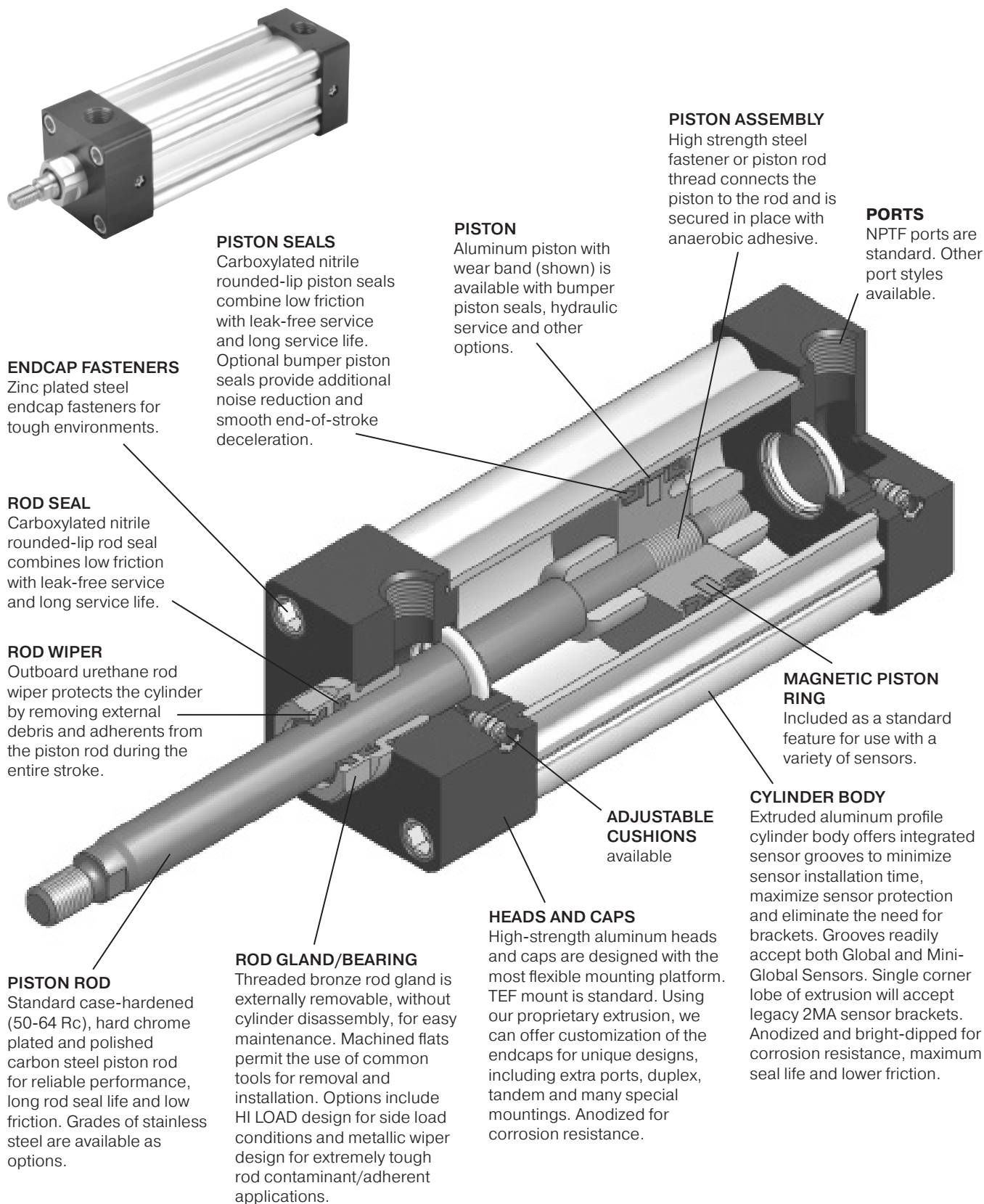


4MA/4ML Series – 1-1/2" to 5" Bore Size

B	Tie Rod Pneumatic Cylinders	
Series	4MA	
Series	4MAP	
Option	ACVB	
Option	LPSP	
Series	P1D	
Series	P1F	
Series	2MNR	



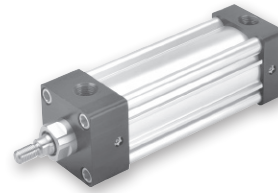
For a complete list of 4MA options, please see pages B3 and B8.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

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

Tie Rod Pneumatic Cylinders
4MA/4ML Series – 1-1/2" to 5" Bore Size

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	Double Rod Cylinder	Series	Ports	Piston Rod Number		Cushion Cap End	Stroke Length
1.50 ¹	Specify "K" only if double rod cylinder is required.	4MA Air Service 4ML Hydraulic Service ²	U NPTF R BSPP B BSPT T SAE	Specify rod code number for required diameter. ^{8,2}		Blank Non-Cushioned Cap End C Cushioned Cap End (not available for 4ML)	Specify stroke length required in inches. ¹¹
2.00							
2.50							
3.25							
4.00							
5.00							
	Mounting Style		Special Modification			Piston Rod Thread Type	
	Specify mounting style code (see table on following page).		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			A Standard (UNF unified thread) W BSF British Fine M* Metric	
	Cushion Head End		Seals			Rod Material and Gland Code	
	Blank Non-Cushioned Head End C Cushioned Head End (not available for 1.50" bore with 1" rod or 4ML)		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			Blank Standard Rod and Gland H Standard Rod and HI LOAD Gland ¹³ Y 17-4 PH Stainless Steel Rod and Standard Gland Z 17-4 PH Stainless Steel Rod and HI LOAD Gland ¹³ J 303 Stainless Steel Rod and Standard Gland K 303 Stainless Steel Rod and HI LOAD Gland ¹³ S 316 Stainless Steel Rod and Standard Gland T 316 Stainless Steel Rod and HI LOAD Gland ¹³	
	Cylinder Construction		Piston Rod Thread Style				
	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		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				
	Piston Type²						
	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 ¹² 6 Bumper Seals and Magnetic Ring ¹² 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						

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

Notes:

- Not available with Linear Position Sensor Option (LPSF).
- 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.
- 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".
- Reed and solid-state sensors only available with standard seals or options E and M. See footnote 2.
- Used for external chemical compatibility applications, not high temperature.
- 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.
- For Linear Position Sensor Option (LPSF), please include the following information for the Special Modification item notes:
 - Sensor part number reference LPSF section
 - Sensor position
- Port position (if other than position 1)
- Length of stop tubing, gross stroke and net stroke (if required)
- Also, Piston Type option (blank), 3, 6, D, F or R is required. Review Piston Rod Selection Chart, please reference page A14 to determine proper piston rod diameter.
- For additional information regarding this style, please reference page B79. If non-standard Rod Material and Gland Code is required with this option, please place an "S" for special in the Special Modification field and specify Rod Material and Gland Code in the item notes.
- 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.
- See page B81 for stroke loss on bumper seal option.
- HI LOAD gland not available with metallic rod wiper.

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.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

B3

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

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAP Series

ACVB Option

LPSF Option

PID Series

P1F Series

2MNR Series

Mounting Styles

Tie Rod Pneumatic Cylinders 4MA/4ML Series – 1-1/2" to 5" Bore Size

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

B
Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

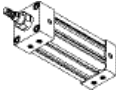
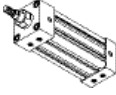
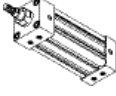
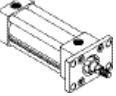
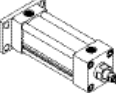
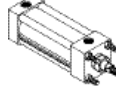
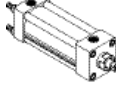
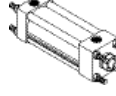
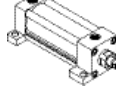
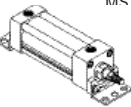
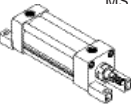
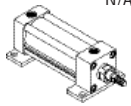
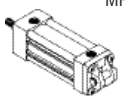
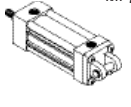
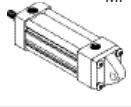
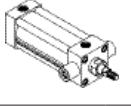
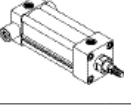
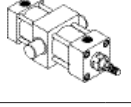
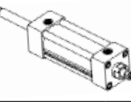
ACVB
Option

LPSF
Option

P1D
Series

P1F
Series

2MNR
Series

Mounting Style	NFPA Mounting	Description	Bore Size
TEF 	MX5/MS4	Sleeve Nut with Side Tap (standard mount)	4MA/4ML 1-1/2 - 5* w/LPSF 2 - 5 w/LPSF w/stop tube 2 - 5
T 	MX0	No Mount (same construction as TEF)	4MA/4ML 1-1/2 - 5 w/LPSF 2 - 5 w/LPSF w/stop tube 2 - 5
TE 	MX5	Sleeve Nut (same construction as TEF)	4MA/4ML 1-1/2 - 5 w/LPSF 2 - 5 w/LPSF w/stop tube 2 - 5
F 	MS4	Side Tap (same construction as TEF)	4MA/4ML 1-1/2 - 5* w/LPSF 2 - 5 w/LPSF w/stop tube 2 - 5
J 	MF1	Head Rectangular Flange	4MA/4ML 1-1/2 - 5 w/LPSF 2 - 5** w/LPSF w/stop tube 2 - 5
H 	MF2	Cap Rectangular Flange	4MA/4ML 1-1/2 - 5 w/LPSF 2 - 5** w/LPSF w/stop tube 2 - 5**
TB 	MX3	Tie Rods Extended Head End	4MA/4ML 1-1/2 - 5 w/LPSF 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/LPSF 2 - 5 w/LPSF w/stop tube 2 - 5
CB 	MS1	Side End Angle	4MA/4ML 1-1/2 - 5 w/LPSF 2 - 5 w/LPSF w/stop tube 2 - 5
G 	MS7	Side End Lug	4MA/4ML 2 w/LPSF 2 w/LPSF w/stop tube 2
NB 	N/A	Base Bar	4MA/4ML 1-1/2 - 4* w/LPSF 2 - 4 w/LPSF w/stop tube 2 - 4
BB 	MP1	Cap Fixed Clevis	4MA/4ML 1-1/2 - 5 w/LPSF 2 - 5** w/LPSF w/stop tube 2 - 5**
BC 	MP2	Cap Detachable Clevis	4MA/4ML 1-1/2 - 5 w/LPSF 2 - 5** w/LPSF w/stop tube 2 - 5**
BE 	MP4	Cap Detachable Eye	4MA/4ML 1-1/2 - 5 w/LPSF 2 - 5** w/LPSF w/stop tube 2 - 5**
D 	MT1	Head Trunnion	4MA/4ML 1-1/2 - 5* w/LPSF 2 - 5 w/LPSF w/stop tube 2 - 5
DB 	MT2	Cap Trunnion	4MA/4ML 1-1/2 - 5 w/LPSF 2 - 5** w/LPSF 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/LPSF 2 - 5 w/LPSF 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 B75).

