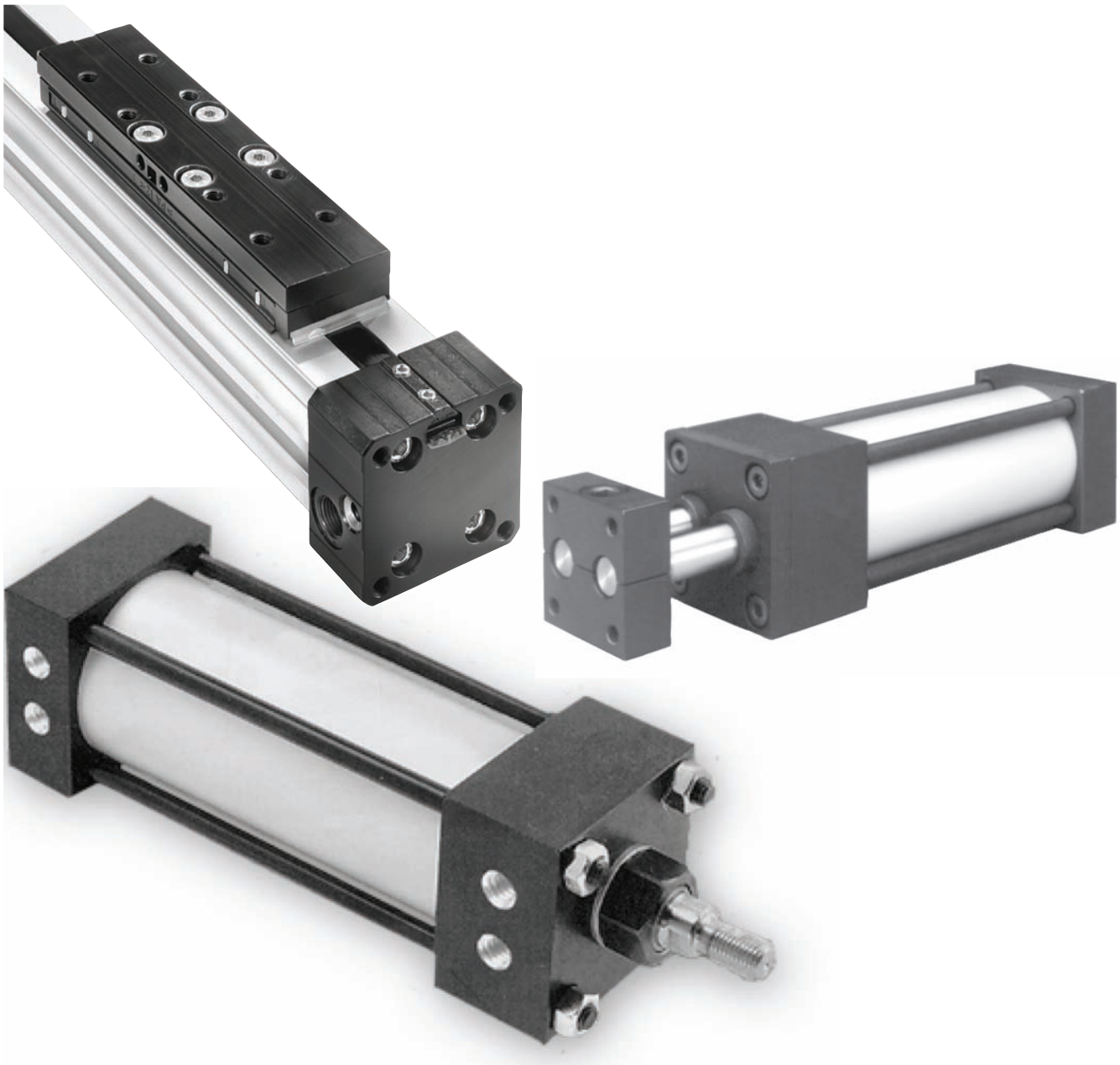
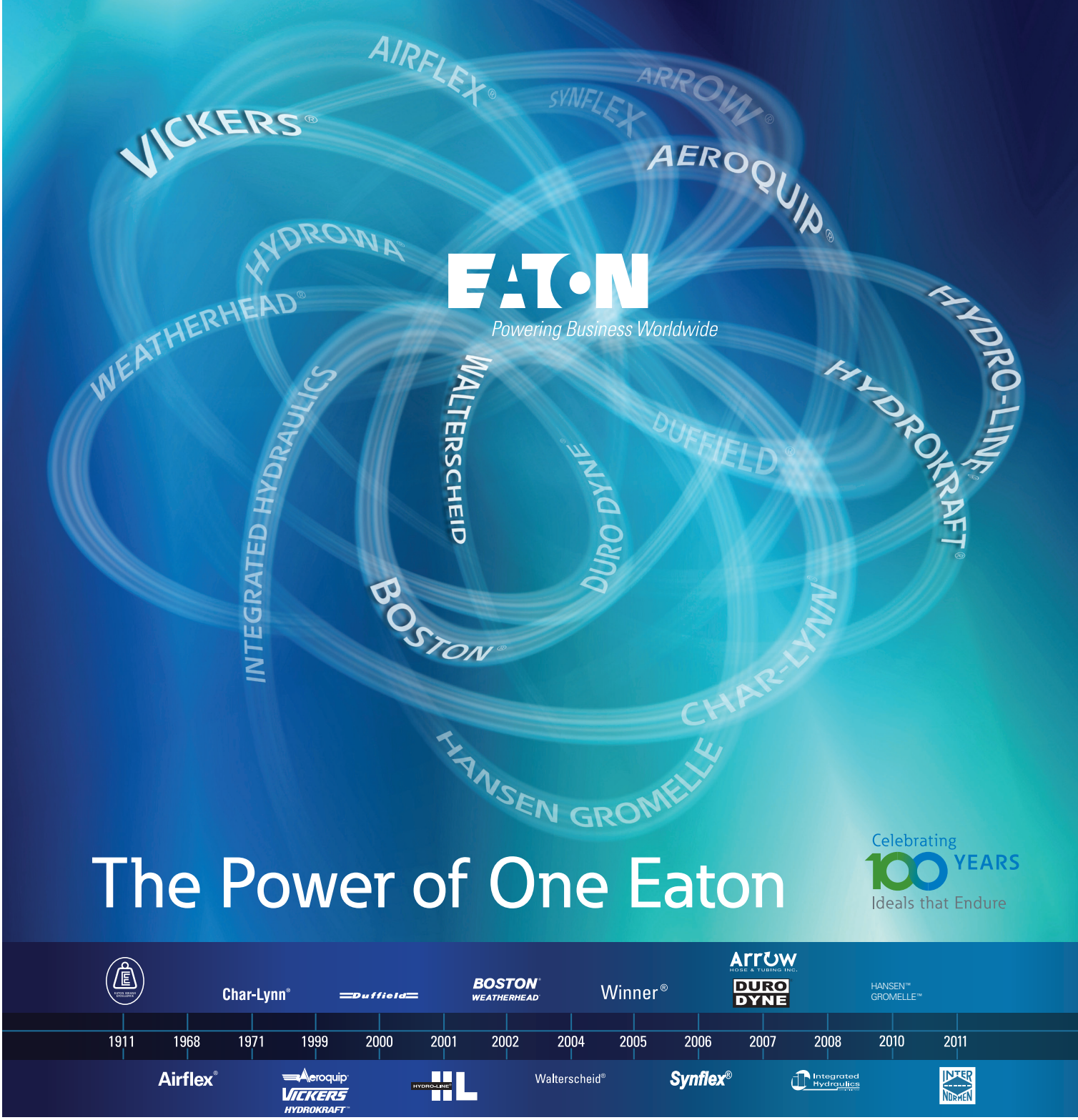
Vickers Pneumatic Cylinders Light Duty

L Series



Powering Business Worldwide



EATON
Powering Business Worldwide

There's a certain energy at Eaton. It's the power of integrating the competencies of some of the world's most respected names to build a brand you can trust to meet every power management need. The energy created supports our commitment to powering business worldwide.

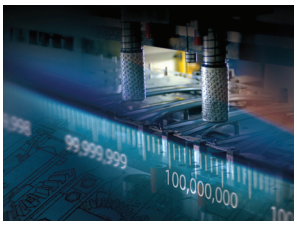
As the world's demand for high-efficiency hydraulic systems for mobile and stationary applications increase, Eaton is helping to solve these challenges more reliably, efficiently, and sustainably. Our goal is simple; to provide unique solutions across a wide range of markets that keep businesses on the leading edge of change. Visit Eaton.com/hydraulics/fusion.

That's the power of One Eaton.

Serving eight key segments - sharing one focus

Alternative Energy

Making energy sources technically practical and economically sound requires the kind of control made possible by high-quality components. When Eaton is on the inside, you will experience the reliable, consistent performance to create and capture energy—making renewable energy an every-day energy.



Discrete Manufacturing

Produce at peak efficiency with the superior precision and repeatability of Eaton products. Eaton hydraulic components provide the precise control and consistent operation required for virtually every step in your manufacturing operation. With Eaton, we'll help you redefine the meaning of raw productivity.

Oil & Gas

As the oil & gas industry continues to face further globalization and consolidation, large-scale organizations that can meet your needs in every corner of the world are more difficult to find. At Eaton, our portfolio of products is only surpassed by our tremendous reach.

Processing

Whatever your industry, no matter which processes you manage, Eaton parts and systems help keep you up and running. Our components make equipment more efficient and easier to use, so you get optimal machine performance and maximum productivity.

Agriculture & Forestry

There's a reason farming and forestry are called "working the land." These segments involve some of the hardest work and longest hours of any sector in the economy. Your productivity and profitability depend on the way you manage time and tasks.

Commercial Vehicles

Eaton technologies can make your driving operation more successful. Greater comfort and productivity help increase driver retention, while reduced emissions, leaks, and noise improve environmental performance. Increased efficiencies overall mean lower costs and higher net revenue.

Material Handling

Eaton hydraulic systems provide the precise control and consistent operation required for material handling and utility work. With a broad selection of products and solutions built in, Eaton helps make you a master of your domain.

Construction & Mining

When you work on a large scale, even the details are big. You need to trust every part of the equipment that lets you handle construction and mining jobs. For reliable components that deliver consistent performance in extreme conditions, turn to Eaton.

Eaton is a leading diversified power management company

Eaton provides reliable, efficient and safe power management for a growing number of industries.

Understanding and helping our customers succeed

- Listening and understanding to requirements and business drivers
- Delivering solutions with value propositions to solve the critical business needs

Knowing what's important to our customers and integrating that knowledge into the fabric of our business

- ...to deliver innovative, quality products
- ...to respond fast
- ...to provide dedicated customer service and support around the globe

Our strength is global reach with local responsiveness and support

- Customers served in more than 150 countries
- Diverse channels ensure reliable availability and support
- Design and engineering teams provide support for standard products and custom solutions
- Eaton experts offer efficient product and application training

Table of Contents

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 8, 72, 93, 108 and 120 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.

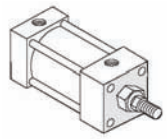
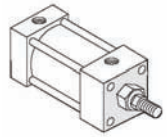
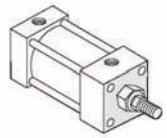
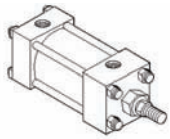
Replacement Parts

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	
Non-Lubricated Air/Hydraulic Cylinder VP Series 	Packaging, bottling, machine tool	• High strength steel design for robust performance • Superior cushion seal design for smoother, faster operation	• Wide range of standard options for faster response
Corrosion Resistant Air Cylinder (NFPA) VN Series 	Packaging, bottling, machine tool	• Unique hybrid aluminum/stainless combination for ultimate corrosion protection at a better price	• Better performance & protection than competitive aluminum products
ISO 6431/VDMA 24562 Air Cylinder ML Series 	Packaging, bottling, material handling, machine tool, auto assembly, commercial laundry	• ISO 6431/VDMA 24562 dimensionally interchangeable • Tie rod design with smooth body	• Broad standard options for flexibility • Collar nut design for bolt-on mountings • Fast product delivery
Rodless Air Cylinder RL Series 	Paper mill, textiles, material handing, packaging, transfer lines	• Unique sealing system with higher pressure rating in industry • Lightweight, space saving design built at 50% space of conventional cylinders	• Long strokes without rod buckling risk; high load carrying capability • Simple, cost-effective guide options • Designed for serviceability
Stainless Steel Air Cylinder (NFPA) SL Series 	Food processing, medical, packaging, milking parlors, automatic car washes	• NFPA tie rod dimensionally interchangeable • Superior corrosion resistance for tough environments	• Robust design with nonmetallic piston wear band, composite bearing insert, and stainless steel rod cartridge
Non-Rotating Cylinders (NFPA) BL Series 	Machine tool, fixturing, clamping, packaging	• NFPA interchangeable • Twin rod design for non-rotating, anti-torque applications	

Series VP/VN Features

Wiper Seal

Urethane wiper seal keeps contaminates 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

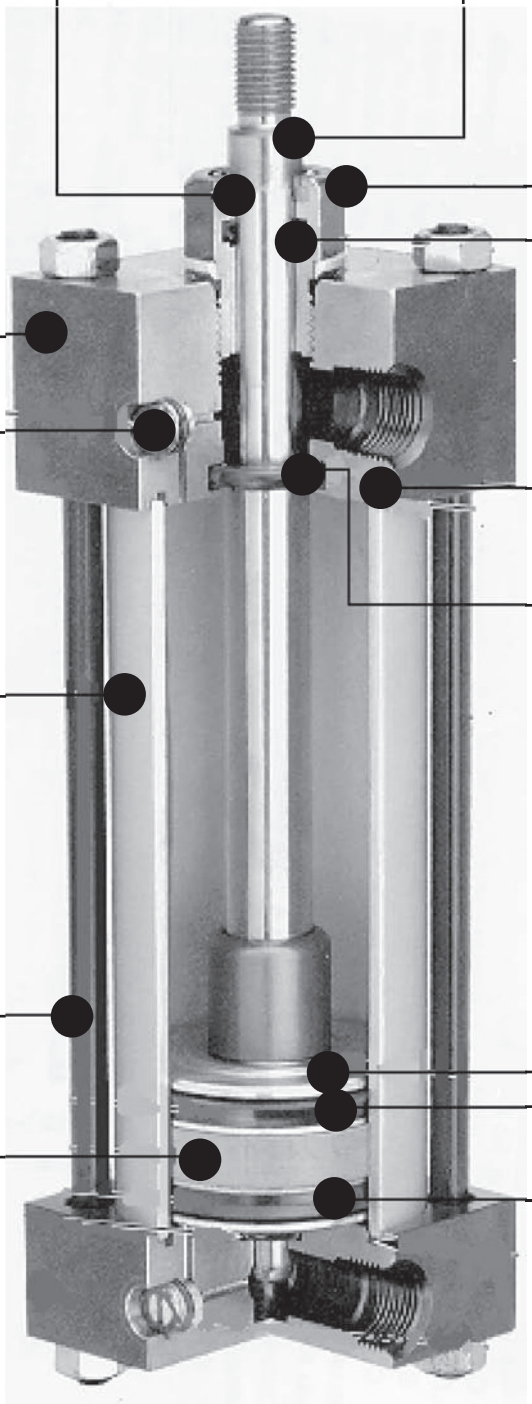
High-strength aluminum alloy tubing is clear anodized on the O.D. and hard anodic coated on the I.D., resulting in a smooth, file hard (60RC), corrosion and score resistant surface finish for extended seal life in Series VP. Stainless steel tubing is used in Series VN option.

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

VP	10	AT	2	N	1	K	A	45A	00	0
1, 2	3, 4	5, 6	7	8	9	10	11	12, 13, 14	15, 16	17

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

VP – Non-lubricated air/ hydraulic cylinder

VN – Corrosion resistant air cylinder

3, 4 **Mounting Style**

Code	Style	ANSI Code
	1-1/2 thru 8" Bore	
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
	3/4 thru 1-1/8 Bore	
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

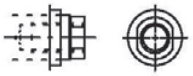
5, 6 **Bore and Rod Diameter**

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

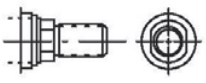
7 **Rod End Types**

Code

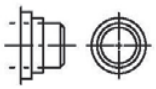
Type 2 Female UN Thread



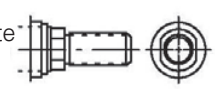
Type 5 Small Male UN Thread



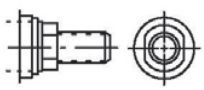
Type 6 Plain No Attachment



Type 9 Intermediate Male UN Tread



Type S Studded Female UN Tread



8 **Seal Options**

N – Standard

T – Viton®

9 **Port Options**

1 – Standard

2 – Oversized (NFPA)

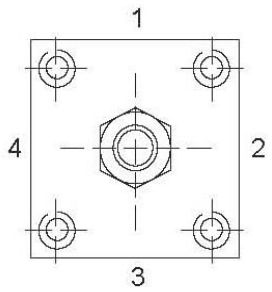
10 **Port Locations**

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	5/16

– 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

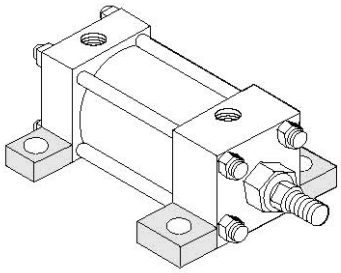
The variety of standard ANSI/ NFPA mountings available in 1-1/2"-8" bore Series VN/ VP gives you a broad selection to match the proper mount to your application. Eaton offers rigid mounts (including side lug mounts, flange mounts, and extended tie rod mounts) and swivel mounts (including clevis mounts and trunnion mounts). A guide to proper mount selection is provided on pages 12 through 45. 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

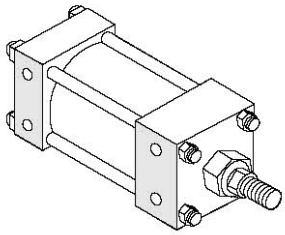
Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified.

Note: In the mounting information, some mounts have been 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.

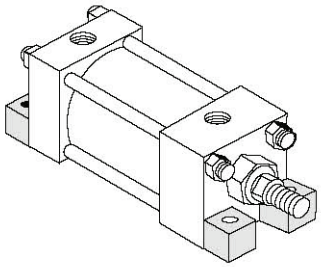
Code 01 (MS2)
Side Lug



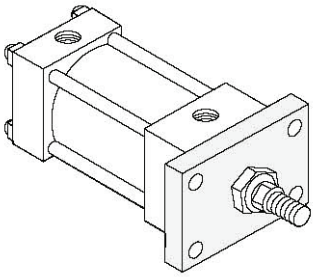
Code 02 (MS4)
Tapped



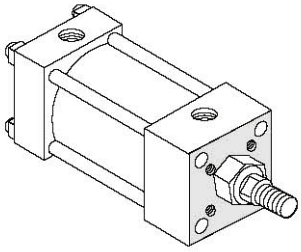
Code 03 (MS7)
End Lug



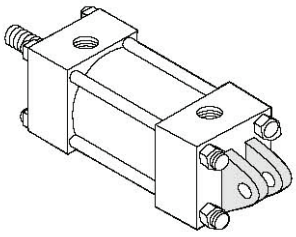
Code 07 (MF1)
Head Rectangular Flange



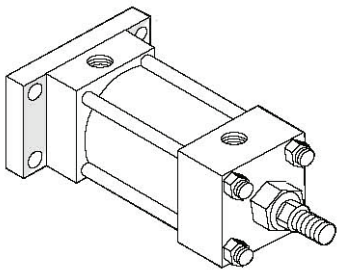
Code 08 (ME3)
Head Square



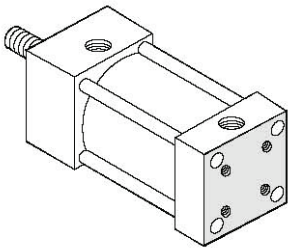
Code 10 (MP1)
Cap Fixed Clevis



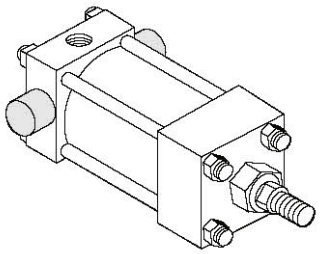
Code 12 (MF2)
Cap Rectangular Flange



Code 13 (ME4)
Cap Square



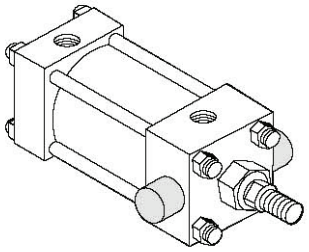
Code 16 (MT2)
Cap Trunnion



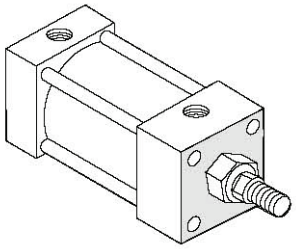
Series VP/VN
Mounting Style

1-1/2 – 8 inch Bores

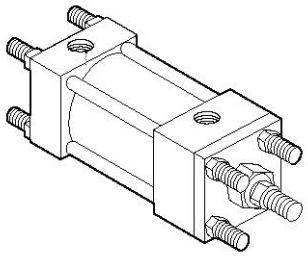
Code 17 (MT2)
Head Trunnion



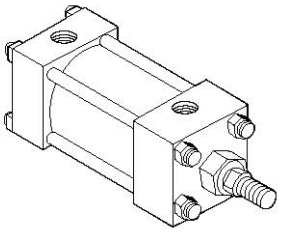
Code 18 Sleeve Nut
Construction for Tapped
Faces



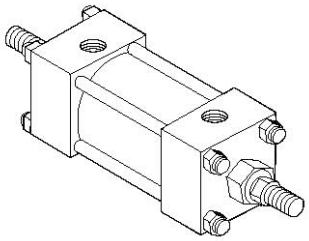
Codes 21 (MX2) Cap, 22
(MX3) head, 23 (MX1)
Extended Tie Rod



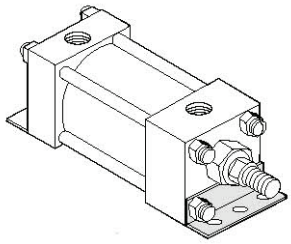
Code 24 (MX0)
No Mounts



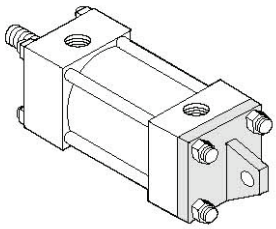
Double Rod
Code 41 (MX0)
No Mounts



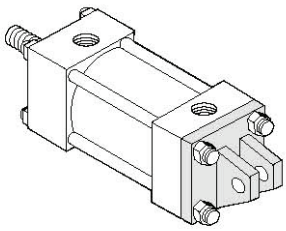
Code 45 (MS1)
Angle



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

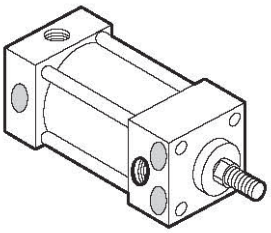
The variety of standard ANSI/ NFPA mountings available in 3/4"-1/8" bore Series VN/ VP gives you a broad selection to match the proper mount to your application. Eaton offers rigid mounts (including side lug mounts, flange mounts, and extended tie rod mounts) and swivel mounts (including clevis mounts and trunnion mounts). A guide to proper mount selection is provided on pages 51 through 58. 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

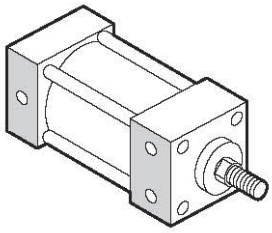
Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified.

Note: In the mounting information, some mounts have been 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.

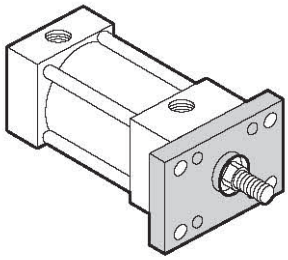
Code 01 (MS8)
Bolt Thru



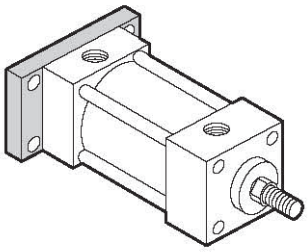
Code 02 (MS9)
Tapped



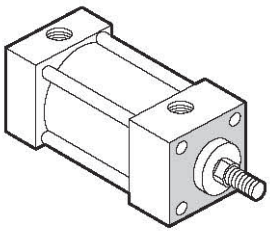
Code 07 (MF1)
Head Rectanular Flange



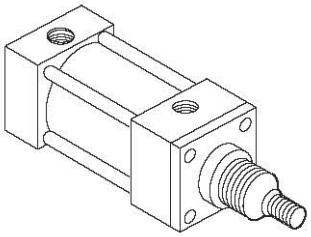
Code 12 (MF2)
Cap Rectangular Flange



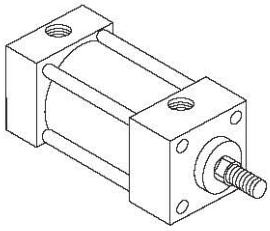
Code 18 (MR1)
Head Tapped Face



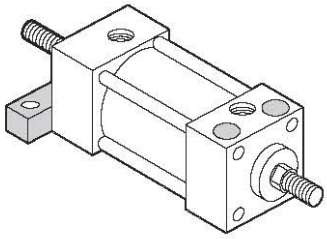
Code 20 (MNR1)
Threaded Nose Mounts



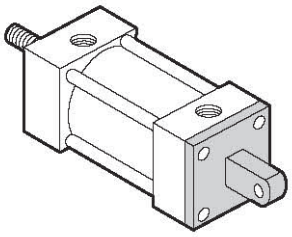
Code 24 (MX0)
No Mounts



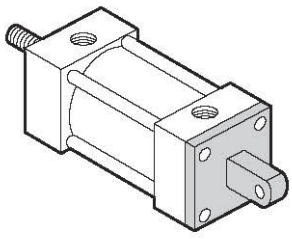
Code 25 Double Rod,
Bolt Thru



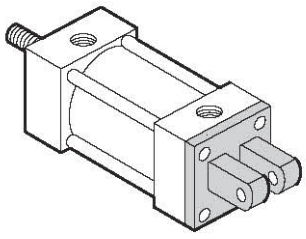
Code 47 (MP3)
Fixed Eye



Code 48 (MP4)
Detachable Eye



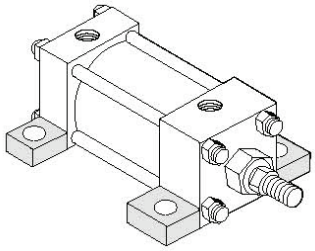
Code 50 (MP2)
Detachable Clevis



Series VP/VN
Mounting Styles and Installation Dimensions

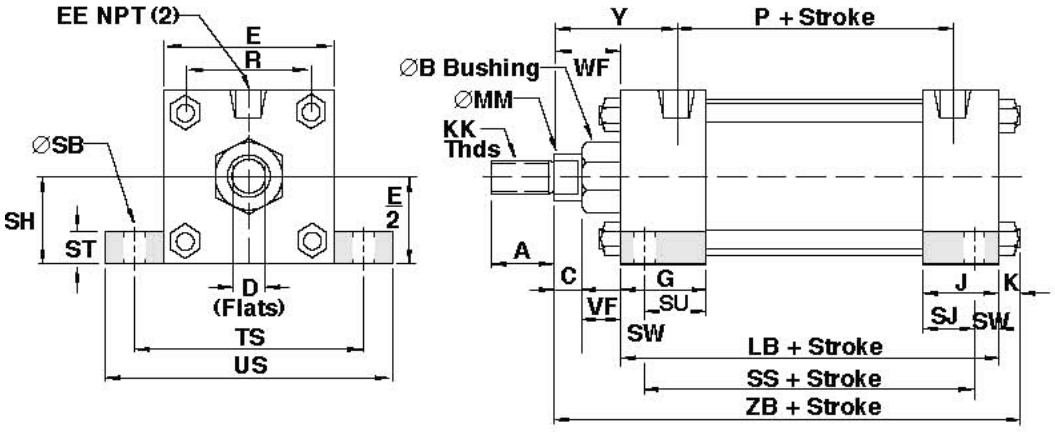
Code 01 Side Lug Mounts
(ANSI MS2)

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 49.

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)
B +.000 -.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	(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	(j9.53)
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)

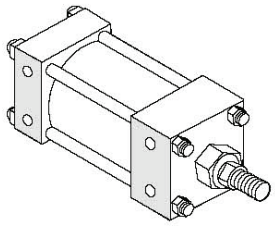
4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1–3/8"	(34.93)	1–3/8"	(34.93)	1–3/8"	(34.93
1–3/8"	(34.93)	1–3/8"	(34.93)	1–3/4"	(44.45)	1–3/4"	(44.45)	1–3/4"	(44.45
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
1.625	(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	(j9.53)	.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.

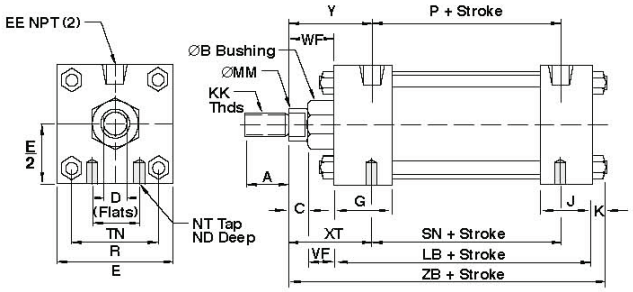


Code 02 Tapped Mounts
(ANSI MS4)

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	(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	(j9.53)
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	(j9.53)	.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)

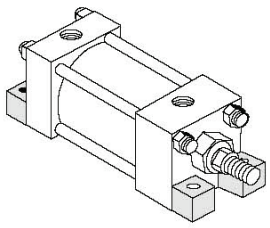
NOTE
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 49.

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.

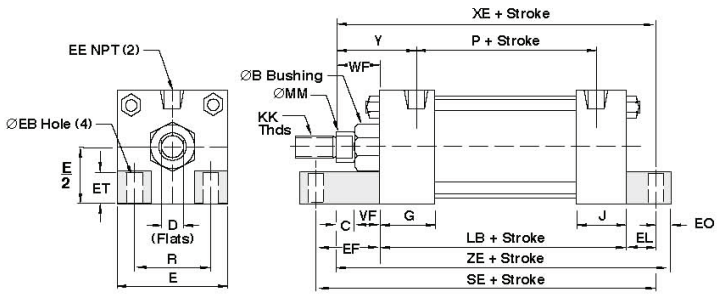


Code 03 End Lug Mounts
(ANSI MS7)

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 +.000 -.002	Std.	1.124	(28.55)	.750	(19.05)	.750	(19.05)	1.125	(28.58
+.000 -.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	(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)
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)

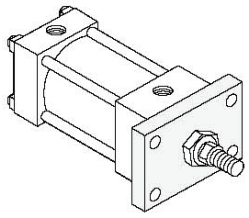
NOTE
Limit operating pressure to 400 psi (27 bar) non–shock hydraulic for minimum deflection.

