.375	0.375	0.375	0.5	0.5	0.5	0.75	0.75
G		.875	1.5	1.5	1.5	1.75	1.75	1.75	2	2
J		.625	1	1	1	1.25	1.25	1.5	1.5	1.5
K		.400	0.469	0.531	0.531	0.625	0.625	0.83	0.83	1
KK	Std.	5/16-24	1/2 - 20	1/2 - 20	1/2 - 20	3/4 - 16	3/4 - 16	3/4 - 16	1 - 14	1 - 14
	O.S.	7/16-20	3/4 - 16	3/4 - 16	3/4 - 16	1 - 14	1 - 14	1 - 14	1-1/4 - 12	1-1/4 - 12
LB		2.25	3.625	3.625	3.75	4.25	4.25	4.5	5	5.125
P		1.375	2.125	2.125	2.25	2.625	2.625	2.875	3	3.125
RE		.750	1.43	1.84	2.19	2.76	3.32	4.1	4.88	6.435
VF	Std.	.125	0.625	0.625	0.625	0.875	0.875	0.875	1	1
	O.S.	-	0.875	0.875	0.875	1	1	1	1.125	1.125
Y	Std.	.938	2	2	2	2.437	2.437	2.437	2.875	2.875
	O.S.	-	2.375	2.375	2.375	2.687	2.687	2.687	3.125	3.125
ZB	Std.	2.625	5.094	5.156	5.281	6.25	6.25	6.705	7.455	7.75
	O.S.	-	5.469	5.531	5.656	6.5	6.5	6.955	7.705	8

Dimensions in inches (mm)

# Series SL Mounting Styles and Installation Dimensions

1-1/2" to 8" bore sizes

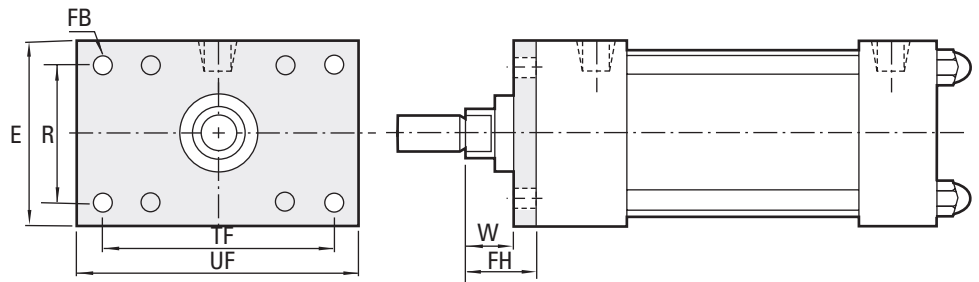
## Code 02 – Side Tapped (MS4)



BORE	1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"	8"
NT	1/4-20	5/16-18	3/8-16	1/2-13	1/2-13	5/8-11	3/4-10	3/4-10
SN	2.250	2.250	2.375	2.625	2.625	2.875	3.125	3.250
TK	.375	.500	.625	.750	.750	1.000	1.125	1.125
TN	.625	.875	1.250	1.500	2.062	2.687	3.250	4.500
XT Std.	1.937	1.937	1.937	2.437	2.437	2.437	2.812	2.812
O.S.	2.312	2.312	2.312	2.687	2.687	2.687	3.062	3.062

Dimensions in inches (mm)

## Code 07 – Head Rectangular Flange (MF1)



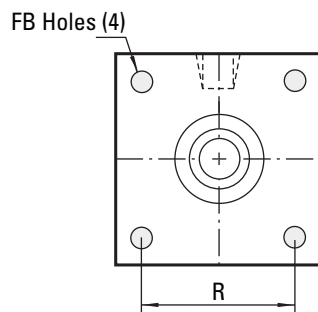
BORE	1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"
E	2.000	2.500	3.000	3.750	4.500	5.500	6.500
FB	.312	.375	.375	.437	.437	.562	.562
G	1.500	1.500	1.500	1.750	1.750	1.750	2.000
FH	.375	.375	.375	.625	.625	.625	.750
R	1.430	1.840	2.190	2.760	3.320	4.100	4.880
TF	2.750	3.375	3.875	4.687	5.437	6.625	7.625
UF	3.375	4.125	4.625	5.500	6.250	7.625	8.625
W Std.	.625	.625	.625	.750	.750	.750	.875
O.S.	1.000	1.000	1.000	1.000	1.000	1.000	1.125

Dimensions in inches (mm)

## Code 08 – Head Square Mount (ME3)

BORE	8"
FB	.687
R	7.570

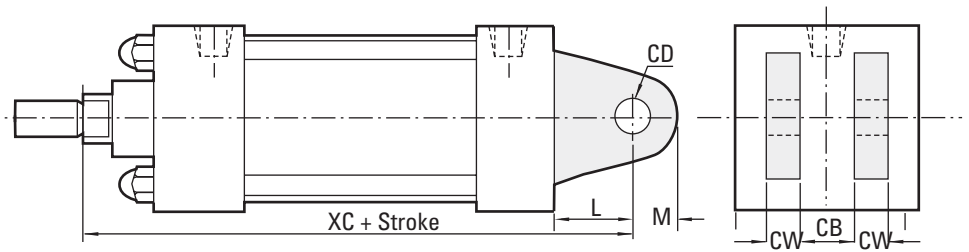
Dimensions in inches (mm)