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

Sensors

See section L for sensors.

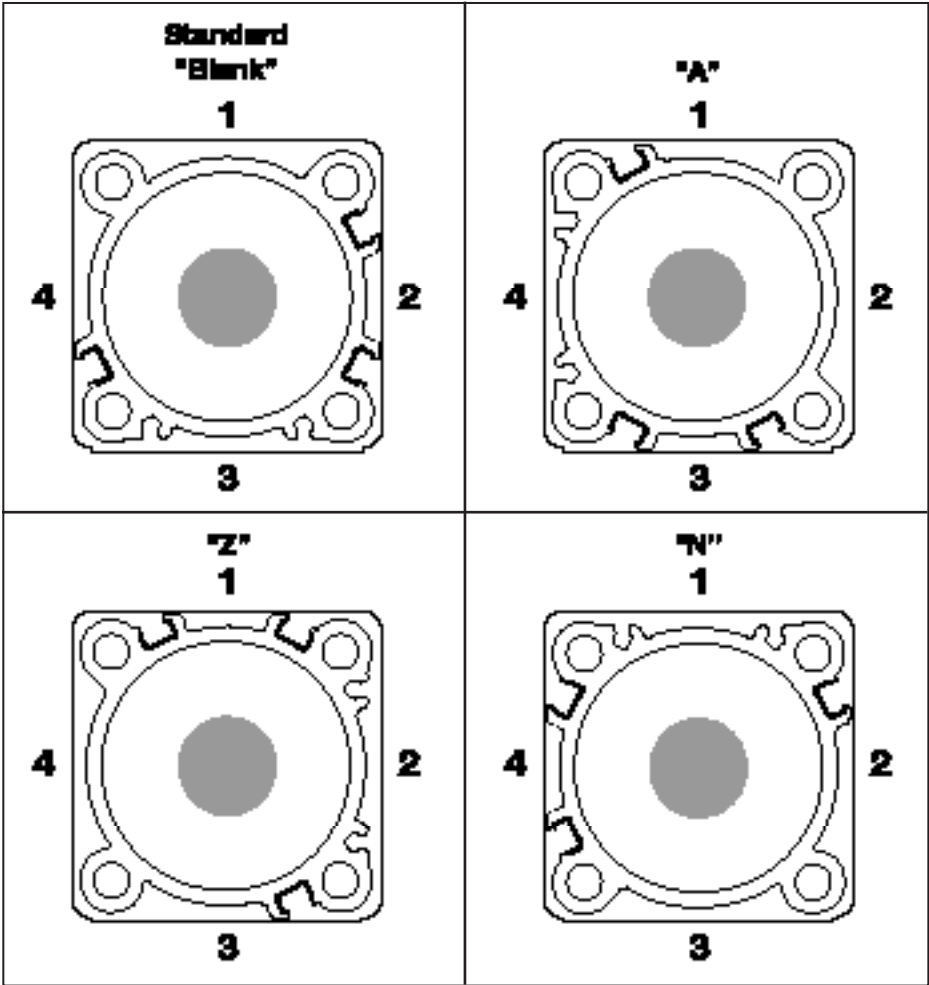


Kits & Accessories

See page B34.

For inventory, lead times, and kit lookup, visit www.pdnplu.com

4MA Extruded Cylinder Body Sensor Slot Orientation



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

B	Tie Rod Pneumatic Cylinders	
	4MA Series	
	4MAP Series	
	ACVB Option	
	LPSF Option	
	P1D Series	
	P1F Series	
	2MNR Series	

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

Bore (inch)	Rod (inch)	No Mount Single Rod 4MA/4ML		No Mount Double Rod	
		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

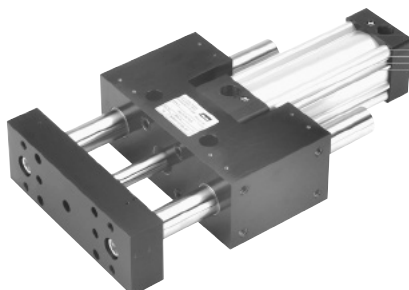
Mounting Code	Position
All except D, DB, DD	2
D, DB, DD	3

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	0.65	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.

Material Specifications

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-rod/studs	Blackened carbon steel 1018 (some mounts)
Tie-rod nuts	Steel alloy, SAE J995 Grade 8 (some mounts)

Tie Rod Pneumatic Cylinders 4MA/4ML Series – 1-1/2" to 5" Bore Size

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

B

Tie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionP1D
SeriesP1F
Series2MNR
Series

For inventory, lead times, and kit lookup, visit www.pdnplu.com

B7

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

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	Determine if standard size piston rod is strong enough to accommodate intended load. Long Push Stroke See Application Engineering section for recommendations.
Long Horizontal Stroke	Determine if standard size piston rod is strong enough to accommodate intended load.
High Operating	For temperatures between 165°F and 250°F use 4MA or 4ML cylinder with high temperature seals. Temperatures

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)
- Analog Interface Profile (LPSF)
- High Temperature Service (to 250°F)
- Low Temperature Service (to -50°F)
- Hydraulic Service (4ML) (400 PSIG)
- Rod lock version (see 4MAP)

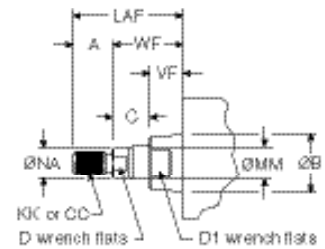
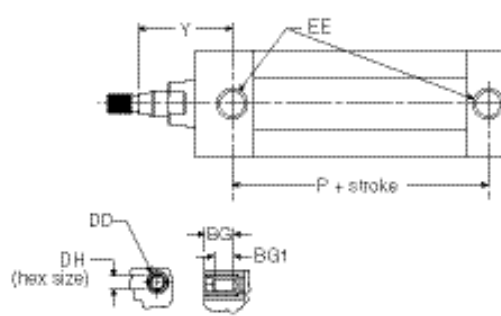
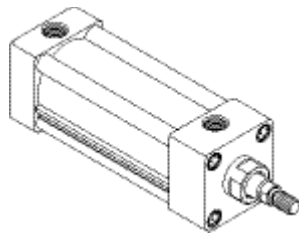


For inventory, lead times, and kit lookup, visit www.pdnplu.com

B8

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

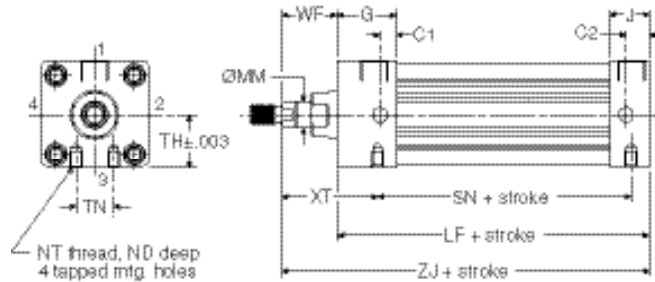
Single Rod
(Styles TEF, T, TE and F)



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

		Thread																	
Bore Size	Rod no.	Rod Dia. MM	Style 8 CC	Style 4 & 9 KK	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 - 12	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 - 12	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 - 12	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	TH	TN	VF	WF	XT	Y	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.

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAP Series

ACVB Option

LPSF Option

P1D Series

P1F Series

2MNR Series

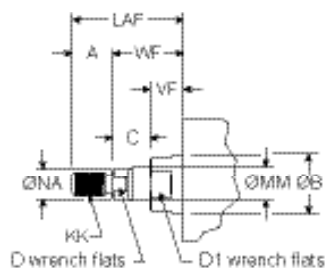
Rod End Thread Styles

Tie Rod Pneumatic Cylinders 4MA Series – 1-1/2" to 5" Bore Size

Thread Style Rod End

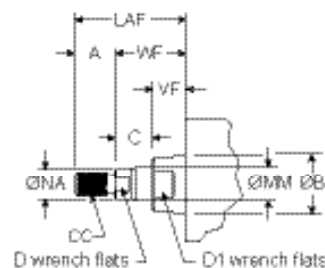
Thread Style 4

(NFPA Style SM)
Small Male



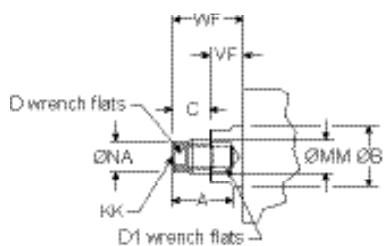
Thread Style 8

(NFPA Style IM)
Intermediate Male



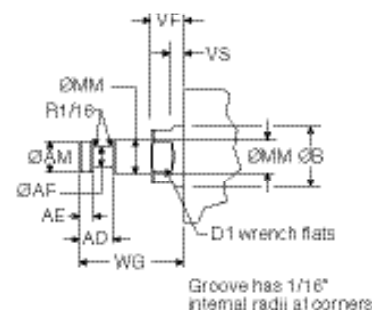
Thread Style 9

(NFPA Style SF)
Short Female



Thread Style 55

For use with Split Coupler
(please reference page B79 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			A	AD	AE	AF	AM	B	C	D	D1	LAF	NA	VF	WF	WG
			Style 8 CC	Style 4 & 9 KK	Style 6														
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 - 12	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 - 12	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 - 12	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



For inventory, lead times, and kit lookup, visit www.pdnplu.com

B10

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

K-type Cylinder

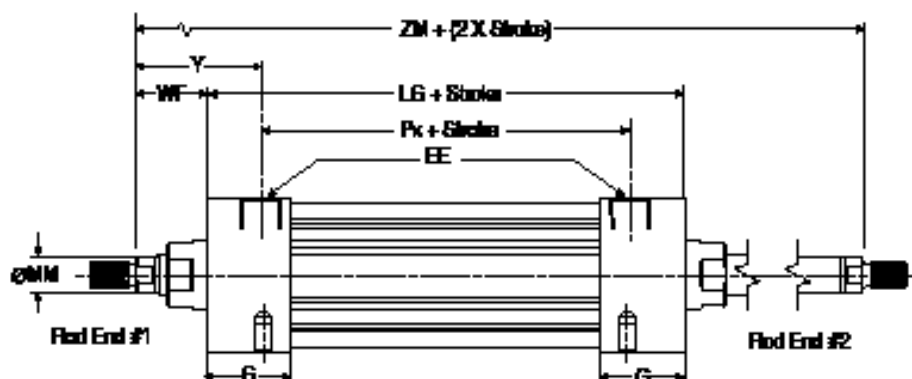
To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary dimensions from that drawing, return to this page and supplement the single rod end dimensions with those shown in the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