For strokes in excess of 30 inches, see "Stop Tube Selection" on page 49.
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.

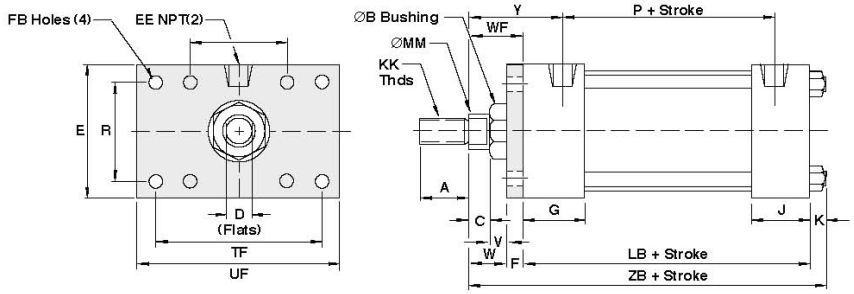


Code 07 Head Rectangular Flange Mounts (ANSI MF1)

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 49.

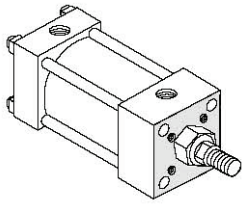
The force of the load should be perpendicular to the mounting surface and parallel to the centerline of the piston rod. For eccentric loads, the larger of the two available rods in each bore size is recommended. Stop tubes should also be considered.

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)

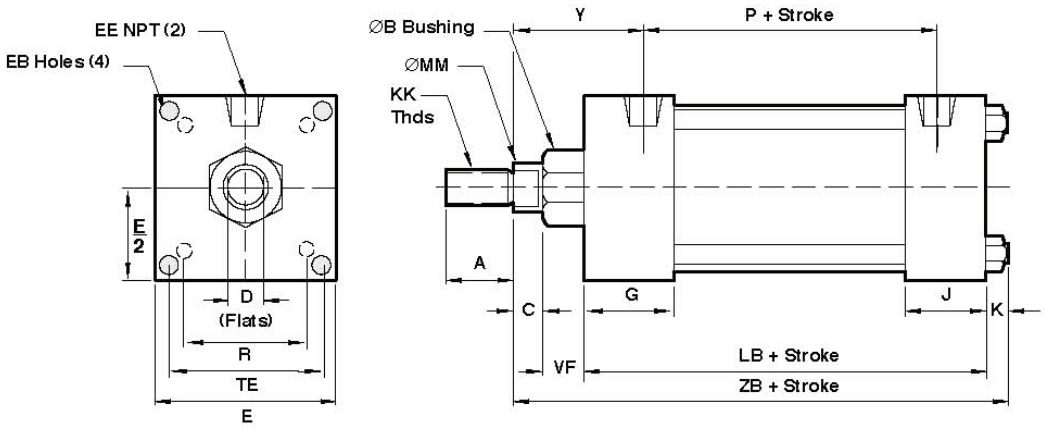
NOTE

For strokes in excess of 30 inches, see "Stop Tube Selection" on page 49.

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.

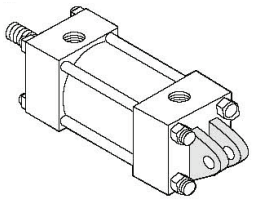
Series VP/VN
Mounting Styles and Installation Dimensions

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.

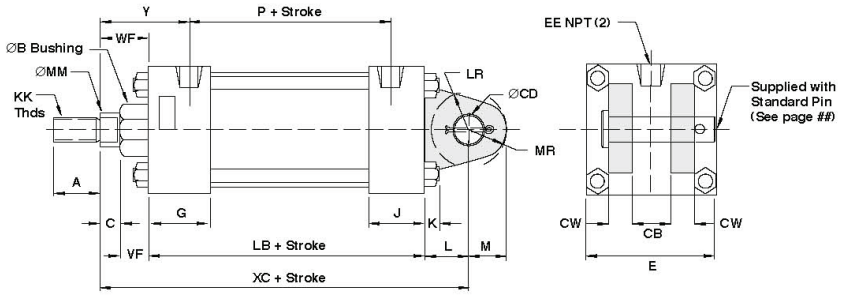


Code 10 Fixed Clevis
(MP1)

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)

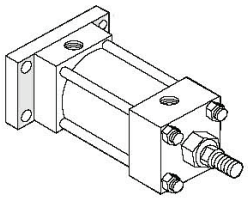
NOTE
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 49.

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.

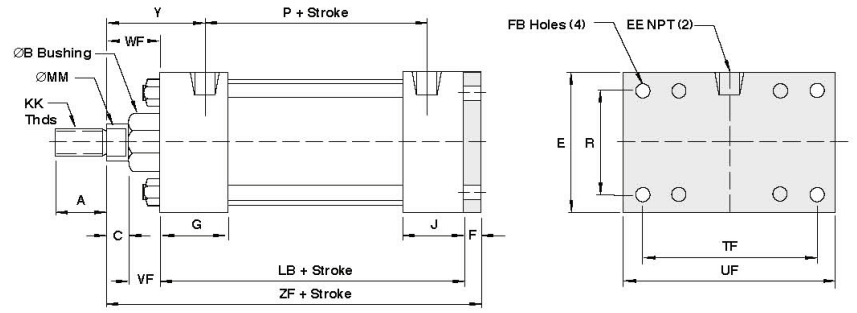


Code 12 Cap Rectangular Flange Mounts (ANSI MF2)

DIMENSION		1 1/2" 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	(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)	.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

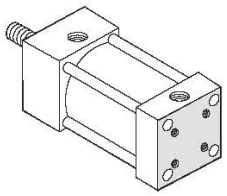
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 49.

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)

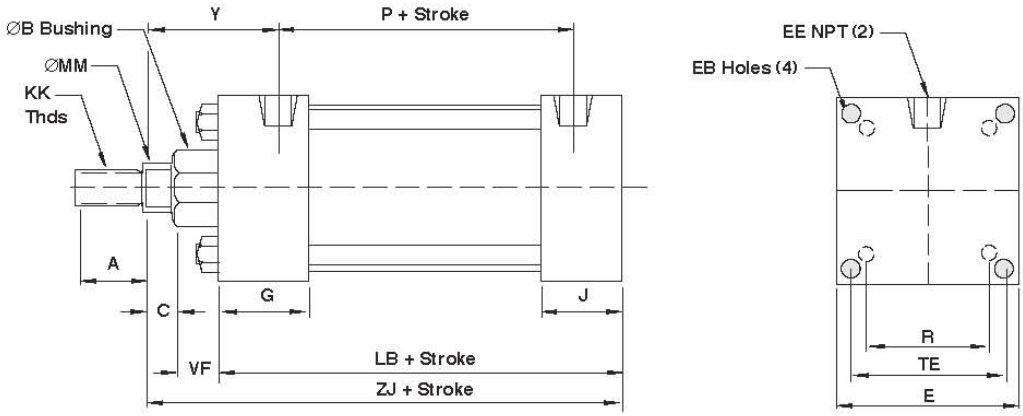
All dimensions in inches (mm)

NOTE
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 49.

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

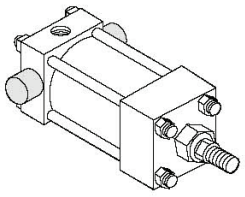
Code 13 Cap Square Mounts
(ANSI ME4)



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.

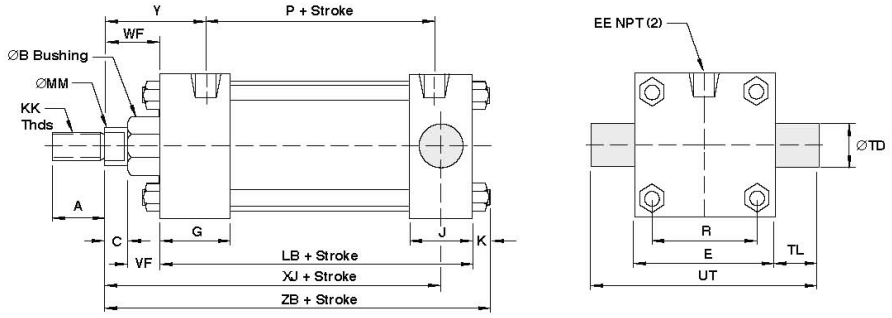


Code 16 Cap Trunnion Mounts
(ANSI MT2)

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)
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)

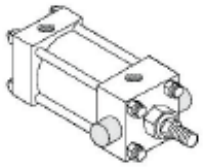
NOTE
For strokes in excess of 30 inches, see "Stop tube selection" on page 49.

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.

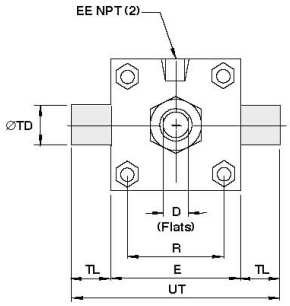


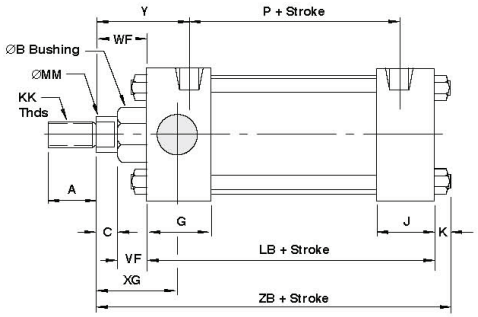
Code 17 Head Trunnion Mounts (ANSI MT1)

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)
1–3/8l"	(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 49.

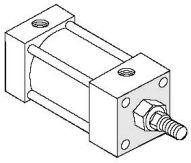
It is recommended that rigidly mounted pillow blocks with bearings at least as long as the trunnion pins be used. The pillow blocks should be installed as close to the shoulder of the trunnion as possible.

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.



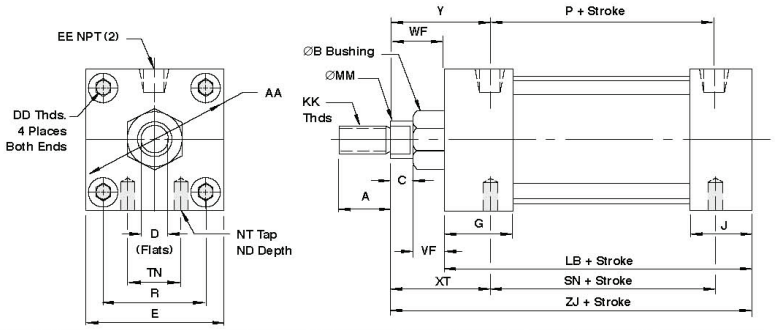
16 Sleeve Nut Construction
Basic Cylinder Side Tapped (Universal)

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 49.

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.

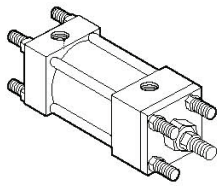
Stop tubes should also be considered.

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.

The mounting surface should be flat and the frame on 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

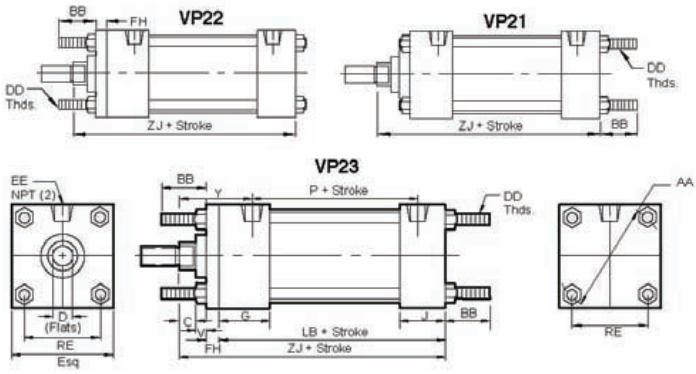
DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1–3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(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)

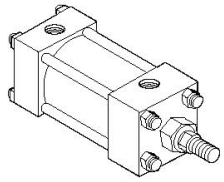
**BB dimension on 8 bore is from the head.
All dimensions in inches (mm)

NOTE
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 49.

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.

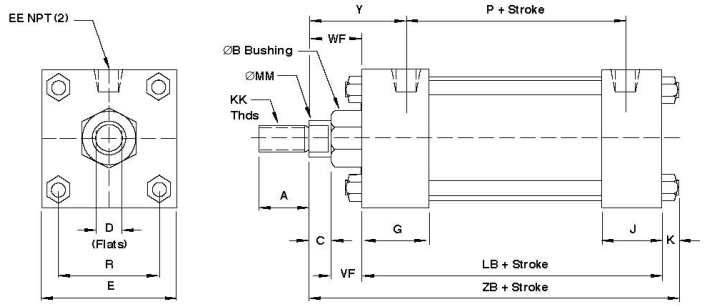


Code 24 No Mount Cylinder
(ANSI MX0)

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)

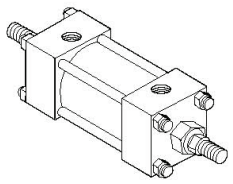
All dimensions in inches (mm)

NOTE
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 49.

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.

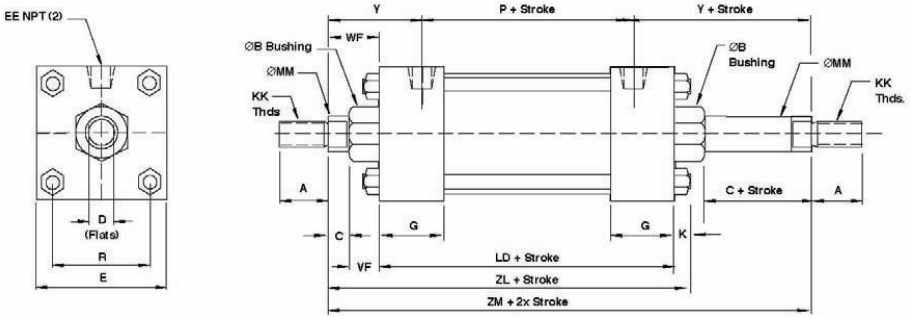


Code 41 Double Rod, No Mount

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

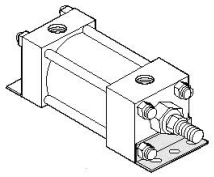
4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1–3/8"	(34.93)	1–3/8"	(34.93)	1–3/8"	(34.93)
1–3/8"	(34.93)	1–3/8"	(34.93)	1–3/4"	(44.45)	1–3/4"	(44.45)	1–3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
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.

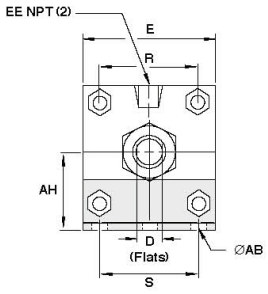


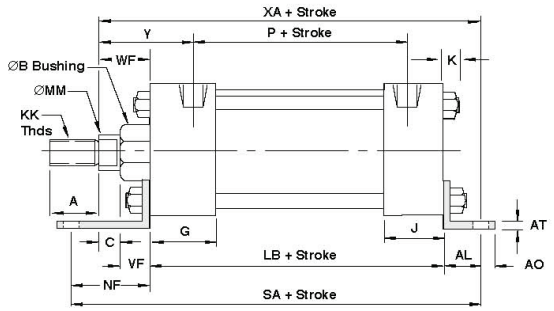
Code 45 Angle Mounts
(ANSI MS1)

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)
6.875	(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)

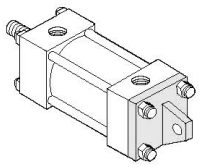
NOTE
Limit operating pressure to 400 psi (27 bar) non–shock hydraulic for minimum deflection.

For strokes in excess of 30 inches, see "Stop Tube Selection" on page 49.

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.

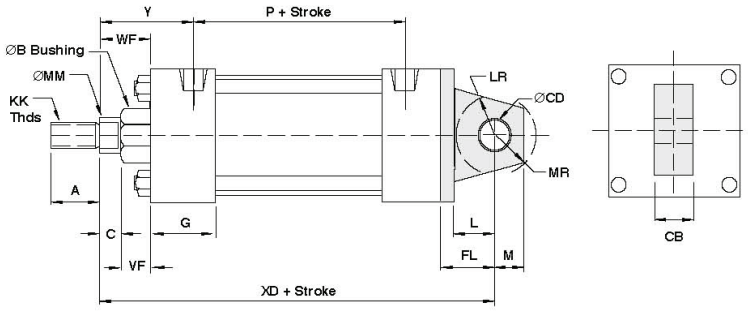


Code 48 Detachable Eye Mounts (MP4)

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)

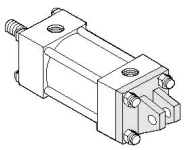
NOTE

For strokes in excess of 30 inches, see "Stop Tube Selection" on page 49.

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.

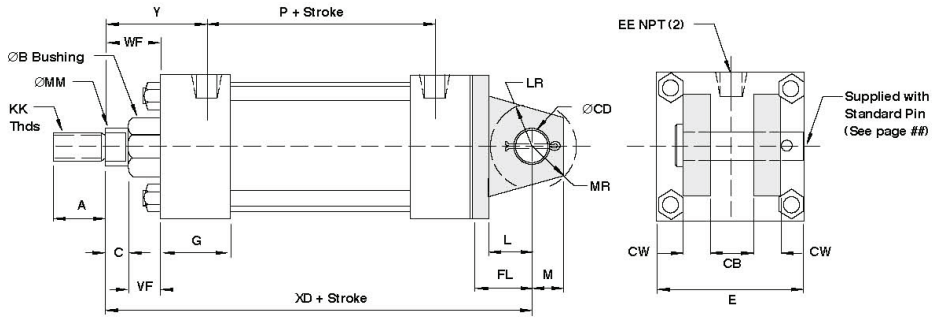


Code 50 Detachable Clevis
(MP2)

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	(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	(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)

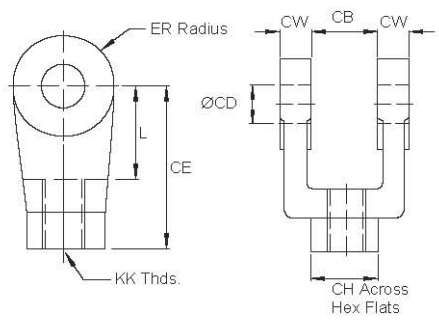
All dimensions in inches (mm)

NOTE
For strokes in excess of 30 inches, see "Stop Tube Selection" on page 49.

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.

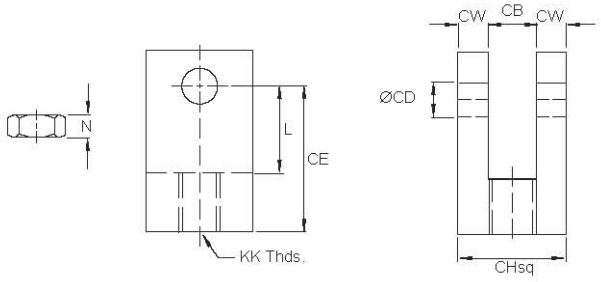
Series VP/VN
Accessories for 1–1/2 thru 8 inch Bore Cylinders

NFPA Rod Clevis



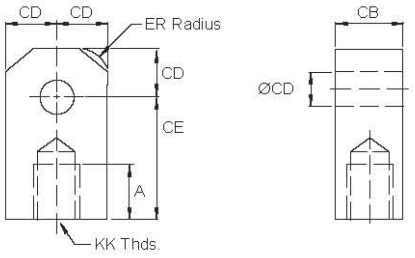
	VP62008A	VP62008B	VP6200CA	VP62010A	VP62016A
CB	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.000 (50.80)
CD	.500 (12.70)	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (60.33)
CE	1.500 (38.10)	1.500 (38.10)	2.375 (60.33)	3.125 (79.38)	4.125 (104.78)
CH	1.000 (25.40)	1.000 (25.40)	1.250 (31.75)	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



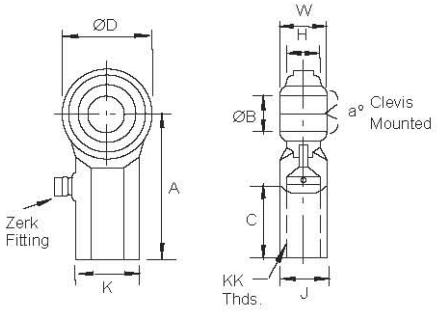
	VP62008C	VP6200CC
CB	.500 (12.70)	.750 (19.05)
CD	.500 (12.70)	.750 (19.05)
CE	1.375 (34.93)	1.750 (44.45)
CH	1.000 (25.40)	1.500 (38.10)
CW	.250 (6.35)	375 (9.53)
KK	1/2–20	3/4–16
L	.750 (19.05)	1.000 (25.40)
N	.375 (9.53)	.500 (12.70)

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	.5)	.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)

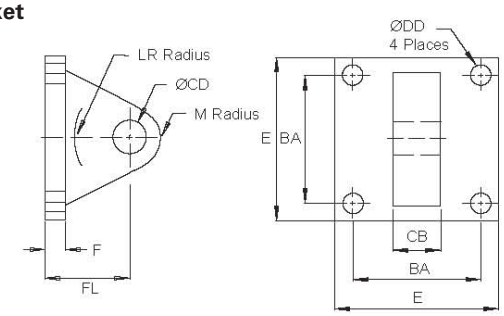
Spherical Rod Eye



		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)	4.125 (104.78)
B	+.0025 / –.0005	.500 (12.70)	.750 (19.05)	1.000 (25.40)
C	+.062 / –.031	1.062 (26.97)	1.562 (39.67)	2.125 (53.98)
D	± .010	1.312 (33.32)	1.750 (44.45)	2.750 (69.85)
H	REF.	.453 (11.51)	.593 (15.06)	1.000 (25.40)
J	± .010	.750 (19.05)	1.000 (25.40)	1.500 (38.10)
K	± .010	.875 (22.23)	1.125 (28.58)	1.625 (41.28)
KK	UNF-2B	1/2-20	3/4-16	1-14
W	+.000 / –.005	.625 (15.88)	.875 (22.23)	1.375 (34.93)

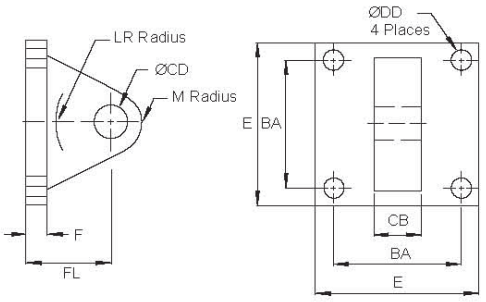
Series VP/VN
Accessories for 1–1/2 thru 8 inch Bore Cylinders

NFPA Eye Bracket



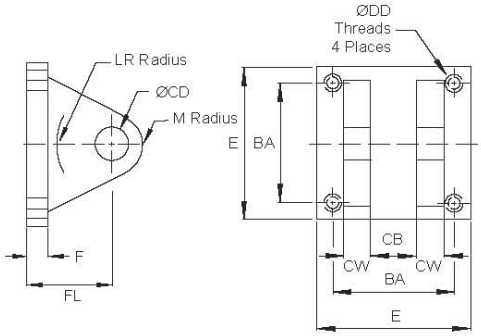
	VP62008A	VP62008B	VP6200CA	VP62010A
BA	1.625 (41.28)	2.562 (65.07)	3.250 (82.55)	3.812 (96.82)
CB	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.000 (50.80)
CD	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (60.33)
DD	.406 (10.31)	.531 (13.49)	.656 (16.66)	.656 (16.66)
E	2.500 (63.50)	3.500 (88.90)	4.500 (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



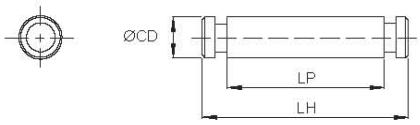
	VP78008B	VP78008C	VP78008D	VP7800CB	VP7800CC
BA	1.437 (36.50)	1.844 (46.84)	2.187 (55.55)	2.937 (74.60)	3.562 (90.47)
CB	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.250 (31.75)
CD	.500 (12.70)	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)
DD	.281 (7.14)	.343 (8.71)	.343 (8.71)	.469 (11.91)	.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



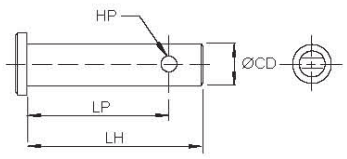
	VP61008A	VP6100CA	VP61010A
BA	1.625 (41.28)	2.562 (65.07)	3.250 (82.55)
CB	.750 (19.05)	1.250 (31.75)	1.500 (38.10)
CD	.500 (12.70)	.750 (19.05)	1.000 (25.40)
CW	.500 (12.70)	.625 (15.88)	.750 (19.05)
DD	3/8 – 24	1/2 – 20	5/8 – 18
E	2.500 (63.50)	3.500 (88.90)	4.500 (114.30)
F	.375 (9.53)	.625 (15.88)	.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)

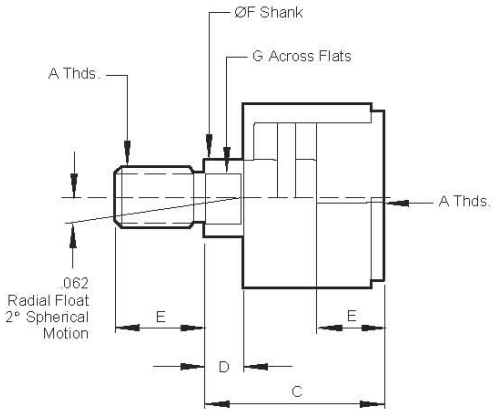
Alternate Eye Bracket

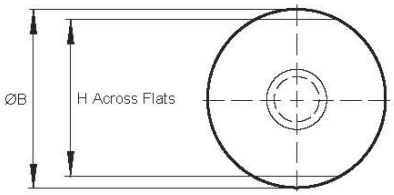


	VP83008B	VP83008C	VP83008CB	VP8300CC	VP83010B	VP83016B
CD	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)	1.000 (25.40)	1.375 (34.93)
HP	.156 (3.96)	.156 (3.96)	.156 (3.96)	.156 (3.96)	.203 (5.16)	.250 (6.35)
LH	1.421 (36.09)	2.250 (57.15)	2.000 (50.80)	3.000 (76.20)	3.500 (88.90)	5.000 (127.00)
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)

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.





	7756A–1/4–28	7756A–5/16–24	7756A–3/8–24	7756A–7/16–20	7756A–1/2–20	7756A–5/8–18	7756A–3/4–16	7756A–7/8–14	7756A–1–14	7756A–1–1/4–12	7756A–1–1/2–12	7756A–1–3/4–12
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

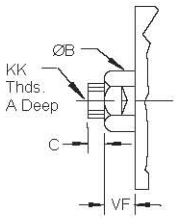
In addition to selecting the correct bore, you must specify the appropriate rod size and rod end configuration for your application.