# Series SL Mounting Styles and Installation Dimensions

1-1/2" to 8" bore sizes

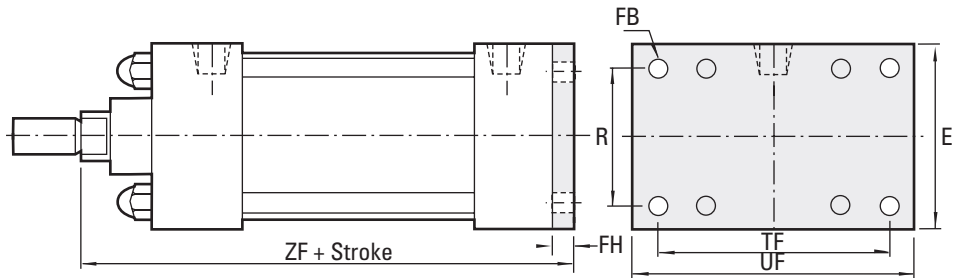
## Code 10 – Cap Fixed Clevis (MP1)



BORE	1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"	8"
CB	.750	.750	.750	1.250	1.250	1.250	1.500	1.500
CD	.500	.500	.500	.750	.750	.750	1.000	1.000
CW	.500	.500	.500	.625	.625	.625	.750	.750
L	.750	.750	.750	1.250	1.250	1.250	1.500	1.500
M	.625	.625	.625	.875	.875	.875	1.000	1.000
XC Std.	5.375	5.375	5.500	6.875	6.875	7.125	8.125	8.250
O.S.	5.750	5.750	5.875	7.125	7.125	7.375	8.375	8.500

Dimensions in inches (mm)

## Code 12 – Rectangular Flange (MF2)



BORE	1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"
E	2.000	2.500	3.000	3.750	4.500	5.500	6.500
FB	.312	.375	.375	.437	.437	.562	.562
G	1.500	1.500	1.500	1.750	1.750	1.750	2.000
FH	.375	.375	.375	.625	.625	.625	.750
R	1.430	1.840	2.190	2.760	3.320	4.100	4.880
TF	2.750	3.375	3.875	4.687	5.437	6.625	7.625
UF	3.375	4.125	4.625	5.500	6.250	7.625	8.625
W Std.	.625	.625	.625	.750	.750	.750	.875
O.S.	1.000	1.000	1.000	1.000	1.000	1.000	1.125
ZF Std.	5.000	5.000	5.125	6.250	6.250	6.500	7.375
O.S.	5.375	5.375	5.500	6.500	6.500	6.750	7.625

Dimensions in inches (mm)



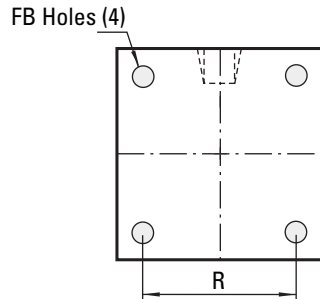
# Series SL Mounting Styles and Installation Dimensions

1-1/2" to 8" bore sizes

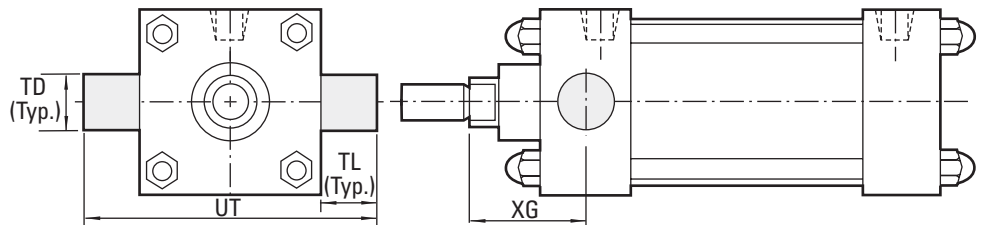
## Code 13 – Cap Square (ME4)

<b>BORE</b>	<b>8"</b>
FB	.687
R	7.570

Dimensions in inches (mm)



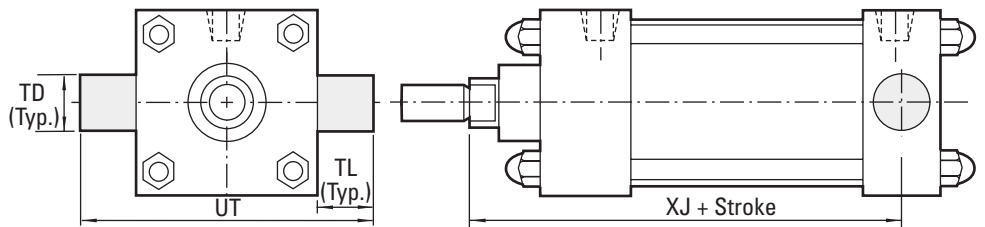
## Code 17 – Head Trunnion (MT1)



<b>BORE</b>	<b>1-1/2"</b>	<b>2"</b>	<b>2-1/2"</b>	<b>3-1/4"</b>	<b>4"</b>	<b>5"</b>	<b>6"</b>	<b>8"</b>
TD	1.000	1.000	1.000	1.000	1.000	1.000	1.375	1.375
TL	1.000	1.000	1.000	1.000	1.000	1.000	1.375	1.375
UT	4.000	4.500	5.000	5.750	6.500	7.500	9.250	11.250
XG Std.	1.750	1.750	1.750	2.250	2.250	2.250	2.625	2.625
O.S.	2.125	2.125	2.125	2.500	2.500	2.500	2.875	2.875

Dimensions in inches (mm)

## Code 16 – Cap Trunnion (MT2)



<b>BORE</b>	<b>1-1/2"</b>	<b>2"</b>	<b>2-1/2"</b>	<b>3-1/4"</b>	<b>4"</b>	<b>5"</b>	<b>6"</b>	<b>8"</b>
TD	1.000	1.000	1.000	1.000	1.000	1.000	1.375	1.375
TL	1.000	1.000	1.000	1.000	1.000	1.000	1.375	1.375
UT	4.000	4.500	5.000	5.750	6.500	7.500	9.250	11.250
XJ Std.	4.125	4.125	4.250	5.000	5.000	5.250	5.875	6.000
O.S.	4.500	4.500	4.625	5.250	5.250	5.500	6.125	6.250

