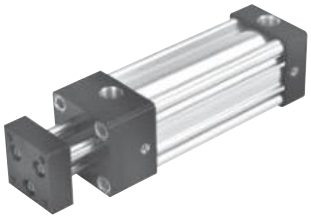


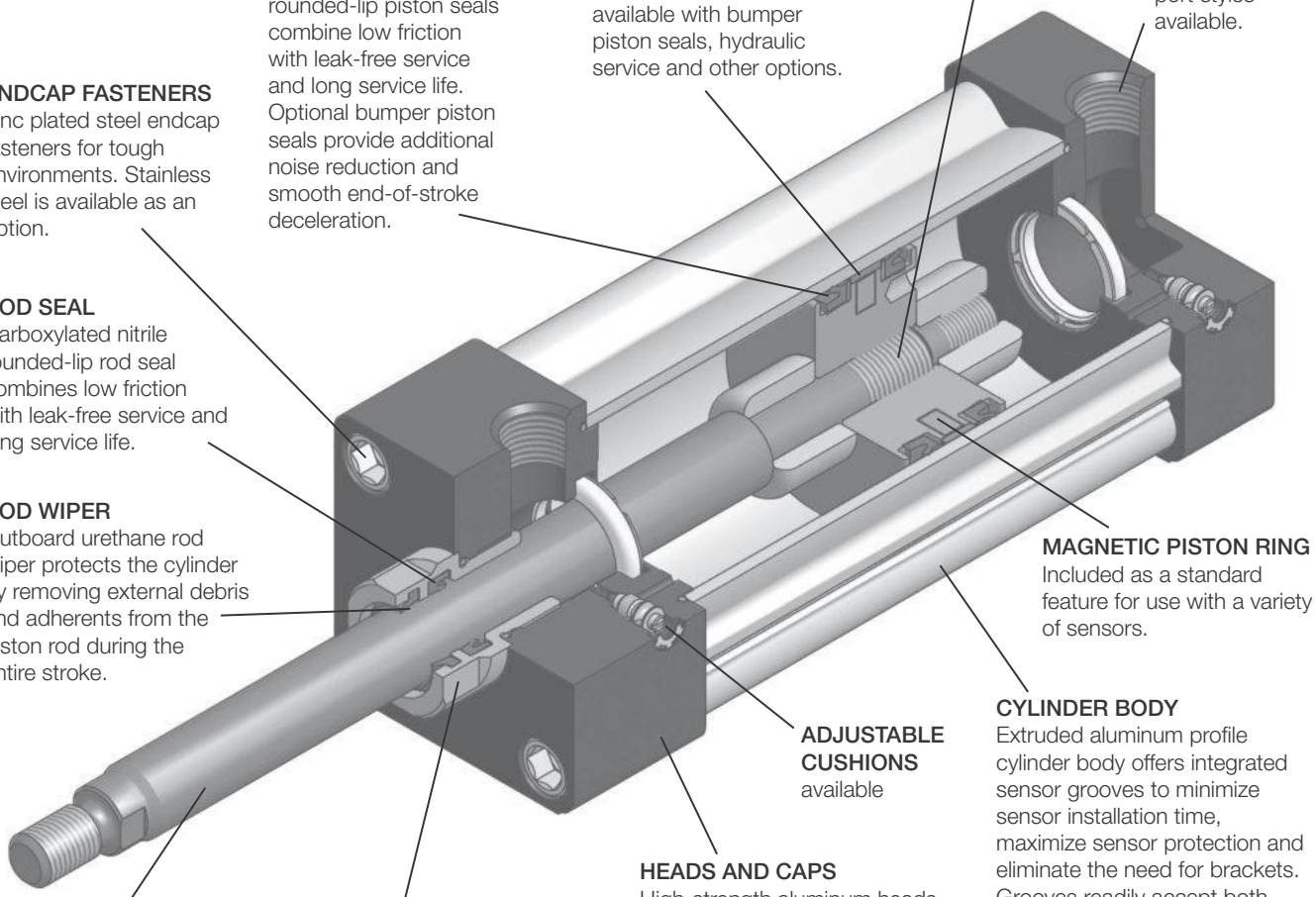
NFPA
Pneumatic Cylinders

Non-Rotating
Pneumatic Cylinders

ISO
Pneumatic Cylinders

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

4MA/4ML Series – 1-1/2" to 5" Bore Size



PISTON ASSEMBLY
High strength steel fastener or piston rod thread connects the piston to the rod and is secured in place with anaerobic adhesive.

PORTS
NPTF ports are standard. Other port styles available.

PISTON
Aluminum piston with wear band (shown) is available with bumper piston seals, hydraulic service and other options.

PISTON SEALS
Carboxylated nitrile rounded-lip piston seals combine low friction with leak-free service and long service life. Optional bumper piston seals provide additional noise reduction and smooth end-of-stroke deceleration.

ENDCAP FASTENERS
Zinc plated steel endcap fasteners for tough environments. Stainless steel is available as an option.

ROD SEAL
Carboxylated nitrile rounded-lip rod seal combines low friction with leak-free service and long service life.

ROD WIPER
Outboard urethane rod wiper protects the cylinder by removing external debris and adherents from the piston rod during the entire stroke.

MAGNETIC PISTON RING
Included as a standard feature for use with a variety of sensors.

ADJUSTABLE CUSHIONS
available

CYLINDER BODY
Extruded aluminum profile cylinder body offers integrated sensor grooves to minimize sensor installation time, maximize sensor protection and eliminate the need for brackets. Grooves readily accept both Global and Mini-Global Sensors. Single corner lobe of extrusion will accept legacy 2MA sensor brackets. Anodized and bright-dipped for corrosion resistance, maximum seal life and lower friction.

HEADS AND CAPS
High-strength aluminum heads and caps are designed with the most flexible mounting platform. TEF mount is standard. Using our proprietary extrusion, we can offer customization of the endcaps for unique designs, including extra ports, duplex, tandem and many special mountings. Anodized for corrosion resistance.

PISTON ROD
Standard case-hardened (50-64 Rc), hard chrome plated and polished carbon steel piston rod for reliable performance, long rod seal life and low friction. Grades of stainless steel are available as options.

ROD GLAND/BEARING
Threaded bronze rod gland is externally removable, without cylinder disassembly, for easy maintenance. Machined flats permit the use of common tools for removal and installation. Options include HI LOAD design for side load conditions and metallic wiper design for extremely tough rod contaminant/adherent applications.

For a complete list of 4MA options, please see pages B3 and B8.

Features

- Industry leading aluminum NFPA interchangeable cylinder with flexible construction
- Bore sizes – 1-1/2", 2", 2-1/2", 3-1/4", 4" and 5"
- Removable bronze alloy gland/bearing for easy maintenance
- Available in any practical stroke length
- 20 standard mounting styles available
- Extruded-profile aluminum body with integrated switch grooves
- Single rod end or double rod ends
- Cushions – standard and adjustable at both ends, optional non-cushioned
- RoHS compliant

Operating information

	4MA	4ML
Operating pressure:	250 PSIG (17 bar) maximum air service	400 PSIG (27 bar) maximum hydraulic service
Temperature range –		
Standard seals	-10°F to 165°F (-23°C to 74°C)	
Fluorocarbon seals	-10°F to 250°F (-23°C to 121°C)	
Low temperature seals	-50°F to 150°F (-46°C to 66°C)	
Filtration requirements:	40 micron, dry filtered air	Filtered hydraulic oil

Ordering information

2.00 | | | J | | 4MA | | U | | | 1 | 4 | | A | | 6.000

Bore size

1.50 [1]
2.00
2.50
3.25
4.00
5.00

Double rod cylinder [12]
Specify "K" only if double rod cylinder is required.

Mounting style
Specify mounting style code (see table on following page).

Series

4MA	Air service
4ML	Hydraulic service [2]

Ports

U	NPTF
R	BSPP
B	BSPT
T	SAE

Piston rod number
Specify rod code number for required diameter. [8, 2]

Stroke length
Specify stroke length required in inches. [11]

Cushion cap end

Blank	Non-cushioned cap end
C	Cushioned cap end (not available for 4ML)

Piston rod thread type

A	Standard (UNF unified thread)
W	BSF British fine
M *	Metric

* Please reference page B78.

Cushion head end

Blank	Non-cushioned head end
C	Cushioned head end (not available for 1.50" bore with 1" rod or 4ML)

Special modification
Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MA with Linear Position Sensor Option) [7]

Seals

Blank	Standard (nitrile seals)
V	Fluorocarbon seals [4]
E	Fluorocarbon rod wiper and rod seal only [5]
4	Low temperature seals [4]
M	Metallic rod wiper, nitrile seals [6]

Cylinder construction

Blank*	Standard (extruded body, standard round lobe orientation)
A*	Extruded body, round lobe orientation rotated 90 degrees from standard
N*	Extruded body, round lobe orientation rotated 180 degrees from standard
Z*	Extruded body, round lobe orientation rotated 270 degrees from standard
T	Aluminum round tube and carbon steel tie rods & nuts

* See table on page B5. Only applies to 1-1/2" to 4" bore size.

Piston rod thread style

4	Small male
8	Intermediate male
9	Short female
55	For use with split coupler [9]
3	Special (and specify all dimensions required)
6	Full male

Rod material and gland code

Blank	Standard rod and gland
H	Standard rod and HI LOAD gland
Y	17-4 PH stainless steel rod and standard gland
Z	17-4 PH stainless steel rod and HI LOAD gland
J	303 stainless steel rod and standard gland [10]
K	303 stainless steel rod and HI LOAD gland [10]
S	316 stainless steel rod and standard gland [10]
T	316 stainless steel rod and HI LOAD gland [10]

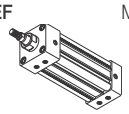
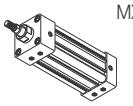
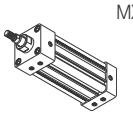
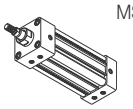
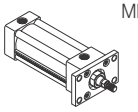
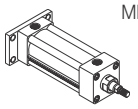
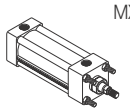
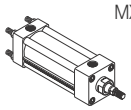
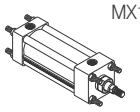
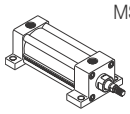
Piston type [2]

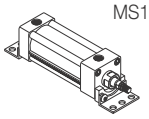
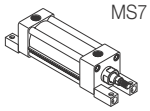
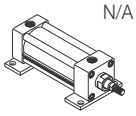
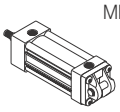
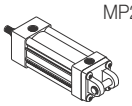
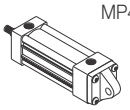
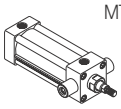
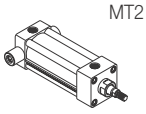
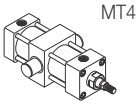
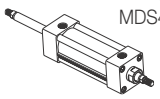
Blank	Lipseals and magnetic ring (legacy) (standard for 4ML)
1	Lipseals, no magnetic ring (legacy)
2	Lipseals, no magnetic ring (aluminum piston)
3	Lipseals and magnetic ring (aluminum piston) (standard for 4ML)
4	Bumper seals, no magnetic ring
6	Bumper seals and magnetic ring
B	Lipseals, 1/4" thick bumpers both ends [3]
H	Lipseals, 1/4" thick bumper head end [3]
C	Lipseals, 1/4" thick bumper cap end [3]
D	Lipseals and magnetic ring, 1/4" thick bumpers both ends [3]
F	Lipseals and magnetic ring, 1/4" thick bumper head end [3]
R	Lipseals and magnetic ring, 1/4" thick bumper cap end [3]

[1] Not available with Linear Position Sensor Option (LPSO).
[2] Piston Types (blank), 1, 4 and 6 not available for 4ML. Piston Types (blank) and 1 not available for oversize rod numbers 2 and 3. Seals option V only available with Piston Types 2 and 4. Seals option 4 only available with Piston Types 2 and 3.
[3] Addition of 1/4" bumper results in a 1/4" stroke loss per bumper, per end. For example, a 6" stroke cylinder with 1/4" bumpers at both ends (option B) has an effective stroke of 5-1/2".
[4] Reed and solid-state sensors only available with standard seals or options E and M. See footnote 2.
[5] Used for external chemical compatibility applications, not high temperature.
[6] If fluorocarbon seals are required with this option, please place an "S" for special in the Special Modification field and specify the "fluorocarbon seals and metallic rod wiper" in the item notes.
[7] For Linear Position Sensor Option (LPSO), please include the following information for the Special Modification item notes:
a. Sensor part number reference LPSO section
b. Sensor position
c. Port position (if other than position 1)
d. Length of stop tubing, gross stroke and net stroke (if required)
Also, Piston Type option (blank), 3, 6, D, F or R is required.
[8] Review Piston Rod Selection Chart, please reference page A14 to determine proper piston rod diameter.
[9] For additional information regarding this style, please reference page B77. If non-standard Rod Material and Gland Code is required with this option, please place an "S" for special in Special Modification field and specify Rod Material and Gland Code in the item notes.
[10] Not available for 4MAJ.
[11] If a stop tube is required, specify gross stroke (net stroke + stop tube) in the model number, then place an "S" for special in the Special Modification field and specify the stop tube length in the item notes.

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.

4MA/4ML Mounting Styles for 1-1/2" to 5" Bore

Mounting style	NFPA mounting	Description		Bore size
TEF 	MX5/MS4	Sleeve Nut with Side Tap (standard mount)	4MA/4ML	1-1/2 - 5*
			w/LPSO	2 - 5
			w/LPSO w/stop tube	2 - 5
T 	MX0	No Mount (same construction as TEF)	4MA/4ML	1-1/2 - 5
			w/LPSO	2 - 5
			w/LPSO w/stop tube	2 - 5
TE 	MX5	Sleeve Nut (same construction as TEF)	4MA/4ML	1-1/2 - 5
			w/LPSO	2 - 5
			w/LPSO w/stop tube	2 - 5
F 	MS4	Side Tap (same construction as TEF)	4MA/4ML	1-1/2 - 5*
			w/LPSO	2 - 5
			w/LPSO w/stop tube	2 - 5
J 	MF1	Head Rectangular Flange	4MA/4ML	1-1/2 - 5
			w/LPSO	2 - 5 **
			w/LPSO w/stop tube	2 - 5
H 	MF2	Cap Rectangular Flange	4MA/4ML	1-1/2 - 5
			w/LPSO	2 - 5 **
			w/LPSO w/stop tube	2 - 5 **
TB 	MX3	Tie Rods Extended Head End	4MA/4ML	1-1/2 - 5
			w/LPSO w/stop tube	2 - 5
TC 	MX2	Tie Rods Extended Cap End	4MA/4ML	1-1/2 - 5
TD 	MX1	Tie Rods Extended Both Ends	4MA/4ML	1-1/2 - 5
C 	MS2	Side Lug	4MA/4ML	1-1/2 - 5
			w/LPSO	2 - 5
			w/LPSO w/stop tube	2 - 5

Mounting style	NFPA mounting	Description		Bore size
CB 	MS1	Side End Angle	4MA/4ML	1-1/2 - 5
			w/LPSO	2 - 5
			w/LPSO w/stop tube	2 - 5
G 	MS7	Side End Lug	4MA/4ML	1-1/2 - 4*
			w/LPSO	2 - 4
			w/LPSO w/stop tube	2 - 4
NB 	N/A	Base Bar	4MA/4ML	1-1/2 - 4*
			w/LPSO	2 - 4
			w/LPSO w/stop tube	2 - 4
BB 	MP1	Cap Fixed Clevis	4MA/4ML	1-1/2 - 5
			w/LPSO	2 - 5 **
			w/LPSO w/stop tube	2 - 5 **
BC 	MP2	Cap Detachable Clevis	4MA/4ML	1-1/2 - 5
			w/LPSO	2 - 5 **
			w/LPSO w/stop tube	2 - 5 **
BE 	MP4	Cap Detachable Eye	4MA/4ML	1-1/2 - 5
			w/LPSO	2 - 5 **
			w/LPSO w/stop tube	2 - 5 **
D 	MT1	Head Trunnion	4MA/4ML	1-1/2 - 5*
			w/LPSO	2 - 5
			w/LPSO w/stop tube	2 - 5
DB 	MT2	Cap Trunnion	4MA/4ML	1-1/2 - 5
			w/LPSO	2 - 5 **
			w/LPSO w/stop tube	2 - 5 **
DD 	MT4	Intermediate Trunnion	4MA/4ML	1-1/2 - 5
KTEF † 	MDX5/ MDS4	Double Rod End, TEF Mount	4MA/4ML	1-1/2 - 5
			w/LPSO	2 - 5
			w/LPSO w/stop tube	2 - 5

* Not available for 1-1/2" bore with 1" rod.

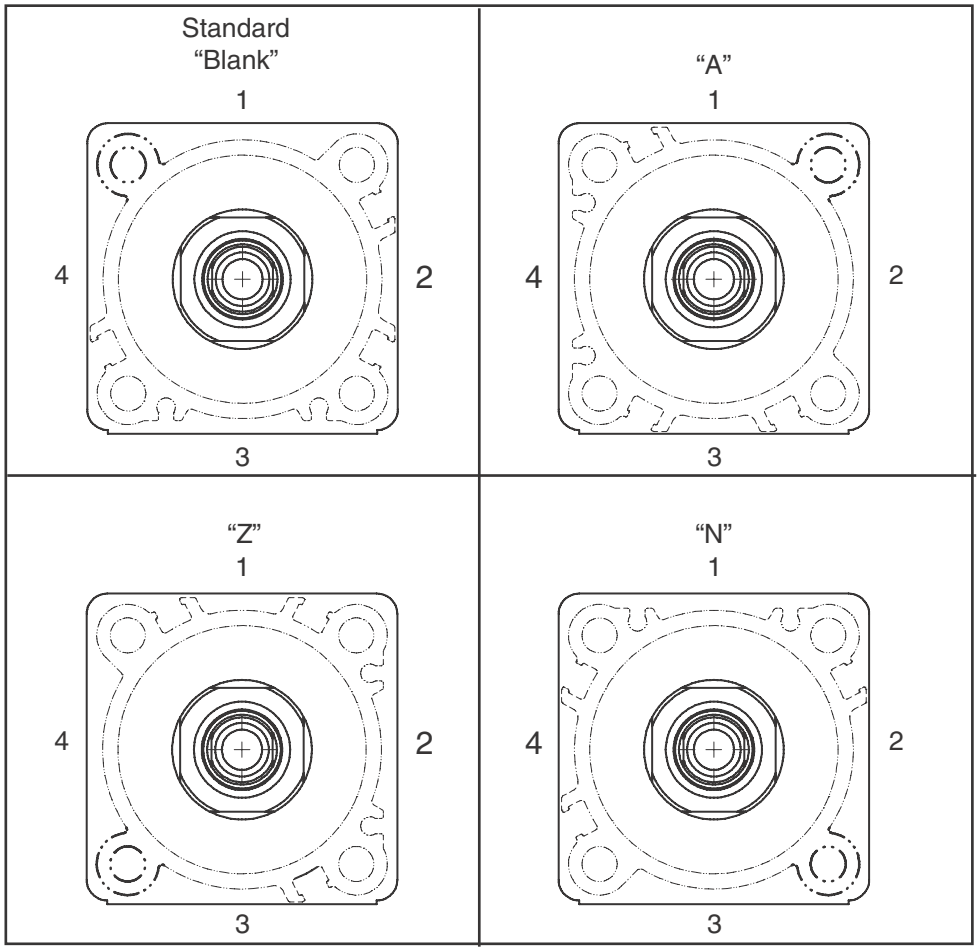
** May interfere with mounting. Please provide clearance for Linear Sensor overhang (see page B73).

† Double rod end cylinders can be ordered with head mountings, i.e. KJ.

Sensors
See section L for sensors.


Kits & Accessories
See page B34.

4MA Extruded Cylinder Body Orientation Options*



* Only applies to 1-1/2" to 4" Bore

General Specifications

- NFPA interchangeable
- Bore sizes – 1-1/2", 2", 2-1/2", 3-1/4", 4" and 5"
- Strokes – available in any practical stroke length
- Rod diameters – 5/8", 1" and 1-3/8"
- Rod end styles – 4 standard, specials available
- Single rod end or double rod ends
- Cushions – optional and adjustable at either end or both ends (N/A for 4ML Hydraulic Version)
- Operating pressure –
  4MA = 250 PSIG (17 bar) maximum air service
  4ML = 400 PSIG (27 bar) maximum hydraulic service
- Media – 4MA = dry, filtered air
  4ML = filtered hydraulic oil
- Temperature range –
  -10°F to 165°F (-23°C to 74°C) standard seals
  -10°F to 250°F (-23°C to 121°C) fluorocarbon seals option
  -50°F to 150°F (-46°C to 66°C) low temperature seals option
- Mounting styles – 20 standard styles
- RoHS compliant

For material options, including seals, piston rods and glands, please see Material Specifications on next page.

Cylinder Weights – 4MA / 4ML Cylinders

		No mount single rod 4MA/4ML		No mount double rod	
Bore (inch)	Rod (inch)	Base wt. (lbs.)	Per inch (lbs.)	Base wt. (lbs.)	Per inch (lbs.)
1-1/2	0.625	1.73	0.20	2.16	0.28
2	0.625	2.40	0.21	3.05	0.30
	1.00	2.99	0.35	4.34	0.58
2-1/2	0.625	3.25	0.23	3.96	0.31
	1.00	4.06	0.37	5.74	0.60
3-1/4	1.00	6.45	0.42	7.65	0.64
	1.375	7.93	0.62	11.46	1.05
4	1.00	8.80	0.49	10.32	0.71
	1.375	10.29	0.69	14.37	1.12
5	1.00	13.20	0.61	15.84	0.84
	1.375	14.72	0.81	18.89	1.24

Standard Cushion Position

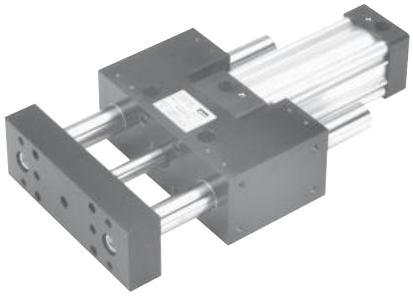
Mounting Code	Position
All except D, DB, DD	2
D, DB, DD	3

Standard Port Sizes

Bore	NPTF	BSPT	BSPP	SAE
1-1/2	3/8	Rc3/8	G3/8	6
2	3/8	Rc3/8	G3/8	6
2-1/2	3/8	Rc3/8	G3/8	6
3-1/4	1/2	Rc1/2	G1/2	10
4	1/2	Rc1/2	G1/2	10
5	1/2	Rc1/2	G1/2	10

Mounting Weight Adders

Bore (inch)	Mounting style, weight (lbs)							
	J, H	D, DB	BB	CB, G	DD	BE	C	BC
1-1/2	0.51	0.50	0.15	0.36	1.70	0.23	0.15	0.20
2	0.76	0.50	0.26	065	2.38	0.32	0.15	0.29
2-1/2	1.13	0.50	0.38	1.05	3.00	0.42	0.15	0.41
3-1/4	2.76	0.50	0.98	1.38	5.35	1.26	0.35	1.06
4	4.05	0.50	1.35	2.20	6.75	1.62	0.35	1.49
5	6.46	0.50	1.20	4.29	8.77	1.26	0.57	2.41



For a guided version of the 4MA or 4ML Series, please see the HB Series in Section E.

Standard Temperatures and Applications

Head and cap	Black anodized aluminum alloy
Head and cap screws	Zinc plated steel alloy
Cylinder body	Clear anodized aluminum alloy
Piston rod	Case-hardened, chrome plated carbon steel
Rod seal	Carboxylated nitrile (Nitroxile)
Rod wiper	Molythane
Rod bearing (gland)	Bronze alloy
Piston	Aluminum alloy
Piston seals	Carboxylated nitrile (Nitroxile)
Piston bearing	Composite (for standard piston) MolyGard™ (for aluminum piston)
Magnetic ring	Plastic-bound magnetic material
Piston fastener	Piston rod for aluminum piston
O-rings	Nitrile
End seals	Nitrile
Cushion seals	Urethane
Cushion needle valves	Stainless steel
Tie-rods/studs	Blackened carbon steel 1018 (some mounts)
Tie-rod nuts	Steel alloy, SAE J995 Grade 8 (some mounts)

Material and Part Changes

4MA Options

High temperatures (-10°F to 250°F)	All seals and wiper are fluorocarbon Aluminum piston without magnetic ring
Low temperatures (-50°F to 150°F)	Rod seal, piston seals, o-rings and end seals are low temperature-rated nitrile

4ML Hydraulic Version

Hydraulic service (general)	Cushions and bumper piston seals not available
Hydraulic service (std temp)	Polyurethane TS-2000 rod seal and nitrile piston seals (for hydraulic use)
Hydraulic service (high temp)	Fluorocarbon TS-2000 rod seal; wiper and all seals are fluorocarbon (for hydraulic use)

Other Standard Options

Cylinder seal options	Fluorocarbon for high temperatures or chemical compatibility Other seal options available, please consult factory
Bumper piston seal options (4MA only, N/A for 4ML)	Carboxylated nitrile (Nitroxile) for standard temperatures Fluorocarbon for high temperatures or chemical compatibility
1/4" thick bumpers option	Urethane
Piston rod material options	Case-hardened, chrome plated carbon steel (standard) 17-4 PH stainless steel, chrome plated 303 stainless steel, chrome plated (N/A for 4ML) 316 stainless steel, chrome plated (N/A for 4ML) For stainless steel without chrome plating, please consult factory
HI LOAD gland option	Composite bearing pressed into bronze alloy gland
Metallic rod scraper option	Dual high strength bronze wipers with PTFE (5/8" rod only) or fluorocarbon energizer

How to Select a 1-1/2" to 5" Bore 4MA Cylinder

Parker cylinders are available based on air or hydraulic operating pressure. The many styles, sizes and optional features available assure that your application requirements are precisely met. To select a cylinder, follow these simple steps:

Step 1 - **Determine the correct cylinder bore size** necessary to achieve required force using the available operating pressure.

Step 2 - **Determine the series cylinder to use**, based on operating pressure.

Step 3 - **Turn to the appropriate cylinder selection section.** Select the mounting style that fits your installation needs. Determine the bore and rod sizes available for the model you select. Then complete model selection.

- Choose a rod end style and the desired rod end accessories.
- Size the cylinder to meet your application requirements.

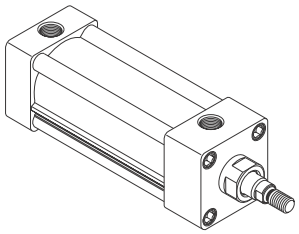
Step 4 - **Consider the following conditions** which may require further modifications to the cylinder you have selected.

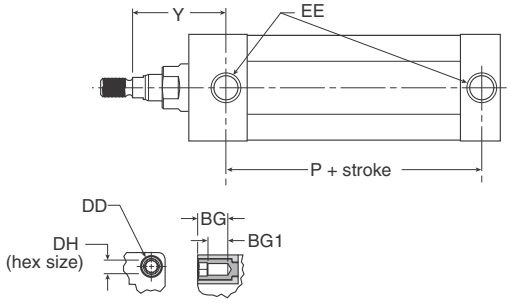
Application Condition	Check the Following
Quick Starts or Stops	Confirm that determined thrust is sufficient to accelerate or decelerate cylinder and load within prescribed distance. Optional cushions should be used to reduce shock during deceleration, check that peak pressures will be within tolerable limits.
Long Push Stroke	Check whether stop tube is required to prevent excessive bearing loads and wear.
High-column Loading Long Push Stroke	Determine if standard size piston rod is strong enough to accommodate intended load. See Application Engineering section for recommendations.
Long Horizontal Stroke	Determine if standard size piston rod is strong enough to accommodate intended load.
High Operating Temperatures	For temperatures between 165°F and 250°F use 4MA or 4ML cylinder with high temperature seals.

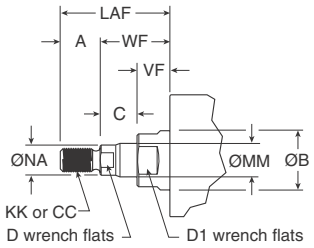
General Options and Modifications:

- Adjustable Cushions
- Non-Magnetic Piston (magnetic ring standard)
- Piston Bumper Seals
- Piston Bumpers (1/4" thick)
- Port and Adjustable Cushion Relocation
- Port Thread Styles
- Multiple Ports
- Special Heads, Caps, Pistons and Mounts
- Double Rod End
- Oversize Rod Diameters
- Rod End Modifications
- Rod Materials (grades of stainless steel)
- Fluorocarbon Rod Wiper and Rod Seal only
- Fluorocarbon Seals (all cylinder seals)
- Metallic Rod Wiper
- HI LOAD Gland Assembly
- Stop Tube
- Mixed Mountings
- Round Tube and Tie Rod Construction
- Stainless Steel Fasteners/Tie Rods
- Shock Absorber on Cap End
- NuCushion Bumpers
- Hydro-Check unit for smooth hydraulic control
- Air Cylinder/Valve Combination (ACVB)
- Adjustable Point Sensors (order separately)
- Continuous Linear Position Sensing (LPSO)
- High Temperature Service (to 250°F)
- Low Temperature Service (to -50°F)
- Hydraulic Service (4ML) (400 PSIG)
- Rod lock version (see 4MAJ)

Single Rod
(Styles TEF, T, TE and F)



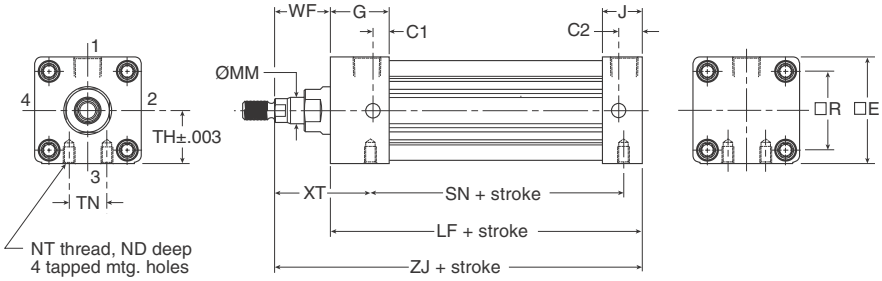




For dimensions of all standard rod end styles, see next page.

1-1/2" bore with 1" rod is TE mount, F mount not available.

1-1/2" bore with 1" rod cannot have a cushion at head end.



Styles TEF, T, TE and F

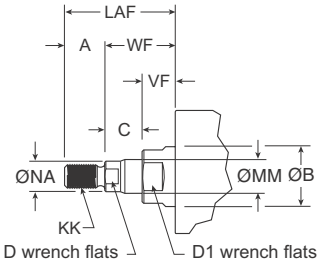
Bore size	Rod no.	Rod dia. MM	Thread Style 8 CC	Thread Style 4 & 9 KK	Thread Style 6	A	AA	+.000 -.002 B	BG	BG1	C	C1	C2	D	D1	DD	DH	E	EE (NPTF)
1-1/2	1	5/8	1/2 - 20	7/16 - 20	5/8 - 18	0.750	2.020	1.124	0.562	0.374	0.385	1.000	0.500	1/2	1	1/4 - 28	1/4	2.000	3/8
	2 *	1	7/8 - 14	3/4 - 16	1 - 14	1.125	2.020	1.499	0.562	0.374	0.510	–	0.500	7/8	1-3/8	1/4 - 28	1/4	2.000	3/8
2	1	5/8	1/2 - 20	7/16 - 20	5/8 - 18	0.750	2.600	1.124	0.562	0.362	0.385	1.000	0.562	1/2	1	5/16 - 24	5/16	2.500	3/8
	3	1	7/8 - 14	3/4 - 16	1 - 14	1.125	2.600	1.499	0.562	0.362	0.510	1.000	0.562	7/8	1-3/8	5/16 - 24	5/16	2.500	3/8
2-1/2	1	5/8	1/2 - 20	7/16 - 20	5/8 - 18	0.750	3.100	1.124	0.562	0.362	0.385	1.000	0.594	1/2	1	5/16 - 24	5/16	3.000	3/8
	3	1	7/8 - 14	3/4 - 16	1 - 14	1.125	3.100	1.499	0.562	0.362	0.510	1.000	0.594	7/8	1-3/8	5/16 - 24	5/16	3.000	3/8
3-1/4	1	1	7/8 - 14	3/4 - 16	1 - 14	1.125	3.900	1.499	0.700	0.500	0.510	1.188	0.719	7/8	1-3/8	3/8- 24	3/8	3.750	1/2
	3	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	3.900	1.999	0.700	0.500	0.635	1.188	0.719	1-1/8	1-7/8	3/8- 24	3/8	3.750	1/2
4	1	1	7/8-14	3/4-16	1-14	1.125	4.700	1.499	0.700	0.500	0.510	1.188	0.719	7/8	1-3/8	3/8-24	3/8	4.500	1/2
	3	1 3/8	1-1/4 - 12	1-14	1-3/8 - 14	1.625	4.700	1.999	0.700	0.500	0.635	1.188	0.719	1-1/8	1-7/8	3/8-24	3/8	4.500	1/2
5	1	1	7/8-14	3/4-16	1-14	1.125	5.800	1.499	0.781	0.531	0.510	1.188	0.813	7/8	1-3/8	1/2-20	1/2	5.500	1/2
	3	1 3/8	1-1/4 - 12	1-14	1-3/8 - 14	1.625	5.800	1.999	0.781	0.531	0.635	1.188	0.813	1-1/8	1-7/8	1/2-20	1/2	5.500	1/2

Bore size	Rod no.	Rod dia. MM	G	J	LAF	NA	ND	NT	R	+.003 -.003 TH	TN	VF	WF	XT	Y	Add stroke LF	P	SN	ZJ
1-1/2	1	5/8	1.438	0.938	1.750	0.563	0.375	1/4 - 20	1.430	0.993	0.625	0.615	1.000	1.938	1.875	3.625	2.313	2.250	4.625
	2 *	1	1.438	0.938	2.500	0.938	-	-	1.430	0.993	-	0.865	1.375	-	2.250	3.625	2.313	-	5.000
2	1	5/8	1.375	0.937	1.750	0.563	0.438	5/16 - 18	1.840	1.243	0.875	0.615	1.000	1.938	1.875	3.625	2.313	2.250	4.625
	3	1	1.375	0.937	2.500	0.938	0.375	5/16 - 18	1.840	1.243	0.875	0.865	1.375	2.313	2.250	3.625	2.313	2.250	5.000
2-1/2	1	5/8	1.344	0.938	1.750	0.563	0.625	3/8 - 16	2.190	1.493	1.250	0.615	1.000	1.938	1.938	3.750	2.375	2.375	4.750
	3	1	1.344	0.938	2.500	0.938	0.625	3/8 - 16	2.190	1.493	1.250	0.865	1.375	2.313	2.313	3.750	2.375	2.375	5.125
3-1/4	1	1	1.594	1.125	2.500	0.938	0.750	1/2 - 13	2.760	1.868	1.500	0.865	1.375	2.438	2.438	4.250	2.625	2.625	5.625
	3	1-3/8	1.594	1.125	3.250	1.313	0.750	1/2 - 13	2.760	1.868	1.500	0.990	1.625	2.688	2.688	4.250	2.625	2.625	5.875
4	1	1	1.594	1.125	2.500	0.938	0.750	1/2 - 13	3.320	2.243	2.063	0.865	1.375	2.438	2.438	4.250	2.625	2.625	5.625
	3	1-3/8	1.594	1.125	3.250	1.313	0.750	1/2 - 13	3.320	2.243	2.063	0.990	1.625	2.688	2.688	4.250	2.625	2.625	5.875
5	1	1	1.594	1.219	2.500	0.938	0.938	5/8 - 11	4.100	2.743	2.688	0.865	1.375	2.438	2.438	4.500	2.875	2.875	5.875
	3	1 3/8	1.594	1.219	3.250	1.313	0.938	5/8 - 11	4.100	2.743	2.688	0.990	1.625	2.688	2.688	4.500	2.875	2.875	6.125

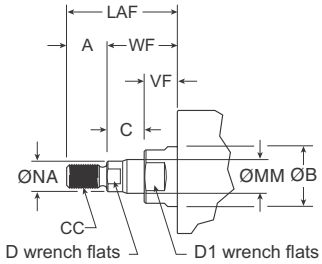
*** NOTE -** 1-1/2" bore with 1" rod is TE mount, F mount not available.
1-1/2" bore with 1" rod cannot have a cushion at head end.

Thread Style Rod End

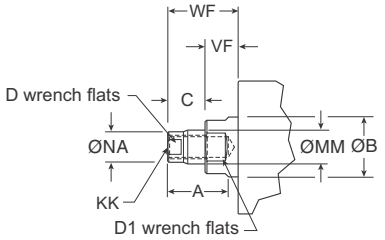
Thread Style 4
(NFPA Style SM)
Small Male



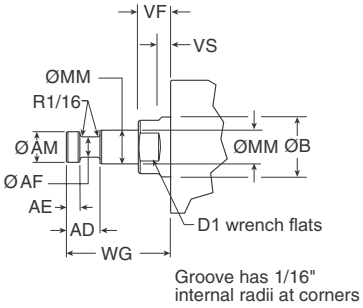
Thread Style 8
(NFPA Style IM)
Intermediate Male



Thread Style 9
(NFPA Style SF)
Short Female



Thread Style 55
For use with Split Coupler
(please reference page B77 for more information)



Thread Style 3 - "Special Thread"
Special threads, rod extensions, rod eyes, blanks, etc. are also available.
To order, specify "Style 3" and give desired dimensions for KK or CC, A and W or WF.
If otherwise special, please supply dimensioned sketch.

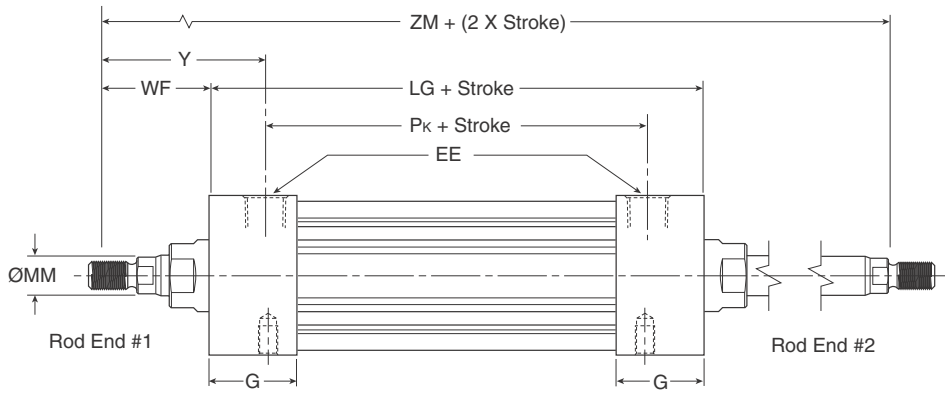
Rod End Dimensions

Bore size	Rod no.	Rod dia. MM	Thread Style 8 CC	Thread Style 4 & 9 KK	Thread Style 6	A	AD	AE	AF	AM	+.000 -.002 B	C	D	D1	LAF	NA	VF	WF	WG
1-1/2	1	5/8	1/2 - 20	7/16 - 20	5/8 - 18	0.750	0.625	0.250	0.375	0.570	1.124	0.385	1/2	1	1.750	0.563	0.615	1.000	1.750
	2	1	7/8 - 14	3/4 - 16	1 - 14	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	1-3/8	2.500	0.938	0.865	1.375	2.375
2	1	5/8	1/2 - 20	7/16 - 20	5/8 - 18	0.750	0.625	0.250	0.375	0.570	1.124	0.385	1/2	1	1.750	0.563	0.615	1.000	1.750
	3	1	7/8 - 14	3/4 - 16	1 - 14	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	1-3/8	2.500	0.938	0.865	1.375	2.375
2-1/2	1	5/8	1/2 - 20	7/16 - 20	5/8 - 18	0.750	0.625	0.250	0.375	0.570	1.124	0.385	1/2	1	1.750	0.563	0.615	1.000	1.750
	3	1	7/8 - 14	3/4 - 16	1 - 14	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	1-3/8	2.500	0.938	0.865	1.375	2.375
3-1/4	1	1	7/8 - 14	3/4 - 16	1 - 14	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	1-3/8	2.500	0.938	0.865	1.375	2.375
	3	1-3/8	1-1/4 - 12	1 - 14	1 - 3/8 - 14	1.625	1.063	0.375	0.875	1.320	1.999	0.635	1-1/8	1-7/8	3.250	1.313	0.990	1.625	2.750
4	1	1	7/8 - 14	3/4 - 16	1 - 14	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	1-3/8	2.500	0.938	0.865	1.375	2.375
	3	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	1.063	0.375	0.875	1.320	1.999	0.635	1-1/8	1-7/8	3.250	1.313	0.990	1.625	2.750
5	1	1	7/8 - 14	3/4 - 16	1 - 14	1.125	0.938	0.375	0.688	0.950	1.499	0.510	7/8	1-3/8	2.500	0.938	0.865	1.375	2.375
	3	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	1.063	0.375	0.875	1.320	1.999	0.635	1-1/8	1-7/8	3.250	1.313	0.990	1.625	2.750

To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary dimensions from that drawing, return to this page and supplement the single rod end dimensions with those shown in the drawings and dimension table below. Note that double rod end cylinders have a head dimension G at both ends, and that LG replaces LF, PK replaces P, etc. The double rod end dimensions differ from, or are in addition to, those for single rod cylinders.

When a double rod end cylinder has two different rod ends, please clearly state which rod end is to be available at which head end.

K-type for 1-1/2" to 5" Bore



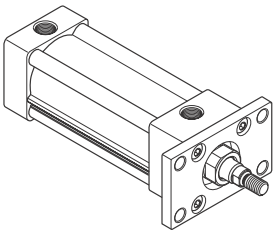
Mounting styles for single rod models	Corresponding mounting styles for double rod models
C	KC
CB	KCB
D	KD
DD	KDD
F	KF
G	KG
J	KJ
NB	KNB
T	KT
TB	KTB
TD	KTD
TE	KTE
TEF	KTEF

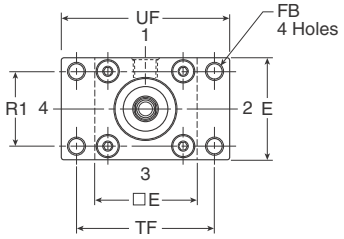
K-type Dimensions

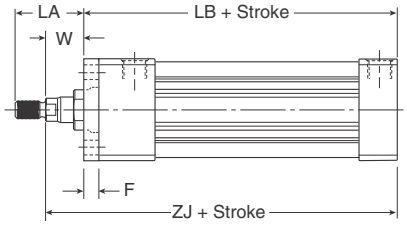
Bore size	Rod no.	Rod dia. MM	EE (NPTF)	G	WF	Y	Add Stroke LG	PK	SAK	XAK	SSK	SNK	SEK	XEK	Add 2X Stroke ZM
1-1/2	1	5/8	3/8	1.438	1.000	1.875	4.125	2.375	6.125	6.125	3.375	2.250	6.375	6.250	6.125
	2	1	3/8	1.438	1.375	2.250	4.125	2.375	6.500	6.500	3.375	–	–	–	5.760
2	1	5/8	3/8	1.375	1.000	1.875	4.125	2.375	6.125	6.125	3.375	2.250	6.750	6.438	6.125
	3	1	3/8	1.375	1.375	2.250	4.125	2.375	6.125	6.500	3.375	2.250	6.750	6.813	6.875
2-1/2	1	5/8	3/8	1.344	1.000	1.938	4.250	2.375	6.250	6.250	3.500	2.375	7.125	6.688	6.250
	3	1	3/8	1.344	1.375	2.313	4.250	2.375	6.250	6.625	3.500	2.375	7.125	7.063	7.000
3-1/4	1	1	1/2	1.594	1.375	2.438	4.750	2.625	7.250	7.375	3.750	2.625	7.750	7.625	7.500
	3	1-3/8	1/2	1.594	1.625	2.688	4.750	2.625	7.250	7.625	3.750	2.625	7.750	7.875	8.000
4	1	1	1/2	1.594	1.375	2.438	4.750	2.625	7.250	7.375	3.750	2.625	8.000	7.750	7.500
	3	1-3/8	1/2	1.594	1.625	2.688	4.750	2.625	7.250	7.625	3.750	2.625	8.000	8.000	8.000
5	1	1	1/2	1.594	1.375	2.438	4.938	2.813	7.688	7.688	3.563	2.813	–	–	7.688
	3	1-3/8	1/2	1.594	1.625	2.688	4.938	2.813	7.688	7.938	3.563	2.813	–	–	8.188
					Replaces Dimension		LF	P	SA	XA	SS	SN	SE	XE	–
					On Single Rod Mounting Styles		All Styles	All Styles	CB	CB	C	TEF, F	G	G	All

Head Rectangular Flange

Style J
(NFPA MF1)





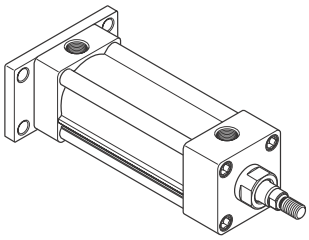


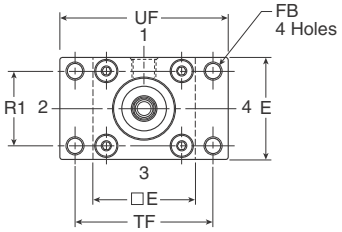
Note: Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J.

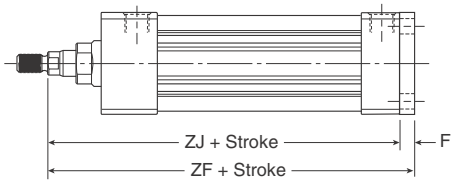
For reference, WF = W + F and LA = W + A.

Cap Rectangular Flange

Style H
(NFPA MF2)





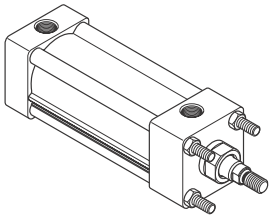


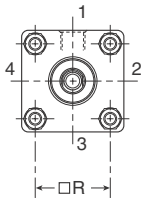
Styles J and H Dimensions

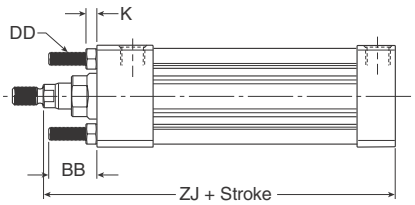
Bore size	Rod no.	Rod dia. MM	A	E	F	FB	LA	R1	TF	UF	W	Add stroke LB	ZF	ZJ
1-1/2	1	5/8	0.750	2.000	0.375	0.313	1.375	1.430	2.750	3.375	0.625	4.000	5.000	4.625
	2	1	1.125	2.000	0.375	0.313	2.125	1.430	2.750	3.375	1.000	4.000	5.375	5.000
2	1	5/8	0.750	2.500	0.375	0.375	1.375	1.840	3.375	4.125	0.625	4.000	5.000	4.625
	3	1	1.125	2.500	0.375	0.375	2.125	1.840	3.375	4.125	1.000	4.000	5.375	5.000
2-1/2	1	5/8	0.750	3.000	0.375	0.375	1.375	2.190	3.875	4.625	0.625	4.125	5.125	4.750
	3	1	1.125	3.000	0.375	0.375	2.125	2.190	3.875	4.625	1.000	4.125	5.500	5.125
3-1/4	1	1	1.125	3.750	0.625	0.438	1.875	2.760	4.688	5.500	0.750	4.875	6.250	5.625
	3	1-3/8	1.625	3.750	0.625	0.438	2.625	2.760	4.688	5.500	1.000	4.875	6.500	5.875
4	1	1	1.125	4.500	0.625	0.438	1.875	3.320	5.438	6.250	0.750	4.875	6.250	5.625
	3	1-3/8	1.625	4.500	0.625	0.438	2.625	3.320	5.438	6.250	1.000	4.875	6.500	5.875
5	1	1	1.125	5.500	0.625	0.563	1.875	4.100	6.625	7.625	0.750	5.125	6.500	5.875
	3	1-3/8	1.625	5.500	0.625	0.563	2.625	4.100	6.625	7.625	1.000	5.125	6.750	6.125

Tie Rods Ext. Head End

Style TB
(NFPA MX3)

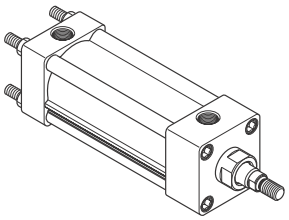


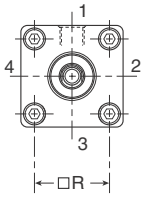


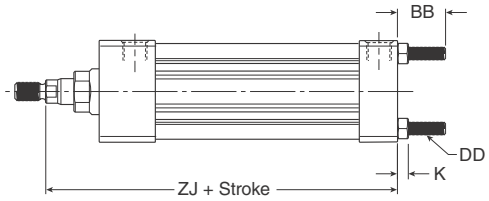


Tie Rods Ext. Cap End

Style TC
(NFPA MX2)

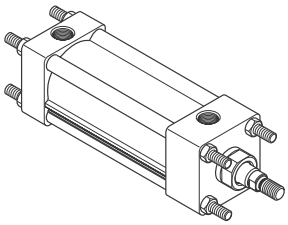


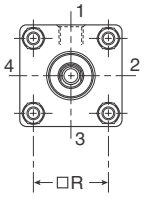


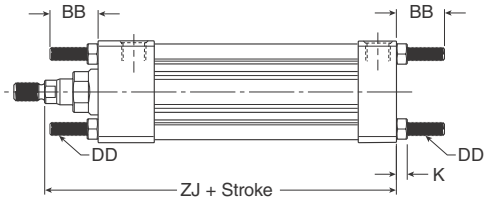


Tie Rods Ext. Both Ends

Style TD
(NFPA MX1)





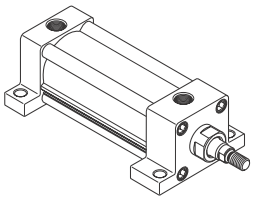


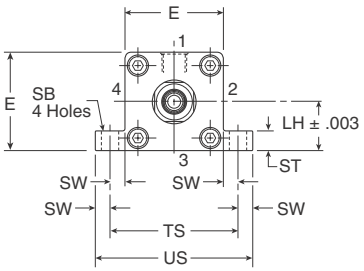
Styles TB, TC and TD Dimensions

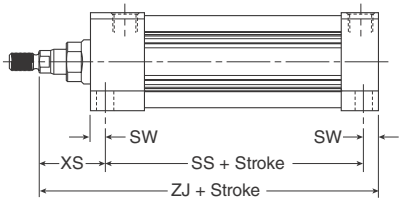
Bore size	Rod no.	Rod dia. MM	BB	DD	E	K	R	Add stroke ZJ
1-1/2	1	5/8	1.000	1/4 - 28	2.000	0.250	1.430	4.625
	2	1	1.000	1/4 - 28	2.000	0.250	1.430	5.000
2	1	5/8	1.125	5/16 - 24	2.500	0.313	1.840	4.625
	3	1	1.125	5/16 - 24	2.500	0.313	1.840	5.000
2-1/2	1	5/8	1.125	5/16 - 24	3.000	0.313	2.190	4.750
	3	1	1.125	5/16 - 24	3.000	0.313	2.190	5.125
3-1/4	1	1	1.375	3/8 - 24	3.750	0.375	2.760	5.625
	3	1-3/8	1.375	3/8 - 24	3.750	0.375	2.760	5.875
4	1	1	1.375	3/8 - 24	4.500	0.375	3.320	5.625
	3	1-3/8	1.375	3/8 - 24	4.500	0.375	3.320	5.875
5	1	1	1.813	1/2 - 20	5.500	0.438	4.100	5.875
	3	1-3/8	1.813	1/2 - 20	5.500	0.438	4.100	6.125

Side Lug

Style C for
(NFPA MS2)





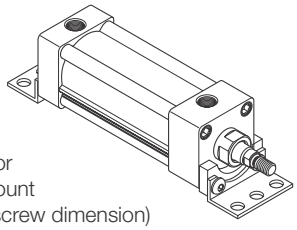


Style C Dimensions

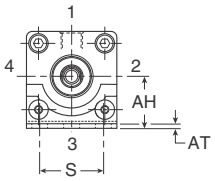
Bore size	Rod no.	Rod dia. MM	E	LH	SB	ST	ST1	ST2	SW	SW1	TS	US	XS	Add stroke SS	Add stroke ZJ
1-1/2	1	5/8	2.000	0.993	0.438	0.500	1.000	0.120	0.375	0.495	2.750	3.500	1.375	2.875	4.625
	2	1	2.000	0.993	0.438	0.500	1.000	0.120	0.375	0.495	2.750	3.500	1.750	2.875	5.000
2	1	5/8	2.500	1.243	0.438	0.500	1.250	0.120	0.375	0.495	3.250	4.000	1.375	2.875	4.625
	3	1	2.500	1.243	0.438	0.500	1.250	0.120	0.375	0.495	3.250	4.000	1.750	2.875	5.000
2-1/2	1	5/8	3.000	1.493	0.438	0.500	1.343	0.120	0.375	0.495	3.750	4.500	1.375	3.000	4.750
	3	1	3.000	1.493	0.438	0.500	1.343	0.120	0.375	0.495	3.750	4.500	1.750	3.000	5.125
3-1/4	1	1	3.750	1.868	0.563	0.750	1.500	0.188	0.500	0.688	4.750	5.750	1.875	3.250	5.625
	3	1-3/8	3.750	1.868	0.563	0.750	1.500	0.188	0.500	0.688	4.750	5.750	2.125	3.250	5.875
4	1	1	4.500	2.243	0.563	0.750	1.500	0.188	0.500	0.688	5.500	6.500	1.875	3.250	5.625
	3	1-3/8	4.500	2.243	0.563	0.750	1.500	0.188	0.500	0.688	5.500	6.500	2.125	3.250	5.875
5	1	1	5.500	2.743	0.813	1.000	1.500	0.250	0.688	0.938	6.875	8.250	2.063	3.125	5.875
	3	1-3/8	5.500	2.743	0.813	1.000	1.500	0.250	0.688	0.938	6.875	8.250	2.313	3.125	6.125

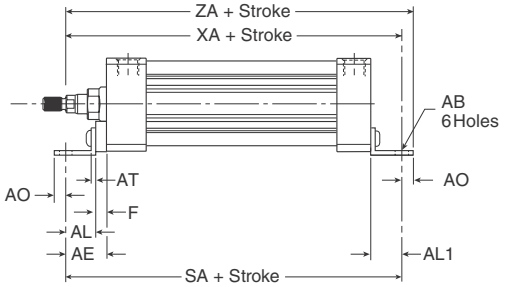
Side End Angle

* Style CB
(NFPA MS1)



Note:
Dimension "S" is for the holes in the mount (not the screw to screw dimension)





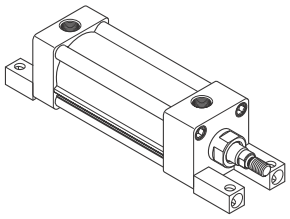
* Maximum recommended pressure for this mount is 150 PSIG.

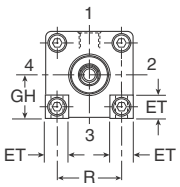
Style CB Dimensions

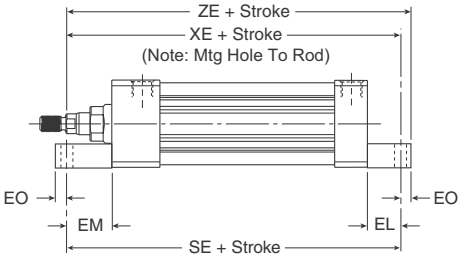
Bore size	Rod no.	Rod dia. MM	AB	AE	AH	AL	AL1	AO	AT	E	F	S	Add stroke SA	Add stroke XA	Add stroke ZA
1-1/2	1	5/8	0.438	1.375	1.188	1.000	1.000	0.375	0.125	2.000	0.375	1.250	6.000	5.625	6.000
	2	1	0.438	1.375	1.188	1.000	1.000	0.375	0.125	2.000	0.375	1.250	6.000	6.000	6.375
2	1	5/8	0.438	1.375	1.438	1.000	1.000	0.375	0.125	2.500	0.375	1.750	6.000	5.625	6.000
	3	1	0.438	1.375	1.438	1.000	1.000	0.375	0.125	2.500	0.375	1.750	6.000	6.000	6.375
2-1/2	1	5/8	0.438	1.375	1.625	1.000	1.000	0.375	0.125	3.000	0.375	2.250	6.125	5.750	6.125
	3	1	0.438	1.375	1.625	1.000	1.000	0.375	0.125	3.000	0.375	2.250	6.125	6.125	6.500
3-1/4	1	1	0.563	1.875	1.938	1.250	1.250	0.500	0.125	3.750	0.625	2.750	7.375	6.875	7.375
	3	1-3/8	0.563	1.875	1.938	1.250	1.250	0.500	0.125	3.750	0.625	2.750	7.375	7.125	7.625
4	1	1	0.563	–	2.250	1.875	1.250	0.500	0.125	4.500	–	3.500	7.375	6.875	7.375
	3	1-3/8	0.563	–	2.250	1.875	1.250	0.500	0.125	4.500	–	3.500	7.375	7.125	7.625
5	1	1	0.688	2.000	2.750	1.375	1.375	0.625	0.188	5.500	0.625	4.250	7.875	7.250	7.875
	3	1-3/8	0.688	2.000	2.750	1.375	1.375	0.625	0.188	5.500	0.625	4.250	7.875	7.500	8.125

Side End Lug

Style G
(NFPA MS7)







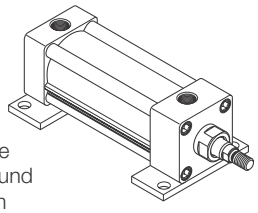
Style G Dimensions

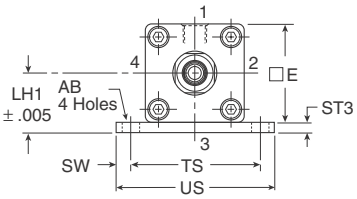
Bore size	Rod no.	Rod dia. MM	E	EB	EL	EM	EO	ET	GH	R	Add Stroke SE	XE	ZE
1-1/2	1	5/8	2.000	0.281	0.750	1.125	0.250	0.563	0.993	1.430	5.500	5.375	5.625
	2	1	–	–	–	–	–	–	–	–	–	–	–
2	1	5/8	2.500	0.344	0.938	1.313	0.313	0.688	1.243	1.840	5.875	5.563	5.875
	3	1	2.500	0.344	0.938	1.313	0.313	0.688	1.243	1.840	5.875	5.938	6.250
2-1/2	1	5/8	3.000	0.344	1.063	1.438	0.313	0.813	1.493	2.190	6.250	5.813	6.125
	3	1	3.000	0.344	1.063	1.438	0.313	0.813	1.493	2.190	6.250	6.188	6.500
3-1/4	1	1	3.750	0.406	0.875	1.500	0.375	1.000	1.868	2.760	6.625	6.500	6.875
	3	1-3/8	3.750	0.406	0.875	1.500	0.375	1.000	1.868	2.760	6.625	6.750	7.125
4	1	1	4.500	0.406	1.000	1.625	0.375	1.188	2.243	3.320	6.875	6.625	7.000
	3	1-3/8	4.500	0.406	1.000	1.625	0.375	1.188	2.243	3.320	6.875	6.875	7.250

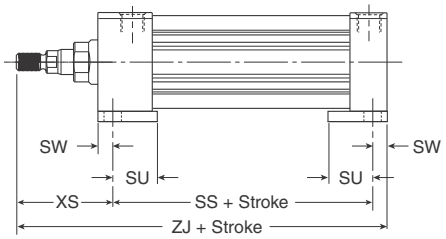
Base Bar Mount

Style NB for 4MA

Note: Fasteners for NB base bar mount have been applied with removable thread locking compound and torqued to bottom of endcaps.