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

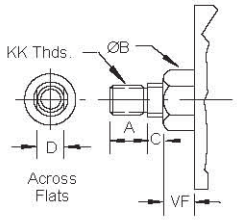
DIMENSION		1 1/2" BORE (38.10)		2" BORE (50.80)		2 1/2" BORE (63.50)		3 1/4" BORE (82.55)	
Rod	Std.	5/8"	(15.88)	5/8"	(15.88)	5/8"	(15.88)	1"	(25.40)
	O.S.	1"	(25.40)	1"	(25.40)	1"	(25.40)	1–3/8"	(34.93)
A	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)
	O.S.	1.125	(28.58)	1.125	(28.58)	1.125	(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)

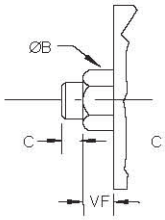
Series VP/VN
Optional Rod Ends for 1-1/2 thru 8 inch Bore Cylinders



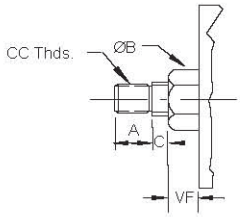
Type 2
Female
UN Thread



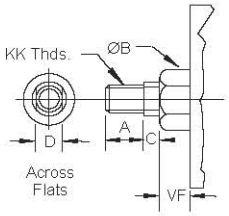
Type 5
Small Male
UN Thread



Type 6
Plain
No Attachment



Type 9
Intermediate Male
UN Thread



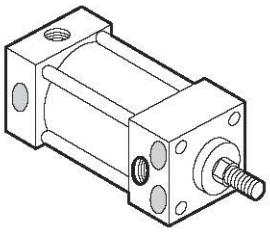
Type S
Studded Female
UN Thread

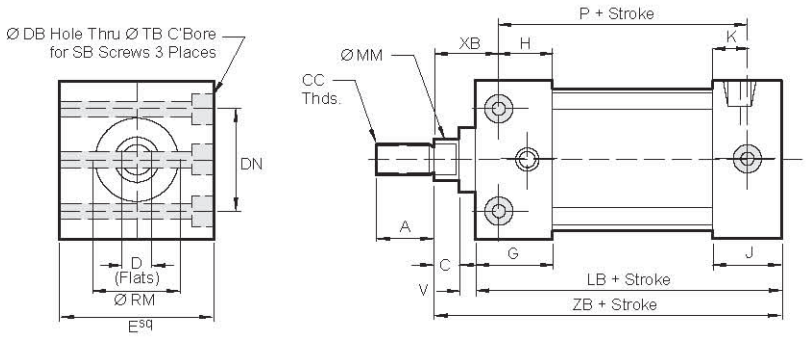
4" BORE (101.60)		5" BORE (127.00)		6" BORE (152.40)		7" BORE (177.80)		8" BORE (203.20)	
1"	(25.40)	1"	(25.40)	1–3/8"	(34.93)	1–3/8"	(34.93)	1–3/8"	(34.93)
1–3/8"	(34.93)	1–3/8"	(34.93)	1–3/4"	(44.45)	1–3/4"	(44.45)	1–3/4"	(44.45)
1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)
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	
.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)

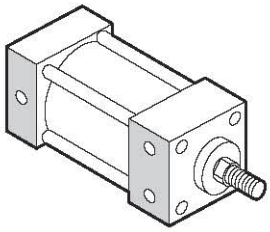
Series VP/VN
3/4 & 1–1/8 inch Bore Cylinders and Mounts

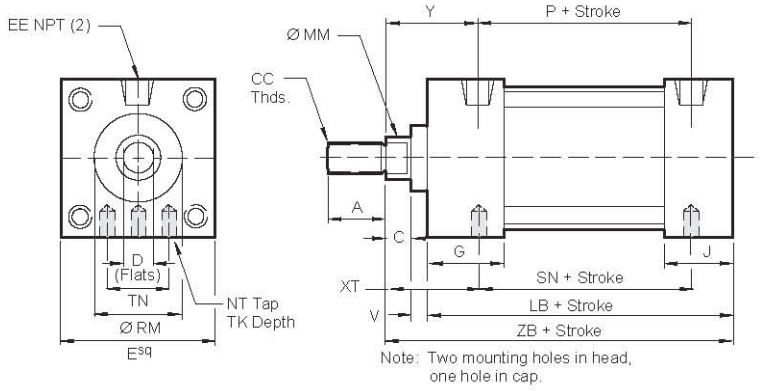
Code 01 Bolt Thru Mounts
(ANSI MS8)



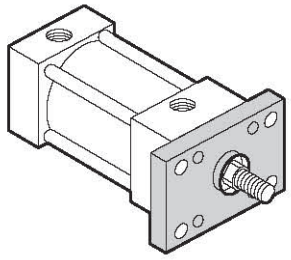


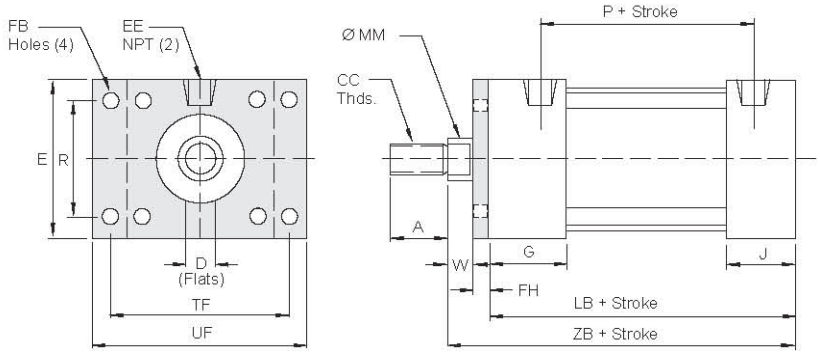
Code 02 Tapped Mounts
(ANSI MS9)





Code 07 Head Rectangular Flange Mounts (ANSI MF1)





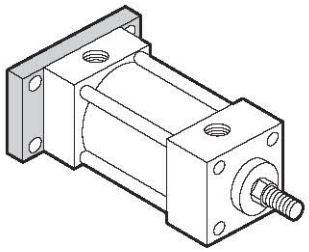
Series VP/VN
3/4 & 1–1/8 inch Bore Cylinders and Mounts

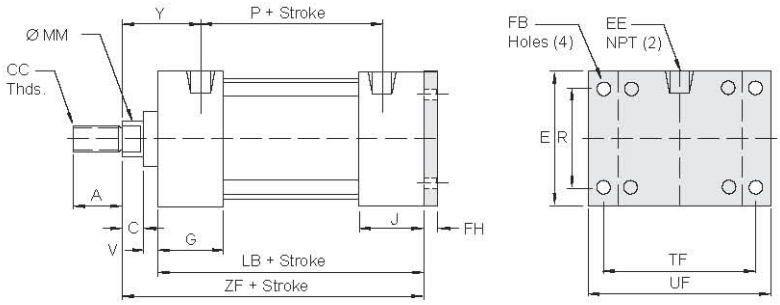
DIMENSION		01 BOLT THRU MOUNTS (MS8) 3/4"	1–1/8"	02 SIDE TAPPED MOUNTS (MS4) 3/4"	1–1/8"	07 HEAD RECT. FLANGE MOUNTS (MF1) 3/4"	1–1/8"
Rod	Std.	.312 (7.92)	.375 (9.53)	.312 (7.92)	.375 (9.53)	.312 (7.92)	.375 (9.53)
	O.S.	-	.500 (12.70)	-	.500 (12.70)	-	.500 (12.70)
A	Std.	.625 (15.88)	.625 (15.88)	.625 (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)

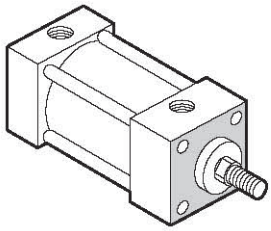
Series VP/VN
3/4 & 1–1/8 inch Bore Cylinders and Mounts

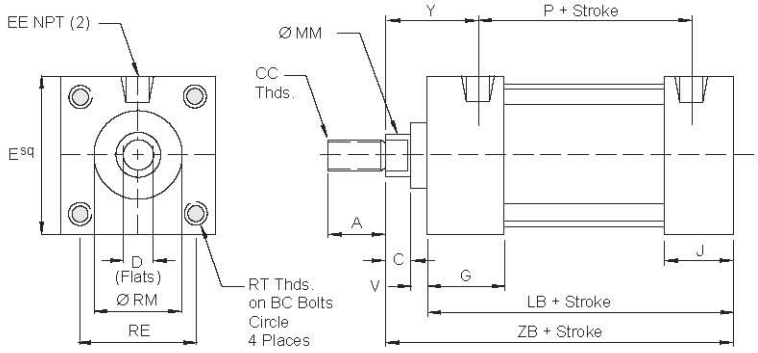
Code 12 Cap Rectangular Flange Mounts (ANSI MF2)



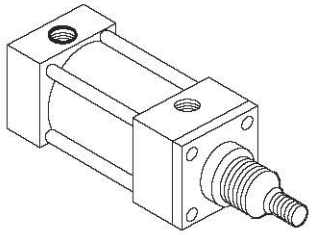


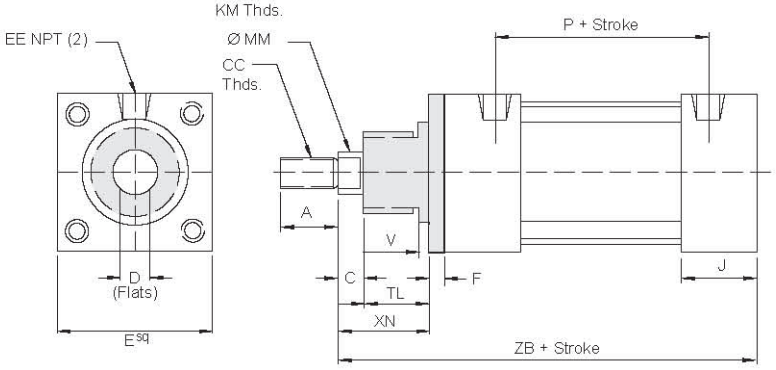
Code 18 Head Tapped Face Mounts (ANSI MR1)





Code 20 Threaded Nose Mounts (ANSI MNR1)





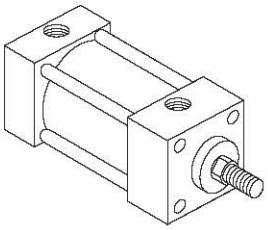
Series VP/VN
3/4 & 1–1/8 inch Bore Cylinders and Mounts

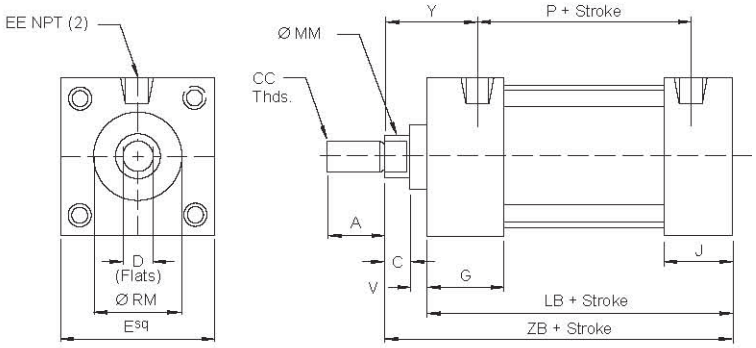
DIMENSION		12 CAP. RECT. FLANGE MOUNTS (MF2) 3/4"	12 CAP. RECT. FLANGE MOUNTS (MF2) 1–1/8"	18 HEAD TAPPED FACE MOUNTS (MR1) 3/4"	18 HEAD TAPPED FACE MOUNTS (MR1) 1–1/8"	20 THREADED NOSE MOUNTS (MNR1) 3/4"	20 THREADED NOSE MOUNTS (MNR1) 1–1/8"
Rod	Std.	.312 (7.92)	.375 (9.53)	.312 (7.92)	.375 (9.53)	.312 (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)

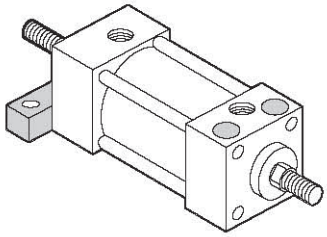
Series VP/VN
3/4 & 1–1/8 inch Bore Cylinders and Mounts

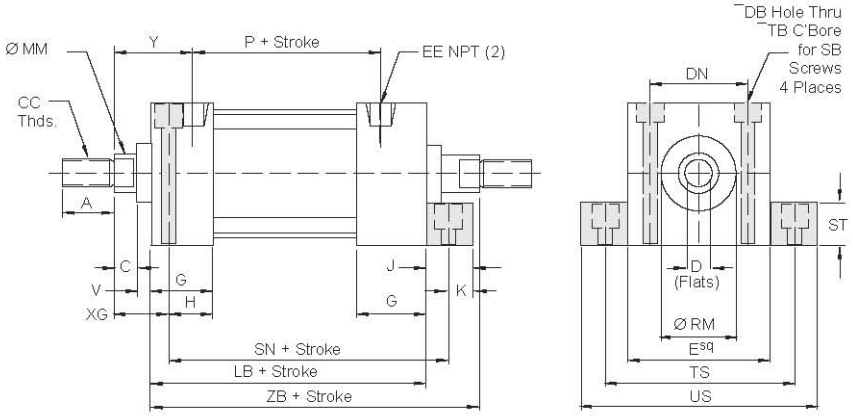
Code 24 No Mounts
(ANSI MX0)



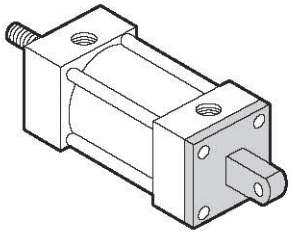


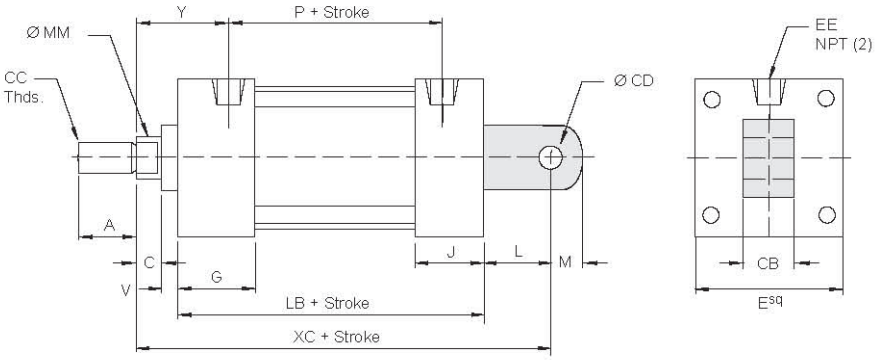
Code 25 Double Rod, Bolt Thru Mounts





Code 47 Fixed Eye Mounts
(ANSI MP3)





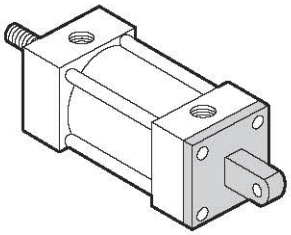
Series VP/VN
3/4 & 1–1/8 inch Bore Cylinders and Mounts

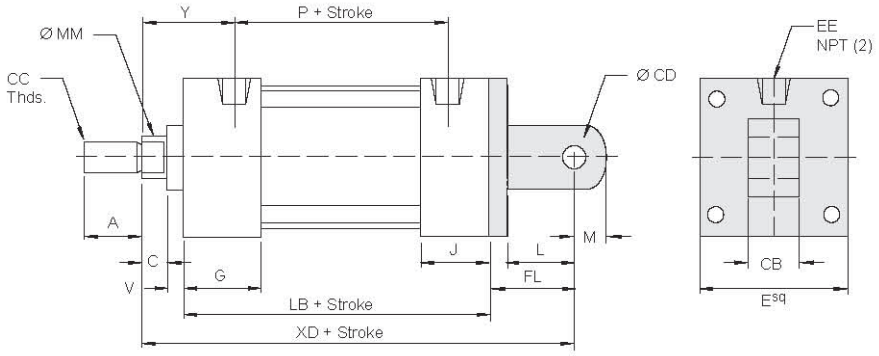
DIMENSION		24 NO MOUNT (MX0) 3/4"	24 NO MOUNT (MX0) 1–1/8"	25 DOUBLE ROD BOLT THRU MOUNTS (MS8) 3/4"	25 DOUBLE ROD BOLT THRU MOUNTS (MS8) 1–1/8"	47 FIXED EYE MOUNTS (MP3) 3/4"	47 FIXED EYE MOUNTS (MP3) 1–1/8"
Rod	Std.	.312 (7.92)	.375 (9.53)	.312 (7.92)	.375 (9.53)	.312 (7.92)	.375 (9.53)
	O.S.	-	.500 (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)

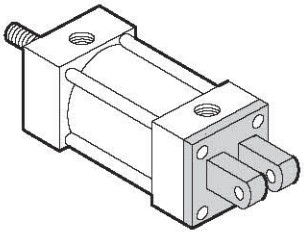
Series VP/VN
3/4 & 1–1/8 inch
Bore Cylinders and Mounts

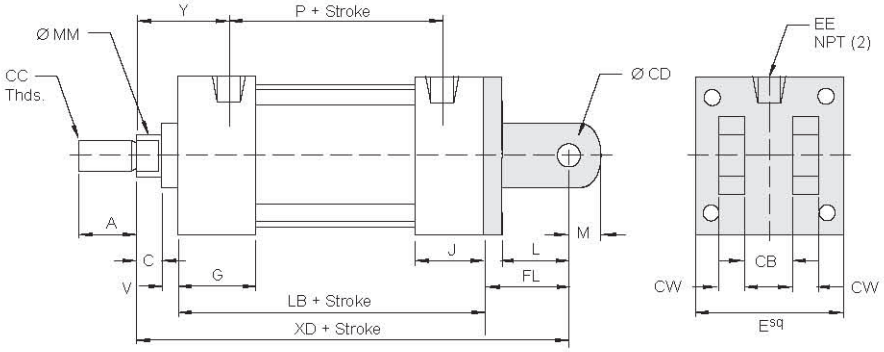
Code 48 Detachable Eye Mounts (ANSI MP4)





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) 3/4"	1–1/8"	50 DETACHABLE CLEVIS MOUNTS (MP2) 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)

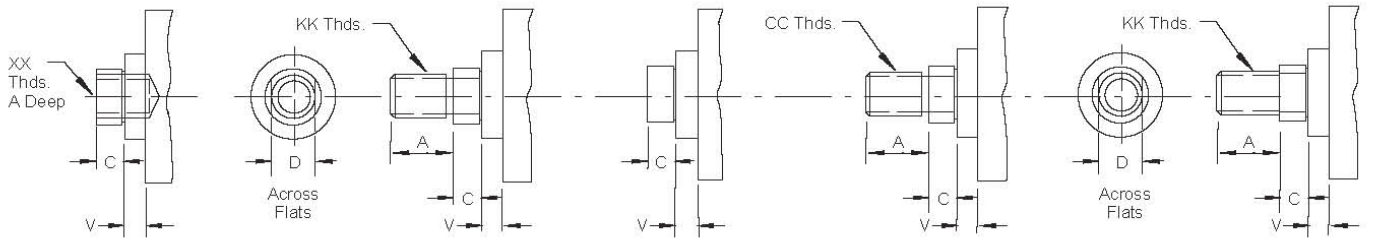
All dimensions in inches (mm)

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.



Type 2
Optional Female

Type 5
Standard Male

Type 6
Optional Plain

Type 9
Optional Male

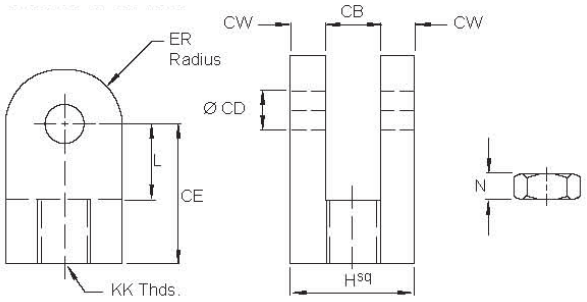
Type S
Optional Studded

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

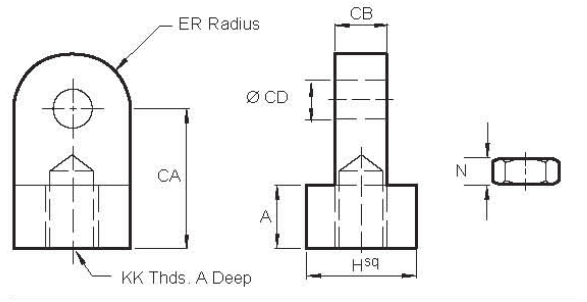
Rod Clevis



	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

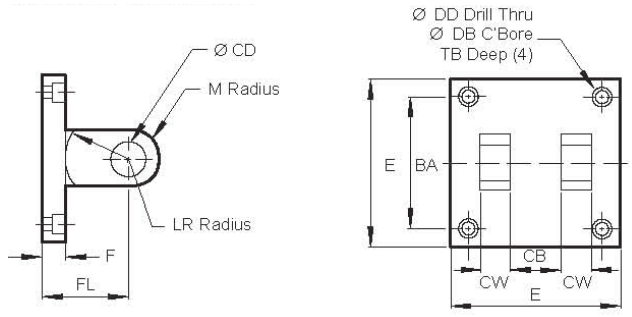
Rod Eye



	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

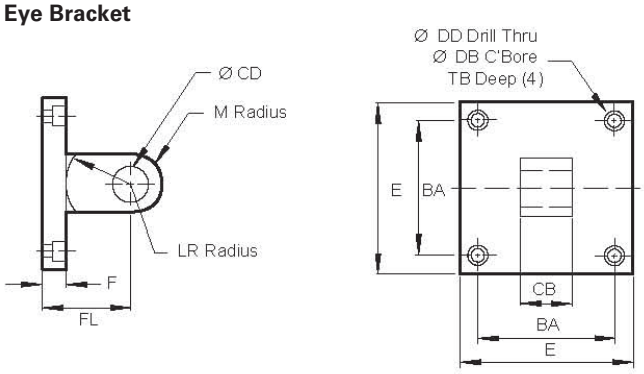


	3/4 VP61004A	1-1/8 VP61006A
BA	.750 (19.05)	1.125 (28.58)
CB	.250 (6.35)	.375 (9.53)
CD	.250 (6.35)	.375 (9.53)
CW	.250 (6.35)	.250 (6.35)
DB	.250 (6.35)	.328 (8.33)
DD	.156 (3.96)	.203 (5.16)
E	1.000 (25.40)	1.500 (38.10)
F	.500 (12.70)	.500 (12.70)
FL	1.125 (28.58)	1.125 (28.58)
LR	.437 (11.10)	.625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

All dimensions in inches (mm)

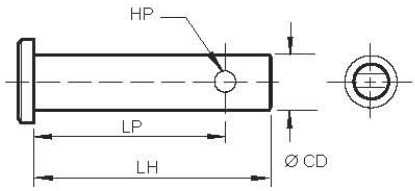
Series VP/VN
Accessories for 3/4 & 1–1/8 inch Bore Cylinders

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.

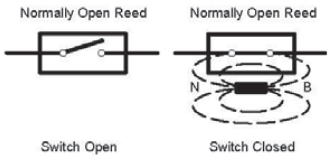
One or more switches may be mounted to provide an indication of piston position.

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.



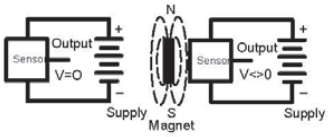
Application Recommendations and Precautions

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.
3. Motors will produce high pulses that will be introduced into the control wiring if the wiring is carried in the same conduit.
4. Never connect the switch without a load present. The switch will be destroyed.
5. 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/Magnetoresistive Working Principle

The solid state (no moving parts) magnetoresistive 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:

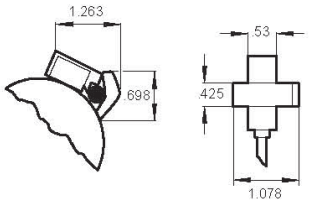
(1) strong magnetic fields,
(2) extreme temperature, and
(3) excessive ferrous filing or chip buildup.

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



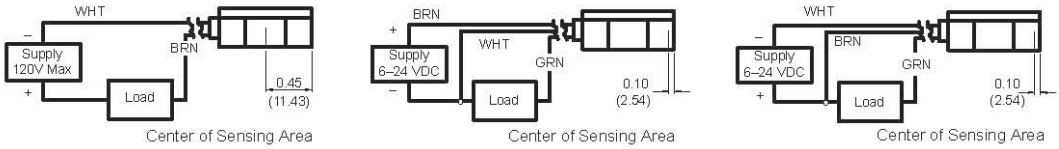
Series VP/VN Specifications: 3/4 thru 2–1/2 inch Bores

*Metal Oxide Varsitor surge Suppression.

Note: All PS7 and PS* Series Switches are supplied with 9 foot leads.

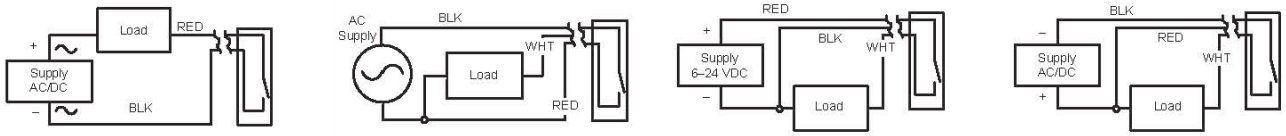
Switch Model	PS8–2–04 Reed	PS8–2–31 Hall	PS8–2–32 Hall
Bore Sizes	3/4I thru 2–1/2I	3/4I thru 2–1/2I	3/4I thru 2–1/2I
Switch Type	Reed Switch *MOV & Light	Hall Effect & Light, Sourcing PNP	Hall Effect & Light, Sinking PNP
Function	SPST Normally Open	Normally Open	Normally Open
Switching Voltage	5–120 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



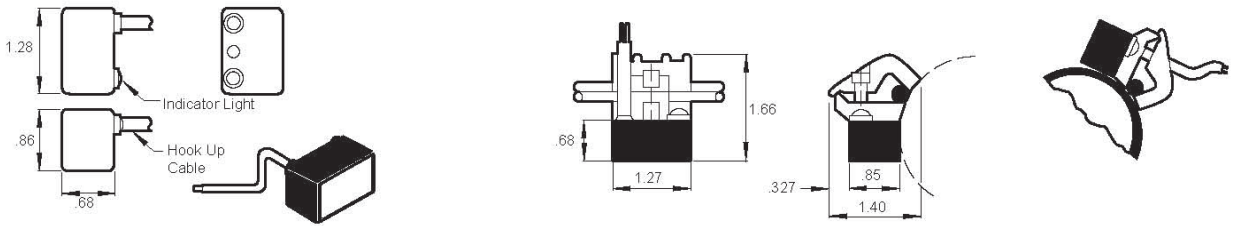
Specifications: 2 thru 8 inch Bores

PS7–04 Reed	PS7–24 Reed	PS7–31 Hall	PS7–32 Hall
2I thru 8I	2I thru 8I	2I thru 8I	2I thru 8I
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 8I 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 49) is strongly recommended whenever possible.

Cylinder Weights

In pounds (kilograms)

BORE INCH	(MM)	ROD INCH	(MM)	MOUNTING CODE 02, 24, 18		07		12, 13		23	
11/2″	(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)
21/2″	(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)
31/4″	(82.55)	1″	(25.40)	7.3	(3.31)	10.8	(4.90)	11.1	(5.03)	7.7	(3.49)
		13/8″	(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)
		13/8″	(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)
		13/8″	(34.93)	16.2	(7.35)	23.5	(10.66)	24.1	(10.93)	17.2	(7.80)
6″	(152.40)	13/8″	(34.93)	23.5	(16.19)	35.6	(16.15)	36.3	(16.47)	24.5	(11.11)
		13/4″	(44.45)	24.8	(11.27)	36.9	(16.77)	37.6	(17.09)	25.8	(11.73)
7″	(177.80)	13/8″	(34.93)	32.1	(14.56)	32.1	(14.56)	32.1	(14.56)	33.4	(15.15)
		13/4″	(44.45)	33.4	(15.18)	33.4	(15.18)	33.4	(15.18)	34.7	(15.77)
8″	(203.20)	13/8″	(34.93)	40.0	(18.14)	40.0	(18.14)	40.0	(18.14)	41.3	(18.73)
		13/4″	(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 EXTEND	RETRACT	T SEALS EXTEND	RETRACT
3/4″	9 (.62)	10 (.69)	5 (.35)	6 (.41)
11/8″	6 (.41)	7 (.48)	3 (.21)	4 (.28)
11/2″, 2″, 21/2″	6 (.41)	7 (.48)	3 (.21)	4 (.28)
31/4″, 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

MOUNTING CODE												ADD PER INCH OF STROKE	
01, 16, 17		45		10		03		08, 13, 50, 47		15, 48, 11			
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).

Piston Rod Diameter Selection:

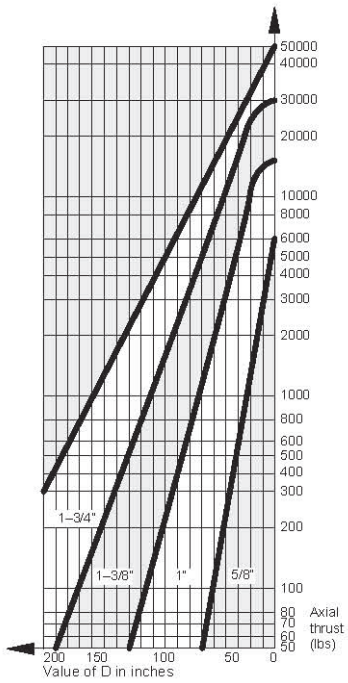
Applications requiring long extend (push) strokes may require oversize piston rod diameters to prevent buckling. To determine the correct rod diameter for your application, follow these simple steps:

1. Select the force from the **Cylinder Force and Volume Chart** that is required for your application.
   Force = Piston Surface Area x 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.

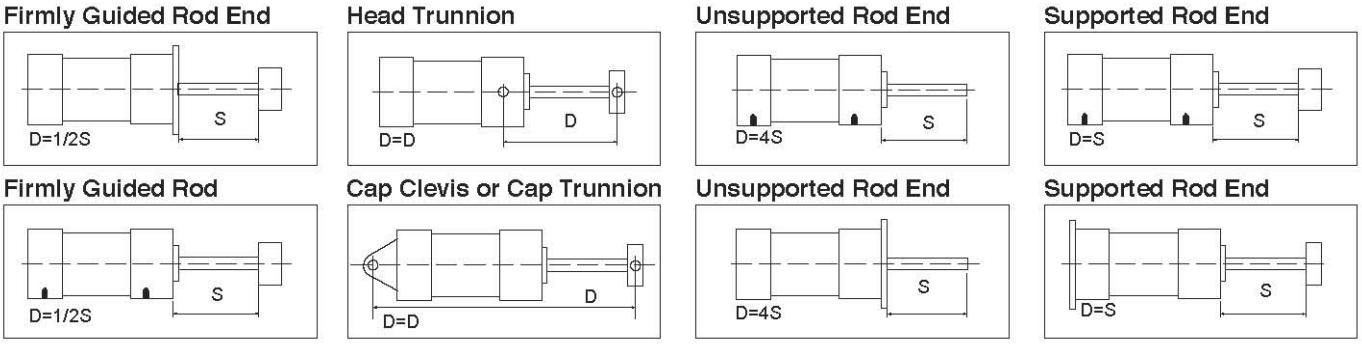
Stop Tube Selection:

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".

Stop Tube Selection:



Cylinder Mounting Diagrams



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:

Stop Tube Design

Three typical stop tube designs are illustrated below.

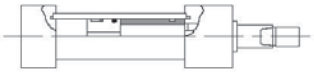
SPECIFY ONE INCH OF STOP TUBE FOR EACH 10 INCHES (OR FRACTION THEREOF) OF STROKE IN EXCESS OF THE MAXIMUM LISTED IN THE FOLLOWING TABLE.

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″

Design A

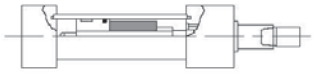
Used for cylinders noncushioned on the rod.



Stop Tube

Design B

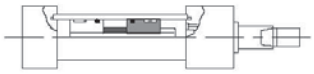
Used for cushioned hydraulic cylinders.



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

Cylinder Force and Volume Charts

Extend Forces in pounds (newtons)

BORE	PISTON AREA IN² (CM²)		40 (3)		60 (4)		PSI (BAR) 80 (6)		100 (7)		150 (10)		200 (14)		VOL. CU. FT. (CM³) DISPLACEMENT PER STROKE INCH	
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 IN² (CM²)		40 (3)		60 (4)		PSI (BAR) 80 (6)		100 (7)		150 (10)		200 (14)		VOL. CU. FT. (CM³) DISPLACEMENT PER STROKE INCH	
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.

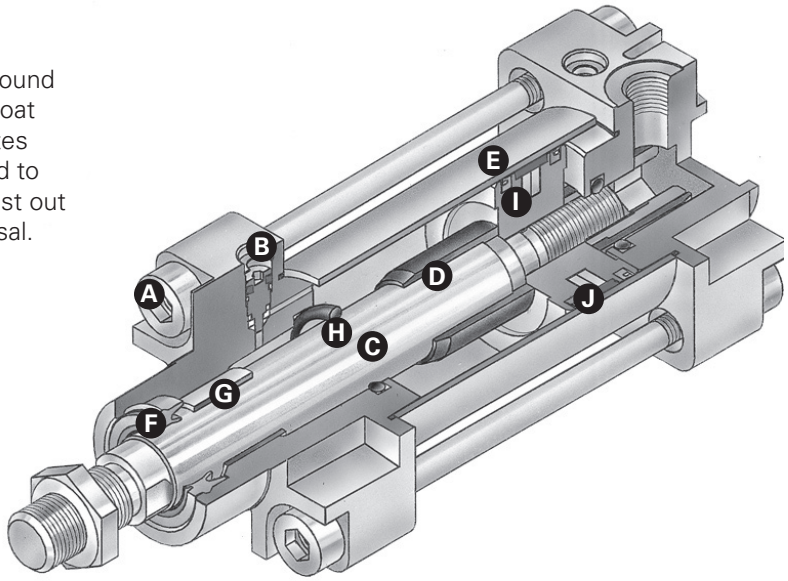
F. Rod Seal Wiper
The combination seal/wiper design is molded from tough abrasion resistant materials for long life and ease of maintenance.