Tie Rod Pneumatic Cylinders

4MA Series – 1-1/2" to 5" Bore Size

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															Add 2X Stroke
	Rod no.	Rod Dia. MM	EE (NPTF)	G	WF	Y	LG	PK	SAK	XAK	SSK	SNK	SEK	XEK	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

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAP Series

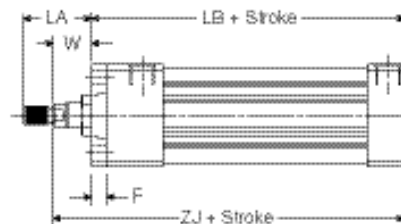
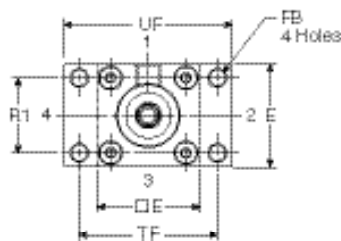
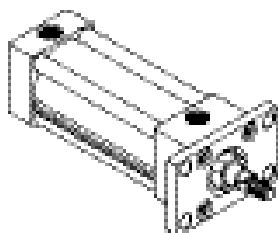
ACVB Option

LPSF Option

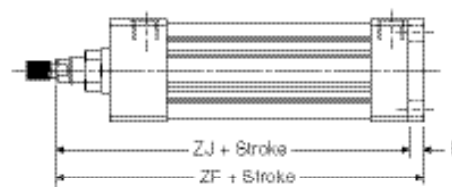
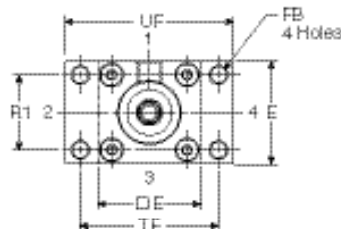
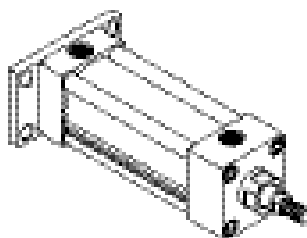
P1D Series

P1F Series

2MNR Series

Head Rectangular FlangeStyle J
(NFPA MF1)

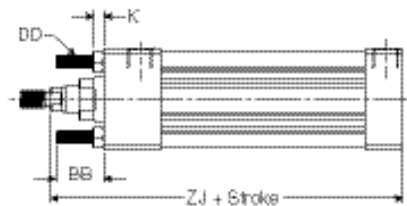
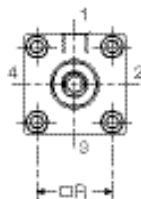
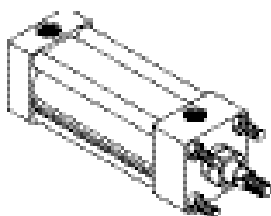
Note: Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J. For reference, $WF = W + F$ and $LA = W + A$.

Cap Rectangular FlangeStyle 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

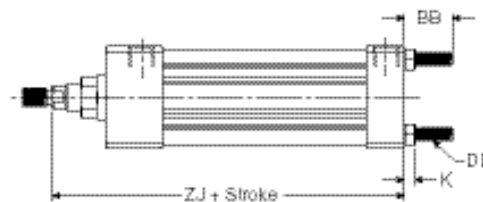
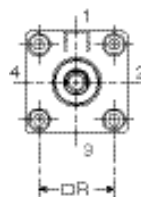
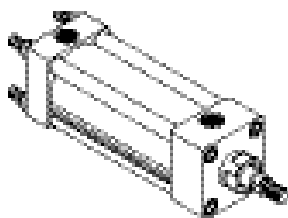
Tie Rods Ext. Head End

Style TB
(NFPA MX3)



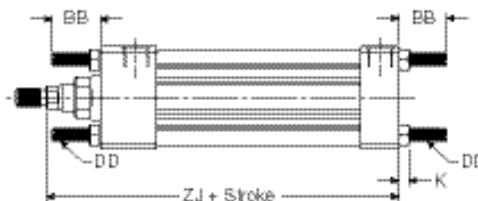
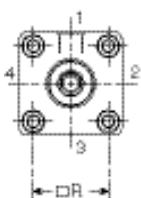
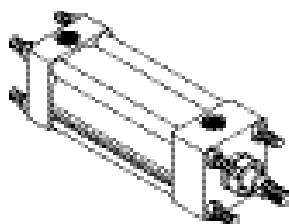
Tie Rods Ext. Cap End

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

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

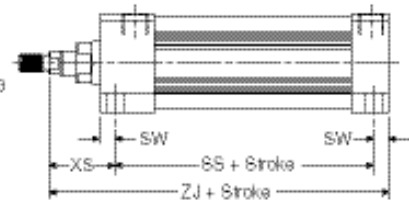
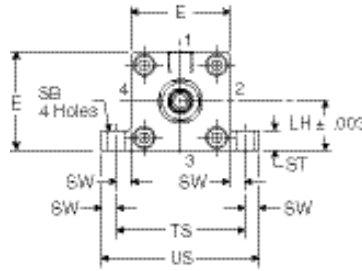
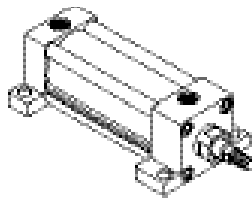
ACVB
Option

LPSF
Option

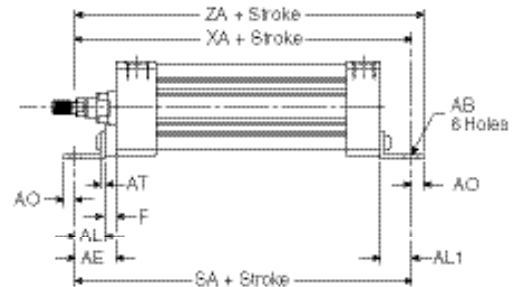
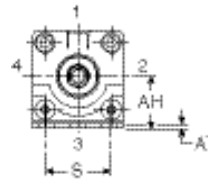
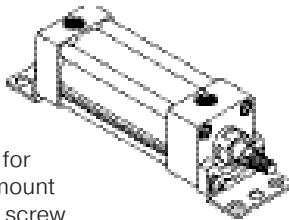
P1D
Series

P1F
Series

2MNR
Series

Style C, CB**Tie Rod Pneumatic Cylinders****4MA/4ML Series – 1-1/2" to 5" Bore Size****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	
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.

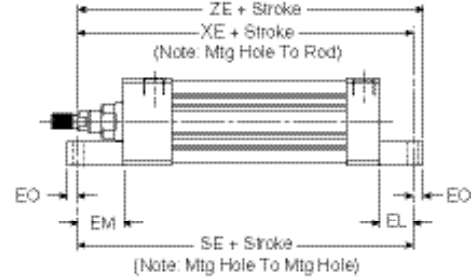
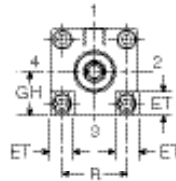
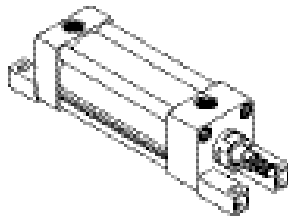
Style CB Dimensions

Bore Size	Rod no.	Rod Dia. MM	AB	AE	AH	AL	AL1	AO	AT	E	F	S	Add Stroke		
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

For inventory, lead times, and kit
lookup, visit www.pdnplu.com

Side End Lug

Style G
 (NFPA MS7)



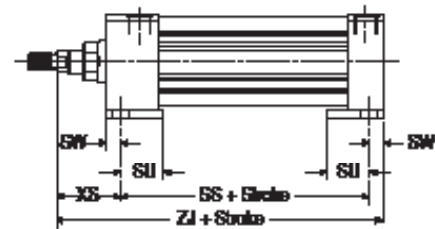
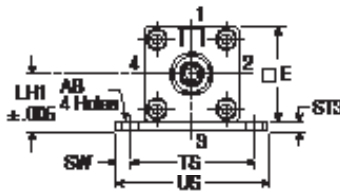
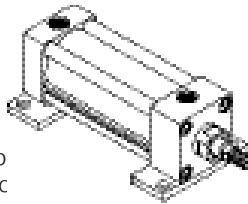
Style G Dimensions

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.



Only Available with 2" bore

Style NB Dimensions

Bore Size	Rod no.	Rod Dia. MM	AB	E	LH1	ST3	SU	SW	TS	US	XS	Add Stroke	
												SS	ZJ
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

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAP Series

ACVB Option

LPSF Option

P1D Series

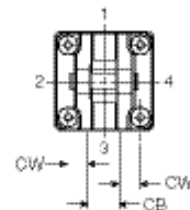
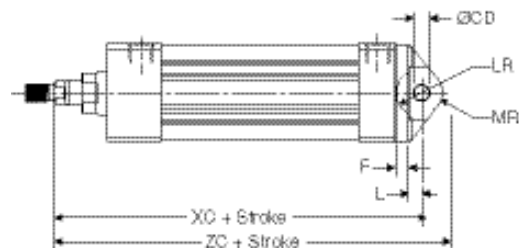
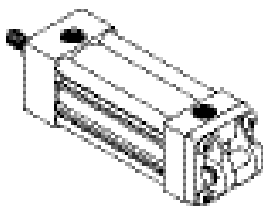
P1F Series

2MNR Series

Cap Fixed Clevis

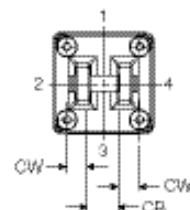
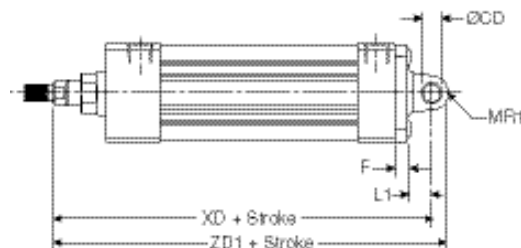
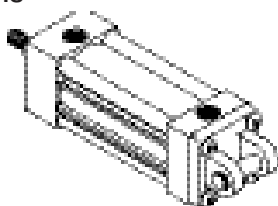
Style BB
(NFPA MP1)