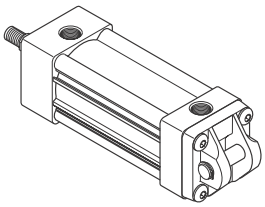
Style NB Dimensions

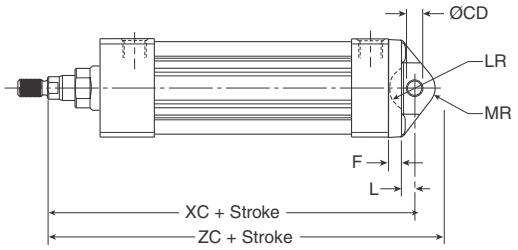
Bore size	Rod no.	Rod dia. MM	AB	E	LH1	ST3	SU	SW	TS	US	XS	Add stroke SS	ZJ
1-1/2	1	5/8	0.438	2.000	1.243	0.250	1.125	0.375	2.750	3.500	1.375	2.875	4.625
	2	1	–	–	–	–	–	–	–	–	–	–	–
2	1	5/8	0.438	2.500	1.493	0.250	1.125	0.375	3.250	4.000	1.375	2.875	4.625
	3	1	0.438	2.500	1.493	0.250	1.125	0.375	3.250	4.000	1.750	2.875	5.000
2-1/2	1	5/8	0.438	3.000	1.868	0.375	1.125	0.375	3.750	4.500	1.375	3.000	4.750
	3	1	0.438	3.000	1.868	0.375	1.125	0.375	3.750	4.500	1.750	3.000	5.125
3-1/4	1	1	0.563	3.750	2.368	0.500	1.250	0.500	4.750	5.750	1.875	3.250	5.625
	3	1-3/8	0.563	3.750	2.368	0.500	1.250	0.500	4.750	5.750	2.125	3.250	5.875
4	1	1	0.563	4.500	2.743	0.500	1.250	0.500	5.500	6.500	1.875	3.250	5.625
	3	1-3/8	0.563	4.500	2.743	0.500	1.250	0.500	5.500	6.500	2.125	3.250	5.875

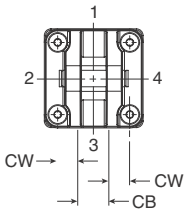
Cap Fixed Clevis

Style BB
(NFPA MP1)

Note: For maximum swivel angle of BB mount with rear mounting plate, see cylinder accessories

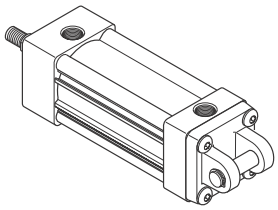


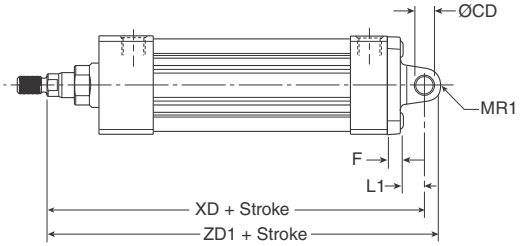


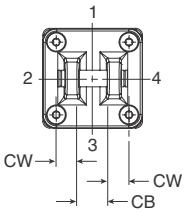


Cap Detachable Clevis

Style BC
(NFPA MP2)

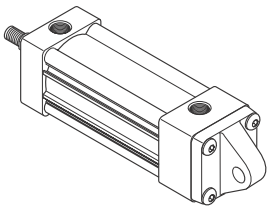


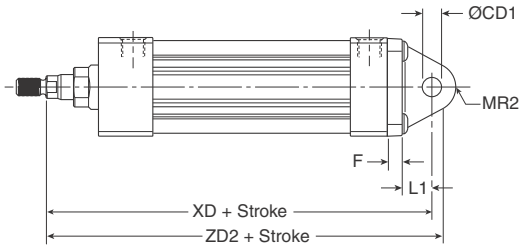


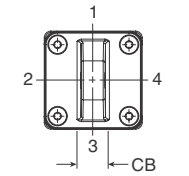


Cap Detachable Eye

Style BE
(NFPA MP4)







Styles BB, BC and BE Dimensions

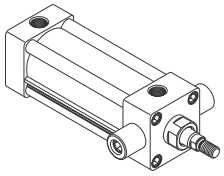
Bore size	Rod no.	Rod dia. MM	CB	+.000 -.002 CD	+.002 +.004 CD1	CW	E *	F	L	LR	L1	MR	MR1	MR2	Add stroke XC	XD	ZC	ZD1	ZD2
1-1/2	1	5/8	0.750	0.501	0.500	0.500	2.000	0.375	0.375	0.750	0.750	0.625	0.500	0.625	5.375	5.750	6.000	6.250	6.375
	2	1	0.750	0.501	0.500	0.500	2.000	0.375	0.375	0.750	0.750	0.625	0.500	0.625	5.750	6.125	6.375	6.625	6.750
2	1	5/8	0.750	0.501	0.500	0.500	2.500	0.375	0.375	0.750	0.750	0.625	0.500	0.625	5.375	5.750	6.000	6.250	6.375
	3	1	0.750	0.501	0.500	0.500	2.500	0.375	0.375	0.750	0.750	0.625	0.500	0.625	5.750	6.125	6.375	6.625	6.750
2-1/2	1	5/8	0.750	0.501	0.500	0.500	3.000	0.375	0.375	0.750	0.750	0.625	0.500	0.688	5.500	5.875	6.125	6.375	6.563
	3	1	0.750	0.501	0.500	0.500	3.000	0.375	0.375	0.750	0.750	0.625	0.500	0.688	5.875	6.250	6.500	6.750	6.313
3-1/4	1	1	1.250	0.751	0.750	0.625	3.750	0.625	0.625	1.000	1.250	0.938	0.750	0.875	6.875	7.500	7.813	8.250	8.375
	3	1-3/8	1.250	0.751	0.750	0.625	3.750	0.625	0.625	1.000	1.250	0.938	0.750	0.875	7.125	7.750	8.063	8.500	8.625
4	1	1	1.250	0.751	0.750	0.625	4.500	0.625	0.625	1.000	1.250	0.938	0.750	0.875	6.875	7.500	7.813	8.250	8.375
	3	1-3/8	1.250	0.751	0.750	0.625	4.500	0.625	0.625	1.000	1.250	0.938	0.750	0.875	7.125	7.750	8.063	8.500	8.625
5	1	1	1.250	0.751	0.750	0.625	5.500	0.625	0.625	1.000	1.250	0.938	0.750	0.875	7.125	7.750	8.063	8.500	8.625
	3	1-3/8	1.250	0.751	0.750	0.625	5.500	0.625	0.625	1.000	1.250	0.938	0.750	0.875	7.375	8.000	8.313	8.750	8.875

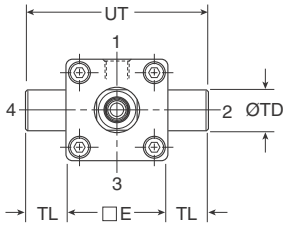
* The 5" bore BB and BE bracket is the same as the 3-1/4" BB and BE bracket.
The outer square dimension E is 3.75" and use SHCS.

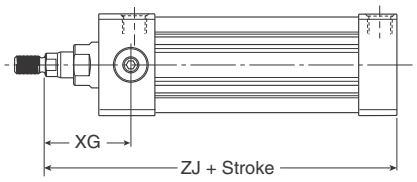
Head Trunnion

***** Style D
(NFPA MT1)

Note: not available for 1-1/2" bore with 1" rod.

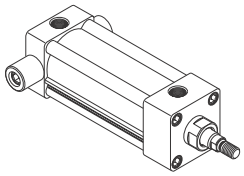


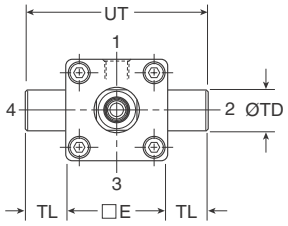


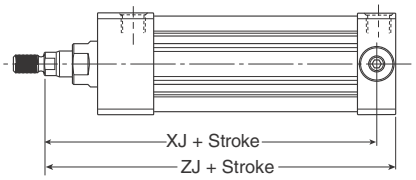


Cap Trunnion

Style DB
(NFPA MT2)



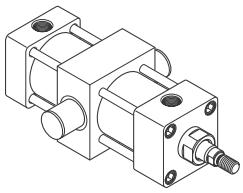


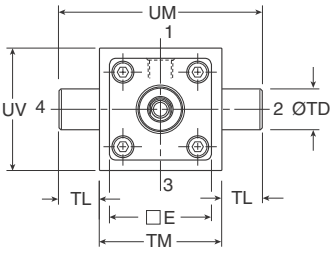


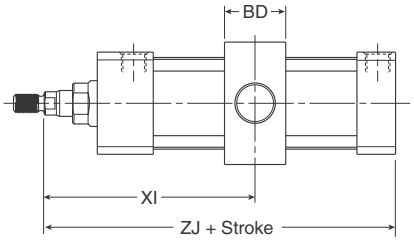
Intermediate Trunnion

Style DD
(NFPA MT4)

Note: Tie rod nuts for Style DD have a slot instead of internal hex.







Note: Tie rod nuts for Style DD have a slot instead of internal hex.

Styles D, DB and DD Dimensions

Bore size	Rod no.	Rod dia. MM	E	BD	+.000 –.001 TD	TL	TM	UM	UT	UV	XG	Min. XI	Add stroke XJ	Add stroke ZJ
1–1/2	1	5/8	2.000	1.250	1.000	1.000	2.500	4.500	4.000	2.500	1.750	3.036	4.125	4.625
	2 *	1	2.000	1.250	1.000	1.000	2.500	4.500	4.000	2.500	–	3.437	4.250	5.000
2	1	5/8	2.500	1.500	1.000	1.000	3.000	5.000	4.500	3.000	1.750	3.125	4.125	4.625
	3	1	2.500	1.500	1.000	1.000	3.000	5.000	4.500	3.000	2.125	3.500	4.500	5.000
2-1/2	1	5/8	3.000	1.500	1.000	1.000	3.500	5.500	5.000	3.500	1.750	3.094	4.250	4.750
	3	1	3.000	1.500	1.000	1.000	3.500	5.500	5.000	3.500	2.125	3.469	4.625	5.125
3-1/4	1	1	3.750	2.000	1.000	1.000	4.500	6.500	5.750	4.250	2.250	3.969	5.000	5.625
	3	1-3/8	3.750	2.000	1.000	1.000	4.500	6.500	5.750	4.250	2.500	4.219	5.250	5.875
4	1	1	4.500	2.000	1.000	1.000	5.250	7.250	6.500	5.000	2.250	3.969	5.000	5.625
	3	1-3/8	4.500	2.000	1.000	1.000	5.250	7.250	6.500	5.000	2.500	4.219	5.250	5.875
5	1	1	5.500	2.000	1.000	1.000	6.250	8.250	7.500	6.000	2.250	3.969	5.250	5.875
	3	1-3/8	5.500	2.000	1.000	1.000	6.250	8.250	7.500	6.000	2.500	4.219	5.500	6.125

* Head trunnion style D not available for 1-1/2" bore with 1" rod

Kits & Accessories

See page B34.

4MA/4ML Series – 6" and 8" Bore Size

PISTON SEALS (hidden)
Carboxylated nitrile rounded-lip piston seals combine low friction with leak-free service and long service life.

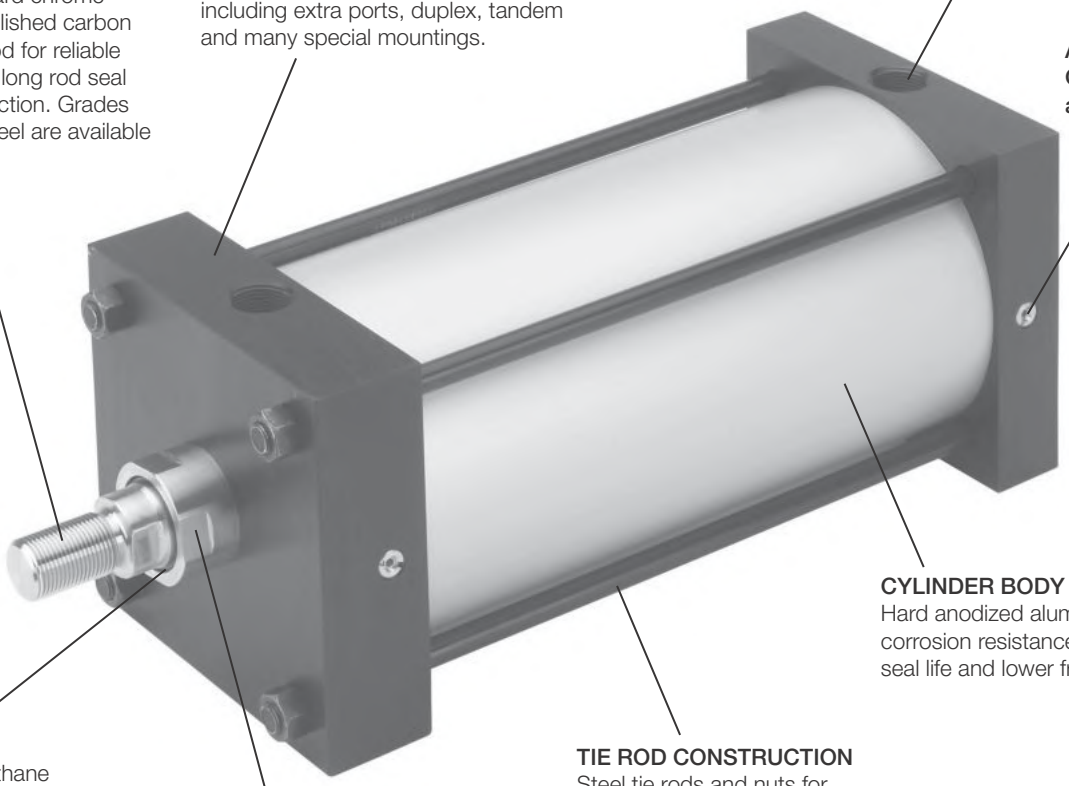
PISTON ASSEMBLY (hidden)
Aluminum piston with wear band increases service life and eliminates metal-to-metal contact. Optional magnetic piston ring for use with a variety of sensors. Anaerobic adhesive is used to permanently lock and seal the piston to the rod.

HEADS AND CAPS
High-strength aluminum heads and caps are anodized for corrosion resistance. We can offer customization of the endcaps for unique designs, including extra ports, duplex, tandem and many special mountings.

PORTS
NPTF ports are standard. Other port styles available.

PISTON ROD
Standard case-hardened (50-64 Rc), hard chrome plated and polished carbon steel piston rod for reliable performance, long rod seal life and low friction. Grades of stainless steel are available as options.

ADJUSTABLE CUSHIONS available



CYLINDER BODY
Hard anodized aluminum for corrosion resistance, maximum seal life and lower friction.

ROD WIPER
Outboard urethane rod wiper protects the cylinder by removing external debris and adherents from the piston rod during the entire stroke.

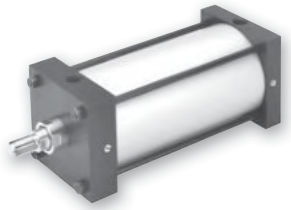
TIE ROD CONSTRUCTION
Steel tie rods and nuts for heavy-duty use. Stainless steel is available as an option.

ROD GLAND/BEARING
Threaded bronze rod gland is externally removable, without cylinder disassembly, for easy maintenance. Machined flats permit the use of common tools for removal and installation. Options include HI LOAD design for side load conditions and metallic wiper design for extremely tough rod contaminant/adherent applications.

ROD SEAL (hidden)
Carboxylated nitrile rounded-lip rod seal combines low friction with leak-free service and long service life.

For a complete list of 4MA options, please see pages B19 and B23.

- Industry leading NFPA interchangeable cylinder with flexible construction
- Bore sizes – 6" and 8"
- Removable bronze alloy gland/bearing for easy maintenance
- Available in any practical stroke length
- Tube and tie rod construction for heavy duty use
- Single rod end or double rod ends
- Cushions – optional and adjustable at either end or both ends (N/A for 4ML hydraulic version)
- 20 standard mounting styles available
- RoHS compliant



Operating information

	4MA	4ML
Operating pressure:	250 PSIG (17 bar) maximum air service	400 PSIG (27 bar) maximum hydraulic service
Temperature range –		
Standard seals	-10°F to 165°F (-23°C to 74°C)	
Fluorocarbon seals	-10°F to 250°F (-23°C to 121°C)	
Low temperature seals	-50°F to 150°F (-46°C to 66°C)	
Filtration requirements:	40 micron, dry filtered air	Filtered hydraulic oil

Ordering information

6.00 | | | J | 4MA | | U | | | 1 | 4 | | A | | 12.000

Bore size

6.00
8.00

Double rod cylinder

Specify "K" only if double rod cylinder is required.

Series

4MA	Air service
4ML	Hydraulic service

Ports

U	NPTF
R	BSPP
B	BSPT
T	SAE

Piston rod number

Specify rod code number for required diameter. [8, 2]

Stroke length

Specify stroke length required in inches. [8]

Mounting style

Specify mounting style code (see table on following page).

Special modification

Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MA with Linear Position Sensor Option) [7]

Cushion cap end

Blank	Non-cushioned cap end
C	Cushioned cap end (not available for 4ML)

Cushion head end

Blank	Non-cushioned head end
C	Cushioned head end (not available for 4ML)

Piston rod thread type

A	Standard (UNF unified thread)
W	BSF British fine
M *	Metric

* Please reference page B78.

Piston type

Blank	Standard (lipseals and no magnetic ring)
3	Lipseals and magnetic ring

Seals

Blank	Standard (nitrile seals)
V	Fluorocarbon seals [1]
E	Fluorocarbon rod wiper and rod seal only [2]
4	Low temperature seals [1]
M	Metallic rod wiper, nitrile seals [3]

Rod material and gland code

Blank	Standard rod and gland
H	Standard rod and HI LOAD gland
Y	17-4 PH stainless steel rod and standard gland
Z	17-4 PH stainless steel rod and HI LOAD gland
J	303 stainless steel rod and standard gland [7]
K	303 stainless steel rod and HI LOAD gland [7]
S	316 stainless steel rod and standard gland [7]
T	316 stainless steel rod and HI LOAD gland [7]

Piston rod thread style

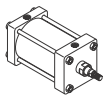
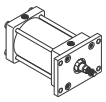
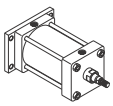
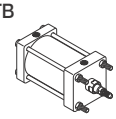
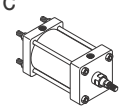
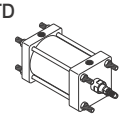
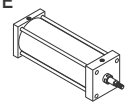
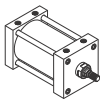
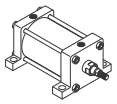
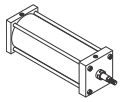
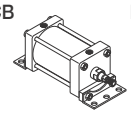
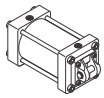
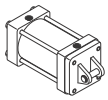
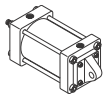
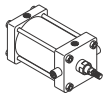
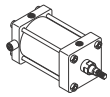
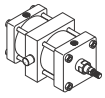
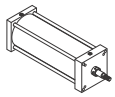
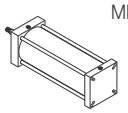
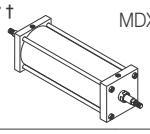
4	Small male
8	Intermediate male
9	Short female
55	For use with split coupler [6]
3	Special (and specify all dimensions required)
6	Full male

[1] Reed and solid-state sensors only available with standard seals or options E and M.
[2] Used for external chemical compatibility applications, not high temperature.
[3] If fluorocarbon seals are required with this option, please place an "S" for special in the Special Modification field and specify the "fluorocarbon seals and metallic rod wiper" in the item notes.
[4] For Linear Position Sensor Option (LPSO), please include the following information for the Special Modification item notes:
a. Sensor part number (please reference pages B72-B76)
b. Sensor position
c. Port position (if other than position 1)
d. Length of stop tubing, gross stroke and net stroke (if required) Also, Piston Type 3 is required.
[5] Review Piston Rod Selection Chart, please reference page A14 to determine proper piston rod diameter.
[6] For additional information regarding this style, please reference page B77. If non-standard Rod Material and Gland Code is required with this option, please place an "S" for special in Special Modification field and specify Rod Material and Gland Code in the item notes.
[7] Not available for 4ML.
[8] If a stop tube is required, specify gross stroke (net stroke + stop tube) in the model number, then place an "S" for special in the Special Modification field and specify the stop tube length in the item notes.

Sensors
See section L for sensors.

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.

4MA/4ML Mounting Styles for 6" & 8" Bore

Mounting style	NFPA mounting	Description	Bore size
T 	MX0	No Mount	6 - 8
J 	MF1	Head Rectangular Flange	6
H 	MF2	Cap Rectangular Flange	6
TB 	MX3	Tie Rods Extended Head End	6 - 8
TC 	MX2	Tie Rods Extended Cap End	6 - 8
TD 	MX1	Tie Rods Extended Both Ends	6 - 8
TE 	MX5	Sleeve Nut	6 - 8
TEF 	MX5/MS4	Sleeve Nut with Side Tap	6 - 8
C 	MS2	Side Lug	6 - 8
F 	MS4	Side Tap	6 - 8
CB 	MS1	Side End Angle	6 - 8
BB 	MP1	Cap Fixed Clevis	6 - 8
BC 	MP2	Cap Detachable Clevis	6 - 8
BE 	MP4	Cap Detachable Eye	6
D 	MT1	Head Trunnion	6 - 8
DB 	MT2	Cap Trunnion	6 - 8
DD 	MT4	Intermediate Trunnion	6 - 8
JB 	ME3	Head Square	8
HB 	ME4	Cap Square	8
KT † 	MDX0	Double Rod End, No Mount	6 - 8

† Double rod end cylinders can be ordered with head mountings, i.e. KJ.

General Specifications

- NFPA interchangeable
- Bore sizes – 6" and 8"
- Strokes – available in any practical stroke length
- Rod diameters – 1-3/8" and 1-3/4"
- Rod end styles – 4 standard, specials available
- Single rod end or double rod ends
- Cushions – optional and adjustable at either end or both ends (N/A for 4ML Hydraulic Version)
- Operating pressure –
  4MA = 250 PSIG (17 Bar) maximum air service
  4ML = 400 PSIG (27 Bar) maximum hydraulic service
- Media – 4MA = dry, filtered air
  4ML = filtered hydraulic oil
- Temperature range –
  -10°F to 165°F (-23°C to 74°C) standard seals
  -10°F to 250°F (-23°C to 121°C) fluorocarbon seals option
  -50°F to 150°F (-46°C to 66°C) low temperature seals option
- Mounting styles – 20 standard styles
- RoHS compliant

For material options, including seals, piston rods and glands, please see Material Specifications on next page.

Cylinder Weights

		No mount single rod 4MA/4ML		No mount double rod	
Bore (inch)	Rod (inch)	Base wt. (lbs.)	Per inch (lbs.)	Base wt. (lbs.)	Per inch (lbs.)
6	1.375	20.50	0.87	25.65	1.30
	1.75	22.61	1.13	30.41	1.82
8	1.375	35.50	1.25	41.15	1.68
	1.75	37.63	1.51	45.90	2.20

Mounting Weight Adders

Bore (inch)	Mounting style, weight (lbs)							
	J, H	D, DB	BB	CB	DD	BE	C	BC
6	10.74	1.22	2.91	5.88	15.52	2.91	0.69	11.38
8	N/A	1.22	2.91	7.84	25.01	N/A	0.67	17.31

Standard Cushion Position

Mounting Code	Position
All except D, DB, DD	2
D, DB, DD	3

Standard Port Sizes

Bore	NPTF	BSPT	BSPP	SAE
6	3/4	Rc3/4	G3/4	12
8	3/4	Rc3/4	G3/4	12

Standard Temperatures and Applications

Head and cap	Black anodized aluminum alloy
Cylinder body	Clear hard-coat anodized aluminum alloy
Piston rod	Case-hardened, chrome plated carbon steel
Rod seal	Carboxylated nitrile (Nitroxile)
Rod wiper	Molythane
Rod bearing (gland)	Bronze alloy
Piston	Aluminum alloy
Piston seals	Carboxylated nitrile (Nitroxile)
Piston bearing	MolyGard™
Magnetic ring	Plastic-bound magnetic material
Piston fastener	Piston rod for aluminum piston
O-rings	Nitrile
End seals	Nitrile
Cushion seals	Urethane
Cushion needle valves	Brass cushion needle valves
Tie-rods	Blackened carbon steel
Tie-rod nuts	Steel alloy, SAE J995 Grade 8

Material and Part Changes

4MA Options

High temperatures (-10°F to 250°F)	All seals and wiper are fluorocarbon Aluminum piston without magnetic ring
Low temperatures (-50°F to 150°F)	Rod seal, piston seals, o-rings and end seals are low temperature-rated nitrile

4ML Hydraulic Version

Hydraulic service (general)	Cushions not available
Hydraulic service (std temp)	Polyurethane TS-2000 rod seal and nitrile piston seals (for hydraulic use)
Hydraulic service (high temp)	Fluorocarbon TS-2000 rod seal; wiper and all seals are fluorocarbon (for hydraulic use)

Other Standard Options

Cylinder seal options	Fluorocarbon for high temperatures or chemical compatibility Other seal options available, please consult factory
Piston rod material options	Case-hardened, chrome plated carbon steel (standard) 17-4 PH stainless steel, chrome plated 303 stainless steel, chrome plated (N/A for 4ML) 316 stainless steel, chrome plated (N/A for 4ML) For stainless steel without chrome plating, please consult factory
HI LOAD gland option	Composite bearing pressed into bronze alloy gland
Metallic rod scraper option	Dual high strength bronze wipers with fluorocarbon energizer

How to Select a 6" - 8" Bore 4MA Cylinder

Parker cylinders are available based on air or hydraulic operating pressure. The many styles, sizes and optional features available assure that your application requirements are precisely met. To select a cylinder, follow these simple steps:

Step 1 - **Determine the correct cylinder bore size** necessary to achieve required force using the available operating pressure.

Step 2 - **Determine the series cylinder to use**, based on operating pressure.

Step 3 - **Turn to the appropriate cylinder selection section.** Select the mounting style that fits your installation needs. Determine the bore and rod sizes available for the model you select. Then complete model selection.

- Choose a rod end style and the desired rod end accessories.
- Size the cylinder to meet your application requirements.

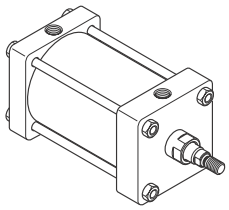
Step 4 - **Consider the following conditions** which may require further modifications to the cylinder you have selected.

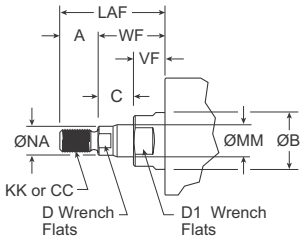
Application Condition	Check the Following
Quick Starts or Stops	Confirm that determined thrust is sufficient to accelerate or decelerate cylinder and load within prescribed distance. Optional cushions should be used to reduce shock during deceleration, check that peak pressures will be within tolerable limits.
Long Push Stroke	Check whether stop tube is required to prevent excessive bearing loads and wear.
High-column Loading Long Push Stroke	Determine if standard size piston rod is strong enough to accommodate intended load. See Application Engineering section for recommendations.
Long Horizontal Stroke	Determine if standard size piston rod is strong enough to accommodate intended load.
High Operating Temperatures	For temperatures between 165°F and 250°F use 4MA cylinder with high temperature seals.

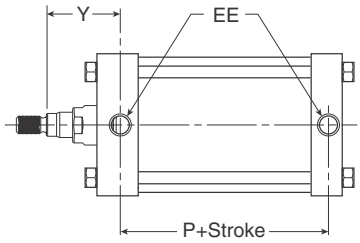
General Options and Modifications:

- Adjustable Cushions
- Magnetic Piston
- Port and Adjustable Cushion Relocation
- Port Thread Styles
- Multiple Ports
- Special Heads, Caps, Pistons and Mounts
- Double Rod End
- Oversize Rod Diameters
- Rod End Modifications
- Rod Materials (grades of stainless steel)
- Stainless Steel Tie Rods and Nuts
- Fluorocarbon Rod Wiper and Rod Seal only
- Fluorocarbon Seals (all cylinder seals)
- Metallic Rod Wiper
- HI LOAD Gland Assembly
- Stop Tube
- Mixed Mountings
- Shock Absorber on Cap End
- Air Cylinder/Valve Combination (ACVB)
- Adjustable Point Sensors (order separately)
- Continuous Linear Position Sensing (LPSO)
- High Temperature Service (to 250°F)
- Low Temperature Service (to -50°F)
- Hydraulic Service (4ML) (400 PSIG)
- Rod lock version (see 4MAJ)

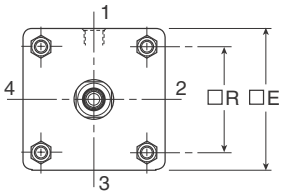
Single Rod
(Style T)

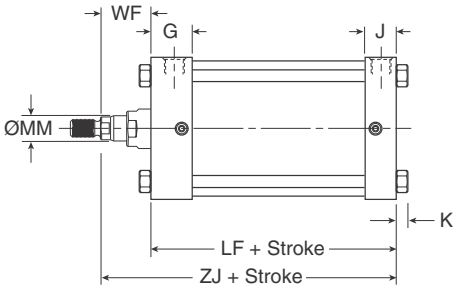






For dimensions of all standard rod end styles, please see next page.





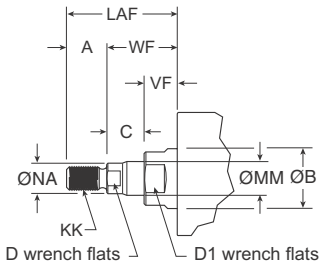
Style T Dimensions

Bore size	Rod no.	Rod dia. MM	Thread Style 8 CC	Thread Style 4 & 9 KK	Thread Style 6	A	AA	+.000 -.002 B	C	D	D1	E	EE (NPTF)	G
6	1	1-3/8	1-1/4 - 12	1-14	1-3/8 - 14	1.625	6.900	1.999	0.635	1-1/8	1-7/8	6.500	3/4	1.910
	3	1-3/4	1-1/2 - 12	1-1/4 - 12	1-3/4 - 12	2.000	6.900	2.374	0.760	1-1/2	2-3/16	6.500	3/4	1.910
8	1	1-3/8	1-1/4 - 12	1-14	1-3/8 - 14	1.625	9.100	1.999	0.635	1-1/8	1-7/8	8.500	3/4	1.810
	3	1-3/4	1-1/2 - 12	1-1/4 - 12	1-3/4 - 12	2.000	9.100	2.374	0.760	1-1/2	2-3/16	8.500	3/4	1.810

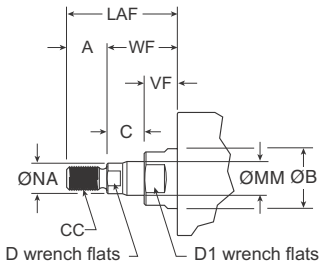
Bore size	Rod no.	Rod dia. MM	J	K	LAF	NA	R	VF	WF	Y	Add stroke LF	Add stroke P	Add stroke ZJ
6	1	1-3/8	1.410	0.438	3.250	1.313	4.880	0.990	1.625	2.813	5.000	3.125	6.625
	3	1-3/4	1.410	0.438	3.875	1.688	4.880	1.115	1.875	3.063	5.000	3.125	6.875
8	1	1-3/8	1.440	0.563	3.250	1.313	6.440	0.990	1.625	2.750	5.125	3.250	6.750
	3	1-3/4	1.440	0.563	3.875	1.688	6.440	1.115	1.875	3.000	5.125	3.250	7.000

Rod End

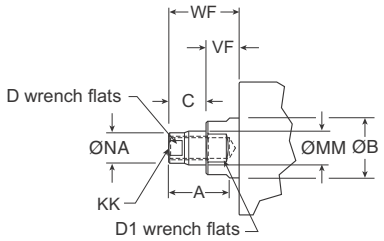
Thread Style 4
(NFPA Style SM)
Small Male



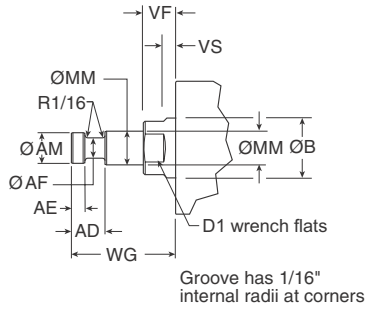
Thread Style 8
(NFPA Style IM)
Intermediate Male



Thread Style 9
(NFPA Style SF)
Short Female



Thread Style 55
For use with Split Coupler
(please reference page B77 for more information)



Thread Style 3 - “Special Thread”
Special threads, rod extensions, rod eyes, blanks, etc. are also available.
To order, specify “Style 3” and give desired dimensions for KK or CC, A and W or WF.
If otherwise special, please supply dimensioned sketch.

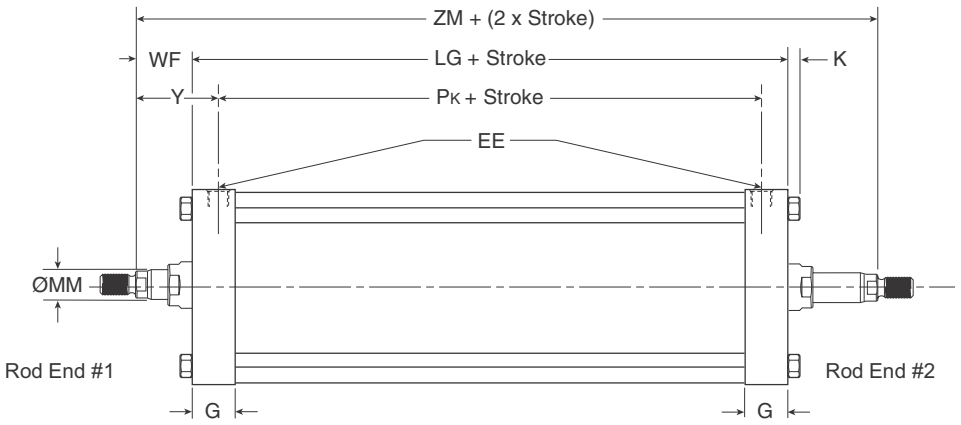
Rod End Dimensions

Bore size	Rod no.	Rod dia. MM	Thread Style 8 CC	Thread Style 4 & 9 KK	Thread Style 6	A	AD	AE	AF	AM	+.000 -.002 B	C	D	D1	LAF	NA	VF	WF	WG
6	1	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	1.063	0.375	0.875	1.320	1.999	0.635	1-1/8	1-7/8	3.250	1.313	0.990	1.625	2.750
	3	1-3/4	1-1/2 - 12	1-1/4- 12	1-3/4 - 12	2.000	1.313	0.500	1.125	1.700	2.374	0.760	1-1/2	2-3/16	3.875	1.688	1.115	1.875	3.125
8	1	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	1.063	0.375	0.875	1.320	1.999	0.635	1-1/8	1-7/8	3.250	1.313	0.990	1.625	2.750
	3	1-3/4	1-1/2 - 12	1-1/4- 12	1-3/4 - 12	2.000	1.313	0.500	1.125	1.700	2.374	0.760	1-1/2	2-3/16	3.875	1.688	1.115	1.875	3.125

To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary dimensions from that drawing, return to this page and supplement the single rod end dimensions with those shown in the drawings and dimension table below. Note that double rod end cylinders have a head dimension G at both ends, and that LG replaces LF, PK replaces P, etc. The double rod end dimensions differ from, or are in addition to, those for single rod cylinders.

When a double rod end cylinder has two different rod ends, please clearly state which rod end is to be available at which head end.

K-type for 6" & 8" bore



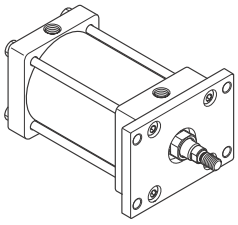
Mounting styles for single rod models	Corresponding mounting styles for double rod models
C	KC
CB	KCB
D	KD
DD	KDD
F	KF
J	KJ
T	KT
TB	KTB
TD	KTD
TE	KTE
TEF	KTEF

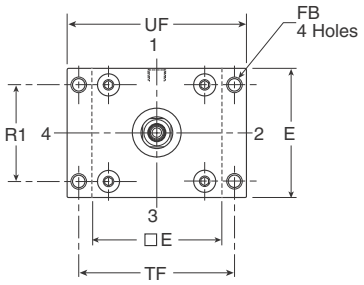
Style KT Dimensions

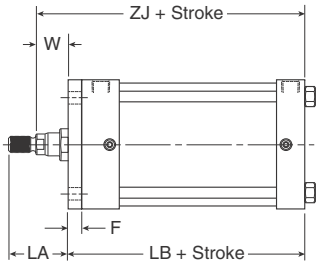
Bore size	Rod no.	Rod dia. MM	EE (NPTF)	G	K	WF	Y	Add stroke LG	PK	SAK	XAK	SSK	SNK	Add 2X stroke ZM
6	1	1-3/8	3/4	1.910	0.438	1.625	2.813	5.500	3.125	8.250	8.500	4.125	3.125	8.750
	3	1-3/4	3/4	1.910	0.438	1.875	3.063	5.500	3.125	8.250	8.750	4.125	3.125	9.250
8	1	1-3/8	3/4	1.810	0.563	1.625	2.750	5.500	3.250	9.125	8.938	4.125	3.125	8.750
	3	1-3/4	3/4	1.810	0.563	1.875	3.000	5.500	3.250	9.125	9.188	4.125	3.125	9.250
							Replaces Dimension	LF	P	SA	XA	SS	SN	–
							On Single Rod Mounting Styles	All Styles	All Styles	CB	CB	C	F, TEF	All

Head Rectangular Flange

Style J
(NFPA MF1)
(only 6" Bore)





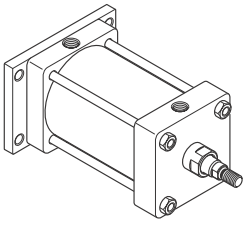


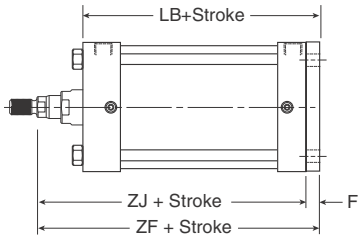
Note: Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J.

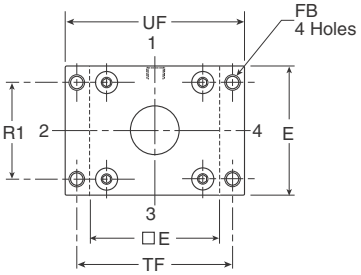
For reference, WF = W + F and LA = W + A.

Cap Rectangular Flange

Style H
(NFPA MF2)
(only 6" Bore)





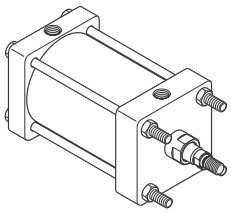


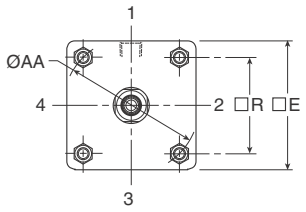
Styles J and H Dimensions

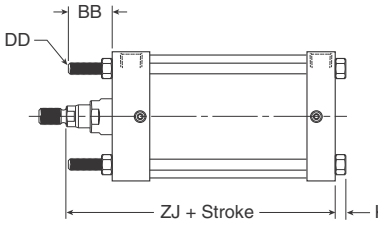
Bore size	Rod no.	Rod dia. MM	A	E	F	FB	LA	R1	TF	UF	W	Add stroke LB	Add stroke ZF	Add stroke ZJ
6	1	1-3/8	1.625	6.500	0.750	0.563	2.500	4.880	7.625	8.625	0.875	5.750	7.375	6.625
	3	1-3/4	2.000	6.500	0.750	0.563	3.125	4.880	7.625	8.625	1.125	5.750	7.625	6.875

Tie Rods Ext. Head End

Style TB
(NFPA MX3)

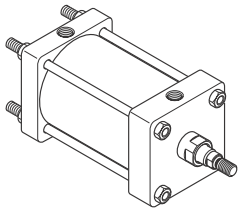


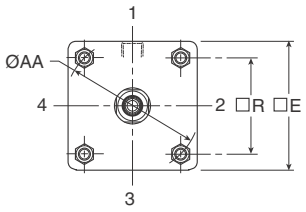


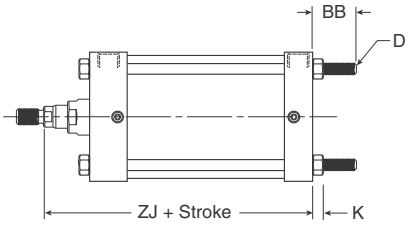


Tie Rods Ext. Cap End

Style TC
(NFPA MX2)

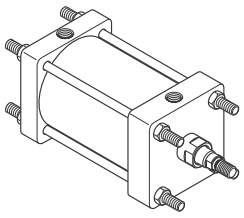


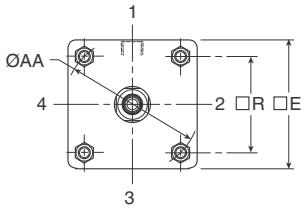


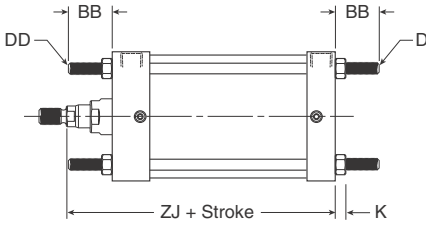


Tie Rods Ext. Both Ends

Style TD
(NFPA MX1)





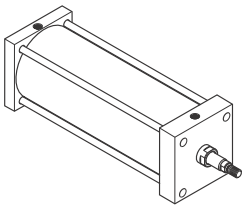


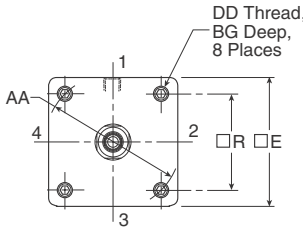
Styles TB, TC and TD Dimensions

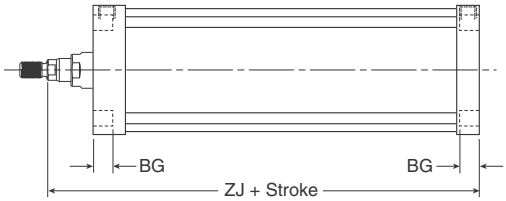
Bore size	Rod no.	Rod dia. MM	AA	BB	DD	E	K	R	Add stroke ZJ
6	1	1-3/8	6.900	1.813	1/2-20	6.500	0.438	4.880	6.625
	3	1-3/4	6.900	1.813	1/2-20	6.500	0.438	4.880	6.875
8	1	1-3/8	9.100	2.313	5/8-18	8.500	0.563	6.440	6.750
	3	1-3/4	9.100	2.313	5/8-18	8.500	0.563	6.440	7.000

Sleeve Nut

Style TE
(NFPA MX5)





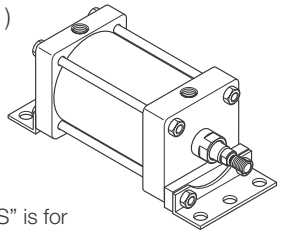


Style TE Dimensions

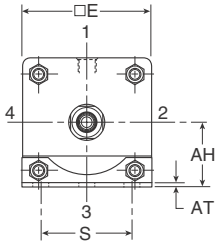
Bore size	Rod no.	Rod dia. MM	AA	BG	DD	E	R	Add stroke ZJ
6	1	1-3/8	6.900	0.500	1/2-20	6.500	4.880	6.625
	3	1-3/4	6.900	0.500	1/2-20	6.500	4.880	6.875
8	1	1-3/8	9.100	0.620	5/8-18	8.500	6.440	6.750
	3	1-3/4	9.100	0.620	5/8-18	8.500	6.440	7.000

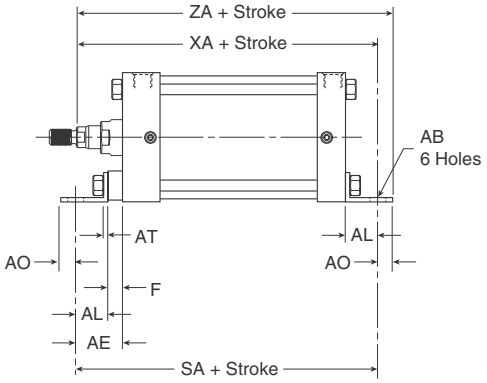
Side End Angle

* Style CB
(NFPA MS1)



Note:
Dimension “S” is for the holes in the mount (not the screw to screw dimension)





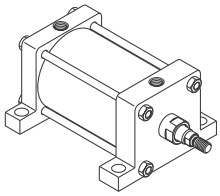
*Maximum recommended pressure for this mount is 150 PSIG

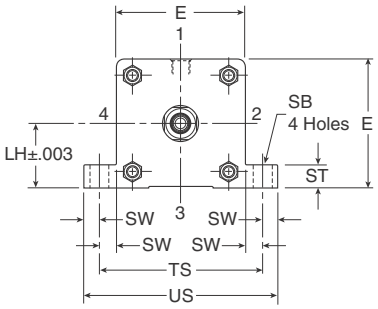
Style CB Dimensions

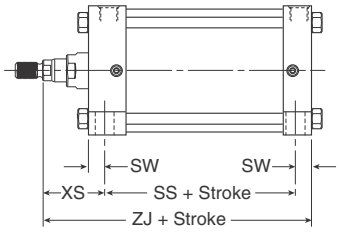
Bore size	Rod no.	Rod dia. MM	AB	AE	AH	AL	AO	AT	E	F	S	Add stroke SA	XA	ZA
6	1	1-3/8	0.813	2.125	3.250	1.375	0.625	0.188	6.500	0.750	5.250	8.500	8.000	8.625
	3	1-3/4	0.813	2.125	3.250	1.375	0.625	0.188	6.500	0.750	5.250	8.500	8.250	8.875
8	1	1-3/8	0.813	1.813	4.250	1.813	0.688	0.250	8.500	–	7.125	8.750	8.563	9.250
	3	1-3/4	0.813	1.813	4.250	1.813	0.688	0.250	8.500	–	7.125	8.750	8.813	9.500

Side Lug

Style C
(NFPA MS2)





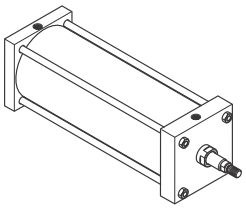


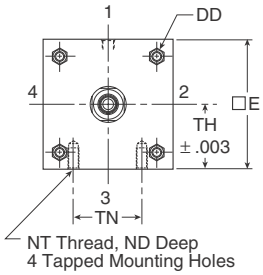
Style C Dimensions

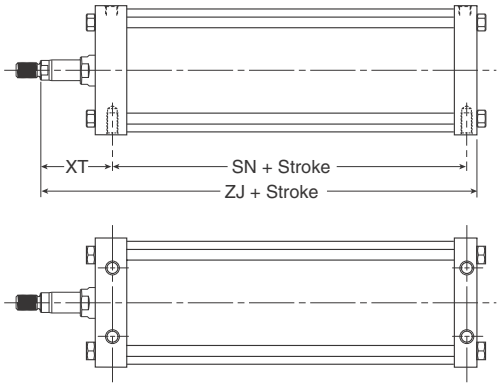
Bore size	Rod no.	Rod dia. MM	E	+/-.003 LH	SB	ST	SW	TS	US	XS	Add stroke SS	Add stroke ZJ
6	1	1-3/8	6.500	3.243	0.813	1.000	0.688	7.875	9.250	2.313	3.625	6.625
	3	1-3/4	6.500	3.243	0.813	1.000	0.688	7.875	9.250	2.563	3.625	6.875
8	1	1-3/8	8.500	4.243	0.813	1.000	0.688	9.875	11.250	2.313	3.750	6.750
	3	1-3/4	8.500	4.243	0.813	1.000	0.688	9.875	11.250	2.563	3.750	7.000

Side Tap

Style F
(NFPA MS4)







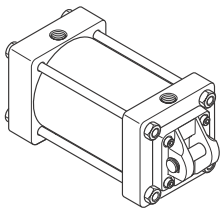
Style F Dimensions

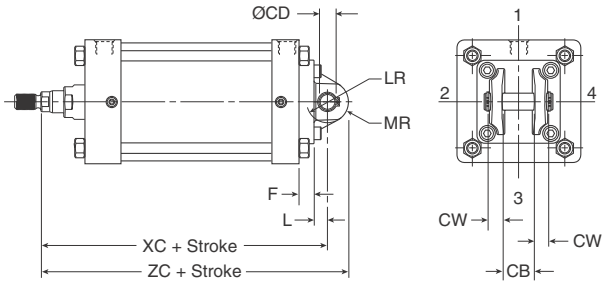
Bore size	Rod no.	Rod dia. MM	E	ND	NT	+/-.003 TH	TN	XT	Add stroke SN	Add stroke ZJ
6	1	1-3/8	6.500	1.125	3/4-10	3.243	3.250	2.813	3.125	6.625
	3	1-3/4	6.500	1.125	3/4-10	3.243	3.250	3.063	3.125	6.875
8	1	1-3/8	8.500	1.125	3/4-10	4.243	4.500	2.813	3.250	6.750
	3	1-3/4	8.500	1.125	3/4-10	4.243	4.500	3.063	3.250	7.000

Cap Fixed Clevis

Style BB
(NFPA MP1)

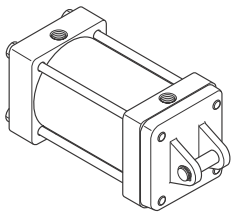
Note: For maximum swivel angle of BB mount with rear mounting plate, please reference cylinder accessories on page B80.

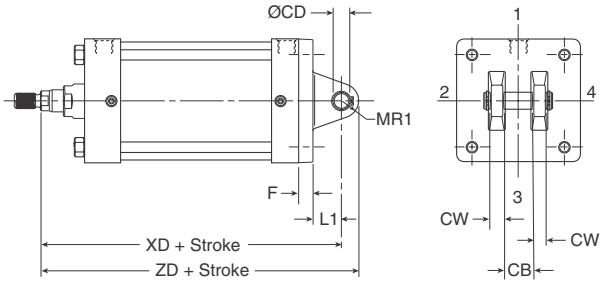




Cap Detachable Clevis

Style BC
(NFPA MP2)



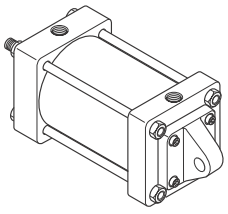


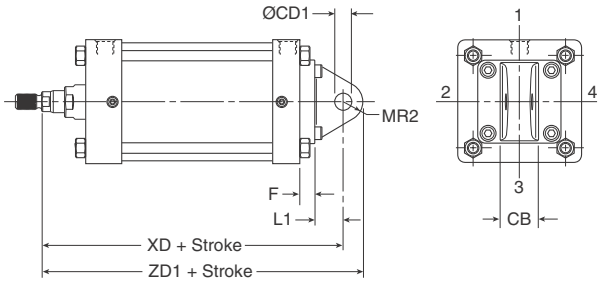
Styles BB and BC Dimensions

Bore size	Rod no.	Rod dia. MM	CB	+.000 -.002 CD	CW	E	F	L	LR	L1	MR	MR1	Add stroke XC	XD	ZC	ZD
6	1	1- 3/8	1.500	1.001	0.750	6.500	0.750	0.750	1.250	1.500	1.125	1.000	8.125	8.875	9.250	9.875
	3	1-3/4	1.500	1.001	0.750	6.500	0.750	0.750	1.250	1.500	1.125	1.000	8.375	9.125	9.500	10.125
8	1	1-3/8	1.500	1.001	0.750	8.500	0.750	0.750	1.250	1.500	1.125	1.000	8.250	9.000	9.375	10.000
	3	1-3/4	1.500	1.001	0.750	8.500	0.750	0.750	1.250	1.500	1.125	1.000	8.500	9.250	9.625	10.250

Cap Detachable Eye

Style BE
(NFPA MP4)
(only 6" Bore)



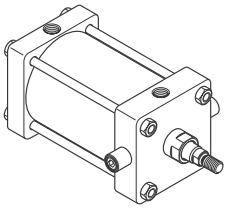


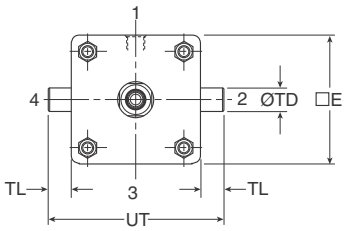
Style BE Dimensions

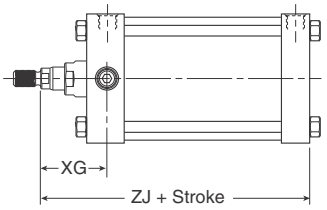
Bore size	Rod no.	Rod dia. MM	CB	+.002 +.004 CD1	E	F	L1	MR2	Add stroke XD	ZD1
6	1	1-3/8	1.500	1.000	6.500	0.750	1.500	1.125	8.875	10.000
	3	1-3/4	1.500	1.000	6.500	0.750	1.500	1.125	9.125	10.250

Head Trunnion

Style D
(NFPA MT1)

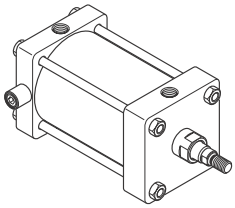


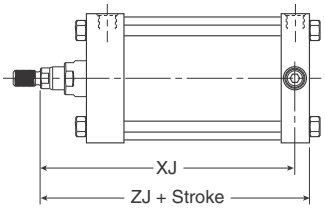


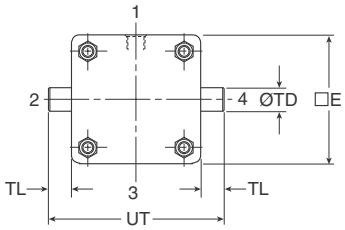


Cap Trunnion

Style DB
(NFPA MT2)

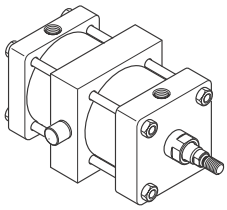


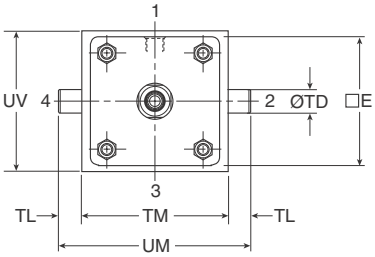


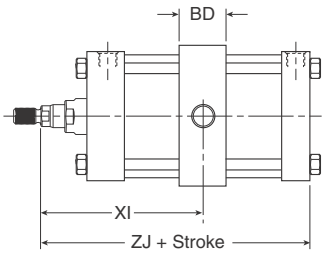


Intermediate Trunnion

Style DD
(NFPA MT4)





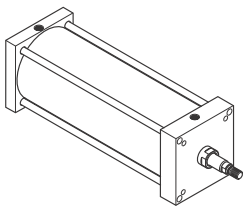


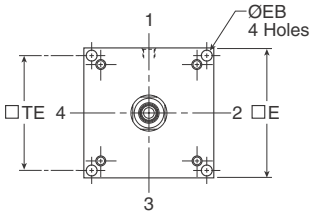
Styles D, DB and DD Dimensions

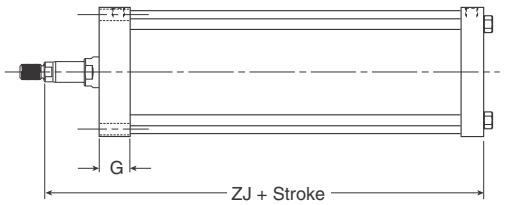
Bore size	Rod no.	Rod dia. MM	E	BD	+.000 -.001 TD	TL	TM	UM	UT	UV	XG	Min. XI	Add stroke XJ	Add stroke ZJ
	1	1-3/8	6.500	2.500	1.375	1.375	7.625	10.375	9.250	7.000	2.625	4.813	5.875	6.625
6	3	1-3/4	6.500	2.500	1.375	1.375	7.625	10.375	9.250	7.000	2.875	5.063	6.125	6.875
	1	1-3/8	8.500	2.500	1.375	1.375	9.750	12.500	11.250	9.500	2.625	4.750	6.000	6.750
8	3	1-3/4	8.500	2.500	1.375	1.375	9.750	12.500	11.250	9.500	2.875	5.000	6.250	7.000

Head Square

Style JB
(NFPA ME3)

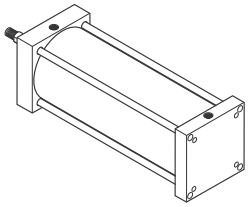


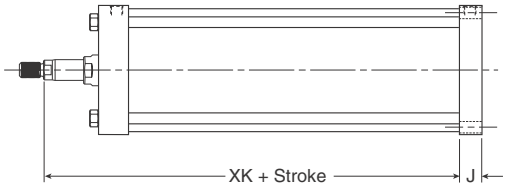


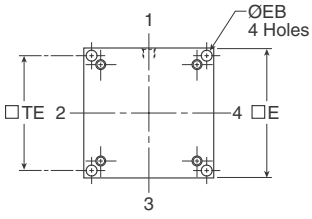


Cap Square

Style HB
(NFPA ME4)







Styles JB and HB Dimensions

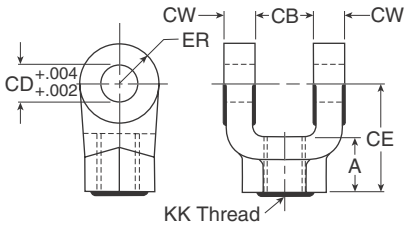
Bore size	Rod no.	Rod dia. MM	E	EB	G	J	TE	Add stroke XK	Add stroke ZJ
8	1	1-3/8	8.500	0.688	1.810	1.440	7.570	5.313	6.750
	3	1-3/4	8.500	0.688	1.810	1.440	7.570	5.563	7.000

Mounting Kits and Accessories

Bore size	J (MF1) Head rectangular flange Kit number	H (MF2) Cap rectangular flange Kit number	BB (MP1) Cap fixed clevis Kit number	BC (MP2) Cap detachable clevis Kit number	BE (MP4) Cap detachable eye Kit number	CB (MS1) Side end angles Kit number	G (MS7) Side end lug Kit number	Kit fastener torque units inch-lbs	Kit fastener torque units N-m
1-1/2	**L079700150**	**L079700150**	**L079710150**	**L079730150**	**L079720150**	**L079740150**	**L079750150**	32-36	3.6-4.1
2	**L079700200**	**L079700200**	**L079710200**	**L079730200**	**L079720200**	**L079740200**	**L079750200**	72-82	8-9
2-1/2	**L079700250**	**L079700250**	**L079710250**	**L079730250**	**L079720250**	**L079740250**	**L079750250**	72-82	8-9
3-1/4	**L079700325**	**L079700325**	**L079710325**	**L079730325**	**L079720325**	**L079740325**	**L079750325**	216-228	24-25.3
4	**L079700400**	**L079700400**	**L079710400**	**L079730400**	**L079720400**	**L079740400**	**L079750400**	216-228	24-25.3
5	**L079700500**	**L079700500**	**L079710500**	**L079730500**	N/A	**L079740500**	N/A	360-372	41-42

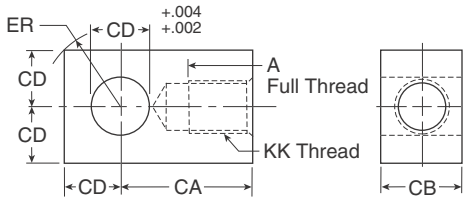
** Spacer plate not used for 4" bore or double rod cylinders

Female Rod Clevis



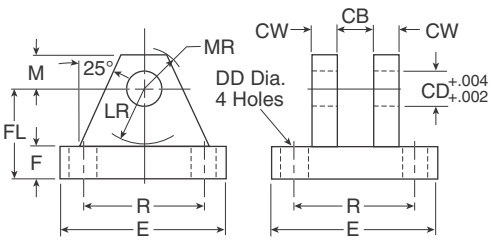
Symbol	1458030044	1458030050	1458030075	1458030088	1458030100	1458030125	1458030150
A	3/4	3/4	1-1/8	1-5/8	1-5/8	2	2-1/4
CB	3/4	3/4	1-1/4	1-1/2	1-1/2	2	2-1/2
CD	1/2	1/2	3/4	1	1	1-3/8	1-3/4
C E	1-1/2	1-1/2	2-1/8	2-15/16	2-15/16	3-3/4	4-1/2
CW	1/2	1/2	5/8	3/4	3/4	1	1-1/4
ER	1/2	1/2	3/4	1	1	1-3/8	1-3/4
KK	7/16-20	1/2-20	3/4-16	7/8-14	1-14	1-1/4-12	1-1/2-12
Load capacity (lbs)	4250	4900	11200	18800	19500	33500	45600

Rod Eye Knuckle



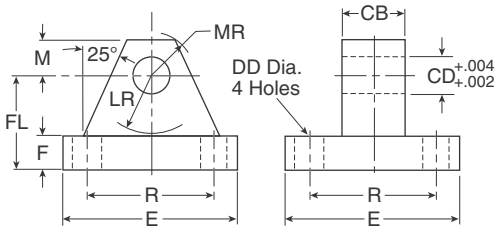
Symbol	1458040044	1458040050	1458040075	1458040088	1458040100	1458040125	1458040150
A	3/4	3/4	1-1/8	1-1/8	1-5/8	2	2-1/4
CA	1-1/2	1-1/2	2-1/16	2-3/8	2-13/16	3-7/16	4
CB	3/4	3/4	1-1/4	1-1/2	1-1/2	2	2-1/2
CD	1/2	1/2	3/4	1	1	1-3/8	1-3/4
ER	23/32	23/32	1-1/16	1-7/16	1-7/16	1-31/32	2-1/2
KK	7/16-20	1/2-20	3/4-16	7/8-14	1-14	1-1/4-12	1-1/2-12
Load capacity (lbs)	5000	5700	12100	13000	21700	33500	45000

Clevis Bracket



Symbol	1458050044	1458050050	1458050075	1458050100	1458050138	1458050175
CB	15/32	3/4	1-1/4	1-1/2	2	2-1/2
CD	7/16	1/2	3/4	1	1-3/8	1-3/4
CW	3/8	1/2	5/8	3/4	1	1-1/4
DD	17/64	13/32	17/32	21/32	21/32	29/32
E	2-1/4	3-1/2	5	6-1/2	7-1/2	9-1/2
F	3/8	1/2	5/8	3/4	7/8	7/8
FL	1	1-1/2	1-7/8	2-1/4	3	3-5/8
LR	5/8	3/4	1-3/16	1-1/2	2	2-3/4
M	3/8	1/2	3/4	1	1-3/8	1-3/4
MR	1/2	5/8	29/32	1-1/4	1-21/32	2-7/32
R	1.75	2.55	3.82	4.95	5.73	7.50
Load capacity (lbs)	3600	7300	14000	19200	36900	34000

Mounting Plate & Eye Bracket



Symbol	1458060031	1458060050	1458060075	1458060100	1458060138	1458060175
CB	15/16	3/4	1-1/4	1-1/2	2	2-1/2
CD	15/16	1/2	3/4	1	1-3/8	1-3/4
DD	17/64	13/32	17/32	21/32	21/32	29/32
E	2-1/4	2-1/2	3-1/2	4-1/2	5	6-1/2
F	3/8	3/8	5/8	7/8	7/8	1-1/8
FL	1	1-1/8	1 7/8	2-3/8	3	3-3/8
LR	5/8	3/4	1 1/4	1-1/2	2-1/8	2-1/4
M	3/8	1/2	3/4	1	1-3/8	1-3/4
MR	1/2	9/16	7/8	1-1/4	1-5/8	2-1/8
R	1.75	1.63	2.55	3.25	3.82	4.95
Load Capacity (lbs)	1700	4100	10500	20400	21200	49480

1-1/2" to 8" Bore Cylinder Accessories

Rod end accessories can be selected by cylinder rod end thread size from Tables A & B below. Mating parts for rod end accessories are listed just to the right of the knuckle or clevis selected. Mounting plates for style MP1 & MP4 cylinder mounts are selected by bore size from Table C.