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.

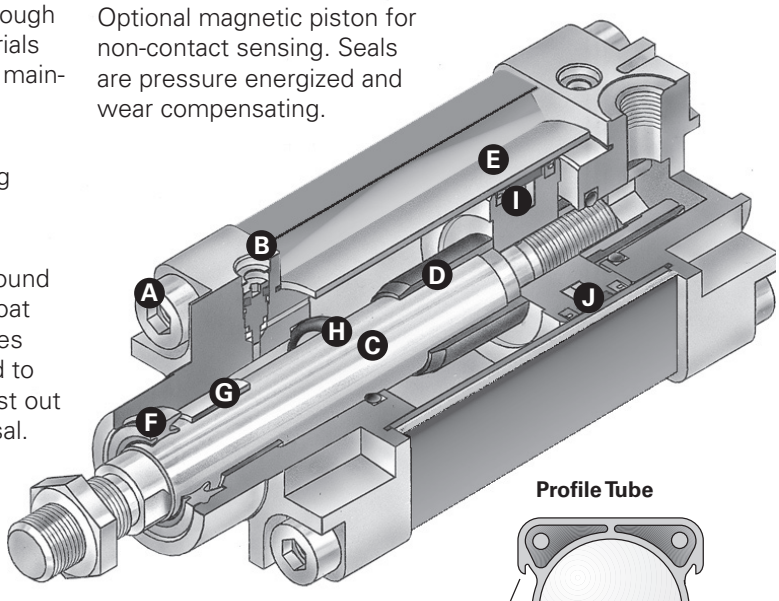
F. Rod Seal Wiper
The combination seal/wiper design is molded from tough abrasion resistant materials for long life and ease of maintenance.

G. Bearing
Heavy duty long wearing nylon rod bearing.

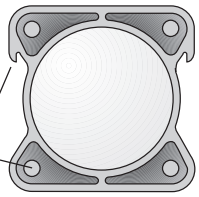
H. Cushion Seal
One piece, nitrile compound seal. Linear and radial float of cushion seal eliminates misalignment. Designed to provide exceptionally fast out of cushion stroke reversal.

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.



Profile Tube



Integral Switch Grooves
Tie Rod Construction

Series ML
Model Code

ML	07	2B	0	N	5	K	A	108	00	X
1, 2	3, 4	5, 6	7	8	9	10	11	12, 13, 14	15, 16	17

1, 2 **Series**
ML* – ISO 6431 / VDMA 24562

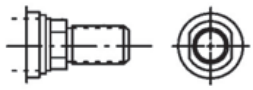
3, 4 **Mounting Style**
07 – Head Rectangular Flange MF1
12 – Cap Rectangular Flange MF2
16 – Cap Trunnion MT5/6
17 – Head Trunnion MT1
18 – Sleeve Nut for Tapped Face -
24 – No Mounts -
23 – Both Ends Extended Tie Rod MX1
45 – Angle MS1
48 – Cap Detachable Eye MP4
50 – Cap Detachable Clevis MP2
XX – Custom

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

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

7 **Rod End Type**

Code	Type
0	Intermediate Male Metric



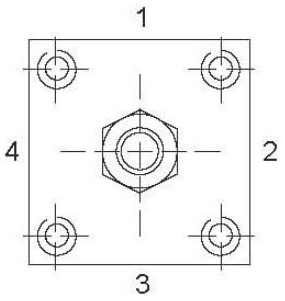
8 **Seal Options**
N – Normal Hydraulic *
L – Low Friction
T – High Temperature
U – Ultra Cushioning Seal**

* Hydraulic seal option only available through 100 mm 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).

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

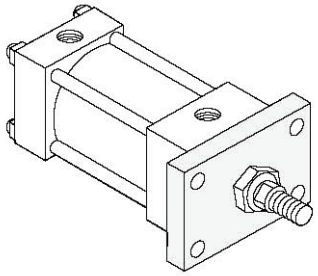
The variety of standard DIN ISO 6431 / VDMA 24562 mountings available in the ML gives you a broad selection to match the proper mount to your application. Eaton offers rigid mounts (including extended tie rod mounts) and swivel mounts (including clevis and trunnion mounts). A guide to proper mount selection is provided on pages 76 through 92. 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

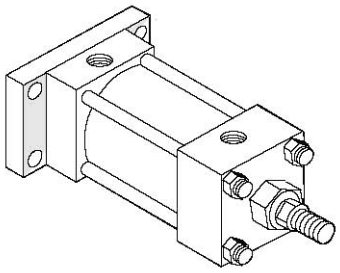
Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified.

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.

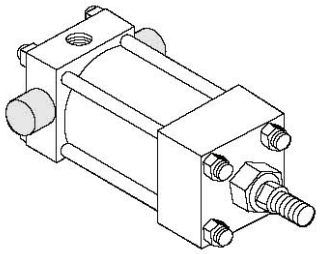
Code 07 Head Rectangular Flange (DIN ISO 6431 / VDMA 24562 Part 2, MF1)



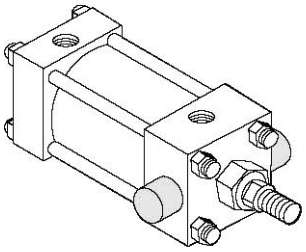
Code 12 Cap Rectangular Flange (DIN ISO 6431 / VDMA 24562 Part 2, MF2)



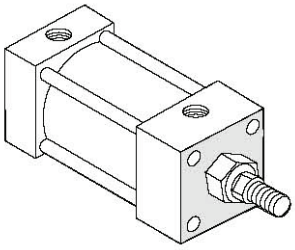
Code 16 Cap Trunnion (VDMA 24562 Part 2, MT5/6)



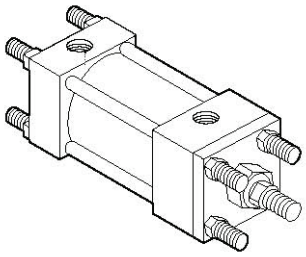
Code 17 Head Trunnion (VDMA 24562 Part 2, MT5/6)



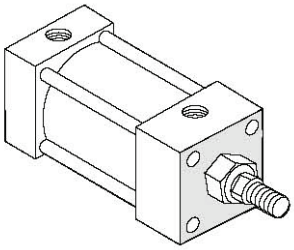
Code 18 Sleeve Nut Construction for Tapped Face



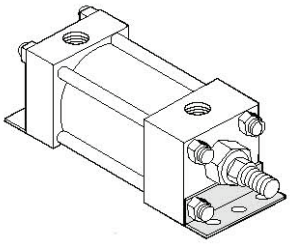
Code 23 Extended Tie Rod (DIN ISO 6431, MX1)



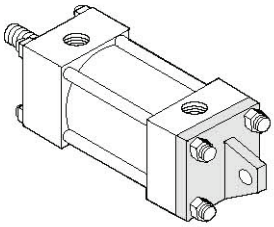
Code 24 No Mounts



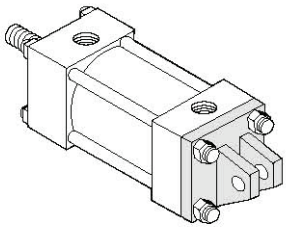
Code 45 Angle (DIN ISO 6431, VDMA 24562 Part 2, MS1)



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



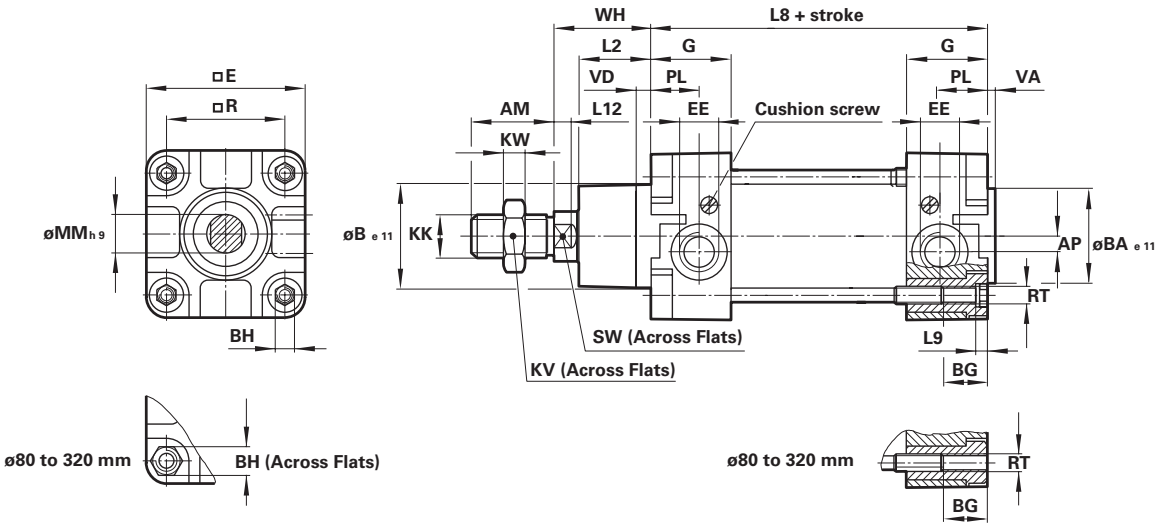
Code 50 Cap Detachable Clevis (DIN ISO 6431, VDMA 24562 Part 2, MP2)



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 WEIGHT AT ZERO STROKE LBS (KG)	WEIGHT PER 25 MM IN LBS (KG)	P/8000 WEIGHT AT ZERO STROKE LBS (KG)	WEIGHT PER 25 MM IN LBS (KG)	PV/8000 WEIGHT AT ZERO STROKE LBS (KG)	WEIGHT PER 25 MM 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)	–	–	–	–

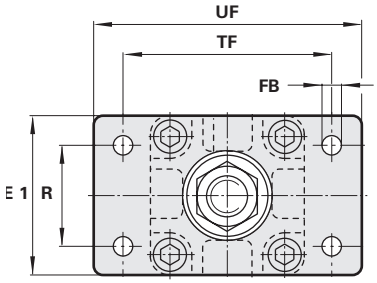
Dimensions in inches (mm)

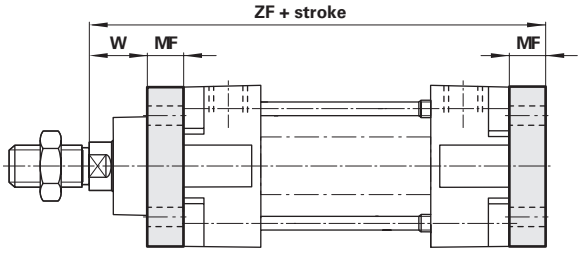
Series ML
Mounting Styles and Installation Dimensions

32-320mm bore sizes

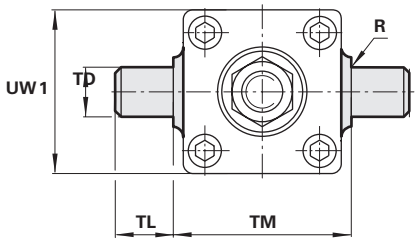
Code 07 – Head Rectangular Flange (DIN ISO 6431 / VDMA 24562 Part 2, MF1)

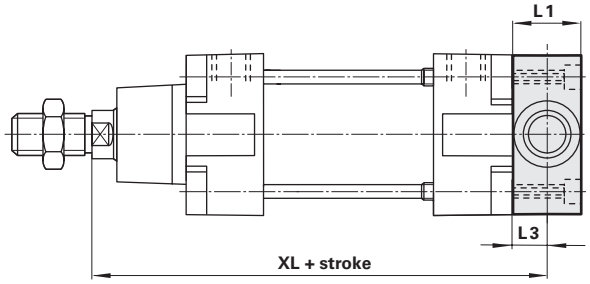
Code 12 – Cap Rectangular Flange (DIN ISO 6431 / VDMA 24562 Part 2, MF2)





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





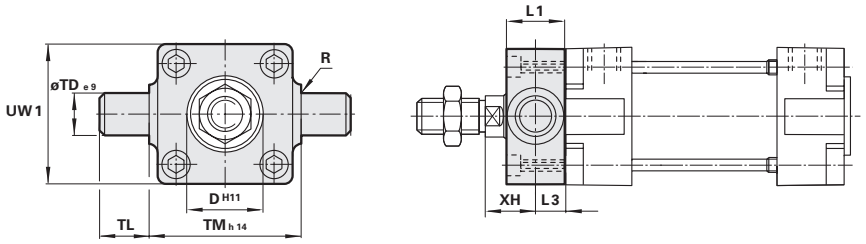
BORE	E1	FB	MF	R	TF	UF	W	ZF	WEIGHT* CODE 07, 12
32	1.97 (50)	0.28 (7)	0.39 (10)	1.26 (32)	2.52 (64)	3.15 (80)	0.63 (16)	5.12 (130)	0.55 (0.25)
40	2.17 (55)	0.35 (9)	0.39 (10)	1.42 (36)	2.83 (72)	3.54 (90)	0.79 (20)	5.71 (145)	0.77 (0.35)
50	2.56 (65)	0.35 (9)	0.47 (12)	1.77 (45)	3.54 (90)	4.33 (110)	0.98 (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

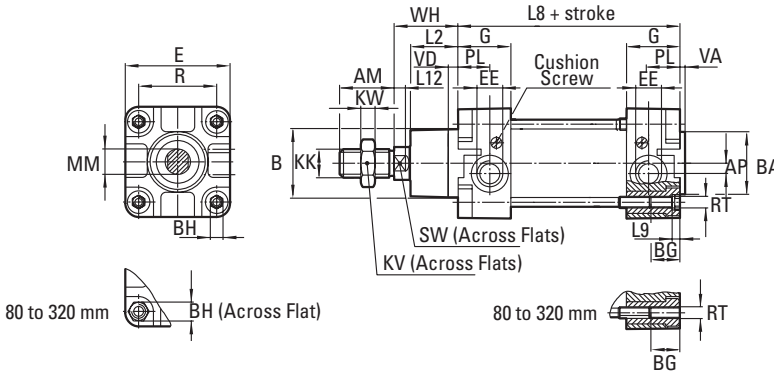


Code 17 – Head Trunnion (VDMA 24562 Part 2, Style MT5/6)

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	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)	–

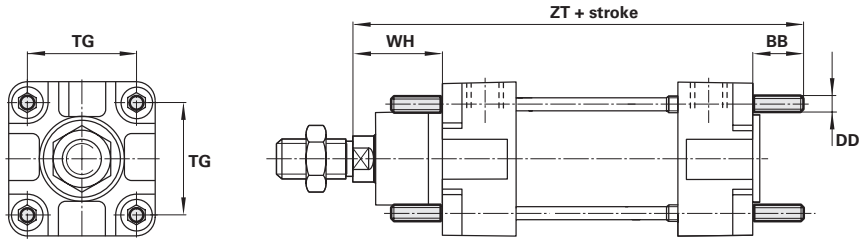
BORE	L12	MM	PL	R	RT	SW	VA	VD	WH	8000 WEIGHT AT ZERO STROKE LBS (KG)	WEIGHT PER 25 MM IN LBS (KG)	P/8000 WEIGHT AT ZERO STROKE LBS (KG)	WEIGHT PER 25 MM IN LBS (KG)	PV/8000 WEIGHT AT ZERO STROKE LBS (KG)	WEIGHT PER 25 MM IN LBS (KG)
32	0.24 (6)	0.47 (12)	0.51 (13)	1.26 (32.5)	M 6	0.39 (10)	0.12 (3)	0.24 (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)	–	–	–	–

Dimensions in inches (mm)

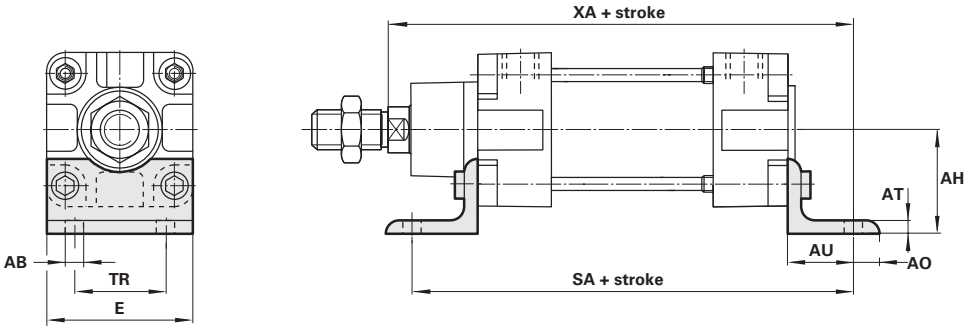
Series ML
Mounting Styles and Installation Dimensions

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)

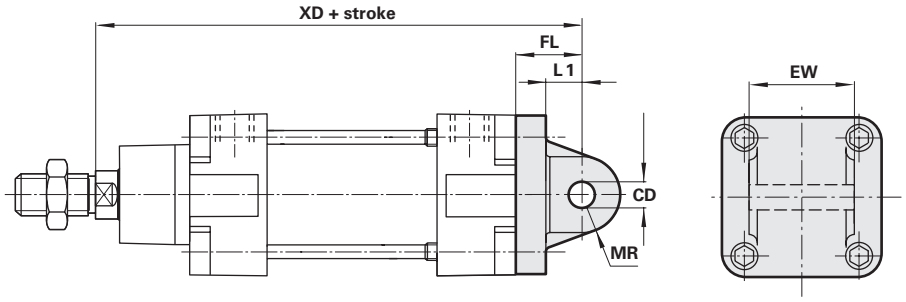
BORE	TG	TR	WH	XA	ZT	WEIGHT* CODE 23	WEIGHT* CODE 45
32	1.28 (32.5)	1.26 (32)	1.02 (26)	5.67 (144)	5.39 (137)	0.04 (0.02)	0.33 (0.15)
40	1.50 (38)	1.42 (36)	1.18 (30)	6.42 (163)	5.98 (152)	0.04 (0.02)	0.40 (0.18)
50	1.83 (46.5)	1.77 (45)	1.46 (37)	6.89 (175)	6.54 (166)	0.11 (0.05)	0.66 (0.30)
63	2.22 (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)

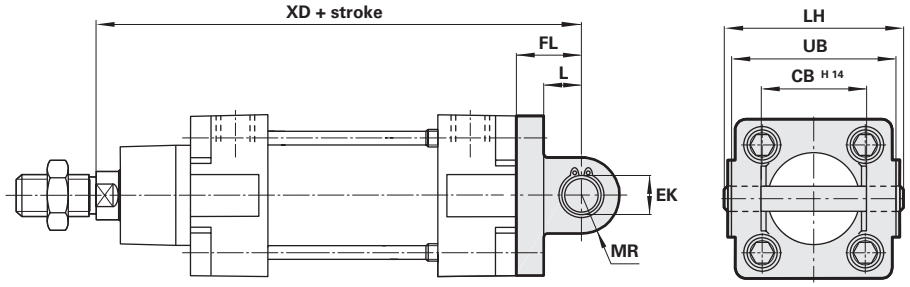
Series ML
Mounting Styles and Installation Dimensions

32-320mm bore sizes

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



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

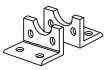


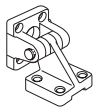
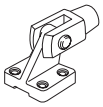
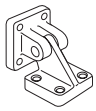
BORE	CD	EW	FL	L1	MR	XD	WEIGHT* CODE 48
32	0.39 (10)	1.02 (25.8)	0.87 (22)	0.51 (13)	0.35 (9)	5.59 (142)	0.20 (0.09)
40	0.47 (12)	1.09 (27.8)	0.98 (25)	0.63 (16)	0.47 (12)	6.30 (160)	0.24 (0.11)
50	0.47 (12)	1.25 (31.7)	1.06 (27)	0.67 (17)	0.47 (12)	6.69 (170)	0.37 (0.17)
63	0.63 (16)	1.56 (39.7)	1.26 (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)

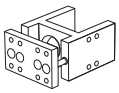
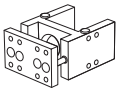
BORE	CB	EK	FL	L	LH	MR	UB	XD	WEIGHT* CODE 50
32	1.02 (26)	0.39 (10)	0.87 (22)	0.51 (13)	2.05 (52)	0.35 (9)	1.77 (45)	5.59 (142)	0.24 (0.11)
40	1.10 (28)	0.47 (12)	0.98 (25)	0.63 (16)	2.36 (60)	0.47 (12)	2.05 (52)	6.30 (160)	0.35 (0.16)
50	1.26 (32)	0.47 (12)	1.06 (27)	0.67 (17)	2.68 (68)	0.47 (12)	2.36 (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

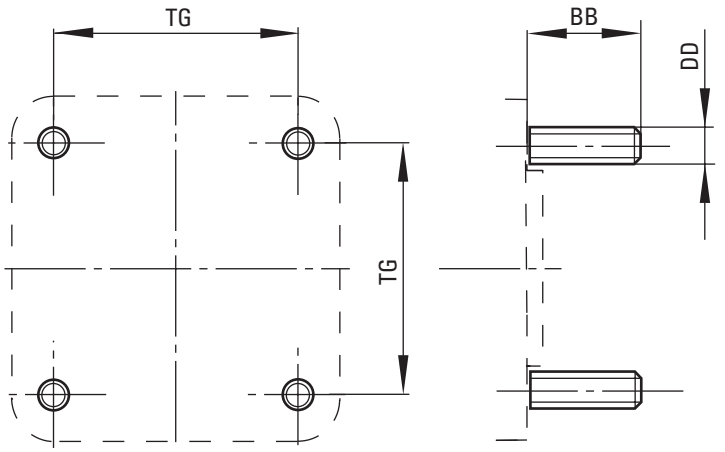
	TIE ROD STUDS	PISTON ROD SWIVEL	FLANGE MOUNTING PLATE	FOOT MOUNTING	REAR CLEVIS MOUNT TYPE 1	REAR CLEVIS MOUNT TYPE 2	PISTON ROD CLEVIS MOUNTING	FRONT OR REAR DETACHABLE TRUNNION MOUNTING	CENTER TRUNNION MOUNTING
									
32	ML/8032/35	ML/8025/38	ML/86012A	ML/8032/21	ML/61012A	ML/61M012A	ML62012A	ML/84012A	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

	REAR HINGE MOUNT TYPE 1	FRONT HINGE MOUNTING	REAR EYE MOUNTING	TRUNNION SUPPORT MOUNTING	NARROW HINGE	WIDE HINGE	UNIVERSAL PISTON ROD-EYE	ADJUSTABLE CENTER TRUNNION	REAR HINGE MOUNT TYPE 2
									
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	–	–

	UNIVERSAL REAR-EYE	SWIVEL HINGE	GUIDE BLOCKS	GUIDE BLOCKS	LOCKING UNIT (PASSIVE)
					
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

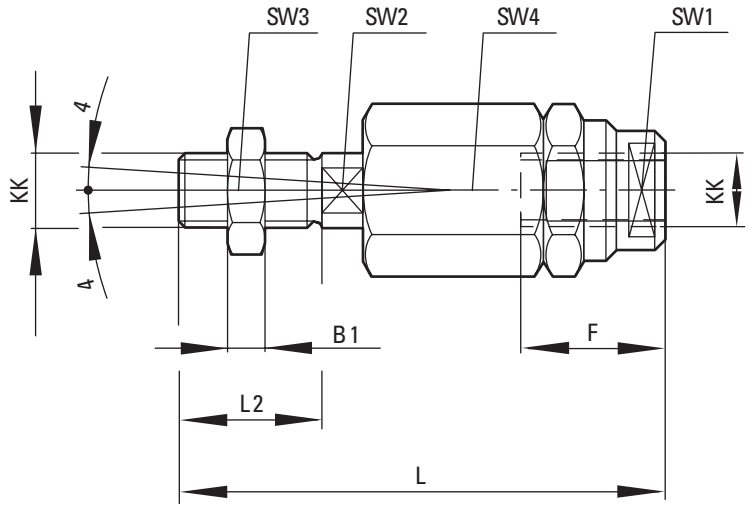
Tie Rod Studs mounting – A ISO 6431



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

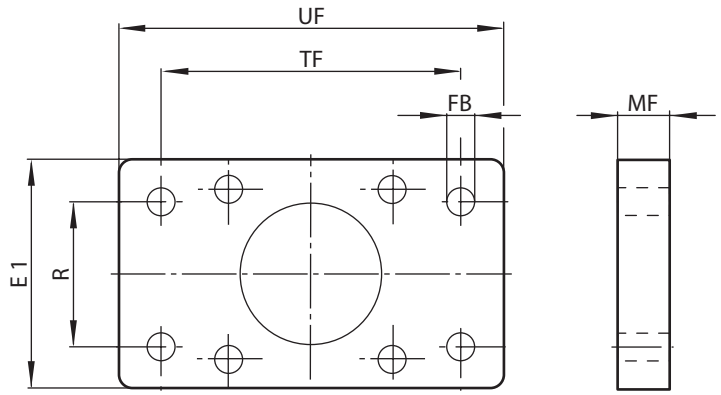


BORE	B1	F	KK	L2	SW 1	SW 2	SW 3	SW 4
32	0.20 (5)	1.02 (26)	M 10 x 1.25	0.79 (20)	0.75 (19)	0.47 (12)	0.67 (17)	1.18 (30)
40	0.24 (6)	1.02 (26)	M 12 x 1.25	0.94 (24)	0.75 (19)	0.47 (12)	0.75 (19)	1.18 (30)
50	0.31 (8)	1.34 (34)	M 16 x 1.5	1.26 (32)	1.18 (30)	0.75 (19)	0.94 (24)	1.65 (42)
63	0.31 (8)	1.34 (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)

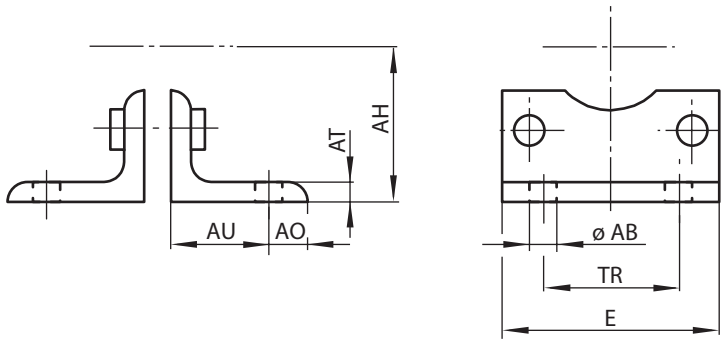
Series ML Cylinder Accessories

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

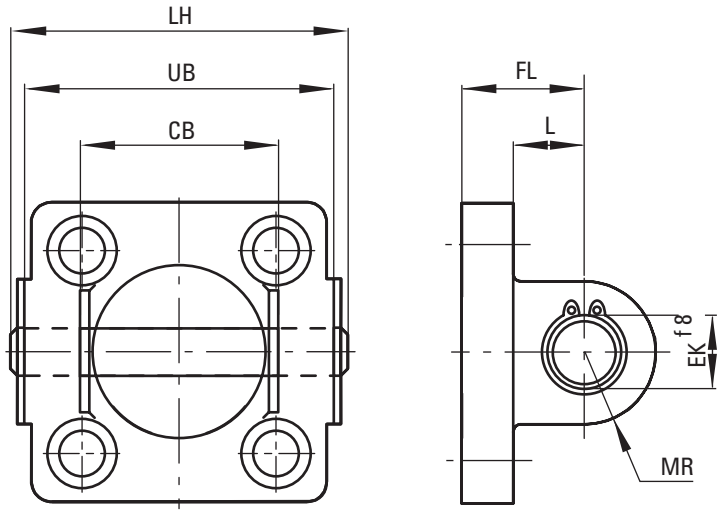


BORE	AB	AH	AO	AT	AU	E	TR
32	.28 (7)	1.26 (32)	.31 (8) [11]	.16 (4)	.94 (24)	1.89 (48)	1.26 (32)
40	.35 (9)	1.42 (36)	.35 (9) [12]	.16 (4) [5]	1.1 (28)	2.09 (53)	1.42 (36)
50	.35 (9)	1.77 (45)	.39 (10) [13]	.2 (5)	1.26 (32)	2.52 (64)	1.77 (45)
63	.35 (9)	1.97 (50)	.47 (12) [13]	.2 (5)	1.26 (32)	2.91 (74)	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

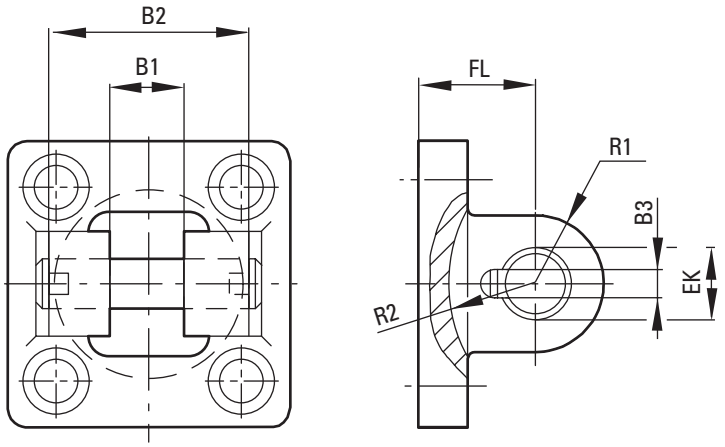
Rear Clevis Mount – Type 1
ISO 6431 and VDMA 24562



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

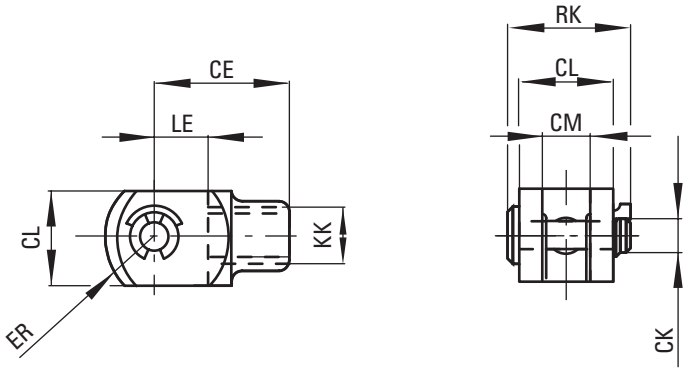


BORE	B1	B2	B3	EK	FL	R1	R2
32	.55 (14)	1.34 (34)	.14 (3.3)	.39 (10)	.87 (22)	.43 (11)	.67 (17)
40	.63 (16)	1.57 (40)	.18 (4.3)	.47 (12)	.98 (25)	.47 (12)	.79 (20)
50	.83 (21)	1.77 (45)	.18 (4.3)	.63 (16)	1.06 (27)	.57 (14.5)	.87 (22)
63	.83 (21)	2.01 (51)	.18 (4.3)	.63 (16)	1.26 (32)	.71 (18)	.98 (25)
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