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



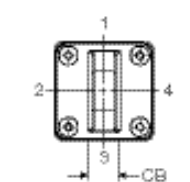
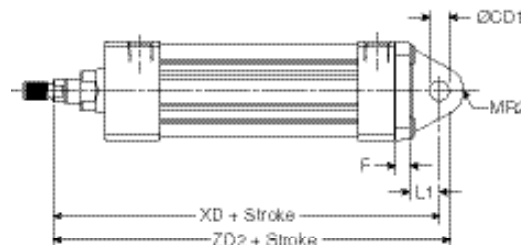
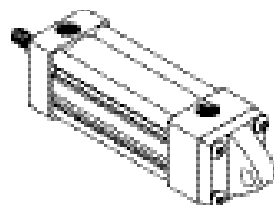
Cap Detachable Clevis

Style BC
(NFPA MP2)



Cap Detachable Eye

Style BE
(NFPA MP4)



Styles BB, BC and BE Dimensions

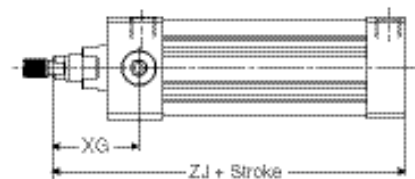
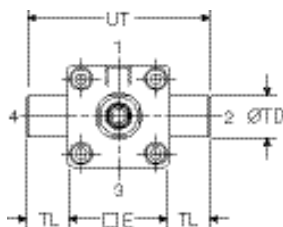
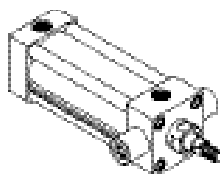
Bore Size	Rod no.	Rod Dia. MM	CB	+.000 -.002 CD	+.002 +.004 CD1	CW	E *	F	L	LR	L1	MR	MR1	MR2	Add Stroke				
															XC	XD	ZC	ZD1	ZD2
1-1/2	1	5/8	0.750	0.501	0.500	0.500	2.000	0.375	0.375	0.750	0.750	0.625	0.500	0.625	5.375	5.750	6.000	6.250	6.375
	2	1	0.750	0.501	0.500	0.500	2.000	0.375	0.375	0.750	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

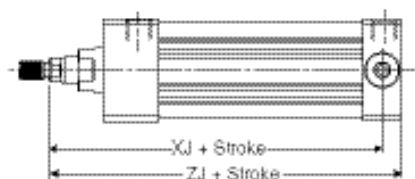
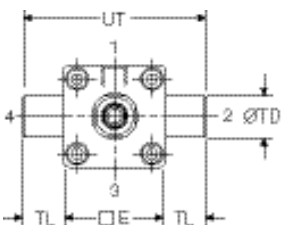
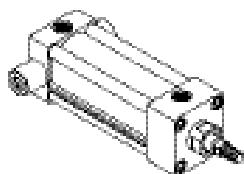
* Style D
(NFPA MT1)

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



Cap Trunnion

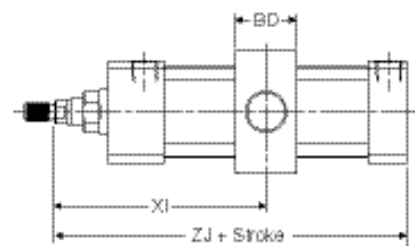
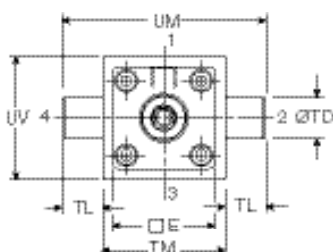
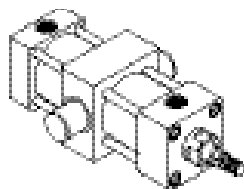
Style DB
(NFPA MT2)



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	Rod Dia. $\pm .000$ $-.001$ TD	TL	TM	UM	UT	UV	XG	Min. XI	Add Stroke	
													XJ	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.



For inventory, lead times, and kit
lookup, visit www.pdnplu.com

B17

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

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

ACVB
Option

LPSF
Option

P1D
Series

P1F
Series

2MNR
Series

4MA/4ML Series – 6" and 8" Bore Size

B

Tie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSP
OptionPID
SeriesPIF
Series2MNR
Series**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.

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.

PORTS

NPTF ports are standard. Other port styles available.

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.

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.

TIE ROD CONSTRUCTION

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

ROD SEAL (HIDDEN)

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

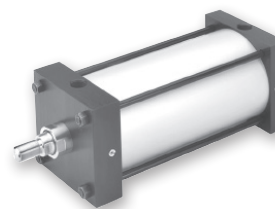
For a complete list of 4MA options, please see pages B19.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

B18

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



- 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

	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)	
Filtration requirements:	40 micron, dry filtered air	Filtered hydraulic oil

6.00 Bore Size 6.00 8.00			J Double Rod Cylinder Specify "K" only if double rod cylinder is required.	4MA Series <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">4MA</td> <td style="width: 50%;">Air Service</td> </tr> <tr> <td>4ML</td> <td>Hydraulic Service</td> </tr> </table>	4MA	Air Service	4ML	Hydraulic Service		U Ports <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">U</td> <td style="width: 50%;">NPTF</td> </tr> <tr> <td>R</td> <td>BSPP</td> </tr> <tr> <td>B</td> <td>BSPT</td> </tr> <tr> <td>T</td> <td>SAE</td> </tr> </table>	U	NPTF	R	BSPP	B	BSPT	T	SAE		1 Piston Rod Number Specify rod code number for required diameter. ⁵	4 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		A Stroke Length Specify stroke length required in inches. ⁸		12.000												
4MA	Air Service																																				
4ML	Hydraulic Service																																				
U	NPTF																																				
R	BSPP																																				
B	BSPT																																				
T	SAE																																				
			Mounting Style Specify mounting style code (see table on following page).							Cushion Cap End <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Blank</td> <td style="width: 70%;">Non-Cushioned Head End</td> </tr> <tr> <td>C</td> <td>Cushioned Head End (not available for 4ML)</td> </tr> </table>			Blank	Non-Cushioned Head End	C	Cushioned Head End (not available for 4ML)																					
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Notes:

- Reed and solid-state sensors only available with standard seals or options E and M.
- Used for external chemical compatibility applications, not high temperature.
- 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.
- For Linear Position Sensor Option (LPSF), please include the following information for the Special Modification item notes:
 - Sensor part number (please reference pages B72-B76)
 - Sensor position
 - Port position (if other than position 1)
 - Length of stop tubing, gross stroke and net stroke (if required)
Also, Piston Type 3 is required.
- Review Piston Rod Selection Chart, please reference page A14 to determine proper piston rod diameter.
- For additional information regarding this style, please reference page B79.
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.
- Not available for 4ML.
- 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 Metallic rod wiper.



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.



Mounting Styles**Tie Rod Pneumatic Cylinders
4MA/4ML Series – 6" & 8" Bore Size****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

Mounting Style	NFPA Mounting	Description	Bore Size
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†	MX0	Double Rod End, No Mount	6 - 8

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

BTie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSP
OptionP1D
SeriesP1F
Series2MNR
SeriesFor inventory, lead times, and kit
lookup, visit www.pdnplu.com

B20

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

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
- 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

Bore (inch)	Rod (inch)	No Mount Single Rod 4MA/4ML		No Mount Double Rod	
		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

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

ACVB
Option

LPSF
Option

P1D
Series

P1F
Series

2MNR
Series



Material Specifications

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-rod	Blackened carbon steel
Tie-rod nuts	Steel alloy, SAE J995 Grade 8

Tie Rod Pneumatic Cylinders 4MA/4ML Series – 6" and 8" Bore Size

Material and Part Changes

4MA Options

High temperatures (-10°F to 250°F)	All seals and wiper are fluorocarbon Aluminum piston without magnetic ring
------------------------------------	---

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

 The Rod Pneumatic Cylinders	4MA Series	4MAP Series	ACVB Option	LPSF Option	P1D Series	P1F Series	2MNR Series
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B22

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

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	Determine if standard size piston rod is strong enough to accommodate intended load. Long Push Stroke See Application Engineering section for recommendations.
Long Horizontal Stroke	Determine if standard size piston rod is strong enough to accommodate intended load.
High Operating	For temperatures between 165°F and 250°F use 4MA cylinder with high temperature seals. Temperatures

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)
- Analog Interface Profile (LPSF)
- High Temperature Service (to 250°F)
- Hydraulic Service (4ML) (400 PSIG)
- Rod lock version (see 4MAP)

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

ACVB
Option

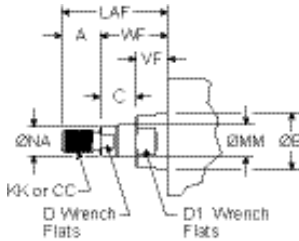
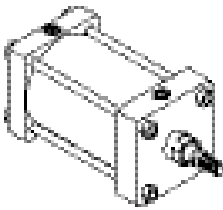
LPSF
Option

P1D
Series

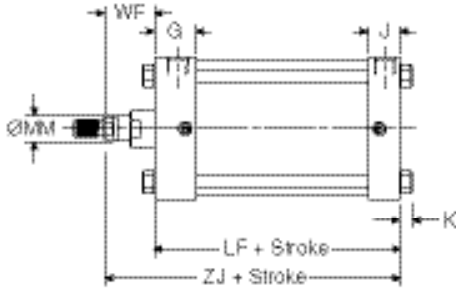
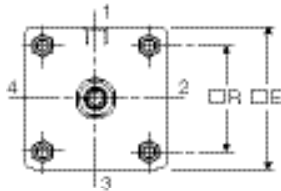
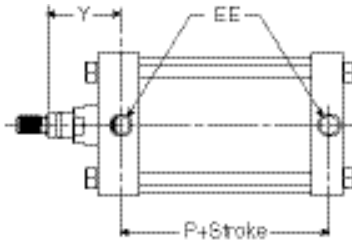
P1F
Series

2MNR
Series

**Single Rod
(Style T)**

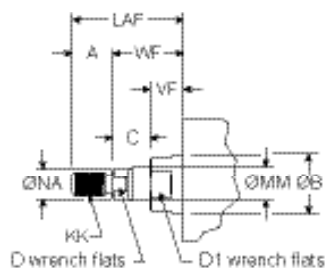
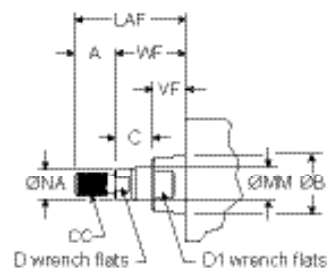
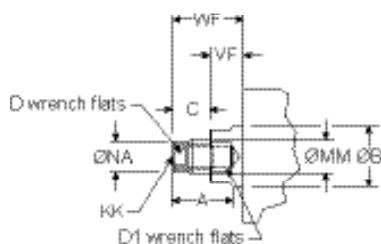
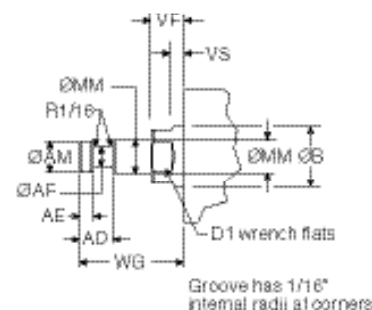


For dimensions of all standard rod end styles,
please see next page.