Table A

	Mating parts		
Rod end thread size	Female rod clevis	Eye bracket	Pivot pin
7/16-20	**1458030044**	**1458060050**	**0856640050**
1/2-20	**1458030050**	**1458060050**	**0856640050**
3/4-16	**1458030075**	**1458060075**	**0856640075**
7/8-14	**1458030088**	**1458060100**	**0856640100**
1-14	**1458030100**	**1458060100**	**0856640100**
1-1/4-12	**1458030125**	**1458060138**	**0856640138**
1-1/2-12	**1458030150**	**1458060175**	**0856640175**

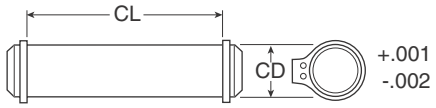
Table B

	Mating parts		
Knuckle	Clevis bracket	Pivot pin	
1458040044	**1458050050**	**0856640050**	
1458040050	**1458050050**	**0856640050**	
1458040075	**1458050075**	**0856640075**	
1458040088	**1458050100**	**0856640100**	
1458040100	**1458050100**	**0856640100**	
1458040125	**1458050138**	**0856640138**	
1458040150	**1458050175**	**0856640175**	

Table C

	Mounting plates	
Bore size	For mtg. style MP1 cylinder	For mtg. style MP4 cylinder
1-1/2	**1458060050**	**1458050050**
2	**1458060050**	**1458050050**
2-1/2	**1458060050**	**1458050050**
3-1/4	**1458060075**	**1458050075**
4	**1458060075**	**1458050075**
5	**1458060075**	—
6	**1458060100**	—
8	**1458060100**	—

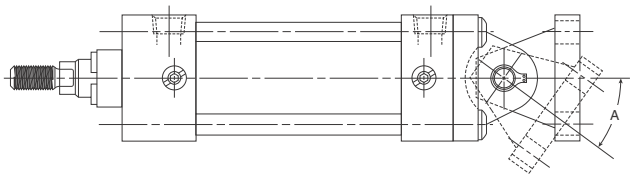
Pivot Pin



Symbol	0856640044	0856640050	0856640075	0856640100	0856640138	0856640175
CD	7/16	1/2	3/4	1	1-3/8	1-3/4
CL	1-5/16	1-7/8	2-5/8	3-1/8	4-1/8	5-3/16
Shear cap. (lbs)	6600	8600	19300	34300	65000	105200

Note: Pivot Pin must be ordered separately for single lug pivot mounting.

Maximum pivot angle for rear clevis mounts (BB mounts) and accessories

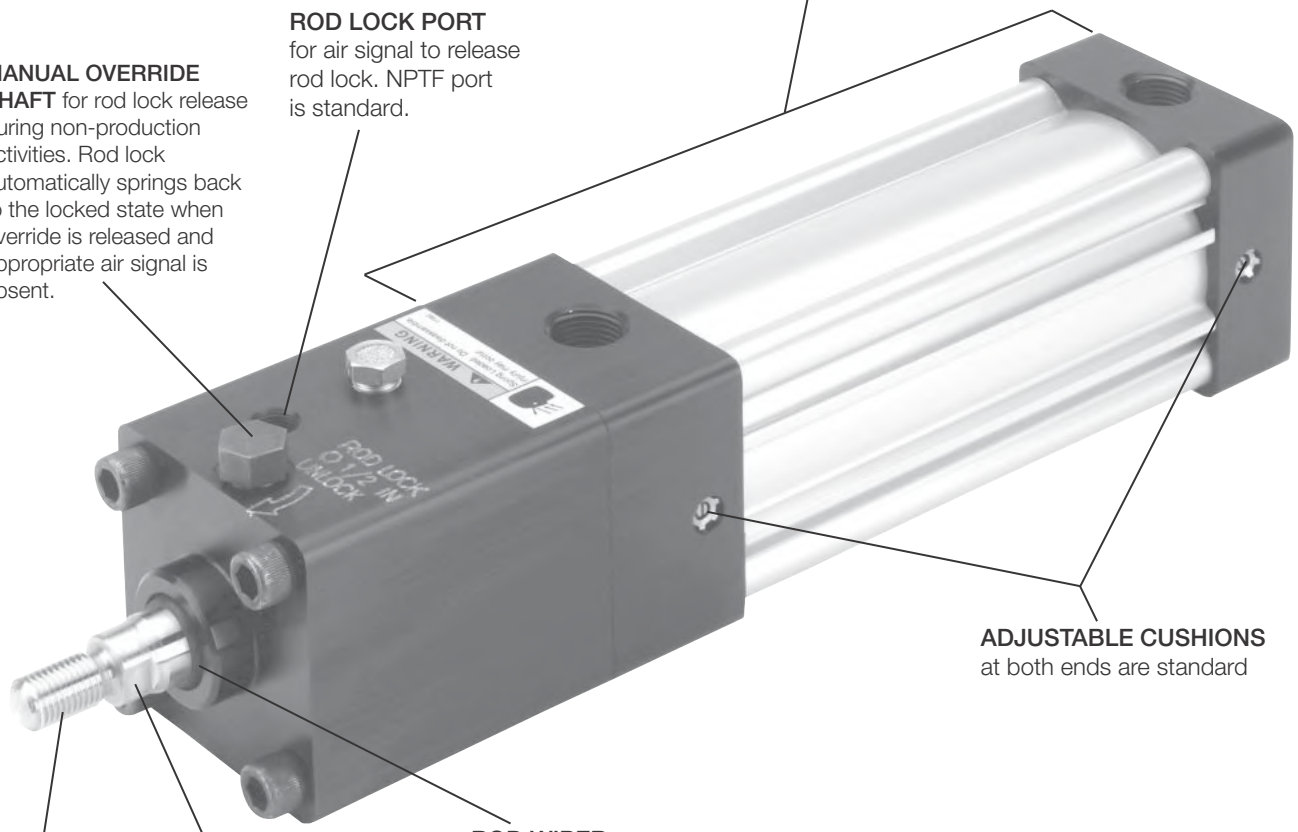


Bore	1-1/2	2	2-1/2	3-1/4	4	5	6	8
Angle A	52	43	29	50	49	45	42	42

Service Kits

			RG - Rod gland cartridge kit. Includes gland and wiper, rod, and o-ring seals		Gland to head torque units		PK - Piston seal kit, standard lipseals. Includes piston and o-ring seals		SK - complete cylinder kit. Includes rod gland kit, piston seal kit, and cushion kits		Torque units endcap fastener or tie rod	
Bore size	Rod dia.	Rod no.	Nitrile seal kit number	Fluorocarbon seals kit number	ft-lbs	Nm	Nitrile seal kit number	Fluorocarbon seal kit number	Nitrile seal kit number	Fluorocarbon seal kit number	inch-lbs	Nm
1-1/2	5/8	1	**RG04MA0061**	**RG04MA0065**	40-45	54-61	**PK1504MA01**	**PK1504MA05**	**SK15104MA1**	**SK15104MA5**	32-36	3.6-4.1
	1	2	**RG04MA0101**	**RG04MA0105**	45-50	61-68			**SK15304MA1**	**SK15304MA5**		
2	5/8	1	**RG04MA0061**	**RG04MA0065**	40-45	54-61	**PK2004MA01**	**PK2004MA05**	**SK20104MA1**	**SK20104MA5**	72-82	8-9
	1	3	**RG04MA0101**	**RG04MA0105**	45-50	61-68			**SK20304MA1**	**SK20304MA5**		
2-1/2	5/8	1	**RG04MA0061**	**RG04MA0065**	40-45	54-61	**PK2504MA01**	**PK2504MA05**	**SK25104MA1**	**SK25104MA5**	72-82	8-9
	1	3	**RG04MA0101**	**RG04MA0105**	45-50	61-68			**SK25304MA1**	**SK25304MA5**		
3-1/4	1	1	**RG04MA0101**	**RG04MA0105**	45-50	61-68	**PK3254MA01**	**PK3254MA05**	**SK32104MA1**	**SK32104MA5**	216-228	24-25.3
	1-3/8	3	**RG04MA0131**	**RG04MA0135**	75-80	102-108			**SK32304MA1**	**SK32304MA5**		
4	1	1	**RG04MA0101**	**RG04MA0105**	45-50	61-68	**PK4004MA01**	**PK4004MA05**	**SK40104MA1**	**SK40104MA5**	216-228	24-25.3
	1-3/8	3	**RG04MA0131**	**RG04MA0135**	75-80	102-108			**SK40304MA1**	**SK40304MA5**		
5	1	1	**RG04MA0101**	**RG04MA0105**	45-50	61-68	**PK5004MA01**	**PK5004MA05**	**SK50104MA1**	**SK50104MA5**	360-372	41-42
	1-3/8	3	**RG04MA0131**	**RG04MA0135**	75-80	102-108			**SK50304MA1**	**SK50304MA5**		
6	1-3/8	1	**RG04MA0131**	**RG04MA0135**	75-80	102-108	**PK6004MA01**	**PK6004MA05**	**SK60104MA1**	**SK60104MA5**	420-432	48-49
	1-3/4	3	**RG04MA0171**	**RG04MA0175**	90-95	122-129			**SK60304MA1**	**SK60304MA5**		
8	1-3/8	1	**RG04MA0131**	**RG04MA0135**	75-80	102-108	**PK8004MA01**	**PK8004MA05**	**SK80104MA1**	**SK80104MA5**	960-972	109-115
	1-3/4	3	**RG04MA0171**	**RG04MA0175**	90-95	122-129			**SK80304MA1**	**SK80304MA5**		

4MAJ Series – Rod Lock



4MA CYLINDER for heavy-duty applications and reliable performance.

ROD LOCK PORT for air signal to release rod lock. NPTF port is standard.

MANUAL OVERRIDE SHAFT for rod lock release during non-production activities. Rod lock automatically springs back to the locked state when override is released and appropriate air signal is absent.

ADJUSTABLE CUSHIONS at both ends are standard

ROD WIPER
Outboard fluorocarbon rod wiper protects the cylinder by removing external debris and adherents from the piston rod during the entire stroke.

STANDARD NFPA ROD END dimensions from the face of the rod lock.

PISTON ROD
Standard case-hardened (50-64 Rc), hard chrome plated and polished carbon steel piston rod for reliable performance, long rod seal life and low friction. 17-4PH stainless steel available as an option.

NFPA Non-Lube Pneumatic Cylinder with Manual Override Rod Lock

Rod lock version 4MA Series (the 4MAJ) provides precise load holding with virtually zero backlash and features high accuracy for demanding applications. The rod lock is a spring-activated type with air pressure release and clamps the piston rod to lock it into position. In the absence of an appropriate air signal, full holding force is applied to the piston rod. When a 60 PSI (or greater) air signal is present, the locking device is released. All rod locks include a manual override shaft to free the rod lock without air pressure during non-production activities.

Some key benefits of the 4MAJ Series Cylinders

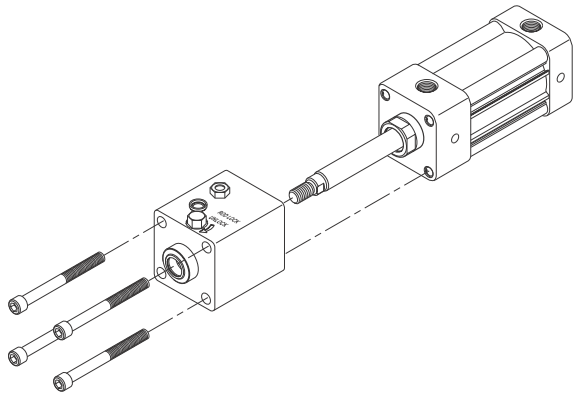
Bolt-On Modularity – As a true cylinder accessory, the rod lock may be removed without affecting the base cylinder (1-1/2" to 5" bores). The same, great cylinder remains intact, allowing the rod lock to bolt-on with minimal length change. This modularity can be extremely important for special installations or while servicing the cylinder. Rod locks for 6" - 8" bores and all Style DD mounts (NFPA MT4) are fastened to the base cylinder using the base cylinder's tie rods. See drawings below.

Aesthetics – we have designed our rod locks with the same anodized aluminum extrusion used for the cylinder endcaps, resulting in a virtually seamless assembly. In addition, we focused every effort to create the shortest overall package, minimizing the need for customers to accommodate significantly longer cylinder lengths.

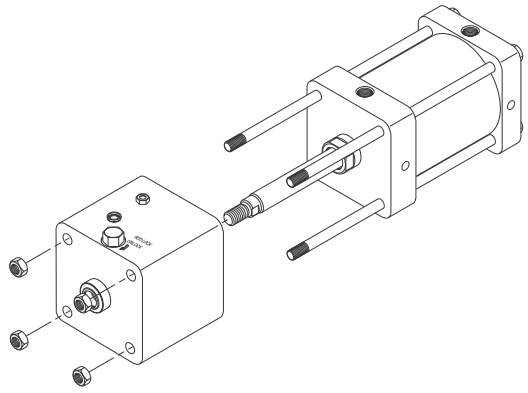
Functionality – With a holding force corresponding to 100 PSI on the cap end for nearly every bore size, the rod lock can be used for a variety of holding applications. The manual override shaft allows occasional release of the piston rod and automatically returns the rod lock back to the locked state when it is released and the appropriate air signal is absent. The front pilot diameter meets NFPA specifications and facilitates proper installation of the cylinder to customer equipment or cylinder accessories.

Ease of Order Entry – To order 4MA Series with the rod lock option, just change the product series to 4MAJ (the "J" is required for the rod lock option). See model code on page B40 for additional information.

1-1/2" to 5" Bores



6" to 8" Bores and all style DD mounts (NFPA MT4)



NFPA Non-Lube Pneumatic Cylinder with Manual Override Rod Lock

Connection

The signal air for the locking device can be obtained directly from a main air supply, or from the air supply serving the valve that controls the cylinder itself. For controlled ON/OFF operation of the locking device, a separate quick-venting valve is used.

The piston rod should not be moving when the locking device is activated. The locking device is not intended to brake a movement in repeated sequences.

NOTE: The 4MAJ is not intended for use in water service applications, or in environments that have high humidity levels and/or splashing fluids present.

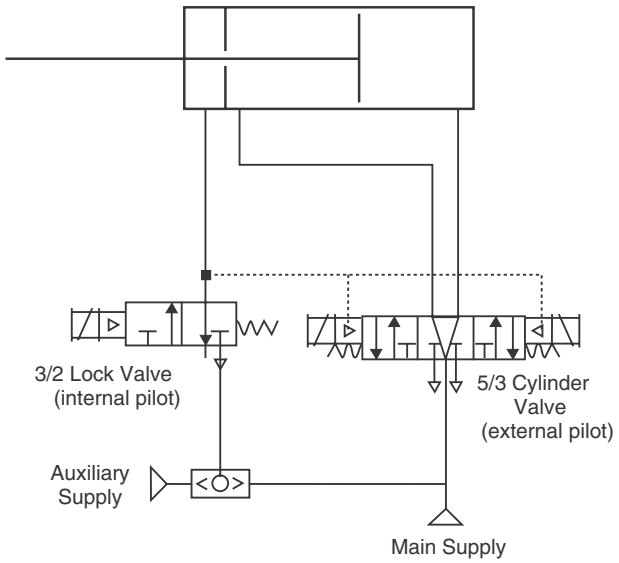
NOTE: Exhaust air from the rod lock can be piped away when there are demands for a contaminant-free environment.

Operation at pressures lower than 60 PSI may lead to inadvertent engagement of the rod lock device.

Other Cylinder and Rod Lock Features:

- The 4MAJ rod lock will operate in both directions, engaging with the same holding force.
- The 4MAJ can be mounted in any position.
- Piston rod rotation is not allowed when the rod lock is engaged (not intended for torsional braking).
- Rod lock is suitable for infrequent dynamic braking (emergency stops). Since the 4MAJ rod lock is designed for static applications, repeated dynamic stops will cause rod and/or bearing wear and reduce holding forces.
- The rated holding force corresponds to static load conditions. If the rated value is exceeded, slipping and other problems may occur.
- If personal safety is required, an unrelated, redundant safety system is recommended.

Sample Pneumatic Circuit



1. Lock valve must be maintained energized during cylinder motion, otherwise rod lock is engaged and cylinder valve shifts to mid position.
2. Cylinder valve must be maintained energized during extend or retract. Also keep energized at end of stroke until change of direction is desired.
3. Mid position of 5/3 Cylinder valve may be pressurized outlets if the combination of pressure load on the cylinder and inertia effects of the attached load do not exceed the holding force rating of the rod lock device, including allowance for wear.
4. Do not use cylinder lines for any logic functions – pressure levels vary too much.

Basic Rod Lock Specifications

Bore size	Rod no.	Rod dia. MM	Air chamber volume (in^3)	Engagement time (seconds)	Rated holding force (lbs)	Minimum torque to override (ft-lbs to hex shaft)
1-1/2	1	5/8	0.25	0.030	180	2
2	1	5/8	0.71	0.040	314	5
	3	1	0.68	0.040	250	5
2-1/2	1	5/8	1.26	0.045	491	7
	3	1	1.49	0.050	491	7
3-1/4	1	1	3.20	0.070	830	17
	3	1-3/8	2.11	0.060	830	17
4	1	1	6.73	0.100	1,256	45
	3	1-3/8	4.78	0.100	1,256	45
5	1	1	11.50	0.150	1,963	72
	3	1-3/8	9.50	0.130	1,963	72
6	1	1-3/8	14.08	0.175	2,830	135
	3	1-3/4	12.75	0.165	2,830	135
8	1	1-3/8	22.66	0.265	5,026	160
	3	1-3/4	23.21	0.265	5,026	160

Note: This specification data applies only to the rod lock part of the 4MAJ cylinder.

For cylinder volume and performance, please use cylinder dimensions and application criteria.

- Industry leading NFPA interchangeable rod lock cylinder with flexible construction
- Rod lock holding force equivalent to cylinder output force at 100 PSIG
- Bore sizes – 1-1/2", 2', 2-1/2", 3-1/4", 4", 5", 6" and 8"
- 17 standard styles mounting styles available
- Available in any practical stroke length
- Rod diameters – 5/8", 1", 1-3/8" and 1-3/4"
- Single rod end or double rod ends
- Adjustable cushions are standard at both ends
- Manual override feature standard on all configurations

Operating information

Operating pressure:	100 PSIG (7 bar) maximum air pressure, except 2" bore with 1" rod rated at 80 PSIG) 60 PSIG (4.1 bar) minimum air pressure to release rod lock
Temperature range –	
Standard seals	-10°F to 165°F (-23°C to 74°C)
Fluorocarbon seals	-10°F to 250°F (-23°C to 121°C)
Filtration requirements:	40 micron, dry filtered air

Ordering information

2.00	C		J		4MAJ		U			1	4		A	C	6.000

Bore size

1.50 [1]
2.00
2.50
3.25
4.00
5.00
6.00 [11]
8.00 [11]

Double Rod Cylinder [12]
Specify "K" only if double rod cylinder is required.

Mounting style
Specify mounting style code (see table on following page).

Series

4MAJ	4MA rod lock cylinder

Ports [4]

U	NPTF
R	BSPP
B	BSPT
T	SAE

Piston rod number
Specify rod code number for required diameter. [8,]

Special modification
Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MAJ with Linear Position Sensor Option) [7]

Stroke length
Specify stroke length required in inches. [8]

Cushion cap end

C	Cushioned cap end "C" is required

Piston rod thread type

A	Standard (UNF unified thread)
W	BSF British fine
M *	Metric

* Please reference page B78.

Cushion head end

C	Cushioned head end "C" is required

Cylinder construction

Blank*	Standard (extruded body, standard round lobe orientation)
A*	Extruded body, round lobe orientation rotated 90 degrees from standard
N*	Extruded body, round lobe orientation rotated 180 degrees from standard
Z*	Extruded body, round lobe orientation rotated 270 degrees from standard
T	Aluminum round tube and carbon steel tie rods & nuts

* Please reference table on page B5. Only applies to 1-1/2" to 4" bore.

Seals

Blank	Standard (nitrile seals)
V	Fluorocarbon seals [5]
E	Fluorocarbon rod wiper and rod seal only [6]

Rod material and gland code

Blank	Standard rod and gland
H	Standard rod and HI LOAD gland
Y	17-4 PH stainless steel rod and standard gland
Z	17-4 PH stainless steel rod and HI LOAD gland

Piston rod thread style

4	Small male
8	Intermediate male
9	Short female
55	For use with split coupler [9]
3	Special (and specify all dimensions required)

Piston type [11]

Blank	Lipseals and magnetic ring (legacy) (standard for 4ML)
1	Lipseals, no magnetic ring (legacy)
2	Lipseals, no magnetic ring (aluminum piston)
3	Lipseals and magnetic ring (aluminum piston)
4	Bumper seals, no magnetic ring
6	Bumper seals and magnetic ring
B	Lipseals, 1/4" thick bumpers both ends [3]
H	Lipseals, 1/4" thick bumper head end [3]
C	Lipseals, 1/4" thick bumper cap end [3]
D	Lipseals and magnetic ring, 1/4" thick bumpers both ends [3]
F	Lipseals and magnetic ring, 1/4" thick bumper head end [3]
R	Lipseals and magnetic ring, 1/4" thick bumper cap end [3]

[1] Not available with 1" rod diameter (rod number 2) for 1-1/2" bore. Not available with Linear Position Sensor Option (LPSO).

[3] Addition of 1/4" bumper results in a 1/4" stroke loss per bumper, per end. For example, a 6" stroke cylinder with 1/4" bumpers at both ends (option B) has an effective stroke of 5-1/2".

[4] Port thread styles only for base cylinder. Rod lock port is always NPTF. If a different rod lock port thread style is required, place an "S" for special in the Special Modification field and indicate the desired rod lock port thread style in the item notes.

[5] Fluorocarbon seals for 4MAJ are only for external chemical compatibility applications, not high temperature.

[6] Used for external chemical compatibility applications, not high temperature.

[7] For Linear Position Sensor Option (LPSO), please include the following information for the Special Modification item notes:
a. Sensor part number (please reference pages B72-B76)
b. Sensor position
c. Port position (if other than position 1)
d. Length of stop tubing, gross stroke and net stroke (if required)

Cylinder dimensions will approximate dimensions for 4MAJ. Piston Type option (blank), 3, 6, D, F or R is required. Please consult the Pneumatic Division for additional information.

[8] Review Piston Rod Selection Chart, please reference page A14 to determine proper piston rod diameter.

[9] For additional information regarding this style, please reference page B77. If non-standard Rod Material and Gland Code is required with this option, please place an "S" for special in Special Modification field and specify Rod Material and Gland Code in the item notes.

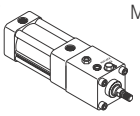
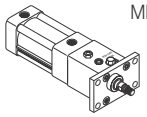
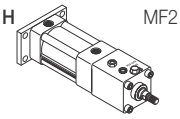
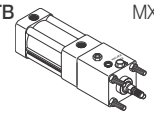
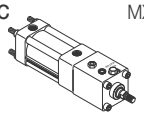
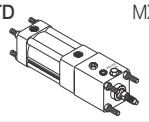
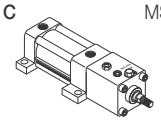
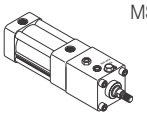
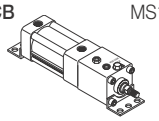
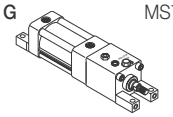
[10] If a stop tube is required, specify gross stroke (net stroke + stop tube) in the model number, then place an "S" for special in the Special Modification field and specify the stop tube length in the item notes. Not available with Piston Types (blank) and 1 for 1-1/2" - 5" bore cylinders.

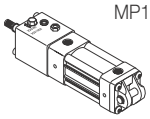
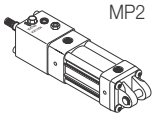
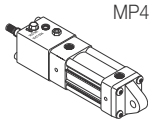
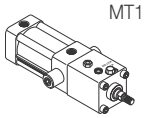
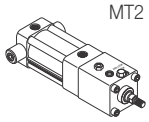
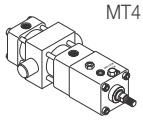
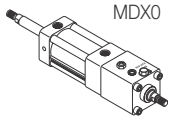
[11] 6"-8" bore 4MAJ can accept only Piston Types (blank) and 3. The (blank) piston for 6"-8" bores is aluminum, lipseals, no magnetic ring. Composite pistons not available with oversize rod number 3.

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Mounting Styles

Mounting style	NFPA mounting	Description		Bore size
T 	MX0	No Mount	4MAJ	1-1/2 - 8
			w/LPSO	2 - 8
			w/LPSO w/stop tube	2 - 8
J 	MF1	Head Rectangular Flange	4MAJ	1-1/2 - 6
			w/LPSO	2 - 6 *
			w/LPSO w/stop tube	2 - 6
H 	MF2	Cap Rectangular Flange	4MAJ	1-1/2 - 6
			w/LPSO	2 - 6 *
			w/LPSO w/stop tube	2 - 6 *
TB 	MX3	Tie Rods Extended Head End	4MAJ	1-1/2 - 8
			w/LPSO	2 - 6 *
TC 	MX2	Tie Rods Extended Cap End	4MAJ	1-1/2 - 8
TD 	MX1	Tie Rods Extended Both Ends	4MAJ	1-1/2 - 8
C 	MS2	Side Lug	4MAJ	1-1/2 - 8
			w/LPSO	2 - 8
			w/LPSO w/stop tube	2 - 8
F 	MS4	Side Tap	4MAJ	1-1/2 - 8
			w/LPSO	2 - 8
			w/LPSO w/stop tube	2 - 8
CB 	MS1	Side End Angle	4MAJ	1-1/2 - 8
			w/LPSO	2 - 8
			w/LPSO w/stop tube	2 - 8
G 	MS7	Side End Lug	4MAJ	1-1/2 - 4
			w/LPSO	2 - 4
			w/LPSO w/stop tube	2 - 4

Mounting style	NFPA mounting	Description		Bore size
BB 	MP1	Cap Fixed Clevis	4MAJ	1-1/2 - 8
			w/LPSO	2 - 8 *
			w/LPSO w/stop tube	2 - 8 *
BC 	MP2	Cap Detachable Clevis	4MAJ	1-1/2 - 8
			w/LPSO	2 - 8 *
			w/LPSO w/stop tube	2 - 8 *
BE 	MP4	Cap Detachable Eye	4MAJ	1-1/2 - 6
			w/LPSO	2 - 6 *
			w/LPSO w/stop tube	2 - 6 *
D 	MT1	Head Trunnion	4MAJ	1-1/2 - 8
			w/LPSO	2 - 8
			w/LPSO w/stop tube	2 - 8
DB 	MT2	Cap Trunnion	4MAJ	1-1/2 - 8
			w/LPSO	2 - 8 *
			w/LPSO w/stop tube	2 - 8 *
DD 	MT4	Intermediate Trunnion	4MAJ	1-1/2 - 8
KT 	MDX0	Double Rod End, No Mount	4MAJ	1-1/2 - 8
			w/LPSO	2 - 8
			w/LPSO w/stop tube	2 - 8

* May interfere with mounting. Please provide clearance for Linear Sensor overhang (see page B73).

Sensors
See section L for sensors. 

General Specifications

- NFPA interchangeable*
- Bore sizes – 1-1/2", 2", 2-1/2", 3-1/4", 4", 5", 6" and 8"
- Strokes – available in any practical stroke length
- Rod diameters – 5/8", 1", 1-3/8" and 1-3/4"
- Rod end styles – 4 standard, specials available
- Single rod end or double rod ends
- Cushions – required and adjustable at both ends
- Operating pressure –
  100 PSIG (6.9 bar)** maximum air service, except for 2" bore with 1" rod (rated at 80 PSIG)

  60 PSIG (4.1 bar) minimum air pressure to release rod lock
- Media – dry, filtered air
- Temperature range –
  -10°F to 165°F (-23°C to 74°C)
- Mounting styles – 18 standard styles

* NFPA standards do not specify rod lock cylinder dimensions. The 4MA cylinder and mounting accessories subscribe to NFPA standards.

** The pressure ratings are for these devices as stated. However, the rated holding forces of the rod locks are as stated on page B62.

For material options, including seals and piston rods, please see Material Specifications on below.

Cylinder Weights

		No Mount Single Rod		No Mount Double Rod	
Bore (inch)	Rod (inch)	Base wt. (lbs.)	Per inch (lbs.)	Base wt. (lbs.)	Per inch (lbs.)
1-1/2	0.625	4.23	0.20	4.66	0.28
2	0.625	5.90	0.21	6.55	0.30
	1.00	6.49	0.35	7.84	0.58
2-1/2	0.625	7.75	0.23	8.46	0.31
	1.00	8.56	0.37	10.24	0.60
3-1/4	1.00	13.95	0.42	15.15	0.64
	1.375	15.93	0.62	19.46	1.05
4	1.00	20.80	0.49	22.32	0.71
	1.375	22.29	0.69	26.37	1.12
5	1.00	31.20	0.61	33.84	0.84
	1.375	32.72	0.81	36.89	1.24
6	1.375	55.50	0.87	60.63	1.30
	1.75	57.61	1.13	65.41	1.82
8	1.375	94.50	1.25	100.15	1.68
	1.75	96.63	1.51	104.90	2.20

Mounting Weight Adders

Bore	Weight (lbs) by mounting style							
(inch)	J, H	D, DB	BB	CB, G	DD	BE	C	BC
1-1/2	0.51	0.50	0.15	0.36	1.70	0.23	0.15	0.20
2	0.76	0.50	0.26	065	2.38	0.32	0.15	0.29
2-1/2	1.13	0.50	0.38	1.05	3.00	0.42	0.15	0.41
3-1/4	2.76	0.50	0.98	1.38	5.35	1.26	0.35	1.06
4	4.05	0.50	1.35	2.20	6.75	1.62	0.35	1.49
5	6.46	0.50	1.20	4.29	8.77	1.26	0.57	2.41
6	10.74	1.22	2.91	5.88	15.52	2.91	0.69	11.38
8	N/A	1.22	2.91	7.84	25.01	N/A	0.67	17.31

Standard Cushion Position

Mounting Code	Position
All except D, DB, DD	2
D, DB, DD	3

Standard Cylinder Port Sizes

Bore	NPTF / BSPT	BSPP	SAE
1-1/2	3/8	G3/8	6
2	3/8	G3/8	6
2-1/2	3/8	G3/8	6
3-1/4	1/2	G1/2	10
4	1/2	G1/2	10
5	1/2	G1/2	10
6	3/4	G3/4	12
8	3/4	G3/4	12

Port thread styles for base cylinder only. Rod lock port is always NPTF. If a different rod lock port thread style is required, place an “S” for special in the Special Modification field and indicate the desired rod lock port thread style in the item notes. Standard rod lock port sizes are detailed in cylinder dimension tables.

Standard Temperatures and Applications

Same as 4MA for 4MAJ, with the following additions/changes:

Piston rod (other materials not available)	Case-hardened, chrome plated carbon steel (standard) 17-4 PH stainless steel, chrome plated.
Rod lock housing	Black anodized aluminum alloy
Rod lock wiper	Fluorocarbon
Manual override shaft	416 stainless steel
Rod lock screws	Black oxided steel alloy

How to Select a 4MAJ Cylinder

Parker cylinders are available based on air operating pressure. The many styles, sizes and optional features available assure that your application requirements are precisely met. To select a cylinder, follow these simple steps:

Step 1 - **Determine the correct cylinder bore size** necessary to achieve required force using the available operating pressure.

Step 2 - **Determine the series cylinder to use**, based on operating pressure.

Step 3 - **Turn to the appropriate cylinder selection section.** Select the mounting style that fits your installation needs. Determine the bore and rod sizes available for the model you select. Then complete model selection.

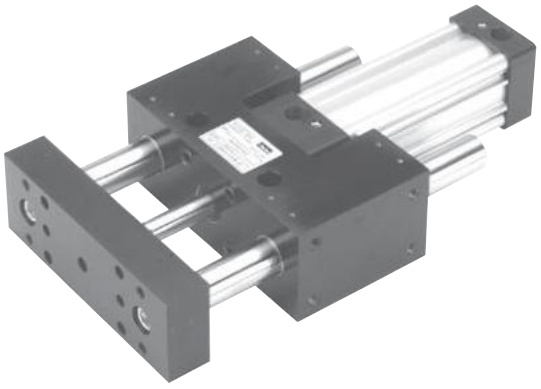
- Choose a rod end style and the desired rod end accessories.
- Size the cylinder to meet your application requirements.

Step 4 - **Consider the following conditions** which may require further modifications to the cylinder you have selected.

Application Condition	Check the Following
Quick Starts or Stops	Confirm that determined thrust is sufficient to accelerate or decelerate cylinder and load within prescribed distance. Mandatory cushions can be used to reduce shock during deceleration, check that peak pressures will be within tolerable limits.
Long Push Stroke	Check whether stop tube (4MAJ with aluminum piston only) is required to prevent excessive bearing loads and wear.
High-column Loading Long Push Stroke	Determine if standard size piston rod is strong enough to accommodate intended load. See Piston Rod Selection Chart or Application Engineering section for recommendations.
Long Horizontal Stroke	Determine if standard size piston rod is strong enough to accommodate intended load.

Options and Modifications:

- Piston Bumper Seals
- Piston Bumpers (1/4" Thick)
- Port and Cushion Adjust Relocation
- Port Thread Styles
- Multiple Ports
- Adjustable Sensors
- Linear Position Sensing Option (LPSO)
- Double Rod End
- Rod End Modifications
- Stop Tube
- Mixed Mountings
- Shock Absorber on Cap End
- Round Tube and Tie Rod Construction
- Air Cylinder/Valve Combination (ACVB)
- Hydro-Check for smooth hydraulic control

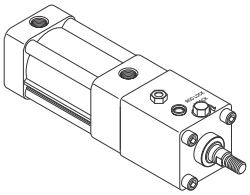


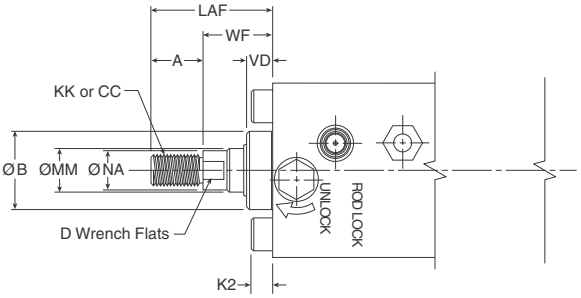
For a guided version of the 4MAJ Series, please see the HB Series in Section E.

Single Rod

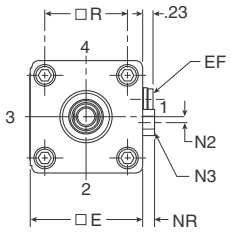
No Mount Basic

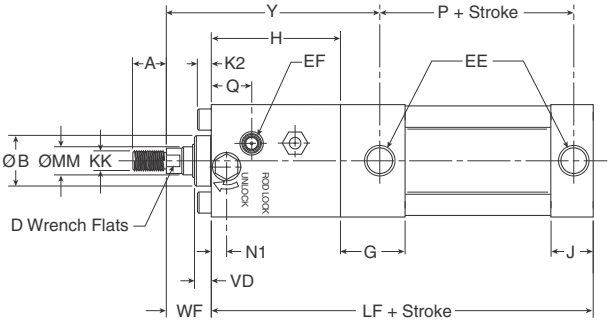
Style T
(NFPA MX0)





For dimensions of all standard rod end styles, see next page.





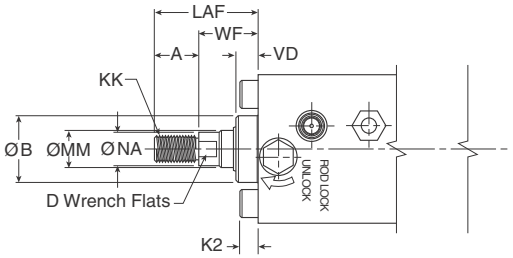
Style T Dimensions

Bore size	Rod no.	Rod dia. MM	Thread Style 8 CC	Thread Style 4 & 9 KK	Thread Style 6	A	AA	+.000 -.002 B	D	E	EE (NPTF)	EF (NPTF)	G	H	J
1-1/2	1	5/8	1/2 - 20	7/16 - 20	5/8 - 18	0.750	2.020	1.124	1/2	2.000	3/8	1/8	1.438	2.625	0.938
2	1	5/8	1/2 - 20	7/16 - 20	5/8 - 18	0.750	2.600	1.124	1/2	2.500	3/8	1/8	1.375	2.875	0.937
	3	1	7/8 - 14	3/4 - 16	1 - 14	1.125	2.600	1.499	7/8	2.500	3/8	1/8	1.375	3.875	0.937
2-1/2	1	5/8	1/2 - 20	7/16 - 20	5/8 - 18	0.750	3.100	1.124	1/2	3.000	3/8	1/8	1.344	2.875	0.938
	3	1	7/8 - 14	3/4 - 16	1 - 14	1.125	3.100	1.499	7/8	3.000	3/8	1/8	1.344	4.000	0.938
3-1/4	1	1	7/8 - 14	3/4 - 16	1 - 14	1.125	3.900	1.499	7/8	3.750	1/2	1/4	1.594	4.500	1.125
	3	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	3.900	1.999	1-1/8	3.750	1/2	1/4	1.594	4.875	1.125
4	1	1	7/8 - 14	3/4 - 16	1 - 14	1.125	4.700	1.499	7/8	4.500	1/2	1/4	1.594	4.875	1.125
	3	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	4.700	1.999	1-1/8	4.500	1/2	1/4	1.594	5.125	1.125
5	1	1	7/8 - 14	3/4 - 16	1 - 14	1.125	5.800	1.499	7/8	5.500	1/2	1/4	1.594	5.375	1.219
	3	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	5.800	1.999	1-1/8	5.500	1/2	1/4	1.594	5.750	1.219

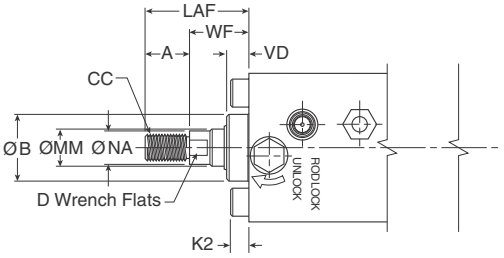
Bore size	Rod no.	Rod dia. MM	K2	LAF	N1	N2	Hex N3	NA	NR	Q	R	VD	WF	Y	Add stroke LF	Add stroke P
1-1/2	1	5/8	0.250	1.750	0.220	0.140	5/16	0.563	0.190	0.715	1.430	0.375	1.000	4.500	6.250	2.313
2	1	5/8	0.313	1.750	0.340	0.130	1/2	0.563	0.265	0.895	1.840	0.375	1.000	4.750	6.500	2.313
	3	1	0.313	2.500	0.338	0.146	1/2	0.938	0.275	1.065	1.840	0.500	1.375	6.125	7.500	2.313
2-1/2	1	5/8	0.313	1.750	0.346	0.150	1/2	0.563	0.265	0.755	2.190	0.500	1.000	4.813	6.625	2.375
	3	1	0.313	2.500	0.346	0.148	1/2	0.938	0.265	1.120	2.190	0.500	1.375	6.313	7.750	2.375
3-1/4	1	1	0.375	2.500	0.631	0.180	5/8	0.938	0.340	1.510	2.760	0.500	1.375	6.938	8.750	2.625
	3	1-3/8	0.375	3.250	0.813	0.247	5/8	1.313	0.350	1.645	2.760	0.625	1.625	7.563	9.125	2.625
4	1	1	0.375	2.500	0.625	0.240	7/8	0.938	0.500	1.725	3.320	0.500	1.375	7.313	9.125	2.625
	3	1-3/8	0.375	3.250	0.771	0.276	7/8	1.313	0.490	1.679	3.320	0.750	1.625	7.813	9.375	2.625
5	1	1	0.500	2.500	0.720	0.220	7/8	0.938	0.500	1.995	4.100	0.500	1.375	7.813	9.875	2.875
	3	1-3/8	0.500	3.250	0.720	0.220	7/8	1.313	0.490	2.330	4.100	0.750	1.625	8.438	10.250	2.875

Rod End

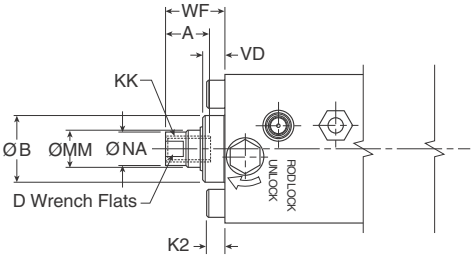
Thread Style 4
(NFPA Style SM)
Small Male



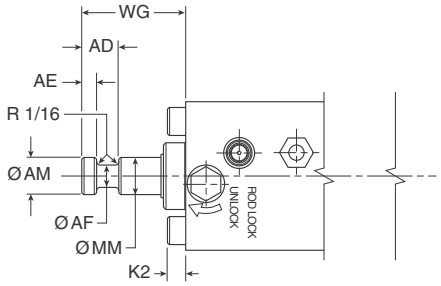
Thread Style 8
(NFPA Style IM)
Intermediate Male



Thread Style 9
(NFPA Style SF)
Short Female



Thread Style 55
For use with Split Coupler
(please reference page B77 for more information)



Thread Style 3 - "Special Thread"
Special threads, rod extensions, rod eyes, blanks, etc. are also available.
To order, specify "Style 3" and give desired dimensions for KK or CC, A and W or WF.
If otherwise special, please supply dimensioned sketch.

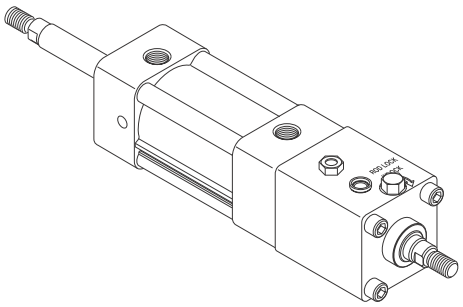
Rod End Dimensions

Bore size	Rod no.	Rod dia. MM	Thread Style 8 CC	Thread Style 4 & 9 KK	Thread Style 6	A	AD	AE	AF	AM	+.000 -.002 B	D	K2	LAF	NA	VD	WF	WG
1-1/2	1	5/8	1/2 - 20	7/16 - 20	5/8 - 18	0.750	0.625	0.250	0.375	0.570	1.124	1/2	0.250	1.750	0.563	0.375	1.000	1.750
2	1	5/8	1/2 - 20	7/16 - 20	5/8 - 18	0.750	0.625	0.250	0.375	0.570	1.124	1/2	0.313	1.750	0.563	0.375	1.000	1.750
	3	1	7/8 - 14	3/4 - 16	1 - 14	1.125	0.938	0.375	0.688	0.950	1.499	7/8	0.313	2.500	0.938	0.500	1.375	2.375
2-1/2	1	5/8	1/2 - 20	7/16 - 20	5/8 - 18	0.750	0.625	0.250	0.375	0.570	1.124	1/2	0.313	1.750	0.563	0.500	1.000	1.750
	3	1	7/8 - 14	3/4 - 16	1 - 14	1.125	0.938	0.375	0.688	0.950	1.499	7/8	0.313	2.500	0.938	0.500	1.375	2.375
3-1/4	1	1	7/8 - 14	3/4 - 16	1 - 14	1.125	0.938	0.375	0.688	0.950	1.499	7/8	0.375	2.500	0.938	0.500	1.375	2.375
	3	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	1.063	0.375	0.875	1.320	1.999	1-1/8	0.375	3.250	1.313	0.625	1.625	2.750
4	1	1	7/8 - 14	3/4 - 16	1 - 14	1.125	0.938	0.375	0.688	0.950	1.499	7/8	0.375	2.500	0.938	0.500	1.375	2.375
	3	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	1.063	0.375	0.875	1.320	1.999	1-1/8	0.500	3.250	1.313	0.750	1.625	2.750
5	1	1	7/8 - 14	3/4 - 16	1 - 14	1.125	0.938	0.375	0.688	0.950	1.499	7/8	0.500	2.500	0.938	0.500	1.375	2.375
	3	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	1.063	0.375	0.875	1.320	1.999	1-1/8	0.500	3.250	1.313	0.750	1.625	2.750

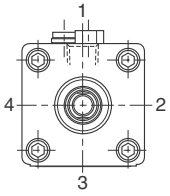
To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary dimensions from that drawing, return to this page and supplement the single rod end dimensions with those shown in the drawings and dimension table below. Note that double rod end cylinders have a head dimension G at both ends, and that LG replaces LF, PK replaces P, etc. The double rod end dimensions differ from, or are in addition to, those for single rod cylinders.

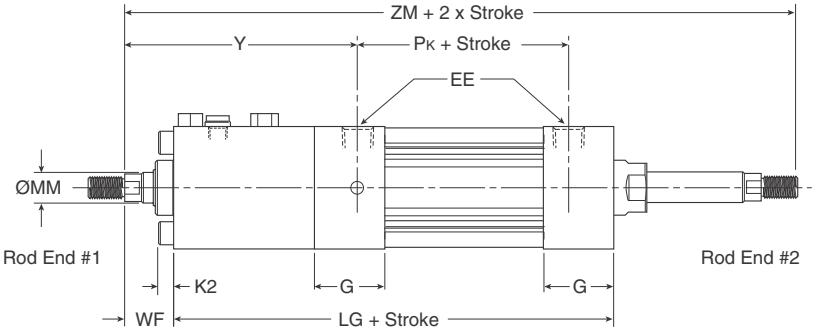
When a double rod end cylinder has two different rod ends, please clearly state which rod end is to be available at which head end.

K-type 1-1/2" to 5" Bore Size



Mounting styles for single rod models	Corresponding mounting styles for double rod models
C	KC
CB	KCB
D	KD
DD	KDD
F	KF
G	KG
J	KJ
T	KT
TB	KTB
TD	KTD





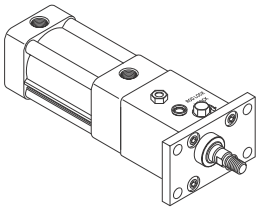
Double rod cylinders not available with composite piston type.

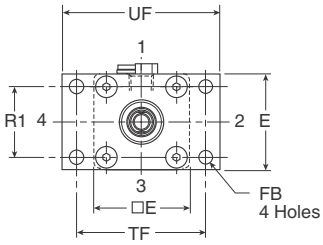
Style KT Dimensions

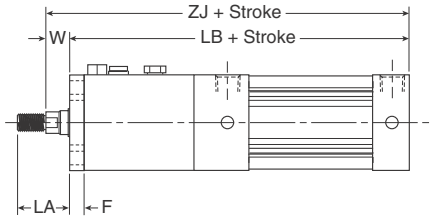
Bore size	Rod no.	Rod dia. MM	EE (NPTF)	G	K2	WF	Y	Add Stroke LG	PK	SAK	XAK	SSK	SNK	SEK	XEK	Add 2X Stroke ZM
1-1/2	1	5/8	3/8	1.438	0.250	1.000	4.500	6.750	2.375	8.750	8.750	3.375	2.250	9.000	8.875	8.750
2	1	5/8	3/8	1.375	0.313	1.000	4.750	7.000	2.375	9.000	9.000	3.375	2.250	9.625	9.313	9.000
	3	1	3/8	1.375	0.313	1.375	6.125	8.000	2.375	10.000	10.375	3.375	2.250	10.625	10.688	10.750
2-1/2	1	5/8	3/8	1.344	0.313	1.000	4.813	7.125	2.375	9.125	9.125	3.500	2.375	10.000	9.563	9.125
	3	1	3/8	1.344	0.313	1.375	6.313	8.250	2.375	10.250	10.625	3.500	2.375	11.125	11.063	11.000
3-1/4	1	1	1/2	1.594	0.375	1.375	6.938	9.250	2.625	11.750	11.875	3.750	2.625	12.250	12.125	12.000
	3	1-3/8	1/2	1.594	0.375	1.625	7.563	9.625	2.625	12.125	12.500	3.750	2.625	12.625	12.750	12.875
4	1	1	1/2	1.594	0.375	1.375	7.313	9.625	2.625	12.125	12.250	3.750	2.625	12.875	12.625	12.375
	3	1-3/8	1/2	1.594	0.375	1.625	7.813	9.875	2.625	12.375	12.750	3.750	2.625	13.125	13.125	13.125
5	1	1	1/2	1.594	0.500	1.375	7.813	10.313	2.813	13.063	13.063	3.563	2.813	–	–	13.063
	3	1-3/8	1/2	1.594	0.500	1.625	8.438	10.688	2.813	13.438	13.688	3.563	2.813	–	–	13.938
						Replaces Dimension		LF	P	SA	XA	SS	SN	SE	XE	–
						On Single Rod Mounting Styles		All Styles	All Styles	CB	CB	C	F	G	G	All

Head Rectangular Flange

Style J
(NFPA MF1)





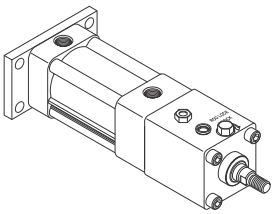


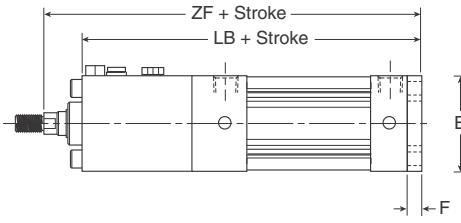
Note: Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J.

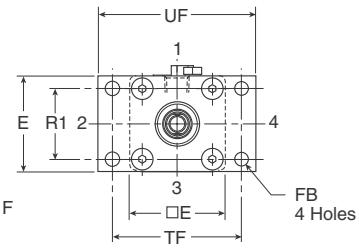
For reference, WF = W + F and LA = W + A.

Cap Rectangular Flange

Style H
(NFPA MF2)





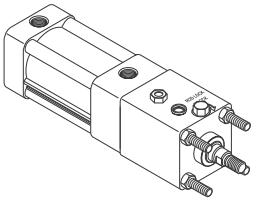


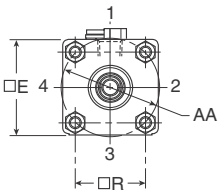
Styles J and H Dimensions

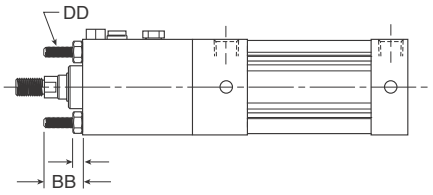
Bore size	Rod no.	Rod dia. MM	A	E	F	FB	LA	R1	TF	UF	W	Add stroke LB	ZF	ZJ
1-1/2	1	5/8	0.750	2.000	0.375	0.313	1.375	1.430	2.750	3.375	0.625	6.625	7.625	7.250
2	1	5/8	0.750	2.500	0.375	0.375	1.375	1.840	3.375	4.125	0.625	6.875	7.875	7.500
	3	1	1.125	2.500	0.375	0.375	2.125	1.840	3.375	4.125	1.000	7.875	9.250	8.875
2-1/2	1	5/8	0.750	3.000	0.375	0.375	1.375	2.190	3.875	4.625	0.625	7.000	8.000	7.625
	3	1	1.125	3.000	0.375	0.375	2.125	2.190	3.875	4.625	1.000	8.125	9.500	9.125
3-1/4	1	1	1.125	3.750	0.625	0.438	1.875	2.760	4.688	5.500	0.750	9.375	10.750	10.125
	3	1-3/8	1.625	3.750	0.625	0.438	2.625	2.760	4.688	5.500	1.000	9.750	11.375	10.750
4	1	1	1.125	4.500	0.625	0.438	1.875	3.320	5.438	6.250	0.750	9.750	11.125	10.500
	3	1-3/8	1.625	4.500	0.625	0.438	2.625	3.320	5.438	6.250	1.000	10.000	11.625	11.000
5	1	1	1.125	5.500	0.625	0.563	1.875	4.100	6.625	7.625	0.750	10.500	11.875	11.250
	3	1-3/8	1.625	5.500	0.625	0.563	2.625	4.100	6.625	7.625	1.000	10.875	12.500	11.875

Tie Rods Extended Head End Mount

Style TB
(NFPA MX3)

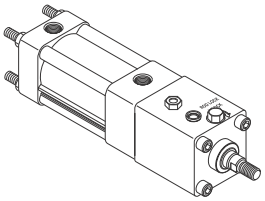


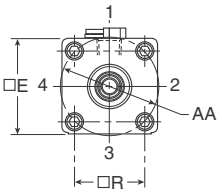


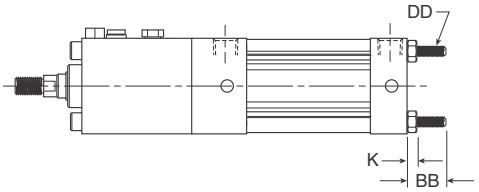


Tie Rods Extended Cap End Mount

Style TC
(NFPA MX2)

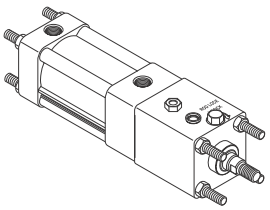


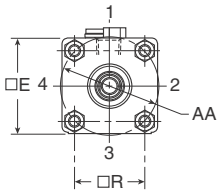


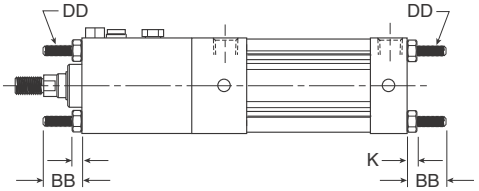


Tie Rods Extended Both Ends Mount

Style TD
(NFPA MX1)





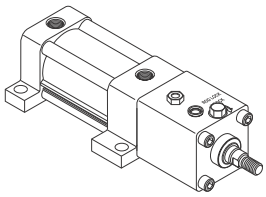


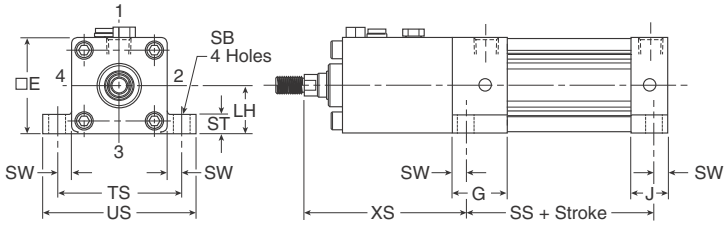
Styles TB, TC and TD Dimensions

Bore size	Rod no.	Rod dia. MM	AA	BB	DD	E	K	R
1-1/2	1	5/8	2.020	1.000	1/4 - 28	2.000	0.250	1.430
2	1	5/8	2.600	1.125	5/16 - 24	2.500	0.313	1.840
	3	1	2.600	1.125	5/16 - 24	2.500	0.313	1.840
2-1/2	1	5/8	3.100	1.125	5/16 - 24	3.000	0.313	2.190
	3	1	3.100	1.125	5/16 - 24	3.000	0.313	2.190
3-1/4	1	1	3.900	1.375	3/8 - 24	3.750	0.375	2.760
	3	1-3/8	3.900	1.375	3/8 - 24	3.750	0.375	2.760
4	1	1	4.700	1.375	3/8 - 24	4.500	0.375	3.320
	3	1-3/8	4.700	1.375	3/8 - 24	4.500	0.375	3.320
5	1	1	5.800	1.813	1/2 - 20	5.500	0.438	4.100
	3	1-3/8	5.800	1.813	1/2 - 20	5.500	0.438	4.100

Side Lug Mount

Style C
(NFPA MS2)



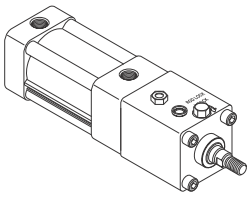


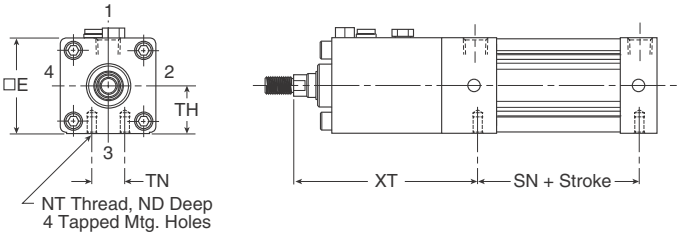
Style C Dimensions

Bore size	Rod no.	Rod dia. MM	E	G	J	+/-.003 LH	SB	ST	SW	TS	US	XS	Add stroke SS
1-1/2	1	5/8	2.000	1.438	0.938	0.993	0.438	0.500	0.375	2.750	3.500	4.000	2.875
2	1	5/8	2.500	1.375	0.937	1.243	0.438	0.500	0.375	3.250	4.000	4.250	2.875
	3	1	2.500	1.375	0.937	1.243	0.438	0.500	0.375	3.250	4.000	5.625	2.875
2-1/2	1	5/8	3.000	1.344	0.938	1.493	0.438	0.500	0.375	3.750	4.500	4.250	3.000
	3	1	3.000	1.344	0.938	1.493	0.438	0.500	0.375	3.750	4.500	5.750	3.000
3-1/4	1	1	3.750	1.594	1.125	1.868	0.563	0.750	0.500	4.750	5.750	6.375	3.250
	3	1-3/8	3.750	1.594	1.125	1.868	0.563	0.750	0.500	4.750	5.750	7.000	3.250
4	1	1	4.500	1.594	1.125	2.243	0.563	0.750	0.500	5.500	6.500	6.750	3.250
	3	1-3/8	4.500	1.594	1.125	2.243	0.563	0.750	0.500	5.500	6.500	7.250	3.250
5	1	1	5.500	1.594	1.219	2.743	0.813	1.000	0.688	6.875	8.250	7.438	3.125
	3	1-3/8	5.500	1.594	1.219	2.743	0.813	1.000	0.688	6.875	8.250	8.063	3.125

Side Tap Mount

Style F
(NFPA MS4)



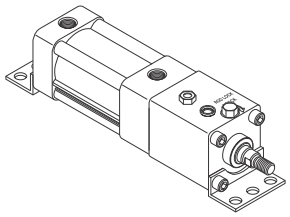


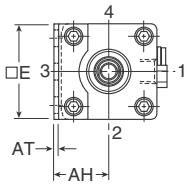
Style F Dimensions

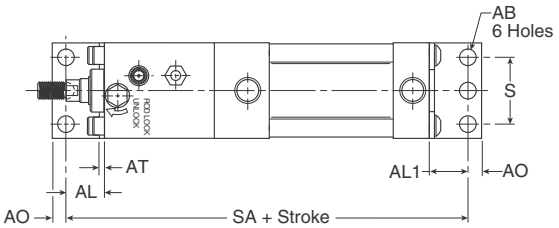
Bore size	Rod no.	Rod dia. MM	E	ND	NT	+/-.003 TH	TN	XT	Add stroke SN
1-1/2	1	5/8	2.000	0.375	1/4 - 20	0.993	0.625	4.563	2.250
2	1	5/8	2.500	0.438	5/16 - 18	1.243	0.875	4.813	2.250
	3	1	2.500	0.375	5/16 - 18	1.243	0.875	6.188	2.250
2-1/2	1	5/8	3.000	0.625	3/8 - 16	1.493	1.250	4.813	2.375
	3	1	3.000	0.625	3/8 - 16	1.493	1.250	6.313	2.375
3-1/4	1	1	3.750	0.750	1/2 - 13	1.868	1.500	6.938	2.625
	3	1-3/8	3.750	0.750	1/2 - 13	1.868	1.500	7.563	2.625
4	1	1	4.500	0.750	1/2 - 13	2.243	2.063	7.313	2.625
	3	1-3/8	4.500	0.750	1/2 - 13	2.243	2.063	7.813	2.625
5	1	1	5.500	0.938	5/8 - 11	2.743	2.688	7.813	2.875
	3	1-3/8	5.500	0.938	5/8 - 11	2.743	2.688	8.438	2.875

Side End Angle Mount

Style CB
(NFPA MS1)





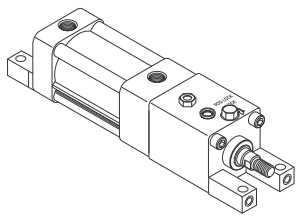


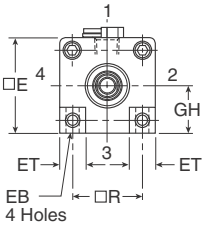
Style CB Dimensions

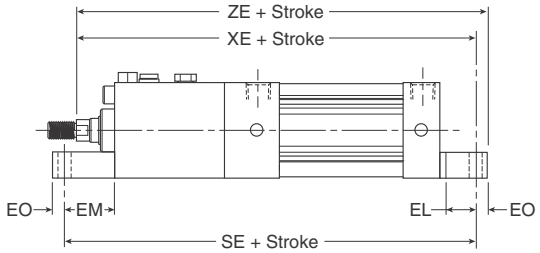
Bore size	Rod no.	Rod dia. MM	AB	AH	AL	AL1	AO	AT	E	S	Add stroke SA
1-1/2	1	5/8	0.438	1.188	1.000	1.000	0.375	0.125	2.000	1.250	8.250
2	1	5/8	0.438	1.438	1.000	1.000	0.375	0.125	2.500	1.750	8.500
	3	1	0.438	1.438	1.000	1.000	0.375	0.125	2.500	1.750	9.500
2-1/2	1	5/8	0.438	1.625	1.000	1.000	0.375	0.125	3.000	2.250	8.625
	3	1	0.438	1.625	1.000	1.000	0.375	0.125	3.000	2.250	9.750
3-1/4	1	1	0.563	1.938	1.250	1.250	0.500	0.125	3.750	2.750	11.250
	3	1-3/8	0.563	1.938	1.250	1.250	0.500	0.125	3.750	2.750	11.625
4	1	1	0.563	2.250	1.875	1.250	0.500	0.125	4.500	3.500	12.250
	3	1-3/8	0.563	2.250	1.875	1.250	0.500	0.125	4.500	3.500	12.500
5	1	1	0.688	2.750	1.375	1.375	0.625	0.188	5.500	4.250	12.625
	3	1-3/8	0.688	2.750	1.375	1.375	0.625	0.188	5.500	4.250	13.000

Side End Lug Mount

Style G
(NFPA MS7)







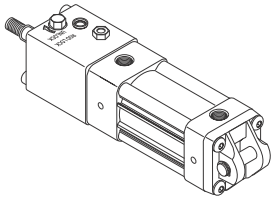
Style G Dimensions

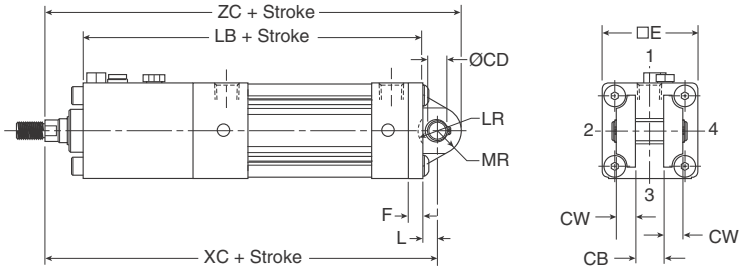
Bore size	Rod no.	Rod dia. MM	E	EB	EL	EM	EO	ET	+/-.003 GH	R	Add stroke SE	XE	ZE
1-1/2	1	5/8	2.000	0.281	0.750	1.125	0.250	0.563	0.993	1.430	8.125	8.000	8.250
2	1	5/8	2.500	0.344	0.938	1.313	0.313	0.688	1.243	1.840	8.750	8.438	8.750
	3	1	2.500	0.344	0.938	1.313	0.313	0.688	1.243	1.840	9.750	9.813	10.125
2-1/2	1	5/8	3.000	0.344	1.063	1.438	0.313	0.813	1.493	2.190	9.125	8.688	9.000
	3	1	3.000	0.344	1.063	1.438	0.313	0.813	1.493	2.190	10.250	10.188	10.500
3-1/4	1	1	3.750	0.406	0.875	1.500	0.375	1.000	1.868	2.760	11.125	11.000	11.375
	3	1-3/8	3.750	0.406	0.875	1.500	0.375	1.000	1.868	2.760	11.500	11.625	12.000
4	1	1	4.500	0.406	1.000	1.625	0.375	1.188	2.243	3.320	11.750	11.500	11.875
	3	1-3/8	4.500	0.406	1.000	1.625	0.375	1.188	2.243	3.320	12.000	12.000	12.375

Cap Fixed Clevis Mount

Style BB
(NFPA MP1)

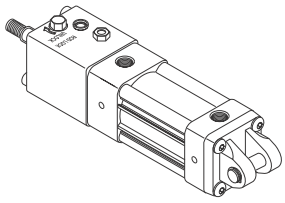
NOTE: For maximum swivel angle of BB mount with rear mounting plate, please reference cylinder accessories on page B80.