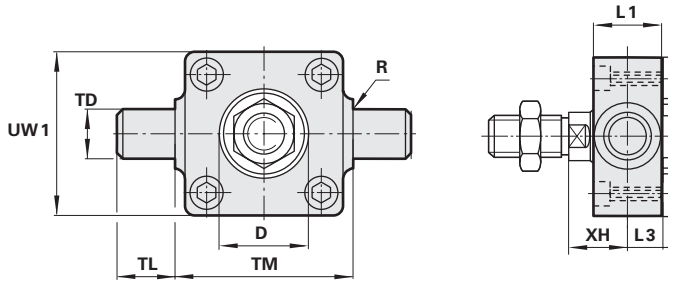
Piston rod clevis mounting ISO 8140



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

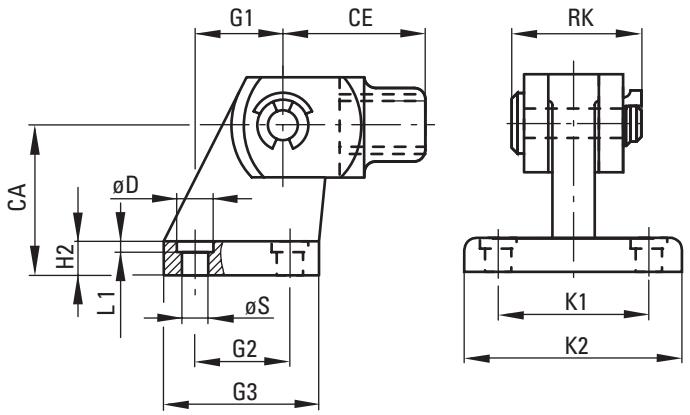


BORE	D	L1	L3	R	TD	TL	TM	UW	XH
32	1.18 (30)	0.63 (16)	0.31 (8)	0.04 (1)	0.47 (12)	0.47 (12)	1.97 (50)	1.97 (50)	0.71 (18)
40	1.38 (35)	0.79 (20)	0.39 (10)	0.06 (1.6)	0.63 (16)	0.63 (16)	2.48 (63)	2.17 (55)	0.79 (20)
50	1.57 (40)	0.94 (24)	0.47 (12)	0.06 (1.6)	0.63 (16)	0.63 (16)	2.95 (75)	2.56 (65)	0.98 (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

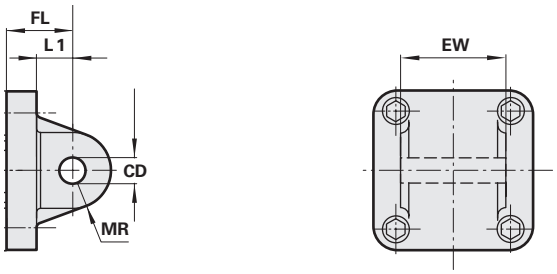
Front hinge mounting



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

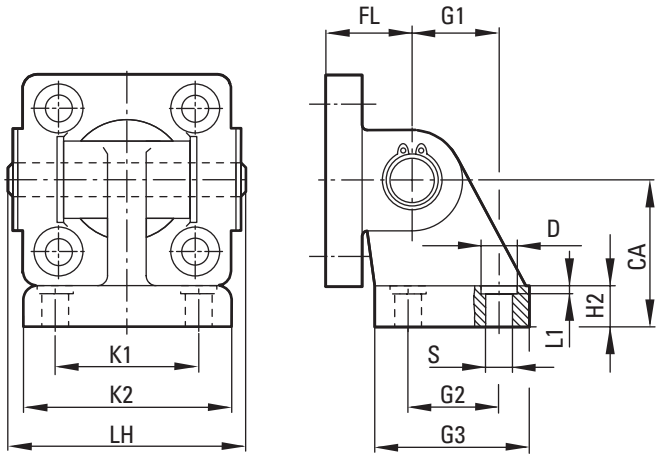


BORE	CD	EW	FL	L1	MR
32	0.39 (10)	1.02 (25.8)	0.87 (22)	0.51 (13)	0.35 (9)
40	0.47 (12)	1.09 (27.8)	0.98 (25)	0.63 (16)	0.47 (12)
50	0.47 (12)	1.25 (31.7)	1.06 (27)	0.67 (17)	0.47 (12)
63	0.63 (16)	1.56 (39.7)	1.26 (32)	0.87 (22)	0.59 (15)
80	0.63 (16)	1.96 (49.7)	1.42 (36)	0.87 (22)	0.59 (15)
100	0.79 (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)

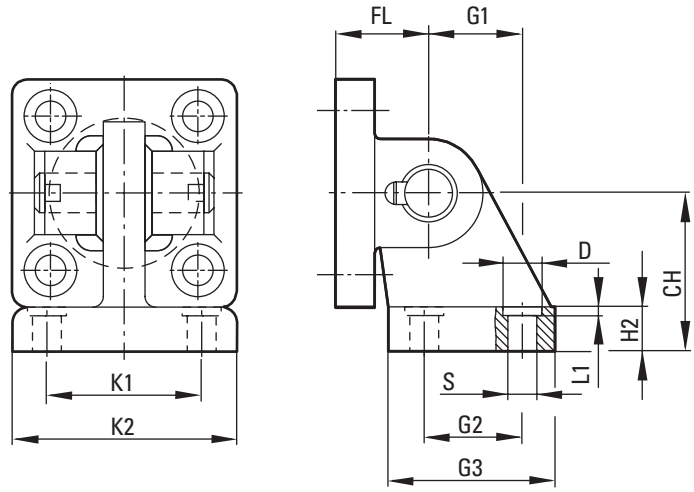
Dimensions in inches (mm)

Series ML Cylinder Accessories

Rear Hinge Mount – Type 1
VDMA 24562 Part 2



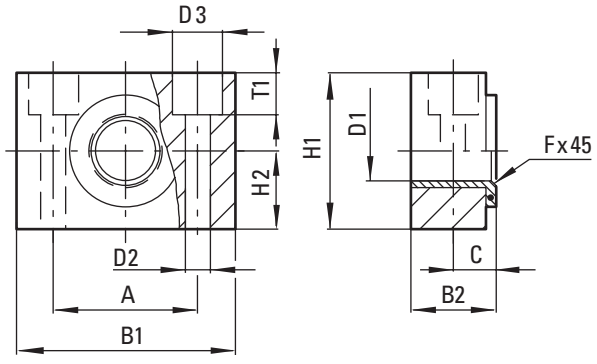
Rear Hinge Mount – Type 2
VDMA 24562 Part 2



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)



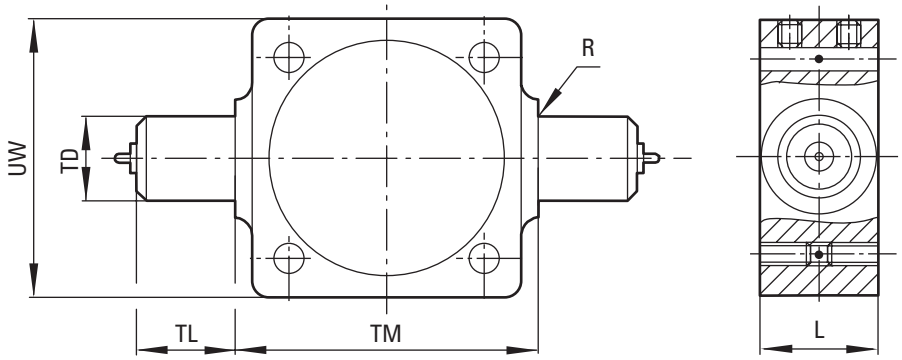
BORE	A	B1	B2	C	D2	D3	FX45°	H1	H2	T1
32	1.26	1.81	.71	.41	.26	.43	.04	1.18	.59	.27
	(32)	(46)	(18)	(10.5)	(6.6)	(11)	(1)	(30)	(15)	(6.8)
40	1.42	2.17	.83	.47	.35	.59	.06	1.42	.71	.35
	(36)	(55)	(21)	(12)	(9)	(15)	(1.6)	(36)	(18)	(9)
50	1.42	2.17	.83	.47	.35	.59	.06	1.42	.71	.35
	(36)	(55)	(21)	(12)	(9)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

Dimensions in inches (mm)

Series ML Cylinder Accessories

Center trunnion mounting – (for tie rod types)

ISO 6431 and VDMA 24562 Part 2

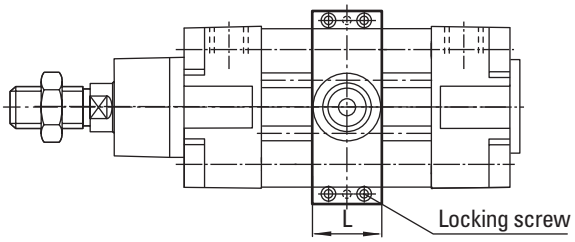


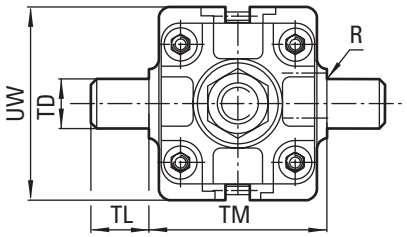
BORE	L	R	TD	TL	TM	UW	TORQUE IN. LB.
32	.79	.04	.47	.47	1.97	1.97	53.1
	(20)	(1)	(12)	(12)	(50)	(50)	
40	.94	.06	.63	.63	2.48	2.28	53.1
	(24)	(1.6)	(16)	(16)	(63)	(58)	
50	1.10	.06	.63	.63	2.95	2.76	53.1
	(28)	(1.6)	(16)	(16)	(75)	(70)	
63	1.10	.06	.79	.79	3.54	3.15	88.5
	(28)	(1.6)	(20)	(20)	(90)	(80)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

Dimensions in inches (mm)

Series ML Cylinder Accessories

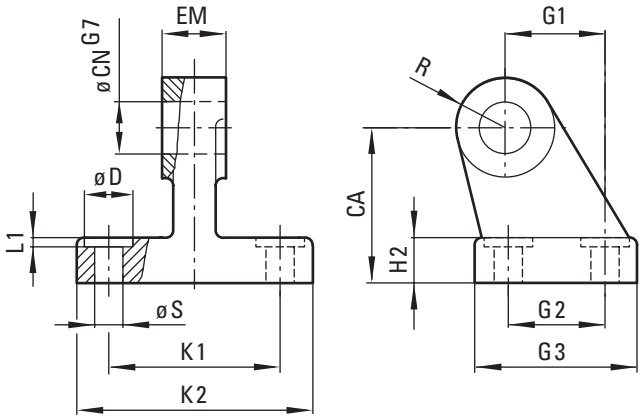
Adjustable center trunnion mounting – (for profile types) ISO 6431, VDMA 24562 Part 2





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

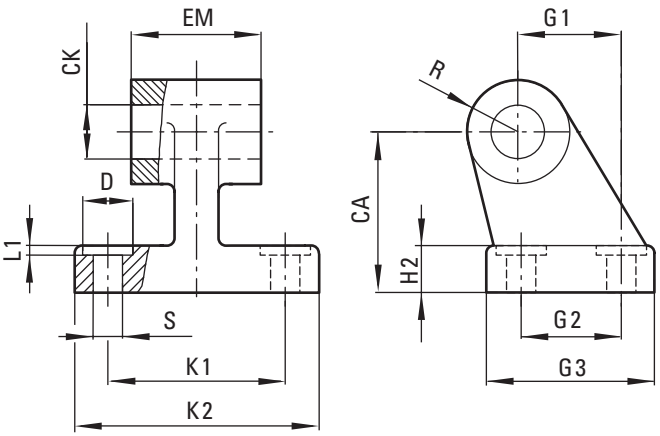
Narrow hinge mounting



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)

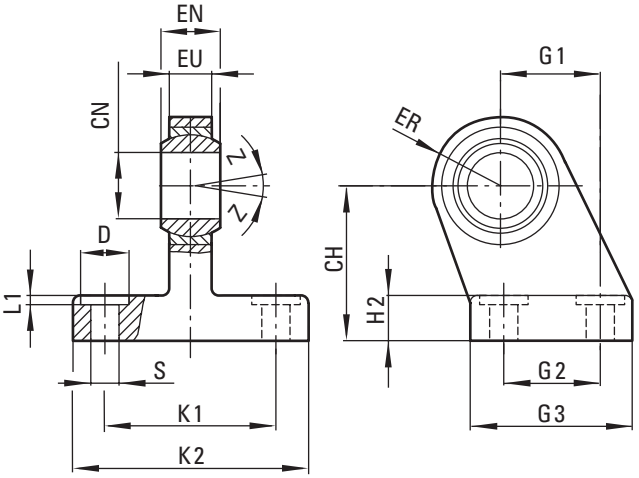
Series ML Cylinder Accessories

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

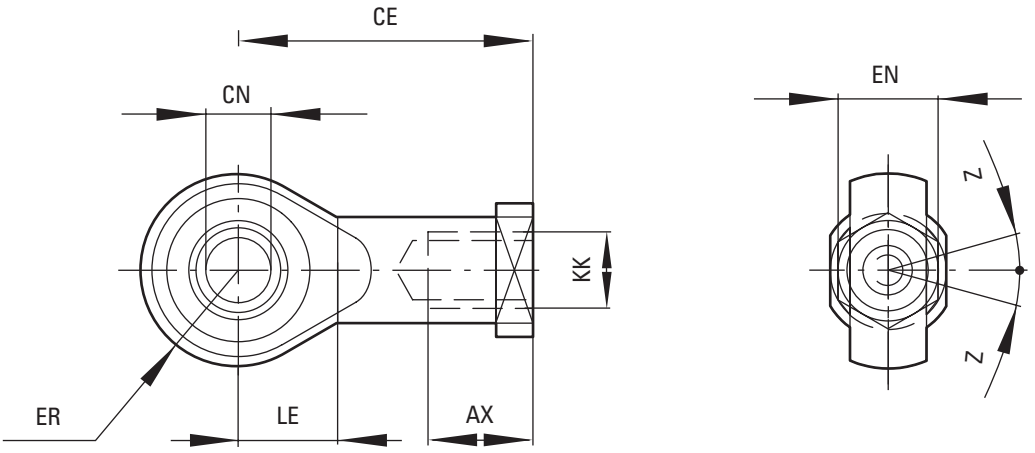


BORE	CH	CN	D	EN	ER	EU	G1	G2	G3	H2	K1	K2	L1	S
32	1.26 (32)	0.39 (10)	0.43 (11)	0.55 (14)	0.63 (16)	0.41 (10.5)	0.83 (21)	0.71 (18)	1.22 (31)	0.31 (8)	1.50 (38)	2.01 (51)	0.06 (1.6)	0.26 (6.6)
40	1.42 (36)	0.47 (12)	0.43 (11)	0.63 (16)	0.75 (19)	0.47 (12)	0.94 (24)	0.87 (22)	1.38 (35)	0.39 (10)	1.61 (41)	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

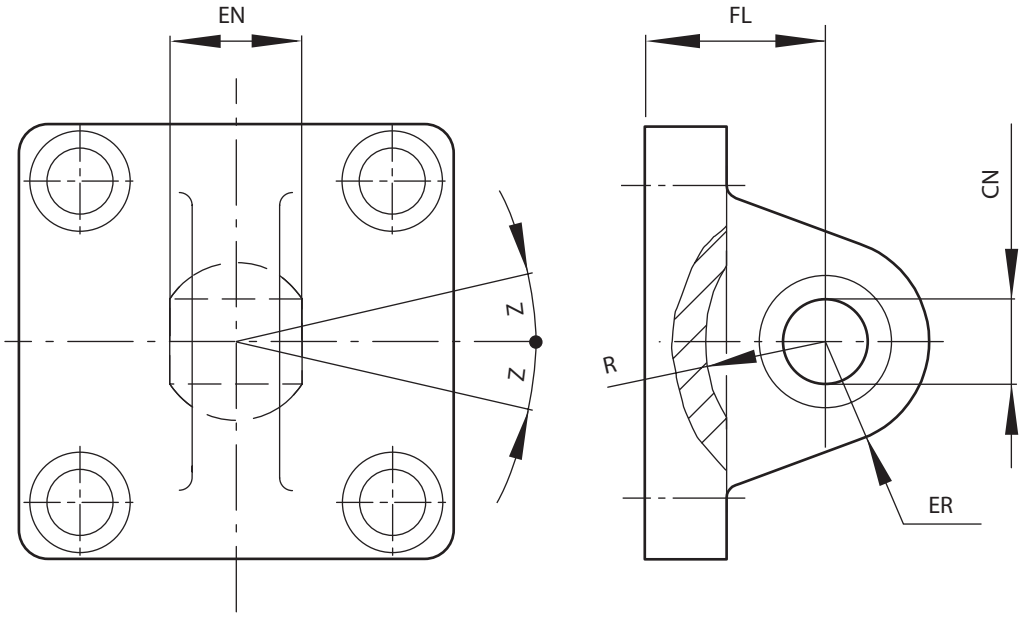


BORE	AX	CE	CN	EN	ER	KK	LE
32	0.79 (20)	1.69 (43)	0.39 (10)	0.55 (14)	0.55 (14)	M 10 x 1.25	0.59 (15)
40	0.87 (22)	1.97 (50)	0.47 (12)	0.63 (16)	0.63 (16)	M 12 x 1.25	0.67 (17)
50	1.10 (28)	2.52 (64)	0.63 (16)	0.83 (21)	0.83 (21)	M 16 x 1.5	0.87 (22)
63	1.10 (28)	2.52 (64)	0.63 (16)	0.83 (21)	0.83 (21)	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



BORE	CN	EN	ER	FL	R	Z	LB
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

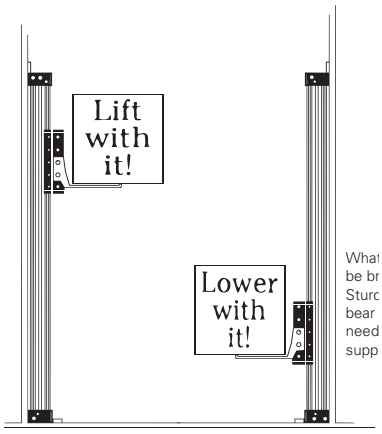
Theoretical Forces I Cushioning I Air Consumption

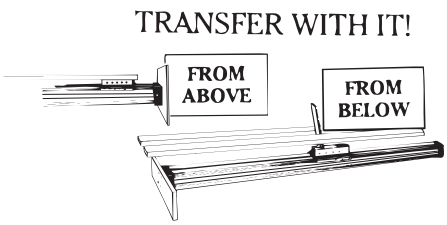
	THEORETICAL FORCES AT 6 BAR (LBS. AT 87 PSI)								AIR CONSUMPTION – LITERS/CM OF STROKE (CUBIC INCHES/INCH)			
BORE	EXTEND LBS. FORCE	(NEWTONS)	RETRACT LBS. FORCE	(NEWTONS)	CUSHION LENGTH INCH	(MM)	INITIAL CUSHION VOLUME INCHES^3	(CM^3)	EXTEND INCH^3	(LITERS)	RETRACT INCH^3	(LITERS)
32	108	(482)	93	(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)

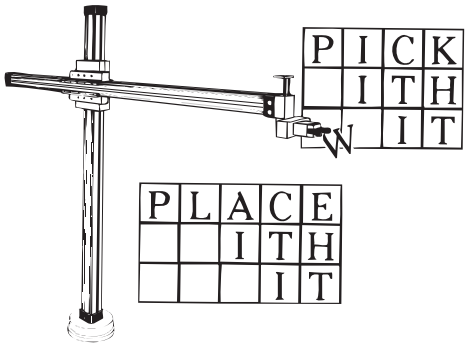
Series RL Features

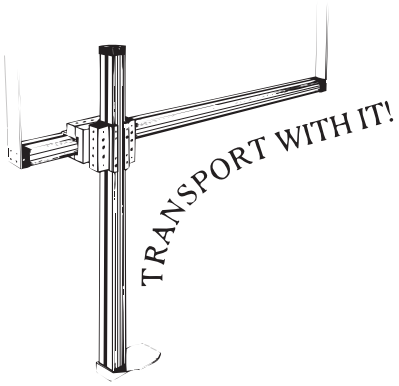
Ultimate Flexibility

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.

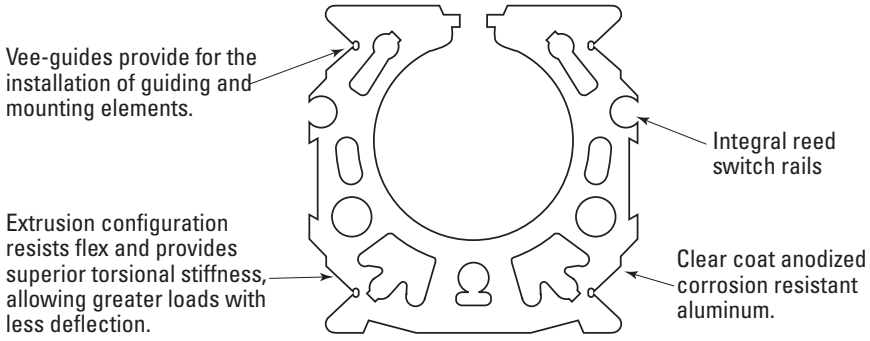








The Extruded Tube of RL Series



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

RL	01	1	A	A	N	1	A	K	0110	0
1, 2	3, 4	5	6	7	8	9	10	11	12, 13, 14, 15	16

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

3, 4 **Mounting Style**
01 – Side Lug Mount
02 – End Lug Mount
03 – 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

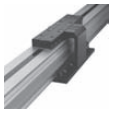
C Roller Guided Carriage

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)

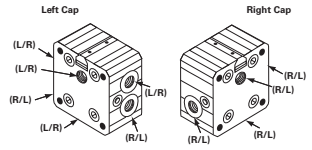
7 **Rod End Type**

Code	Type
A	Standard

8 **Seal Options**
ON – Normal, Standard

9 **Port Options**
1 – NPTF Standard
7 – BSPPLd

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 abroad 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 95 through 96. 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.

Selecting the Proper Mounting

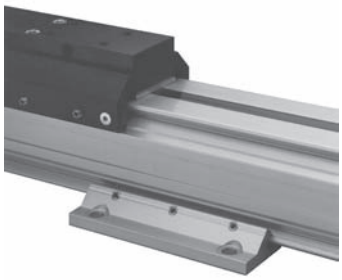
Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified.

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.

Code 24
No Mount

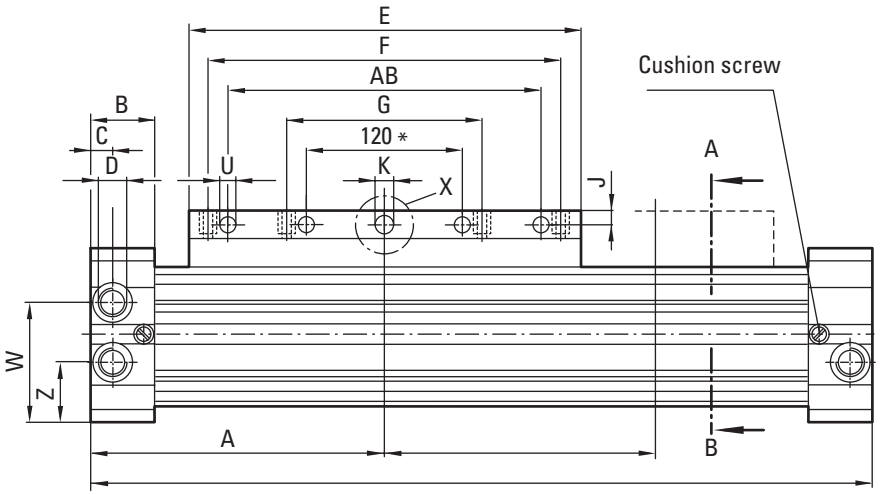
Code 03
End Lug

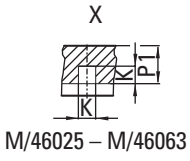
Code 01
Side Lug



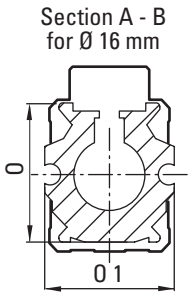
Series RL
Mounting Styles and Installation Dimensions

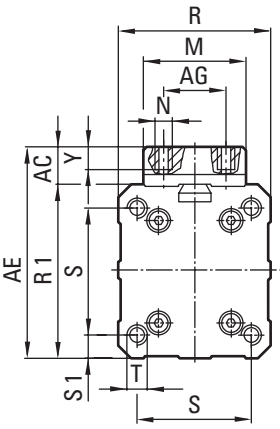
Code 24 – No Mount
(Standard Cylinder)

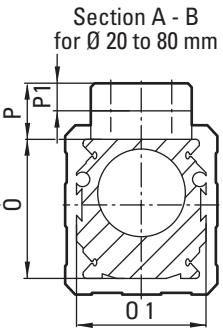




M/46025 – M/46063







*For cylinder 80 mm

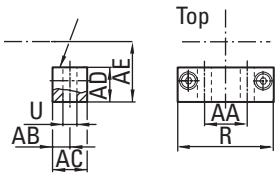
BORE	A	AB	AC	AE	AG	AO	B	C	D	E	F	G	J	K	L
16	2.46 (62.5)	–	0.28 (7)	1.50 (38)	0.31 (8)	/0.30 (7.5)	0.69 (18)	0.31 (08)	– M5	3.15 (80)	2.36 (60)	– –	0.10 (2.5)	0.12 (3)	1.22 (31)
20	3.34 (85)	/2.36 (60)	0.55 (14)	2.13/2.32 (54/59)	0.71 (18)	/0.26 (6.5)	0.91 (23)	0.31 (08)	1/8 NPT G1/8	4.33 (110)	3.15 (80)	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

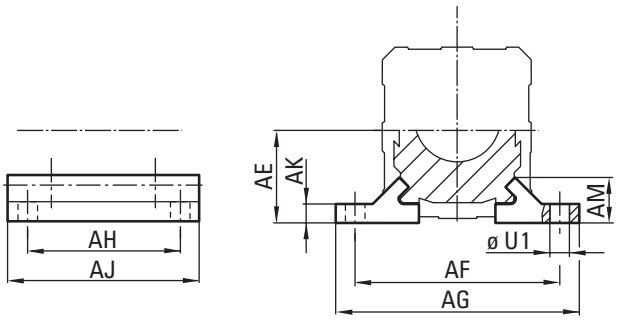


BORE	AA	AB	AC	AD	AE	R	U
16	0.63	0.39	0.59	0.12	0.63	1.06	0.22
	(16)	(10)	(15)	(03)	(16)	(27)	(5.5)
20	0.67	0.20	0.39	0.39	0.85	1.57	0.22
	(17)	(05)	(10)	(10)	(21.5)	(40)	(5.5)
25	0.71	0.28	0.59	0.53	0.94	1.89	0.28
	(18)	(07)	(15)	(13.5)	(24)	(48)	(7)
32	1.02	0.43	0.87	0.65	1.20	2.36	0.35
	(26)	(11)	(22)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

End cover mounts for cylinders 25 to 80 mm 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

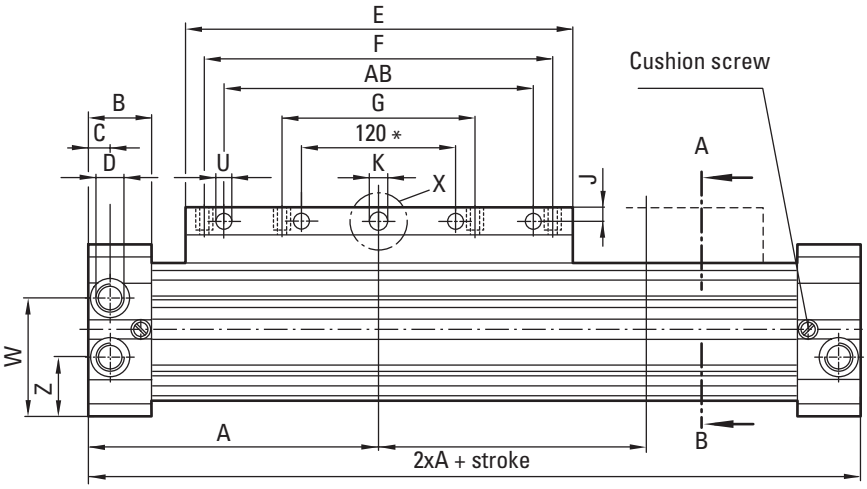


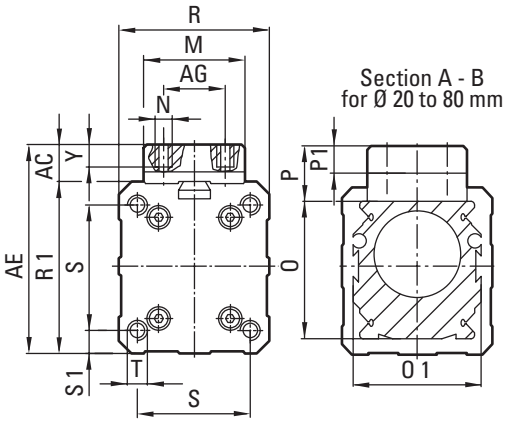
BORE	AE	AF	AG	AH	AJ	AK	AM	U
16	0.63	1.57	1.97	0.79	1.18	0.14	0.35	0.22
	(16)	(40)	(50)	(20)	(30)	(3.5)	(9)	(5.5)
20	0.85	2.05	2.44	1.77	2.36	0.18	0.47	0.22
	(21.5)	(52)	(62)	(45)	(60)	(5)	(12)	(5.5)
25	0.94	2.36	2.83	2.36	3.15	0.22	0.51	0.26
	(24)	(60)	(72)	(60)	(80)	(5.5)	(13)	(6.6)
32	1.20	2.99	3.62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

Dimensions in inches (mm)