Style T Dimensions

Bore Size	Rod No.	Rod Dia. MM	Thread		Style 6	A	AA	B	C	D	D1	E	EE (NPTF)	G
			Style 8 CC	Style 4 & 9 KK										
6	1	1-3/8	1-1/4 - 12	1-14	1-3/8 - 12	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 - 12	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	Add Stroke											
			J	K	LAF	NA	R	VF	WF	Y	LF	P	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 Styles**Tie Rod Pneumatic Cylinders
4MA/4ML Series – 6" and 8" Bore Size****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 6	A	AD	AE	AF	AM	B	C	D	D1	LAF	NA	VF	WF	WG
			Style 8 CC	Style 4 & 9 KK															
6	1	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 12	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 - 12	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

BTie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionP1D
SeriesP1F
Series2MNR
Series

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lookup, visit www.pdnplu.com

B25

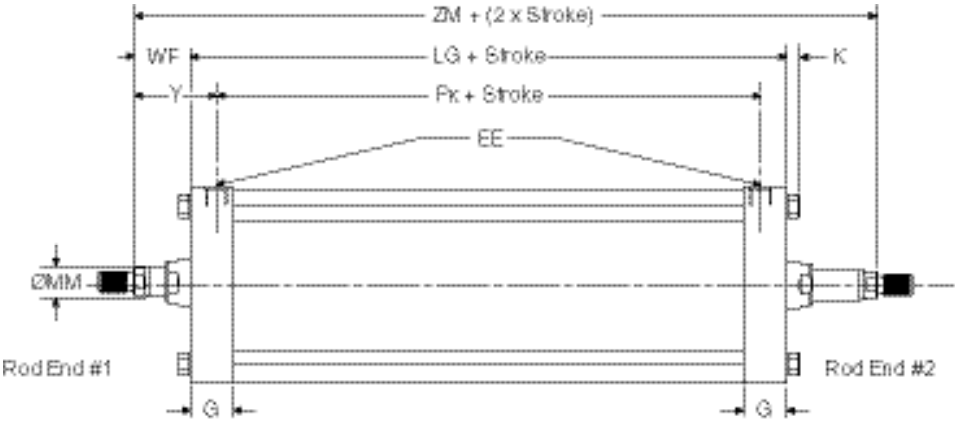
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Wadsworth, Ohio
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To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary 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



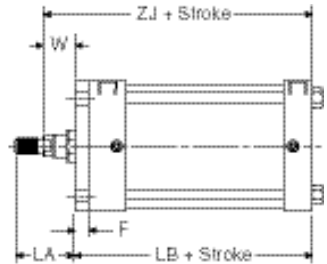
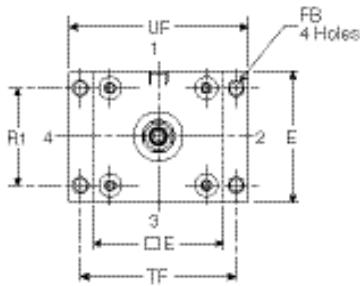
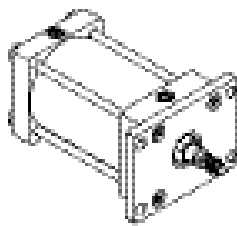
Mounting Styles For Single Rod Models	Corresponding Mounting Styles For Double Rod Models
C	KC
CB	KCB
D	KD
DD	KDD
F	KF
J	KJ
T	KT
TB	KTB
TD	KTD
TE	KTE
TEF	KTEF

Style KT Dimensions

Bore Size	Rod No.	Rod Dia. MM	EE (NPTF)	G	K	WF	Y	Add Stroke						Add 2X Stroke
								LG	PK	SAK	XAK	SSK	SNK	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

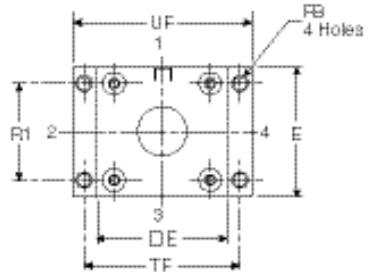
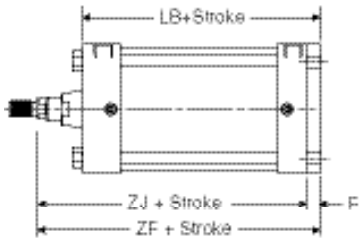
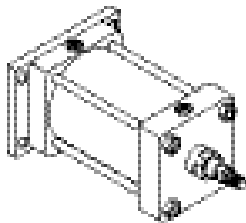
Style J
(NFPA MF1)
(only 6" Bore)



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)



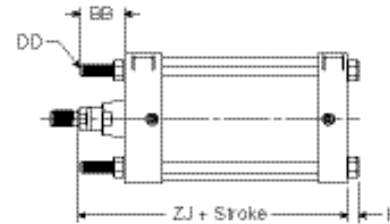
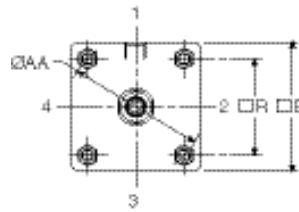
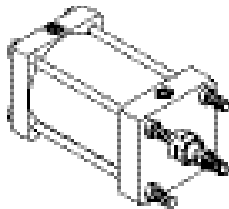
Styles J and H Dimensions

Bore Size	Rod No.	Rod Dia. MM	A	E	F	FB	LA	R1	TF	UF	W	Add Stroke		
												LB	ZF	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

B	Tie Rod Pneumatic Cylinders	
	4MA Series	
	4MAP Series	
	ACVB Option	
	LPSF Option	
	P1D Series	
	P1F Series	
	2MNR Series	

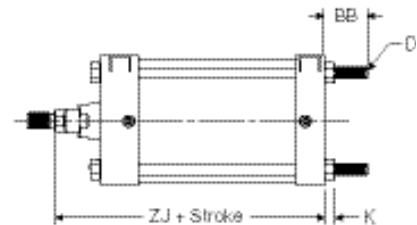
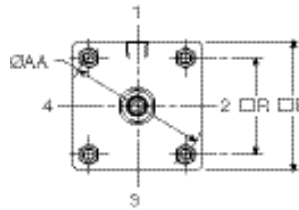
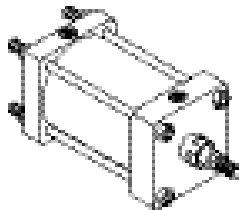
Tie Rods Ext. Head End

Style TB
(NFPA MX3)



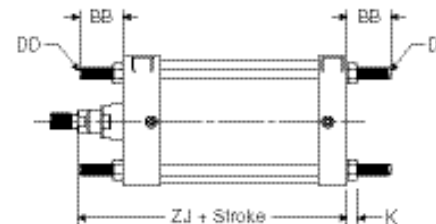
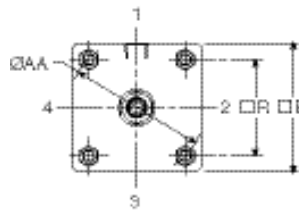
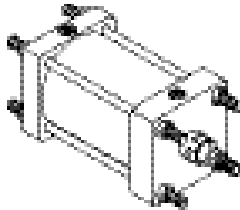
Tie Rods Ext. Cap End

Style TC
(NFPA MX2)



Tie Rods Ext. Both Ends

Style TD
(NFPA MX1)

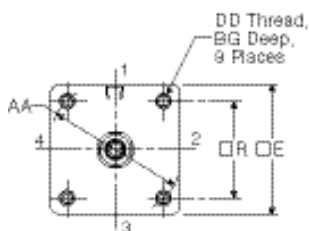
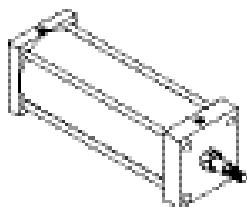


Styles TB, TC and TD Dimensions

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)

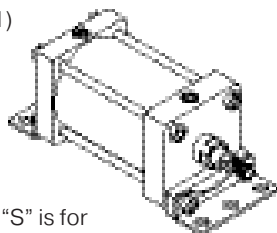


Style TE Dimensions

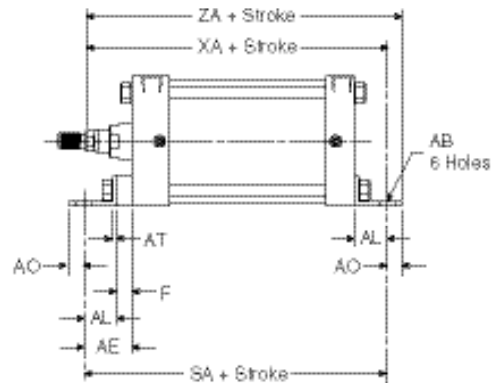
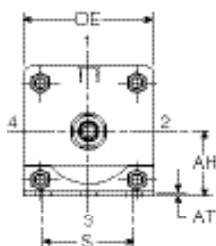
Bore Size	Rod No.	Rod Dia. MM	AA	BG	DD	E	R	Add Stroke
								ZJ
6	1	1-3/8	6.900	0.500	1/2-20	6.500	4.880	6.625
	3	1-3/4	6.900	0.500	1/2-20	6.500	4.880	6.875
8	1	1-3/8	9.100	0.620	5/8-18	8.500	6.440	6.750
	3	1-3/4	9.100	0.620	5/8-18	8.500	6.440	7.000