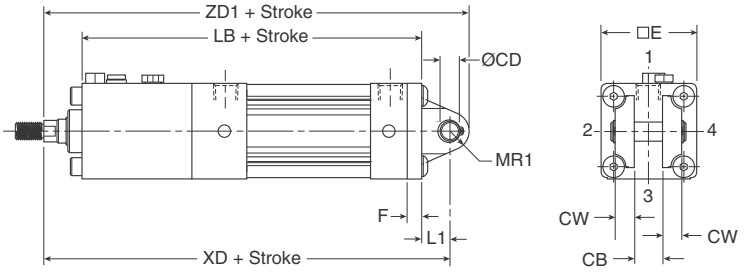




Cap Detachable Clevis Mount

Style BC
(NFPA MP2)



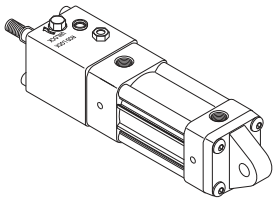


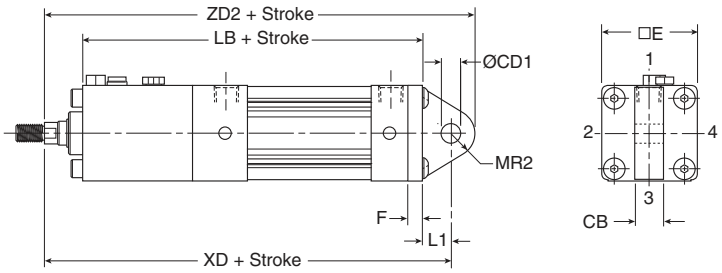
Styles BB and BC Dimensions

Bore size	Rod no.	Rod dia. MM	CB	+.000 -.002 CD	CW	E	F	L	L1	LR	MR	MR1	Add stroke LB	XC	XD	ZC	ZD1
1-1/2	1	5/8	0.750	0.501	0.500	2.000	0.375	0.375	0.750	0.750	0.625	0.500	6.625	8.000	8.375	8.625	8.875
2	1	5/8	0.750	0.501	0.500	2.500	0.375	0.375	0.750	0.750	0.625	0.500	6.875	8.250	8.625	8.875	9.125
	3	1	0.750	0.501	0.500	2.500	0.375	0.375	0.750	0.750	0.625	0.500	7.875	9.625	10.000	10.250	10.500
2-1/2	1	5/8	0.750	0.501	0.500	3.000	0.375	0.375	0.750	0.750	0.625	0.500	7.000	8.375	8.750	9.000	9.250
	3	1	0.750	0.501	0.500	3.000	0.375	0.375	0.750	0.750	0.625	0.500	8.125	9.875	10.250	10.500	10.750
3-1/4	1	1	1.250	0.751	0.625	3.750	0.625	0.625	1.250	1.000	0.938	0.750	9.375	11.375	12.000	12.313	12.750
	3	1-3/8	1.250	0.751	0.625	3.750	0.625	0.625	1.250	1.000	0.938	0.750	9.750	12.000	12.625	12.938	13.375
4	1	1	1.250	0.751	0.625	4.500	0.625	0.625	1.250	1.000	0.938	0.750	9.750	11.750	12.375	12.688	13.125
	3	1-3/8	1.250	0.751	0.625	4.500	0.625	0.625	1.250	1.000	0.938	0.750	10.000	12.250	12.875	13.188	13.625
5	1	1	1.250	0.751	0.625	5.500	0.625	0.625	1.250	1.000	0.938	0.750	10.500	12.500	13.125	13.438	13.875
	3	1-3/8	1.250	0.751	0.625	5.500	0.625	0.625	1.250	1.000	0.938	0.750	10.875	13.125	13.750	14.063	14.500

Cap Detachable Eye Mount

Style BE
(NFPA MP4)





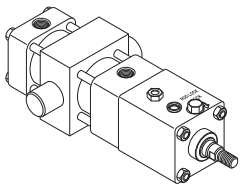
Style BE Dimensions

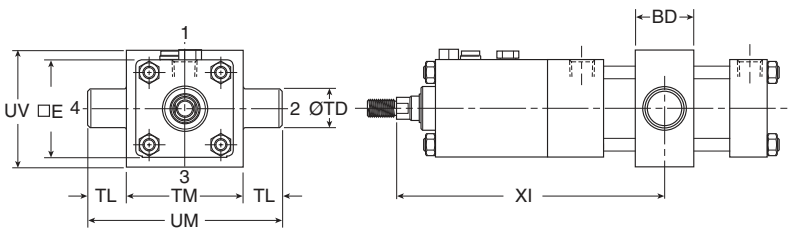
Bore size	Rod no.	Rod dia. MM	CB	+.002 +.004 CD1	E	F	L1	MR2	Add Stroke LB	XD	ZD2
1-1/2	1	5/8	0.750	0.500	2.000	0.375	0.750	0.625	6.625	8.375	9.000
2	1	5/8	0.750	0.500	2.500	0.375	0.750	0.625	6.875	8.625	9.250
	3	1	0.750	0.500	2.500	0.375	0.750	0.625	7.875	10.000	10.625
2-1/2	1	5/8	0.750	0.500	3.000	0.375	0.750	0.688	7.000	8.750	9.438
	3	1	0.750	0.500	3.000	0.375	0.750	0.688	8.125	10.250	10.938
3-1/4	1	1	1.250	0.750	3.750	0.625	1.250	0.875	9.375	12.000	12.875
	3	1-3/8	1.250	0.750	3.750	0.625	1.250	0.875	9.750	12.625	13.500
4	1	1	1.250	0.750	4.500	0.625	1.250	0.875	9.750	12.375	13.250
	3	1-3/8	1.250	0.750	4.500	0.625	1.250	0.875	10.000	12.875	13.750
5 *	1	1	1.250	0.750	5.500	0.625	1.250	0.875	10.500	13.125	14.000
	3	1-3/8	1.250	0.750	5.500	0.625	1.250	0.875	10.875	13.750	14.625

Intermediate Trunnion Mount

Style DD
(NFPA MT4)

Note: Tie rod nuts for Style DD have a slot instead of external hex.





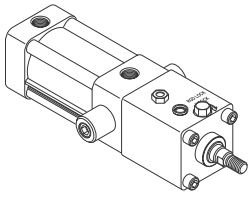
Note: Style DD requires minimum stroke per table.

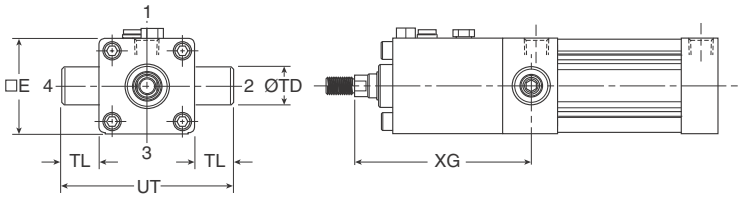
Style DD Dimensions

Bore size	Rod no.	Rod dia. MM	E	BD	+.000 -.001 TD	TL	TM	UM	UV	Min. XI	Min. stroke
1-1/2	1	5/8	2.000	1.250	1.000	1.000	2.500	4.500	2.500	5.69	3.250
2	1	5/8	2.500	1.500	1.000	1.000	3.000	5.000	3.000	6.00	4.000
	3	1	2.500	1.500	1.000	1.000	3.000	5.000	3.000	7.38	4.000
2-1/2	1	5/8	3.000	1.500	1.000	1.000	3.500	5.500	3.500	5.97	3.875
	3	1	3.000	1.500	1.000	1.000	3.500	5.500	3.500	7.47	3.875
3-1/4	1	1	3.750	2.000	1.000	1.000	4.500	6.500	4.250	8.469	4.375
	3	1-3/8	3.750	2.000	1.000	1.000	4.500	6.500	4.250	9.094	4.375
4	1	1	4.500	2.000	1.000	1.000	5.250	7.250	5.000	8.844	4.875
	3	1-3/8	4.500	2.000	1.000	1.000	5.250	7.250	5.000	9.344	4.875
5	1	1	5.500	2.000	1.000	1.000	6.250	8.250	6.000	9.344	5.125
	3	1-3/8	5.500	2.000	1.000	1.000	6.250	8.250	6.000	9.969	5.125

Head Trunnion Mount

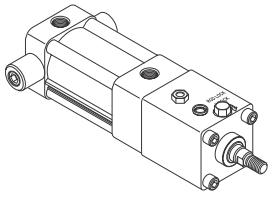
Style D
(NFPA MT1)

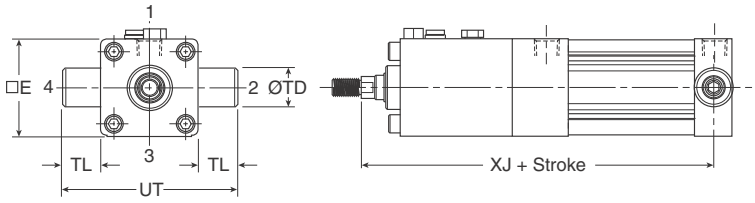




Cap Trunnion Mount

Style DB
(NFPA MT2)



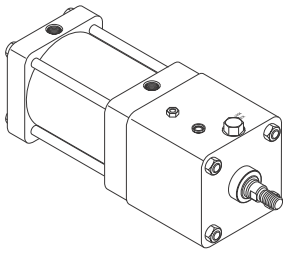


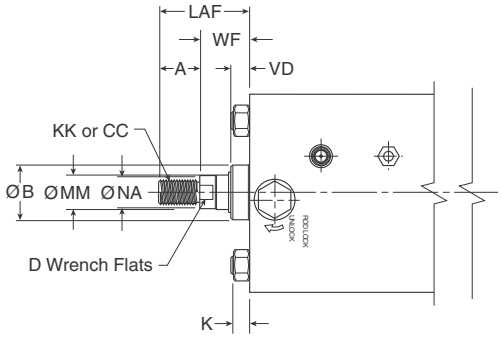
Styles D and DB Dimensions

Bore size	Rod no.	Rod dia. MM	E	+.000 -.001 TD	TL	UT	XG	XJ
1-1/2	1	5/8	2.000	1.000	1.000	4.000	4.375	6.750
2	1	5/8	2.500	1.000	1.000	4.500	4.625	7.000
	3	1	2.500	1.000	1.000	4.500	6.000	8.375
2-1/2	1	5/8	3.000	1.000	1.000	5.000	4.625	7.125
	3	1	3.000	1.000	1.000	5.000	6.125	8.625
3-1/4	1	1	3.750	1.000	1.000	5.750	6.750	9.500
	3	1-3/8	3.750	1.000	1.000	5.750	7.375	10.125
4	1	1	4.500	1.000	1.000	6.500	7.125	9.875
	3	1-3/8	4.500	1.000	1.000	6.500	7.625	10.375
5	1	1	5.500	1.000	1.000	7.500	7.625	10.625
	3	1-3/8	5.500	1.000	1.000	7.500	8.250	11.250

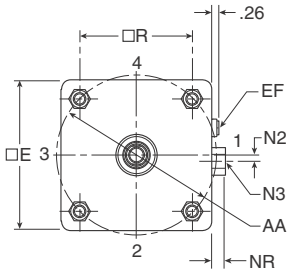
No Mount

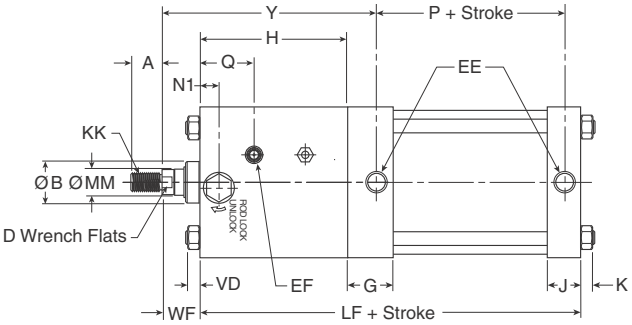
Style T
(NFPA MX0)





For dimensions of all standard rod end styles, see next page.





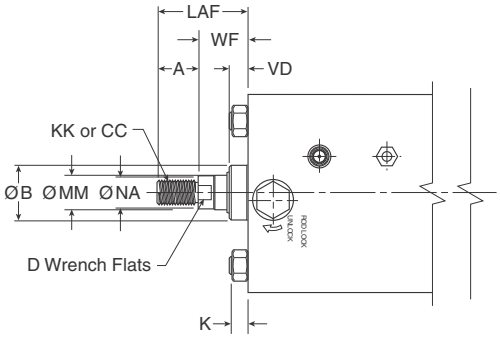
Style T Dimensions

Bore size	Rod no.	Rod dia. MM	Thread Style 8 CC	Thread Style 4 & 9 KK	Thread Style 6	A	AA	+.000 -.002 B	D	E	EE (NPTF)	EF (NPTF)	G	H	J
6	1	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	6.900	1.999	1-1/8	6.500	3/4	1/4	1.910	6.375	1.410
	3	1-3/4	1-1/2 - 12	1-1/4 - 12	1-3/4 - 12	2.000	6.900	2.374	1-1/2	6.500	3/4	1/4	1.910	6.875	1.410
8	1	1-3/8	1-1/4 - 12	1 - 4	1-3/8 - 14	1.625	9.100	1.999	1-1/8	8.500	3/4	1/4	1.810	6.625	1.440
	3	1-3/4	1-1/2 - 12	1-1/4 - 12	1-3/4 - 12	2.000	9.100	2.374	1-1/2	8.500	3/4	1/4	1.810	7.125	1.440

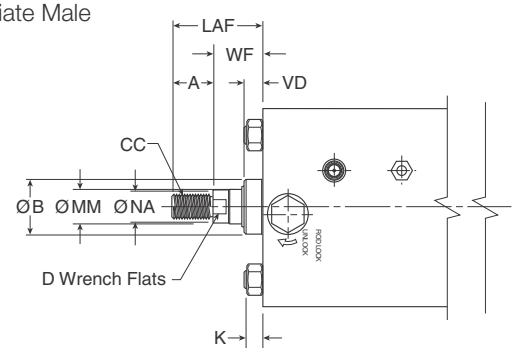
Bore size	Rod no.	Rod dia. MM	K	LAF	N1	N2	Hex N3	NA	NR	Q	R	VD	WF	Y	Add stroke LF	Add stroke P
6	1	1-3/8	0.438	3.250	1.165	0.177	1-5/16	1.313	0.750	2.705	4.880	0.755	1.625	9.188	11.375	3.125
	3	1-3/4	0.438	3.875	1.495	0.177	1-5/16	1.688	0.740	3.055	4.880	0.875	1.875	9.938	11.875	3.125
8	1	1-3/8	0.563	3.250	1.305	0.177	1-5/16	1.313	0.740	2.885	6.440	0.755	1.625	9.375	11.750	3.250
	3	1-3/4	0.563	3.875	1.570	0.177	1-5/16	1.688	0.740	3.145	6.440	0.875	1.875	10.125	12.250	3.250

Rod End

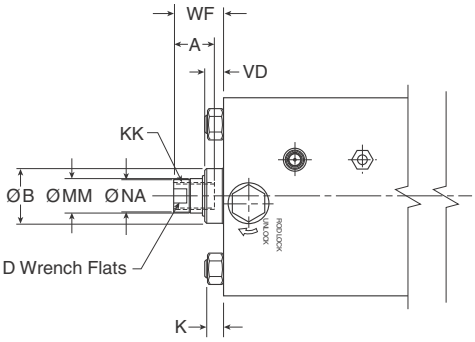
Thread Style 4
(NFPA Style SM)
Small Male



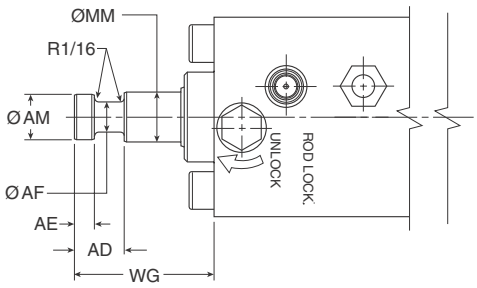
Thread Style 8
(NFPA Style IM)
Intermediate Male



Thread Style 9
(NFPA Style SF)
Short Female



Thread Style 55
For use with Split Coupler
(please reference page B77 for more information)



Thread Style 3 - "Special Thread"
Special threads, rod extensions, rod eyes, blanks, etc. are also available.
To order, specify "Style 3" and give desired dimensions for KK or CC, A and W or WF.
If otherwise special, please supply dimensioned sketch.

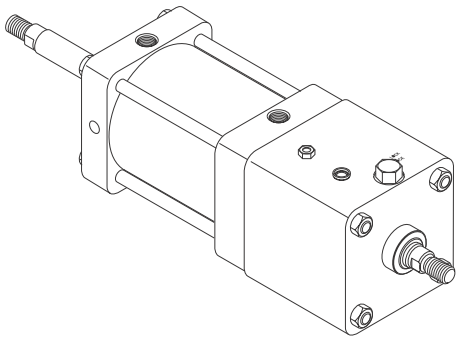
Rod End Dimensions

Bore size	Rod no.	Rod dia. MM	Thread: Style 8 CC	Thread: Style 4 & 9 KK	Thread: Style 6	A	AD	AE	AF	AM	+.000 -.002 B	D	K	LAF	NA	VD	WF	WG
6	1	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	1.063	0.375	0.875	1.320	1.999	1-1/8	0.438	3.250	1.313	0.755	1.625	2.750
	3	1-3/4	1-1/2 - 12	1-1/4 - 12	1-3/4 - 12	2.000	1.313	0.500	1.125	1.700	2.374	1-1/2	0.438	3.875	1.688	0.875	1.875	3.125
8	1	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 14	1.625	1.063	0.375	0.875	1.320	1.999	1-1/8	0.563	3.250	1.313	0.755	1.625	2.750
	3	1-3/4	1-1/2 - 12	1-1/4 - 12	1-3/4 - 12	2.000	1.313	0.500	1.125	1.700	2.374	1-1/2	0.563	3.875	1.688	0.875	1.875	3.125

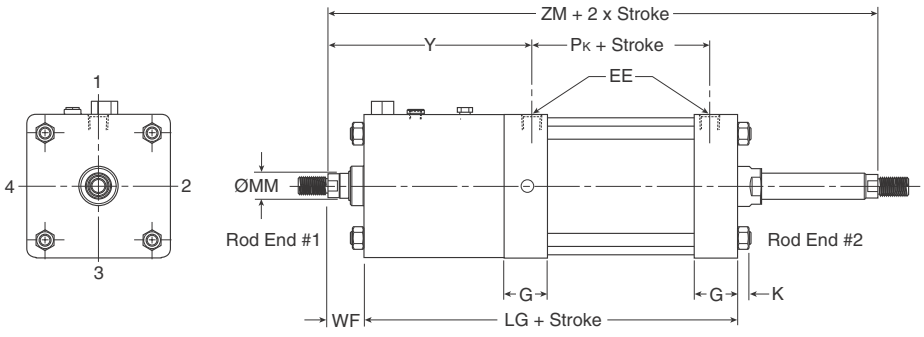
To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary dimensions from that drawing, return to this page and supplement the single rod end dimensions with those shown in the drawings and dimension table below. Note that double rod end cylinders have a head dimension G at both ends, and that LG replaces LF, PK replaces P, etc. The double rod end dimensions differ from, or are in addition to, those for single rod cylinders.

When a double rod end cylinder has two different rod ends, please clearly state which rod end is to be available at which head end.

K-type 6" to 8" Bore Size



Mounting styles for single rod models	Corresponding mounting styles for double rod models
C	KC
CB	KCB
D	KD
DD	KDD
F	KF
J	KJ
T	KT
TB	KTB
TD	KTD

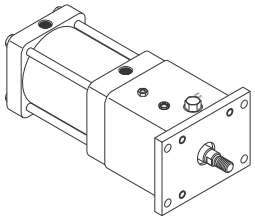


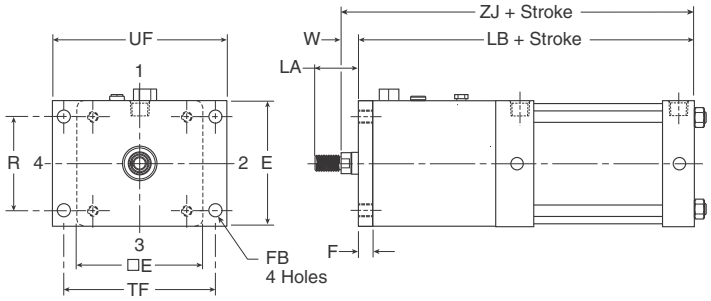
Style KT Dimensions

Bore size	Rod no.	Rod dia. MM	EE (NPTF)	G	K	WF	Y	Add Stroke LG	PK	SAK	XAK	SSK	SNK	Add 2X Stroke ZM
6	1	1-3/8	3/4	1.910	0.438	1.625	9.188	11.875	3.125	14.625	14.875	4.125	3.125	15.125
	3	1-3/4	3/4	1.910	0.438	1.875	9.938	12.375	3.125	15.125	15.625	4.125	3.125	16.125
8	1	1-3/8	3/4	1.810	0.563	1.625	9.375	12.125	3.250	15.750	15.563	4.125	3.125	15.375
	3	1-3/4	3/4	1.810	0.563	1.875	10.125	12.625	3.250	16.250	16.313	4.125	3.125	16.375
						Replaces Dimension On		LF	P	SA	XA	SS	SN	–
						Single Rod Mounting Styles		All Styles	All Styles	CB	CB	C	F	All

Head Rectangular Flange Mount

Style J
(NFPA MF1)
(only 6" Bore)



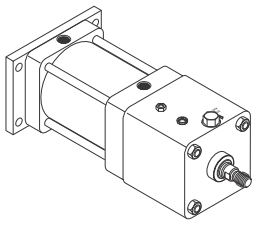


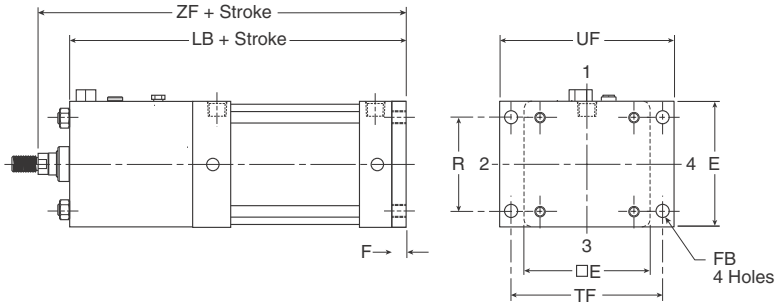
Note: Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J.

For reference, WF = W + F and LA = W + A.

Cap Rectangular Flange Mount

Style H
(NFPA MF2)
(only 6" Bore)



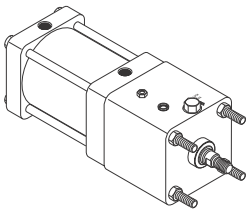


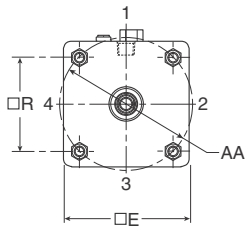
Styles J and H Dimensions

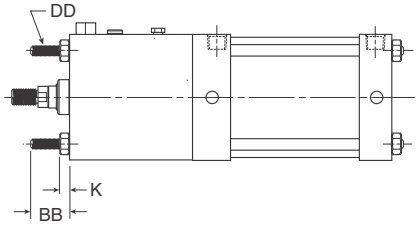
Bore size	Rod no.	Rod dia. MM	A	E	F	FB	LA	R	TF	UF	W	Add stroke LB	Add stroke ZF	Add stroke ZJ
6	1	1-3/8	1.625	6.500	0.750	0.563	2.500	4.880	7.625	8.625	0.875	12.125	13.750	13.000
	3	1-3/4	2.000	6.500	0.750	0.563	3.125	4.880	7.625	8.625	1.125	12.625	14.500	13.750

Tie Rods Extended Head End Mount

Style TB
(NFPA MX3)

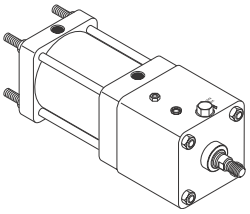


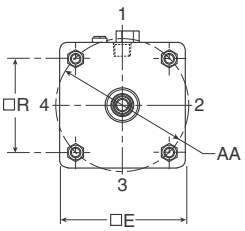


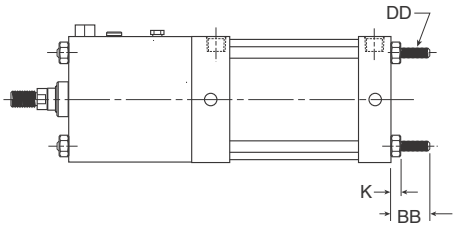


Tie Rods Extended Cap End Mount

Style TC
(NFPA MX2)

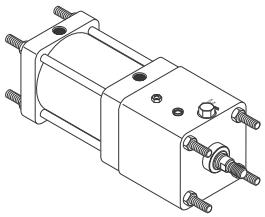


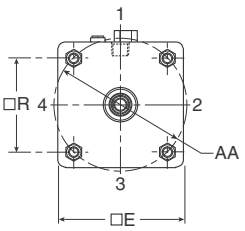


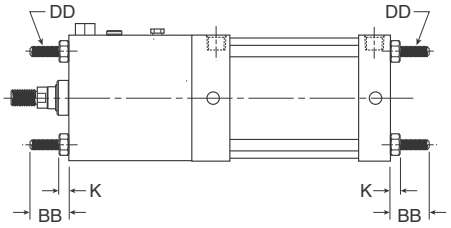


Tie Rods Extended Both Ends Mount

Style TD
(NFPA MX1)





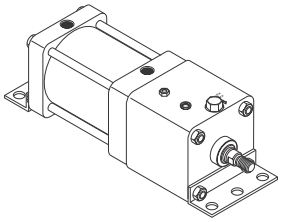


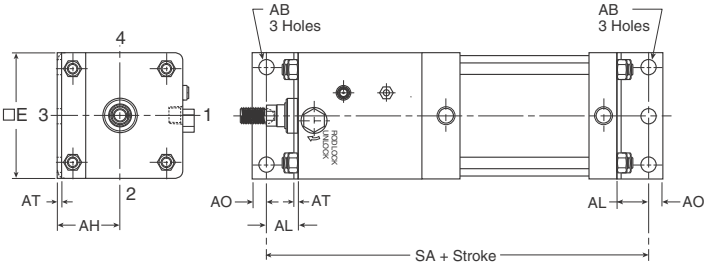
Styles TB, TC and TD Dimensions

Bore size	Rod no.	Rod dia. MM	AA	BB	DD	E	K	R
6	1	1-3/8	6.900	1.813	1/2-20	6.500	0.438	4.880
	3	1-3/4	6.900	1.813	1/2-20	6.500	0.438	4.880
8	1	1-3/8	9.100	2.313	5/8-18	8.500	0.563	6.440
	3	1-3/4	9.100	2.313	5/8-18	8.500	0.563	6.440

Side End Angle Mount

Style CB
(NFPA MS1)



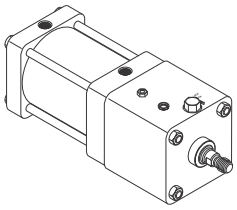


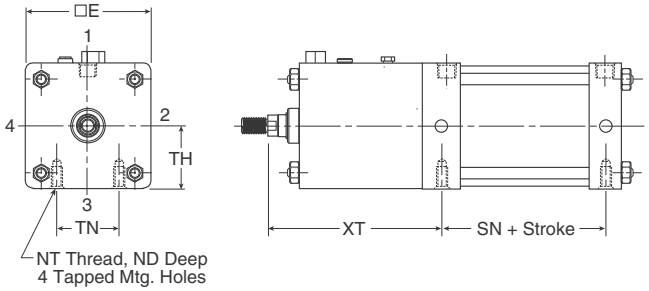
Style CB Dimensions

Bore size	Rod no.	Rod dia. MM	AB	AH	AL	AO	AT	E	S	Add stroke SA
6	1	1-3/8	0.813	3.250	1.375	0.625	0.188	6.500	5.250	14.125
	3	1-3/4	0.813	3.250	1.375	0.625	0.188	6.500	5.250	14.625
8	1	1-3/8	0.813	4.250	1.813	0.688	0.250	8.500	7.125	15.375
	3	1-3/4	0.813	4.250	1.813	0.688	0.250	8.500	7.125	15.875

Side Tap Mount

Style F
(NFPA MS4)



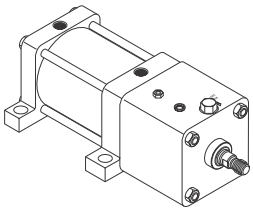


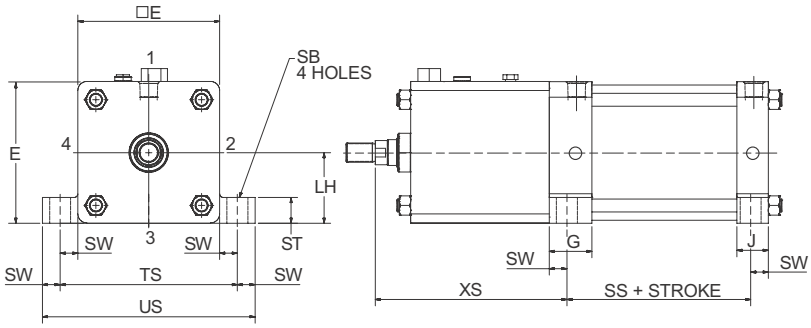
Style F Dimensions

Bore size	Rod no.	Rod dia. MM	E	ND	NT	+/-.003 TH	TN	XT	Add stroke SN
6	1	1-3/8	6.500	1.125	3/4-10	3.243	3.250	9.188	3.125
	3	1-3/4	6.500	1.125	3/4-10	3.243	3.250	9.938	3.125
8	1	1-3/8	8.500	1.125	3/4-10	4.243	4.500	9.438	3.250
	3	1-3/4	8.500	1.125	3/4-10	4.243	4.500	10.188	3.250

Side Lug Mount

Style C
(NFPA MS2)





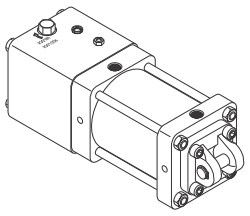
Style C Dimensions

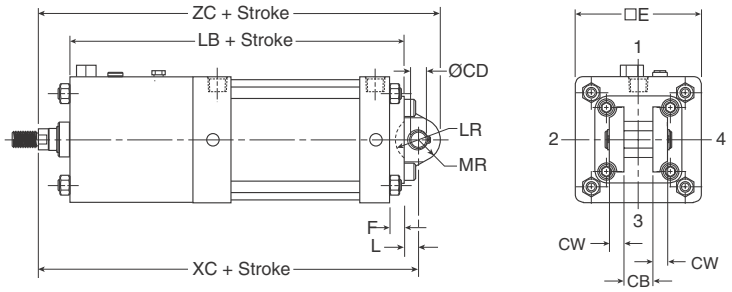
Bore size	Rod no.	Rod dia. MM	E	G	J	+/-.003 LH	SB	ST	SW	TS	US	XS	Add stroke SS
6	1	1-3/8	6.500	1.910	1.410	3.243	0.813	1.000	0.688	7.875	9.250	8.688	3.625
	3	1-3/4	6.500	1.910	1.410	3.243	0.813	1.000	0.688	7.875	9.250	9.438	3.625
8	1	1-3/8	8.500	1.810	1.440	4.243	0.813	1.000	0.688	9.875	11.250	8.938	3.750
	3	1-3/4	8.500	1.810	1.440	4.243	0.813	1.000	0.688	9.875	11.250	9.688	3.750

Cap Fixed Clevis

Style BB
(NFPA MP1)

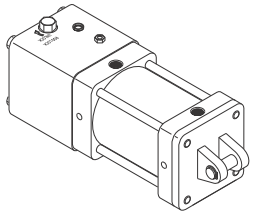
NOTE: For maximum swivel angle of BB mount with rear mounting plate, please reference cylinder accessories on page B80.

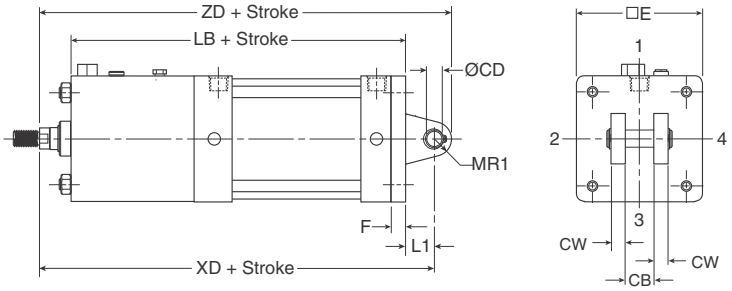




Cap Detachable Clevis

Style BC
(NFPA MP2)



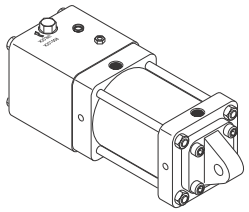


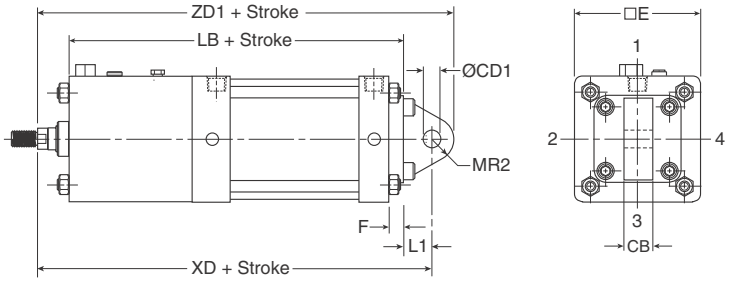
Styles BB and BC Dimensions

Bore size	Rod no.	Rod dia. MM	CB	+.000 -.002 CD	CW	E	F	L	L1	LR	MR	MR1	Add stroke LB	XC	XD	ZC	ZD
6	1	1-3/8	1.500	1.001	0.750	6.500	0.750	0.750	1.500	1.250	1.125	1.000	12.125	14.500	15.250	15.625	16.250
	3	1-3/4	1.500	1.001	0.750	6.500	0.750	0.750	1.500	1.250	1.125	1.000	12.625	15.250	16.000	16.375	17.000
8	1	1-3/8	1.500	1.001	0.750	8.500	0.750	0.750	1.500	1.250	1.125	1.000	12.500	14.875	15.625	16.000	16.625
	3	1-3/4	1.500	1.001	0.750	8.500	0.750	0.750	1.500	1.250	1.125	1.000	13.000	15.625	16.375	16.750	17.375

Cap Detachable Eye Mount

Style BE
(NFPA MP4)
(only 6" Bore)



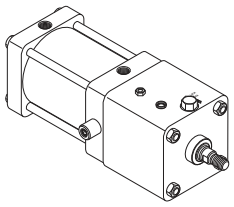


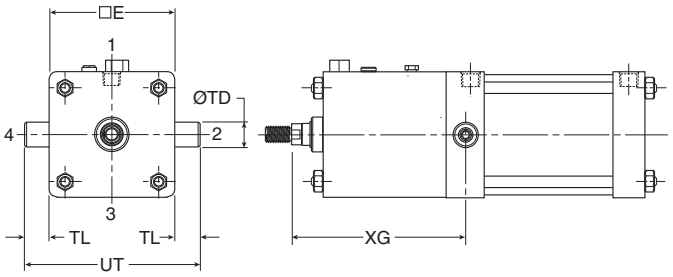
Style BE Dimensions

Bore size	Rod no.	Rod dia. MM	CB	+.002 +.004 CD1	E	F	L1	MR2	Add stroke LB	XD	ZD1
6	1	1-3/8	1.500	1.000	6.500	0.750	1.500	1.125	12.125	15.250	16.375
	3	1-3/4	1.500	1.000	6.500	0.750	1.500	1.125	12.625	16.000	17.125

Head Trunnion Mount

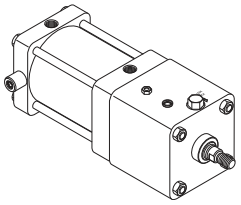
Style D
(NFPA MT1)

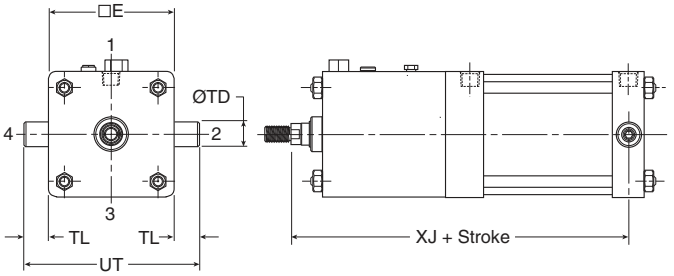




Cap Trunnion Mount

Style DB
(NFPA MT2)



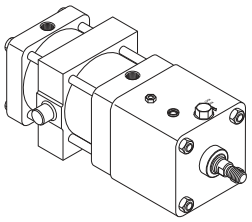


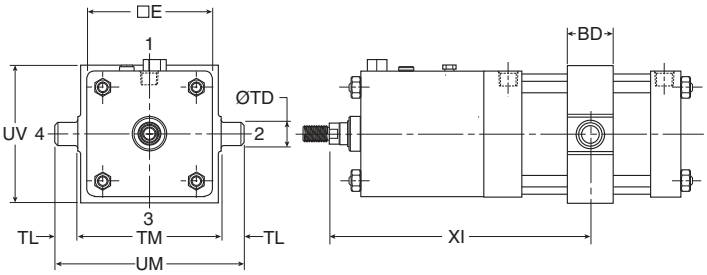
Styles D and DB Dimensions

Bore size	Rod no.	Rod dia. MM	E	+.000 -.001 TD	TL	UT	XG	XJ
6	1	1-3/8	6.500	1.375	1.375	9.250	9.000	12.250
	3	1-3/4	6.500	1.375	1.375	9.250	9.750	13.000
8	1	1-3/8	8.500	1.375	1.375	11.250	9.250	12.625
	3	1-3/4	8.500	1.375	1.375	11.250	10.000	13.375

Intermediate Trunnion Mount

Style DD
(NFPA MT4)





Note: Style DD requires minimum stroke per table.

Style DD Dimensions

Bore size	Rod no.	Rod dia. MM	E	BD	+.000 -.001 TD	TL	TM	UM	UV	Min. XI	Min. stroke
6	1	1-3/8	6.500	2.500	1.375	1.375	7.625	10.375	7.000	11.16	6.125
	3	1-3/4	6.500	2.500	1.375	1.375	7.625	10.375	7.000	11.91	6.125
8	1	1-3/8	8.500	2.500	1.375	1.375	9.750	12.500	9.500	11.31	6.500
	3	1-3/4	8.500	2.500	1.375	1.375	9.750	12.500	9.500	12.06	6.500

Kits & Accessories
See page B34 to B36.

How to Order ACVB Option fully assembled to 4MA Cylinder

2.00			J		4MA		U		S	1	4		A		6.000

Bore Size

1.50
2.00
2.50
3.25
4.00
5.00

Double Rod Cylinder [1]

Specify "K" only if double rod cylinder is required.

Mounting Style

Specify mounting style code per available 4MA mount.

Series

4MA

Ports

U	NPTF

Seals

Blank	Standard (nitrile seals)
E	Fluorocarbon rod wiper and rod seal only
M	Metallic rod wiper, nitrile seals

Piston Rod Number

See 4MA section for more details.

Stroke Length

Specify stroke length required in inches.

Cushion Cap End

Blank	Non-cushioned cap end
C	Cushioned cap end

Cushion Head End

Blank	Non-cushioned head end
C	Cushioned head end

Cylinder Construction

Blank	Standard (extruded body, standard round lobe orientation) *
A	Extruded body, round lobe orientation rotated 90 degrees from standard *
N	Extruded body, round lobe orientation rotated 180 degrees from standard *
Z	Extruded body, round lobe orientation rotated 270 degrees from standard *
T	Aluminum round tube and carbon steel tie

* See Table on page B5.

Special Modification

Specify "S" for ACVB options and any other special modification other than rod end. See examples below.

Piston Rod Thread Type

A	Standard (UNF Unified Thread)
W	BSF British Fine
M	Metric (see page B78)

Rod Material and Gland Code

Blank	Standard rod and gland
H	Standard rod and HI LOAD gland
Y	17-4 PH stainless steel rod and standard gland
Z	17-4 PH stainless steel rod and HI LOAD gland
J	303 stainless steel rod and standard gland
K	303 stainless steel rod and HI LOAD gland
S	316 stainless steel rod and standard gland
T	316 stainless steel rod and HI LOAD gland

Piston Type

Blank	Lipseals and magnetic ring (legacy) (standard for 4ML)
1	Lipseals, no magnetic ring (legacy)
2	Lipseals, no magnetic ring (aluminum piston)
3	Lipseals and magnetic ring (aluminum piston)
4	Bumper seals, no magnetic ring
6	Bumper seals and magnetic ring
B	Lipseals, 1/4" thick bumpers both ends
H	Lipseals, 1/4" thick bumper head end
C	Lipseals, 1/4" thick bumper cap end
D	Lipseals and magnetic ring, 1/4" thick bumpers both ends
F	Lipseals and magnetic ring, 1/4" thick bumper head end
R	Lipseals and magnetic ring, 1/4" thick bumper cap end

Piston Rod Thread Style

4	Small male
8	Intermediate male
9	Short female
55	For use with split coupler
3	Special (and specify all dimensions required)
6	Full male

ACVB Minimum Stroke Requirements**

Bore	4MA
Compact Manifold	
1.50	0.500
2.00	0.500
2.50	0.438
Full Manifold	
1.50	5.813
2.00	5.813
2.50	5.750
3.25	5.500
4.00	5.500
5.00	5.250

** For desired strokes less than the minimum requirement, specify a stop tube for the cylinder assembly. Total stroke should be (desired net stroke) + (stop tube length to help exceed minimum stroke). Stop tube only available for 4MA with aluminum piston.

Example:
1.50" bore 4MA with 5.000" of desired net stroke:

Gross stroke = 5.813"

Stop tube = 0.813"

Net stroke = 5.000"

Note: place gross stroke in cylinder model number and specify stop tube length and net stroke in the item notes.

Example

2.00 CJ4MAUS14AC 6.000

S = ACVB Valve Combination
S = 3C2B54 Manifold Code
(See following page.)

Flow Control Option

Add "S = with SP37 Flow Controls" to item notes

Muffler Option

Add "S = with EM Mufflers" to item notes

For ACVB with the 2A Series, please use the 2A Series Model Code and specify the following in the item notes:

S = ACVB Valve Combination

S = (Manifold Code from following page)

ACVB Series Valve/Manifold Codes

Valve Series	
3	B3
5	B5
6	B6

Manifold Type / Location	
C	Compact Manifold / Cap End (For use with B3 valve only)
D	Compact Manifold / Head End (For use with B3 valve only)
F	Full Manifold / Cap End (For use with B3, B5 or B6 valves)
G	Full Manifold / Head End (For use with B3, B5 or B6 valves)

Operator Type / Function	
1	Single Solenoid / Air Return
2	Double Solenoid
3	Single Remote Pilot / Air Return
4	Double Remote Pilot

NOTE: Cylinders with single solenoid valves mounted at the CAP END will be NORMALLY RETRACTED. Cylinders with single solenoid valves mounted at the HEAD END will be NORMALLY EXTENDED.

Pilot Source / Pilot Exhaust	
A	Internal - Port #1 / Tapped M5 (B5, B6 only)
B	Internal - Port #1 / Vented
0	None. Remote Pilot Valve

Connector / Valve Series Available (Connector can be rotated in 90° increments for Options A-H)	
0	None / B3, B5, B6 (Remote Pilot)
5	15mm 3-PIN DIN 43650C / B3, B5, B6 (Male Connector)
6	15mm 3-PIN DIN 43650C (rotated 180°) / B3, B5, B6 (Male Connector)
A	30mm Square 3-PIN ISO 4400 Form A / B5, B6 (Male Connector)
B	22mm Rectangular 3-PIN Type B Industrial / B5, B6 (Male Connector)
C	3-PIN Automotive Mini / B5 (Female Connector)
D	5-PIN Automotive Mini / B5 (Female Connector)
F	Hazardous Duty 1/2" Conduit 18" Leads / B5, B6
H	1/2" NPT Conduit 18" Leads / B5, B6

Customer orientation of connector at 45 degree increments possible on Options A through H on B5 and B6 valves.

Voltage	
4	24 VDC
5	110 VAC
X	Remote Pilot

Example: 6 F 2 A 5 5

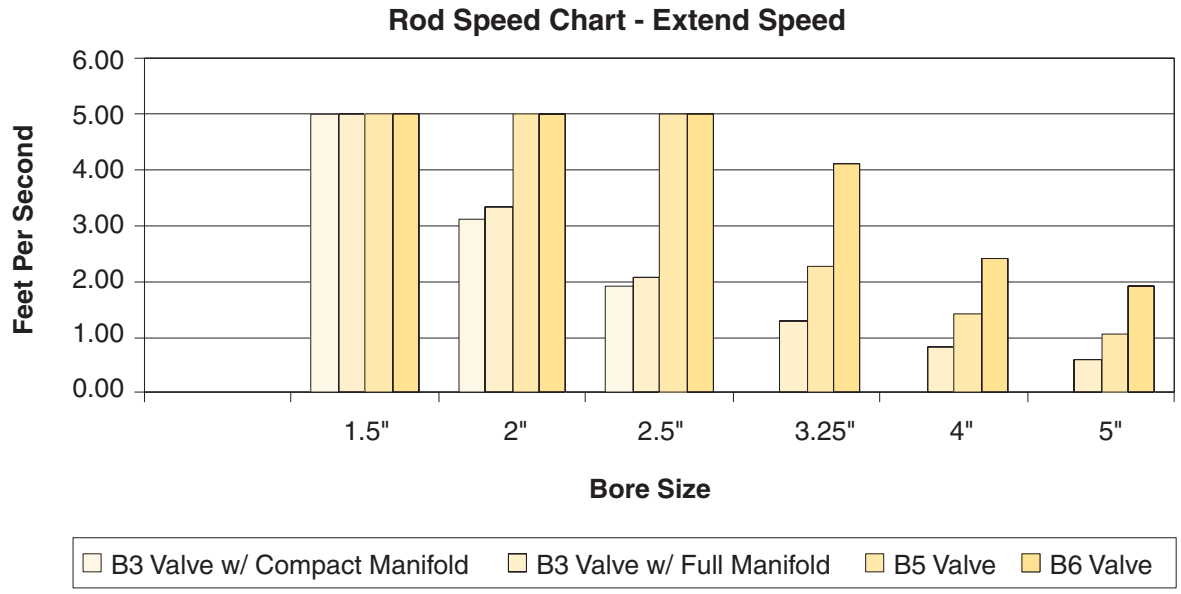
6	F	2	A	5	5
B6 Valve	Cap Mounted Full Manifold	Double Solenoid	Internal Pilot (Port 1)	15mm 3-PIN Square Connector	110 VAC

Compact Manifold

- Standard Fluid – Dry, filtered air.
- Standard Temperature: -5°F to 120°F (-15°C to 49°C).
- Maximum 145 PSI operating pressure.
- Fits 1-1/2" through 2-1/2" Bore 4MA standard cylinders.
- Uses standard Parker fittings, tubing, and seals.
- Compact manifold accommodates B3 Series valve from Parker Pneumatic Division North America without field modification to cylinder.

Full Manifold

- Standard Fluid: Dry, filtered air.
- Standard Temperature: -5° F to 120° F (-15°C to 49°C).
- Maximum 145 PSI operating pressure.
- Fits 1-1/2" through 5" Bore 4MA standard cylinders.
- Uses standard Parker fittings, tubing, and seals.
- Full manifold accommodates B3, B5 and B6 series Parker Pneumatic valves, without field modification to cylinder (B6 series shown).
- Bolt pattern conforms to NAMUR standard on B5 and B6 valves.
- Manifold and valve do not overhang beyond head or cap fasteners.



Steps to size a cylinder-valve system

Step 1. Gather the Application Parameters

Total load

Maximum velocity needed to move load in specified time*

Minimum pressure available

Step 2. Size Cylinder

Use equations in engineering section of Pneumatic Actuator Catalog to calculate minimum bore size

Step 3. Size Valve/Manifold

Use the Rod Speed Chart above

Choose valve/manifold system that will supply maximum velocity needed for bore size chosen above

Step 4. Choose the Appropriate Model Code**

Specify necessary valve and manifold

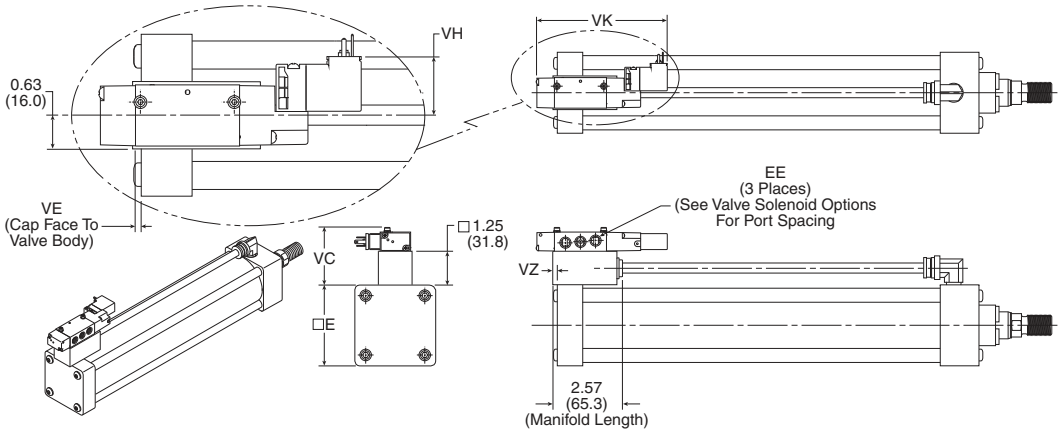
Choose type of control required

Choose type of connection and voltage required

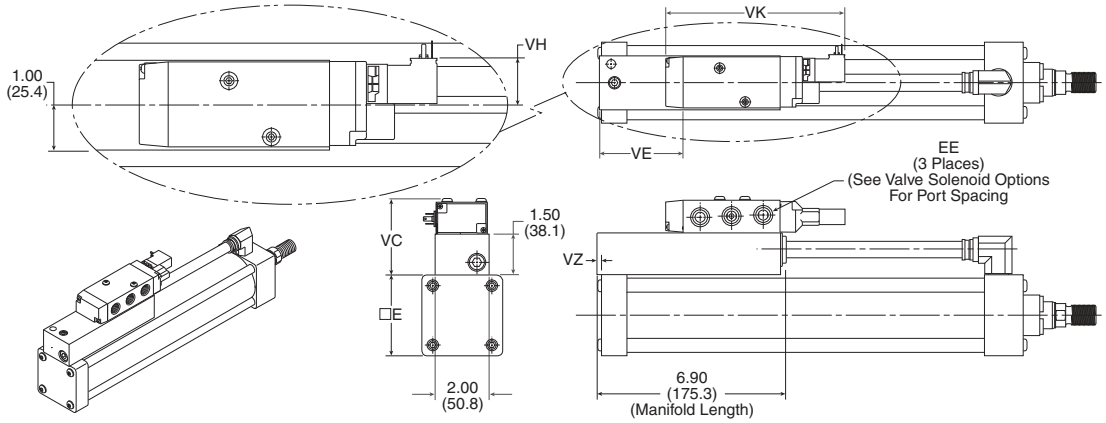
* If maximum velocity is not easily calculated, divide the total stroke distance by the total stroke time and multiply by 2.

** See the ACVB Series Valve/Manifold Code page for more details.

Compact Manifold



Full Manifold



Dimensions

Bore	E (SQ.)	Manifold	Valve	VE*	VZ**
1-1/2	2	Compact	B3	0.17 (4.3)	0.23 (5.8)
		Full	B3	3.78 (96.3)	0.23 (5.8)
			B5	3.48 (88.4)	0.13 (3.3)
			B6	2.97 (75.4)	0.13 (3.3)
2	2-1/2	Compact	B3	0.17 (4.3)	0.23 (5.8)
		Full	B3	3.78 (96.3)	0.13 (3.3)
			B5	3.36 (85.3)	0.13 (3.3)
			B6	2.97 (75.4)	0.13 (3.3)
2-1/2	3	Compact	B3	0.17 (4.3)	0.23 (5.8)
		Full	B3	3.78 (96.3)	0.13 (3.3)
			B5	3.36 (85.3)	0.13 (3.3)
			B6	2.97 (75.4)	0.13 (3.3)
3-1/4	3-3/4	Full	B3	3.90 (99.1)	0.00
			B5	3.48 (88.4)	0.00
			B6	3.10 (78.7)	0.00
4	4-1/2	Full	B3	3.90 (99.1)	0.00
			B5	3.48 (88.4)	0.00
			B6	3.10 (78.7)	0.00
5	5-1/2	Full	B3	3.90 (99.1)	0.00
			B5	3.48 (88.4)	0.00
			B6	3.10 (78.7)	0.00

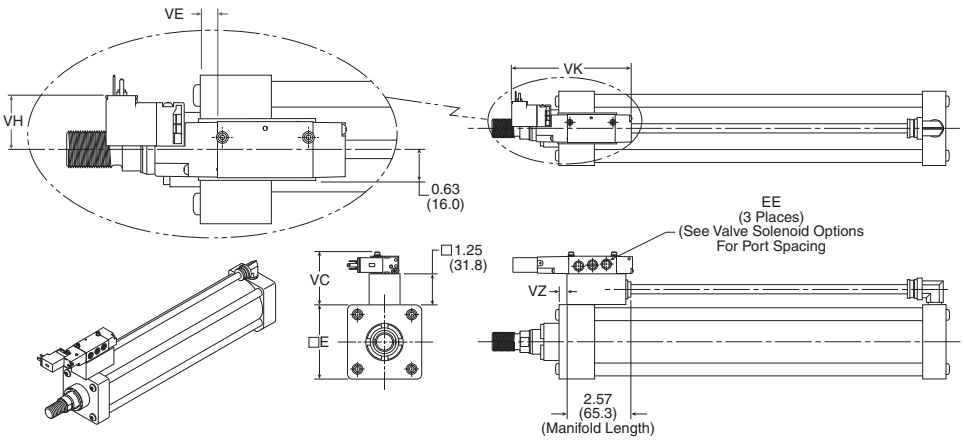
Valve	EE (NPTF)	VH	VK	VC	
B3	1/8	1.09 (27.7)	4.67 (118.6)	Compact Manifold	2.12 (53.8)
				Full Manifold	2.37 (60.2)
B5	1/4	1.12 (28.4)	5.78 (146.8)	Full Manifold	2.81 (71.4)
B6	3/8	1.12 (28.4)	6.67 (169.4)	Full Manifold	2.81 (71.4)

* VE = Dimension from edge of endcap to edge of valve body.

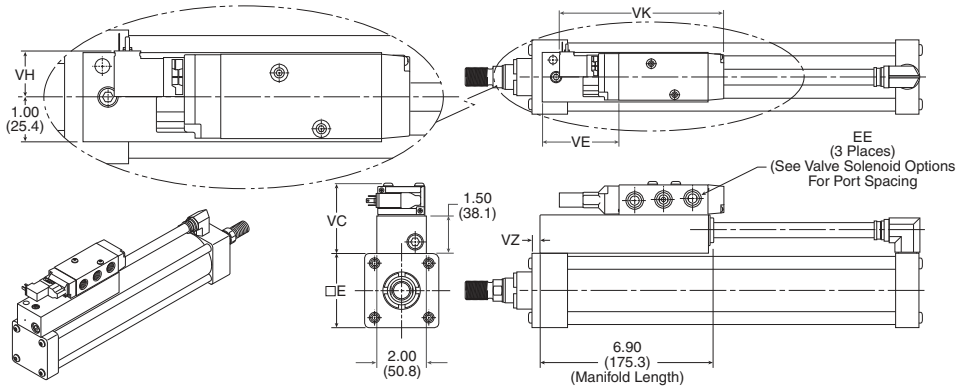
** VZ = Dimension from edge of endcap to edge of manifold.

Note: Dimensions shown are for a single solenoid enclosure with Option 5. For other valve or enclosure option dimensions, see pages B68-B69.

Compact Manifold



Full Manifold



Dimensions

Bore	E (SQ.)	Manifold	Valve	VE*	VZ**
1-1/2	2	Compact	B3	0.26 (6.6)	0.20 (5.1)
		Full	B3	4.21 (106.9)	0.31 (7.9)
			B5	3.79 (96.3)	0.31 (7.9)
			B6	3.41 (86.6)	0.31 (7.9)
2	2-1/2	Compact	B3	0.26 (6.6)	0.20 (5.1)
		Full	B3	4.21 (106.9)	0.31 (7.9)
			B5	3.79 (96.3)	0.31 (7.9)
			B6	3.41 (86.6)	0.31 (7.9)
2-1/2	3	Compact	B3	0.33 (8.4)	0.27 (6.9)
		Full	B3	4.27 (108.5)	0.38 (9.6)
			B5	3.86 (98.0)	0.38 (9.6)
			B6	3.47 (88.1)	0.38 (9.6)
3-1/4	3-3/4	Full	B3	4.40 (111.8)	0.50 (12.7)
			B5	3.98 (101.1)	0.50 (12.7)
			B6	3.60 (91.4)	0.50 (12.7)
4	4-1/2	Full	B3	4.40 (111.8)	0.50 (12.7)
			B5	3.98 (101.1)	0.50 (12.7)
			B6	3.60 (91.4)	0.50 (12.7)
5	5-1/2	Full	B3	4.40 (111.8)	0.50 (12.7)
			B5	3.98 (101.1)	0.50 (12.7)
			B6	3.60 (91.4)	0.50 (12.7)

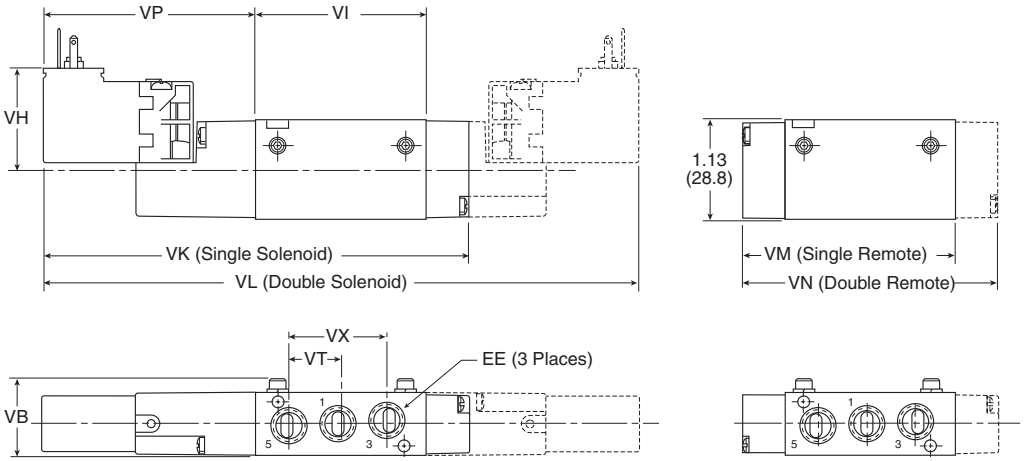
Valve	EE (NPTF)	VH	VK	VC	
B3	1/8	1.09 (27.7)	4.67 (118.6)	Compact Manifold	2.12 (53.8)
				Full Manifold	2.37 (60.2)
B5	1/4	1.12 (28.4)	5.78 (146.8)	Full Manifold	2.81 (71.4)
B6	3/8	1.12 (28.4)	6.67 (169.4)	Full Manifold	2.81 (71.4)

* VE = Dimension from edge of endcap to edge of valve body.