Dimensions in inches (mm)

# Series SL Mounting Styles and Installation Dimensions

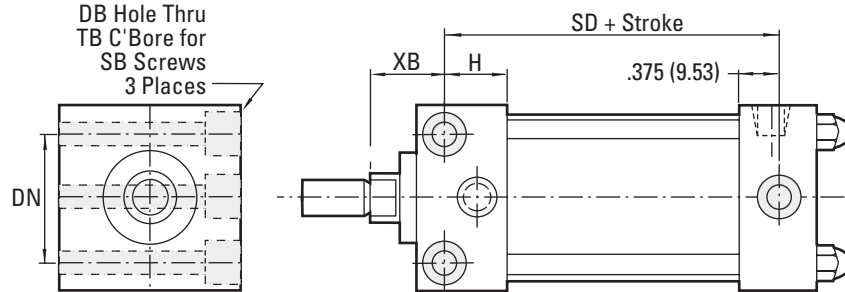
1-1/8" bore

## Code 01 – Bolt Thru (MS8)

### BOLT THRU

DB	.203
DN	1.000
SB	#10
SD	1.750
XB	.625

Dimensions in inches (mm)

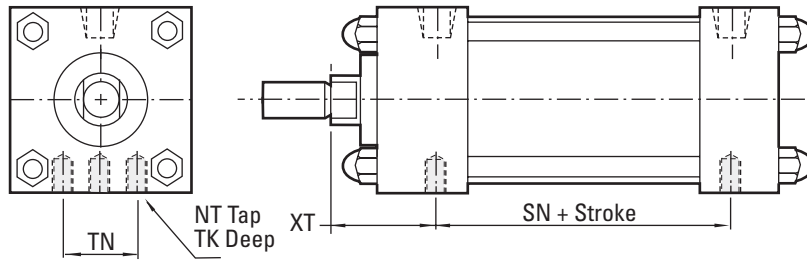


## Code 02 – Tapped (MS9)

### SIDE TAP

NT	10-32
SN	1.750
TK deep	.250
TN	1.000
XT	.625

Dimensions in inches (mm)

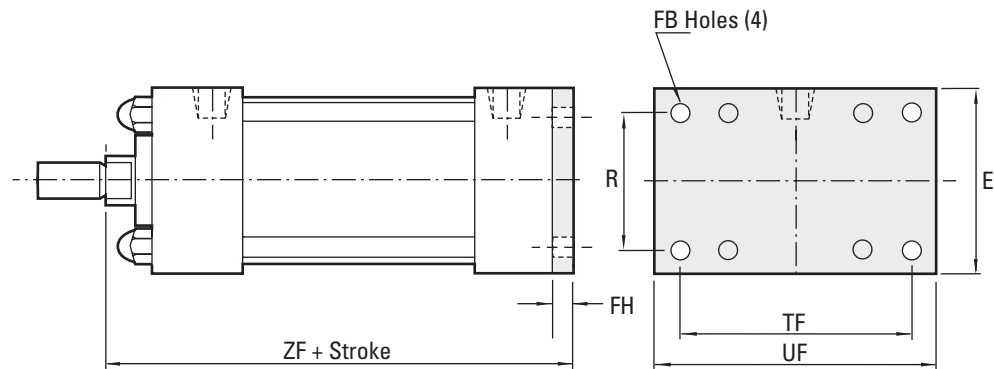


## Code 12 – Cap Rectangular Flange (MF2)

### REAR FLANGE

E	1.500
FB	.219
FH	.250
R	1.000
TF	2.000
UF	2.500
ZF	2.875

Dimensions in inches (mm)



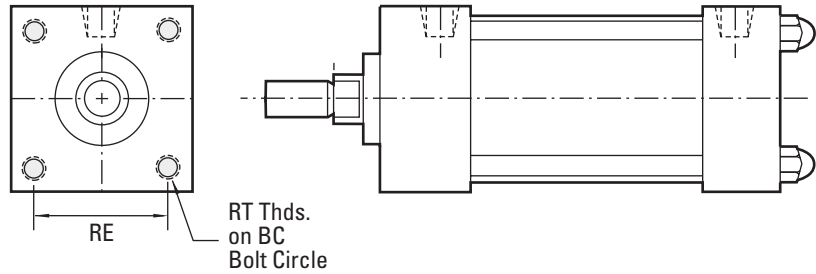
# Series SL Mounting Styles and Installation Dimensions

1-1/8" bore

## Code 18 – Head Tapped Face (MR1)

30 (MR1) HEAD FACE	
BC	1.593
RE	1.125
RT	10-32

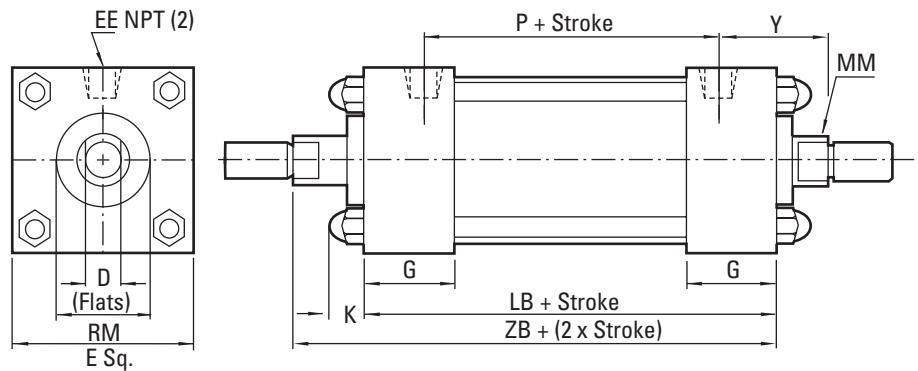
Dimensions in inches (mm)