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	6.625
	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	6.875
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

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAP Series

ACVB Option

LPSF Option

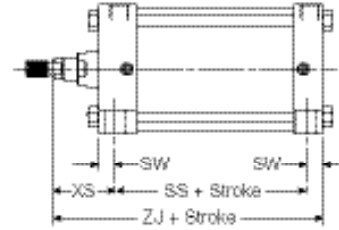
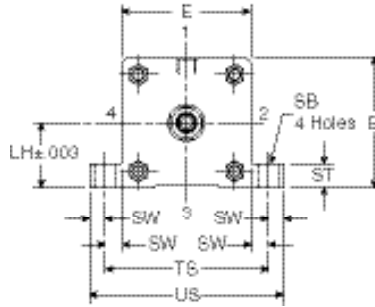
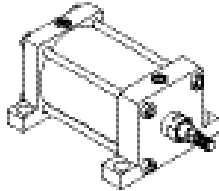
P1D Series

P1F Series

2MNR Series

Side Lug

Style C
(NFPA MS2)

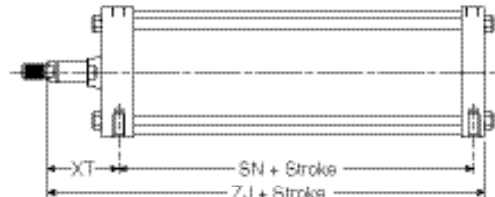
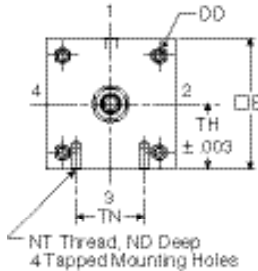
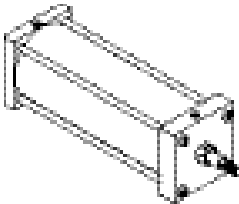


Style C Dimensions

Bore Size	Rod No.	Rod Dia. MM	E	LH ± .003	SB	ST	SW	TS	US	XS	Add Stroke	
											SS	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)

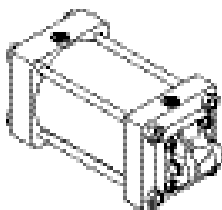


Style F Dimensions

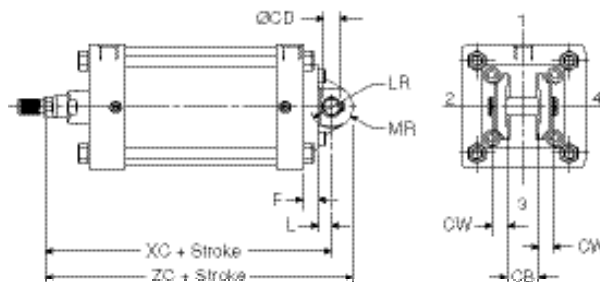
Bore Size	Rod No.	Rod Dia. MM	E	ND	NT	TH ± .003	TN	XT	Add Stroke	
									SN	ZJ
6	1	1-3/8	6.500	1.125	3/4-10	3.243	3.250	2.813	3.125	6.625
	3	1-3/4	6.500	1.125	3/4-10	3.243	3.250	3.063	3.125	6.875
8	1	1-3/8	8.500	1.125	3/4-10	4.243	4.500	2.813	3.250	6.750
	3	1-3/4	8.500	1.125	3/4-10	4.243	4.500	3.063	3.250	7.000

Cap Fixed Clevis

Style BB
(NFPA MP1)

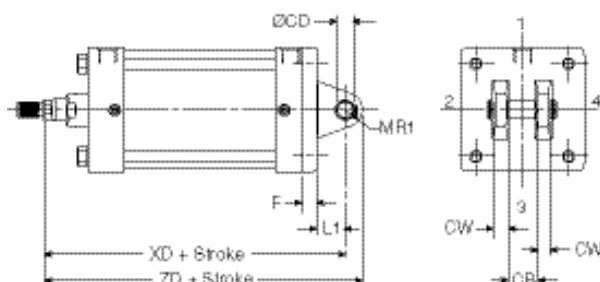
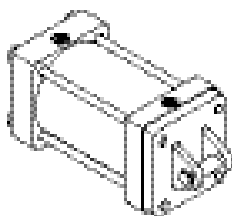


Note: For maximum swivel angle of BB mount with rear mounting plate, please reference cylinder accessories on page B80.



Cap Detachable Clevis

Style BC
(NFPA MP2)

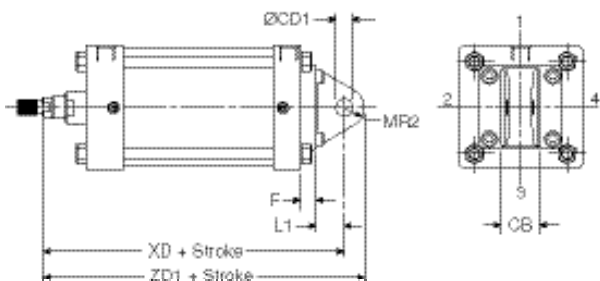
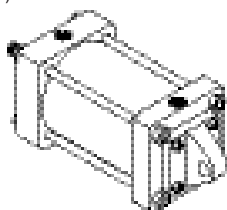


Styles BB and BC Dimensions

Bore Size	Rod No.	Rod Dia. MM	CB	Rod Dia. $\pm .002$ 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	Rod Dia. $\pm .002$ 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

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

ACVB
Option

LPSF
Option

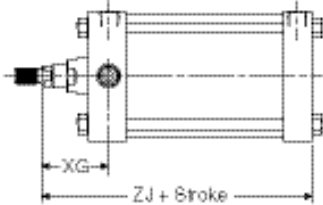
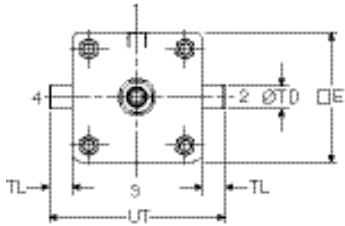
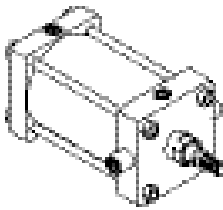
P1D
Series

P1F
Series

2MNR
Series

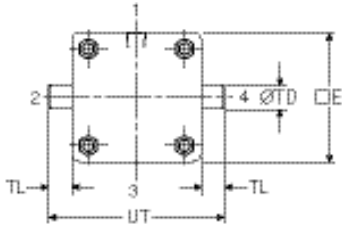
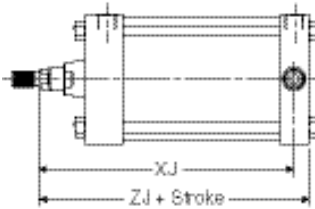
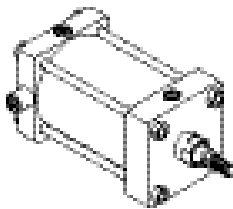
Head Trunnion

Style D
(NFPA MT1)



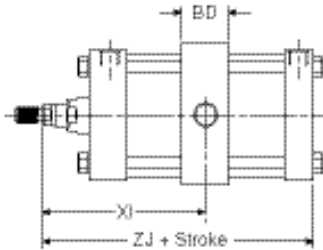
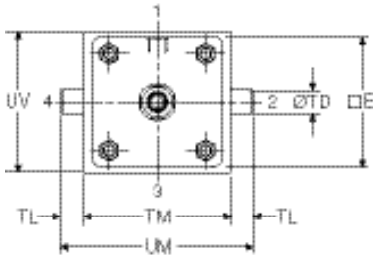
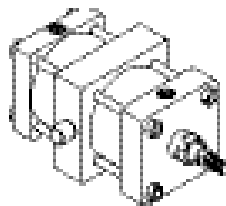
Cap Trunnion

Style DB
(NFPA MT2)



Intermediate Trunnion

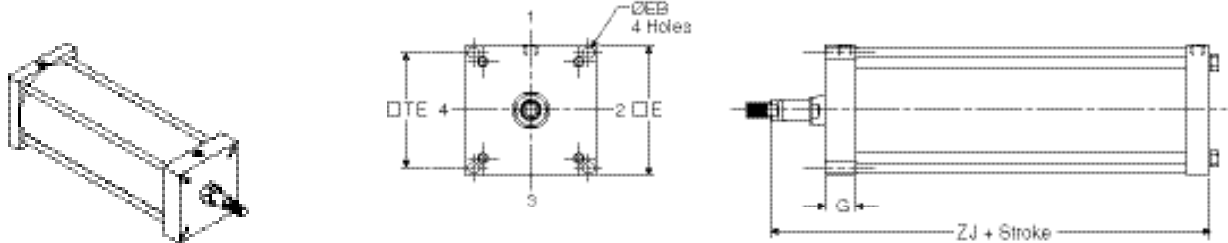
Style DD
(NFPA MT4)



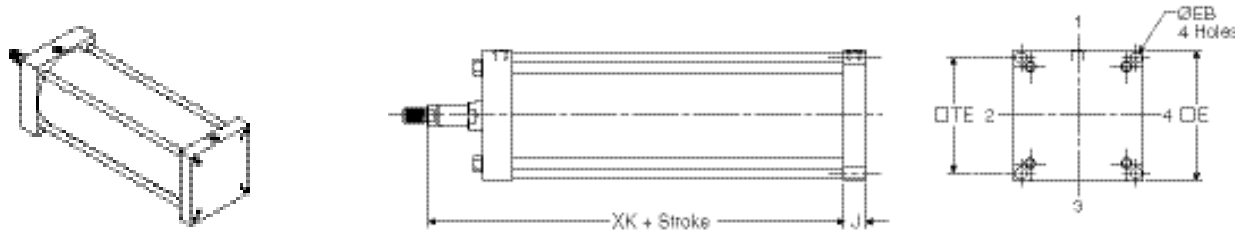
Styles D, DB and DD Dimensions

Bore Size	Rod No.	Rod Dia. MM	E	BD	Rod Dia. $\begin{smallmatrix} +.000 \\ -.001 \end{smallmatrix}$ TD	TL	TM	UM	UT	UV	XG	Min. XI	Add Stroke	
													XJ	ZJ
6	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
	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
8	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
	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