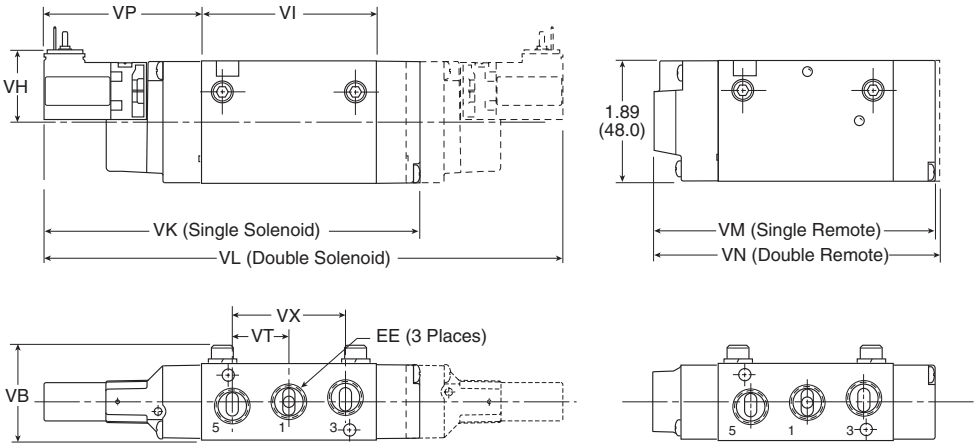
** VZ = Dimension from edge of endcap to edge of manifold.

Note: single solenoid enclosure 5 shown. For other valve or options, see pages B68-B69.

B3 Valve



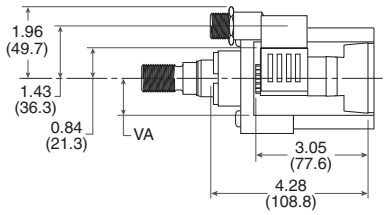
B5 and B6 Valve



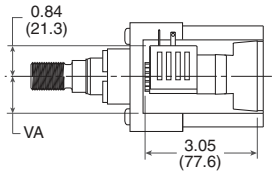
Valve Dimensions

Valve	EE (NPTF)	VB	VH	VI	VK	VL	VM	VN	VP	VT	VX
B3	1/8	0.87 (22.1)	1.09 (27.7)	1.93 (49.0)	4.67 (118.6)	6.44 (163.6)	3.12 (79.2)	3.33 (84.6)	2.25 (57.2)	0.56 (14.2)	1.12 (28.4)
B5	1/4	1.31 (33.3)	1.12 (28.4)	2.70 (68.6)	5.78 (146.8)	7.51 (190.8)	4.37 (111.0)	4.70 (119.4)	2.40 (61.0)	0.88 (22.4)	1.75 (44.5)
B6	3/8	1.31 (33.3)	1.12 (28.4)	3.60 (91.5)	6.67 (169.4)	8.41 (213.6)	5.26 (133.6)	5.59 (142.0)	2.40 (61.0)	1.17 (29.7)	2.34 (59.4)

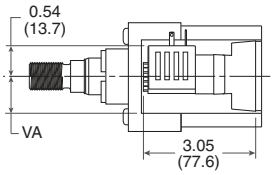
Optional Electrical Connections



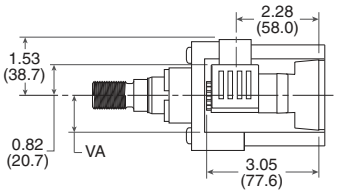
Enclosure C, D



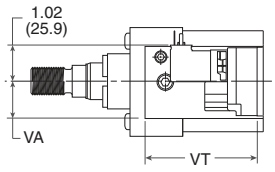
Enclosure A



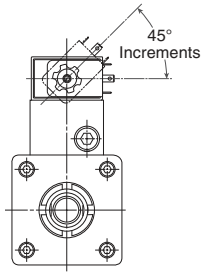
Solenoid Option A, B, C, D, F & H
(Can be rotated in 45° increments as shown)



Enclosure 5



Enclosure F & H
(B5 & B6 Only)

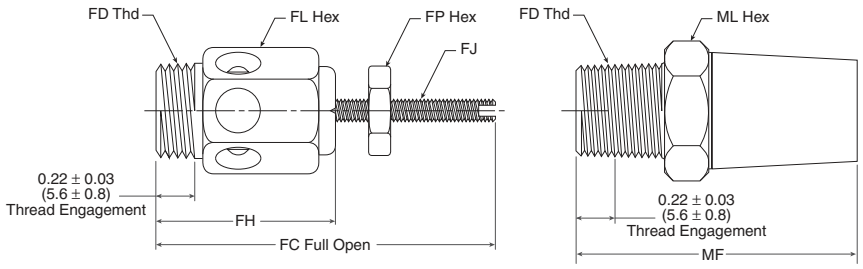


Enclosure B

Optional Electrical Connections Dimensions

Valve	VA	VT
B3	0.63 (16.0)	2.25 (57.2)
B5	1.00 (25.4)	2.40 (61.0)
B6	1.00 (25.4)	2.40 (61.0)

Optional Flow Controls / Mufflers



Optional Flow Controls / Mufflers Dimensions

Valve	FC	FD	FJ	FH	FL	FP	MF	ML
B3	1.48 (37.6)	1/8	10-32	0.90 (22.9)	1/2	3/8	1.00 (25.4)	7/16
B5	1.92 (48.8)	1/4	1/4-28	1.17 (29.7)	9/16	7/16	1.32 (33.5)	9/16
B6	1.92 (48.8)	3/8	1/4-28	1.27 (32.3)	11/16	7/16	1.54 (39.1)	11/16

Manifold Kits Without Valve

	Compact manifold	Full manifold	
Bore Size	1-1/2", 2", and 2-1/2"	1-1/2", 2" and 2-1/2"	3-1/4", 4", and 5"
Kit w/ Tubing	**L078350000**	**L078380000**	**L078390000**
Kit w/o Tubing	**L078370000**	**L078400000**	**L078410000**
Max. Stroke for Kit w/ Tubing*	34.5"	39.5"	39"
Tubing Part #	**0880383836**	**0880386336**	

Example:

Manifold Kits:

Without Tubing Include:

- Manifold
- Grease
- O-rings for all applicable valves
- All necessary fasteners
- All necessary fittings
- Assembly Instructions

With Tubing Include:

- All “without tubing” items
- 36" of appropriate tubing
  – 3/8" O.D. for compact manifold
  – 5/8" O.D. for full manifold
- See above table for maximum stroke lengths.

Valve:

To Order Valve:

- Consult latest revision of Parker Pneumatic Products (Catalog #0600P).
- Specify “T” code as port size/thread type on B3, B5 or B6 valve order.
- All valves supplied with flush, locking overrides (code ‘C’).
- Manifolds designed for 2 position valves only.

Example: B61TBCH49A defines:

B6 ACVB Single Solenoid Valve, Flush Locking Override, with 1/2" NPT conduit, using 24VDC voltage.

Flow Controls & Mufflers:

Order as separate line items.

Valve size	Port size (NPTF)	Flow control part no.	Muffler part no.
B3	1/8	**045020002**	**EM12**
B5	1/4	**045040004**	**EM25**
B6	3/8	**045060060**	**EM37**

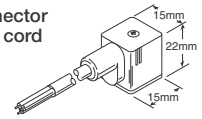
⚠ WARNING

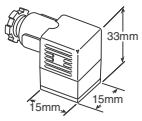
The Prestomatic fittings on the manifold and cylinder end caps are to be used in conjunction with Parker Air Brake tubing PFT-6B and PFT-10B only. The use of other tubing may not be compatible with the Prestomatic fittings. This may lead to a tubing failure which could cause the cylinder piston rod to suddenly retract or extend at high speed.

Female Electrical Connectors

15mm 3-Pin DIN 43650C

Connector with cord





Connector only

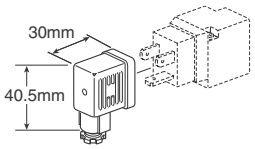
	Cord length	Connector	Connector with cord
Unlighted	6 Feet	**PS2932BP**	**PS2932JBP**
Light – 24VAC or DC	6 Feet	**PS294679BP**	**PS2946J79BP***
Light – 110/120VAC	6 Feet	**PS294683BP**	**PS2946J83BP***

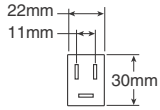
* LED with surge suppression.

Note: Max ø6.5mm cable size required for connector w/o 6' (2m) cord. IP65 rated when properly installed.

Engineering data:
Conductors: 2 poles plus ground
Cable range (connector only): 4 to 6mm (0.16 to 0.24 Inch)
Contact spacing: 8mm

22mm Rectangular 3-Pin – Type B Industrial
(Use with Enclosure "B")





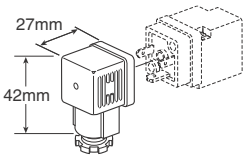
Description	Connector with 6' (2m) cord	Connector
Unlighted	**PS2429JBP**	**PS2429BP**
Light – 24V60Hz, 24VDC	**PS2430J79BP***	**PS243079BP**
Light – 120V/60Hz	**PS2430J83BP***	**PS243083BP**

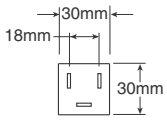
* LED with surge suppression.

Note: Max ø6.5mm cable size required for connector w/o 6' (2m) cord. IP65 rated when properly installed.

Engineering data:
Conductors: 2 poles plus ground
Cable range (connector only): 6 to 8mm (0.24 to 0.31 Inch)
Contact spacing: 11mm

30mm Square 3-Pin – ISO 4400, DIN 43650A
(Use with Enclosure "A")





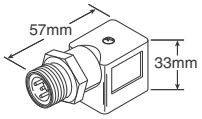
Description	Connector with 6' (2m) cord	Connector
Unlighted	**PS2028JCP**	**PS2028BP**
Light – 6-48V. 50/60Hz. 6-48VDC	**PS2032J79CP***	**PS203279BP**
Light – 120V/60Hz	**PS2032J83CP***	**PS203283BP**

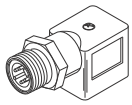
* LED with surge suppression.

Note: Max ø6.5mm cable size required for connector w/o 6' (2m) cord. IP65 rated when properly installed.

Engineering data:
Conductors: 2 poles plus ground
Cable range (connector only): 8 to 10mm (0.31 to 0.39 Inch)
Contact spacing: 8mm

3-Pin / 5-Pin Male Automotive Connectors
(Use on 22mm Rectangular 3-Pin Solenoid)

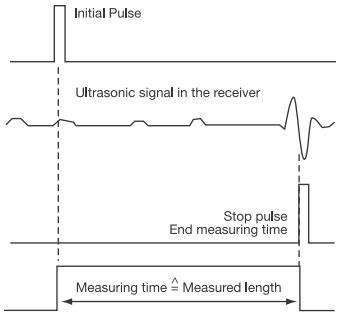




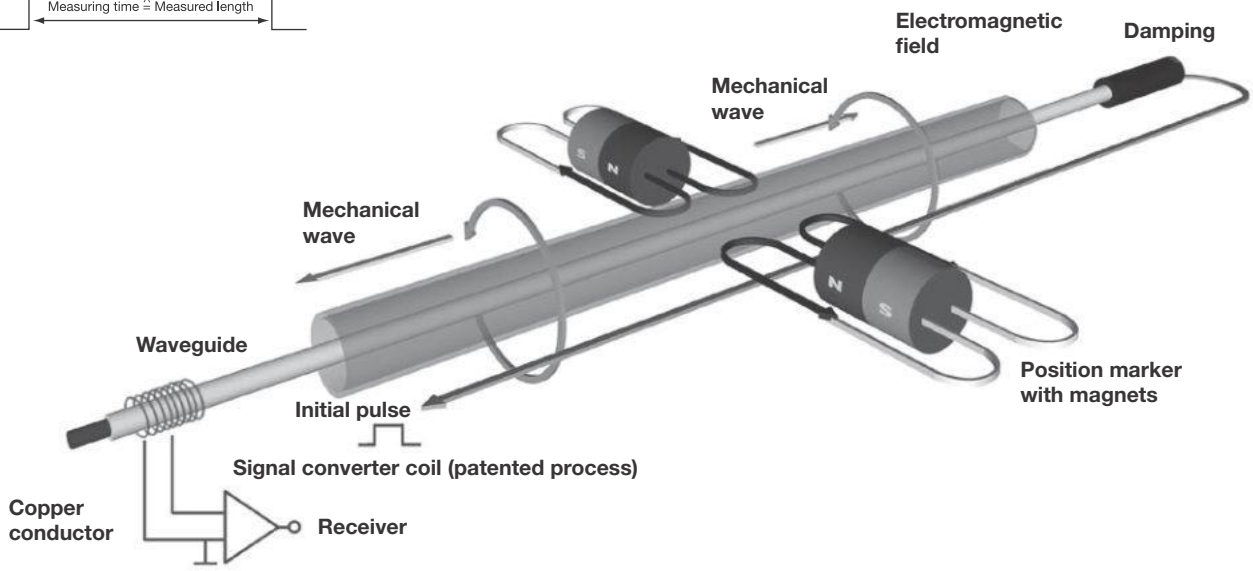
Description	3-pin	5-pin
Unlighted	**PS2893CP**	**PS2893DP**
Lighted - Voltage	**PS2893C##P**	**PS2893D83P**

— 79 = 24VDC & 24VAC
83 = 120VAC

Linear Position Sensor for Continuous Position Feedback



Generation of the ultrasonic torsion pulse in a metallic conductor based on the principle of magnetostriction.



Principles of Operation

The measuring element ("waveguide"), consists of a special nickel-alloy tube.

A copper conductor is introduced through the length of this tube. The start of measurement is initiated by a short current pulse.

This current generates a circular magnetic field which rotates around the waveguide. A permanent magnet at the point of measurement is used as the marker element, whose lines of field run at right angles to the electromagnetic field. In the area on the waveguide where the two fields intersect, a magneto-strictive effect causes an elastic deformation of the waveguide, which propagates along the wave guide in both directions in the form of a mechanical wave.

The propagation velocity of this wave in the waveguide is 2830 m/s, and is nearly insensitive to environmental effects (e.g., temperature, shock, contamination).

The component of the wave which reaches the far end of the waveguide is damped there, whereas the component which arrives at the signal converter is changed into an electrical signal by reversing the magnetostrictive effect. The wave travel time from its point of origin to the signal converter is directly proportional to the distance between the permanent magnet and the signal converter. A time measurement then allows the distance to be determined with extremely high accuracy.

Design

The transducers are made to the same safety and reliability standards for use in the harshest conditions:

- The electronics unit is compactly designed using SMD technology. The boards are protected in a space-saving, rugged aluminum extruded housing.
- The waveguide is protected in the extruded aluminum housing.

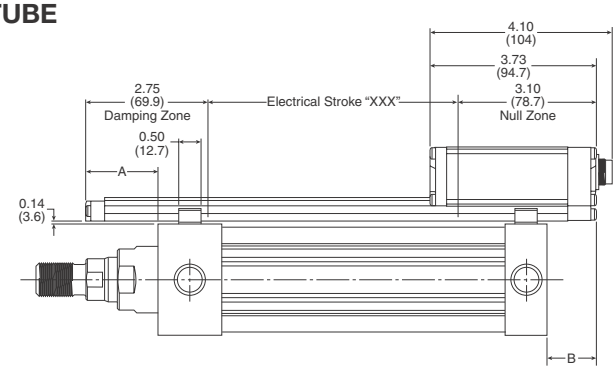
Quality

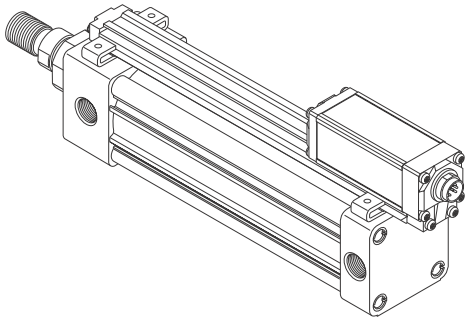
Each and every transducer undergoes a specially designed, computer-controlled testing procedure which includes 100% checking of all specified data.

The drawings below show that the Linear Position Sensor is longer than the cylinder of the same stroke length. The sensor overhang on the head end of the cylinder, as indicated by dimension A, may be eliminated by adding stop tubing, which effectively increases the gross stroke of the cylinder. The recommended stop tube lengths are provided in the table below for each bore size. The examples show that the electrical stroke of the sensor will always match the **net** stroke of the cylinder.

As a result of the limited sensing range of the sensor, it will overhang at the cap end of the cylinder by the amount of dimension B.

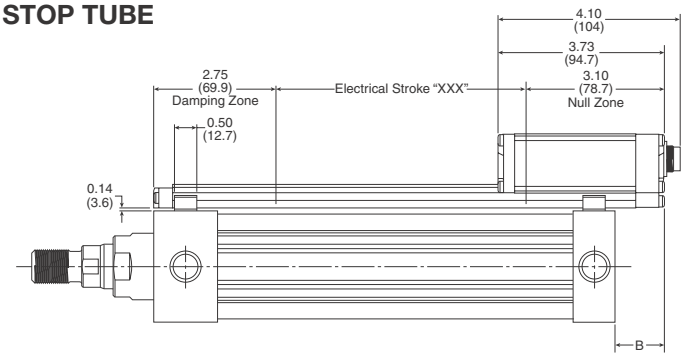
NO STOP TUBE

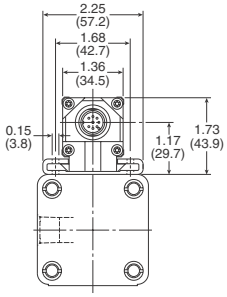




Example A: 12" Stroke cylinder without stop tube equals 12" Electrical Stroke for the Sensor.

WITH STOP TUBE

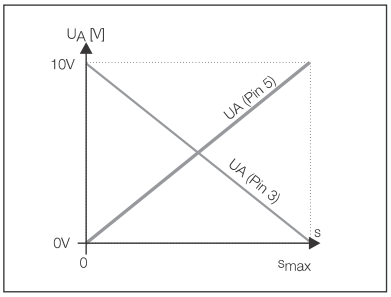
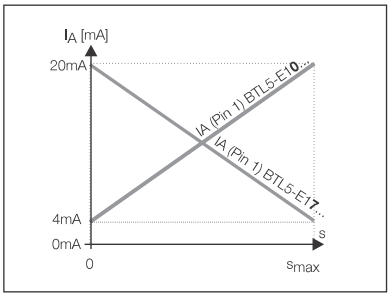




Example B: To eliminate sensor overhang on the head end of a 2.0" bore cylinder, add 1.0" of recommended stop tube length. The cylinder gross stroke becomes 13" and the net stroke remains 12". Specify a sensor with an electrical stroke of 12". Note that the electrical stroke equals cylinder **net** stroke length.

Example C: To eliminate sensor overhang on the head end of a 5.0" bore cylinder, add 0.625" of recommended stop tube length. The cylinder gross stroke becomes 12.625" and the net stroke remains 12". Specify a sensor with an electrical stroke of 12". Note that the electrical stroke equals cylinder **net** stroke length.

			No stop tube		With stop tube		
Bore	Rod code	Rod diameter	A	B	Stop tube length	A_1	B
2	1	5/8	0.95	1.3	1.0	0	1.3
	3	1					
2-1/2	1	5/8	0.90	1.25	1.0	0	1.25
	3	1					
3-1/4	1	1	0.64	1.0	0.75	0	1.0
	3	1-3/8					
4	1	1	0.63	0.99	0.75	0	0.99
	3	1-3/8					
5	1	1	0.55	0.79	0.625	0	0.79
	3	1-3/8					
6	1	1-3/8	0.47	0.46	0.50	0	0.45
	3	1-3/4					
8	1	1-3/8	0.28	0.44	0.375	0	0.44
	3	1-3/4					

Output signal		analog	analog
Transducer interface		**A**	**E**
Input interface		analog	analog
			
Ordering code		BTL5-**A11**-M_ _ _ _-RSU022S32	BTL5-**E1**_-M_ _ _ _-RSU022S32
Output voltage		**0...10 V**	
Output current			**4...20 mA**
Load current		max. 10 mA	
Max. ripple		≤ 5 mV	
Load resistance			≤ 500 Ohm
System resolution		≤ **0.1 mV**	≤ **0.2 µA**
Hysteresis		≤ 4 µm	
Repeatability		6 µm (hysteresis + resolution)	
Output update rate		STANDARD = 1 ms ≤1400 mm	
Max. non-linearity		±100 µm to 500 mm stroke	
		±0.02 % 501...3606 mm stroke	
Temperature coefficient	Voltage output	[150 µV/°C + (5 ppm/°CxPxU/L)]xDT	
	Current output	[0.6 µA/°C + (10 ppm/°CxPxI/L)]x DT	
Shock loading		100 g/11 ms per IEC 68-2-27	
Vibration		12 g, 10...2000 Hz per IEC 68-2-6	
Traverse velocity of magnet		any	
Operating voltage		24 V DC ± 20%	
Current draw		≤150 mA	
Polarity reversal protected		yes	
Overvoltage protection		Transzorb protection diodes	
Dielectric constant		500 V (Ground to housing)	
Operating temperature		-40...185 °F (-40...85°C)	
Storage temperature		-40...212 °F (-40...100°C)	

S32 Pin assignments	Pin	Color	BTL5-**A11**...	BTL5-**E1**...BTL5-**E7**...
Output signals	1	YE	not used	4...20 mA 20...4 mA
	2	GY	signal GND	0 V output
	3	PK	10...0 V	10...0 V
	5	GN	0...10 V	0...10 V
Supply voltage	6	BU	GND	GND
	7	BN	+24 V DC	+24 V DC
	8	WH	(GND)	(GND)

Connect shield to housing.

Specifications subject to change.

Please enter code for output signal and nominal stroke in ordering code.

BTL transducers with analog outputs are available in the ranges of 0...10V, 4...20mA with rising or falling signal.

Ordering Sample:

BTL5-A11-M_ _ _ _-R-SU 022S32

Output signal
1 increasing and decreasing (for A)
0 increasing
7 decreasing (for E)

Standard stroke lengths (mm)

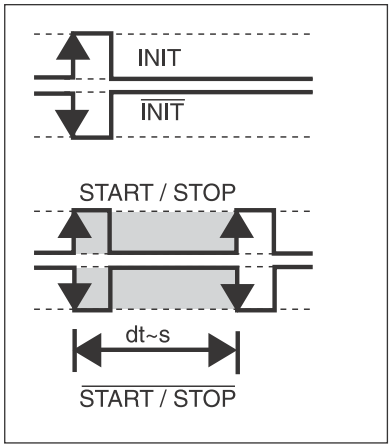
M Interface

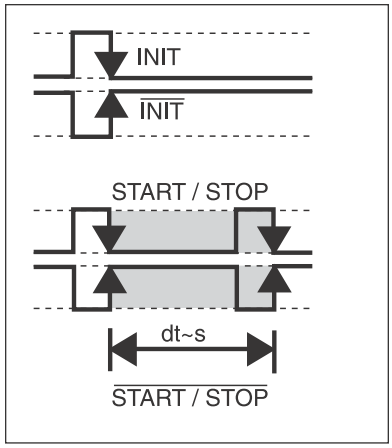
Differential **START/STOP** control-specific interface.

P Interface

Compatible with BTA processors and various OEM controls. Reliable signal transmission, even over cable lengths up to 500 m (1640 ft.) between BTA and BTL, is assured by the especially noise-immune RS485 differential drivers and receivers. Noise signals are effectively suppressed.

Series	BTL5 Low Profile	BTL5 Low Profile
Transducer interface	pulse **M**	pulse **P**
User interface	pulse **M**	pulse **P**





Ordering code	BTL5-**M**1-M_ _ _ _-RSU022S32	BTL5-**P**1-M_ _ _ _-RSU022S32
System resolution	Process-dependent/control dependent	
Repeatability	Hysteresis + Resolution	
Resolution	≤ 2 µm	
Hysteresis	≤ 4 µm	
Standard sampling rate	STANDARD = 1 kHz ≤1400 mm	
Max. non-linearity	±100 µm to 500 mm nominal stroke	
	±0.02 % 501...3750 mm nominal stroke	
Temperature coefficient of overall system	(6 µm + 5 ppm x L)/°C	
Traverse velocity of magnet	any	
Operating voltage	24 V DC ±20 % or ±15V DC ±2% (optional)	
Current draw	≤ 100 mA	
Operating temperature	–40...185 °F (-40...85°C)	
Storage temperature	–40...212 °F (-40...100°C)	

S32 Pin assignments		Pin	Color	BTL5-**M**1-M...	BTL5-**P**1-M...
Input/output signals	Input	1	YE	INIT	INIT
	Output	2	GY	START/STOP	START/STOP
	Input	3	PK	INIT	INIT
	Output	5	GN	START/STOP	START/STOP
Supply voltage		6	BU	GND	GND
		7	BN	+24 V DC	+24 V DC
		8	WH	(GND)	(GND)

Shield connected to housing

Specifications subject to change.

Please enter code for nominal stroke in ordering code.

Ordering Sample:

BTL5-P1-M_ _ _ _-R-SU 022S32

Output signal

Standard stroke lengths (mm)

Sensor Ordering Code

BTL-5 – A 1 1 – M 0305 - R SU022 S32

Output Signal	
A	0...10V
E	4...20mA
M	Differential Start/Stop, leading edge active
P	Differential Start/Stop, trailing edge active

Supply Voltage	
1	24 V ±20%

Output Signal (Analog only)	
1	Vmin or Vmax at Connector End, i.e. user selectable rising or falling*
0	Imin at Connector End (rising toward opposite end)**
7	Imax at Connector End (falling toward opposite end)**

* Available only with 0...10V output signal (A).
** Available only with 4...20mA output signal (E).

Nominal Stroke
Specify whole mm using 4 digits, i.e. 0305 = 305mm active electrical stroke*

* Electrical stroke = net cylinder stroke.

Housing Geometry	
R	Low Profile Extrusion

Connection Type	
S32	8-pin Quick Disconnect Metal Connector
KA05	Integral Axial Cable (specify cable length in whole meters using 2 digits, i.e. 05 = 5m)

Please see page B3 or B19 to order 4MA cylinder configuration.

Standard Lengths

Electrical Stroke

inches	mm
2	0051
3	0077
4	0102
5	0127
6	0152
7	0178
8	0203
9	0230
10	0254
11	0280
12	0305
13	0330

inches	mm
15	0381
16	0407
18	0457
20	0508
22	0560
24	0610
26	0661
28	0711
30	0762
32	0813
36	0914
40	1016

inches	mm
42	1067
48	1220
50	1270
60	1524
70	1778
80	2032
90	2286
100	2540
110	2794
120	3048

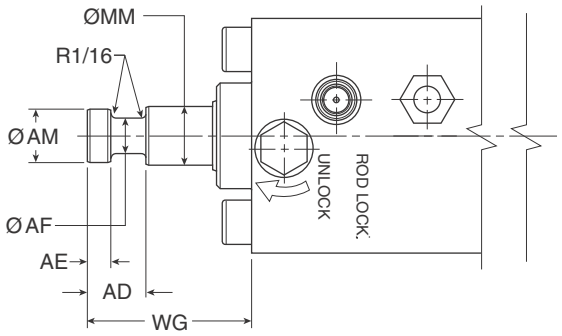
S32 Cables

Length	
5M	**BKS-S32M-05**
10M	**BKS-S32M-10**

Parker "Style 55" Piston Rod End

Rod end flange coupling for Parker 4MA, 4ML and 4MAJ Series cylinders:

- Simplifies alignment
- Reduces assembly time
- Allows full rated pneumatic pressure in push and pull directions
- Available in 5/8" through 1-3/4" piston rod diameters



Example: Style 55 Rod End shown on 4MAJ Series cylinder

How To Order

Complete Model Number and place a "55" in the Piston Rod End designator position.

Example: 2.00 CJ4MAJU155C 6.000

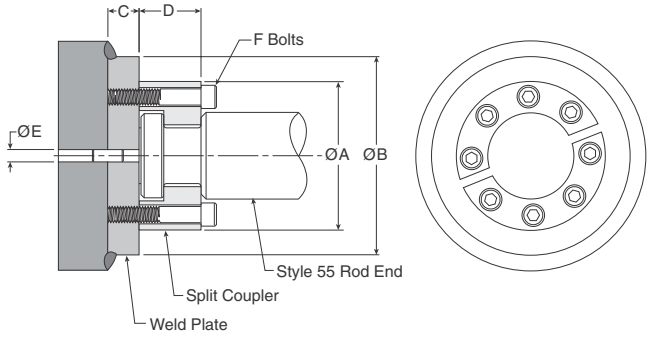
Consult factory for availability of mounting accessories and hardware.

Style 55 Rod End Dimensions

Rod dia. MM	AD	AE	AF	AM	WG
5/8	5/8	1/4	3/8	.57	1-3/4
1	1-5/16	3/8	11/16	.95	2-3/8
1-3/8	1-1/16	3/8	7/8	1.32	2-3/4
1-3/4	1-5/16	1/2	1-1/8	1.70	3-1/8

See 4MA or 4MAJ Series sections for more dimensions.

Split Couplers and Weld Plates



⚠ WARNING: Piston rod separation from the machine member can result in severe personal injury or even death to nearby personnel. The cylinder user must make sure the weld holding the weld plate to the machine is of sufficient quality and size to hold the intended load. The cylinder user must also make sure the bolts holding split coupler to the weld plate are of sufficient strength to hold the intended load and installed in such a way that they will not become loose during the machine's operation.

NOTE: Screws are not included with split coupler or weld plate.

Table 1
Part Numbers and Dimensions

Rod dia.	A	B	C	D	E	F	Bolt size	Bolt circle	Split coupler part no.	Weld plate part no.
0.625	1.50	2.00	0.50	0.56	0.250	4	#10-24 x .94 LG	1.125	**1472340062**	**1481740062**
1.00	2.00	2.50	0.50	0.88	0.250	6	.250-20 x 1.25 LG	1.500	**1472340100**	**1481740100**
1.375	2.50	3.00	0.63	1.00	0.250	6	.312-18 x 1.50 LG	2.000	**1472340138**	**1481740138**
1.75	3.00	4.00	0.63	1.25	0.250	8	.312-18 x 1.75 LG	2.375	**1472340175**	**1481740175**

NOTE: All dimensions without a tolerance are reference dimensions.

Metric Rod Threads

Standard metric thread sizes for piston rod thread type M.

Rod dia. MM	Styles 4 & 9 KK	Style 8 CC
3/8	M6 x 1.0	M8 x 1.25
1/2	M8 x 1.25	M12 x 1.25
5/8	M10 x 1.5	M12 x 1.5
1	M20 x 1.5	M22 x 1.5
1-3/8	M26 x 1.5	M30 x 2.0
1-3/4	M33 x 2.0	M39 x 2.0

NOTE: All other rod end dimensions are standard per catalog.

Check Seal Cushions

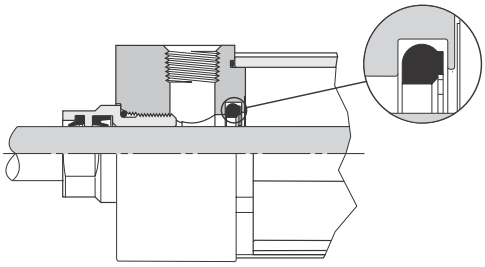
For Increased Productivity and Maximum Performance

The check seal cushion is new and different from ordinary cushion designs. It combines the sealing capabilities of a lipseal for efficient capture of air to effectively cushion and to provide check valve action for quick stroke reversal.

The design also provides “floating cushions” to assure cushion repeatability and long life. At the start of the stroke in each direction, the check valve design allows full flow to piston face with a minimum pressure drop for a maximum power stroke.

Additional benefits of the new check seal cushions are increased productivity and top performance for faster cycle time, minimum wear, easy adjustment and low pressure drop.

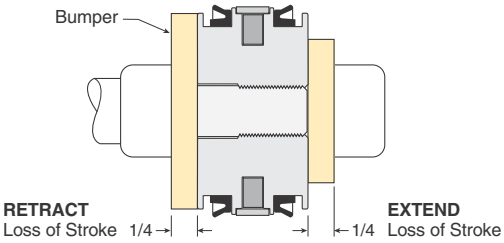
The basic cushion design is available at both ends without change in envelope or mounting dimensions. A captive cushion adjusting needle is supplied for easy, precise adjustment on all bore sizes.



Bumpers

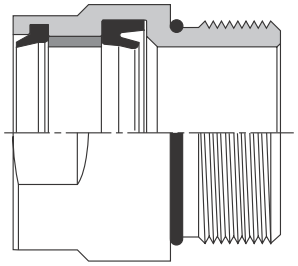
Impact dampening conventional bumpers can be provided on one or both sides of the piston with a 1/4" stroke loss per bumper. This style of bumper is ideal for applications subjected to high speeds where cycle time may discourage the use of cushions.

Available in 1-1/2" - 4" bore sizes for 4MA, 4ML and 4MAJ Series cylinders.



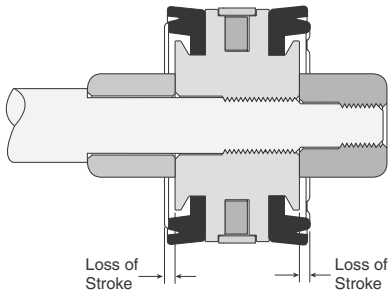
HI LOAD Gland Assembly

Applications with inherent side load require a slide package for maximum service life. In some cases, there may be limitations to the size or expense of these additional components. One possible solution may be the use of the optional HI LOAD gland assembly that incorporates a high strength composite bearing for radial load conditions. Extensive testing showed an approximate 50% increase in service life for general applications. Please note that each application is unique and results may vary. Includes seal options for standard, high and low temperature applications with air (4MA) or hydraulic (4ML) service.



Bumper Seal Option

Impact dampening Bumper Seals are now optional on all 4MA and 4MAJ cylinders from 1-1/2" to 5" bore. The Bumper Seal piston combines the features of low-friction, rounded lipseals and impact-damping bumpers to provide reduced noise and smoother end-of-stroke deceleration. At pressure greater than 80 PSI, the compressible Buna Nitrile or Fluorocarbon Bumper Seal has minimal effect on stroke loss. When specified, Bumper Seals will be supplied on both ends of the piston, eliminating the need to specify head end or cap end only.



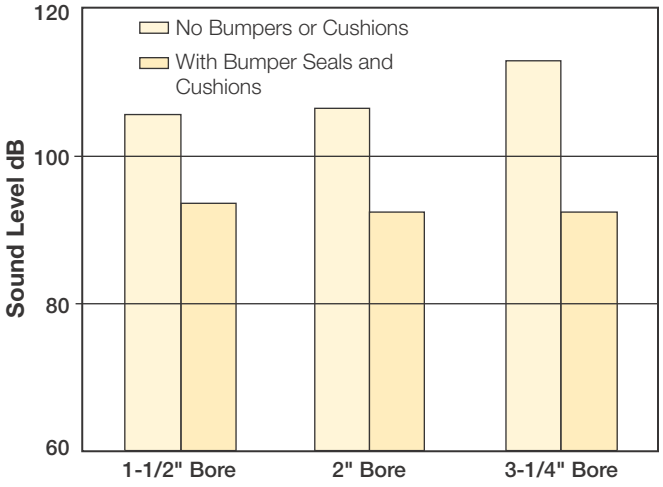
Summary of Accelerometer Test Results

Bore Size	Piston Type	Cushioning Efficiency (Maximum G's of Deceleration Force Created)	Cushioning Time (ms)
1-1/2"	Standard Piston	13.4	22
	Bumper Seal Piston	5.1	22
2"	Standard Piston	12.6	33
	Bumper Seal Piston	7.8	26
2-1/2"	Standard Piston	12.2	36
	Bumper Seal Piston	5.2	24

Bumper Seals Reduce Noise

The special profile of the Bumper Seal prevents the piston from noisily banging into the end cap at the end of stroke. Independent testing shows that the Bumper Seal, when combined with cushions, will absorb the final piston inertia and reduce the stroke noise by as much as 20 dB. The Sound Level Comparison graph illustrates the noise-reducing effects of the Bumper Seal piston when combined with cushions.

Impact noise was recorded at a distance of 3 feet from the front of the cylinder, inside a semi-anechoic chamber. Cylinders were operating at 95 PSI.



Sound Level Comparison

Bumper Seals have Minimum Effect on Stroke Length

The accompanying chart depicts typical amounts of overall stroke loss incurred at various system pressures. The amount of stroke loss may vary slightly due to design tolerances of seal size, variance in seal durometer and compression set associated with cylinder wear. To determine the stroke loss at either end of the cylinder, divide the values by two.

Pressure (PSI)	Typical Overall Loss of Stroke (inch) by Bore Size				
	1-1/2"	2"	2-1/2"	3-1/4"	4"
0	0.16	0.13	0.19	0.22	0.22
20	0.12	0.11	0.12	0.18	0.18
40	0.10	0.08	0.09	0.12	0.12
60	0.08	0.07	0.07	0.09	0.09
80	0.06	0.05	0.05	0.06	0.06
100	0.05	0.03	0.02	0.04	0.04

1-1/2" to 8" Bore Cylinder Accessories

Rod end accessories can be selected by cylinder rod end thread size from Table A & B below. Mating parts for rod end accessories are listed just to the right of the knuckle or clevis selected. Mounting plates for style MP1 & MP4 cylinder mounts are selected by bore size from Table C.

TABLE A

Rod end thread size	Mating parts: Female rod clevis	Mating parts: Eye bracket	Mating parts: Pivot pin
7/16-20	**1458030044**	**1458060050**	**0856640050**
1/2-20	**1458030050**	**1458060050**	**0856640050**
3/4-16	**1458030075**	**1458060075**	**0856640075**
7/8-14	**1458030088**	**1458060100**	**0856640100**
1-14	**1458030100**	**1458060100**	**0856640100**
1-1/4-12	**1458030125**	**1458060138**	**0856640138**
1-1/2-12	**1458030150**	**1458060175**	**0856640175**

TABLE B

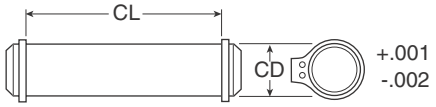
Mating parts: Knuckle	Mating parts: Clevis bracket	Mating parts: Pivot pin
1458040044	**1458050050**	**0856640050**
1458040050	**1458050050**	**0856640050**
1458040075	**1458050075**	**0856640075**
1458040088	**1458050100**	**0856640100**
1458040100	**1458050100**	**0856640100**
1458040125	**1458050138**	**0856640138**
1458040150	**1458050175**	**0856640175**

TABLE C

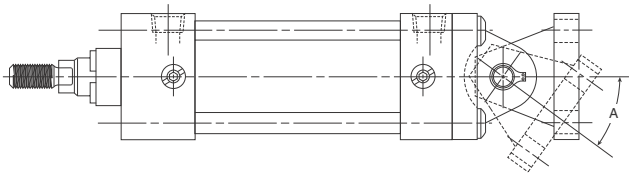
Bore size	Mounting plates: For mtg. style MP1 cylinder	Mounting plates: For mtg. style MP4 cylinder
1-1/2	**1458060050**	**1458050050**
2	**1458060050**	**1458050050**
2-1/2	**1458060050**	**1458050050**
3-1/4	**1458060075**	**1458050075**
4	**1458060075**	**1458050075**
5	**1458060075**	–
6	**1458060100**	–
8	**1458060100**	–

Pivot Pin

Note: Pivot Pin must be ordered separately for single lug pivot mounting.



Symbol	0856640044	0856640050	0856640075	0856640100	0856640138	0856640175
CD	7/16	1/2	3/4	1	1-3/8	1-3/4
CL	1-5/16	1-7/8	2-5/8	3-1/8	4-1/8	5-3/16
Shear Cap. (lbs)	6600	8600	19300	34300	65000	105200



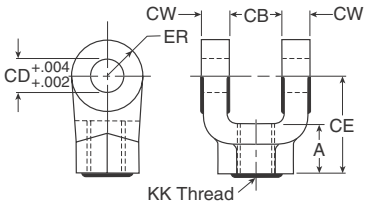
Maximum Pivot Angle for Rear Clevis Mounts (BB Mounts) and Accessories

Bore	1-1/2	2	2-1/2	3-1/4	4	5	6	8
Angle A	52	43	29	50	49	45	42	42

Note:
4MA Cylinder Mounting Kits and assembly instructions can be found on page B82.

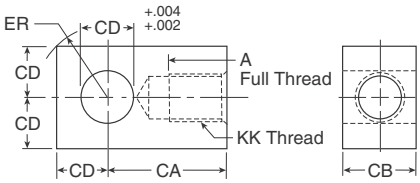
These kits can all be bolted onto cylinders with standard TEF mounts.

Female Rod Clevis



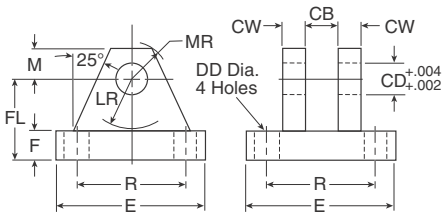
Symbol	1458030044	1458030050	1458030075	1458030088	1458030100	1458030125	1458030150
A	3/4	3/4	1-1/8	1-5/8	1-5/8	2	2-1/4
CB	3/4	3/4	1-1/4	1-1/2	1-1/2	2	2-1/2
CD	1/2	1/2	3/4	1	1	1-3/8	1-3/4
C E	1-1/2	1-1/2	2-1/8	2-15/16	2-15/16	3-3/4	4-1/2
CW	1/2	1/2	5/8	3/4	3/4	1	1-1/4
ER	1/2	1/2	3/4	1	1	1-3/8	1-3/4
KK	7/16-20	1/2-20	3/4-16	7/8-14	1-14	1-1/4-12	1-1/2-12
Load Capacity (lbs)	4250	4900	11200	18800	19500	33500	45600

Rod Eye Knuckle



Symbol	1458040044	1458040050	1458040075	1458040088	1458040100	1458040125	1458040150
A	3/4	3/4	1-1/8	1-1/8	1-5/8	2	2-1/4
CA	1-1/2	1-1/2	2-1/16	2-3/8	2-13/16	3-7/16	4
CB	3/4	3/4	1-1/4	1-1/2	1-1/2	2	2-1/2
CD	1/2	1/2	3/4	1	1	1-3/8	1-3/4
ER	23/32	23/32	1-1/16	1-7/16	1-7/16	1-31/32	2-1/2
KK	7/16-20	1/2-20	3/4-16	7/8-14	1-14	1-1/4-12	1-1/2-12
Load Capacity (lbs)	5000	5700	12100	13000	21700	33500	45000

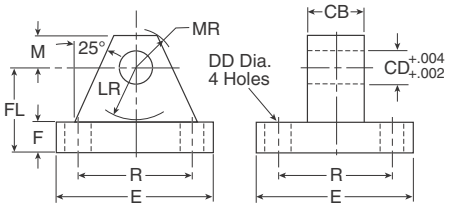
Clevis Bracket



* Wall mount - will not mount directly to rear of cylinder.

Symbol	1458050044	1458050050	1458050075	1458050100	1458050138	1458050175
CB	15/32	3/4	1-1/4	1-1/2	2	2-1/2
CD	7/16	1/2	3/4	1	1-3/8	1-3/4
CW	3/8	1/2	5/8	3/4	1	1-1/4
DD	17/64	13/32	17/32	21/32	21/32	29/32
E	2-1/4	3-1/2	5	6-1/2	7-1/2	9-1/2
F	3/8	1/2	5/8	3/4	7/8	7/8
FL	1	1-1/2	1-7/8	2-1/4	3	3-5/8
LR	5/8	3/4	1-3/16	1-1/2	2	2-3/4
M	3/8	1/2	3/4	1	1-3/8	1-3/4
MR	1/2	5/8	29/32	1-1/4	1-21/32	2-7/32
R	1.75	2.55	3.82	4.95	5.73	7.50
Load Capacity (lbs)	3600	7300	14000	19200	36900	34000

Mounting Plate & Eye Bracket



* Wall mount - will not mount directly to rear of cylinder.

Symbol	1458060031	1458060050	1458060075	1458060100	1458060138	1458060175
CB	15/16	3/4	1-1/4	1-1/2	2	2-1/2
CD	15/16	1/2	3/4	1	1-3/8	1-3/4
DD	17/64	13/32	17/32	21/32	21/32	29/32
E	2-1/4	2-1/2	3-1/2	4-1/2	5	6-1/2
F	3/8	3/8	5/8	7/8	7/8	1-1/8
FL	1	1-1/8	17/8	2-3/8	3	3-3/8
LR	5/8	3/4	1-1/4	1-1/2	2-1/8	2-1/4
M	3/8	1/2	3/4	1	1-3/8	1-3/4
MR	1/2	9/16	7/8	1-1/4	1-5/8	2-1/8
R	1.75	1.63	2.55	3.25	3.82	4.95
Load Capacity (lbs)	1700	4100	10500	20400	21200	49480

Mounting Kit Assembly

Perform the following steps when installing mounting kits onto 1-1/2" - 5" bore 4MA and 4ML cylinders with the standard mount (TE or TEF).

1. Clean mating parts to remove oil, grease and dirt.
2. Fasteners should be clean, dry and burr free.
3. Brush mounting fastener threads thoroughly with anti-seize lubricant.
4. Follow the appropriate procedure below for the desired mounting.

Rear Pivot Mounting Kits – Styles BB, BC and BE (Fig. 1)
Place pivot mount over end cap, lining up the four fastener holes in the end cap with the pivot mounting plate. Note that the pivot mount can be rotated allowing for different cylinder port locations. Secure mounting to cylinder cap (finger tight) using the four fasteners. Torque the fasteners to the specifications in the table below.

End Angle Mounting Kit – Styles CB (Fig. 2)
The end angles bolt to the front and rear of the cylinder end caps. The spacer plate** provided is to be assembled at the rod end under the angle plate. Line up the two holes of the spacer plate and angle plate with the two fastener holes in the cylinder head. If 2 different length fasteners are in the kit, use the longer fasteners for the cylinder head end (rod end) mount. Secure (finger tight) using two fasteners. Repeat this assembly at the opposite end (less spacer). Place the assembly with the end angles down on a flat surface and torque the four fasteners to the specifications shown in the table below.

Flange Mounting Kits – Styles J and H Single and Double Rod Cylinders (Fig. 3)
Place rectangular flange plate over appropriate end cap. Line up the four holes in the mounting plate with the four fastener holes in the cylinder end cap. Note that the rectangular mounting plate can be rotated to allow for different port locations. Secure the rectangular mounting plate to the end cap (finger tight) using the four fasteners. Then torque the four fasteners to the specifications shown in the table below.

Side End Lug Mounting Kits – Style G (Fig. 4)
Attach the two longer lugs with the fasteners provided in the kit to the cylinder head as shown. Attach the two shorter lugs to the cylinder cap in a similar fashion. Place the assembly with the lugs down on a flat surface and torque the four fasteners to the specifications shown in the table below.

Fig. 1 - Pivot Mounting Kit

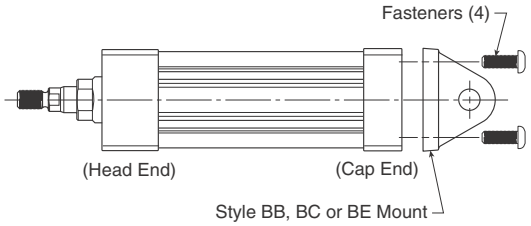


Fig. 2 - End Angle Mounting Kit

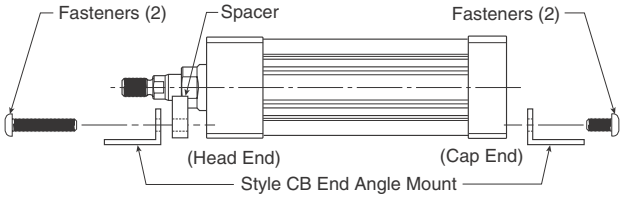


Fig. 3 - Flange Mounting Kit

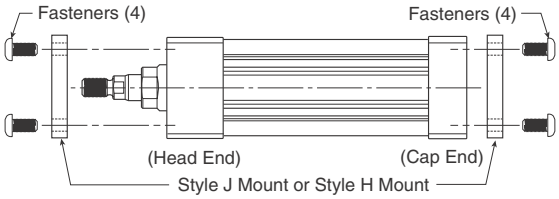
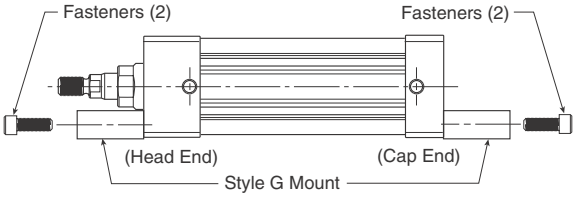


Fig. 4 - Side End Lug Mounting Kit - Style MS7



Mounting Kits

Bore Size	J (MF1) Head rectangular flange Kit number	H (MF2) Cap rectangular flange Kit number	BB (MP1) Cap fixed clevis Kit number	BC (MP2) Cap detachable clevis Kit number	BE (MP4) Cap detachable eye Kit number	CB (MS1) Side end angles Kit number	G (MS7) Side end lug Kit number	Kit fastener torque units USA inch-lbs	Kit fastener torque units Metric Nm
1-1/2	**L079700150**	**L079700150**	**L079710150**	**L079730150**	**L079720150**	**L079740150**	**L079750150**	32 - 36	3.6 - 4.1
2	**L079700200**	**L079700200**	**L079710200**	**L079730200**	**L079720200**	**L079740200**	**L079750200**	72 - 82	8 - 9
2-1/2	**L079700250**	**L079700250**	**L079710250**	**L079730250**	**L079720250**	**L079740250**	**L079750250**	72 - 82	8 - 9
3-1/4	**L079700325**	**L079700325**	**L079710325**	**L079730325**	**L079720325**	**L079740325**	**L079750325**	216 - 228	24 - 25.3
4	**L079700400**	**L079700400**	**L079710400**	**L079730400**	**L079720400**	**L079740400**	**L079750400**	216 - 228	24 - 25.3
5	**L079700500**	**L079700500**	**L079710500**	**L079730500**	N/A	**L079740500**	N/A	360 - 372	41 - 42

** Spacer plate not used for 4" bore or double rod cylinders

Gland Kits (Gland cartridges and rod seals)

Pneumatic service only

Temperatures:

- Nitrile -10°F to 165°F (-23°C to 74°C)
- Fluorocarbon -10°F to 250°F (-23°C to 121°C)

Servicing the rod gland (Cylinder disassembly is not required)

Air leakage around the piston rod at the gland area will normally indicate a need to replace the gland cartridge.

The Parker 4MA gland is a unique cartridge design. It is threaded into the cylinder head and all sizes are removable without disturbing the endcap fasteners.

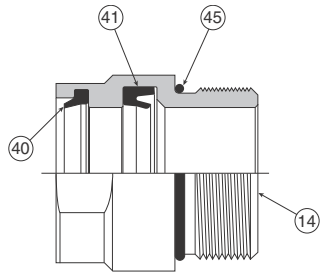
To remove the old gland cartridge from the cylinder:

1. Inspect the piston rod to be sure it is free of burrs or other foreign material that would prevent sliding the gland off the rod.
2. Disconnect any attachments to the piston rod end thread.
3. Lubricate the rod with Lube-A-Cyl (included in kit).
4. Unscrew the gland cartridge from the head using the appropriate wrench (see D1 dimension in catalog).
5. Slide the gland cartridge off the piston rod.
6. Verify that the gland-to-head o-ring (#45) is also removed from the head.

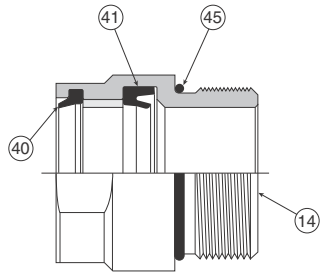
To install the new gland cartridge onto the cylinder:

1. Re-inspect the surface of the piston rod for scratches, dents and other surface damage, and repair if necessary.
2. Clean and lubricate the surface of the piston rod with Lube-A-Cyl (included in kit).
3. Lubricate the rod wiper (#40), rod seal (#41), o-ring (#45) and the inside surfaces of the gland cartridge with Lube-A-Cyl.
4. Slide the gland cartridge onto the piston rod, align it with the threads in the head, and tighten (clockwise) until seated firmly against the head.
5. Torque the gland cartridge to the specifications shown below. Tools are available to assist this process (see below).

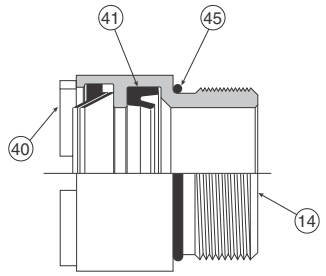
   Note: Make sure the gland cartridge is sufficiently tight. Failure to do so may result in loosening during operation.



Standard Rod Gland



HI LOAD Rod Gland (includes composite bearing)



Metallic Rod Wiper Gland

Rod dia.	Standard & HI LOAD gland Gland wrench	Metallic rod wiper gland Gland wrench	Spanner wrench
5/8	0695800000	0695900000	0116760000
1	0695810000	0695910000	0116760000
1-3/8	0695820000	0695920000	0117030000
1-3/4	0695830000	0695930000	0116770000

Every gland cartridge kit contains 1 each of the following:

Symbol	Description
14	Gland
40	Rod Wiper
41	Rod Seal
45	O-ring - Gland to head

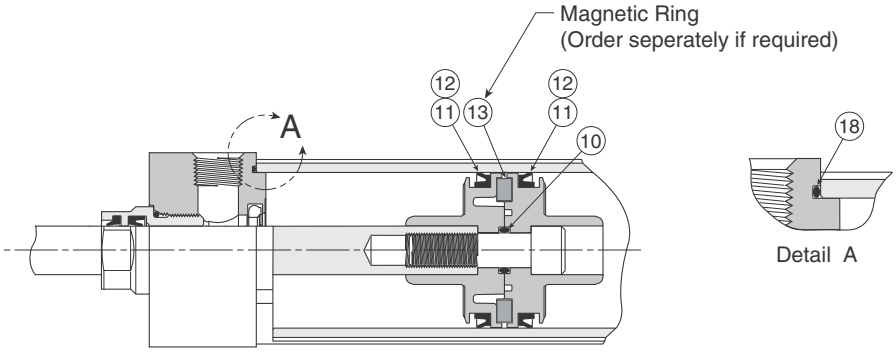
Bore size	Rod dia.	Rod no.	Standard rod gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45: Nitrile seals kit number	Fluorocarbon seals kit number	HI LOAD rod gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45: Nitrile seals kit number	Fluorocarbon seals kit number	Metallic rod wiper gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45: Nitrile & PUR seals kit number	Fluorocarbon seals kit number	Gland to head torque units: USA ft-lbs	Metric N-m
1-1/2	5/8	1	RG04MA0061	RG04MA0065	RG04MAH061	RG04MAH065	RG04MAM061	RG04MAM065	40 - 45	54 - 61
	1	2	RG04MA0101	RG04MA0105	RG04MAH101	RG04MAH105	RG04MAM101	RG04MAM105	45 - 50	61 - 68
2	5/8	1	RG04MA0061	RG04MA0065	RG04MAH061	RG04MAH065	RG04MAM061	RG04MAM065	40 - 45	54 - 61
	1	3	RG04MA0101	RG04MA0105	RG04MAH101	RG04MAH105	RG04MAM101	RG04MAM105	45 - 50	61 - 68
2-1/2	5/8	1	RG04MA0061	RG04MA0065	RG04MAH061	RG04MAH065	RG04MAM061	RG04MAM065	40 - 45	54 - 61
	1	3	RG04MA0101	RG04MA0105	RG04MAH101	RG04MAH105	RG04MAM101	RG04MAM105	45 - 50	61 - 68
3-1/4	1	1	RG04MA0101	RG04MA0105	RG04MAH101	RG04MAH105	RG04MAM101	RG04MAM105	45 - 50	61 - 68
	1-3/8	3	RG04MA0131	RG04MA0135	RG04MAH131	RG04MAH135	RG04MAM131	RG04MAM135	75 - 80	102 - 108
4	1	1	RG04MA0101	RG04MA0105	RG04MAH101	RG04MAH105	RG04MAM101	RG04MAM105	45 - 50	61 - 68
	1-3/8	3	RG04MA0131	RG04MA0135	RG04MAH131	RG04MAH135	RG04MAM131	RG04MAM135	75 - 80	102 - 108
5	1	1	RG04MA0101	RG04MA0105	RG04MAH101	RG04MAH105	RG04MAM101	RG04MAM105	45 - 50	61 - 68
	1-3/8	3	RG04MA0131	RG04MA0135	RG04MAH131	RG04MAH135	RG04MAM131	RG04MAM135	75 - 80	102 - 108
6	1-3/8	1	RG04MA0131	RG04MA0135	RG04MAH131	RG04MAH135	RG04MAM131	RG04MAM135	75 - 80	102 - 108
	1-3/4	3	RG04MA0171	RG04MA0175	RG04MAH171	RG04MAH175	RG04MAM171	RG04MAM175	90 - 95	122- 129
8	1-3/8	1	RG04MA0131	RG04MA0135	RG04MAH131	RG04MAH135	RG04MAM131	RG04MAM135	75 - 80	102 - 108
	1-3/4	3	RG04MA0171	RG04MA0175	RG04MAH171	RG04MAH175	RG04MAM171	RG04MAM175	90 - 95	122- 129

Piston Seal Kits (Piston and cylinder body seals)

Pneumatic service only

Temperatures:

- Nitrile -10°F to 165°F (-23°C to 74°C)
- Fluorocarbon -10°F to 250°F (-23°C to 121°C)



Composite piston assembly shown above.

Aluminum piston options available.

The same piston lipseals fit both piston types.

Servicing the piston seals – see next page

Warning – The piston rod (or fastener) to piston threaded connection is secured with an anaerobic adhesive that is temperature sensitive. Cylinders specified with all fluorocarbon seals are assembled with an anaerobic adhesive having a maximum operating temperature rating of 250°F (121°C). Cylinders specified with other seal compounds are assembled with an anaerobic adhesive having a maximum operating temperature rating of 165°F (74°C). These temperature limitations are necessary to prevent possible loosening of the threaded connections. Cylinders originally manufactured with Class 1 seals (Nitrile) that will be exposed to ambient temperatures above 165°F (4°C) must be modified for higher temperature service. Contact pdnapps@parker.com immediately and arrange for the piston to rod connection to be properly re-assembled to withstand the higher temperature service and other cylinder changes.

Note: the maximum temperature rating for the composite piston is 165°F (74°C).

Every standard piston seal kit (PK) contains 2 of the following:

Symbol	Description
11	Piston seal (lipseal)
18	O-ring - cylinder body to head & cap

Every bumper piston seal kit (BK) contains 2 of the following:

Symbol	Description
12	Piston seal (bumper seat cushion)
18	O-ring - cylinder body to head & cap

1 tube of Lube-A-Cyl is also included with each PK or BK kit.

	PK - Piston seal kit, standard lipseals includes 2 each of symbol 11 & 18		BK - Piston seal kit, bumper seals includes 2 each of symbol 12 & 18		Magnetic ring (not replaceable for composite piston)	Torque units endcap fastener or tie rod	
	Includes wear band (#27) for aluminum pistons and 4" and 5" composite pistons						
Bore size	Nitrile seals kit number	Fluorocarbon seals kit number	Nitrile seals kit number	Fluorocarbon seals kit number	Only with nitrile seals part number	USA inch-lbs	Metric N-m
1-1/2	**PK1504MA01**	**PK1504MA05**	**BK01504MA1**	**BK01504MA5**	**0865130151**	32 - 36	3.6 - 4.1
2	**PK2004MA01**	**PK2004MA05**	**BK02004MA1**	**BK02004MA5**	**0865130200**	72 - 82	8 - 9
2-1/2	**PK2504MA01**	**PK2504MA05**	**BK02504MA1**	**BK02504MA5**	**0865130250**	72 - 82	8 - 9
3-1/4	**PK3254MA01**	**PK3254MA05**	**BK03254MA1**	**BK03254MA5**	**0865130325**	216 - 228	24 - 25.3
4	**PK4004MA01**	**PK4004MA05**	**BK04004MA1**	**BK04004MA5**	**0865130400**	216 - 228	24 - 25.3
5	**PK5004MA01**	**PK5004MA05**	**BK05004MA1**	**BK05004MA5**	**0865130500**	360 - 372	41 - 42
6	**PK6004MA01**	**PK6004MA05**	N/A	N/A	**0865130600**	420 - 432	48 - 49
8	**PK8004MA01**	**PK8004MA05**	N/A	N/A	**0865130800**	960 - 972	109 - 115

Parker Lube-A-Cyl...

Is recommended for use in air cylinders during normal operation, and particularly when servicing and reassembling cylinders. It is a multi-purpose lubricant in grease form that provides lubrication without deteriorating effects on synthetic seals. It produces a thin film which will not blow out with exhaust air. It provides piston, rod and seal lubrication, and has excellent resistance to water and mechanical breakdown with temperature range of -10°F to 350°F (-23°C to 177°C). Lube-A-Cyl is packaged in 1.5 oz. tubes, a sufficient quantity for average size air cylinder. One application should last for a period of 6 to 18 months depending upon service. Order by part number 0761630000.

Servicing the Piston Seals

Disassemble the cylinder completely, remove the old seals and clean all the parts. The cylinder bore and piston should then be examined for evidence of scoring. (The light scratch marks usually present on both cylinder bore and piston will generally have no detrimental effects on the performance of the cylinder.)

Apply Parker “Lube-A-Cyl” to O.D. of piston and all grooves. Install one piston Lipseal (sym. # 11 or 12) in the groove nearest the rod. The two “lips” of this seal should face toward the rod end of the piston. **Aluminum and 4" & 5" composite pistons only –** If required, install magnetic ring (sym. #13) in the bottom of the middle groove and then install wear band (sym. #27) in the top of the middle groove.

Coat the inside of the cylinder body with Parker “Lube-A-Cyl” and insert the piston – cap end first – into the cylinder body as shown in detail “2” below.

Next, turn the cylinder body on its side and push the piston and rod assembly through the barrel just far enough to expose the groove for the second Lipseal. (See detail “3” below.) For aluminum pistons, be careful not to move the piston too far so as to expose the wear strip (sym. #27). If the piston should move too far, push the piston and rod assembly completely through the cylinder body and again start the piston from the original end. Now install the second Lipseal (sym. # 11 or 12) in the exposed groove with the two “lips” facing away from the rod and pull the piston into the cylinder body.