## Code 41 – Double Rod, No Mounts (MX0)

DOUBLE ROD END CYLINDER WITH 01 (MX0) BASIC	
D	Std. .312
O	.S. .437
E	1.500
EE	.125
G	.875
K	.400
LB	2.250
MM	Std. .370
	O.S. .495
P	1.375
RM	Std. .750
	O.S. 1.000
Y	.938
ZB	3.250

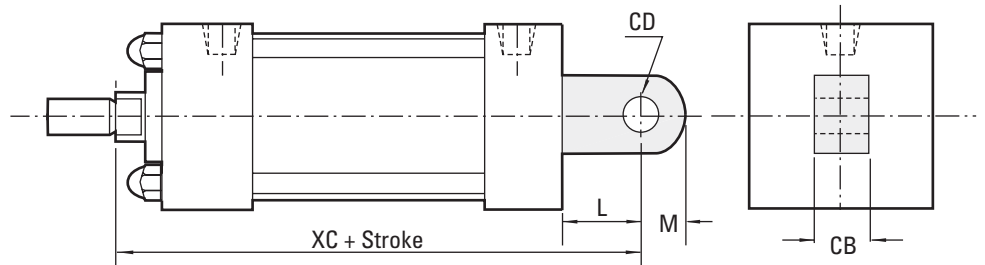
Dimensions in inches (mm)



## Code 47 – Fixed Eye (MP3)

17 (MP3) FIXED EYE	
CB	.375
CD	.375
L	.437
M	.375
XC	3.062

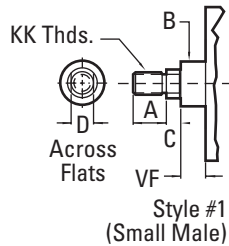
Dimensions in inches (mm)



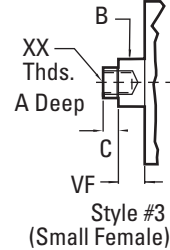
# Series SL Rod End Types

## Standard & Optional Rod Ends

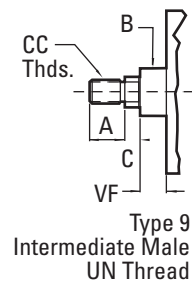
### Type 5: Small Male UN Thread



### Type 2: Female UN Thread



### Type 9: Intermediate Male UN Thread



BORE		1-1/8"	1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"	8"
ø Rod	Std.	3/8"	5/8"	5/8"	5/8"	1"	1"	1"	1-3/8"	1-3/8"
	(MM) O.S.	1/2"	1"	1"	1"	1-3/8"	1-3/8"	1-3/8"	1-3/4"	1-3/4"
A	Std.	.625	0.750	0.750	0.750	1.125	1.125	1.125	1.625	1.625
	O.S.	.750	1.125	1.125	1.125	1.625	1.625	1.625	2.000	2.000
B +.000 -.002	Std.	—	1.125	1.125	1.125	1.500	1.500	1.500	2.000	2.000
	O.S.	—	1.500	1.500	1.500	2.000	2.000	2.000	2.375	2.375
C	Std.	.250	0.375	0.375	0.375	0.500	0.500	0.500	0.625	0.625
	O.S.	—	0.500	0.500	0.500	0.625	0.625	0.625	0.750	0.750
CC	Std.	3/8 – 24	7/16 – 20	7/16 – 20	7/16 – 20	7/8 – 14	7/8 – 14	7/8 – 14	1-1/4 – 12	1-1/4 – 12
	O.S.	1/2 – 20	7/8 – 14	7/8 – 14	7/8 – 14	1-1/4 – 12	1-1/4 – 12	1-1/4 – 12	1-1/2 – 12	1-1/2 – 12
D	Std.	.312	0.500	0.500	0.500	0.812	0.812	0.812	1.125	1.125
	O.S.	.437	0.812	0.812	0.812	1.125	1.125	1.125	1.500	1.500
E			2	2.5	3	3.750	4.500	5.500	6.500	8.500
EE	Std.		0.250	0.250	0.250	0.375	0.375	0.375	0.500	0.500
	O.S.		0.375	0.375	0.375	0.500	0.500	0.500	0.750	0.750
FF	Std.		5/8 – 18	5/8 – 18	5/8 – 18	1 – 14	1 – 14	1 – 14	1-3/8 – 12	1-3/8 – 12
	O.S.		1 – 14	1 – 14	1 – 14	1-3/8 – 12	1-3/8 – 12	1-3/8 – 12	1-3/4 – 12	1-3/4 – 12
G			1.500	1.500	1.500	1.750	1.750	1.750	2	2
J			1	1	1	1.250	1.250	1.500	1.500	1.500
K			0.469	0.531	0.531	0.625	0.625	0.830	0.830	1
KK	Std.		1/2 – 20	1/2 – 20	1/2 – 20	3/4 – 16	3/4 – 16	3/4 – 16	1 – 14	1 – 14
	O.S.		3/4 – 16	3/4 – 16	3/4 – 16	1 – 14	1 – 14	1 – 14	1-1/4 – 12	1-1/4 – 12
LB			3.625	3.625	3.750	4.250	4.250	4.50	5	5.125
P			2.125	2.125	2.250	2.625	2.625	2.875	3	3.125
RE			1.430	1.840	2.190	2.760	3.320	4.100	4.880	6.435
VF	Std.	.125	0.625	0.625	0.625	0.875	0.875	0.875	1	1
	O.S.	—	0.875	0.875	0.875	1	1	1	1.125	1.125
XX	Std.	1/4 – 28	7/16 – 20	7/16 – 20	7/16 – 20	3/4 – 16	3/4 – 16	3/4 – 16	1 – 14	1 – 14
	O.S.	3/8 – 24	3/4 – 16	3/4 – 16	3/4 – 16	1 – 14	1 – 14	1 – 14	1-1/4 – 12	1-1/4 – 12
Y	Std.		2.000	2	2	2.437	2.437	2.437	2.875	2.875
	O.S.		2.375	2.375	2.375	2.687	2.687	2.687	3.125	3.125
ZB	Std.		5.094	5.156	5.281	6.250	6.250	6.705	7.455	7.750
	O.S.		5.469	5.531	5.656	6.500	6.500	6.955	7.705	8