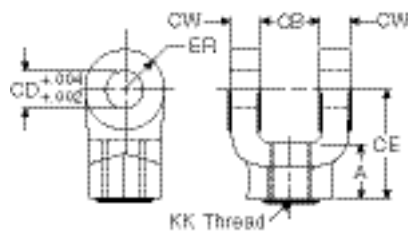
Bore Size	Rod No.	Rod Dia. MM	E	EB	G	J	TE	Add Stroke	
								XK	ZJ
8	1	1-3/8	8.500	0.688	1.810	1.440	7.570	5.313	6.750
	3	1-3/4	8.500	0.688	1.810	1.440	7.570	5.563	7.000

B	Tie Rod Pneumatic Cylinders	
	4MA Series	
	4MAP Series	
	ACVB Option	
	LPSF Option	
	P1D Series	
	P1F Series	
	2MNR Series	

Mounting Kits and Accessories

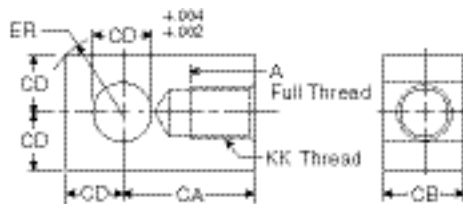
Bore Size	J (MF1)	H (MF2)	BB (MP1)	BC (MP2)	BE (MP4)	CB (MS1)	G (MS7)	Kit Fastener Torque Units	
	Head Rectangular Flange	Cap Rectangular Flange	Cap Fixed Clevis	Cap Detachable Clevis	Cap Detachable Eye	Side End Angles	Side End Lug	inch-lbs	N-m
	Kit Number	Kit Number	Kit Number	Kit Number	Kit Number	Kit Number	Kit Number		
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

Female Rod Clevis



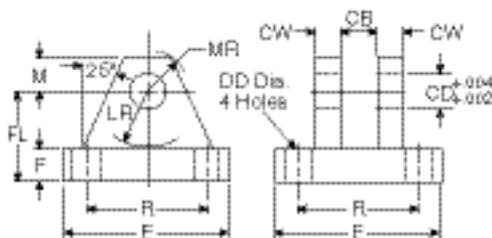
Symbol	1458030044	1458030050	1458030075	1458030088	1458030100	1458030125	1458030150
A	3/4	3/4	1-1/8	1-5/8	1-5/8	2	2-1/4
CB	3/4	3/4	1-1/4	1-1/2	1-1/2	2	2-1/2
CD	1/2	1/2	3/4	1	1	1-3/8	1-3/4
C E	1-1/2	1-1/2	2-1/8	2-15/16	2-15/16	3-3/4	4-1/2
CW	1/2	1/2	5/8	3/4	3/4	1	1-1/4
ER	1/2	1/2	3/4	1	1	1-3/8	1-3/4
KK	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



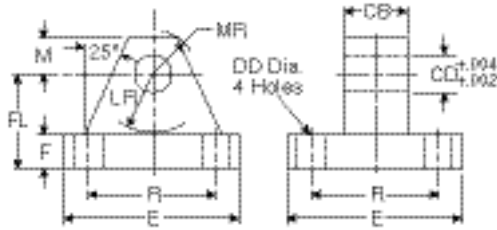
Symbol	1458040044	1458040050	1458040075	1458040088	1458040100	1458040125
A	3/4	3/4	1-1/8	1-1/8	1-5/8	2
CA	1-1/2	1-1/2	2-1/16	2-3/8	2-13/16	3-7/16
CB	3/4	3/4	1-1/4	1-1/2	1-1/2	2
CD	1/2	1/2	3/4	1	1	1-3/8
ER	23/32	23/32	1-1/16	1-7/16	1-7/16	1-31/32
KK	7/16-20	1/2-20	3/4-16	7/8-14	1-14	1-1/4-12
Load Capacity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

Clevis Bracket



Symbol	1458050050	1458050075	1458050100
CB	3/4	1-1/4	1-1/2
CD	1/2	3/4	1
CW	1/2	5/8	3/4
DD	13/32	17/32	21/32
E	3-1/2	5	6-1/2
F	1/2	5/8	3/4
FL	1-1/2	1-7/8	2-1/4
LR	3/4	1-3/16	1-1/2
M	1/2	3/4	1
MR	5/8	29/32	1-1/4
R	2.55	3.82	4.95
Load Capacity (lbs)	7300	14000	19200

Mounting Plate & Eye Bracket



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

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

Rod End Thread Size	Mating Parts		
	Female Rod Clevis	Eye Bracket	Pivot Pin
7/16-20	1458030044	1458060050	0683680000
1/2-20	1458030050	1458060050	0683680000
3/4-16	1458030075	1458060075	0683690000
7/8-14	1458030088	1458060100	0683700000
1-14	1458030100	1458060100	0683700000
1-1/4-12	1458030125	1458060138	0683710000
1-1/2-12	1458030150	—	0683720000

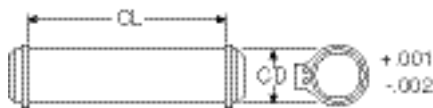
Table B

Knuckle	Mating Parts	
	Clevis Bracket	
1458040044	1458050050	
1458040050	1458050050	
1458040075	1458050075	
1458040088	1458050100	
1458040100	1458050100	
1458040125	—	
—	—	

Table C

Bore Size	Mounting Plates	
	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	0683680000	0683690000	0683700000	0683710000	0683720000
CD	1/2	3/4	1	1-3/8	1-3/4
CL	1-7/8	2-5/8	3-1/8	4-1/8	5-3/16
Shear Cap. (lbs)	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

4MAP Series – Rod Lock

Standard with magnet & sensor slot

- Sense when rod lock is engaged
- Sense when rod lock is disengaged
- Sensor sold separately

Category certified rod locks, Intertek certified to meet Category B to Category 4 safety requirements, EN ISO 13849 and the ANSI Standards EN ISO 12100.

Single Channel Architecture			Redundant Architecture	
1 Lock, No Sensor		1 Lock, 1 Sensor	2 Locks, 1 Sensor Each	2 Locks, 2 Sensors Each
Cat B	Cat 1	Cat 2	Cat 3	Cat 4
Pla, PLb	PLb, PLc	Pla, PLb, PLc, PLd	Pla, PLb, PLc, PLd	PLe

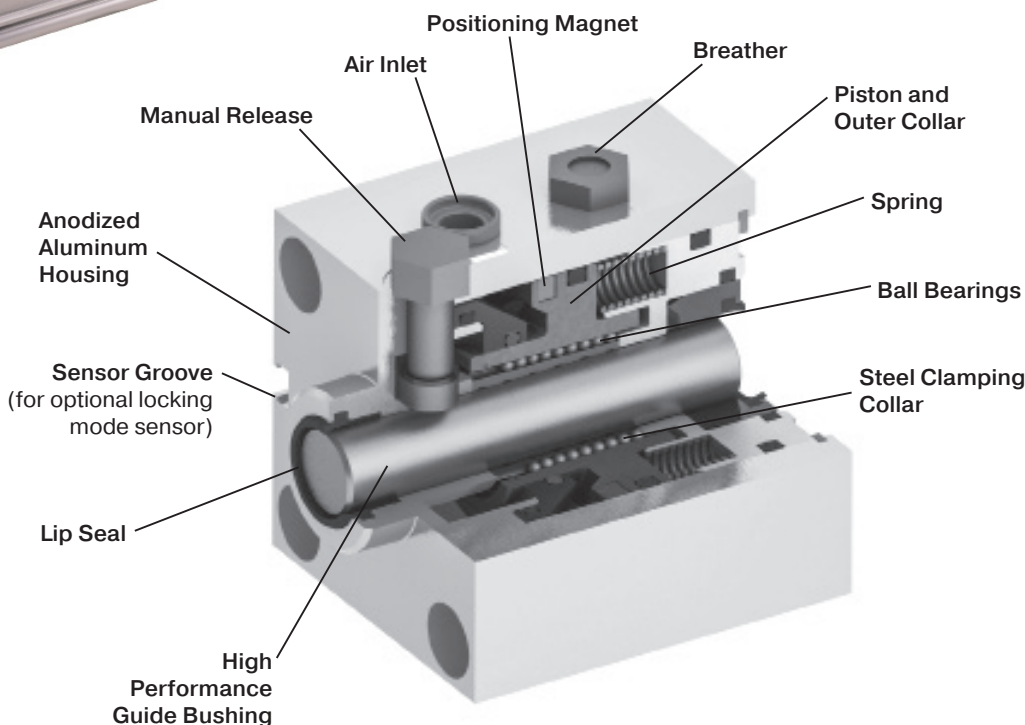
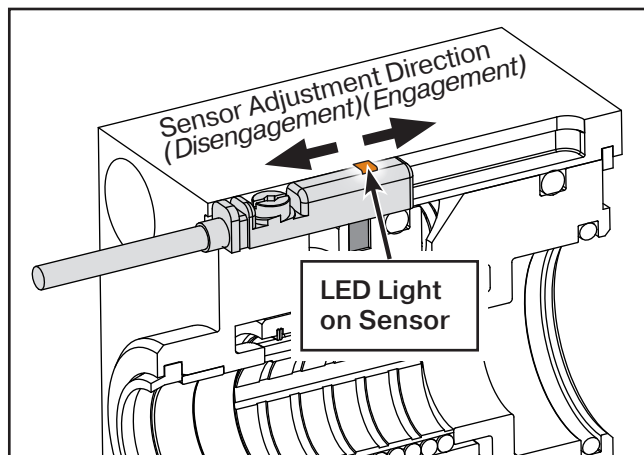
Spring-engaged, air-released unit hold cylinder in position during power-off/e-stop situations.

Cam operated manual release feature mechanically disengages the rod lock with the simple turn of a hex screw using a standard wrench.

IP67 Rating

1.50 to 8.00" Bore Sizes

Holding force to 2830 pounds



Rod Lock Features and Specifications

Safety Standard Compliance

ISO 13849 is a Safety Standard which applies to machines and systems, and aims to reduce risk, in event of machine failure. Rod Locks intended for safety related applications are to be installed in accordance with the required performance level/category level per ISO 13849-1:2015. The category rating of safety channels and performance level of the machine is the responsibility of the system manufacturer. For fulfillment of the safety function, the Rod Lock is to be viewed as an individual component.

Braking Function: All safety rated Rod Locks use multiple Compression springs to provide the necessary spring force over the life of the unit. The use of multiple springs ensures that a reduced locking force will be available in the event of spring failure.