The piston and rod are securely locked together with anaerobic adhesive. This threaded connection should only be disassembled or reassembled by factory trained personnel.

NOTE: An extreme pressure lubricant (such as molybdenum disulphate) should be used on the tie rod threads and bearing faces to reduce friction and tie rod twist.

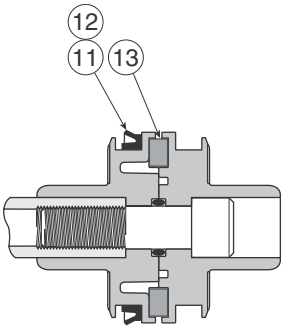
Assemble both cap and head, complete with cylinder body O-Rings (sym. # 18), to each end of the cylinder body. Install end cap fasteners and tighten to appropriate torque, using opposite corner to corner torquing sequence.

In case of a “DD” – center trunnion – mounted cylinder, care must be taken to prevent binding the cylinder body when repositioning the trunnion collar. The proper method of assembling this type of cylinder is as follows:

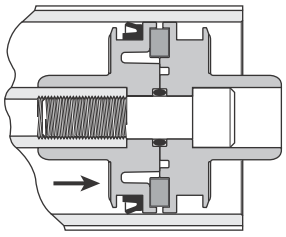
After all the piston seals have been installed on the piston and the piston is in the cylinder body, fit the cap with its O-ring (sym. # 18) in position onto the cylinder body. Then “stud” into the trunnion collar the four tie rods that connect the cap to the trunnion collar. Hand tighten the four tie rod nuts at the cap. Distances from the inner face of the cap to the finished face of the trunnion collar should the be made equal at all four tie rods when all four tie rod nuts are in contact with the cap.

When the assembly is ready for final torquing, it may be necessary to adjust the tie rods at the cap when torquing the tie rods at the head in order to position the trunnion collar in its final position.

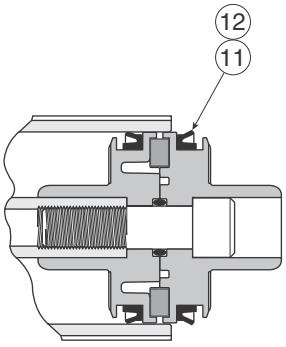
As a check, to be certain the trunnion mount will not interfere with cylinder operation, move the piston and rod assembly by hand to determine whether there is any tendency for the piston to bind at the spot where the trunnion collar is located. If any binding is noticeable, readjust the tie rods.



Detail “1”



Detail “2”



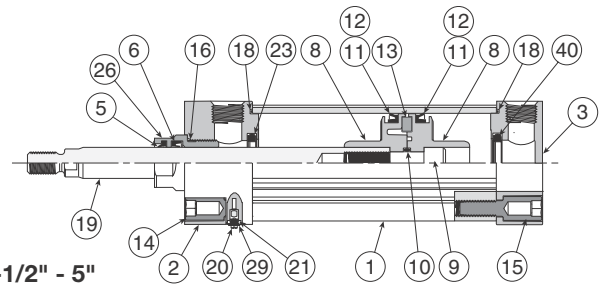
Detail “3”

4MA Complete Cylinder Kits (All parts to service entire cylinder)

Pneumatic service only

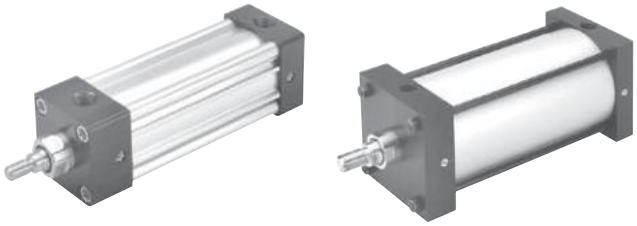
Temperatures:

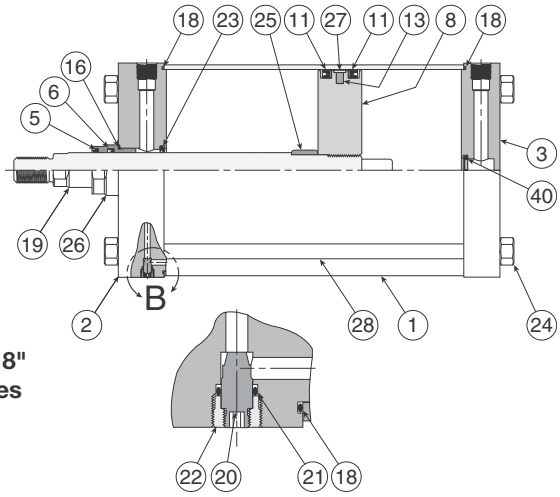
- Nitrile -10°F to 165°F (-23°C to 74°C)
- Fluorocarbon -10°F to 250°F (-23°C to 121°C)



1-1/2" - 5" Bores

Symbol	Description
1	Cylinder body
2	Head
3	Cap
5	Rod wiper
6	Rod seal
8	Piston (composite or aluminum)
9	Piston fastener (only for composite piston)
10	O-ring - piston fastener to piston
11	Piston seal (lipseal)
12	Piston seal (Bumper seal option)
13	Magnetic ring
14	Head fastener
15	Cap fastener
16	O-ring - gland to head
18	O-ring - cylinder body to head & cap
19	Piston rod
20	Cushion needle valve
21	O-ring - cushion needle valve
22	Cushion needle valve retainer (6" & 8")
23	Cushion check seal - head
24	Tie rod nut (6" & 8" bore or Style DD mounts)
25	Head cushion sleeve
26	Gland
27	Wear band (aluminum and 4" & 5" composite pistons)
28	Tie rod (6" & 8" bore or Style DD mounts)
29	Retaining washer
40	Cushion check seal - cap





6" - 8" Bores

Detail B

Servicing the complete cylinder

This kit offers all parts to service an entire 4MA cylinder with the standard rod gland and standard piston lipseals. Kits are available with Nitrile or Fluorocarbon seals.

This kit is a combination of the Standard Gland Kit, Standard Piston Seal Kit, Head Cushion Kit and Cap Cushion Kit. The kits can service cylinders with either the composite or aluminum piston (lipseal). Depending on cylinder configuration, some parts may not be used. Please refer to the pages or bulletins of these individual kits for service instructions.

1 tube of Lube-A-Cyl is also included with each SK kit.

			SK - Complete cylinder kit includes 1 each of standard rod gland kit, standard piston seal kit, head cushion kit and cap cushion kit		Gland to head torque units		Endcap fastener or tie rod torque units	
Bore size	Rod dia.	Rod no.	Nitrile seals kit number	Fluorocarbon seals kit number	USA ft-lbs	Metric Nm	USA inch-lbs	Metric Nm
1-1/2	5/8	1	**SK15104MA1**	**SK15104MA5**	40 - 45	54 - 61	32 - 36	3.6 - 4.1
	1	2	**SK15304MA1***	**SK15304MA5***	45 - 50	61 - 68		
2	5/8	1	**SK20104MA1**	**SK20104MA5**	40 - 45	54 - 61	72 - 82	8 - 9
	1	3	**SK20304MA1**	**SK20304MA5**	45 - 50	61 - 68		
2-1/2	5/8	1	**SK25104MA1**	**SK25104MA5**	40 - 45	54 - 61	72 - 82	8 - 9
	1	3	**SK25304MA1**	**SK25304MA5**	45 - 50	61 - 68		
3-1/4	1	1	**SK32104MA1**	**SK32104MA5**	45 - 50	61 - 68	216 - 228	24 - 25.3
	1-3/8	3	**SK32304MA1**	**SK32304MA5**	75 - 80	102 - 108		
4	1	1	**SK40104MA1**	**SK40104MA5**	45 - 50	61 - 68	216 - 228	24 - 25.3
	1-3/8	3	**SK40304MA1**	**SK40304MA5**	75 - 80	102 - 108		
5	1	1	**SK50104MA1**	**SK50104MA5**	45 - 50	61 - 68	360 - 372	41 - 42
	1-3/8	3	**SK50304MA1**	**SK50304MA5**	75 - 80	102 - 108		
6	1-3/8	1	**SK60104MA1**	**SK60104MA5**	75 - 80	102 - 108	420 - 432	48 - 49
	1-3/4	3	**SK60304MA1**	**SK60304MA5**	90 - 95	122- 129		
8	1-3/8	1	**SK80104MA1**	**SK80104MA5**	75 - 80	102 - 108	960 - 972	109 - 115
	1-3/4	3	**SK80304MA1**	**SK80304MA5**	90 - 95	122- 129		

*Does not include Head Cushion Kit (not available)

4ML Gland Kits (Gland cartridges and rod seals)

Hydraulic service (includes TS-2000 rod seal)

Temperatures:

- Nitrile/Polyurethane (PUR) -10°F to 165°F (-23°C to 74°C)
- Fluorocarbon -10°F to 250°F (-23°C to 121°C)

Servicing the rod gland (Cylinder disassembly is not required)

Fluid leakage around the piston rod at the gland area will normally indicate a need to replace the gland cartridge.

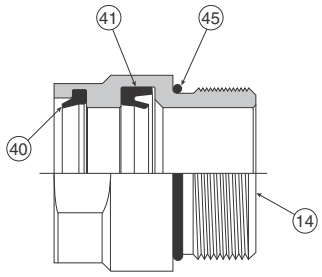
The Parker 4ML gland is a unique cartridge design. It is threaded into the cylinder head and all sizes are removable without disturbing the endcap fasteners.

To remove the old gland cartridge from the cylinder:

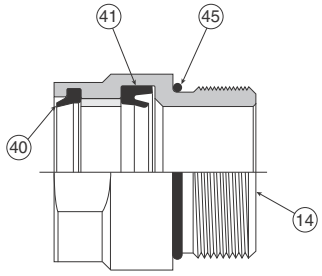
1. Inspect the piston rod to be sure it is free of burrs or other foreign material that would prevent sliding the gland off the rod.
2. Disconnect any attachments to the piston rod end thread.
3. Lubricate the rod with clean light oil.
4. Unscrew the gland cartridge from the head using the appropriate wrench (see D1 dimension in catalog).
5. Slide the gland cartridge off the piston rod.
6. Verify that the gland-to-head o-ring (#45) is also removed from the head.

To install the new gland cartridge onto the cylinder:

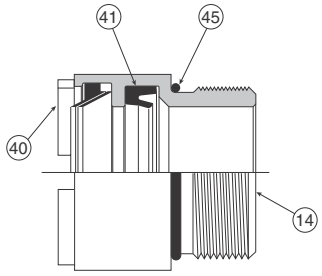
1. Re-inspect the surface of the piston rod for scratches, dents and other surface damage, and repair if necessary.
2. Clean and lubricate the surface of the piston rod with clean light oil.
3. Lubricate the rod wiper (#40), rod seal (#41), o-ring (#45) and the inside surfaces of the gland cartridge with clean light oil.
4. Slide the gland cartridge onto the piston rod, align it with the threads in the head, and tighten (clockwise) until seated firmly against the head.
5. Torque the gland cartridge to the specifications shown below. Tools are available to assist this process (see below).
   Note: Make sure the gland cartridge is sufficiently tight. Failure to do so may result in loosening during operation.



Standard Rod Gland



HI LOAD Rod Gland
(includes composite bearing)



Metallic Rod Wiper Gland

Rod dia.	Standard & HI LOAD gland Gland wrench	Metallic rod wiper gland Gland wrench	Spanner wrench
5/8	0695800000	0695900000	0116760000
1	0695810000	0695910000	0116760000
1-3/8	0695820000	0695920000	0117030000
1-3/4	0695830000	0695930000	0116770000

Every gland cartridge kit contains 1 each of the following:

Symbol	Description
14	Gland
40	Rod Wiper
41	Rod Seal
45	O-ring - Gland to head

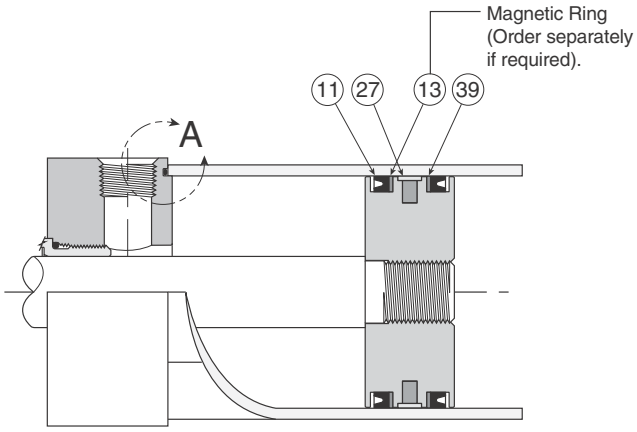
Bore Size	Rod Dia.	Rod No.	Standard rod gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45: Nitrile & PUR seals kit number	Standard rod gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45: Fluorocarbon seals kit number	HI LOAD rod gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45: Nitrile & PUR seals kit number	HI LOAD rod gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45: Fluorocarbon seals kit number	Metallic rod wiper gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45: Nitrile & PUR seals kit number	Metallic rod wiper gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45: Fluorocarbon seals kit number	Gland to head torque units: USA ft-lbs	Gland to head torque units: Metric N-m
1-1/2	5/8	1	RG04ML0061	RG04ML0065	RG04MLH061	RG04MLH065	RG04MLM061	RG04MLM065	40 - 45	54 - 61
	1	2	RG04ML0101	RG04ML0105	RG04MLH101	RG04MLH105	RG04MLM101	RG04MLM105	45 - 50	61 - 68
2	5/8	1	RG04ML0061	RG04ML0065	RG04MLH061	RG04MLH065	RG04MLM061	RG04MLM065	40 - 45	54 - 61
	1	3	RG04ML0101	RG04ML0105	RG04MLH101	RG04MLH105	RG04MLM101	RG04MLM105	45 - 50	61 - 68
2-1/2	5/8	1	RG04ML0061	RG04ML0065	RG04MLH061	RG04MLH065	RG04MLM061	RG04MLM065	40 - 45	54 - 61
	1	3	RG04ML0101	RG04ML0105	RG04MLH101	RG04MLH105	RG04MLM101	RG04MLM105	45 - 50	61 - 68
3-1/4	1	1	RG04ML0101	RG04ML0105	RG04MLH101	RG04MLH105	RG04MLM101	RG04MLM105	45 - 50	61 - 68
	1-3/8	3	RG04ML0131	RG04ML0135	RG04MLH131	RG04MLH135	RG04MLM131	RG04MLM135	75 - 80	102 - 108
4	1	1	RG04ML0101	RG04ML0105	RG04MLH101	RG04MLH105	RG04MLM101	RG04MLM105	45 - 50	61 - 68
	1-3/8	3	RG04ML0131	RG04ML0135	RG04MLH131	RG04MLH135	RG04MLM131	RG04MLM135	75 - 80	102 - 108
5	1	1	RG04ML0101	RG04ML0105	RG04MLH101	RG04MLH105	RG04MLM101	RG04MLM105	45 - 50	61 - 68
	1-3/8	3	RG04ML0131	RG04ML0135	RG04MLH131	RG04MLH135	RG04MLM131	RG04MLM135	75 - 80	102 - 108
6	1-3/8	1	RG04ML0131	RG04ML0135	RG04MLH131	RG04MLH135	RG04MLM131	RG04MLM135	75 - 80	102 - 108
	1-3/4	3	RG04ML0171	RG04ML0175	RG04MLH171	RG04MLH175	RG04MLM171	RG04MLM175	90 - 95	122- 129
8	1-3/8	1	RG04ML0131	RG04ML0135	RG04MLH131	RG04MLH135	RG04MLM131	RG04MLM135	75 - 80	102 - 108
	1-3/4	3	RG04ML0171	RG04ML0175	RG04MLH171	RG04MLH175	RG04MLM171	RG04MLM175	90 - 95	122- 129

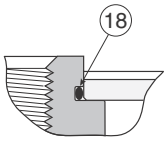
4ML Piston Seal Kits (Piston and cylinder body seals)

Hydraulic service

Temperatures:

- Nitrile -10°F to 165°F (-23°C to 74°C)
- Fluorocarbon -10°F to 250°F (-23°C to 121°C)





Detail A

Servicing the piston seals – see next page

Warning – The piston rod (or fastener) to piston threaded connection is secured with an anaerobic adhesive that is temperature sensitive. Cylinders specified with all fluorocarbon seals are assembled with an anaerobic adhesive having a maximum operating temperature rating of 250°F (121°C). Cylinders specified with other seal compounds are assembled with an anaerobic adhesive having a maximum operating temperature rating of 165°F (74°C). These temperature limitations are necessary to prevent possible loosening of the threaded connections. Cylinders originally manufactured with Class 1 seals (Nitrile) that will be exposed to ambient temperatures above 165°F (74°C) must be modified for higher temperature service. Contact pdnapps@parker.com immediately and arrange for the piston to rod connection to be properly re-assembled to withstand the higher temperature service and other cylinder changes.

Every piston seal kit (PK) contains (2) of symbols 11, 18 and 39, and (1) of symbol 27

Symbol	Description
11	Piston seal (lipseal)
18	O-ring - cylinder body to head & cap
27	Wear band
39	Piston seal backup washer

	PK - Piston Seal Kit, Standard Lipseals Includes 2 each of symbol 11, 39 & 18 Wear band (#27) for aluminum piston included		Magnetic Ring Symbol 13 Only with Nitrile Seals	Endcap Fastener or Tie Rod Torque Units	
Bore Size	Nitrile Seals Kit Number	Fluorocarbon Seals Kit Number	Part Number	USA inch-lbs	Metric N-m
1-1/2	**PK1504ML01**	**PK1504ML05**	**0865130151**	32 - 36	3.6 - 4.1
2	**PK2004ML01**	**PK2004ML05**	**0865130200**	72 - 82	8 - 9
2-1/2	**PK2504ML01**	**PK2504ML05**	**0865130250**	72 - 82	8 - 9
3-1/4	**PK3254ML01**	**PK3254ML05**	**0865130325**	216 - 228	24 - 25.3
4	**PK4004ML01**	**PK4004ML05**	**0865130400**	216 - 228	24 - 25.3
5	**PK5004ML01**	**PK5004ML05**	**0865130500**	360 - 372	41 - 42
6	**PK6004ML01**	**PK6004ML05**	**0865130600**	420 - 432	48 - 49
8	**PK8004ML01**	**PK8004ML05**	**0865130800**	960 - 972	109 - 115

Servicing the Piston Seals

Disassemble the cylinder completely, remove the old seals and clean all the parts. The cylinder bore and piston should then be examined for evidence of scoring. (The light scratch marks usually present on both cylinder bore and piston will generally have no detrimental effects on the performance of the cylinder.)

Apply clean light oil to O.D. of piston and all grooves. Install one piston Lipseal (sym. # 11) & one Back-Up Washer (sym. #39) in the groove nearest the rod. The two "lips" of the Lipseal (sym. #11) should face toward the rod end of the piston and the Back-Up Washer (sym. #39) should be installed in the same piston groove as shown. If required, install the magnetic ring (sym. # 13) in the bottom of the middle groove. (See detail "1" below) Next, install the wear strip (sym. # 27) in the top of the middle groove – (See detail "2" below).

Coat the inside of the cylinder body with clean light oil and insert the piston – cap end first – into the cylinder body as shown in detail "3" below.

Next, turn the cylinder body on its side and push the piston and rod assembly through the barrel just far enough to expose the piston groove for the second Lipseal. (See detail "4" below.) Be careful not to move the piston too far so as to expose the wear strip (sym. # 27). If the piston should move too far, push the piston and rod assembly completely through the cylinder body and again start the piston from the original end. Now install the second Lipseal (sym. # 11) & Back-Up Washer (sym. #39) in the exposed groove with the two "lips" of the Lipseal (sym. #11) facing away from the rod and the Back-Up Washer (sym. #39) positioned as shown. Then pull the piston into the cylinder body.

The piston and rod are securely locked together with anaerobic adhesive. This threaded connection should only be disassembled or reassembled by factory trained personnel.

NOTE: An extreme pressure lubricant (such as molybdenum disulphate) should be used on the tie rod threads and bearing faces to reduce friction and tie rod twist.

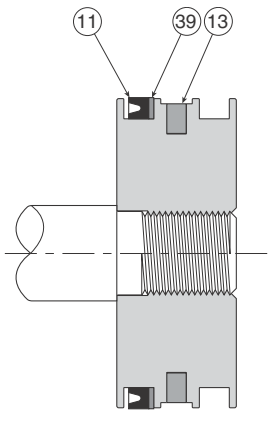
Assemble both cap and head, complete with cylinder body O-Rings (sym. # 18), to each end of the cylinder body. Install end cap fasteners and tighten to appropriate torque, using opposite corner to corner torquing sequence. After screws are torqued, firmly torque the rod gland against the head.

In case of a "DD" – center trunnion – mounted cylinder, care must be taken to prevent binding the cylinder body when repositioning the trunnion collar. The proper method of assembling this type of cylinder is as follows:

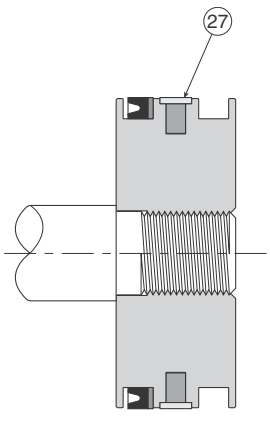
After all the piston seals have been installed on the piston and the piston is in the cylinder body, fit the cap with its O-ring (sym. # 18) in position onto the cylinder body. Then "stud" into the trunnion collar the four tie rods that connect the cap to the trunnion collar. Hand tighten the four tie rod nuts at the cap. Distances from the inner face of the cap to the finished face of the trunnion collar should the be made equal at all four tie rods when all four tie rod nuts are in contact with the cap.

When the assembly is ready for final torquing, it may be necessary to adjust the tie rods at the cap when torquing the tie rods at the head in order to position the trunnion collar in its final position.

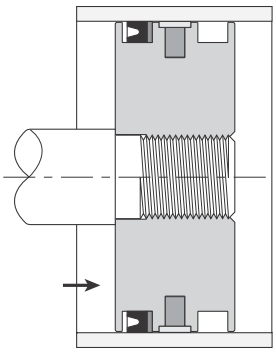
As a check, to be certain the trunnion mount will not interfere with cylinder operation, move the piston and rod assembly by hand to determine whether there is any tendency for the piston to bind at the spot where the trunnion collar is located. If any binding is noticeable, readjust the tie rods.



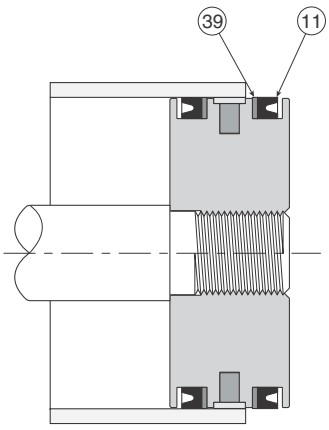
Detail "1"



Detail "2"



Detail "3"



Detail "4"

Cylinder Kits (All parts to service entire cylinder)

Hydraulic service

Temperatures:

- Nitrile/Polyurethane (PUR) -10°F to 165°F (-23°C to 74°C)
- Fluorocarbon -10°F to 250°F (-23°C to 121°C)

Servicing the complete cylinder

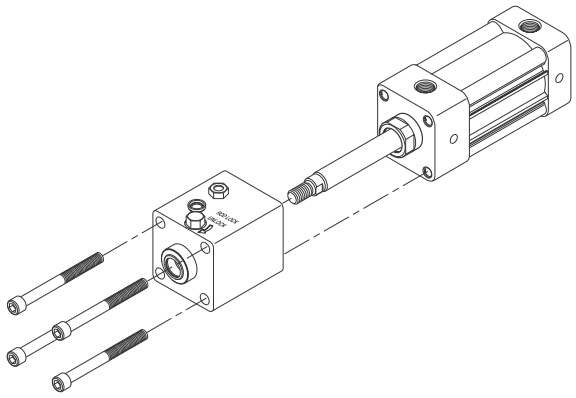
This kit offers all parts to service an entire 4ML cylinder with the standard rod gland and standard piston lipseals. Kits are available with Nitrile/Polyurethane or Fluorocarbon seals.

This kit is a combination of the Standard Gland Kit and Standard Piston Seal Kit. Please refer to the pages or bulletins of these individual kits for service instructions.

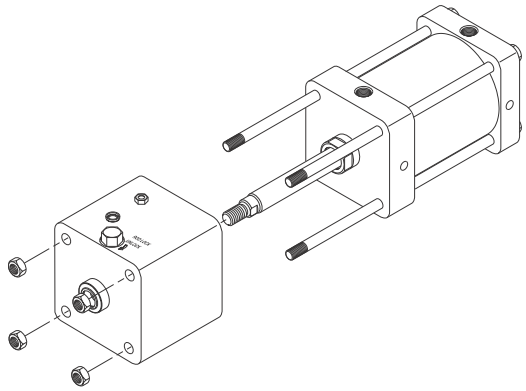
			SK - Complete cylinder kit includes 1 each of standard rod Gland kit and piston seal kit		Gland to head torque units		Endcap Fastener or Tie Rod Torque Units	
Bore size	Rod dia.	Rod no.	Nitrile & PUR seals kit number	Fluorocarbon seals kit number	USA ft-lbs	Metric Nm	USA inch-lbs	Metric Nm
1-1/2	5/8	1	**SK15104ML1**	**SK15104ML5**	40 - 45	54 - 61	32 - 36	3.6 - 4.1
	1	2	**SK15304ML1**	**SK15304ML5**	45 - 50	61 - 68		
2	5/8	1	**SK20104ML1**	**SK20104ML5**	40 - 45	54 - 61	72 - 82	8 - 9
	1	3	**SK20304ML1**	**SK20304ML5**	45 - 50	61 - 68		
2-1/2	5/8	1	**SK25104ML1**	**SK25104ML5**	40 - 45	54 - 61	72 - 82	8 - 9
	1	3	**SK25304ML1**	**SK25304ML5**	45 - 50	61 - 68		
3-1/4	1	1	**SK32104ML1**	**SK32104ML5**	45 - 50	61 - 68	216 - 228	24 - 25.3
	1-3/8	3	**SK32304ML1**	**SK32304ML5**	75 - 80	102 - 108		
4	1	1	**SK40104ML1**	**SK40104ML5**	45 - 50	61 - 68	216 - 228	24 - 25.3
	1-3/8	3	**SK40304ML1**	**SK40304ML5**	75 - 80	102 - 108		
5	1	1	**SK50104ML1**	**SK50104ML5**	45 - 50	61 - 68	360 - 372	41 - 42
	1-3/8	3	**SK50304ML1**	**SK50304ML5**	75 - 80	102 - 108		
6	1-3/8	1	**SK60104ML1**	**SK60104ML5**	75 - 80	102 - 108	420 - 432	48 - 49
	1-3/4	3	**SK60304ML1**	**SK60304ML5**	90 - 95	122- 129		
8	1-3/8	1	**SK80104ML1**	**SK80104ML5**	75 - 80	102 - 108	960 - 972	109 - 115
	1-3/4	3	**SK80304ML1**	**SK80304ML5**	90 - 95	122- 129		

Rod Lock Removal and Re-assembly

1-1/2" to 5" Bores



6" to 8" Bores and all Style DD Mounts (NFPA MT4)



To **remove** the rod lock from the 4MAJ cylinder in order to service the base 4MAJ cylinder, please perform the following steps:

1. Remove the 4MAJ cylinder from the application to a serviceable area.
2. Using a corner-to-corner sequence, loosen the four SHCS fasteners (1-1/2" to 5" bores) or tie rod nuts (6" to 8" bores and all Style DD mounts (NFPA MT4) at the rod lock face and remove them from the rod lock. Please note that the tie rod nuts for 6" to 8" bores and all Style DD mounts are also used to assemble the base cylinder.
3. Apply a minimum of 60 PSI air pressure to the rod lock port, or apply the appropriate amount of torque to the manual override shaft, in order to release the rod lock from the piston rod.
4. Carefully slide the rod lock off the piston rod and away from the base cylinder. The rod lock is piloted and sealed to the gland OD, so some force may be required.
5. Particularly at larger bores, the rod lock can be heavy. Please remove the rod lock from the piston rod and follow all necessary safety precautions.

SHCS Fastener Torque or Tie Rod torque

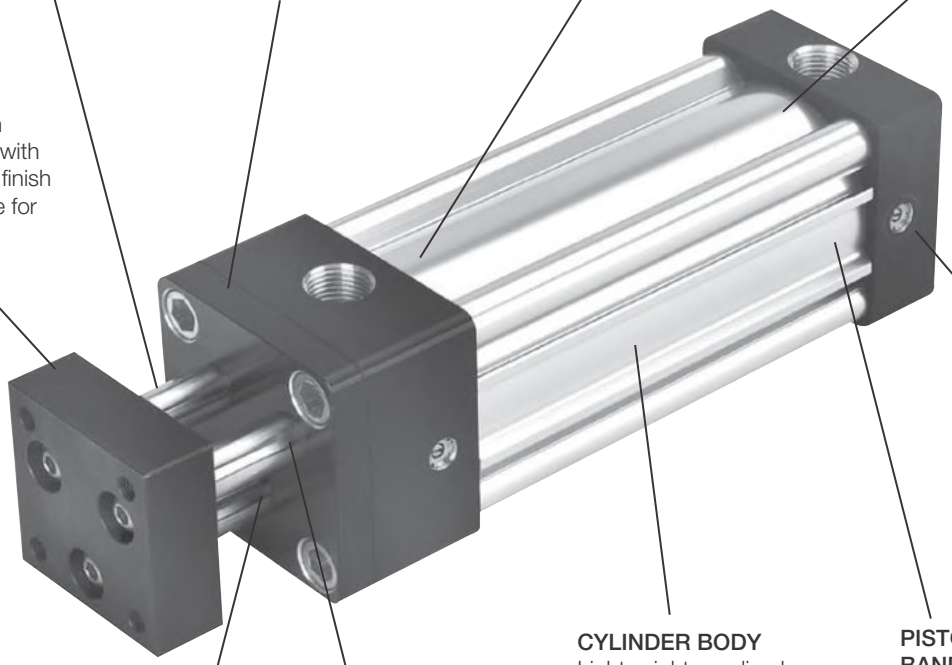
Bore size	inch-lbs	Nm
1-1/2	32-36	3.6-4.1
2	72-82	8-9
2-1/2	72-82	8-9
3-1/4	216-228	24-25.3
4	216-228	24-25.3
5	360-372	41-42
6	420-432	48-49
8	960-972	109-115

To **re-assemble** the rod lock to the base 4MAJ cylinder, please perform the following steps:

1. Remove all dirt and debris from the mating features of the rod lock, base cylinder, fasteners (or nuts) and threads.
2. Apply a minimum of 60 PSI air pressure to the rod lock port, or apply the appropriate amount of torque to the manual override shaft, in order to open the rod lock.
3. Carefully slide the rod lock onto the piston rod and toward the base cylinder. The rod lock is piloted and sealed to the gland OD, so some force may be required. Press the rod lock to the head face as close as possible, avoiding damage to the rod lock o-ring that seals the gland OD.
4. Using a corner-to-corner sequence, install and tighten, to approximately 75% of final torque specifications, the SHCS fasteners (1-1/2" to 5" bores) or tie rod nuts (6" to 8" bores and all Style DD mounts (NFPA MT4)) at the rod lock face. See torque specification table below.
5. Using a calibrated torque wrench, tighten the fasteners or nuts to the final torque specification using the same corner-to-corner sequence.
6. Remove the air pressure from the rod lock port or remove the torque from the manual override shaft to return the rod lock to the locked state.

The rod lock units are not field-repairable and must be returned to the Pneumatic Division for any repairs. Please contact pdnapps@parker.com for any assistance.

2MNR Series – 1-1/2" to 4" Bore Size



MULTIPLE PISTON RODS
Three hard-chrome plated and polished piston rods provide stability and strength for higher bearing support. Precision machining provides precise fit for antirotation.

RETAINER
Retainer is easily removed for access to rod gland assemblies.

CHECK SEAL CUSHION
Molded uretuane cushion combines the sealing capabilities f a lipseal for effective cushioning with check valve action for quick stroke reversal. "Floating" cushions assure cushion repeatability and long life.

ROUNDED LIP PISTON SEALS
Carboxylated nitrile w/PTFE seals glide over lubricant film instead of scraping it off.

TOOLING PLATE
Cold rolled carbon steel tooling plate with corrosionresistant finish is easily removable for maintenance.

CUSHION NEEDLE VALVES
Adjustable captive design makes precise adjustment quick and easy. Can be adjusted while cylinder is under pressure.

CYLINDER BODY
Lightweight anodized aluminum body is wear resistant. The smooth extruded design eliminates areas for contamination.

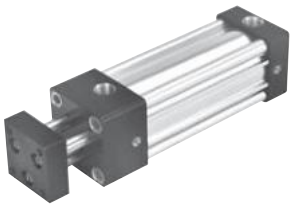
PISTON AND WEAR BAND Aluminum lightweight piston with nylon wear band (not shown) eliminates metal-to-metal contact to extend cylinder life. Formed, shaped wear band makes installation and repair easier than regular wear strip.

ROD SEAL/WIPER
Combination rod seal and rod wiper, available in either nitrile or fluorocarbon, is inserted into the bearing, creating a rod gland. Completely self-compensating for zero leakage at all pressures.

ROD BEARING
Permanently lubricated sintered bronze bearing provides excellent performance in nonlube applications. Bearings are easily removed for service.

Features

- NFPA Interchangeable
- Bore sizes: 1-1/2 to 4 inches
- Single end or double end designs
- Mounting styles: 9 NFPA standard
- Mounts plus 1 base bar style
- Non-rotating, multi-rod design
- Strokes: available in any practical stroke length
- Cushions: optional at either end or both ends of stroke
- Caustic washdown version available



Operating information

Operating pressure: maximum air service	250 PSIG (17 bar)
Temperature range –	
Standard seals	-10°F to 165°F (-23°C to 73°C)
Fluorocarbon seals	-20°F to 250°F (-29°C to 121°C)
Filtration requirements:	40 micron, dry filtered air

Ordering information

2.00 | | **J** | **2MNR** | | **U** | | | **T** | **9** | **A** | | **6.000**

Bore size *

1.50
2.00
2.50
3.25
4.00

* Required for basic cylinder model number. For bumpers, please consult factory.

Cushion head end
Use "C" only if head end cushion is required.

Double rod / double end cylinder

Blank	Single end cylinder
K	Double rod cylinder (three rods with tooling plate one end, single rod on the opposite side)

Mounting style
Specify mounting style code (see table on following chart below)..

Series

2MNR

Piston type

Blank	Standard
3	Piston magnet

Ports

U	NPTF
R	BSPP

Seals

Blank	Standard (nitrile seals)
V	Fluorocarbon seals

Magnetic piston option is available with standard seals only.

Special modification
Specify "S" only for special modification only.

Tooling plate

T	Standard plate

Piston rod thread style

9	Standard
3	Special (and specify all dimensions required)

NOTE: Always specify thread KK. thread depth A and W when special tooling plate requires

Piston rod thread type

A	Standard (UNF unified thread)

Cushion cap end
Use "C" only if cap end cushion is required.

Stroke length
Specify stroke length required in inches.

Sensors
See section L for sensors.

Cylinder mounting styles

Mounting style code	NFPA style	Mounting description
T	MX0	No mount (basic)
TC	MX2	Tie rods extended cap end
F	MS4	Side tapped
BB †	MP1	Cap Fixed Clevis
BC †	MP2	Cap Detachable Clevis
BE †	MP4	Detachable Pivot Eye
H †	MF2	Cap Rectangular Flange
J †	MF1	Head Rectangular Flange
TE	MX5	Sleeve Nut (Cap End Only)
NB	Non NFPA Style	Base Bar

† Mounting styles with asterisks can be ordered assembled to the cylinder or as a basic (T) no-mount cylinder.

How to Order Parker 2MNR Series Cylinders with Sensors:

Sensors are not mounted to the cylinder prior to shipment.

When ordering a cylinder to accommodate a sensor:

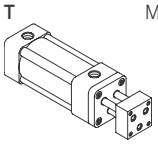
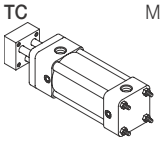
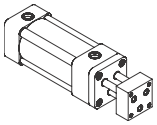
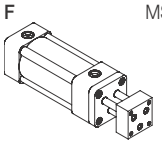
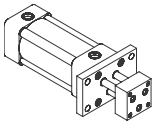
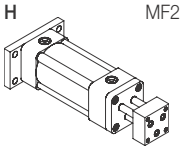
1. Derive a proper model number as shown in the table above.
2. Place a "3" in the piston column of the model number.
3. Order appropriate brackets and sensor as separate line items. See Section L for specifications and part numbers.

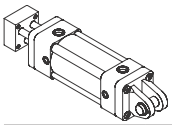
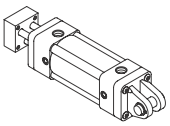
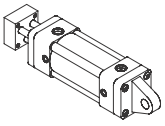
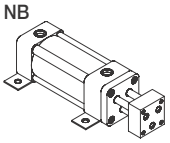
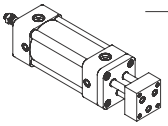
Example: For cylinder prepared for sensor
2.00CJ2MNR3UT9AC 6.000

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

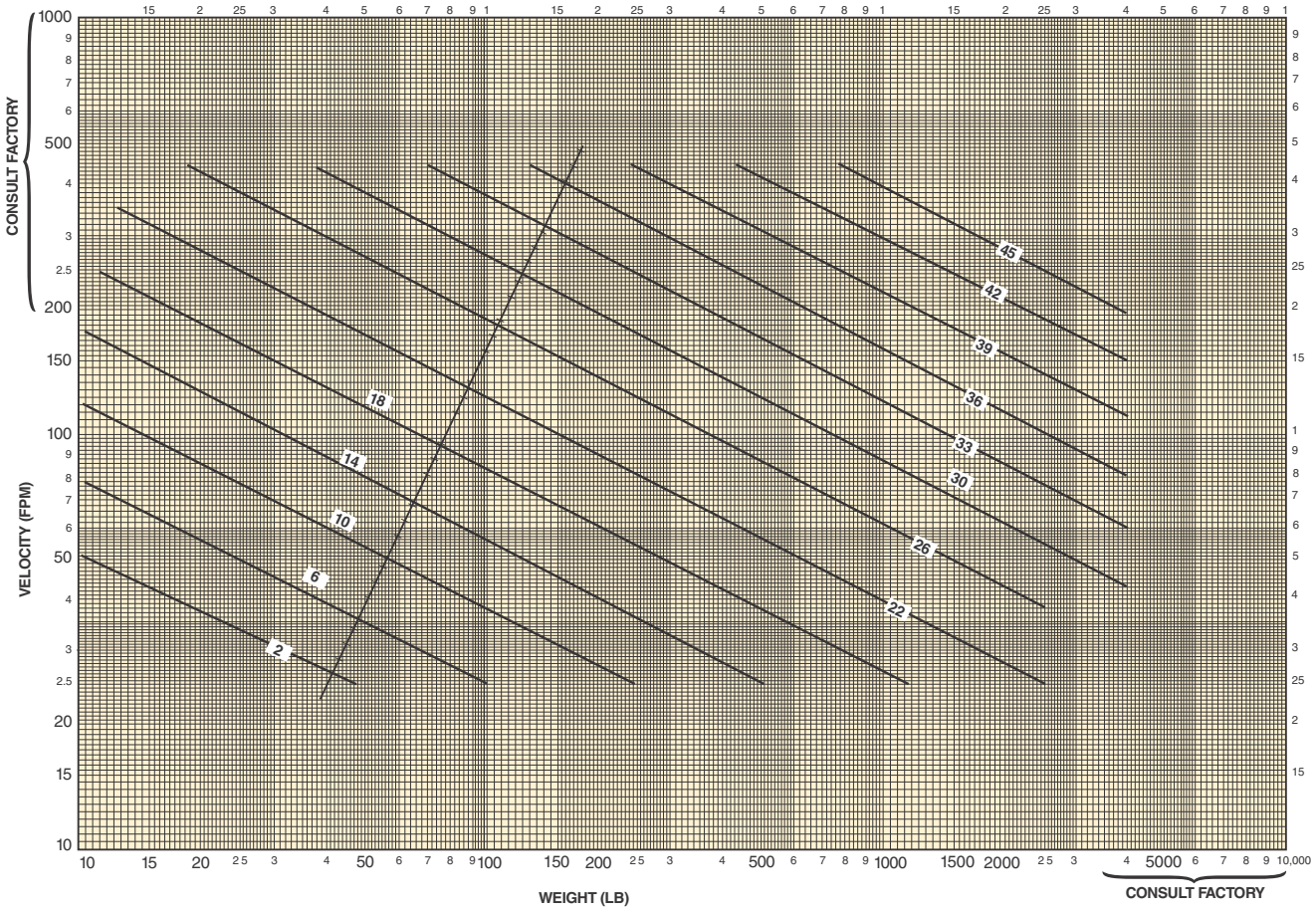
2MNR Mounting Styles

Mounting style	NFPA mounting	Description	Bore size
T 	MX0	Basic Mount	1-1/2 - 4
TC 	MX2	Tie Rod Extended Cap End	1-1/2 - 4
TE 	MX5	Sleeve Nut (Cap end only)	1-1/2 - 4
F 	MS4	Side Tap)	1-1/2 - 4
J 	MF1	Head Rectangular Flange	1-1/2 - 4
H 	MF2	Cap Rectangular Flange	1-1/2 - 4

Mounting style	NFPA mounting	Description	Bore size
BC 	MP2	Cap Detachable Clevis	1-1/2 - 4
BB 	MP1	Cap Fixed Clevis	1-1/2 - 4
BE 	MP4	Detachable Pivot Eye	1-1/2 - 4
NB 		Base Bar	1-1/2- 4
K 		Double Rod	1-1/2 - 4

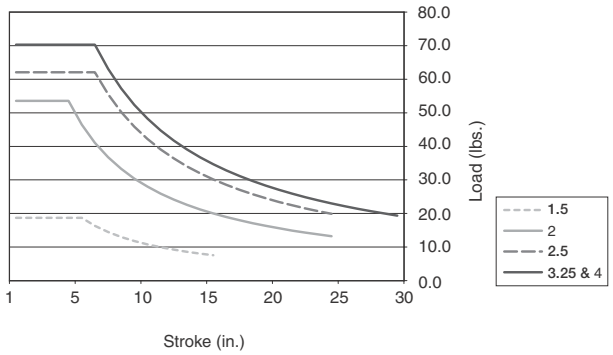
Air Cylinder Cushion Ratings

	Single ended cylinders and double ended cylinders – multi-rod both ends			Double ended cylinders – single rod one end		
Bore size	Cylinder end	Rating with no back pressure	Rating with back pressure	Cylinder end	Rating with no back pressure	Rating with back pressure
1-1/2"	Cap	12	17	Single Rod	7	12
	Rod	6	11	Triple Rod	6	11
2"	Cap	14	20	Single Rod	11	16
	Rod	10	14	Triple Rod	10	14
2-1/2"	Cap	17	23	Single Rod	12	18
	Rod	11	15	Triple Rod	11	15
3-1/4"	Cap	21	26	Single Rod	15	20
	Rod	15	20	Triple Rod	15	20
4"	Cap	23	28	Single Rod	17	23
	Rod	17	23	Triple Rod	17	23

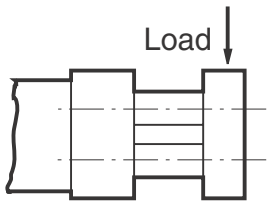


Loading Information

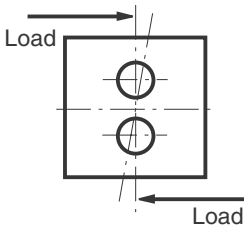
Side Load Versus Stroke



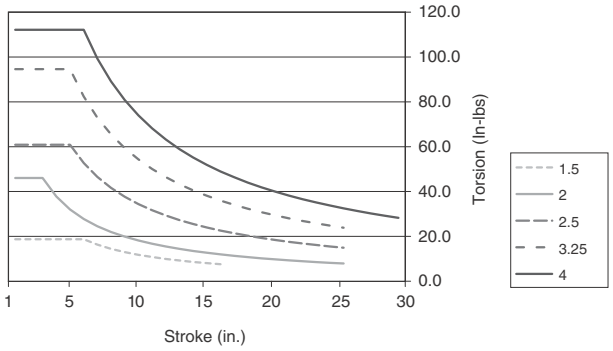
Side Load



Torsional Load



Torsional Load Versus Stroke



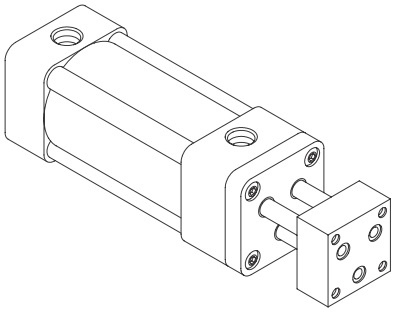
Theoretical Extend and Retract Forces in Pounds

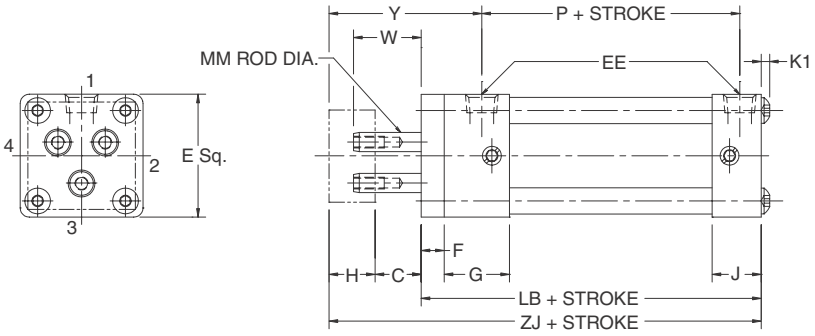
Bore Size	Movement	Effective area (in^2)	Pressure (PSI) 20	40	60	80	100	150	200	250	Cu. ft. of displacement per inch of stroke
1-1/2"	Extend	1.767	35	71	106	141	177	265	353	442	0.00102
	Retract	1.537	31	61	92	123	154	231	307	384	0.00089
2"	Extend	3.142	63	126	188	251	314	471	628	785	0.00182
	Retract	2.553	51	102	153	204	255	383	511	638	0.00148
2-1/2"	Extend	4.909	98	196	295	393	491	736	982	1227	0.00284
	Retract	3.988	80	160	239	319	399	598	798	997	0.00231
3-1/4"	Extend	8.296	166	332	498	664	830	1244	1659	2074	0.00480
	Retract	7.375	148	295	443	590	738	1106	1475	1844	0.00427
4"	Extend	12.566	251	503	754	1005	1257	1885	2513	3142	0.00727
	Retract	11.646	233	466	699	932	1165	1747	2329	2911	0.00674

Double Rod Extend Forces – Single Rod Style

Bore Size	Rod Size	Effective area (in^2)	Pressure (PSI) 20	40	60	80	100	150	200	250	Cu. ft. of displacement per inch of stroke
1-1/2"	5/8"	1.460	29	58	88	117	146	219	292	365	0.00085
2"	5/8"	2.835	57	113	170	227	283	425	567	709	0.00164
2-1/2"	5/8"	4.602	92	184	276	368	460	690	920	1150	0.00266
3-1/4"	1"	7.510	150	300	451	601	751	1127	1502	1878	0.00435
4"	1"	11.781	236	471	707	942	1178	1767	2356	2945	0.00682

Basic Single End – Style T (NFPA MX0)

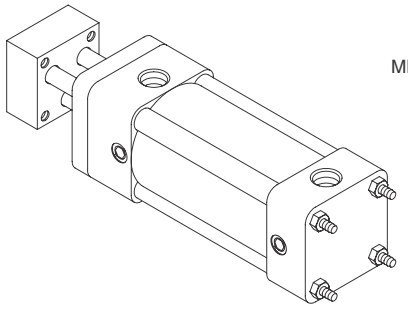


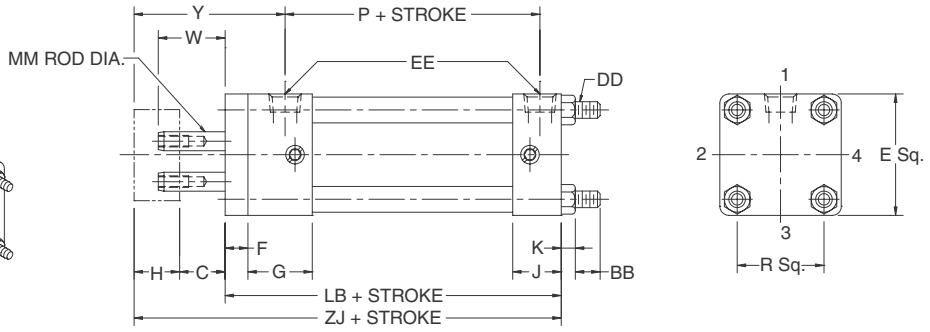


Style T and Dimensions

Bore	Rod dia. mm	C	E	EE (NPTF)	F	G	H	J	K1	W	Y	Add stroke LB	P	ZJ
1-1/2	8mm	3/4	2	1/4	3/8	1-7/16	3/4	15/16	1/8	1.10	2-3/4	4	2-5/16	5-1/2
2	12mm	3/4	2-1/2	1/4	3/8	1-7/16	3/4	15/16	5/32	1.10	2-3/4	4	2-5/16	5-1/2
2-1/2	16mm	3/4	3	3/8	3/8	1-7/16	1	15/16	5/32	1.35	3-1/16	4-1/8	2-3/8	5-7/8
3-1/4	16mm	3/4	3-3/4	1/2	3/8	1-11/16	1	1-3/16	3/16	1.10	3-7/16	4-7/8	2-5/8	6-5/8
4	16mm	3/4	4-1/2	1/2	3/8	1/11/16	1	1-3/16	3/16	1.10	3-7/16	4-7/8	2-5/8	6-5/8

Tie Rods Extend Cap End – Style TC

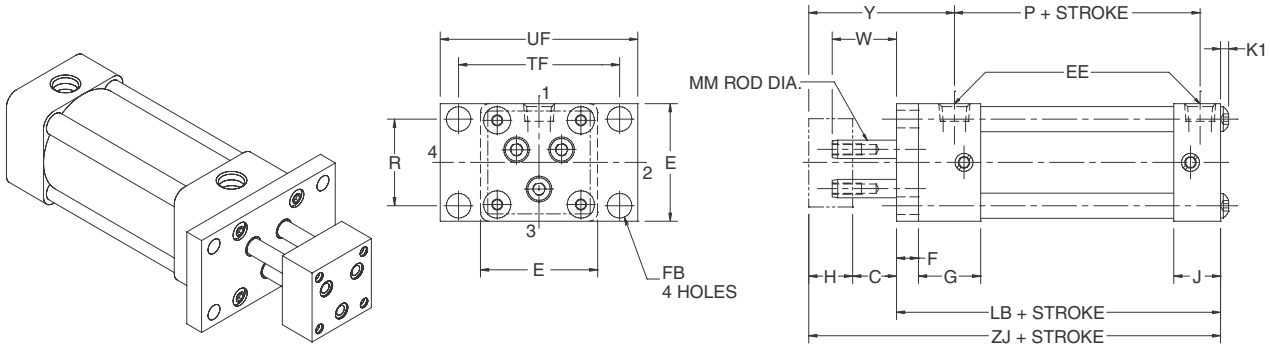




Style TC and Dimensions

Bore	Rod dia. mm	BB	C	DD	E	EE (NPTF)	F	G	H	J	K	R	W	Y	Add stroke LB	P	ZJ
1-1/2	8mm	1	3/4	1/4-28	2	1/4	3/8	1-7/16	3/4	15-16	1/4	1.43	1.10	2-3/4	4	2-5/16	5-1/2
2	12mm	1-1/8	3/4	5/16-24	2-1/2	1/4	3/8	1-7/16	3/4	15-16	5/16	1.84	1.10	2-3/4	4	2-5/16	5-1/2
2-1/2	16mm	1-1/8	3/4	5/16-24	3	3/8	3/8	1-7/16	1	15-16	5/16	2.19	1.35	3-1/16	4-1/8	2-3/8	5-7/8
3-1/4	16mm	1-3/8	3/4	3/8-24	3-3/4	1/2	5/8	1-11/16	1	1-3/16	3/8	2.76	1.10	3-7/16	4-7/8	2-5/8	6-5/8
4	16mm	1-3/8	3/4	3/8-24	4-1/2	1/2	5/8	1-11/16	1	1-3/16	3/8	3.32	1.10	3-7/16	4-7/8	2-5/8	6-5/8

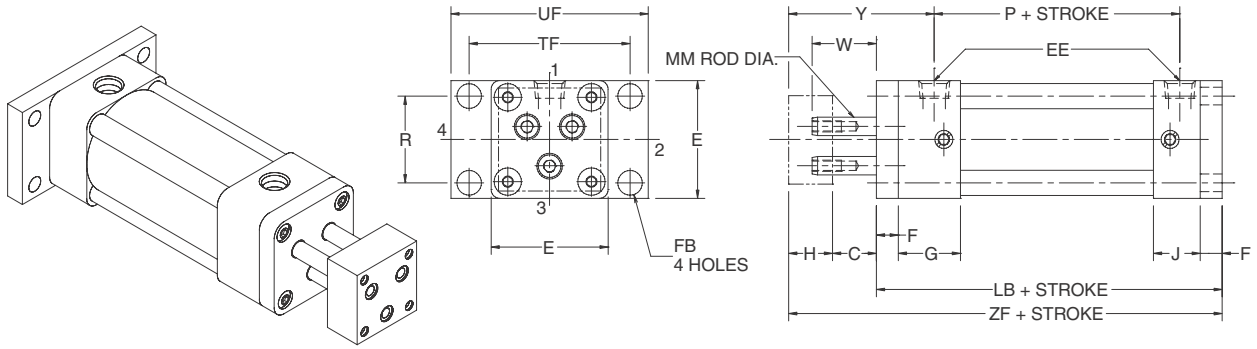
Head Rectangular Flange – Style J (NFPA MF1)



Style J and Dimensions

Bore	Rod dia. mm	C	E	EE (NPTF)	F	FB	G	H	J	K1	R	TF	UF	W	Y	Add stroke LB	P	ZJ
1-1/2	8mm	3/4	2	1/4	3/8	5/16	1-7/16	3/4	15/16	1/8	1.43	2-3/4	3-3/8	1.10	2-3/4	4	2-5/16	5-1/2
2	12mm	3/4	2-1/2	1/4	3/8	3/8	1-7/16	3/4	15/16	5/32	1.84	3-3/8	4-1/8	1.10	2-3/4	4	2-5/16	5-1/2
2-1/2	16mm	3/4	3	3/8	3/8	3/8	1-7/16	1	15/16	5/32	2.19	3-7/8	4-5/8	1.35	3-1/16	4-1/8	2-3/8	5-7/8
3-1/4	16mm	3/4	3-3/4	1/2	3/8	7/16	1-11/16	1	1-3/16	3/16	2.76	4-11/16	5-1/2	1.10	3-7/16	4-7/8	2-5/8	6-5/8
4	16mm	3/4	4-1/2	1/2	3/8	7/16	1/11/16	1	1-3/16	3/16	3.32	5-7/16	6-1/4	1.10	3-7/16	4-7/8	2-5/8	6-5/8

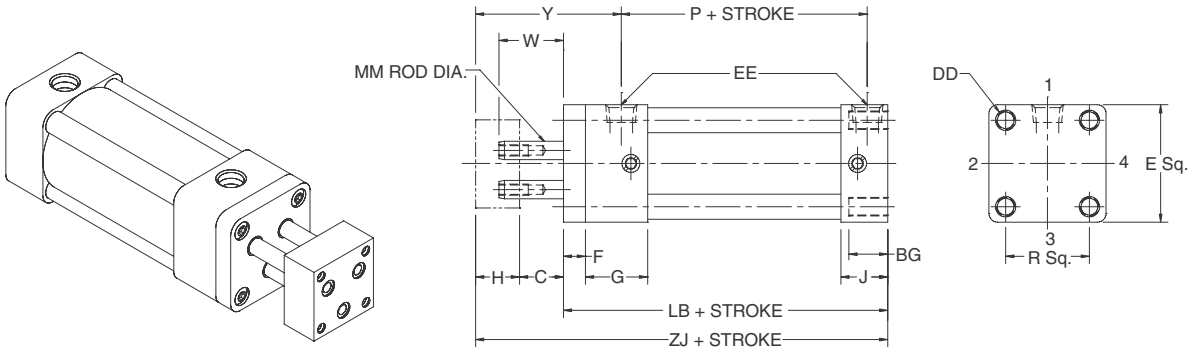
Cap Rectangular Flange – Style H (NFPA MF2)



Style H and Dimensions

Bore	Rod dia. mm	C	E	EE (NPTF)	F	FB	G	H	J	R	TF	UF	W	Y	Add stroke LB	P	ZJ
1-1/2	8mm	3/4	2	1/4	3/8	5/16	1-7/16	3/4	15-16	1.43	2-3/4	3-3/8	1.10	2-3/4	4-3/8	2-5/16	5-7/8
2	12mm	3/4	2-1/2	1/4	3/8	3/8	1-7/16	3/4	15-16	1.84	3-3/8	4-1/8	1.10	2-3/4	4-3/8	2-5/16	5-7/8
2-1/2	16mm	3/4	3	3/8	3/8	3/8	1-7/16	1	15-16	2.19	3-7/8	4-5/8	1.35	3-1/16	4-1/2	2-3/8	6/1-4
3-1/4	16mm	3/4	3-3/4	1/2	5/8	7/16	1-11/16	1	1-3/16	2.76	4-11/16	5-1/2	1.10	3-7/16	5-1/2	2-5/8	7-1/4
4	16mm	3/4	4-1/2	1/2	5/8	7/16	1-11/16	1	1-3/16	3.32	5-7/16	6-1/4	1.10	3-7/16	5-1/2	2-5/8	7-1/4

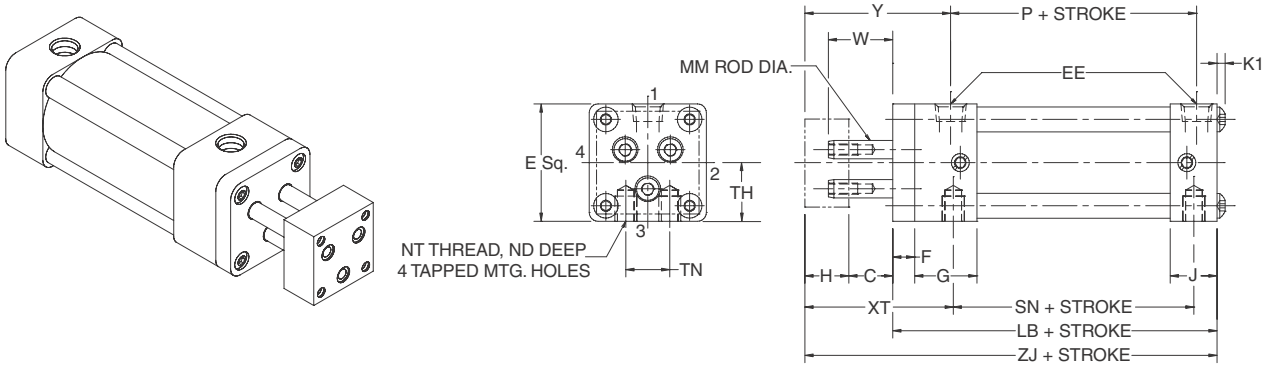
Sleeve Nut (Cap End Only) – Style TE (NFPA MX5)



Style TE and Dimensions

Bore	Rod dia. mm	BG	C	DD	E	EE (NPTF)	F	G	H	J	R	W	Y	Add stroke LB	P	ZF	ZJ
1-1/2	8mm	0.45	3/4	1/4-28	2	1/4	3/8	1-7/16	3/4	15/16	1.43	1.10	2-3/4	4	2-5/16	5.10	5-1/2
2	12mm	0.48	3/4	5/16-24	2-1/2	1/4	3/8	1-7/16	3/4	15/16	1.84	1.10	2-3/4	4	2-5/16	5.10	5-1/2
2-1/2	16mm	0.48	3/4	5/16-24	3	3/8	3/8	1-7/16	1	15/16	2.19	1.35	3-1/16	4-1/8	2-3/8	5.35	5-7/8
3-1/4	16mm	0.50	3/4	3/8-24	3-3/4	1/2	3/8	1-11/16	1	1-3/16	2.76	1.10	3-7/16	4-7/8	2-5/8	5.23	6-5/8
4	16mm	0.50	3/4	3/8-24	4-1/2	1/2	3/8	1/11/16	1	1-3/16	3.32	1.10	3-7/16	4-7/8	2-5/8	5.98	6-5/8

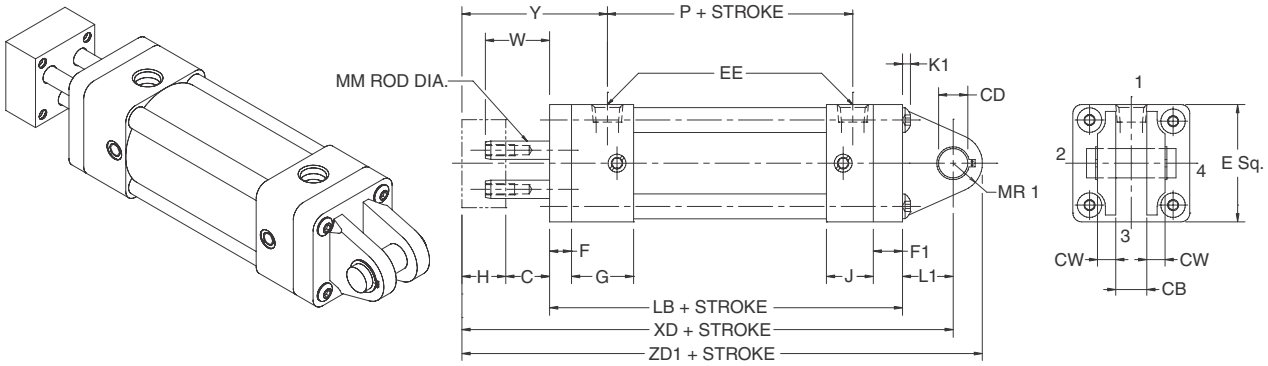
Side Tapped Mount – Style F (NFPA MS4)