Dimensions in inches (mm)

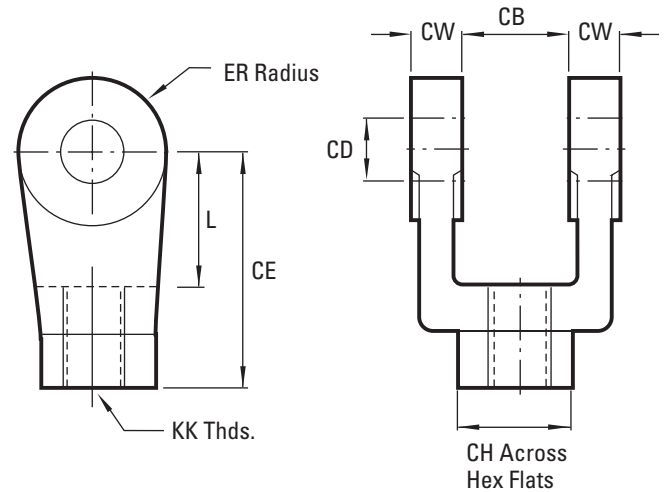
# Accessories for SL Cylinders

1-1/2" to 8" bore sizes

## Rod Clevis 303 Stainless Steel

	SL62008A	SL6200CA	SL62010A	SL62016A
CB	.750	1.250	1.500	2.000
CD	.500	.750	1.000	1.375
CE	1.500	2.375	3.125	4.125
CH	1.000	1.250	1.500	2.000
CW	.500	.625	.750	1.000
ER	.500	.750	1.000	1.375
KK	1/2-20	3/4-16	1-14	1-1/4 - 12
L	.750	1.250	1.500	2.125

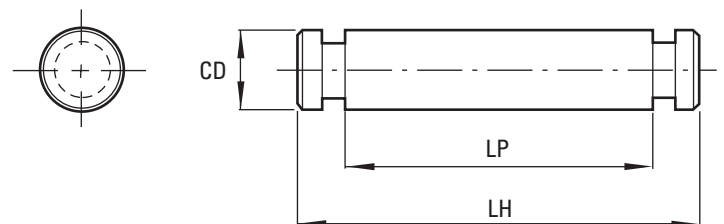
Dimensions in inches (mm)



## NFPA Pin 303 Stainless Steel

	SL83008A	SL8300CA	SL83010A	SL83016A
CD	500	.750	1.000	1.375
LH	2.219	3.125	3.750	5.625
LP	1.875	2.750	3.250	4.375

Dimensions in inches (mm)



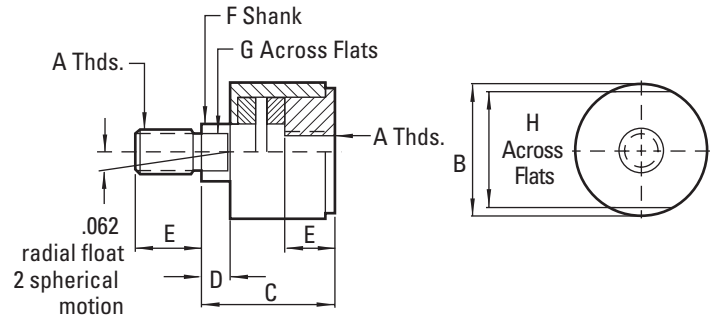
# Accessories for SL Cylinders

1-1/2" to 8" bore sizes

## Rod Alignment Coupler

	SL7756A- 7/16-20	SL7756A- 1/2-20	SL7756A- 3/4-16	SL7756A- 1-14
A	7/16-20	1/2 - 20	3/4 - 16	1-14
B	1.250	1.250	1.750	2.500
C	2.000	2.000	2.312	2.937
D	.500	.500	.500	.500
E	.750	.750	1.125	1.625
F	.625	.625	.969	1.375
G	.563	.563	.812	1.156
H	1.125	1.125	1.500	2.250
Max Pull (lbs)	2.250	3.150	7.750	12.250

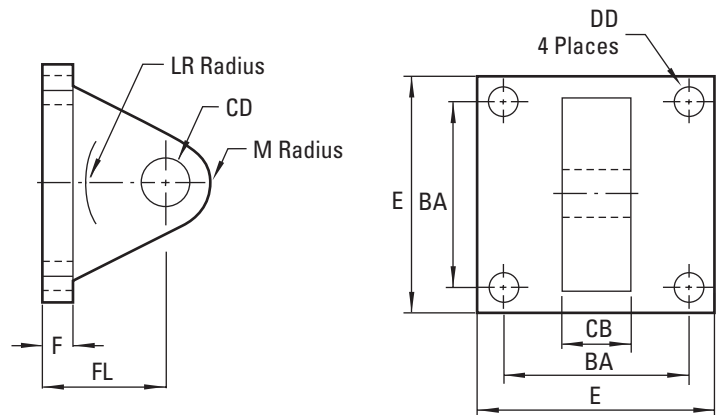
Made of 303 Stainless Steel, the Rod Alignment Coupler allows 1/16" of radial float and 2° of spherical movement.  
Dimensions in inches (mm)