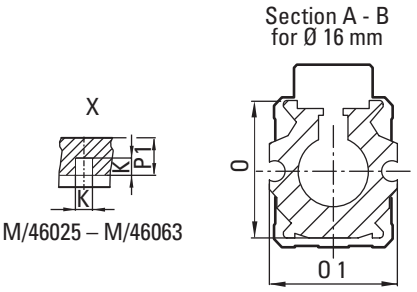
Series RL
Carriage Options

Code A – Cylinder with Internal guide

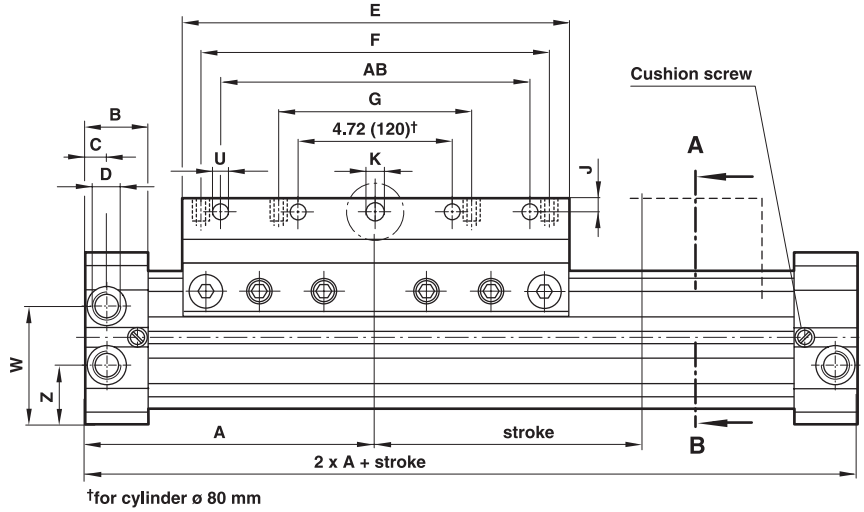


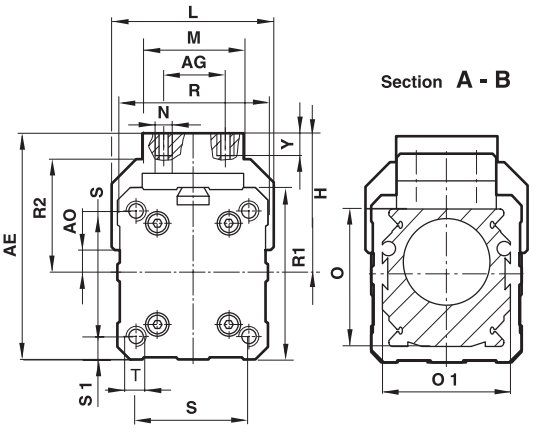


*For cylinder Ø 80 mm



Code B – Cylinder with external guide





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	/7.48	0.79	4.92/5.39	0.98	/1.00	1.57	0.67	1/2 NPT	12.60	9.45	4.72	/0.30	0.32	4.33
	(215)	(190)	(20)	(125/137)	(25)	(25.5)	(40)	(17)	G1/2	(320)	(240)	(120)	(7.5)	(8)	(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)

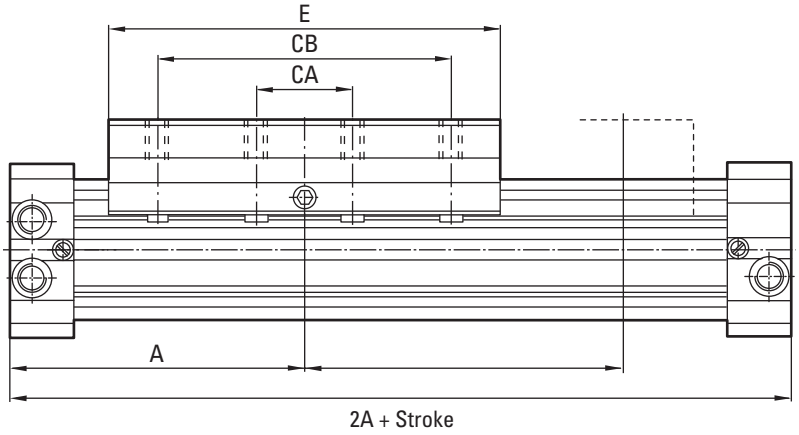
BORE	M	N	O	O1	P	P1	R	R1	R2	S	S1	T	U	W	Y	Z
16	0.71	M3	0.98	1.26	0.47	–	1.06	1.22	/0.73	0.63	0.22	M3x5 deep	–	–	0.16/0.20	0.63
	(18)		(25)	(32)	(12)		(27)	(31)	(18.5)	(16)	(5.5)				(4/5)	(16.3)
20	1.06/1.06	M5	1.26	1.50	0.73	–	1.57	1.57	/0.94	1.26	0.16	M5x12 deep	–	–	0.47	0.85
	(27/27)		(32)	(38)	(18.5)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

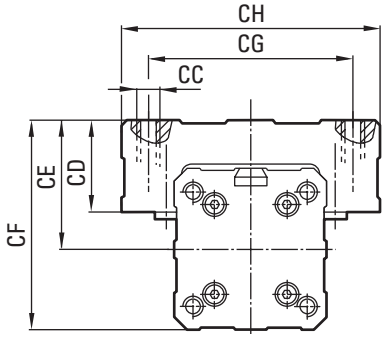
Dimensions in inches (mm)

Series RL
Carriage Options

Roller Guided Carriage

Code C – Cylinders with precision roller guide





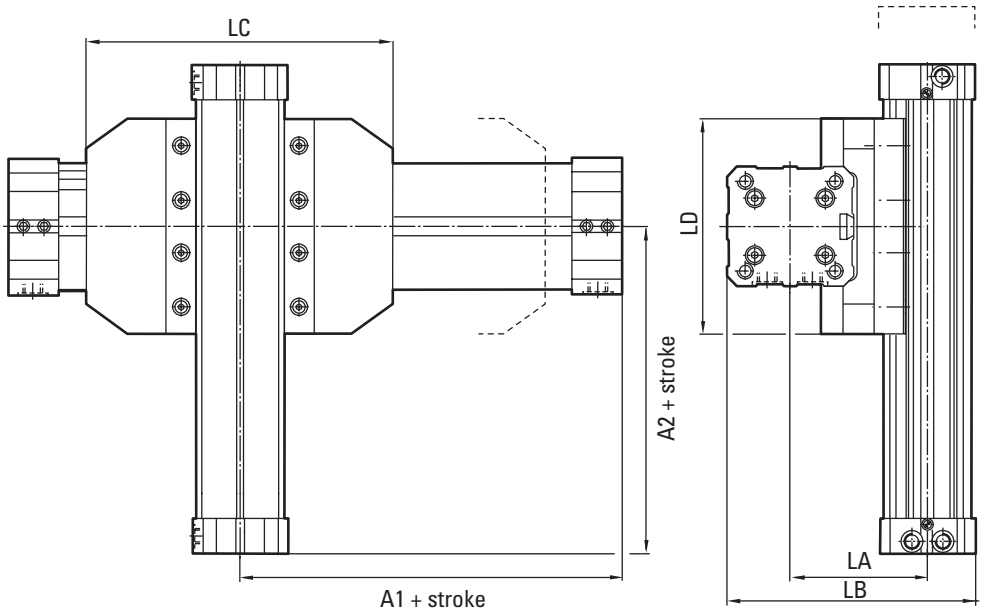
BORE	A	CA	CB	CC	CD	CE	CF	CG	CH	E
25	3.94	1.77	3.54	M6x14 deep	1.42	1.65	2.60	2.36	3.35	5.12
	(100)	(45)	(90)		(36)	(42)	(66)	(60)	(85)	(130)
32	4.72	2.36	4.72	M8x16 deep	1.50	1.97	3.15	2.95	3.86	6.30
	(120)	(60)	(120)		(38)	(50)	(80)	(75)	(98)	(160)
40	5.91	3.15	5.91	M8x16 deep	1.65	2.26	3.74	3.62	4.65	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

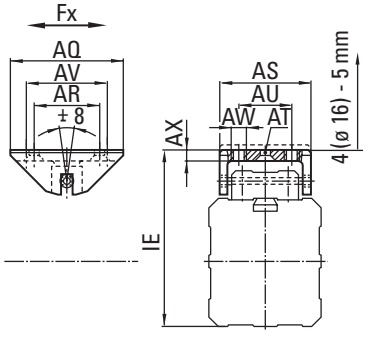


Externally Guided Right Angle Mounting System

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

Dimensions in inches (mm)

Code H – Swinging bridge



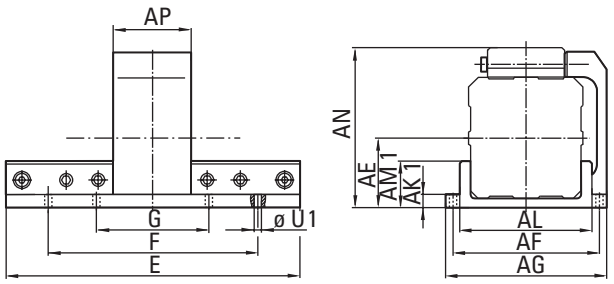
BORE	AQ	AR	AS	AT	AU	AV	AW	AX	IE	FX (N)
16	1.57 (40)	– –	1.02 (26)	– –	0.47 (12)	1.18 (30)	M4	0.16 (4)	1.89 +.16 (48 +4)	3.94 (100)
20	1.97 (50)	1.38 (35)	1.50 (38)	DIN74-Bm5	0.79 (20)	1.57 (40)	M5	0.20 (5)	2.58 +.20 (65.5 +5)	5.91 (150)
25	2.36 (60)	1.57 (40)	1.73 (44)	DIN74-Bm5	0.79 (20)	1.77 (45)	M5	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)

Series RL
Carriage Options

Carriage Plate Mounting, Side Mounting Plate

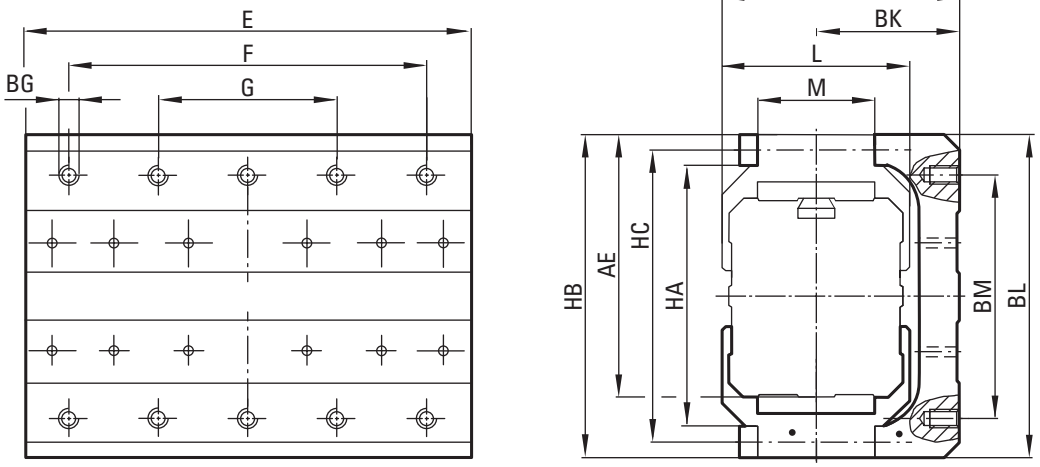
Code G – Carriage plate mounting



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

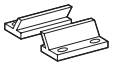


BORE	AE	BG	BJ	BK	BL	BM	E	F	G	HA	HB	HC	L	M
16	1.50 (38)	–	– –	– –	– –	– –	3.15 (80)	– –	– –	– –	1.93 (49)	– –	– –	0.71 (18)
20	2.32 (59)	M5x10 deep	2.13 (54)	1.30 (33)	3.07 (78)	2.17 (55)	4.33 (110)	– –	1.57 (40)	2.52 (64)	3.11 (79)	2.52 (64)	1.65 (42)	1.06 (27)
25	2.66 (67.5)	M5x10 deep	2.48 (63)	1.46 (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)

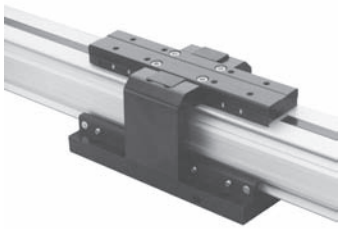
Series RL
Accessories

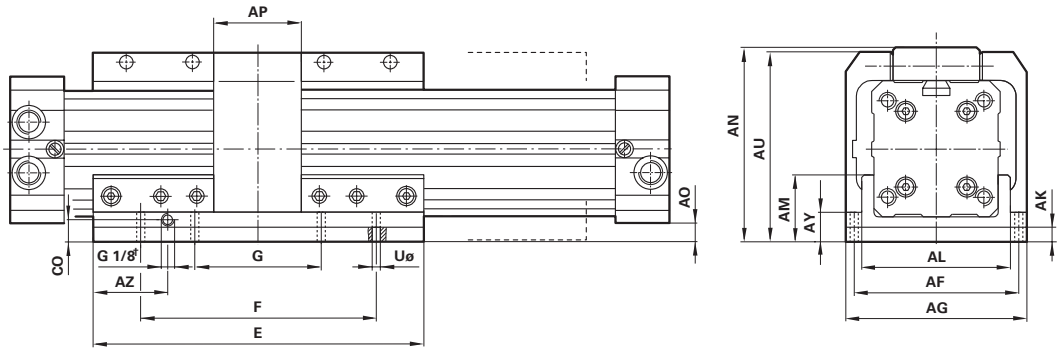
Mountings

Bore	END LUG MOUNT	SWINGING BRIDGE*	CARRIAGE MOUNTING PLATE*	CENTER SUPPORT	SECONDARY CARRIAGE**	SIDE MOUNTING PLATE**
						
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	–

Dimensions in inches (mm)

Active Holding Brake System



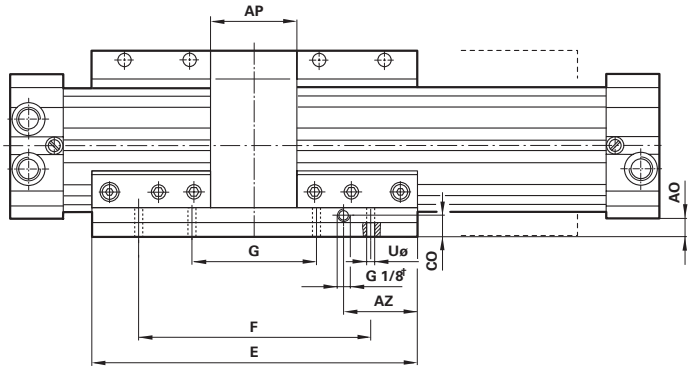


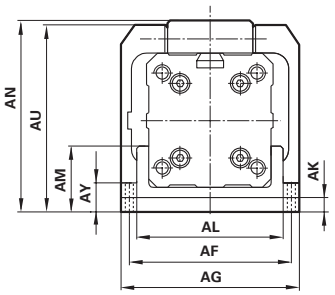
BORE NPT ISO	25 MM RLC/46025B/L3/* RLM/46025B/L3/*		32 MM RLC/46032B/L3/* RLM/46032B/L3/*		40 MM RLC/46040B/L3/* RLM/46040B/L3/*		50 MM RLC/46050B/L3/* RLM/46050B/L3/*		63 MM RLC/46063B/L3/* RLM/46063B/L3/*	
AF	2.44	(62)	3.07	(78)	3.70	(94)	4.41	(112)	5.20	(132)
AG	2.95	(75)	3.62	(92)	4.41	(112)	5.20	(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 dew point 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)

BORE SIZES:	AREA (SQ . IN.)
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.

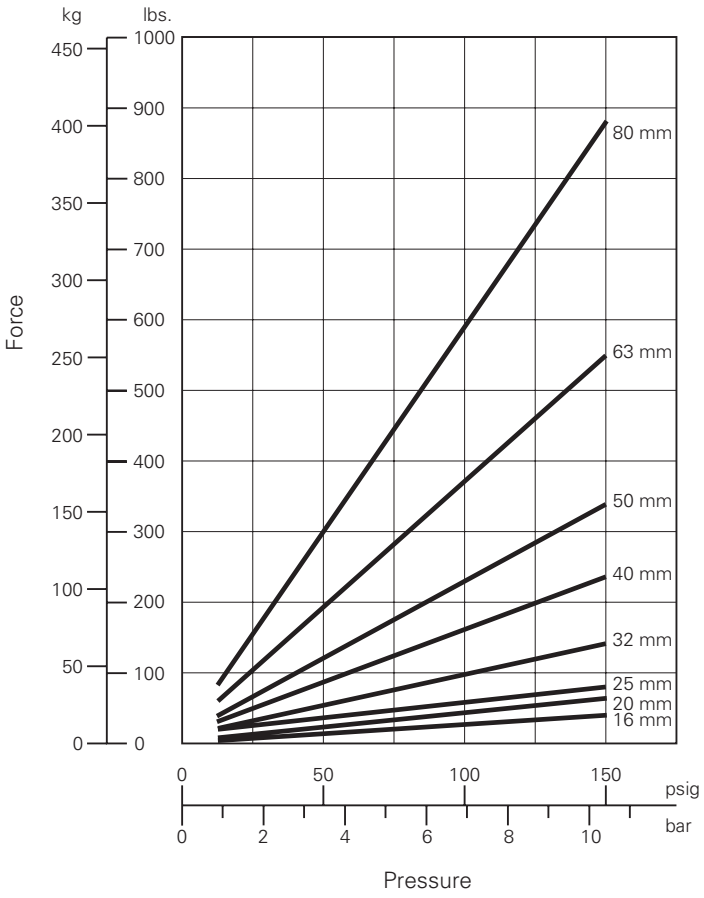
Seal Strips and Piston Seals: Polyurethane

Cover Strips: Polyamide

Guide Rails: UHMW Polymer

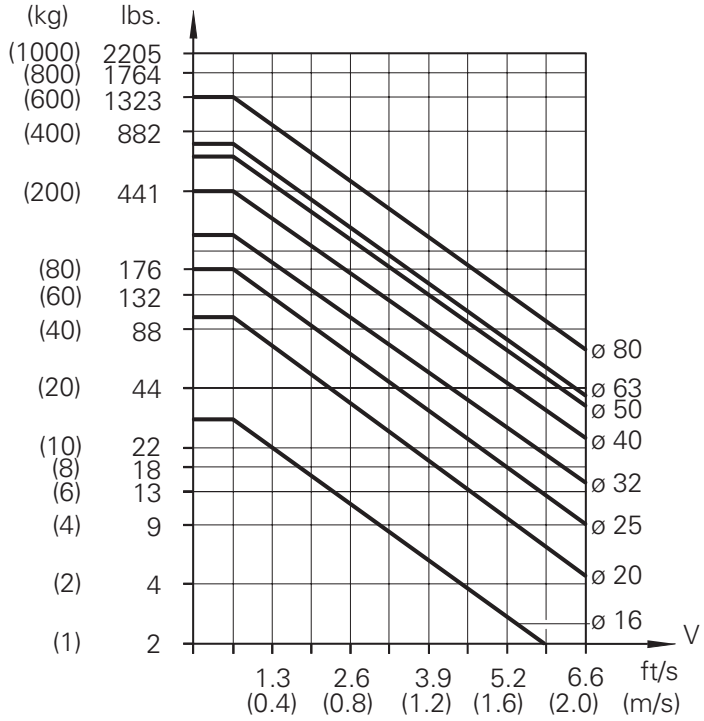
Seals: Nitrile rubber or Polyurethane

THRUST – Based on 75% of Maximum Thrust



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.



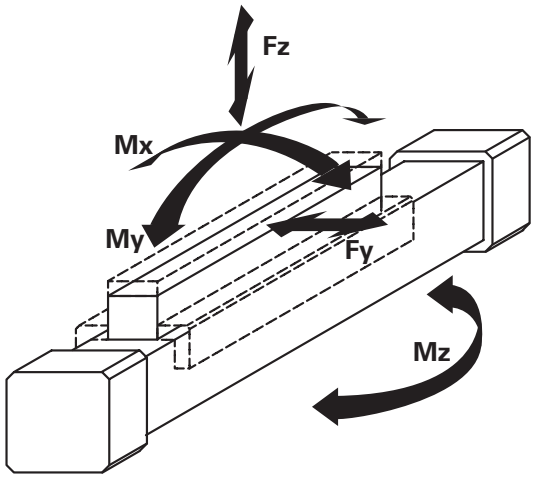
Loading values for RL cylinders

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:

$$\frac{Mx}{Mx\ max} + \frac{My}{My\ max} + \frac{Mz}{Mz\ max} + \frac{Fy}{Fy\ max} + \frac{Fz}{Fz\ max} \leq 1$$



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 weights lbs (kgs)

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	—	—	—

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, lightweight 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), corrosionresistant and score-resistant surface finish.

K. Tie Rods

High-strength steel maintains compression on tube end seals.

L. Retainer

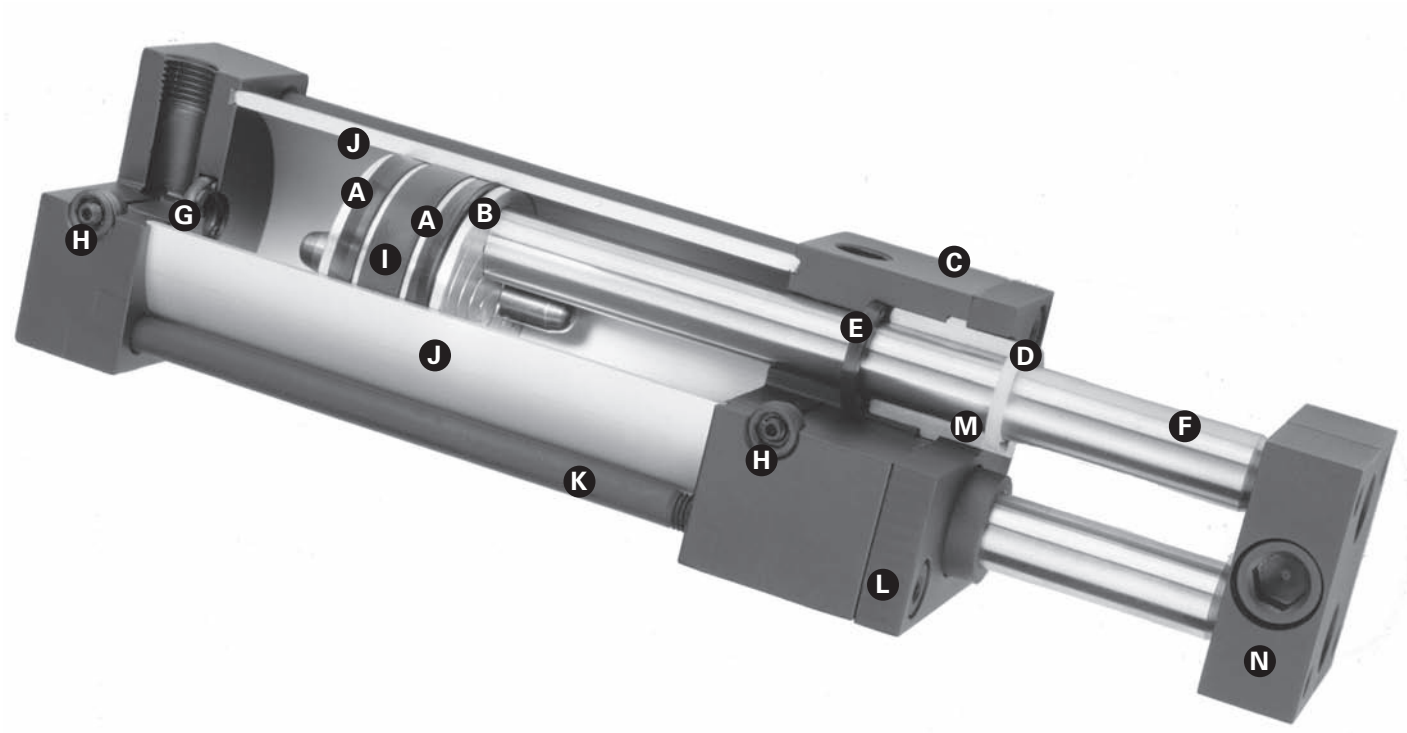
High-strength steel is used to retain rod bearings.

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

BL	01	IT	G	N	1	K	A	508	00	0
[1, 2]	[3, 4]	[5, 6]	[7]	[8]	[9]	[10]	[11]	[12, 13, 14]	[15, 16]	[17]

[1, 2] **Series**
BL – Non-Rotating Cylinders

[3, 4] **Mounting Style**

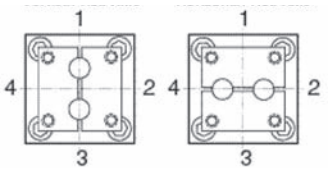
01 –	Side Lug -	
02 –	Side Tapped	MS4
07 –	Head Rectangular Flange	MF1
12 –	Cap Rectangular Flange	MF2
24 –	No Mount	MX0
25 –	Double Rod, Side Lug -	
26 –	Double Rod, Tapped -	
31 –	Double Rod, Rectangular Flange -	
41 –	Double Rod, No Mount	-
48 –	Detachable Eye	MP4
50 –	Detachable Clevis	MP2
XX –	Custom	

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

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

[7] **Rod End Type**

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



[8] **Seal Options**
N – Normal
T – High Temperature

[9] **Port Options**
1 – NPTF Standard

[10] **Port Location**

Code	Head	Cap
K	1	1
R	2	2
W	3	3
4	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
A	–	–
B	–	1
C	–	2
D	–	3
E	–	4
F	1	–
G	2	–
H	3	–
J	4	–
K	1	1
R	2	2
S	2	3
T	2	4
V	3	2
W	3	3
Y	3	4
4	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	15/16

[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

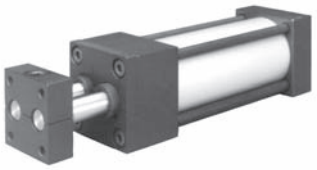
The variety of NFPA mountings available in the Series BL gives you a broad selection to match the proper mount to your application. Eaton offers rigid mounts (including side lug mounts and flange mounts) and swivel mounts (including clevis mounts). A guide to proper mount selection is provided on pages 110 through 115. 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.

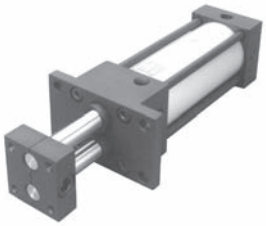
Code 24 –
No Mount (MXO)



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)

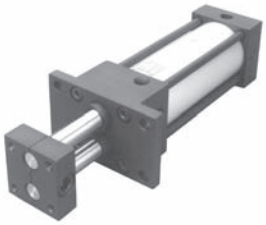
Code 50 –
Detachable Clevis (MP2)

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)

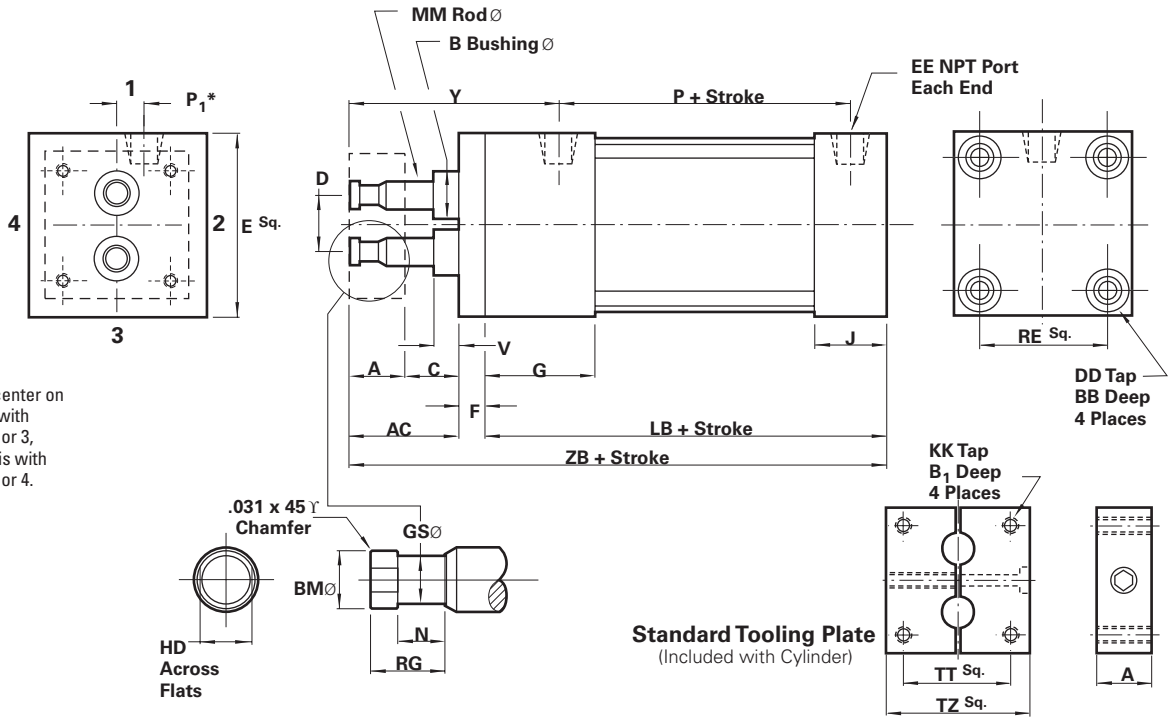


Series BL
Mounting Styles and Installation Dimensions

1-1/8" to 4" bore sizes

1-1/8" to 4" bore sizes

Code 24 –
No Mount (MX0)



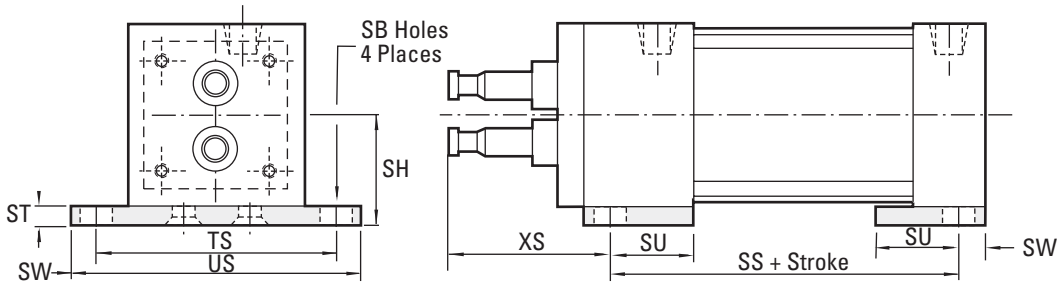
*Head Port is off center on vertical rod axis with port in position 1 or 3, horizontal rod axis with port in position 2 or 4.