Style TC and Dimensions

Bore	Rod dia. mm	C	E	EE (NPTF)	F	G	H	J	K1	ND	NT	TH ±0.003	TN	W	XT	Y	Add stroke LB	P	SN	ZJ
1-1/2	8mm	3/4	2	1/4	3/8	1-7/16	3/4	15-16	1/8	3/8	1/4-20	0.993	5/8	1.10	2-13/16	2-3/4	4	2-5/16	2-1/4	5-1/2
2	12mm	3/4	2-1/2	1/4	3/8	1-7/16	3/4	15-16	5/32	7/16	5/16-18	1.243	7/8	1.10	2-13/16	2-3/4	4	2-5/16	2-1/4	5-1/2
2-1/2	16mm	3/4	3	3/8	3/8	1-7/16	1	15-16	5/32	5/8	3/8-16	1.493	1-1/4	1.35	3-1/16	3-1/16	4-1/8	2-3/8	2-3/8	5-7/8
3-1/4	16mm	3/4	3-3/4	1/2	5/8	1-11/16	1	1-3/16	3/16	3/4	1/2-13	1.868	1-1/2	1.10	3-7/16	3-7/16	4-7/8	2-5/8	2-3/8	6-5/8
4	16mm	3/4	4-1/2	1/2	5/8	1-11/16	1	1-3/16	3/16	3/4	1/2-13	2.243	2-1/16	1.10	3-7/16	3-7/16	4-7/8	2-5/8	2-3/8	6-5/8

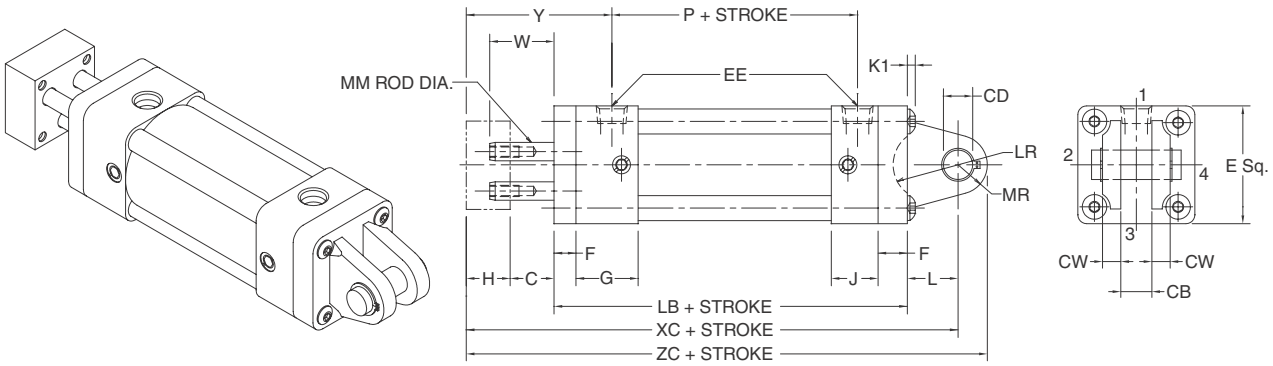
Cap Detachable Clevis – Style BC (NFPA MP2)



Style BC and Dimensions

Bore	Rod dia. mm	C	CB	CD +.000 -.002	CW	E	EE (NPTF)	F	F1	G	H	J	K1	L1	MR1	W	Y	Add stroke LB	P	XD	ZD1
1-1/2	8mm	3/4	3/4	0.501	1/2	2	1/4	3/8	3/8	1-7/16	3/4	15/16	1/8	3/4	1/2	1.10	2-3/4	4-3/8	2-5/16	6-5/8	7-1/8
2	12mm	3/4	3/4	0.501	1/2	2-1/2	1/4	3/8	3/8	1-7/16	3/4	15/16	5/32	3/4	1/2	1.10	2-3/4	4-3/8	2-5/16	6-5/8	7-1/8
2-1/2	16mm	3/4	3/4	0.501	1/2	3	3/8	3/8	3/8	1-7/16	1	15/16	5/32	3/4	1/2	1.35	3-1/16	4-1/2	2-3/8	7	7-1/2
3-1/4	16mm	3/4	1-1/4	0.751	5/8	3-3/4	1/2	3/8	5/8	1-11/16	1	1-3/16	3/16	1-1/4	3/4	1.10	3-7/16	5-1/2	2-5/8	8-1/2	9-1/4
4	16mm	3/4	1-1/4	0.751	5/8	4-1/2	1/2	3/8	5/8	1/11/16	1	1-3/16	3/16	1-1/4	3/4	1.10	3-7/16	5-1/2	2-5/8	8-1/2	9-1/4

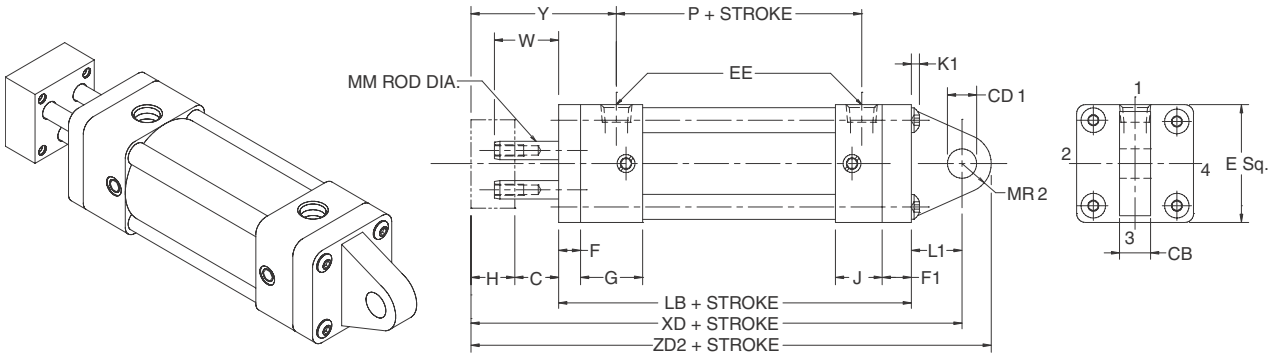
Cap Fixed Clevis – Style BB (NFPA MP1)



Style BB and Dimensions

Bore	Rod dia. mm	C	CB	CD +.000 -.002	CW	E	EE (NPTF)	F	G	H	J	L	LR	MR	W	Y	Add stroke LB	P	XC	ZC
1-1/2	8mm	3/4	3/4	0.501	1/2	2	1/4	3/8	1-7/16	3/4	15-16	15/16	3/4	5/8	1.10	2-3/4	4-3/8	2-5/16	6-1/4	6-7/8
2	12mm	3/4	3/4	0.501	1/2	2-1/2	1/4	3/8	1-7/16	3/4	15-16	15/16	3/4	5/8	1.10	2-3/4	4-3/8	2-5/16	6-1/4	6-7/8
2-1/2	16mm	3/4	3/4	0.501	1/2	3	3/8	3/8	1-7/16	1	15-16	15/16	3/4	5/8	1.35	3-1/16	4-1/2	2-3/8	6-5/8	7-1/4
3-1/4	16mm	3/4	1-1/4	0.751	5/8	3-3/4	1/2	5/8	1-11/16	1	1-3/16	1-3/16	1	15/16	1.10	3-7/16	5-1/2	2-5/8	7-7/8	8-13/16
4	16mm	3/4	1-1/4	0.751	5/8	4-1/2	1/2	5/8	1-11/16	1	1-3/16	1-3/16	1	15/16	1.10	3-7/16	5-1/2	2-5/8	7-7/8	8-13-16

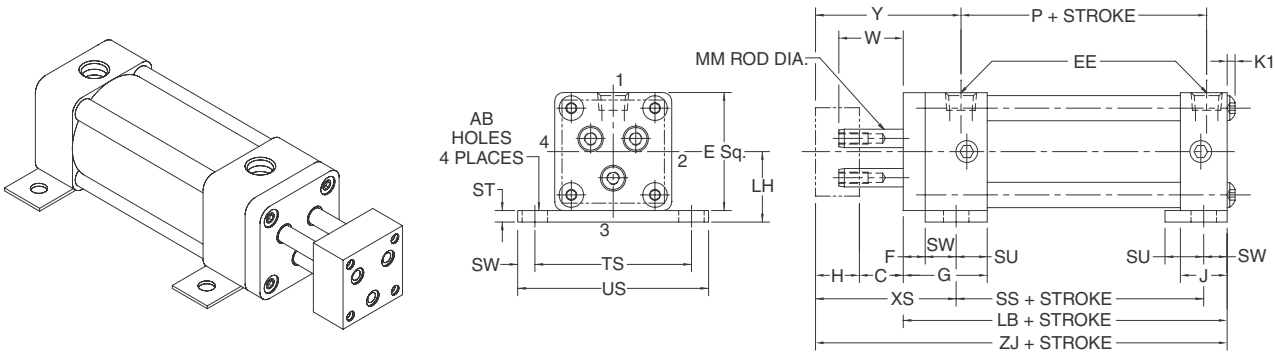
Detachable Pivot Eye – Style BE (NFPA MP4)



Style BE and Dimensions

Bore	Rod dia. mm	C	CB	CD +.000 -.002	E	EE (NPTF)	F	F1	G	H	J	K1	L1	MR2	W	Y	Add stroke LB	P	XD	ZD2
1-1/2	8mm	3/4	3/4	0.500	2	1/4	3/8	3/8	1-7/16	3/4	15/16	1/8	3/4	5/8	1.10	2-3/4	4-3/8	2-5/16	6-5/8	7-1/4
2	12mm	3/4	3/4	0.500	2-1/2	1/4	3/8	3/8	1-7/16	3/4	15/16	5/32	3/4	5/8	1.10	2-3/4	4-3/8	2-5/16	6-5/8	7-1/4
2-1/2	16mm	3/4	3/4	0.500	3	3/8	3/8	3/8	1-7/16	1	15/16	5/32	3/4	11/16	1.35	3-1/16	4-1/2	2-3/8	7	7-11/16
3-1/4	16mm	3/4	1-1/4	0.750	3-3/4	1/2	3/8	5/8	1-11/16	1	1-3/16	3/16	1-1/4	7/8	1.10	3-7/16	5-1/2	2-5/8	8-1/2	9-3/8
4	16mm	3/4	1-1/4	0.750	4-1/2	1/2	3/8	5/8	1/11/16	1	1-3/16	3/16	1-1/4	7/8	1.10	3-7/16	5-1/2	2-5/8	8-1/2	9-3/8

Base Bar – Style NB

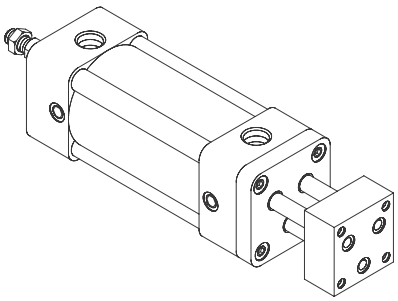


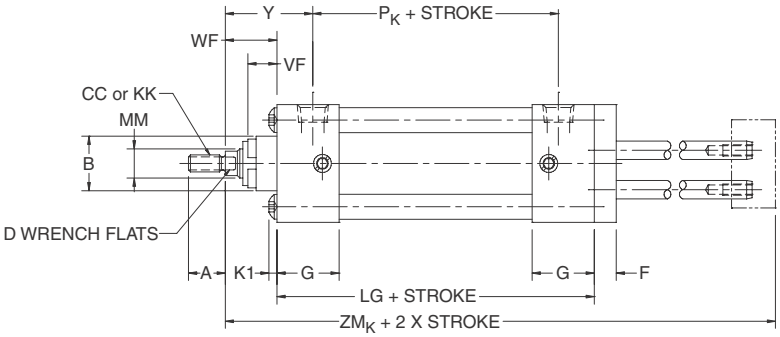
Style NB and Dimensions

Bore	Rod dia. mm	AB	C	E	EE (NPTF)	F	G	H	J	K1	LH ± .000	ST	SU	SW	TS	US	W	XS	Y	Add stroke LB	P	SS	ZJ
1-1/2	8mm	7/16	3/4	2	1/4	3/8	1-1/2	3/4	15-16	1/8	15/16	1/4	1-1/8	3/8	2-3/4	3-1/2	1.10	2-1/4	2-3/4	4	2-5/16	2-7/8	5-1/2
2	12mm	7/16	3/4	2-1/2	1/4	3/8	1-1/2	3/4	15-16	5/32	15/16	1/4	1-1/8	3/8	3-1/4	4	1.10	2-1/4	2-3/4	4	2-5/16	2-7/8	5-1/2
2-1/2	16mm	7/16	3/4	3	3/8	3/8	1-1/2	1	15-16	5/32	15/16	3/8	1-1/8	3/8	3-3/4	4-1/2	1.35	2-1/2	3-1/16	4-1/8	2-3/8	3	5-7/8
3-1/4	16mm	9/16	3/4	3-3/4	1/2	5/8	1-3/4	1	1-3/16	3/16	1-3/16	1/2	1-1/4	1/2	4-3/4	5-3/4	1.10	2-7/8	3-7/16	4-7/8	2-5/8	3-1/4	6-5/8
4	16mm	9/16	3/4	4-1/2	1/2	5/8	1-3/4	1	1-3/16	3/16	1-3/16	1/2	1-1/4	1/2	5-1/2	6-1/2	1.10	2-7/8	3-7/16	4-7/8	2-5/8	3-1/4	6-5/8

Double End – Style K

Three rods with tooling plate one end
Single rod on the opposite end



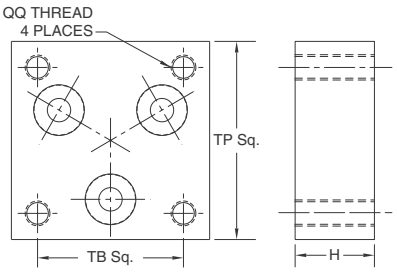


Style K and Dimensions

Bore	Rod no.	Rod dia. mm	Thread style 8 CC	Thread style 4 & 9 KK	A	B +.000 -.002	C	D	F	G	H	K1	VF	WF	Y
1-1/2	1	5/8	1/2-20	7/16-20	3/4	1.124	3/4	1/2	3/8	1-7/16	3/4	1/8	5/8	1	1-7/8
2	1	5/8	1/2-20	7/16-20	3/4	1.124	3/4	1/2	3/8	1-7/16	3/4	5/32	5/8	1	1-7/8
2-1/2	1	5/8	1/2-20	7/16-20	3/4	1.124	3/4	1/2	3/8	1-7/16	1	5/32	5/8	1	1-15/16
3-1/4	1	1	7/8-14	3/4-16	1-1/8	1.499	3/4	7/8	5/8	1-11/16	1	3/16	3/4	1-3/8	2-7/16
4	1	1	7/8-14	3/4-16	1-1/8	1.499	3/4	7/8	5/8	1/11/16	1	3/16	3/4	1-3/8	2-7/16

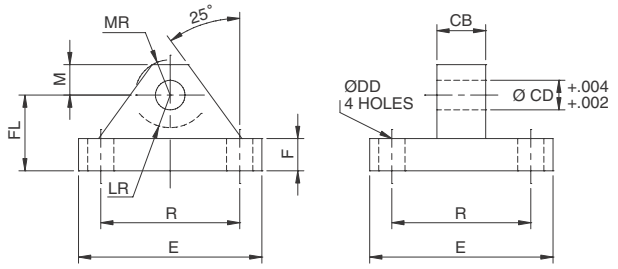
	Add stroke				Add 2X stroke	
Bore	LG	SSK	SNK	PK	ZMK	ZMR
1-1/2	4-1/8	3-3/8	2-1/4	2-3/8	7	7-7/8
2	4-1/8	3-3/8	2-1/4	2-3/8	7	7-7/8
2-1/2	4-1/4	3-1/2	2-3/8	2-3/8	7-3/8	8-1/2
3-1/4	4-3/4	3-3/4	2-5/8	2-5/8	8-1/2	9-1/2
4	4-3/4	3-3/4	2-5/8	2-5/8	8-1/2	9-1/2
Replaces dimension		SS	SN			
On mtg. style		NB	F			

Standard Tooling Plate – Style T



Bore	H	QQ	TB	TP
1-1/2	3/4	10-32	1.12	1-1/2
2	3/4	1/4-28	1.43	2
2-1/2	1	5/16-24	1.84	2-1/2
3-1/4	1	3/8-24	2.19	3-1/4
4	1	3/8-24	2.76	4

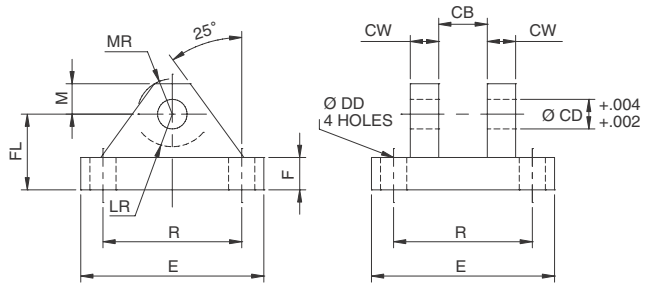
Mounting Plate & Eye Bracket



Mounting Plate & Eye Bracket Dimensions

Bore size	1-1/2, 2, 2-1/2	3-1/4, 4
Part number	1458060050	1458060075
CB	3/4	1-1/4
CD	1/2	3/4
DD	13/32	17/32
E	2-1/2	3-1/2
F	3/8	5/8
FL	1-1/8	1-7/8
LR	3/4	1-1/4
M	1/2	3/4
MR	9/16	7/8
R	1.63	2.55

Clevis Bracket

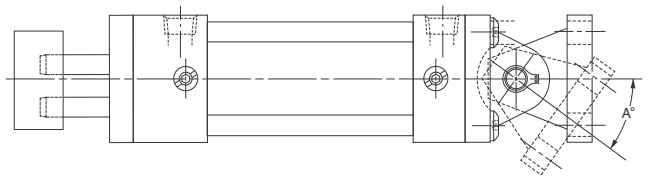


Clevis Bracket Dimensions

Bore size	1-1/2, 2, 2-1/2	3-1/4, 4
Part number	1458050050	1458050075
CB	3/4	1-1/4
CD	1/2	3/4
CW	1/2	5/8
DD	13/32	17/32
E	3-1/2	5
F	1/2	5/8
FL	1-1/2	1-7/8
LR	3/4	1-3/16
M	1/2	3/4
MR	5/8	2/32
R	2.55	3.82

Seal Kits

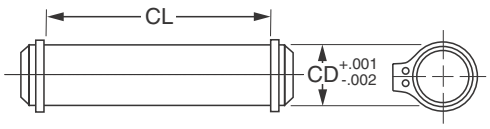
	Part number	
Bore size	Standard seal kit	Fluorocarbon seal kit
1-1/2	**SG2MNR1501**	**SG2MNR1505**
2	**SG2MNR2001**	**SG2MNR2005**
2-1/2	**SG2MNR2501**	**SG2MNR2505**
3-1/4	**SG2MNR3201**	**SG2MNR3205**
4	**SG2MNR4001**	**SG2MNR4005**



Bore size	1-1/2	2	2-1/2	3-1/4	4
Angle A *	52	43	29	50	49

* Angle of rotation specified is for BB style mount only.

Pivot Pin

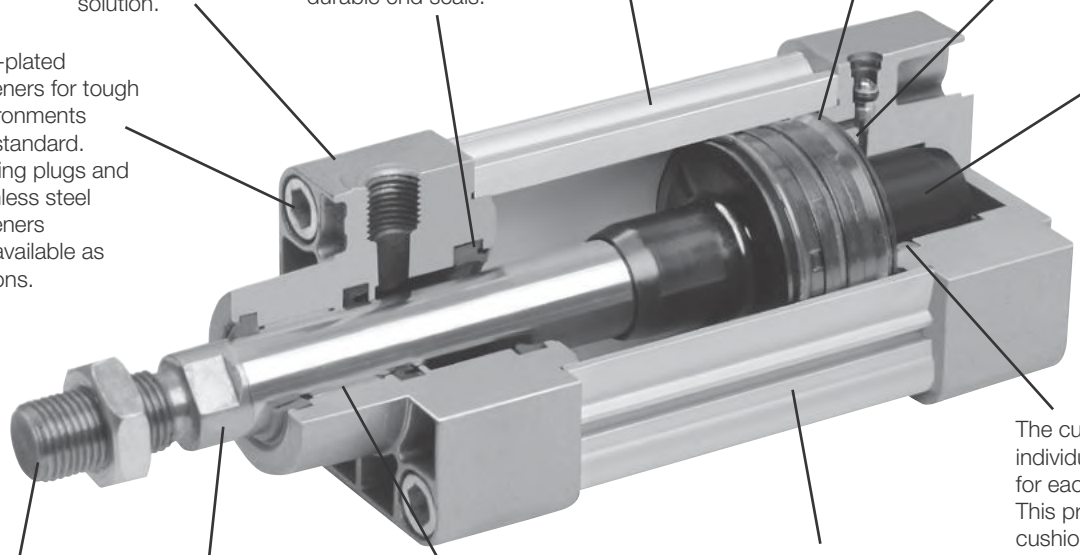


Pivot Pin Dimensions

Part number	0856640050	0856640075
CD	1/2	3/4
CL	1-7/8	2-5/8

P1D Series – ISO Pneumatic Cylinders

Basic Version



P1D Basic Version

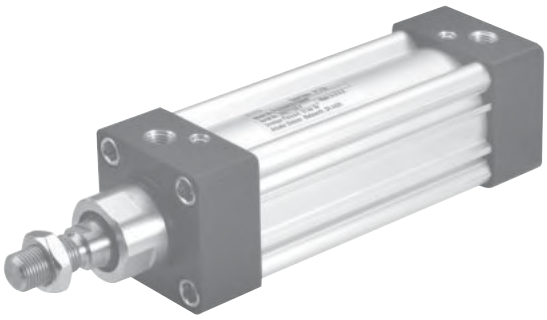
P1D Basic Version cylinders are available in 32-125mm bores and utilize internal composite technology to save weight, while assuring the high performance and functionality expected of ISO cylinders. Cushions and bumpers at both ends and a magnetic piston are included as standard. The Standard Version serves all markets where performance at an affordable price is desired.

International standards
The new P1D Series complies with the current ISO 6431, ISO/DIS 15552, VDMA 24562 and AFNOR installation dimensional standards for customer reassurance world-wide.

Mechanically protected sensor technology
The body extrusion has recessed sensor grooves on three sides of the cylinder. The new Global Sensors drop into the sensor groove quickly and easily. Both the cable and the sensor are protected. Choose a sensor in a variety of cable lengths and with flying leads, 8mm connector or 12mm connector.

Optimized cushioning
Thanks to the plastic inserts in the end covers, each cylinder bore has been given individual flow geometry. This provides optimized cushioning, which is quicker and easier to set and adjust.

Smooth, quiet operation and long service life
All seals and end-of-stroke bumpers are made from polyurethane (PUR), the bearings and piston are made from proven engineering plastics with excellent bearing properties and all cylinders are greased at the factory with a transparent, food-grade grease. Altogether, this gives the P1D Series very long service life and smooth, quiet operation.



P1D Removable Gland Version

P1D Removable Gland Version cylinders are available in 32-200mm bores and utilize bar stock endcaps and a removable high-strength bronze bearing for traditional and custom applications. The bronze bearing assembly is externally removable for quick and easy maintenance. No other ISO cylinder manufacturer in the world produces a Removable Gland Version and meets these demands. This version covers all applications which require performance and customization at all bore sizes.

Removable Gland

An extra-long inboard bearing surface ensures lubrication from within the cylinder. Outboard of the bearing are two leak-proof seals. The rod wiper seal wipes away any dirt on the rod. This means less wear on bearing surfaces and internal parts. The result is positive, no-leak sealing, regardless of conditions. And with the famous Parker removable style gland, you can replace the rod seals and/or bearings when necessary without disassembling the rest of the cylinder and without the need of any special wrenches.

Aluminum Piston Option

For high temperature applications, an aluminum piston is available with fluorocarbon seals. The piston is threaded onto the piston rod and secured in place with anaerobic adhesive which is temperature sensitive. For applications above 121°C (250°F) specify a pinned piston to rod connection. The polyurethane seals that are standard on the nylon piston are also an available option with the aluminum piston. The magnet that is cleverly hidden underneath the wear-band is also a standard feature on the aluminum piston. The durable wear-band prevents any metal-to-metal contact between the piston and the cylinder body wall increasing the overall life of the cylinder.

Machined End Caps with Captive Cushion Screw Adjustment

The end caps are made of precision lightweight aluminum. This allows for maximum flexibility and quick manufacturing for any customization that is required. The end caps also feature a captive cushion needle valve adjustment screw for optimized cushioning that is inherent throughout the P1D family of ISO cylinders.

P1D Series Rod Lock Cylinder

The P1D Series Rod Lock Cylinder incorporates a powerful piston rod locking device, which clamps the piston rod and locks it in position. The locking device is a spring lock with an air pressure release and is integrated into the front (head) cover of the cylinder.

In the absence of air signal pressure, full holding force is applied to the piston rod. When air is present at 4 bar (58 psi), the locking device is released.

The P1D Series Rod Lock Cylinder is available for cylinder bores 32-125mm. The design provides several valuable characteristics, such as:

- A holding force corresponding to a pressure of 7 bar (102 psi)
- A clean design, with the front (head) end cover and locking device built into a common block for compact installation
- Easy to clean, well-sealed construction
- Exhaust air from the locking device can be piped away when there are high demands for a contaminant free environment

P1D Series Rod Lock Cylinder with Manual Override

The P1D Series Rod Lock Cylinder with Manual Override is available for rod lock release during non-production activities. It incorporates the same features as the standard rod lock cylinder.

P1D Clean Version

The P1D Clean Version is completely designed for the food industry. The stringent requirements for hygiene regarding choice of material and corrosion resistance have guided the development of this cylinder version. Available with BSPP ports (ISO 1179-1 with ISO 228-1 threads).

All the main dimensions of the P1D Clean comply with ISO 6431, ISO/DIS 1555, VDMA 24562 and AFNOR standards except the somewhat larger footprint of the end covers and envelope of the body extrusion, due to the hygienic, convex, easy-to-clean geometry of the cushioning adjustment screw and the components of the integrated sensor system.

Convex shape for optimum hygiene
What makes the P1D Clean version unique is its convex body extrusion, which allows the cylinder to be kept clean. Regardless of orientation, fluids will run off the cylinder body surfaces.

Sealing plugs
Plastic sealing plugs are installed in the end cover screws which are not used for the cylinder installation. To ensure the sealing function, the plugs cannot be re-used. When installed in the end cover screws, they are tapped lightly with a hammer for high axial force.

Cushioning screw with positive geometry
To offer the best hygiene properties, the projecting cushioning screw is sealed against the end cover. This eliminates dirt-collecting cavities and gives the best hygiene, since it is so easy to clean.

P1D Tie-Rod Version

The P1D Tie-Rod Version cylinders are based on the same high level technology as the Basic Version. They accept either Standard Version or Removable Gland Version heads and caps. This cylinder is the perfect choice wherever a true tie-rod cylinder is needed.

International standards
The P1D Tie-Rod Version complies with ISO 6431, ISO/DIS 15552, VDMA 24562 and AFNOR installation dimension standards, for customer reassurance world-wide.

"Drop-in" sensor
The P1D Tie-Rod Version utilizes the same drop-in Global Sensors as the other versions. An ingenious multi-jointed adapter clamps the sensors to the tie rod in any chosen position along the stroke.

Large Bore Sizes
The P1D Tie-Rod Version is now available in 160 and 200mm bore sizes.

32-125mm bores

Design Versions

P1D Basic Version

The P1D Basic Version cylinders meet the specifications in the ISO 15552 standard. This means full interchangeability to any ISO 15552 cylinder anywhere around the globe. P1D Basic Version will be available throughout the extensive worldwide Parker Hannifin organization.

P1D Standard Version

P1D Standard Version cylinders are available in 32-125mm bores and utilize internal composite technology to save weight, while assuring the high performance and functionality expected of ISO cylinders. Cushions and bumpers at both ends and a magnetic piston are included as standard. The Standard Version serves all markets where performance at an affordable price is desired.

P1D Removable Gland Version

P1D Removable Gland Version cylinders are available in 32-200mm bores and utilize bar stock endcaps and a removable high-strength bronze bearing for traditional and custom applications. The bronze bearing assembly is externally removable for quick and easy maintenance. No other ISO cylinder manufacturer in the world produces a Removable Gland Version and meets these demands. This version covers all applications which require performance and customization at all bore sizes.

P1D Rod Lock Cylinder

The P1D Rod Lock Cylinder incorporates a powerful piston rod locking device, which clamps the piston rod and locks it in position. The locking device is a spring lock with an air pressure release and is integrated into the front (head) cover of the cylinder.

P1D Clean Version

The P1D Clean Version is completely designed for the food industry. The stringent requirements for hygiene regarding choice of material and corrosion resistance have guided the development of this cylinder version. Available with BSPP ports (ISO 1179-1 with ISO 228-1 threads).

P1D Tie-Rod Version

The P1D Tie-Rod Version cylinders are based on the same high level technology as the Standard Version. They accept either Standard Version or Removable Gland Version heads and caps. This cylinder is the perfect choice wherever a true tie-rod cylinder is needed.

Guided Cylinders

For guided versions of the P1D, see the P5E Series and HB Series.

P5E Series

The innovative P1D is a long lasting ISO/VDMA cylinder. The cylinders are double acting, with a new design of air cushioning.

The P1D complies with the current ISO 6431, ISO 15552, VDMA 24562 and AFNOR installation dimension standards

- Available in 32 to 200mm bores
- PUR seals for long service life
- Drop-in sensors
- Corrosion resistant design
- Magnetic piston as standard
- Lubricated with food grade grease

Operating information

Operating pressure:	145 PSIG (10 bar) maximum	
Temperature range:	Standard:	-4°F to 176°F (-20°C to 80°C)
	High temperature:	14°F to 250°F (-10°C to 121°C)
Cylinders for low pressure hydraulic operation:		Ø32 - 125mm
ATEX approval:	CE Ex IIGD c T4	248°F (120°C)
Filtration requirements:	40 micron, dry filtered air	

P1D Standard - Double acting

Ø32mm - (G1/8)

Stroke (mm)	Order Code
25	P1D-S032MC-0025NNNNN
40	P1D-S032MC-0040NNNNN
50	P1D-S032MC-0050NNNNN
80	P1D-S032MC-0080NNNNN
100	P1D-S032MC-0100NNNNN
125	P1D-S032MC-0125NNNNN
160	P1D-S032MC-0160NNNNN
200	P1D-S032MC-0200NNNNN
250	P1D-S032MC-0250NNNNN
320	P1D-S032MC-0320NNNNN
400	P1D-S032MC-0400NNNNN
500	P1D-S032MC-0500NNNNN

Ø40mm - (G1/4)

25	P1D-S040MC-0025NNNNN
40	P1D-S040MC-0040NNNNN
50	P1D-S040MC-0050NNNNN
80	P1D-S040MC-0080NNNNN
100	P1D-S040MC-0100NNNNN
125	P1D-S040MC-0125NNNNN
160	P1D-S040MC-0160NNNNN
200	P1D-S040MC-0200NNNNN
250	P1D-S040MC-0250NNNNN
320	P1D-S040MC-0320NNNNN
400	P1D-S040MC-0400NNNNN
500	P1D-S040MC-0500NNNNN

Ø50mm - (G1/4)

25	P1D-S050MC-0025NNNNN
40	P1D-S050MC-0040NNNNN
50	P1D-S050MC-0050NNNNN
80	P1D-S050MC-0080NNNNN
100	P1D-S050MC-0100NNNNN
125	P1D-S050MC-0125NNNNN
160	P1D-S050MC-0160NNNNN
200	P1D-S050MC-0200NNNNN
250	P1D-S050MC-0250NNNNN
320	P1D-S050MC-0320NNNNN
400	P1D-S050MC-0400NNNNN
500	P1D-S050MC-0500NNNNN

Ø63mm - (G3/8)

Stroke (mm)	Order Code
25	P1D-S063MC-0025NNNNN
40	P1D-S063MC-0040NNNNN
50	P1D-S063MC-0050NNNNN
80	P1D-S063MC-0080NNNNN
100	P1D-S063MC-0100NNNNN
125	P1D-S063MC-0125NNNNN
160	P1D-S063MC-0160NNNNN
200	P1D-S063MC-0200NNNNN
250	P1D-S063MC-0250NNNNN
320	P1D-S063MC-0320NNNNN
400	P1D-S063MC-0400NNNNN
500	P1D-S063MC-0500NNNNN

Ø80mm - (G3/8)

25	P1D-S080MC-0025NNNNN
40	P1D-S080MC-0040NNNNN
50	P1D-S080MC-0050NNNNN
80	P1D-S080MC-0080NNNNN
100	P1D-S080MC-0100NNNNN
125	P1D-S080MC-0125NNNNN
160	P1D-S080MC-0160NNNNN
200	P1D-S080MC-0200NNNNN
250	P1D-S080MC-0250NNNNN
320	P1D-S080MC-0320NNNNN
400	P1D-S080MC-0400NNNNN
500	P1D-S080MC-0500NNNNN

Ø100mm - (G1/2)

Stroke (mm)	Order Code
25	P1D-S100MC-0025NNNNN
40	P1D-S100MC-0040NNNNN
50	P1D-S100MC-0050NNNNN
80	P1D-S100MC-0080NNNNN
100	P1D-S100MC-0100NNNNN
125	P1D-S100MC-0125NNNNN
160	P1D-S100MC-0160NNNNN
200	P1D-S100MC-0200NNNNN
250	P1D-S100MC-0250NNNNN
320	P1D-S100MC-0320NNNNN
400	P1D-S100MC-0400NNNNN
500	P1D-S100MC-0500NNNNN

Ø125mm - (G1/2)

25	P1D-S125MC-0025NNNNN
40	P1D-S125MC-0040NNNNN
50	P1D-S125MC-0050NNNNN
80	P1D-S125MC-0080NNNNN
100	P1D-S125MC-0100NNNNN
125	P1D-S125MC-0125NNNNN
160	P1D-S125MC-0160NNNNN
200	P1D-S125MC-0200NNNNN
250	P1D-S125MC-0250NNNNN
320	P1D-S125MC-0320NNNNN
400	P1D-S125MC-0400NNNNN
500	P1D-S125MC-0500NNNNN

The cylinders are supplied complete with a zinc plated steel piston rod nut.

Sensors
See section L for sensors.

☐ Most popular.

Ordering information

P1D	–	S	032	M	C	–	0500	N	N	N	N	N

Piston Style

Cushions	Piston material: Composite [1]	Piston material: Aluminum [2]
None	M	Y
Cush B/E	– [3, 20]	4
Cush head	J	5
Cush cap	K	6

Bore size

032	32mm
040	40mm
050	50mm
063	63mm
080	80mm
100	100mm
125	125mm
160	160mm [8]
200	200mm [8]

Stroke [14]
Specify whole mm using 4 digits, i.e. 0500

Rod end

N	Metric male
6	Metric female
3	Special*

* Please provide desired dimensions for KK, AM and WH or W. If otherwise, please provide dimensioned sketch.

Cylinder ports front & rear

–	BSPP Ports (G Threads)**
E	NPTF Ports*
Q	BSPT Ports (R_C Threads)*†

* Not available on clean version.
† Not available on die cast version.
** ISO 1179-1 with ISO 228-1 threads.

Version

	Cylinder body profile	Rod lock: None	Rod lock: Fitted w/ standard rod lock [7]	Rod lock: Fitted w/ manual override rod lock [7]
Die cast end caps [4]	Basic	B	N/A	N/A
	Standard	S	L	N/A
	Tie Rod [13]	T	M	N/A
	Clean	C	D	N/A
Machined end caps rod lock not available with removable gland. [5]	Standard	G [5]	R	J
	Tie Rod [13]	E [5]	7 [4]	Consult Factory
Special [6]	Any Special	/		

Function

Fastener type	Rod wiper style	Double acting	Double rod	Tandem [13]
Standard end cover screws	Std scraper	M [20]	F	C
	Metal scraper	Q	R	J
Stainless steel end cover screws [9]	Std scraper	A	G	N/A
	Metal scraper	S	T	N/A

Piston rod & seal material

Piston rod material	Seal material: Standard	Seal material: Fluorocarbon [10]	Seal material: Hydraulic [11]
Chrome plated carbon steel [2]	C [20]	G	J
Chrome plated stainless steel [2, 19]	R [20]	D	Z
303 Stainless steel [12]	S	N/A	N/A
Acid-resistant stainless steel	M	N [2]	N/A

Rod mountings & plugs [15]

Rod mounting	No plugs [16, 20]	With plugs [1]
Swivel rod eye	S	A
Swivel rod eye SS	T	1
Swivel rod eye with clevis bracket GA [19]	V	E
Swivel rod eye SS with clevis bracket GA	W	2
Clevis	C	B
Clevis SS	D	3
Flexco coupling	F	G
One additional piston rod nut	X	P
Stainless steel piston rod nut	Y	4
Acid-resistant nut	Z	5
None (piston rod nut only)	N	R

Sensors [17]

Prepared for factory-fitted sensors	Cable location: Front or left	Cable location: Rear or right	Cable location: Front & rear
P1D clean version	6	7	8
P1D all versions (except Clean) prepared for sensors or clean version without sensor capability [18, 20]	N		

Mounting style

	Standard [20]	Rotated 90°
Flange MF1 at head (front) end	1	3
Flange MF2 at cap (rear) end	B	4
Flanges MF1 and MF2 at both ends	2	K
Foot brackets MS1	F	R
Clevis bracket GA aluminum	C	U
Rear eye MP4 aluminum	E	V
Rear swivel eye MP6 aluminum	S	W
Clevis bracket MP2 aluminum	T	Y
Rear eye + clevis (MP4 + MP2) aluminum	L	Z
Clevis bracket MP2 + pivot hinge aluminum	X	5
Clevis bracket GA aluminum + steel swivel hinge	Q	0
Rear swivel eye + clevis bracket GA aluminum	M	A
Intermediate trunnion MT4 (requires XV dimension)	G	7
Trunnion flange at head (front) end [4]	H	P
Trunnion flange at cap (rear) end [4]	J	8
None (MX0)	N	9

Notes:

1 Not available for 160-200mm bores.
2 Not available on Clean Version.
3 Must be placed in model code.
4 Not available for 160-200mm bores or with fluorocarbon seals.
5 When Removable Gland Version is fitted with rod lock, gland cannot be replaced without disassembling cylinder.
6 If special cylinder is ordered (other than rod end), End Cap Style, Cylinder Body Profile and Rod Lock option must be given in addition to the special request.
7 Cylinders fitted with rod locks must be cushioned on both ends.
8 Tie Rod Version E must be specified for these bores.
9 Applies only to end cover screws for 32-125mm bores. For stainless steel tie rods and nuts (all bore sizes), change Version to special and request stainless steel tie rods and nuts.
10 If used for temperature above 80°C (176°F), aluminum piston required. Not available with die cast end caps.
11 Hydraulic seal option valid for Removable Gland Version only. Adjustable cushion options and Rod Lock Versions not available.
12 Only available on Clean Version.
13 Tie Rod Version is required for Tandem Function.
14 When specifying a stop tube, place a "/" in the version field. Then specify the version, amount of stop tube and amount of net stroke. The stroke used in the model code should be gross stroke (net stroke plus stop tube).
15 Please review Piston Rod Selection Chart in the Engineering Section to check for a rod buckling condition.
16 Clean Version comes standard with plugs. Use this column when ordering Clean Version.
17 For sensor part numbers and specifications, please refer to Electronic Sensors section.
18 P1D Clean Version ordered without sensors cannot be retrofitted with sensor capability.
19 Consult factory for this option.
20 Only option for Basic Version.

Double Rod Cylinders

Double rod option is available with Mounting Styles MX0, MS1, MF1, MF2 and MT4.

For double rod cylinders, it is assumed that the rod number and rod end are the same for both piston rods. On a double rod cylinder where the two rod ends are different, use a rod end of '3' and be sure to clearly state which rod end is to be assembled at which end.

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.

General Specifications

- Bore sizes 32-200mm
- Max stroke 2800mm
- Min stroke 25mm
  (must specify Tie Rod Version for strokes <25mm)
- Rod Ends – 2 standard, specials to order
- Single rod end and double rod end styles
- Working pressure Max 10 bar (145 PSI)
- Working temperature –
  -20°C to 80°C (-4°F to 176°F) standard
  -10°C to 121°C (14°F to 250°F) high temp version
- Aluminum piston is required for service above 80°C (176°F)
- Greased for life (non-lube), does not normally need additional lubrication. If air line lubrication is initiated, it must always be continued.
- Working medium: Dry, filtered compressed air to ISO 8573-1 class 3. 4. 3. or better

P1D Rod Lock Version

- Fluid Medium: Dry, filtered, compressed air
- Maximum Cylinder Operating Pressure: 10 bar (145 PSI)
- Required Pressure to Unlock[1]: 4 bar (58 PSI)
- Minimum Torque Required for Manual Override Version:
  32mm Bore = 0.9 N-m / 8 in-lbs
  40mm Bore = 0.9 N-m / 8 in-lbs
  50mm Bore = 2.7 N-m / 24 in-lbs
  63mm Bore = 2.7 N-m / 24 in-lbs
  80mm Bore = 27.1 N-m / 240 in-lbs
  100mm Bore = 36.6 N-m / 324 in-lbs
  125mm Bore = 61.0 N-m / 540 in-lbs
- Maximum Operating Temperature:
  -10°C to 75°C (14°F to 167°F)
  Min stroke 10mm
- Maximum Cylinder Operating Speed: 5 feet per second

[1] Signal pressure to port on locking device. Operation at pressures lower than 4 bar (58 psi) may lead to inadvertent engagement of the rod lock device.

Quick Reference

Bore size	Cylinder area, cm^2	Piston rod Dia. mm	Piston rod Area, cm^2	Piston rod Male thread	Cushioning length mm	Air consumption [1] liter	Connection thread [4]	Theoretical cylinder forces at 6 bar (N) [2] Extend stroke	Theoretical cylinder forces at 6 bar (N) [2] Retract stroke
32	8.0	12	1.1	M10x1.25	17	0.105	G1/8	482	414
40	12.6	16	2.0	M12x1.25	19	0.162	G1/4	754	633
50	19.6	20	3.1	M16x1.5	20	0.253	G1/4	1178	989
63	31.2	20	3.1	M16x1.5	23	0.414	G3/8	1870	1681
80	50.3	25	4.9	M20x1.5	23	0.669	G3/8	3016	2721
100	78.5	25	4.9	M20x1.5	27	1.043	G1/2	4712	4417
125	122.7	32	8.0	M27x2	30	1.662	G1/2	7363	6880
160	201.1	40	12.6	M36x2	38	2.724	G3/4	12.064	11,310
200	314.2	40	12.6	M36x2	38	4.256	G3/4	18.850	18,096

Cylinder bore size	Total mass (kg) 0mm stroke 3 Basic	Total mass (kg) 0mm stroke 3 Tie-Rod	Supplement per 10mm stroke Basic	Supplement per 10mm stroke Tie-Rod	Total mass (kg) moving components at 0mm stroke All variants	Supplement per 10mm stroke All variants
32	0.55	0.54	0.023	0.022	0.13	0.009
40	0.80	0.79	0.033	0.030	0.24	0.016
50	1.20	1.20	0.048	0.048	0.42	0.025
63	1.73	1.73	0.051	0.051	0.50	0.025
80	2.45	2.47	0.075	0.079	0.90	0.039
100	4.00	4.00	0.084	0.084	1.10	0.039
125	6.87	6.73	0.138	0.129	2.34	0.063
160	—	16.19	—	0.160	Consult Factory	Consult Factory
200	—	22.23	—	0.185	Consult Factory	Consult Factory

1 Free air consumption per 10mm stroke for a double stroke at 6 bar
2 The values for cylinder forces are theoretical and should be reduced to suit working conditions.
3 Total Mass for composite piston for 32-125mm bores and aluminum piston for 160-200mm bores.
4 ISO 1179-1 with ISO 228-1 threads

Basic & Standard Version

Body extrusion	Clear anodized aluminium
End covers	Anodized aluminum
End cover inserts	POM
End cover nuts/screws	Zinc plated steel 8.8
Piston rod nut	Zinc plated steel
Piston rod	Chrome-plated steel (standard)
Rod wiperseal	PUR
Piston rod bearing	POM
Piston	POM
Piston bearing	POM
Magnetic ring	Plastic bound magnetic material
Piston fastener	Zinc plated steel (composite piston)
Piston seal	PUR
O-rings	Nitrile rubber, NBR
End-of-stroke bumpers and end seals	PUR
Cushioning seals	PUR
Cushioning screws	PA

Piston Rod Material Options

(or with equivalent properties):

Standard	Case-hardened, chrome plated carbon steel
Chrome plated stainless steel	17-4 PH, chrome plated stainless steel
Stainless steel	303 stainless steel
Acid-resistant stainless steel	316 stainless steel

ISO AFNOR VDMA

Additional/Substitute Specifications

P1D Tie-Rod Version

Tie-rods	Blackened steel

P1D Removable Gland Version

End covers	Black anodized aluminum
End cover screws	Zinc plated steel 8.8 (32-125mm bores)
Cylinder Body	Clear anodized aluminum
Rod gland	PTFE filled high strength bronze
Rod seal	Buna Nitrile for sealing action
Rod wiper	Buna Nitrile for wiping action
Piston rod	Case hardened chrome-plated steel
Piston rod nut	Zinc plated steel
Piston	POM (standard)
	Aluminum (optional)
Piston seals	PUR
Piston bearing	POM or Molyguard wear band for aluminum piston
Magnetic ring	Plastic bound magnetic material
Piston fastener	Zinc plated steel (composite piston)
O-rings	Buna Nitrile
Cushioning seals	PUR
Cushioning screws	Stainless steel (brass for 160 and 200mm bores)

Design Variants for Removable Gland Version

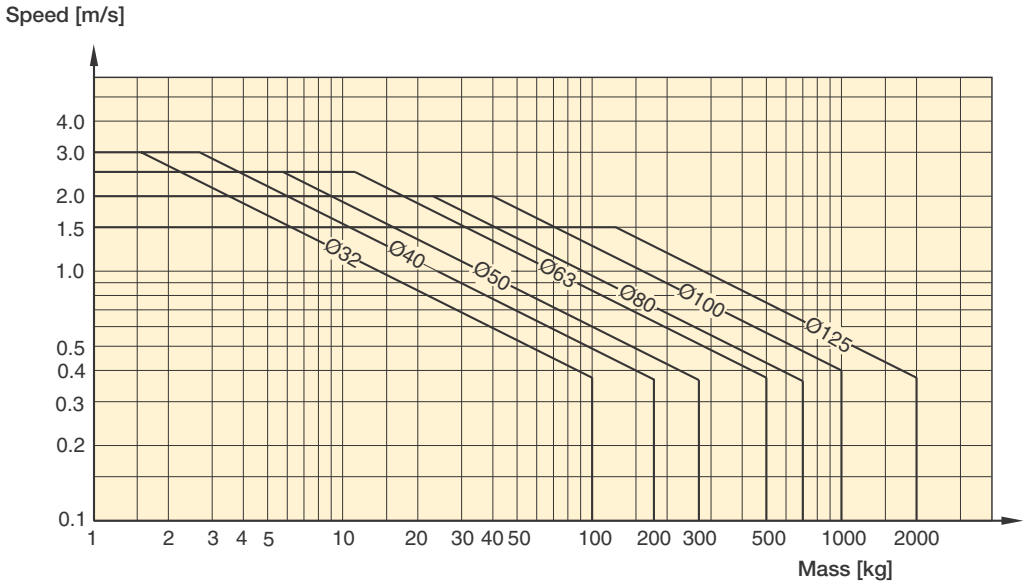
High temperature option includes:	
All seals	Fluorocarbon
Piston	Aluminum (without magnetic ring)
Low pressure hydraulic option includes:	
Rod seal	Buna Nitrile
Rod wiper	PUR
Piston seals	Buna Nitrile
Piston	Aluminum (non-cushioned)
Metallic Rod Scraper includes:	
Rod wiper	Dual high strength bronze wipers with nitrile or fluorocarbon energizer

Cushioning Characteristics

The diagram below is used for sizing of cylinders related to the cushioning capacity. The maximum cushioning capacity shown in the diagram assumes the following:

- Low load, i.e. low pressure drop across the piston
- Equilibrium speed
- Correctly adjusted cushioning screw
- 6 bar at cylinder port

The load is the sum of internal and external friction, plus any gravitational forces. At high relative load (pressure drop exceeding 1 bar), we recommend that for any given speed, the mass should be reduced by a factor of 2.5, or for a given mass, the speed should be reduced by a factor of 1.5. This is in relation to the maximum performance given in the diagram.



Recommended Air Quality for Cylinders

For best possible service life and trouble-free operation, ISO 8573-1 quality class 3.4.3 should be used. This means 5 µm filter (standard filter) dew point 3°C (37°F) for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m³, which is what a standard compressor with a standard filter gives.

ISO 8573-1 Quality Classes

	Polution		Water		Oil
Quality class	Particle size (mm)	Max. concentration (mg/m³)	Max pressure dew point (°C)	(°F)	Max. concentration (mg/m³)
1	0.1	0.1	-70	-94	0.01
2	1	1	-40	-40	-0.1
3	5	5	-20	-4	1.0
4	15	8	+3	+37	5.0
5	40	10	+7	+44	25
6	–	–	+10	+50	–

Guide for Selecting Suitable Tubing

The selection of the correct size of tubing is often based on experience, with no great thought to optimizing energy efficiency and cylinder velocity. This is usually acceptable, but making a rough calculation can result in worthwhile economic gains.

The following is the basic principle:

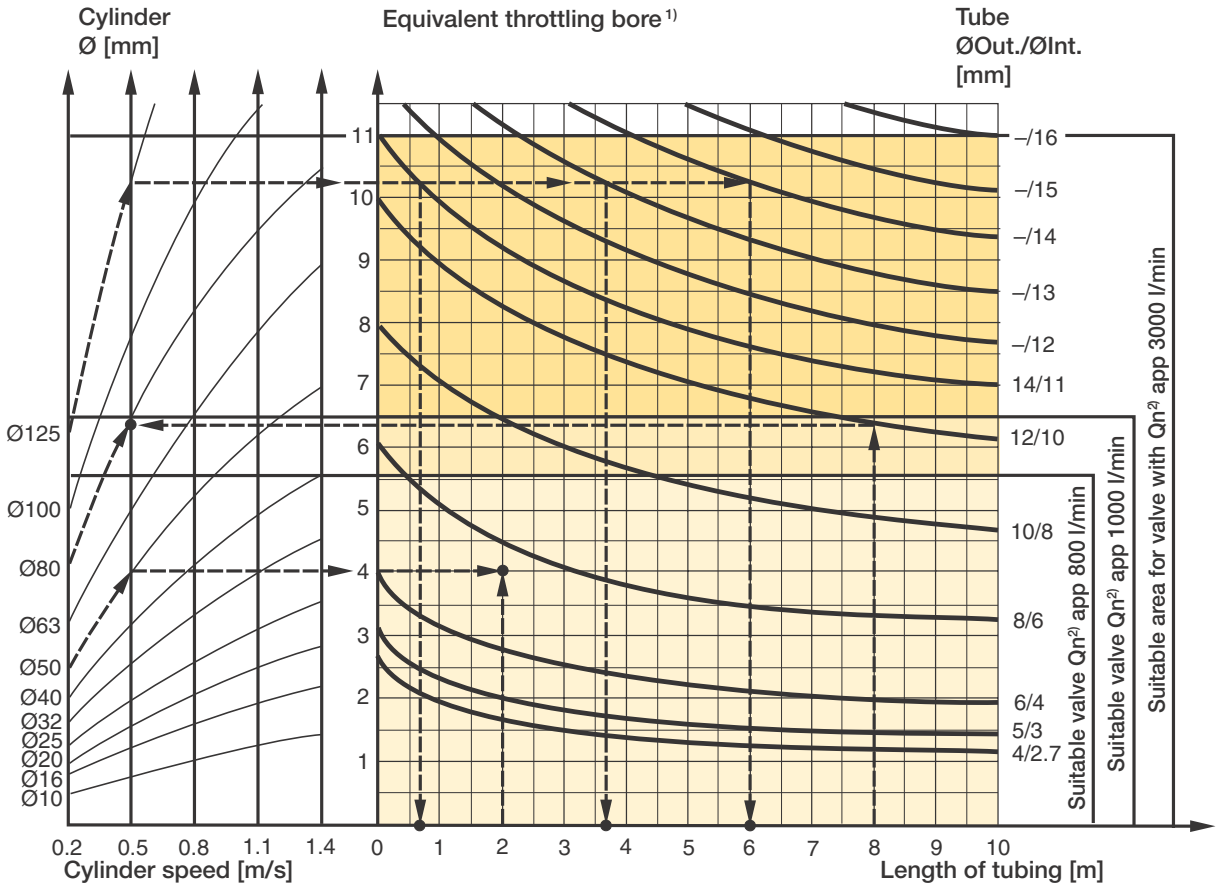
1. The primary line to the working valve could be over sized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore throttles the flow and thus limits the cylinder speed, while an oversized pipe creates a dead volume which increases the air consumption and filling time.

The chart below is intended to help when selecting the correct size of tube to use between the valve and the cylinder.

The following prerequisites apply:

The cylinder load should be about 50% of the theoretical force (= normal load). A lower load gives a higher velocity and vice versa. The tube size is selected as a function of the cylinder bore, the desired cylinder velocity and the tube length between the valve and the cylinder.

If you want to use the capacity of the valve to its maximum, and obtain maximum speed, the tubing should be chosen so that they at least correspond with the equivalent restriction diameter (see description below), so that the tubing does not restrict the total flow. This means that a short tubing must have at least the equivalent restriction diameter. If the tubing is longer, choose it from the table below. Straight fittings should be chosen for highest flow rates. (Elbow and banjo fittings cause restriction.)



1) The "equivalent throttling bore" is a long throttle (for example a tube) or a series of throttles (for example, through a valve) converted to a short throttle which gives a corresponding flow rate. This should not be confused with the "orifice" which is sometimes specified for valves. The value for the orifice does not normally take account of the fact that the valve contains a number of throttles.

2) Qn is a measure of the valve flow capacity, with flow measured in liter per minute (l/min) at 6 bar(e) supply pressure and 1 bar pressure drop across the valve.

P1D Rod Lock Version – Rod Lock Data

Connection

The signal air for the locking device can be obtained directly from a main air supply, or from the air supply serving the valve that controls the cylinder itself. For controlled ON/OFF operation of the locking device, a separate quick-venting valve is used.
The piston rod should not be moving when the locking device is activated. The locking device is not intended to brake a movement in repeated sequences.

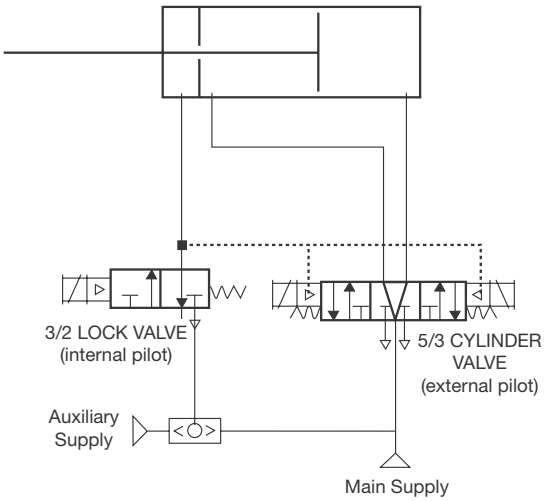
Holding Forces*

	Holding forces	
Bore size	(N)	(lbs)
32mm	550	123
40mm	860	193
50mm	1345	303
63mm	2140	481
80mm	3450	755
100mm	5390	1211
125mm	8425	1894

NOTE: All P1D Rod Lock Versions are not intended for use in water service applications, or in environments that have high humidity levels and/or splashing fluids present.

* While cylinder is on extend at 87 PSI.

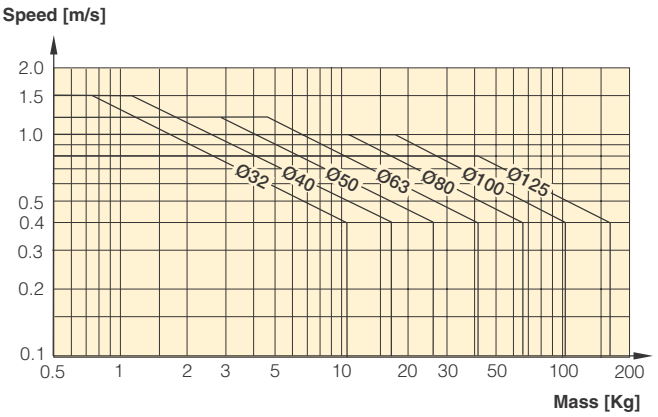
Sample Pneumatic Circuit



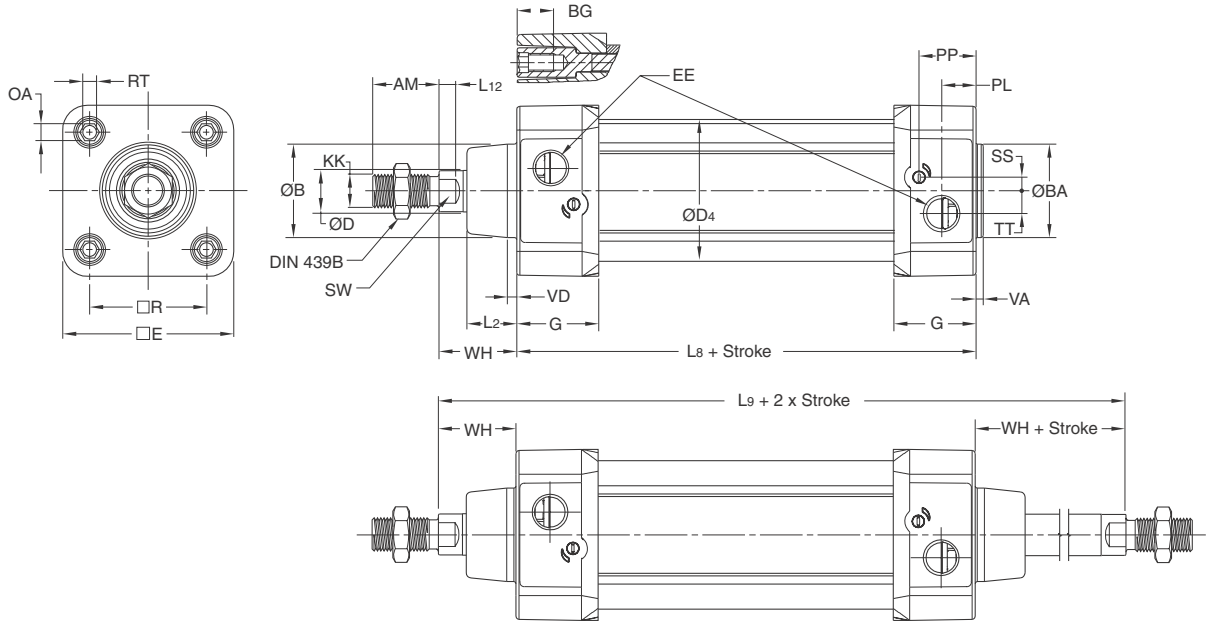
1. Lock valve must be maintained energized during cylinder motion, otherwise rod lock is engaged and cylinder valve shifts to mid position.
2. Cylinder valve must be maintained energized during extend or retract. Also keep energized at end of stroke until change of direction is desired.
3. Mid position of 5/3 Cylinder valve may be pressurized outlets if the combination of pressure load on the cylinder and inertia effects of the attached load do not exceed the holding force rating of the rod lock device, including allowance for wear.
4. Do not use cylinder lines for any logic functions — pressure levels vary too much.

Use as a Brake

The chart to the right shows the maximum values for speed and braking mass if the cylinder is used as a brake. The cylinder should not be exposed to additional compressive forces as this significantly reduces the external mass that can be braked.
We recommend systems in which the cylinder does not act as a motor during braking. Heat is generated if the brake is used frequently, and this must be taken into account to ensure that the maximum temperature is not exceeded.