## Eye Bracket 303 Stainless Steel

	SL78008A	SL7800CA	SL78010A
BA	1.625	2.562	3.250
CB	.750	1.250	1.500
CD	.500	.750	1.000
DD	.406	.531	.656
E	2.500	3.500	4.500
F	.375	.625	.750
FL	1.125	1.875	2.250
LR	.750	1.250	1.500
M	.500	.750	1.000

Dimensions in inches (mm)



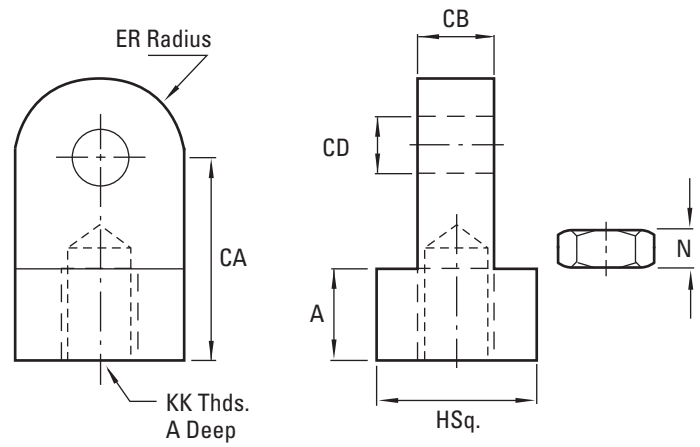
# Accessories for SL Cylinders

1-1/8" bore

## Rod eye 303 stainless steel w/jam nut

	<b>SL60006A*</b>	<b>SL60006B**</b>
A	.437	.437
CA	.875	.875
CB	.375	.375
CD	.375	.375
ER	.375	.375
H	.750	.750
KK	3/8-24	1/2-20
N	.219	.312

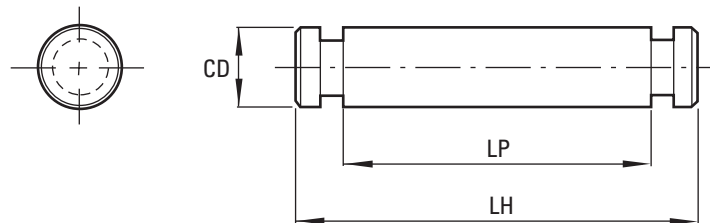
\* Includes jam nut (3/8-24)  
 \*\* Includes jam nut (1/2-20)  
 Dimensions in inches (mm)



## Pivot pin 303 stainless steel

<b>PIVOT PIN</b>	<b>SL83006A</b>
CD	.375
LH	1.250
LP	1.032

Dimensions in inches (mm)



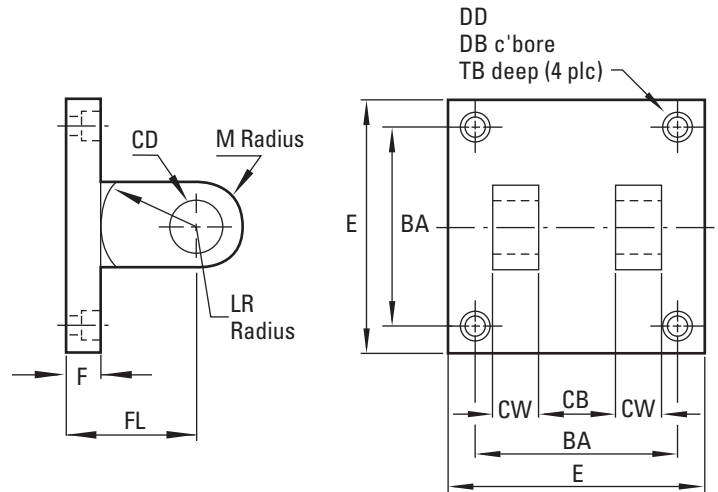
# Accessories for SL Cylinders

1-1/8" bore

## Clevis bracket 304 stainless steel

SL61006A	
BA	1.125
CB	.375
CD	.375
CW	.250
DB	.328
DD	.203
E	1.50
F	.500
FL	1.125
LR	.625
M	.375
TB	.260

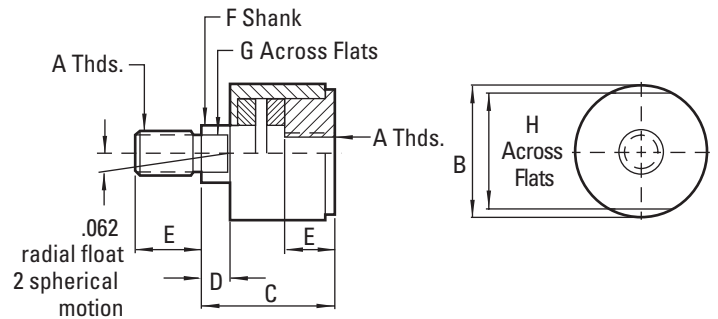
Dimensions in inches (mm)



## NFPA Rod alignment coupler

SL7756A-3/8-24	
A	3/8 - 24
B	.875
C	1.250
D	.250
E	.625
F	.375
G	.312
H	.750
Maximum pull	1,375

Dimensions in inches (mm)



Made of 303 Stainless Steel, the Rod Alignment Coupler allows 1/16" of radial float and 2° of spherical movement.

This prevents cylinder binding due to misalignment thus extending bearing and seal life, and permits greater tolerance between the center line of the cylinder and mating part for simplified installation.