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

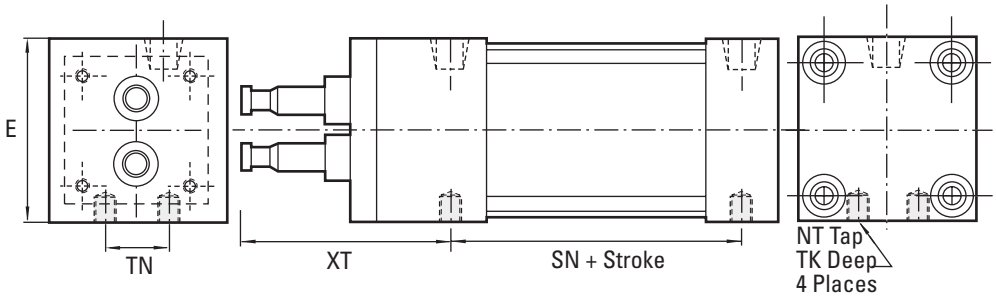
1-1/8" to 4" bore sizes

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)

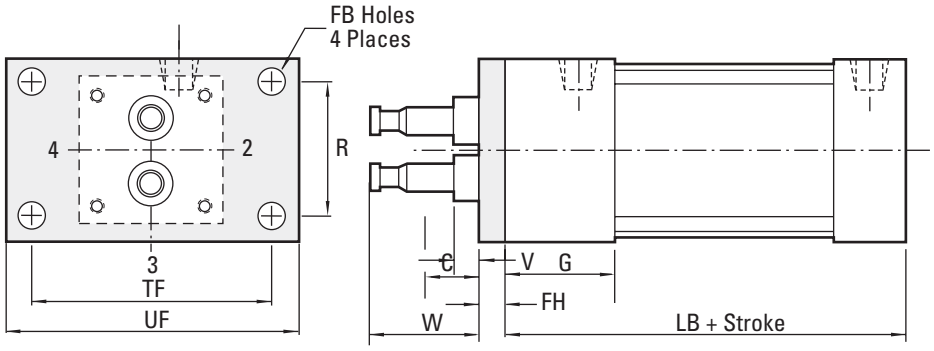


DIMENSION	.1-1/8" BORE (28.58)		.1-1/2" BORE (38.10)		.2" BORE (50.80)		.2-1/2" BORE (63.50)		.3-1/4" BORE (82.55)		.4" BORE (101.60)	
E	1.500	(38.10)	2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	4.500	(114.30)
NT	10 – 32		1/4 – 20		5/16 – 18		3/8 – 16		1/2 – 13		1/2 – 13	
SN	1.500	(38.10)	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

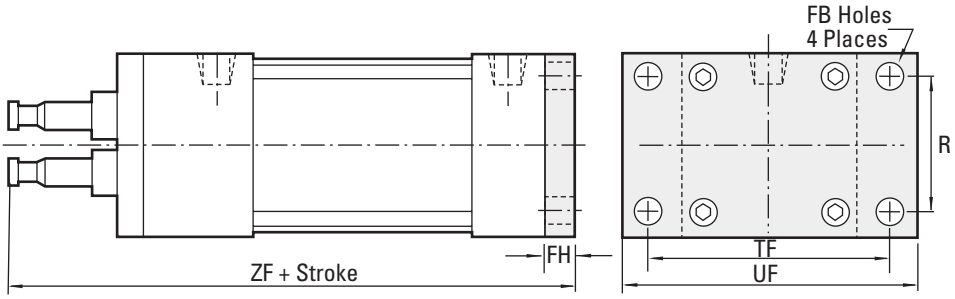
1-1/8" to 4" bore sizes

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)

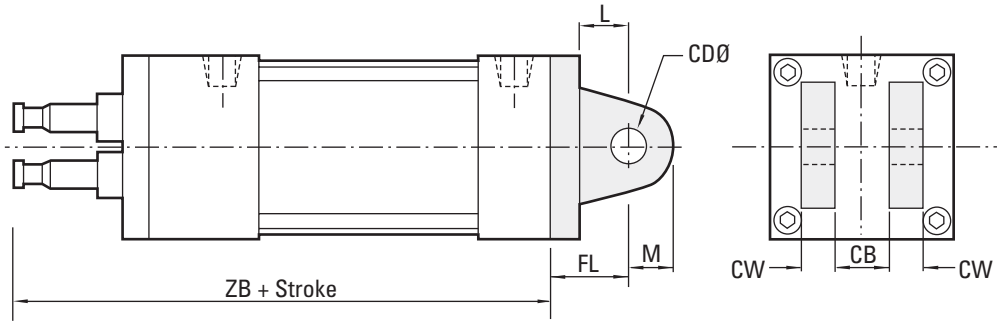


DIMENSION	.1-1/8" BORE (28.58)		.1-1/2" BORE (38.10)		.2" BORE (50.80)		.2-1/2" BORE (63.50)		.3-1/4" BORE (82.55)		.4" BORE (101.60)	
FB	.219	(5.56)	.312	(7.92)	.375	(9.53)	.375	(9.53)	.437	(11.10)	.437	(11.10)
FH	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.625	(15.88)	.625	(15.88)
R	1.000	(25.40)	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

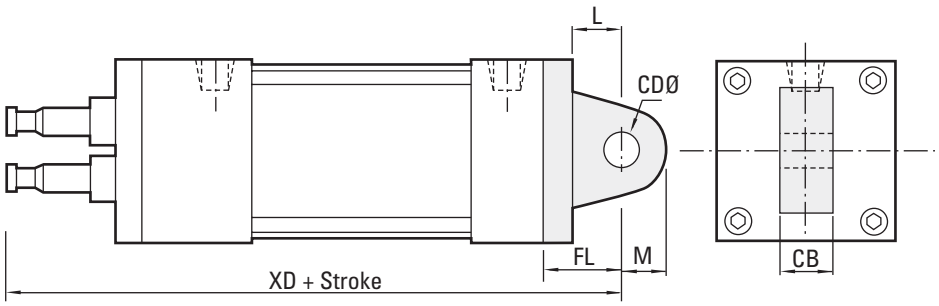
1-1/8" to 4" bore sizes

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)

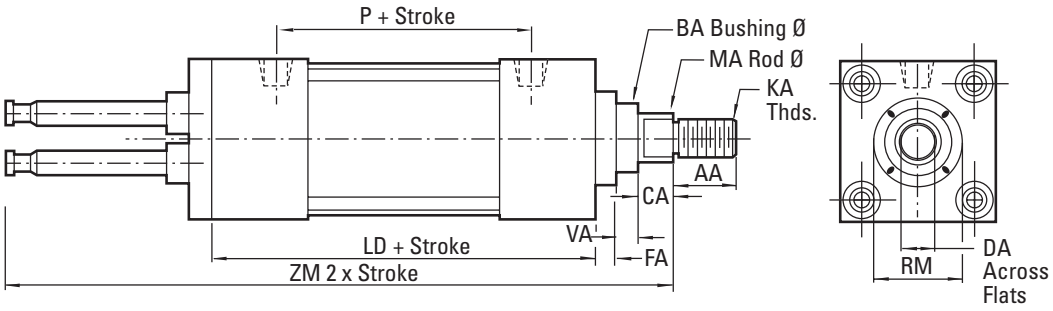


DIMENSION	.1-1/8" BORE (28.58)		.1-1/2" BORE (38.10)		.2" BORE (50.80)		.2-1/2" BORE (63.50)		.3-1/4" BORE (82.55)		.4" BORE (101.60)	
CB	.375	(9.53)	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)	1.250	(31.75)
CD	.375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)
FL	1.125	(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

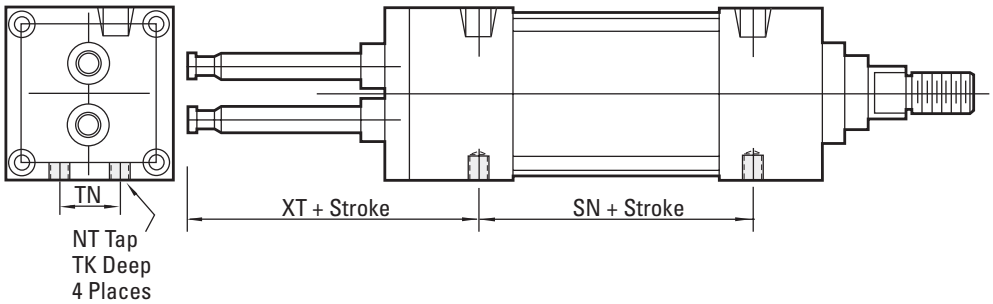
1-1/8" to 4" bore sizes

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)

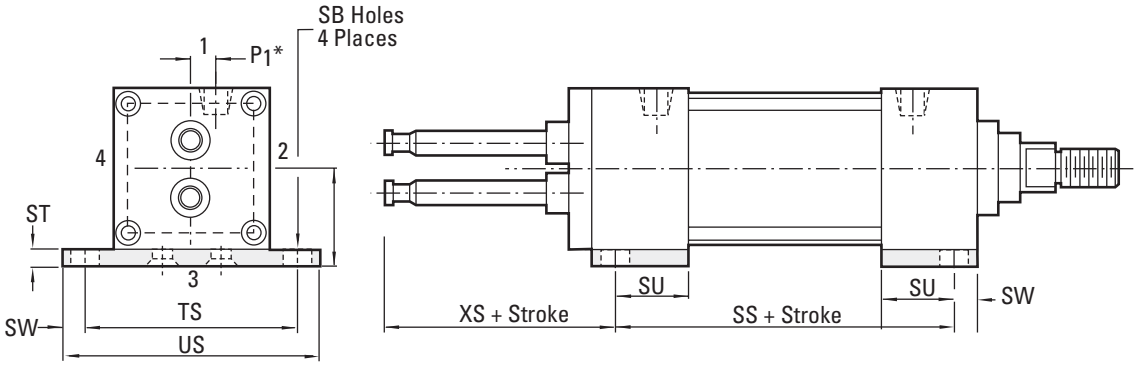


DIMENSION	.1-1/8" BORE (28.58)		.1-1/2" BORE (38.10)		.2" BORE (50.80)		.2-1/2" BORE (63.50)		.3-1/4" BORE (82.55)		.4" BORE (101.60)	
NT	10 – 32		1/4 – 20		5/16 – 18		3/8 – 16		1/2 – 13		1/2 – 13	
SN	1.875	(47.63)	2.250	(57.15)	2.250	(57.15)	2.375	(60.33)	2.625	(66.68)	2.625	(66.68)
TK	.250	(6.35)	.375	(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

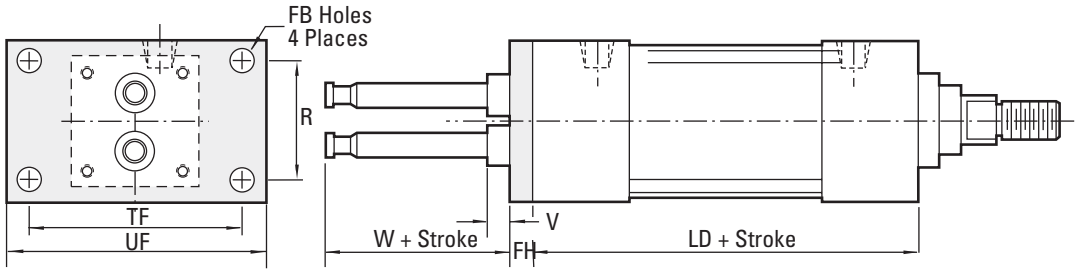
1-1/8" to 4" bore sizes

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)

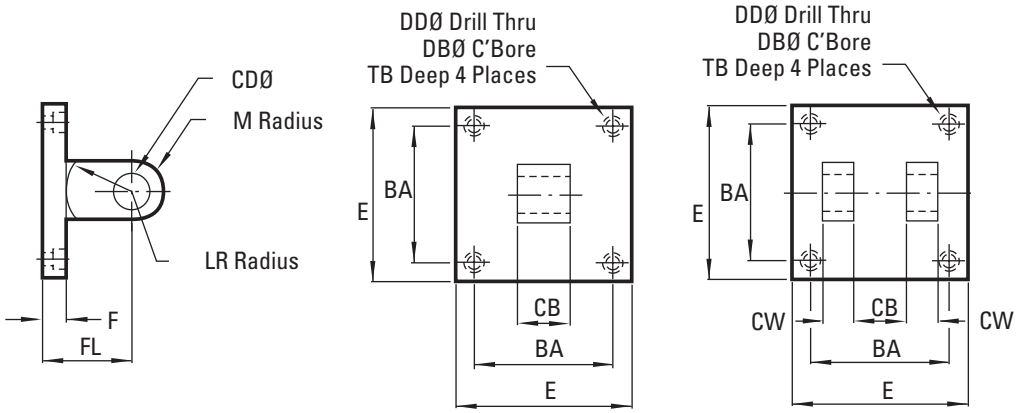


DIMENSION	.1-1/8" BORE (28.58)		.1-1/2" BORE (38.10)		.2" BORE (50.80)		.2-1/2" BORE (63.50)		.31/4" BORE (82.55)		.4" BORE (101.60)	
FB	.219	(5.56)	.312	(7.92)	.375	(9.53)	.375	(9.53)	.437	(11.10)	.437	(11.10)
FH	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.625	(15.88)	.625	(15.88)
LD	2.875	(73.03)	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

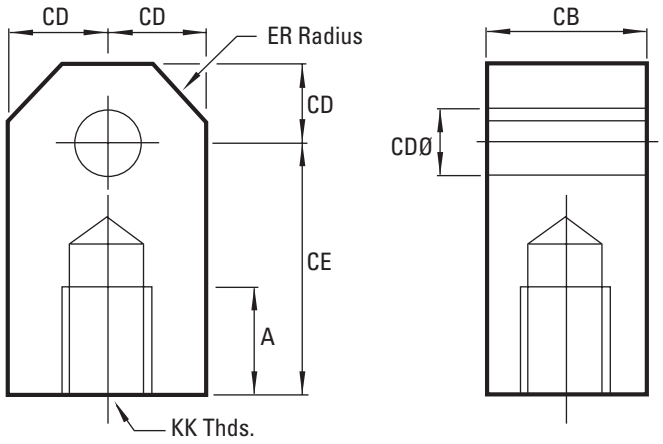
1-1/8" to 4" bore sizes

1-1/8" Bore Eye & Clevis Bracket



	BL78006A		BL610006A	
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



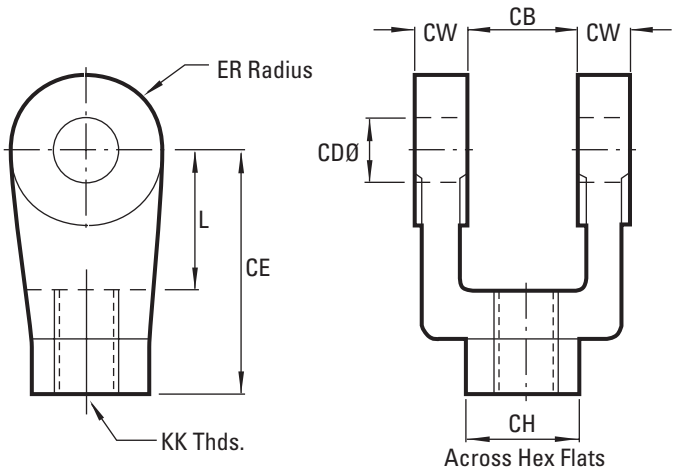
	BL60008C		BL6000CA		BL600010A	
CB	.750	(19.05)	1.250	(31.75)	1.500	(38.10)
CD	.500	(12.70)	.750	(19.05)	1.000	(25.40)
CE	1.500	(38.10)	2.062	(52.37)	2.812	(71.42)
ER	.562	(14.27)	.937	(23.80)	1.125	(28.58)
KK	1/2-20		3/4-16		1-14	

Series BL
Accessories

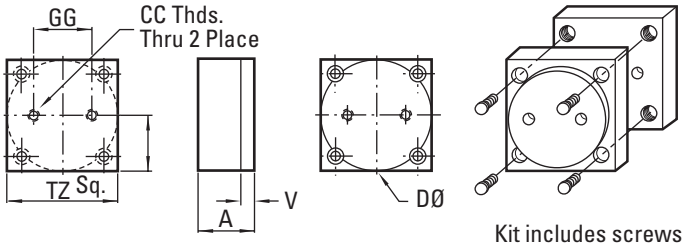
1-1/8" to 4" bore sizes

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

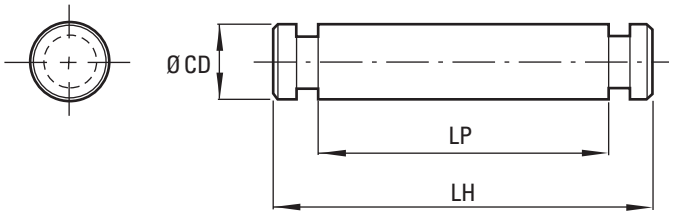


BORE	1-1/8" BL-171-225K		1-1/2" BL-171-03K		2" BL-171-04K		2-1/2" BL-171-05K		3/4" BL-171-065K		4" BL-171-08K	
A	.625	(15.88)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)	.875	(22.23)
CC	1/4-20	5/16-18	5/16-18	3/8-16	1/2-13	1/2-13						
D	1.260	(32.00)	1.575	(40.01)	1.969	(50.01)	2.480	(62.99)	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

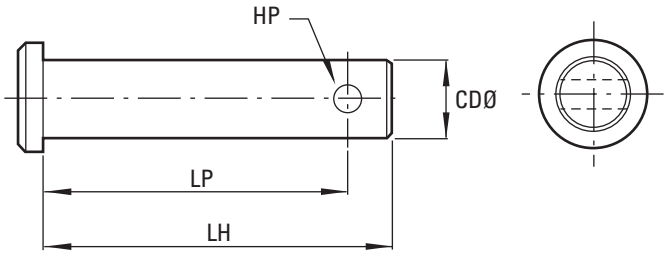
1-1/8" to 4" bore sizes

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 50/60 Hz	6-24 VDC	6-24 VDC	5-240 VDC/VAC 50/60 Hz	24-240 VAC 50/60 Hz	6-24 VDC	6-24 VDC
Switching Current	.5 Amp Max	.5 Amp Max	.5 Amp Max	1 Amp Max	4 Amp Max 50 Amp Inrush	1 Amp Max	1 Amp Max
Switching Power	10 VA	12 Watts Max	12 Watts Max	30 Watts Max	100 Watts Max	24 Watts Max	24 Watts Max
Max Voltage Drop	3.5 Volts	.5 Volts	.5 Volts	3 Volts	N/A	.5 Volts	.5 Volts
Magnetic Sensitivity	85 Gauss	85 Gauss	85 Gauss	85 Gauss Parallel	85 Gauss Parallel	85 Gauss Parallel	85 Gauss Parallel
Enclosure Class	NEMA 6/CSA	NEMA 6/CSA	NEMA 6/CSA	NEMA 6/CSA	NEMA 6/CSA	NEMA 6/CSA	NEMA 6/CSA
Temperature Range	-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

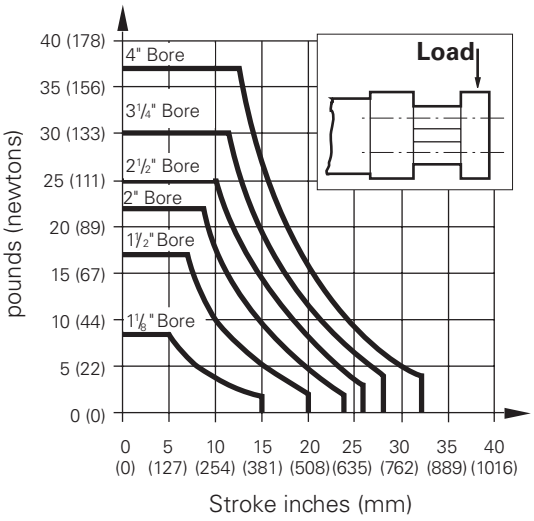
Series BL
Technical Information

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.

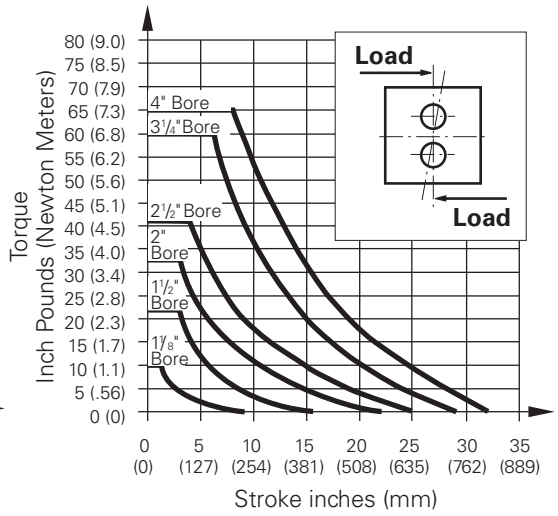
NOTE: For strokes or loads not listed consult factory.

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.

Transverse Loads



Torsional Loads



Theoretical Extend and Retract Forces in pounds (newtons)

BORE	MOVEMENT	EFFECTIVE PISTON AREA N² (CM²)	20	(1)	40	(3)	50	(3)	60	PSI (BAR) (4)	80	(6)	100	(7)	125	(9)	150	(10)	CU FT (CM³) DISPLACEMENT PER IN OF STROKE
	Extend	.99 (6.41)	20	(88)	40	(177)	50	(221)	60	(265)	80	(354)	99	(442)	124	(553)	149	(664)	.00058 (16)
1-1/8″	Retract	.84 (5.43)	17	(75)	34	(150)	42	(187)	50	(225)	67	(299)	84	(374)	105	(468)	126	(561)	.00049 (14)
	Extend	1.77 (11.40)	35	(157)	71	(315)	88	(393)	106	(472)	141	(629)	177	(786)	221	(983)	265	(1179)	.00102 (29)
1-1/2″	Retract	1.55 (9.97)	31	(138)	62	(275)	77	(344)	93	(413)	124	(550)	155	(688)	193	(860)	232	(1032)	.00089 (25)
	Extend	3.14 (20.27)	63	(280)	126	(559)	157	(699)	189	(839)	251	(1119)	314	(1398)	393	(1748)	471	(2097)	.00182 (52)
2″	Retract	2.53 (16.31)	51	(225)	101	(450)	126	(562)	152	(675)	202	(900)	253	(1125)	316	(1406)	379	(1687)	.00146 (41)
	Extend	4.91 (31.67)	98	(437)	196	(874)	245	(1092)	295	(1311)	393	(1748)	491	(2185)	614	(2731)	736	(3277)	.00284 (80)
2-1/2″	Retract	4.30 (27.71)	86	(382)	172	(765)	215	(956)	258	(1147)	344	(1529)	430	(1911)	537	(2389)	644	(2867)	.00249 (71)
	Extend	8.30 (53.32)	166	(738)	332	(1477)	415	(1846)	498	(2215)	664	(2953)	830	(3692)	1037	(4615)	1244	(5538)	.00480 (136)
3-1/4″	Retract	7.51 (48.45)	150	(668)	300	(1337)	376	(1671)	451	(2005)	601	(2674)	751	(3342)	939	(4177)	1127	(5013)	.00435 (123)
	Extend	12.57 (81.07)	251	(1118)	503	(2237)	628	(2796)	754	(3355)	1005	(4473)	1257	(5592)	1571	(6990)	1885	(8388)	.00727 (206)
4″	Retract	11.78 (76.01)	236	(1049)	471	(2097)	589	(2621)	707	(3146)	943	(4194)	1178	(5243)	1473	(6553)	1767	(7864)	.00682 (193)
Extend Double Rod Forces																			
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, lightweight 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

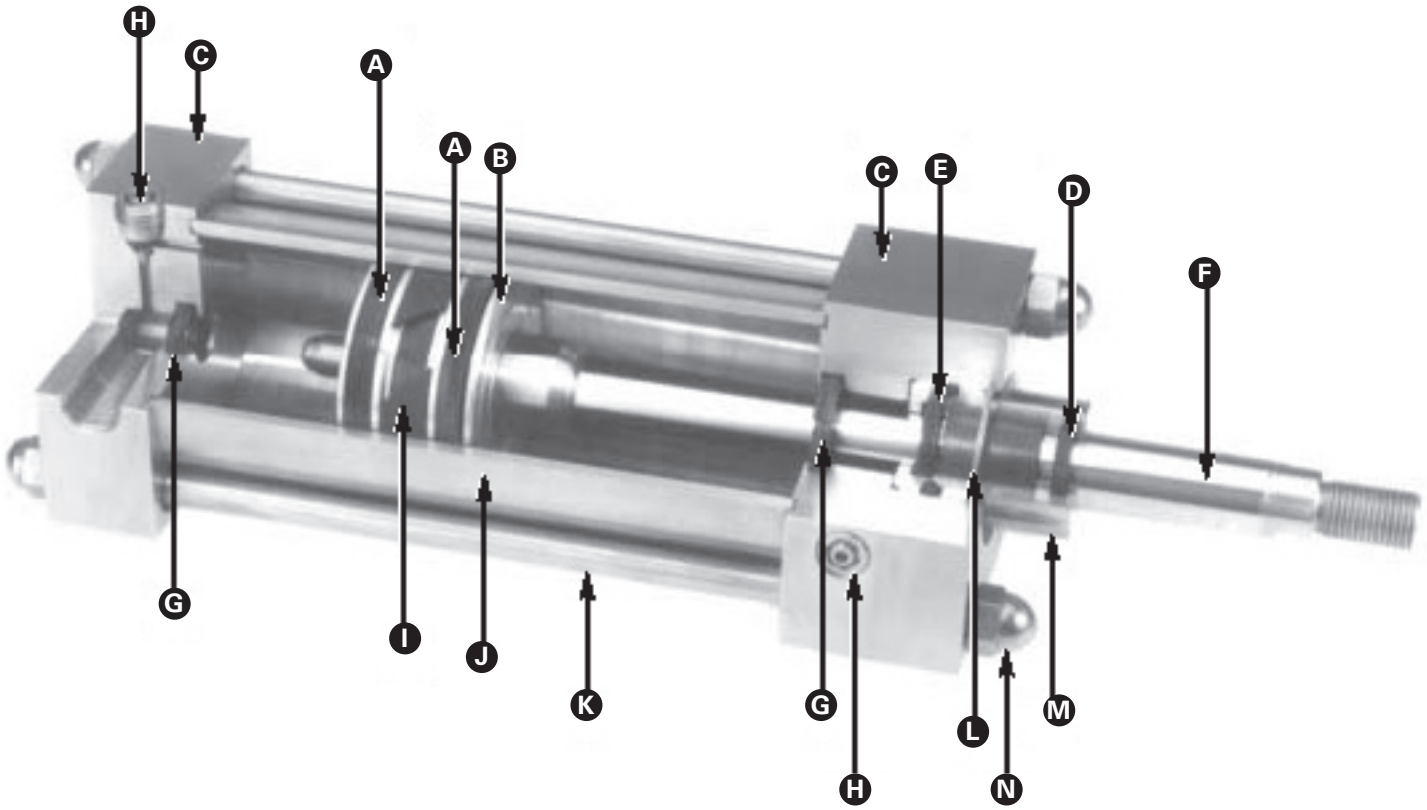
Stainless steel snap ring securely retains bushing in head.

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 RL
Model Code

S L	0 2	1 A	2	N	1	K	A	5 0 C	0 0	0
1, 2	3, 4	5, 6	7	8	9	10	11	12, 13, 14	15, 16	17

1, 2 Series
SL – Stainless Steel Pneumatic Cylinders

3, 4 Mounting Style

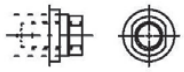
1-1/2" thru 8" Bore		
02 –	Side Tapped	**MS4**
07 –	Head Rectangular Flange	**MF1**
08 –	Head Square*	**ME3***
10 –	Cap Fixed Clevis	**MP1**
12 –	Cap Rectangular Flange	**MF2**
13 –	Cap Square*	**ME4**
16 –	Cap Trunnion	**MT2**
17 –	Head Trunnion	**MT1**
24 –	No mounts	**MX0**
XX –	Custom	
* 8" bore 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**

5, 6 Bore and Rod Size Combinations

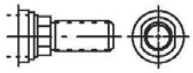
Code	Bore	Rod
1A	1-1/8"	3/8"
1B	1-1/8"	1/2"
CC	1-1/2"	5/8"
CE	1-1/2"	1"
DC	2"	5/8"
DE	2"	1"
EC	2-1/2"	5/8"
EE	2-1/2"	1"
GE	3-1/4"	1"
GH	3-1/4"	1-3/8"
HE	4"	1"
HH	4"	1-3/8"
KE	5"	1"
KH	5"	1-3/8"
LH	6"	1-3/8"
LL	6"	1-3/4"
NH	8"	1-3/8"
NL	8"	1-3/4"

7 Rod End Type

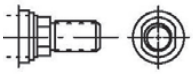
Type 2 Female UN Thread



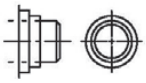
Type 9 Intermediate Male UN Thread



Type 5 Small Male UN Thread



Type 6 Plain No Attachment

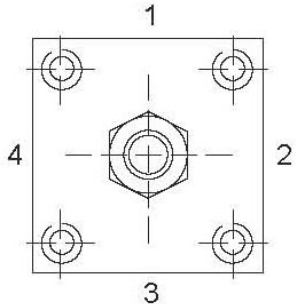


8 Seal Options
N – Standard (Nitrile)

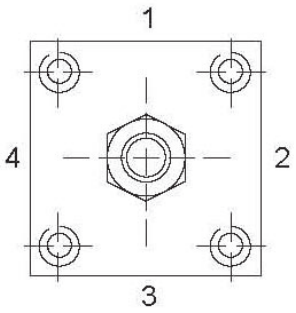
9 Port Options
1 – Standard
2 – Oversized (NFPA)

10 Port Locations
Positions are numbers as shown in picture below.

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
R	2	2
S	2	3
T	2	4
V	3	2
W	3	3
Y	3	4
4	4	4

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 –

PK – Magnet Furnished to operate Hall Effect or Read Type Switch

17 Custom
X – Custom Modification

Series SL
Mounting Styles: 1-1/2" – 8" Bore

Available Mountings

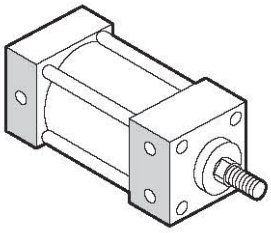
The variety of standard NFPA mountings available in the 1 1/2"-8" bore Series SL gives you a broad selection to match the proper mount to your application. Eaton offers rigid mounts (including flange mounts) and swivel mounts (including clevis mounts). A guide to proper mount selection is provided on pages 126 through 130. 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

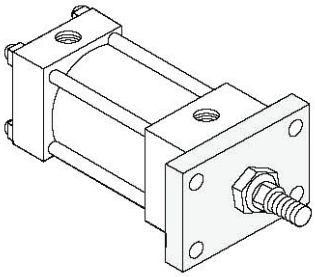
Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified.

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.