P1D Basic & Standard Version



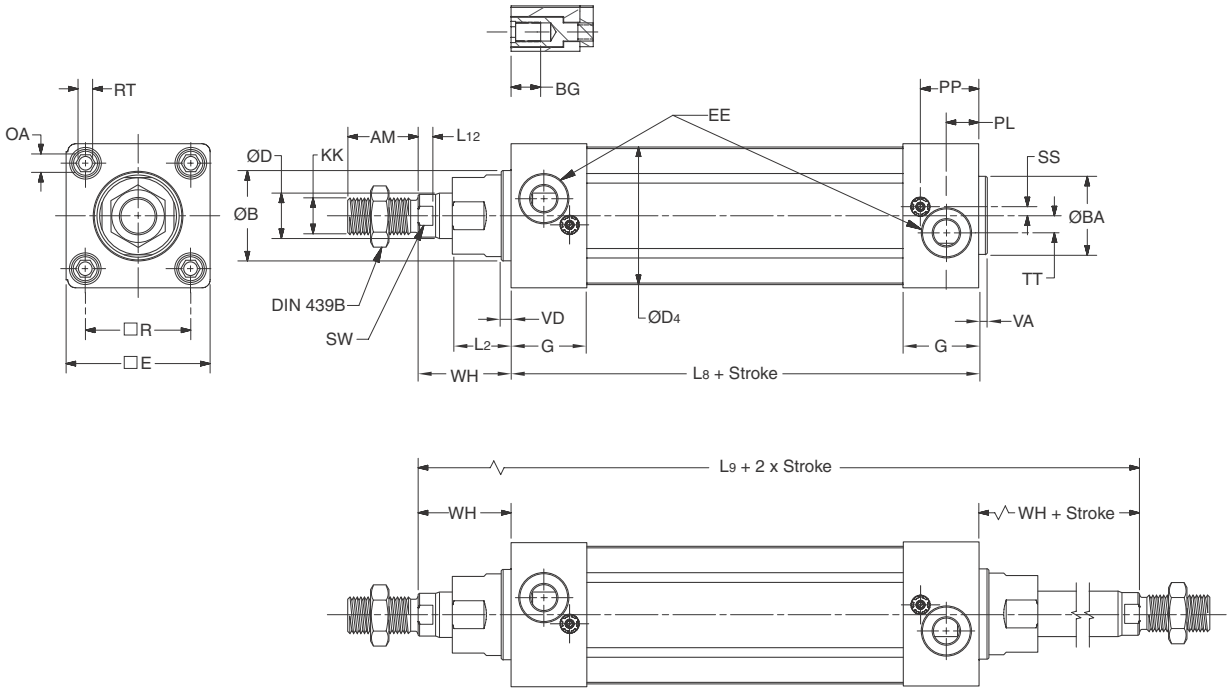
Basic & Standard Version

Bore size	AM mm	B mm	BA mm	BG mm	D mm	D4 mm	E	EE BSPP *	EE NPTF/ BSPT	G mm	KK †	L2 mm	L8 mm	L9 mm	L12 mm
32	22	30	30	16	12	5.0	50.0	G1/8	1/8	28.5	M10x1.25	16.0	94	146	6.0
40	24	35	35	16	16	52.0	57.4	G1/4	1/4	33.0	M12x1.25	19.0	105	165	6.5
50	32	40	40	16	20	60.7	69.4	G1/4	1/4	33.5	M16x1.5	24.0	106	180	8.0
63	32	45	45	16	20	71.5	82.4	G3/8	3/8	39.5	M16x1.5	24.0	121	195	8.0
80	40	45	45	17	25	86.7	99.4	G3/8	3/8	39.5	M20x1.5	30.0	128	220	10.0
100	40	55	55	17	25	106.7	116.0	G1/2	1/2	44.5	M20x1.5	32.4	138	240	10.0
125	54	60	60	20	32	134.0	139.0	G1/2	1/2	51.0	M27x2	45.0	160	290	13.0

Bore size	OA mm	PL mm	PP mm	R mm	RT	SS mm	SW mm	TT mm	VA mm	VD mm	WH mm
32	6	13	21.8	32.5	M6	4.0	10	4.5	3.5	4.5	26
40	6	14	21.9	38.0	M6	8.0	13	5.5	3.5	4.5	30
50	8	14	25.9	46.5	M8	4.0	17	7.5	3.5	4.5	37
63	8	16	27.4	56.5	M8	6.5	17	11.0	3.5	4.5	37
80	6	16	30.5	72.0	M10	0	22	15.0	3.5	4.5	46
100	6	18	35.8	89.0	M10	0	22	20.0	3.5	4.5	51
125	8	23	40.5	110.0	M12	0	27	17.5	3.5	6.5	65

* ISO 1179-1 with IS2O 228-1 threads.

P1D Removable Gland Version



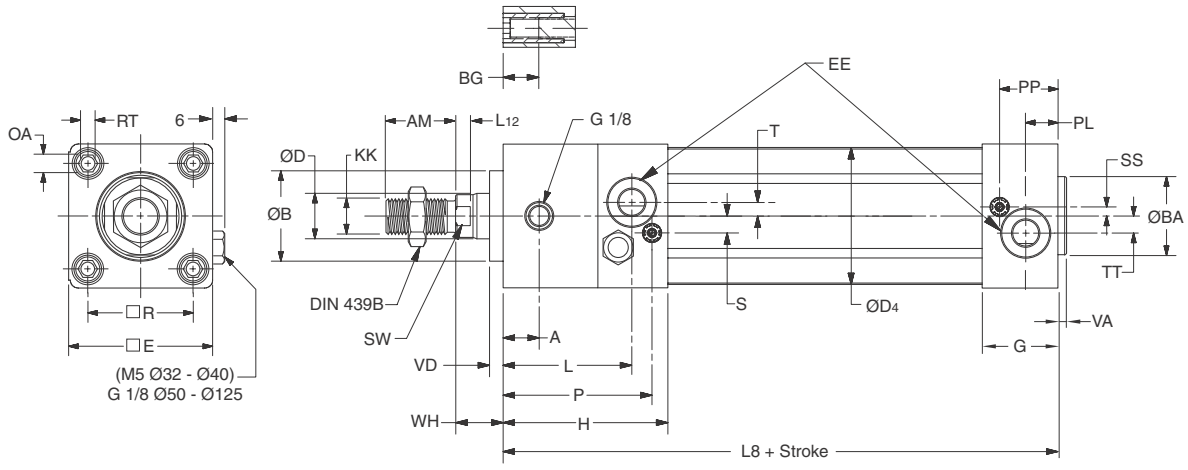
Removable Gland Version

Bore size	AM mm	B mm	BA mm	BG mm	D mm	D4 mm	E mm	EE BSPP *	EE NPTF/ BSPT	G mm	KK	L2 mm	L8 mm	L9 mm	L12 mm
32	22	30	30	16	12	45.0	46.5	G1/8	1/8	28.5	M10x1.25	18	94	146	6.0
40	24	35	35	16	16	52.0	52.0	G1/4	1/4	33.0	M12x1.25	20	105	165	6.5
50	32	40	40	16	20	60.7	63.5	G1/4	1/4	33.5	M16x1.5	26	106	180	6.5
63	32	45	45	16	20	71.5	76.0	G3/8	3/8	39.5	M16x1.5	26	121	195	6.5
80	40	45	45	17	25	86.7	95.5	G3/8	3/8	39.5	M20x1.5	33	128	220	10.0
100	40	55	55	17	25	106.7	114.5	G1/2	1/2	44.5	M20x1.5	33	138	240	10.0
125	54	60	60	20	32	134.0	140.0	G1/2	1/2	51.0	M27x2	41	160	290	13.0

Bore size	OA mm	PL mm	PP mm	R mm	RT	SS mm	SW mm	TT mm	VA mm	VD mm	WH mm
32	6	13	21.8	32.5	M6	6.5	10	4.5	3.5	4.5	26
40	6	14	21.9	38.0	M6	8.0	13	5.5	3.5	4.5	30
50	8	14	25.9	46.5	M8	4.0	17	7.5	3.5	4.5	37
63	8	16	27.4	56.5	M8	6.5	17	11.0	3.5	4.5	37
80	6	16	30.5	72.0	M10	0	22	15.0	3.5	4.5	46
100	6	18	35.8	89.0	M10	0	22	20.0	3.5	4.5	51
125	8	23	40.5	110.0	M12	0	27	17.5	5.5	6.5	65

* ISO 1179-1 with ISO 228-1 threads

P1D Rod Lock (Version R or L)



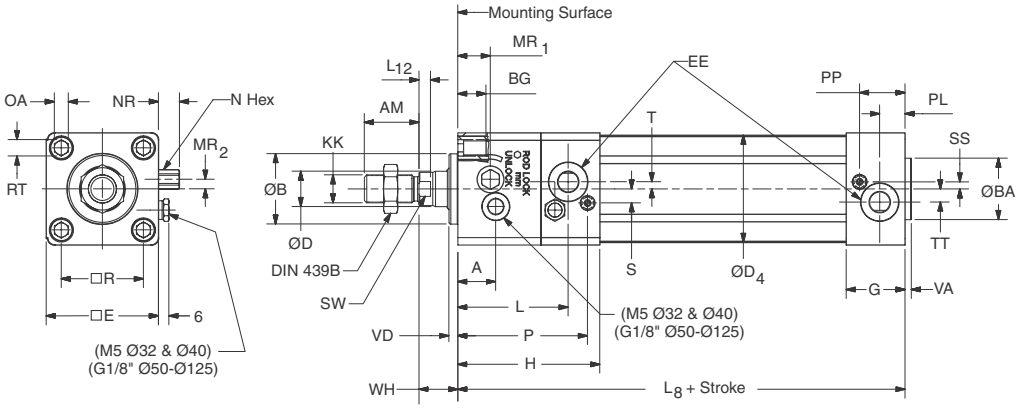
Rod Lock (Version R or L)

Bore size	A mm	AM mm	B mm	BA mm	BG mm	D mm	D4 mm	E mm	EE *	G mm	H mm	KK	L mm	L8 mm	L12 mm
32	16	22	30	30	16	12	45.0	46.5	G1/8	28.5	71.5	M10x1.25	56.0	137	6.0
40	16	24	35	35	16	16	52.0	52.0	G1/4	33.0	77.0	M12x1.25	56.0	149	6.5
50	18	32	40	40	16	20	60.7	63.5	G1/4	33.5	80.5	M16x1.5	62.5	153	6.5
63	26	32	45	45	16	20	71.5	76.0	G3/8	39.5	96.5	M16x1.5	74.5	178	6.5
80	35	40	45	45	17	25	86.7	95.5	G3/8	39.5	110.5	M20x1.5	87.0	209	10.0
100	50	40	55	55	17	25	106.7	114.5	G1/2	44.5	132.5	M20x1.5	106.0	236	10.0
125	60	54	60	60	20	32	134.0	140.0	G1/2	51.0	145.0	M27x2	117.0	264	13.0

Bore size	OA mm	P mm	PL mm	PP mm	R mm	RT mm	S mm	SS mm	SW mm	T mm	TT mm	VA mm	VD mm	WH mm
32	6	64.8	13	21.8	32.5	M6	7	6.5	10	2.5	4.5	3.5	4.5	15
40	6	68.0	14	21.9	38.0	M6	9	8.0	13	2.0	5.5	3.5	4.5	16
50	8	73.5	14	25.9	46.5	M8	8	4.0	17	4.0	7.5	3.5	5.0	17
63	8	89.5	16	27.4	56.5	M8	8	6.5	17	2.0	11.0	3.5	5.0	17
80	6	101.5	16	30.5	72.0	M10	9	0	22	5.0	15.0	3.5	4.0	20
100	6	123.5	18	35.8	89.0	M10	12	0	22	6.0	20.0	3.5	4.0	20
125	8	136.0	23	40.5	110.0	M12	12	0	27	6.0	17.5	5.5	6.0	27

* ISO 1179-1 with ISO 228-1 threads

P1D Rod Lock Version with Manual Override (Version J)



Rod Lock Version with Manual Override (Version J)

Bore size	A mm	AM mm	B mm	BA mm	BG mm	D mm	D_4 mm	E mm	EE[1]	G mm	H mm	KK	L mm	L_8 mm	L_{12} mm	MR_1 mm	MR_2 mm
32	27.0	22	30	30	16	12	45.0	46.5	G1/8	28.5	71.5	M10X1.25	56.0	137	6.0	16.0	3.0
40	27.0	24	35	35	16	16	52.0	52.0	G1/4	33.0	77.0	M12X1.25	56.0	149	6.5	16.0	3.0
50	21.5	32	40	40	16	20	60.7	63.5	G1/4	33.5	80.5	M16X1.5	62.5	153	6.5	18.5	5.5
63	39.0	32	45	45	16	20	71.5	76.0	G3/8	39.5	96.5	M16X1.5	74.5	178	6.5	22.0	4.0
80	38.5	40	45	45	17	25	86.7	95.5	G3/8	39.5	110.5	M20X1.5	87.0	209	10.0	15.0	19. 8
100	55.0	40	55	55	17	25	106.7	114.5	G1/2	44.5	132.5	M20X1.5	106.0	236	10.0	15.0	20.8
125	61.0	54	60	60	20	32	134.0	140.0	G1/2	51.0	145.0	M27X2	117.0	264	13.0	19.0	23.0

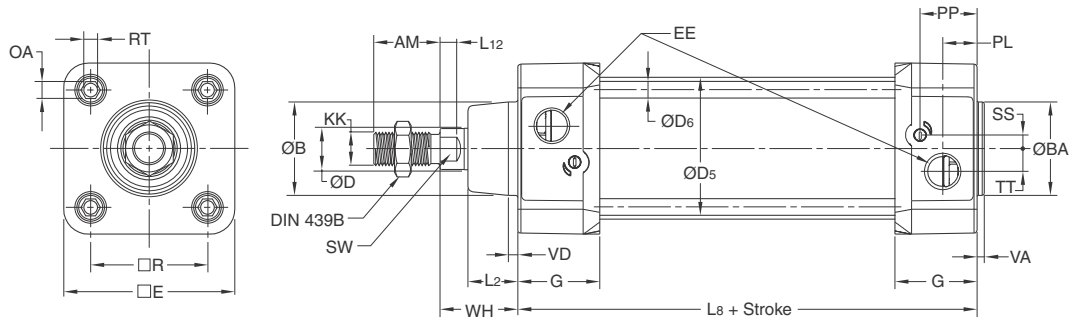
Bore size	N mm	NR mm	OA mm	P mm	PL mm	PP mm	R mm	RT	S mm	SS mm	SW mm	T mm	TT mm	VA mm	VD mm	WH mm
32	8	10.0	6	64.8	13	21.8	32.5	M6	7	6.5	10	2.5	4.5	3.5	4.5	15
40	8	10.0	6	68.0	14	21.9	38.0	M6	9	8.0	13	2.0	5.5	3.5	4.5	16
50	10	12.0	8	73.5	14	25.9	46.5	M8	8	4.0	17	4.0	7.5	3.5	5.0	17
63	10	12.0	8	89.5	16	27.4	56.5	M8	8	6.5	17	2.0	11.0	3.5	5.0	17
80	11	12.5	6	101.5	16	30.5	72.0	M10	9	0	22	5.0	15.0	3.5	14.0	30
100	11	12.5	6	123.5	18	35.8	89.0	M10	12	0	22	6.0	20.0	3.5	14.0	30
125	11	12.5	8	136.0	23	40.5	110.0	M12	12	0	27	6.0	17.5	5.5	16.0	37

1 ISO 1179-1 with ISO 228-1 threads

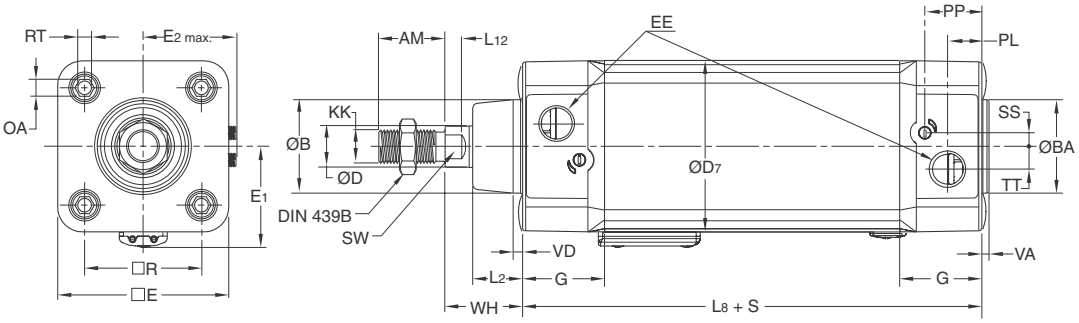
Tolerances

Bore size	B mm	R mm	L_8 mm	BA mm	Stroke-length tolerance mm
32	d11	±0.5	±0.4	d11	+1/-0
40	d11	±0.5	±0.7	d11	+1/-0
50	d11	±0.6	±0.7	d11	+1/-0
63	d11	±0.7	±0.8	d11	+1/-0
80	d11	±0.7	±0.8	d11	+1/-0
100	d11	±0.7	±1.0	d11	+1/-0
125	d11	±1.1	±1.0	d11	+1/-0

P1D Tie-Rod Version (32-125mm)



P1D Clean Version



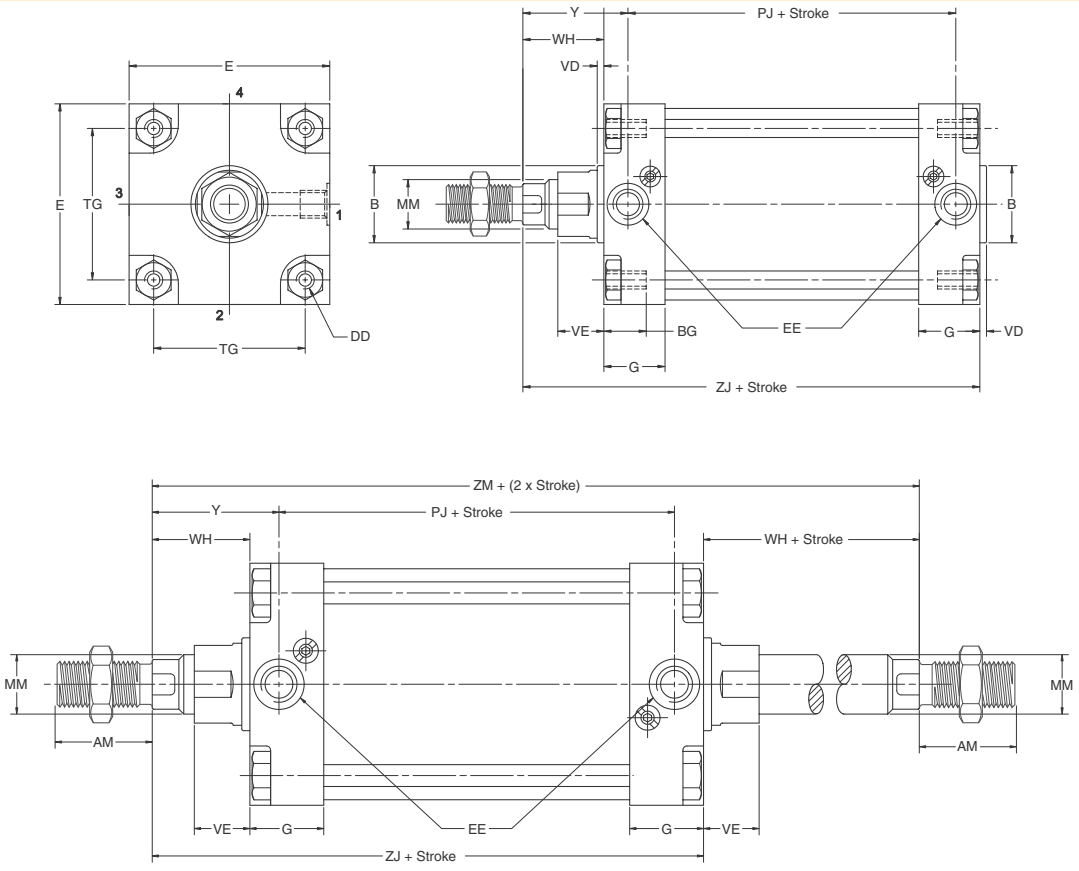
Tie-Rod & Clean VersionVersion (32-125mm)

Bore size	AM mm	B mm	BA mm	D mm	D5 mm	D6 mm	D7 mm	E	E1 mm	E2 max mm	EE BSPP *	EE NPTF/ BSPT	G mm	KK †
32	22	30	30	12	36	5.3	49.6	50.0	32	5	G1/8	1/8	28.5	M10x1.25
40	24	35	35	16	45	5.3	57.3	57.4	36	6	G1/4	1/4	33.0	M12x1.25
50	32	40	40	20	55	7.1	69.3	69.4	42	6	G1/4	1/4	33.5	M16x1.5
63	32	45	45	20	68	7.1	82.3	82.4	49	5	G3/8	3/8	39.5	M16x1.5
80	40	45	45	25	85	8.9	99.3	99.4	57	5	G3/8	3/8	39.5	M20x1.5
100	40	55	55	25	105	8.9	117.6	116.0	68	6	G1/2	1/2	44.5	M20x1.5
125	54	60	60	32	132	10.7	142.8	139.0	81	6	G1/2	1/2	51.0	M27x2

Bore size	L2 mm	L8 mm	L12 mm	OA mm	PL mm	PP mm	R mm	RT	SS mm	SW mm	TT mm	VA mm	VD mm	WH mm
32	16.0	94	6.0	6	13	21.8	32.5	M6	4.0	10	4.5	3.5	4.5	26
40	19.0	105	6.5	6	14	21.9	38.0	M6	8.0	13	5.5	3.5	4.5	30
50	24.0	106	8.0	8	14	25.9	46.5	M8	4.0	17	7.5	3.5	4.5	37
63	24.0	121	8.0	8	16	27.4	56.5	M8	6.5	17	11.0	3.5	4.5	37
80	30.0	128	10.0	6	16	30.5	72.0	M10	0	22	15.0	3.5	4.5	46
100	32.4	138	10.0	6	18	35.8	89.0	M10	0	22	20.0	3.5	4.5	51
125	45.0	160	13.0	8	23	40.5	110.0	M12	0	27	17.5	3.5	6.5	65

* ISO 1179-1 with IS2O 228-1 threads.

P1D Tie-Rod Version (160-200mm)



Rod End #1 Rod End #2

P1D Tie-Rod Version (160-200mm)

Bore size	AM mm	B d11 mm	BG mm	DD	E mm	EE BSPP[3]	EE NPTF/ BSPT	G mm	MM mm	TG mm	VD mm	VE mm	WH mm	Y mm	PJ1 mm	ZJ1 mm	ZM2 mm
160	72	65	24	M16	177	G3/4	3/4	54	40	140	6	56	80	105	130	260	340
200	72	75	24	M16	214	G3/4	3/4	54	40	175	6	56	95	120	130	275	370

[1] Add stroke
[2] Add 2× stroke
[3] ISO 1179-1 with ISO 228-1 threads

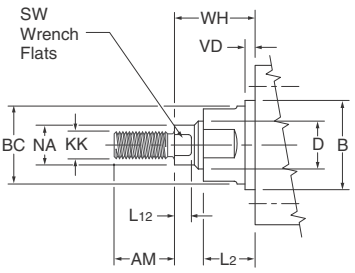
Double Rod Cylinders

Double rod option is available on Mounting Styles MX0, MS1, MF1, MF2 and MT4.

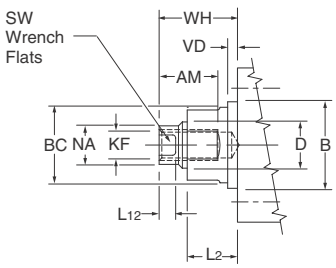
For double rod cylinders, it is assumed that the rod number and rod end are the same for both piston rods. On a double rod cylinder where the two rod ends are different, use a rod end of '3' and be sure to clearly state which rod end is to be assembled at which end.

All Mountings Except MF1

Thread Style N



Thread Style 6



Thread Style 3 - "Special Thread"

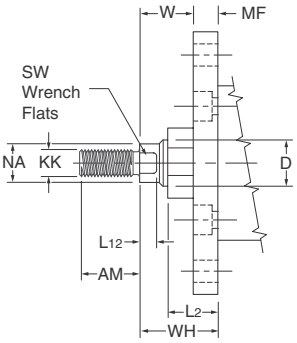
Special thread, extension, rod eye, blank, etc are also available. To order, specify "Style 3" and provide desired dimensions for KF or KK, AM and WH. If otherwise special, furnish dimensioned sketch.

Bore size	D	KK	KF	AM	B d11	BC	SW across flats	L12	NA	VD	L2	WH*
32	12	M10x1.25	M8x1	22	30	27	10	6	11	4.5	18	26
40	16	M12x1.25	M10x1.25	24	35	32	13	6.5	15	4.5	20	30
50	20	M16x1.5	M14x1.5	32	40	36	17	6.5	19	4.5	26	37
63	20	M16x1.5	M14x1.5	32	45	36	17	6.5	19	4.5	26	37
80	25	M20x1.5	M18x1.5	40	45	41	22	10	24	4.5	33	46
100	25	M20x1.5	M18x1.5	40	55	41	22	10	24	4.5	33	51
125	32	M27x2	M24x2	54	60	50	27	13	31	6.5	41	65
160	40	M36x2	M30x2	72	65	60	36	16	39	6	56	80
200	40	M36x2	M30x2	72	75	60	36	16	39	6	56	95

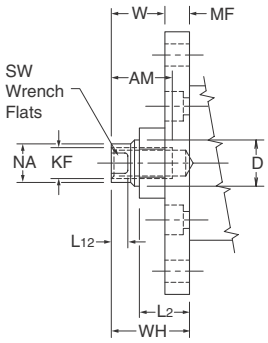
***NOTE:** Dimensions do not apply to Rod Lock Versions.

With MF1 Mounting

Thread Style N



Thread Style 6



"Special Thread" Style 3

Special thread, extension, rod eye, blank, etc are also available. To order, specify "Style 3" and provide desired dimensions for KF or KK, AM and WH. If otherwise special, furnish dimensioned sketch.

Bore size	D	KK	KF	AM	SW across flats	L12	MF	NA	L2	W†	WH†
32	12	M10x1.25	M8x1	22	10	6	10	11	18	16	26
40	16	M12x1.25	M10x1.25	24	13	6.5	10	15	20	20	30
50	20	M16x1.5	M14x1.5	32	17	6.5	12	19	26	25	37
63	20	M16x1.5	M14x1.5	32	17	6.5	12	19	26	25	37
80	25	M20x1.5	M18x1.5	40	22	10	16	24	33	30	46
100	25	M20x1.5	M18x1.5	40	22	10	16	24	33	35	51
125	32	M27x2	M24x2	54	27	13	20	31	41	45	65
160	40	M36x2	M30x2	72	36	16	20	39	56	60	80
200	40	M36x2	M30x2	72	36	16	25	39	56	70	95

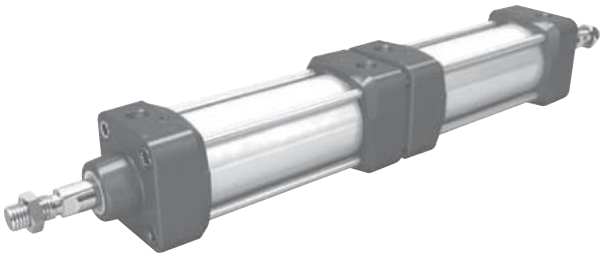
†**NOTE:** Dimensions do not apply to Rod Lock Versions.

3 and 4-Position Duplex Cylinders

This type of cylinder function can consist of two cylinders installed back to back. Two cylinders with the same stroke result in a 3-position cylinder with a symmetrical center position, whereas two different strokes result in a 4-position cylinder where the two central positions can be calculated from the different stroke lengths.

A 3-position duplex cylinder can also be obtained by mounting two cylinders of different strokes, in series, but not connecting the piston rods together. This concept is illustrated in a guided cylinder application shown on page F142 of the HB series.

These 3 and 4-position cylinders can be ordered in two ways as follows.



Factory-fitted P1D Duplex Cylinders

P1D tie-rod version duplex cylinders are completed at the factory and are joined together as one unit by special tie-rods. This version needs to be ordered as a special (/). Please consult factory for assistance.

Customer-Installed Mounting Kit

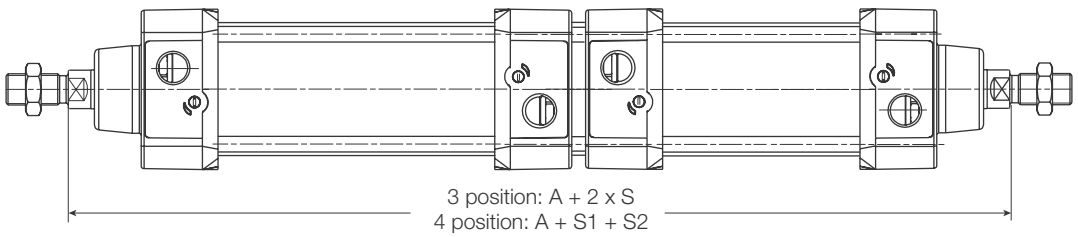
There is an installation mounting kit available for cylinder bores 32-100mm which makes it possible to join any two P1D cylinders, of the same bore, together at any time to make a 3 or 4-position cylinder. Please refer to the cylinder mountings on top of page B127.

Tandem Cylinders

In addition to the duplex cylinder options above, the P1D tie-rod version is also available as a tandem cylinder. By ordering two cylinders of equal strokes, mounted in series, and connecting the piston rods together, you achieve almost twice the output force, at the same pressure, as a standard cylinder. This is a great advantage when restricted mounting space prevents the use of a larger bore cylinder. Please review version and function options in the model code on page B97.

Cylinder Bore	A (mm)	
	P1D-T	P1D-B
32	247	256
40	277	286
50	293	306
63	323	336
80	355	373
100	385	403
125	461	–

S = Stroke

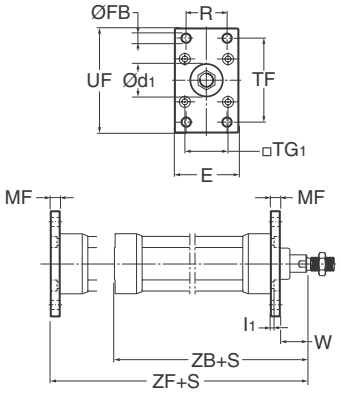


Flange – MF1, MF2

Intended for fixed mounting of cylinder. Flange can be fitted to front or rear end cover of cylinder.

Materials:
32-100mm bore flange: Surface-treated aluminum, black
125-200mm bore flange: Steel, black
Mounting screws acc. to DIN 6912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.



According to ISO MF1/MF2, VDMA 24 562, AFNOR

Bore size mm	d1 H11 mm	FB H13 mm	TG1 mm	E mm	R JS14 mm	MF JS14 mm	TF JS14 mm	UF	l1 -0.5 mm	W mm	ZF mm	ZB mm	Weight kg	Part number
32	30	7	32.5	45	32	10	64	80	5.0	16	130	123.5	0.23	**P1C-4KMBA**
40	35	9	38.0	52	36	10	72	90	5.0	20	145	138.5	0.28	**P1C-4LMBA**
50	40	9	46.5	65	45	12	90	110	6.5	25	155	146.5	0.53	**P1C-4MMBA**
63	45	9	56.5	75	50	12	100	120	6.5	25	170	161.5	0.71	**P1C-4NMBA**
80	45	12	72.0	95	63	16	126	150	8.0	30	190	177.5	1.59	**P1C-4PMBA**
100	55	14	89.0	112	75	16	150	185	8.0	35	205	192.5	2.19	**P1C-4QMBA**
125	60	16	110.0	140	90	20	180	205	10.5	45	245	230.5	3.78	**P1C-4RMB**
160	65	18	140.0	180	115	20	230	260	9.5	60	280	266	C.F.	**L075370160**
200	75	22	175.0	220	135	25	270	300	12.5	70	300	281	C.F.	**L075370200**

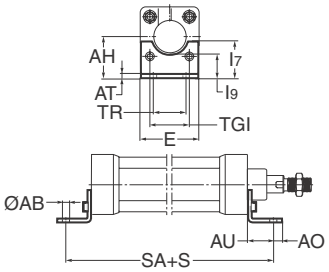
S = Stroke length C.F. = Consult Factory

Foot Bracket – MS1

Intended for fixed mounting of cylinder. Foot bracket can be fitted to front and rear end covers of cylinder.

Materials:
Foot bracket: Surface-treated steel, black
Mounting screws acc. to DIN 912: Zinc-plated steel 8.8

Supplied in pairs with mounting screws for attachment to cylinder.



According to ISO MS1, VDMA 24 562, AFNOR

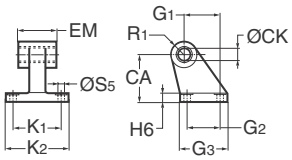
Bore size mm	AB H14 mm	TG1 mm	E mm	TR JS14 mm	AO mm	AU mm	AH JS15 mm	l7 mm	AT mm	l9 JS14 mm	SA mm	Weight* kg	Part number
32	7	32.5	45	32	10	24	32	30	4.5	17.0	142	0.06	**P1C-4KMF**
40	9	38.0	52	36	8	28	36	30	4.5	18.5	161	0.08	**P1C-4LMF**
50	9	46.5	65	45	13	32	45	36	5.5	25.0	170	0.16	**P1C-4MMF**
63	9	56.5	75	50	13	32	50	35	5.5	27.5	185	0.25	**P1C-4NMF**
80	12	72.0	95	63	14	41	63	49	6.5	40.5	210	0.50	**P1C-4PMF**
100	14	89.0	115	75	15	41	71	54	6.5	43.5	220	0.85	**P1C-4QMF**
125	16	110.0	140	90	22	45	90	71	8.0	60.0	250	1.48	**P1C-4RMF**
160	18	140.0	180	115	15	60	115	100	9.0	63.5	300	C.F.	**L075380160**
200	22	175.0	220	135	30	70	135	100	12.0	65.0	320	C.F.	**L075380200**

S = Stroke length C.F. = Consult Factory *Weight per item

Pivot Bracket with Rigid Bearing

Intended for flexible mounting of cylinder. The pivot bracket can be combined with clevis bracket MP2.

Materials:
Pivot bracket: Surface-treated aluminium, black
Bearing: Sintered oil-bronze bushing



According to CETOP RP 107 P, VDMA 24 562, AFNOR

Bore size mm	CK H9 mm	S5 H13 mm	K1 JS14 mm	K2	G1 JS14 mm	G2 JS14 mm	EM mm	G3 mm	CA JS15 mm	H6 mm	R1 mm	Weight kg	Part number
32	10	6.6	38	51	21	18	25.5	31	32	8	10.0	0.06	**P1C-4KMD**
40	12	6.6	41	54	24	22	27.0	35	36	10	11.0	0.08	**P1C-4LMD**
50	12	9.0	50	65	33	30	31.0	45	45	12	13.0	0.15	**P1C-4MMD**
63	16	9.0	52	67	37	35	39.0	50	50	12	15.0	0.20	**P1C-4NMD**
80	16	11.0	66	86	47	40	49.0	60	63	14	15.0	0.33	**P1C-4PMD**
100	20	11.0	76	96	55	50	59.0	70	71	15	19.0	0.49	**P1C-4QMD**
125	25	14.0	94	124	70	60	69.0	90	90	20	22.5	1.02	**P1C-4RMD**
160	30	14.0	118	156	97	89	88.5	126	115	25	31.0	C.F.	**L075480160**
200	30	16.0	122	162	105	89	88.5	130	135	30	31.0	C.F.	**L075480200**

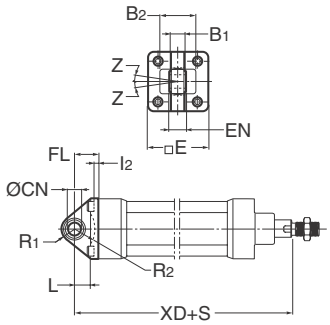
C.F. = Consult Factory

Swivel Eye Bracket – MP6

Intended for use together with clevis bracket GA

Materials:
Bracket: Surface-treated aluminium, black
(Cast iron for 160-200mm bores)
Swivel bearing acc. to DIN 648K: Hardened steel

Supplied complete with mounting screws for attachment to cylinder.



According to VDMA 24 562, AFNOR

Bore size mm	E mm	B1 mm	B2 mm	EN mm	R1 mm	R2 mm	FL mm	I2 mm	L mm	CN H7 mm	XD mm	Z	Weight kg	Part number
32	45	10.5	–	14	16	–	22	5.5	12	10	142	4°	0.08	**P1C-4KMSA**
40	52	12.0	–	16	18	–	25	5.5	15	12	160	4°	0.11	**P1C-4LMSA**
50	65	15.0	51	21	21	19	27	6.5	15	16	170	4°	0.20	**P1C-4MMSA**
63	75	15.0	–	21	23	–	32	6.5	20	16	190	4°	0.27	**P1C-4NMSA**
80	95	18.0	–	25	29	–	36	10.0	20	20	210	4°	0.52	**P1C-4PMSA**
100	115	18.0	–	25	31	–	41	10.0	25	20	230	4°	0.72	**P1C-4QMSA**
125	140	25.0	–	37	40	–	50	10.0	30	30	275	4°	1.53	**P1C-4RMSA**
160	177	30.0	–	43	44	41	55	4.0	41	35	315	16°	C.F.	**L075420160**
200	214	30.0	–	43	48	42	60	8.0	42	35	335	16°	C.F.	**L075420200**

S = Stroke length C.F. = Consult Factory

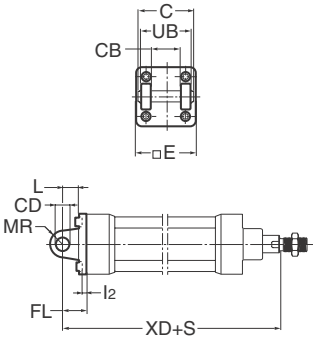
Clevis Bracket – MP2

Intended for flexible mounting of cylinder. Clevis bracket MP2 can be combined with clevis bracket MP4.

Materials:

Clevis bracket: Surface-treated aluminium, black for 32-160mm bores; Cast iron for 200mm bore
Pin: Surface hardened steel
Circlips according to DIN 471: Spring steel
Mounting screws acc. to DIN 912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.



According to ISO MP2, VDMA 24 562, AFNOR

Bore size mm	C mm	E mm	UB H14 mm	CB H14 mm	FL ±0.2 mm	L mm	l2 mm	CD H9 mm	MR mm	XD mm	Weight kg	Part number
32	53	45	45	26	22	13	5.5	10	10	142	0.08	**P1C-4KMT**
40	60	52	52	28	25	16	5.5	12	12	160	0.11	**P1C-4LMT**
50	68	65	60	32	27	16	6.5	12	12	170	0.14	**P1C-4MMT**
63	78	75	70	40	32	21	6.5	16	16	190	0.29	**P1C-4NMT**
80	98	95	90	50	36	22	10.0	16	16	210	0.36	**P1C-4PMT**
100	118	115	110	60	41	27	10.0	20	20	230	0.64	**P1C-4QMT**
125	139	140	130	70	50	30	10.0	25	25	275	1.17	**P1C-4RMT**

S = Stroke length C.F. = Consult Factory

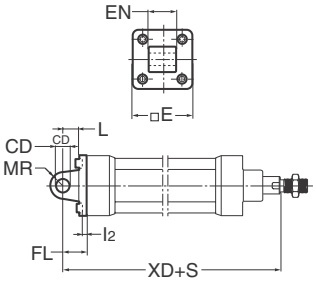
Clevis Bracket – MP4

Intended for flexible mounting of cylinder. Clevis bracket MP4 can be combined with clevis bracket MP2.

Materials:

Clevis bracket: Surface-treated aluminium, black for 32-125mm bores; Cast iron for 160-200mm bores
Mounting screws acc. to DIN 912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.



According to ISO MP4, VDMA 24 562, AFNOR

Bore size mm	E mm	EW mm	FL mm	L ±0.2 mm	l2 mm	CD mm	MR H9 mm	XD mm	Weight kg	Part number
32	45	26	22	13	5.5	10	10	142	0.09	**P1C-4KME**
40	52	28	25	16	5.5	12	12	160	0.13	**P1C-4LME**
50	65	32	27	16	6.5	12	12	170	0.17	**P1C-4MME**
63	75	40	32	21	6.5	16	16	190	0.36	**P1C-4NME**
80	95	50	36	22	10.0	16	16	210	0.46	**P1C-4PME**
100	115	60	41	27	10.0	20	20	230	0.83	**P1C-4QME**
125	140	70	50	30	10.0	25	25	275	1.53	**P1C-4RME**
160	180	90	55	35	10.0	30	25	315	C.F.	**L075410160**
200	220	90	60	35	14.0	30	25	335	C.F.	**L075410200**

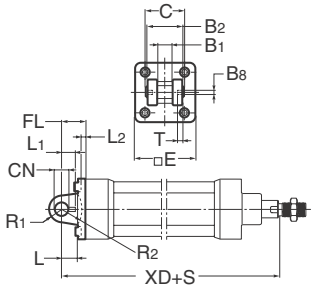
S = Stroke length C.F. = Consult Factory

Clevis Bracket – GA

Intended for flexible mounting of cylinder. Clevis bracket GA can be combined with pivot bracket with swivel bearing, swivel eye bracket and swivel rod eye.

Materials:
Clevis bracket: Surface-treated aluminium
Pin: Surface hardened steel
Locking pin: Spring steel
Circlips according to DIN 471: Spring steel
Mounting screws acc. to DIN 912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.

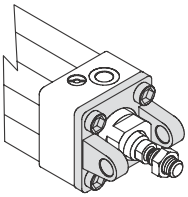


According to VDMA 24 562, AFNOR

Bore size mm	C mm	E mm	B2 d12 mm	B1 H14 mm	T mm	B3 mm	R2 mm	L1 mm	FL ±0.2 mm	I2 mm	L mm	CN F7 mm	R1 mm	XD mm	Weight kg	Part number
32	41	45	34	14	3	3.3	17	11.5	22	5.5	12	10	11	142	0.09	**P1C-4KMCA**
40	48	52	40	16	4	4.3	20	12.0	25	5.5	15	12	13	160	0.13	**P1C-4LMCA**
50	54	65	45	21	4	4.3	22	14.0	27	6.5	17	16	18	170	0.17	**P1C-4MMCA**
63	60	75	51	21	4	4.3	25	14.0	32	6.5	20	16	18	190	0.36	**P1C-4NMCA**
80	75	95	65	25	4	4.3	30	16.0	36	10.0	20	20	22	210	0.58	**P1C-4PMCA**
100	85	115	75	25	4	4.3	32	16.0	41	10.0	25	20	22	230	0.89	**P1C-4QMCA**
125	110	140	97	37	6	6.3	42	24.0	50	10.0	30	30	30	275	1.75	**P1C-4RMCA**

S = Stroke length C.F. = Consult Factory

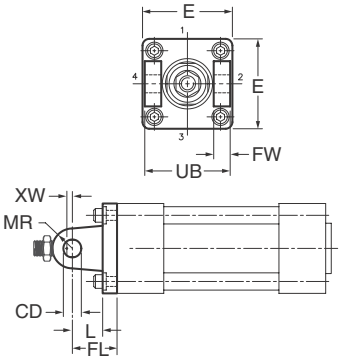
Head Detachable Clevis – MP7



Intended for flexible mounting of cylinder

Materials:
Clevis bracket: Cast iron for 32-63mm bores;
Surface treated aluminum, black for 80-200mm bores
Mounting screws acc. to DIN 912: Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to cylinder.



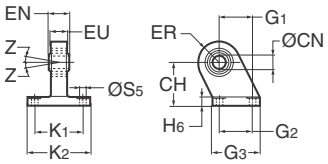
According to ISO MP7, VDMA 24 562, AFNOR

Bore size mm	CD mm	E mm	FL mm	FW mm	L mm	MR mm	UB mm	XW mm	Part number
32	10	46.5	22	8	12	10	45	4	**L075400032**
50	12	63.5	27	10	15	13	60	10	**L075400050**
63	16	76	32	15	20	16	70	5	**L075400063**
125	25	140	50	30	35	25	130	15	**L075400125**
160	30	177	55	40	36	30	170	25	**L075400160**

Pivot Bracket with Swivel Bearing

Intended for use together with clevis bracket GA.

Materials:
Pivot bracket: Surface-treated steel, black
Swivel bearing acc. to DIN 648K: Hardened steel



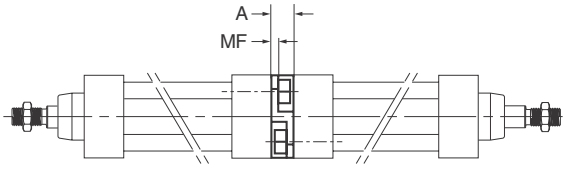
According to VDMA 24 562, AFNOR

Bore size mm	CN H7 mm	S5 H13 mm	K1 JS14 mm	K2 mm	EU mm	G1 JS14 mm	G2 JS14 mm	EN mm	G3 mm	CH JS15 mm	H6 mm	ER mm	Z	Weight kg	Part number
32	10	6.6	38	51	10.5	21	18	14	31	32	10	16	4°	0.18	**P1C-4KMA**
40	12	6.6	41	54	12.0	24	22	16	35	36	10	18	4°	0.25	**P1C-4LMA**
50	16	9.0	50	65	15.0	33	30	21	45	45	12	21	4°	0.47	**P1C-4MMA**
63	16	9.0	52	67	15.0	37	35	21	50	50	12	23	4°	0.57	**P1C-4NMA**
80	20	11.0	66	86	18.0	47	40	25	60	63	14	28	4°	1.05	**P1C-4PMA**
100	20	11.0	76	96	18.0	55	50	25	70	71	15	30	4°	1.42	**P1C-4QMA**
125	30	14.0	94	124	25.0	70	60	37	90	90	20	40	4°	3.10	**P1C-4RMA**

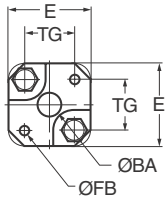
Mounting Kit

Mounting kit for back to back mounted cylinders, 3 and 4 position duplex cylinders.

Materials:
Mounting: Aluminium
Mounting screws: Zinc-plated steel 8.8



Bore size mm	E mm	TG mm	ØFB mm	MF mm	A mm	ØBA mm	Weight kg	Part number
32	50	32.5	6.5	5	16	30	0.060	**P1E-6KB0**
40	60	38.0	6.5	5	16	35	0.078	**P1E-6LB0**
50	66	46.5	8.5	6	20	40	0.162	**P1E-6MB0**
63	80	56.5	8.5	6	20	45	0.194	**P1E-6NB0**
80	100	72.0	10.5	8	25	45	0.450	**P1E-6PB0**
100	118	89.0	10.5	8	25	55	0.672	**P1E-6QB0**

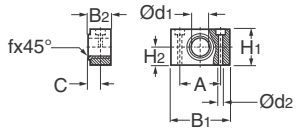


Pivot Bracket – MT4

Intended for use together with central trunnion MT4.

Materials:
Pivot bracket: Surface-treated aluminium
Bearing acc. to DIN 1850 C: Sintered oil-bronze bushing

Supplied in pairs.

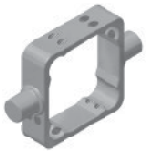


According to ISO, VDMA 24 562, AFNOR

Bore size mm	B1 mm	B2 mm	A mm	C mm	d1 mm	d2 H13 mm	H1 mm	H2 mm	fx45° min mm	Weight* kg	Part number
32	46	18.0	32	10.5	12	6.6	30	15	1.0	0.04	**9301054261**
40	55	21.0	36	12.0	16	9.0	36	18	1.6	0.07	**9301054262**
50	55	21.0	36	12.0	16	9.0	36	18	1.6	0.07	
63	65	23.0	42	13.0	20	11.0	40	20	1.6	0.12	**9301054264**
80	65	23.0	42	13.0	20	11.0	40	20	1.6	0.12	
100	75	28.5	50	16.0	25	14.0	50	25	2.0	0.21	**9301054266**
125	75	28.5	50	16.0	25	14.0	50	25	2.0	0.21	

* Weight per item

Intermediate Trunnion – MT4



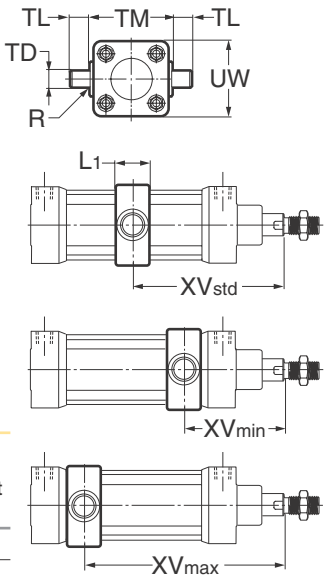
Standard*

Tie Rod Version

Intended for articulated mounting of cylinder. The trunnion is factory-fitted at an optional location. Order by specifying Mounting Style G or 7 and providing the desired XV dimension (3-digit measure in mm). See page B97 for ordering information. Combined with pivot bracket for MT4 for 32-125mm bores.

Materials:
Trunnion: Zinc plated steel
(Cast iron for 160-200mm bores)

* Standard mounting is for the Standard cylinder body and is permanently affixed by the factory.



XV Standard for Rod Lock version:

$$\frac{L8 + Stroke + WH}{2}$$

According to ISO MT4, VDMA 24 562, AFNOR

Bore size mm	TM h14 mm	TL h14 mm	TD e9 mm	R mm	UW mm	L1 P1D-G mm	L1 P1D-E mm	X1 mm	Standard "G" XVmin mm	Standard "G" X2 mm	Standard "7" XVmin mm	Standard "7" X2 mm	Tie Rod XVmin mm	Tie Rod X2 mm	Weight kg
32	50	12	12	1.0	46	18	15	73.0	84.0	76.0	94.0	62.0	62.0	84.0	0.13
40	63	16	16	1.6	59	20	20	82.5	91.0	82.0	103.0	74.0	73.0	92.0	0.31
50	75	16	16	1.6	69	20	20	90.0	108.5	89.5	107.5	71.5	80.5	99.5	0.37
63	90	20	20	1.6	84	26	25	97.5	111.0	93.5	126.0	84.0	89.5	106.0	0.69
80	110	20	20	1.6	102	26	25	110.0	125.0	109.5	143.0	95.0	98.0	122.0	0.89
100	132	25	25	2.0	125	32	30	120.0	132.5	114.5	167.5	107.5	110.5	129.5	1.58
125	160	25	25	2.0	155	33	32	145.0	160.0	142.0	188.0	130.0	132.0	158.0	2.60
160	200	32	32	2.5	190	–	70	C.F.	–	–	–	–	169	C.F.	C.F.
200	250	32	32	2.5	242	–	70	C.F.	–	–	–	–	184	C.F.	C.F.

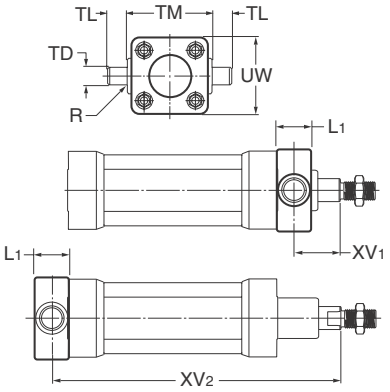
XVstd = X1 + Stroke length/2 XVmax = X2 + Stroke length C.F. = Consult Factory

Flange Mounted Trunnion, J or H

Intended for articulated mounting of cylinder. This trunnion can be flange mounted on the front or rear end cover of all P1D cylinders. If you choose, you can order a complete cylinder with factory-fitted flange mounted trunnion – see the ordering information on page B67 Individual trunnions have part numbers as shown below.

Materials:
Trunnion: zinc plated steel
Screws: zinc plated steel, 8.8

Delivered complete with mounting screws for attachment to the cylinder



According to ISO MT4, VDMA 24 562, AFNOR

Bore size mm	TM h14 mm	TL h14 mm	TD e9 mm	R mm	UW mm	L1 mm	XV_1 mm	X mm	Weight kg	Part number
32	50	12	12	1.0	46	14	19.0	127.0	0.17	**P1D-4KMYF**
40	63	16	16	1.6	59	19	20.5	144.5	0.43	**P1D-4LMYF**
50	75	16	16	1.6	69	19	27.5	152.5	0.55	**P1D-4MMYF**
63	90	20	20	1.6	84	24	25.0	170.0	1.10	**P1D-4NMYF**
80	110	20	20	1.6	102	24	34.0	186.0	1.66	**P1D-4PMYF**
100	132	25	25	2.0	155	29	36.5	203.5	3.00	**P1D-4QMYF**

XV_2 = X + Stroke length

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Swivel Rod Eye

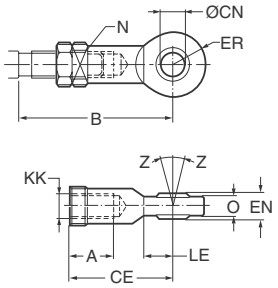
Stainless Steel
Swivel Rod Eye

Swivel rod eye for articulated mounting of cylinder.
Swivel rod eye can be combined with clevis bracket GA.
Maintenance-free.

Materials:
Swivel rod eye: Zinc-plated steel
Swivel bearing according to DIN 648K: Hardened steel

Swivel rod eye: Stainless steel 304
Swivel bearing according to DIN 648K: Stainless steel

Use stainless steel nut (see next page) with stainless steel swivel rod eye.



According to ISO 8139

Bore size mm	A mm	B min mm	B max mm	CE mm	CN H9 mm	EN h12 mm	ER mm	KK	LE min mm	N mm	O mm	Z	Weight kg	Part number	Stainless steel part number
32	20	48.0	55	3	10	14	14	M10x1.25	15	17	10.5	12°	0.08	**P1C-4KRS**	**P1S-4JRT**
40	22	56.0	62	50	12	16	16	M12x1.25	17	19	12.0	12°	0.12	**P1C-4LRS**	**P1S-4LRT**
50	28	72.0	80	64	16	21	21	M16x1.5	22	22	15.0	15°	0.25	**P1C-4MRS**	**P1S-4MRT**
63	28	72.0	80	64	16	21	21	M16x1.5	22	22	15.0	15°	0.25		
80	33	87.0	97	77	20	25	25	M20x1.5	26	32	18.0	15°	0.46	**P1C-4PRS**	**P1S-4PRT**
100	33	87.0	97	77	20	25	25	M20x1.5	26	32	18.0	15°	0.46		
125	51	123.5	137	110	30	37	35	M27x2	36	41	25.0	15°	1.28	**P1C-4RRS**	**P1S-4RRT**
160/200	56	C.F.	C.F.	125	35*	43	40	M36x2	40	50	28.0	15°	C.F.	**P1C-4SRS**	**–**

*H7 C.F. = Consult Factory

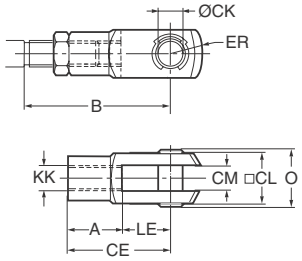
Clevis

Stainless Steel
Clevis

Clevis for articulated mounting of cylinder.

Materials:
Clevis, clip: Galvanized steel
Pin: Hardened steel

Clevis: Stainless steel
Pin: Stainless steel
Circlips according to DIN 471: Stainless steel



According to ISO 8140

Bore size mm	A mm	B min mm	B max mm	CE mm	CK h11/E9 mm	CL mm	CM mm	ER mm	KK	LE mm	O mm	Weight kg	Part number	Stainless steel part number
32	20	45.0	52	40	10	20	10	16	M10x1.25	20	28.0	0.09	**P1C-4KRC**	**P1S-4JRD**
40	24	54.0	60	48	12	24	12	19	M12x1.25	24	32.0	0.15	**P1C-4LRC**	**P1S-4LRD**
50	32	72.0	80	64	16	32	16	25	M16x1.5	32	41.5	0.35	**P1C-4MRC**	**P1S-4MRD**
63	32	72.0	80	64	16	32	16	25	M16x1.5	32	41.5	0.35		
80	40	90.0	100	80	20	40	20	32	M20x1.5	40	50.0	0.75	**P1C-4PRC**	**P1S-4PRD**
100	40	90.0	100	80	20	40	20	32	M20x1.5	40	50.0	0.75		
125	56	123.5	137	110	30	55	30	45	M27x2	54	72.0	2.10	**P1C-4RRC**	**P1S-4RRD**
160/200	71	C.F.	C.F.	144	35	70	35	57	M36x2	72	95	C.F.	**L075490036**	Consult factory

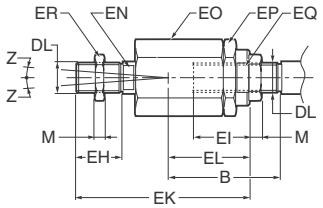
C.F. = Consult Factory

Flexo Coupling

Flexo coupling for articulated mounting of piston rod. Flexo fitting is intended to take up axial angle errors within a range of ±4°.

Materials:
Flexo coupling, nut: Zinc-plated steel
Socket: Hardened steel

Supplied complete with galvanized adjustment nut.



Bore size mm	B min mm	B max mm	DL	EH mm	EI mm	EK mm	EL mm	EN mm	EO mm	EP mm	EQ mm	ER mm	M mm	Z	Weight kg	Part number
32	36.0	43	M10x1.25	20	23	70	31	12	30	30	19	30	5.0	4°	0.21	**P1C-4KRF**
40	37.0	43	M12x1.25	23	23	77	31	12	30	30	19	30	6.0	4°	0.22	**P1C-4LRF**
50	53.0	61	M16x1.5	40	32	112	45	19	41	41	30	41	8.0	4°	0.67	**P1C-4MRF**
63	53.0	61	M16x1.5	40	32	112	45	19	41	41	30	41	8.0	4°	0.67	
80	57.0	67	M20x1.5	39	42	122	56	19	41	41	30	41	10.0	4°	0.72	**P1C-4PRF**
100	57.0	67	M20x1.5	39	42	122	56	19	41	41	30	41	10.0	4°	0.72	
125	75.5	89	M27x2	48	48	145	60	24	55	55	32	55	13.5	4°	1.80	**P1C-4RRF**
160/200	C.F.	C.F.	M36x2	72	78	251	C.F.	36	75	75	50	55	18.0	4°	C.F.	**KY1139**

C.F. = Consult Factory

Nuts

Intended for fixed mounting of accessories to the piston rod.

Material: Zinc-plated steel

All P1D cylinders are delivered with a zinc-plated steel piston rod nut.

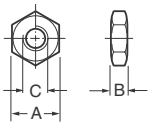
Stainless Steel Nut

Material: Stainless steel A2

Acid-proof nut

Material: Acid-proof steel A4

Cylinders with acid-proof piston rod are supplied with nut of acid-proof steel.



According to DIN 439 B

Bore size mm	A mm	B mm	C	Weight kg	Part numbers		
					Steel	Stainless steel	Acid-proof
32	17	5.0	M10x1.25	0.007	**0867340300**	**9126725404**	**0261109919**
40	19	6.0	M12x1.25	0.010	**0867340400**	**9126725405**	**0261109920**
50	24	8.0	M16x1.5	0.021	**0867340600**	**9126725406**	**0261109917**
63	24	8.0	M16x1.5	0.021			
80	30	10.0	M20x1.5	0.040	**0261109911**	**0261109921**	**0261109916**
100	30	10.0	M20x1.5	0.040			
125	41	13.5	M27x2	0.100	**0867340900**	**0261109922**	**0261109918**
160/200	55	18.0	M36x2	C.F.	**L075540036**	Consult factory	Consult factory

C.F. = Consult Factory

Screw Set for MP2, MP4, MS1 and GA

Set of stainless steel screws for fitting clevis brackets MP2, MP4 and GA onto the cylinder. The screws have an internal hexagonal head and are used in special environments, e.g. the food industry, or where there are extra demands for protection against corrosion.

Material:
According to DIN 912, Stainless steel, A2

4 pcs per pack.

Bore mm	Weight kg	Part number
32	0.02	**9301054321**
40	0.02	**9301054321**
50	0.05	**9301054322**
63	0.05	**9301054322**
80	0.09	**9301054323**
100	0.09	**9301054323**
125	0.15	**9301054324**

Screw Set for MF1/MF2

Set of stainless steel screws for fitting flanges MF1/MF2 onto the cylinder. The screws have an internal hexagonal head and are used in special environments, e.g. the food industry, or where there are extra demands for protection against corrosion.

Material:
According to DIN 6912, Stainless steel, A2

4 pcs per pack

Bore mm	Weight kg	Part number
32	0.02	**9301054331**
40	0.02	**9301054331**
50	0.04	**9301054332**
63	0.04	**9301054332**
80	0.07	**9301054333**
100	0.07	**9301054333**
125	0.12	**9301054334**

Sealing Plugs

Set of sealing plugs to be fitted in unused end covers. The plugs can be used for all P1D cylinders to avoid collecting dirt and fluids in the end cover screw recesses.

Material:
Polyamid PA

4 pcs per pack

Bore mm	Weight kg	Part number
32	0.01	**9121742201**
40	0.01	**9121742201**
50	0.02	**9121742202**
63	0.02	**9121742202**
80	0.02	**9121742203**
100	0.02	**9121742203**
125	0.03	**9121742204**

Service Kits: P1D-B, P1D-T, P1D-C, and P1D-F Versions

Cylinder bore mm	P1D cylinder version Consisting of: piston, rod and o-ring seals
32	**SK032P1D01**
40	**SK040P1D01**
50	**SK050P1D01**
63	**SK063P1D01**
80	**SK080P1D01**
100	**SK100P1D01**
125	**SK125P1D01**

Grease for P1D Series

Size	Part number
30g (standard)	**9127394541**

Gland Service Kits: P1D-G and P1D-E Versions

Bore size mm	Rod dia. mm	Rod no.	RG-rod gland cartridge kit Consisting of: rod gland, seals, and wiper		RK-rod seal kit Consisting of: gland seals, and wiper	
			Nitrile seals part number	Fluorocarbon seals part number	Nitrile seals part number	Fluorocarbon seals Part number
32	12	1	**RG0P1D0121**	**RG0P1D0125**	**RK0P1D0121**	**RK0P1D0125**
40	16	1	**RG0P1D0161**	**RG0P1D0165**	**RK0P1D0161**	**RK0P1D0165**
50 & 63	20	1	**RG0P1D0201**	**RG0P1D0205**	**RK0P1D0201**	**RK0P1D0205**
80 & 100	25	1	**RG0P1D0251**	**RG0P1D0255**	**RK0P1D0251**	**RK0P1D0255**
125	32	1	**RG0P1D0321**	**RG0P1D0325**	**RK0P1D0321**	**RK0P1D0325**

Piston and End Seal Service Kits: P1D-G and P1D-E Versions

Bore size mm	PK – piston seal kit Consisting of: piston seals, wear ring, and magnetic strip (nitrile only)		CB – cylinder body end seal kit Consisting of: end seal o-rings	
	Nitrile seals part number	Fluorocarbon seals part number	Nitrile seals part number	Fluorocarbon seals part number
32	**PK032P1D01**	**PK032P1D05**	**CB032P1D01**	**CB032P1D05**
40	**PK040P1D01**	**PK040P1D05**	**CB040P1D01**	**CB040P1D05**
50	**PK050P1D01**	**PK050P1D05**	**CB050P1D01**	**CB050P1D05**
63	**PK063P1D01**	**PK063P1D05**	**CB063P1D01**	**CB063P1D05**
80	**PK080P1D01**	**PK080P1D05**	**CB080P1D01**	**CB080P1D05**
100	**PK100P1D01**	**PK100P1D05**	**CB100P1D01**	**CB100P1D05**
125	**PK125P1D01**	**PK125P1D05**	**CB125P1D01**	**CB125P1D05**