# Series SL Technical Information

## Operating Temperatures

Series SS -40°F to 200°F  
(-40°C to 93°C)

## Operating Pressure

250 psig Air (17.2 Bar)  
400 psig Hydraulic (27.6 Bar)  
Bore Sizes: 1-1/8", 1-1/2", 2",  
2-1/2", 3-1/4", 4", 5", 6", 8"

## Lubrication

None required  
Eaton's Vickers™ pneumatic cylinders are rated for "no lube added" service. All internal components are lubricated at time of assembly with a Teflon® based grease.

## Materials

Head and End Caps: 304 stainless steel  
Tube: 304 stainless steel  
Piston Rod: hard chrome plated 303 stainless steel  
Piston: 2011-T451 aluminum with Teflon® composite wearband  
Rod Bearings: 304 stainless steel with Teflon® composite wearband  
Seals: urethane rod seal and wiper, nitrile piston seals  
Tie Rods: 303 stainless steel

## Side Loading

Cylinders are specifically designed to push and pull. Side loading of the piston rod should be avoided to ensure maximum operating performance and life.  
Care should be taken during installation to properly align the load to be moved with the center line of the cylinder. The use of a rod alignment coupler is strongly recommended whenever possible.

## Cylinder Weights

In pounds (kilograms)

BORE	ROD	MOUNTING CODE											
		24, 02, 01, 08, 13, 18		07 & 12		*10 & 47		17, 16, 47		ADD PER INCH OF STROKE			
1-1/8"	3/8"	(28.58)	(9.53)	1.1	(.49)	1.5	(.68)	1.3	(.58)	–	–	.13	(.05)
	1/2"	(12.70)	(12.70)	1.2	(.54)	1.6	(.72)	1.4	(.63)	–	–	.15	(.06)
1-1/2"	5/8"	(38.10)	(15.88)	3.3	(1.49)	4.0	(1.81)	3.8	(1.72)	3.8	(1.72)	.3	(.13)
	1"	(25.40)	(25.40)	4.1	(1.85)	4.8	(2.17)	4.6	(2.08)	4.6	(2.08)	.4	(.18)
2"	5/8"	(50.80)	(15.88)	5.9	(2.67)	7.0	(3.17)	6.4	(2.90)	6.4	(2.90)	.5	(.22)
	1"	(25.40)	(25.40)	6.3	(2.85)	7.4	(3.35)	6.8	(2.94)	6.8	(3.08)	.6	(.27)
2-1/2"	5/8"	(63.50)	(15.88)	8.0	(3.62)	9.5	(4.30)	8.7	(3.94)	8.5	(3.85)	.6	(.27)
	1"	(25.40)	(25.40)	8.5	(3.85)	10.0	(4.53)	9.2	(4.17)	9.0	(4.08)	.7	(.31)
31/4"	1"	(82.55)	(25.40)	15.0	(6.80)	18.7	(8.48)	16.0	(7.25)	15.5	(7.03)	.8	(.36)
	13/8"	(34.93)	(34.93)	15.5	(7.03)	19.2	(8.70)	16.5	(7.48)	16.0	(7.25)	1.0	(.45)
4"	1"	(101.60)	(25.40)	23.0	(10.43)	28.0	(12.70)	27.0	(12.24)	23.5	(10.65)	1.0	(.45)
	13/8"	(34.93)	(34.93)	23.5	(10.65)	28.5	(12.92)	27.5	(12.47)	24.0	(10.88)	1.2	(.54)
5"	1"	(127.00)	(25.40)	34.5	(15.64)	42.0	(19.05)	41.0	(18.59)	35.0	(15.87)	1.1	(.49)
	13/8"	(34.93)	(34.93)	35.0	(15.87)	42.5	(19.27)	41.5	(18.82)	35.5	(16.10)	1.3	(.58)
6"	13/8"	(152.40)	(34.93)	60.0	(27.21)	71.9	(32.61)	69.0	(31.29)	61.2	(27.76)	1.5	(.68)
	13/4"	(44.45)	(44.45)	62.0	(28.12)	73.9	(33.52)	71.0	(32.20)	63.2	(28.66)	1.7	(.77)
8"	13/8"	(203.20)	(34.93)	79.0	(35.83)	–	–	88.0	(39.91)	80.2	(36.37)	2.0	(.90)
	13/4"	(44.45)	(44.45)	82.0	(37.19)	–	–	91.0	(41.27)	83.2	(37.73)	2.3	(1.04)

\*Weight includes pivot pin

# Series SL Technical Information

## Piston Rod Diameter Selection

Applications requiring long extend (push) strokes may require oversize piston rod diameters to prevent buckling. To determine the correct rod diameter for your application follow these simple steps:

1. Select the thrust from the **Cylinder Force and Volume Chart** that is required for your application.

$$\text{Thrust} = \text{Piston Surface Area} \times \text{Operating Pressure}$$

2. From the **Cylinder Mounting Diagrams** select the mounting style being used.
3. With the piston rod fully extended, calculate the value of **D** (in inches) using the formula shown or the cylinder mounting diagram selected in step #2.
4. Locate the value of **D** (in inches) at the bottom of the **Selection Chart**. Enter the chart at this point and move vertically upward until intersecting with the horizontal line representing the required thrust which was selected in step #1. The band within which these lines intersect represents the minimum recommended piston rod diameter.

ing the required thrust which was selected in step #1. The band within which these lines intersect represents the minimum recommended piston rod diameter.

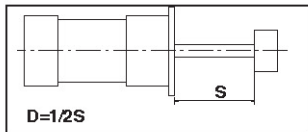
piston rod diameter selection instructions above) is less than 40", a stop tube is **not** required. However, if **D** is 40" or more, 1" of stop tube is recommended for every 10" (or fraction thereof) over 40".