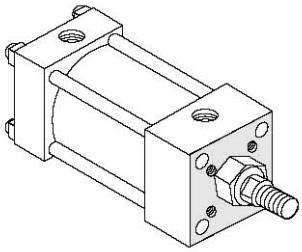
Code 02 (MS4)
Side Tap



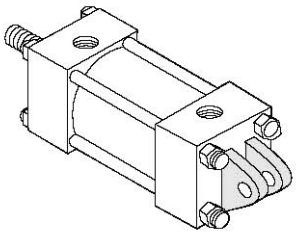
Code 07 (MF1)
Head Rectangular Flange



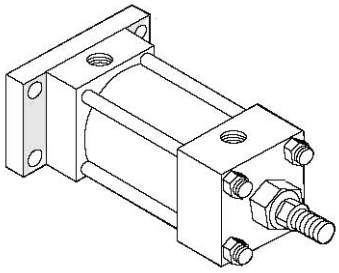
Code 08 (ME3)
Head Square



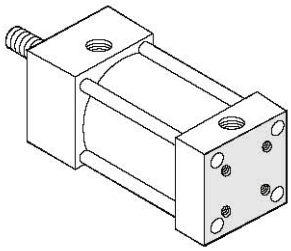
Code 10 (MP1)
Cap Fixed Clevis



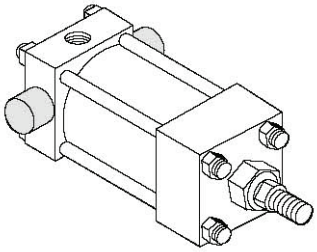
Code 12 (MF2)
Cap Rectangular Flange



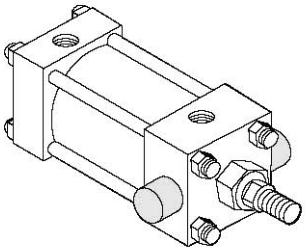
Code 13 (ME4)
Cap Square



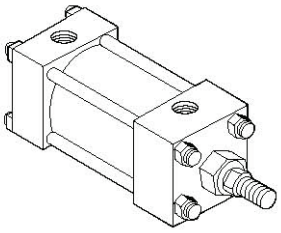
Code 16 (MT2)
Cap Trunnion



Code 17 (MT2)
Head Trunnion



Code 24 (MX0)
No Mounts



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

Available Mountings

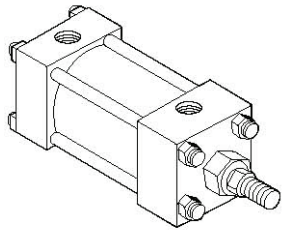
The variety of standard NFPA mountings available in the 1 1/8" bore Series SL gives you a broad selection to match the proper mount to your application. Eaton offers rigid mounts (including bolt-thru mounts and flange mounts). A guide to proper mount selection is provided on pages 126 through 130. For 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

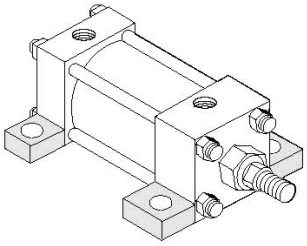
Just as the cylinder bore must be sized to provide the proper force for an application, a cylinder mounting that can absorb these application forces must also be specified.

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.

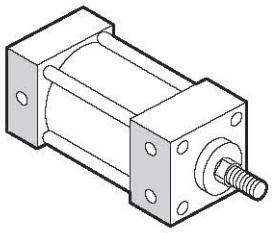
Code 24 (MX0)
No Mounts



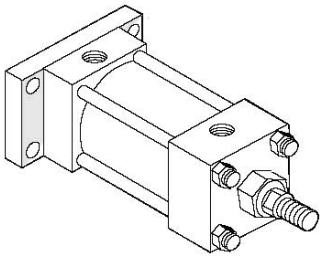
Code 01 (MS8)
Bolt Thru



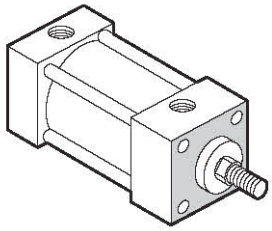
Code 02 (MS9)
Tapped



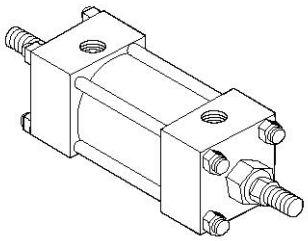
Code 12 (MF2)
Cap Rectangular Flange



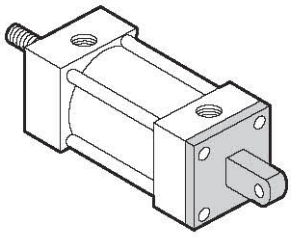
Code 18 (MR1)
Head Tapped Face



Code 41 (MX0)
Double Rod, No Mounts



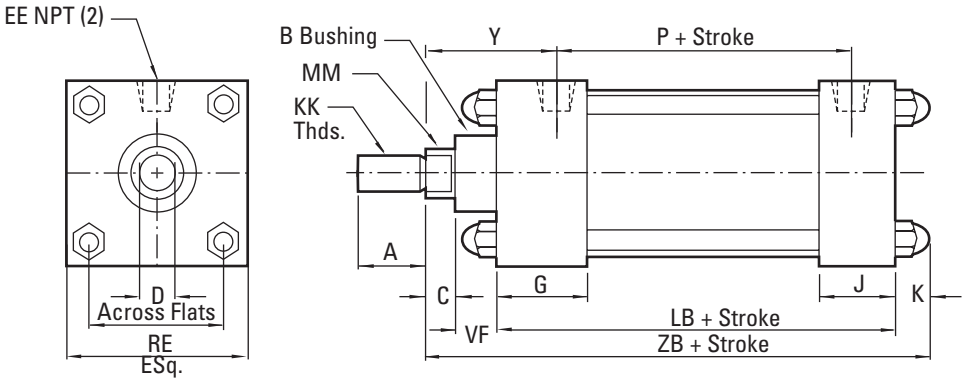
Code 47 (MP3)
Fixed Eye



Series SL Standard Cylinder

1-1/8" to 8" bore

Standard Cylinder Dimensions



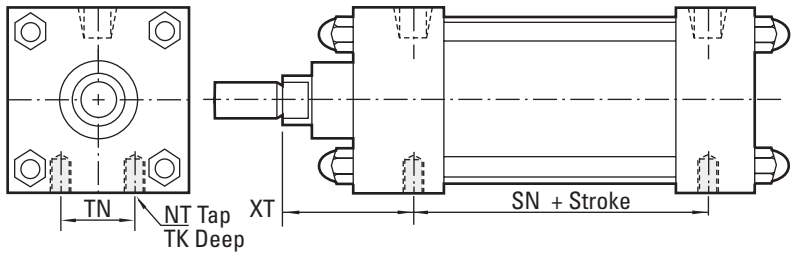
BORE		1–1/8"	1–1/2"	2"	2–1/2"	3–1/4"	4"	5"	6"	8"
ø Rod (MM)	Std.	3/8"	5/8"	5/8"	5/8"	1"	1"	1"	1-3/8"	1-3/8"
	O.S.	1/2"	1"	1"	1"	1-3/8"	1-3/8"	1-3/8"	1-3/4"	1-3/4"
A	Std.	.625	0.75	0.75	0.75	1.125	1.125	1.125	1.625	1.625
	O.S.	.750	1.125	1.125	1.125	1.625	1.625	1.625	2.000	2.000
B +.000 -.002	Std.		1.125	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

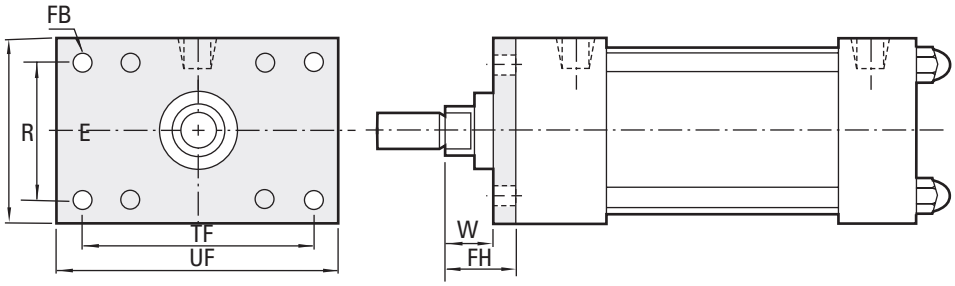
Code 02 – Side Tapped (MS4)



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)

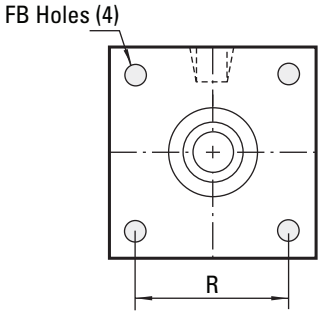
Code 07 – Head Rectangular Flange (MF1)



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)



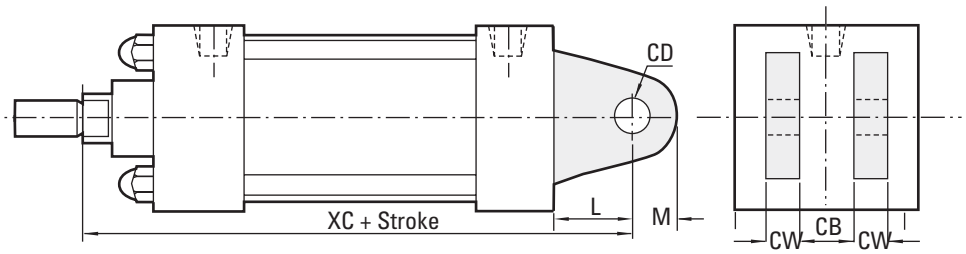
BORE	8"
FB	.687
R	7.570

Dimensions in inches (mm)

Series SL Mounting Styles and Installation Dimensions

1-1/2" to 8" bore sizes

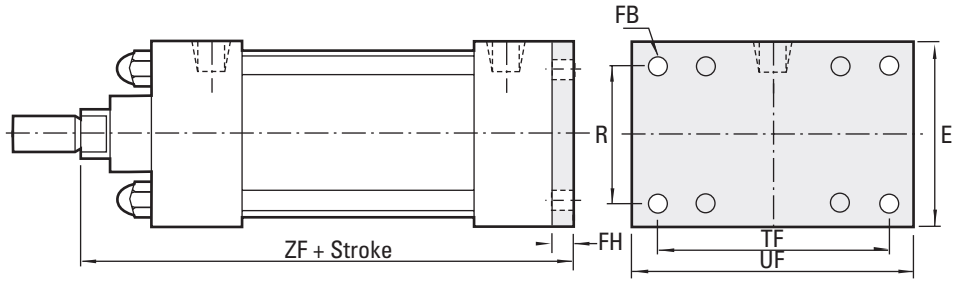
Code 10 – Cap Fixed Clevis (MP1)



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)



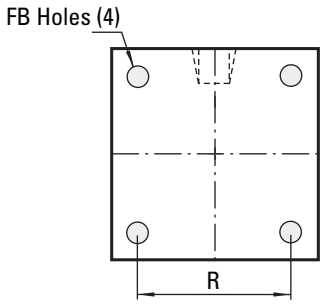
BORE		1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"
E		2.000	2.500	3.000	3.750	4.500	5.500	6.500
FB		.312	.375	.375	.437	.437	.562	.562
G		1.500	1.500	1.500	1.750	1.750	1.750	2.000
FH		.375	.375	.375	.625	.625	.625	.750
R		1.430	1.840	2.190	2.760	3.320	4.100	4.880
TF		2.750	3.375	3.875	4.687	5.437	6.625	7.625
UF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

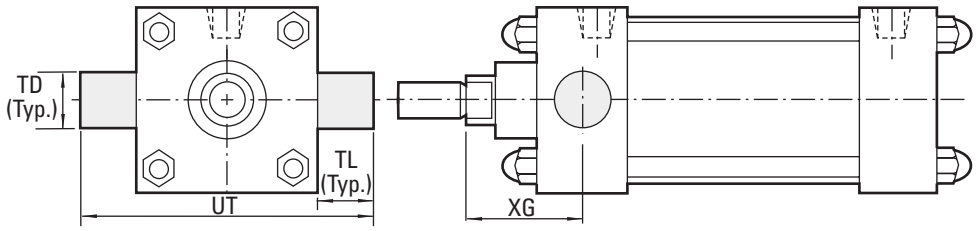
Code 13 – Cap Square (ME4)



BORE	8"
FB	.687
R	7.570

Dimensions in inches (mm)

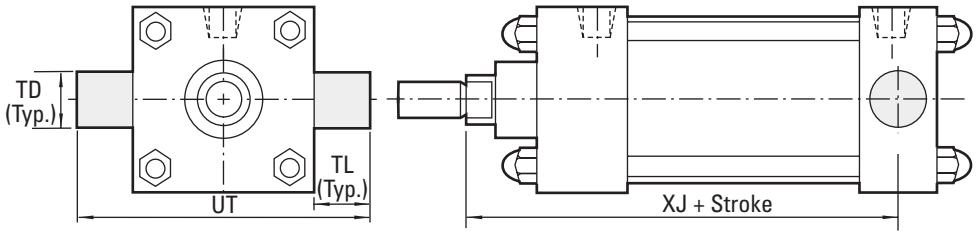
Code 17 – Head Trunnion (MT1)



BORE		1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"	8"
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)



BORE		1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"	8"
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)

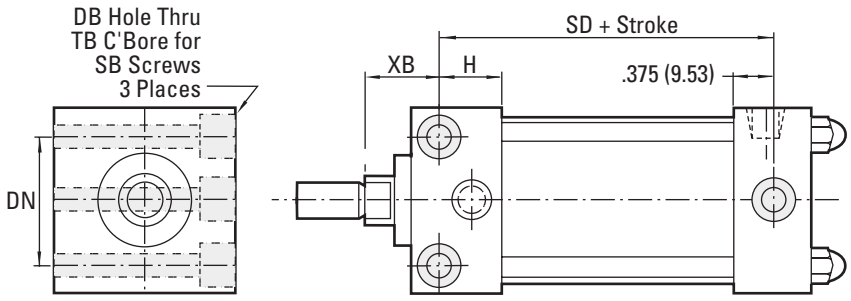
Series SL Mounting Styles and Installation Dimensions

1-1/8" bore

Code 01 – Bolt Thru (MS8)

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

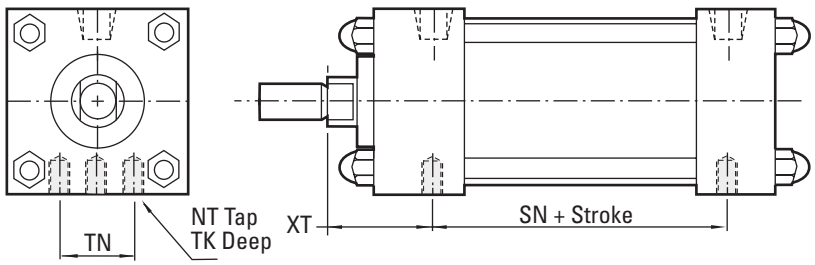
Dimensions in inches (mm)



Code 02 – Tapped (MS9)

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

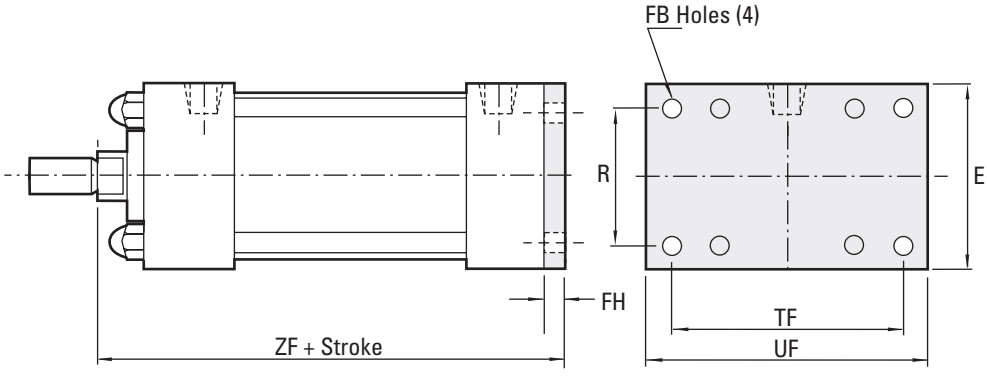
Dimensions in inches (mm)



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)



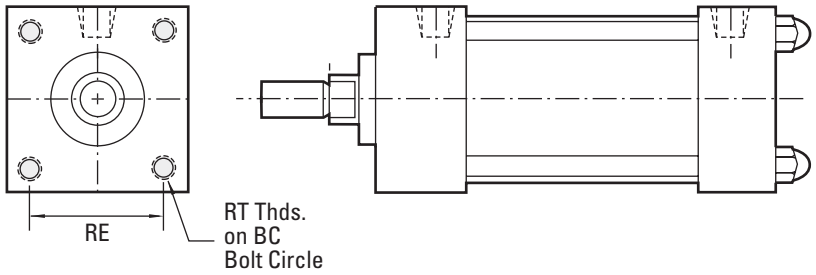
Series SL Mounting Styles and Installation Dimensions

1-1/8" bore

Code 18 – Head Tapped Face (MR1)

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

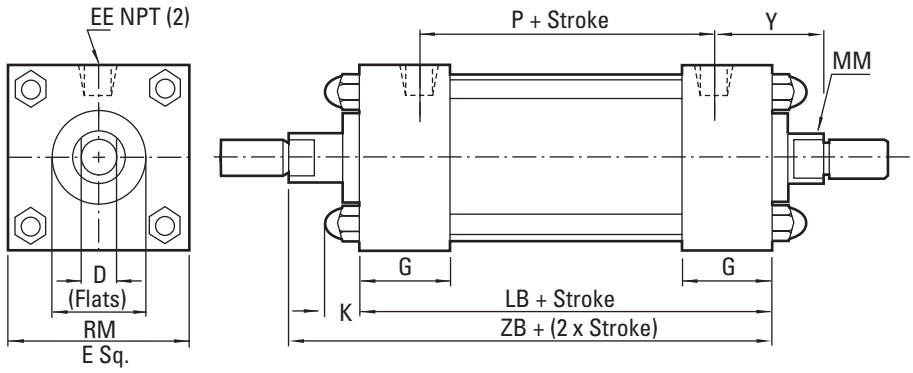
Dimensions in inches (mm)



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

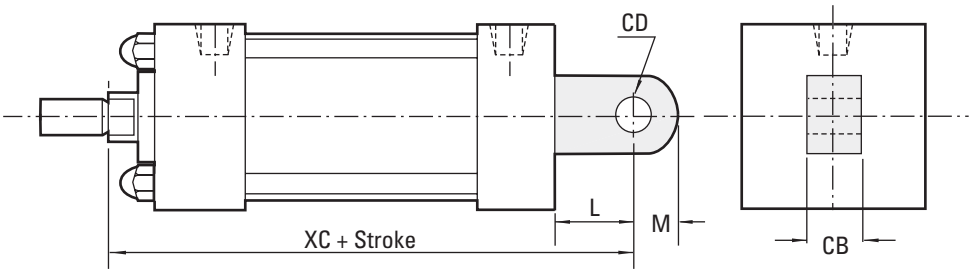
Dimensions in inches (mm)



Code 47 – Fixed Eye (MP3)

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

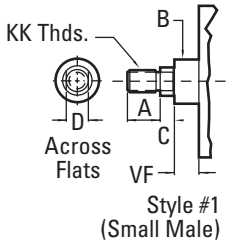
Dimensions in inches (mm)



Series SL Rod End Types

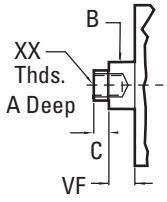
Standard & Optional Rod Ends

Type 5: Small Male UN Thread



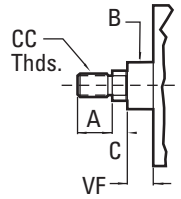
Style #1 (Small Male)

Type 2: Female UN Thread



Style #3 (Small Female)

Type 9: Intermediate Male 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)

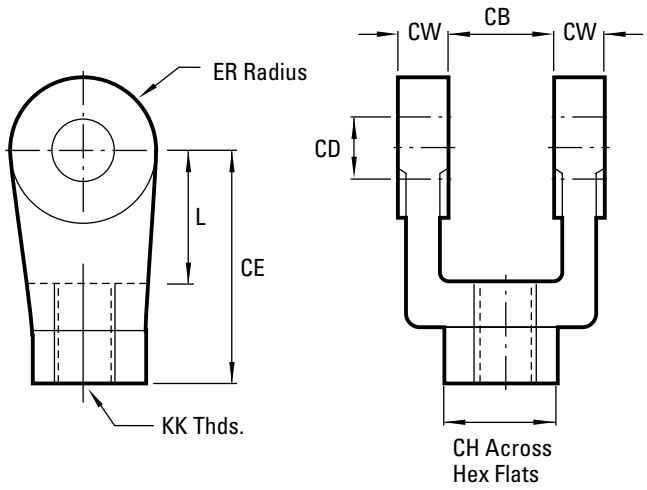
Accessories for SL Cylinders

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

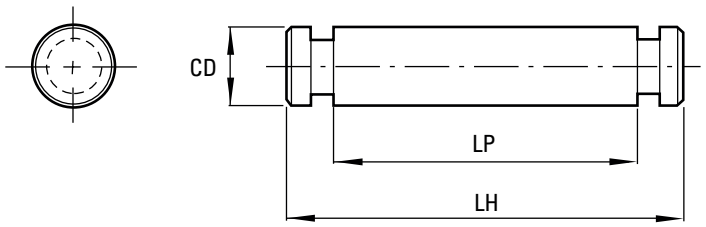
Dimensions in inches (mm)



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)



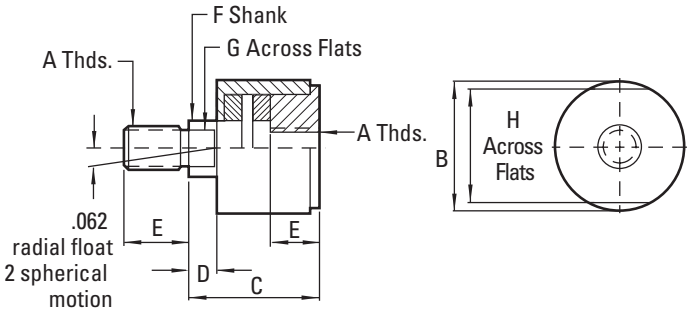
Accessories for SL Cylinders

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

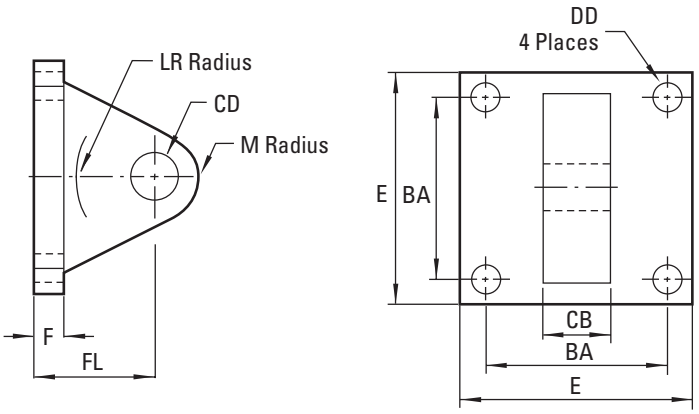
Made of 303 Stainless Steel, the Rod Alignment Coupler allows 1/16" of radial float and 2° of spherical movement.
Dimensions in inches (mm)



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)



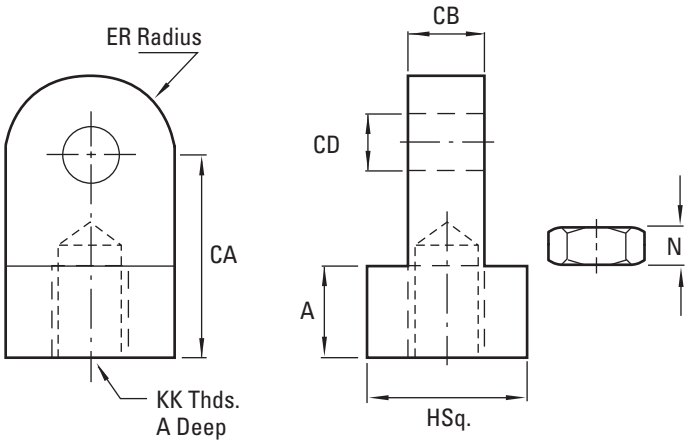
Accessories for SL Cylinders

1-1/8" bore

Rod eye 303 stainless steel w/jam nut

	SL60006A*	SL60006B**
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

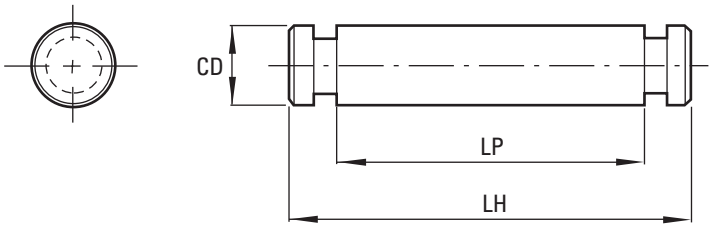
* Includes jam nut (3/8-24)
** Includes jam nut (1/2-20)
Dimensions in inches (mm)



Pivot pin 303 stainless steel

PIVOT PIN	SL83006A
CD	.375
LH	1.250
LP	1.032

Dimensions in inches (mm)



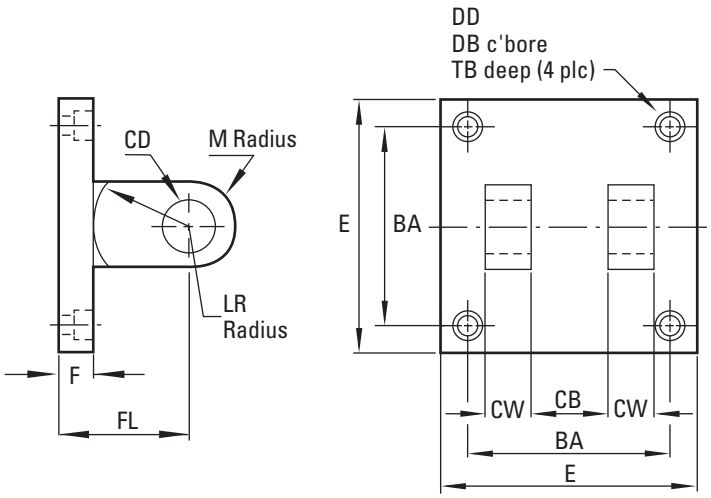
Accessories for SL Cylinders

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

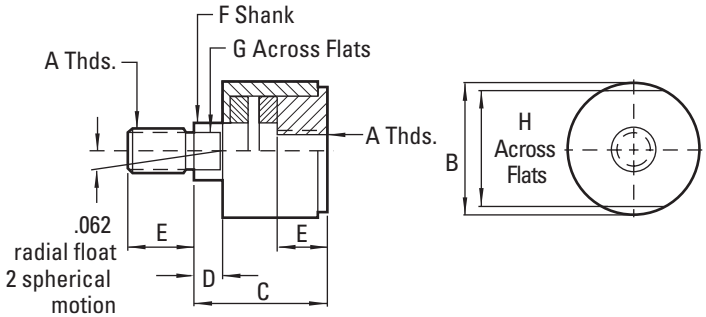
Dimensions in inches (mm)



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

*Weight includes pivot pin

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.

Thrust = Piston Surface Area x Operating Pressure

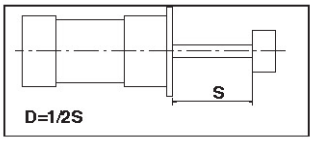
2. From the **Cylinder Mounting Diagrams** select the mounting style being used.
3. With the piston rod fully extended, calculate the value of **D** (in inches) using the formula shown or the cylinder mounting diagram selected in step #2.
4. Locate the value of **D** (in inches) at the bottom of the **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

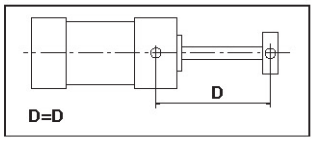
Stop tubes enhance the transverse load carrying capability of a long stroke cylinder by increasing the distance between the piston and rod bearing at full extension. When the value of **D** (calculated from the piston rod diameter selection instructions above) is less than 40", a stop tube is **not** 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

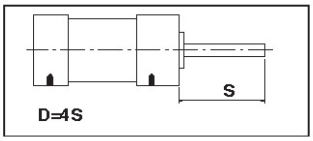
Firmly Guided Rod End



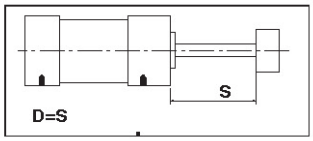
Head Trunnion



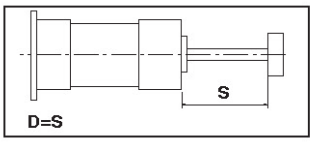
Unsupported Rod End



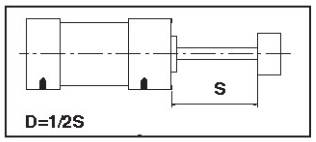
Supported Rod End



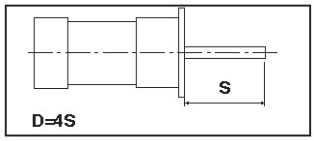
Supported Rod End



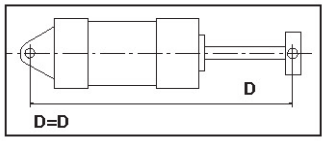
Firmly Guided Rod End



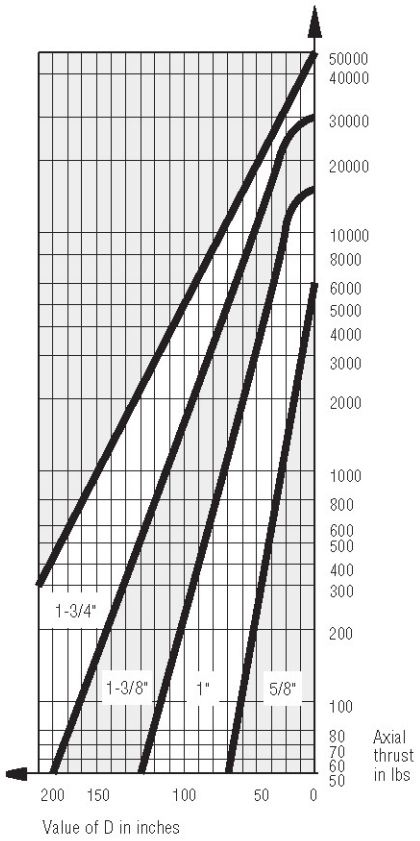
Unsupported Rod End



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) 40	(3)	60	(4)	80	(6)	100	(7)	150	(10)	200	(14)	VOLUME CU FT (CM^3) DISPLACEMENT PER INCH	
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) 40	(3)	60	(4)	80	(6)	100	(7)	150	(10)	200	(14)	VOLUME CU FT (CM^3) DISPLACEMENT PER INCH	
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)	.00 18	(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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