## Stop Tube Selection

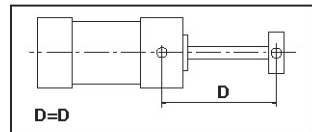
Stop tubes enhance the transverse load carrying capability of a long stroke cylinder by increasing the distance between the piston and rod bearing at full extension. When the value of **D** (calculated from the

## Cylinder Mounting Diagrams

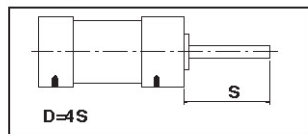
### Firmly Guided Rod End



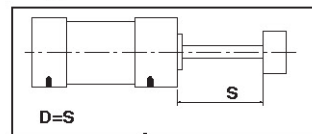
### Head Trunnion



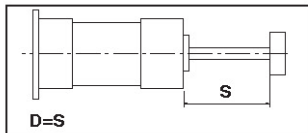
### Unsupported Rod End



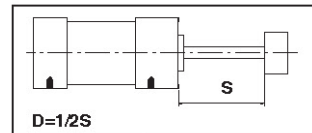
### Supported Rod End



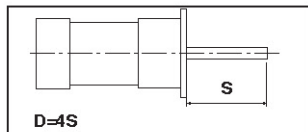
### Supported Rod End



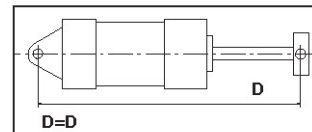
### Firmly Guided Rod End



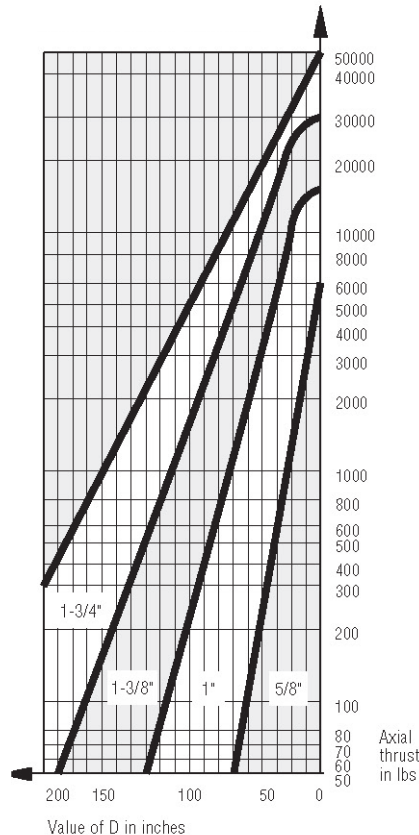
### Unsupported Rod End



### Cap Clevis or Cap Trunnion



## Selection Chart



# Series SL Technical Information

## Cylinder Force and Volume Charts

Extend Forces in pounds (newtons)

BORE	PISTON AREA	PSI (BAR)										VOLUME CU FT (CM3) DISPLACEMENT PER INCH
		40 (3)	60 (4)	80 (6)	100 (7)	150 (10)	200 (14)					
1-1/8"	.99 (6.41)	40 (177)	60 (265)	80 (354)	99 (442)	149 (664)	200 (890)	.00057 (16)				
1-1/2"	1.77 (11.40)	71 (315)	106 (472)	142 (629)	177 (786)	266 (1179)	353 (1570)	.00102 (29)				
2"	3.14 (20.27)	126 (559)	189 (839)	251 (1119)	314 (1398)	471 (2097)	628 (2793)	.00182 (52)				
2-1/2"	4.91 (31.67)	196 (874)	295 (1311)	393 (1748)	491 (2185)	737 (3277)	982 (4368)	.00284 (80)				
3-1/4"	8.30 (53.32)	332 (1477)	498 (2215)	664 (2953)	830 (3692)	1245 (5538)	1659 (7379)	.00480 (136)				
4"	12.57 (81.07)	503 (2237)	754 (3355)	1005 (4473)	1257 (5592)	1886 (8388)	2513 (11178)	.00727 (206)				
5"	19.64 (126.71)	785 (3491)	1178 (5240)	1571 (6988)	1964 (8736)	2946 (13104)	3928 (17472)	.01137 (322)				
6"	28.27 (182.39)	1130 (5026)	1696 (7544)	2262 (10061)	2827 (12574)	4240 (18860)	5654 (25149)	.01837 (520)				
8"	50.26 (324.26)	2010 (8940)	3015 (13411)	4020 (17881)	5026 (22356)	7539 (33533)	10052 (44711)	.02227 (631)				

Deduct these Forces for Retract Strokes

BORE	ROD AREA	PSI (BAR)										VOLUME CU FT (CM3) DISPLACEMENT PER INCH
		40 (3)	60 (4)	80 (6)	100 (7)	150 (10)	200 (14)					
3/8"	.112 (.72)	5 (20)	7 (30)	9 (40)	11 (50)	17 (75)	22 (100)	.0007 (2)				
1/2"	.196 (1.26)	8 (35)	12 (52)	16 (70)	20 (87)	30 (131)	39 (174)	.00011 (3)				
5/8"	.307 (1.98)	12 (53)	18 (80)	25 (111)	31 (138)	46 (205)	61 (271)	.0018 (5)				
1"	.785 (5.06)	31 (138)	47 (209)	63 (280)	70 (351)	118 (525)	157 (698)	.00045 (13)				
1-3/8"	1.485 (9.58)	59 (262)	89 (396)	119 (529)	149 (663)	222 (997)	297 (1321)	.00086 (24)				
1-3/4"	2.404 (15.51)	95 (423)	144 (641)	192 (854)	240 (1068)	360 (1601)	480 (2135)	.00139 (39)				

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