Single Channel Architecture		Redundant Architecture	
1 Lock, No Sensor	1 Lock, 1 Sensor	2 Locks, 1 Sensor Each	2 Locks, 2 Sensors Each
Cat B	Cat 1	Cat 2	Cat 3
Pla, PLb	PLb, PLc	Pla, PLb, PLc, PLd	PLe

The sensors listed below cannot be replaced by other manufactures or part numbers. Changing to a non-approved sensor eliminates all safety ratings

Parker Part #	Parker Description
966190	4MAP RL Sensor NPN NO
966195	4MAP RL Sensor PNP NO

PNP Mode (Sourcing) – Normally Open (N.O.) or Normally Closed (N.C.) PNP type Sourcing Output available, see Figure 5. Typically matched with a PLC Sinking Input.

NPN Mode (Sinking) – Normally Open (N.O.) or Normally Closed (N.C.) NPN type Sinking Output available, see Figure 5. Typically matched with a PLC Sourcing Input.

Tie Rod Pneumatic Cylinders 4MAP Series, Rod Lock Option

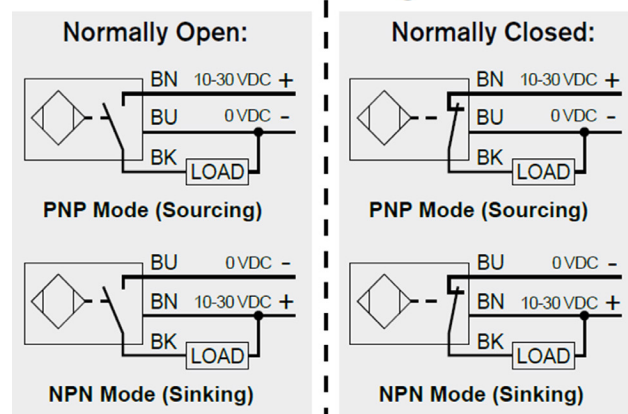
Sensor Wiring

Parker's Magnetic Proximity Sensors are available to gather operational data from the Rod Lock. The 4MAP rod lock can be equipped with one or two T-slots for sensor mounting. These sensors may be used by system manufacturers to gain higher safety category ratings per ISO 13849-1. Rating of the safety function is the responsibility of the system manufacturer. Each Proximity sensor can be set up to sense one of the following functions of the Rod Lock:

Disengagement Sensor Definition – Sensor is activated when the rated air pressure is applied and the piston moves to a disengaged position.

Engagement Sensor Definition – Sensor is activated when the piston moves out of the disengaged position into a position in which the clamp collar constricts on the rod.

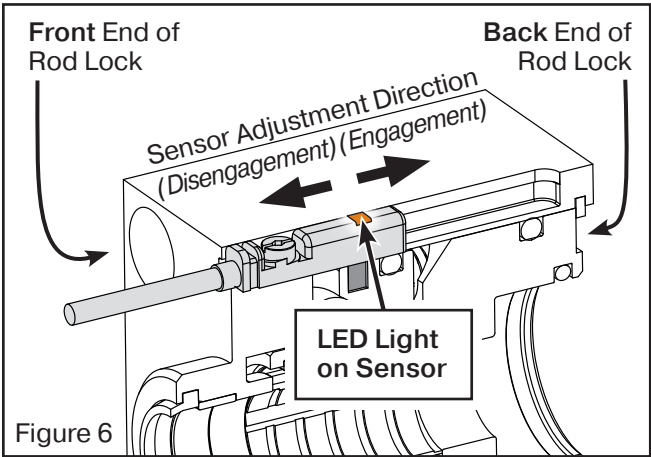
Sensor Wiring



B

Tie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionP1D
SeriesP1F
Series2MNR
Series

LED Light on Sensor



Sensing Disengagement Position:

1. With rod lock on rod, supply air pressure to the rod lock so it is disengaged.
2. Install sensor as shown in Figure 6. Start with sensor positioned closest to the back of the rod lock, past the sensing target. Slide the sensor towards the front end of the rod lock until LED is lit. Once the LED is lit, move sensor a small amount further into sensing target.
3. Use a standard flat-head screwdriver or 1.5mm allen wrench to turn the screw and fix the sensor in the t-slot.
4. Cycle air pressure to ensure the LED is lit only when release air pressure is supplied to the rod lock.

Sensing Engagement Position:

1. With rod lock on rod, remove air pressure to the rod lock so it is engaged.
2. Install sensor as shown in Figure 6. Start with sensor positioned closest to the front of the rod lock, before the sensing target is reached. Slide the sensor towards the back end of the rod lock until LED is lit. Once the LED is lit, move sensor a small amount further into sensing target.
3. Use a standard flat-head screwdriver or 1.5mm allen wrench to turn the screw and fix the sensor in the t-slot.
4. Cycle air pressure to ensure the LED is lit only when air pressure is removed from the brake.

B	Tie Rod Pneumatic Cylinders	
	Series	4MA
	4MAP Series	
	Option	ACVB
	LPSF Option	
	Series	P1D
	P1F Series	
	Series	2MNR

NFPA Non-Lube Pneumatic Cylinder with Manual Override Rod Lock

Rod lock version 4MA Series (the 4MAP) 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 4MAP 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.

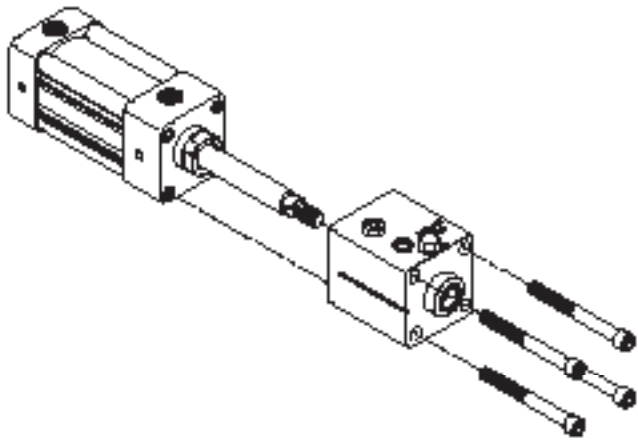
Aesthetics – we have designed our rod locks with the same anodized aluminum extrusion used for the cylinder endcaps, resulting in a virtually seamless assembly. In addition, we focused every effort to create the shortest overall package, minimizing the need for customers to accommodate significantly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

Functionality – With a holding force corresponding to 100 PSI on the cap end for nearly every bore size, the rod lock

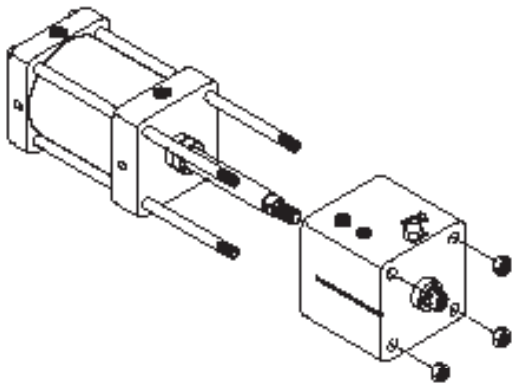
can be used for a variety of holding applications. The manual override shaft allows occasional release of the piston rod and automatically returns the rod lock back to the locked state when it is released and the appropriate air signal is absent. The front pilot diameter meets NFPA specifications and 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 4MAP (the "P" is required for the rod lock option). See model code on page B42 for additional information.

1-1/2" to 5" Bores



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



B	Tie Rod Pneumatic Cylinders	
	4MA Series	4MAP Series
	ACVB Option	LPSF Option
	P1D Series	P1F Series
	2MNR Series	

Rod Lock Features and Specifications

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 4MAP 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.

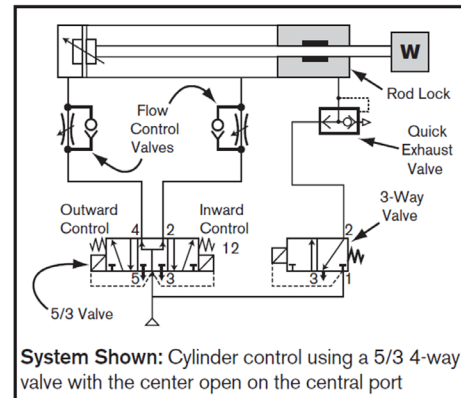
Operation at pressures lower than 60 PSI may lead to inadvertent engagement of the rod lock device.

Other Cylinder and Rod Lock Features:

- The 4MAP rod lock will operate in both directions, engaging with the same holding force.
- The 4MAP 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 4MAP 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.

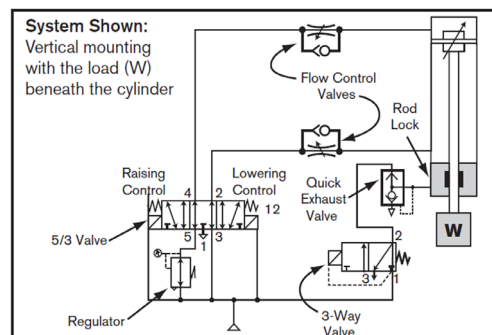
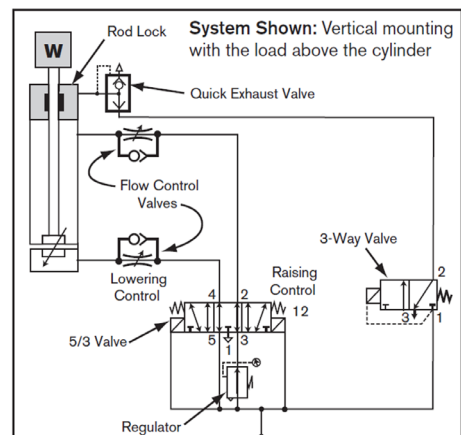
Horizontal Mounting

Pressure is maintained on both sides of the cylinder piston, keeping it balanced and preventing rod displacement upon release. Use exhaust ports 3 and 5 (see below).



Vertical Mounting

Pressure is maintained on both sides of the cylinder piston. The force on the piston must not exceed its locking capacity when it is combined with the force of the load. Use of a 5/3 (5 ported, 4-way, 3 [center] position) valve provides a braking effect and maintains accurate rod positioning. Stopping precision is determined by the rate of speed of the rod and loads in motion.



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 4MAP cylinder.

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

B

Tie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionP1D
SeriesP1F
Series2MNR
Series

Ordering Information

- 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: 120 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 - 33°F to 150°F (1°C to 65°C)
 Fluorocarbon seals - up to 212°F (100°C) intermittent

Filtration requirements: 40 micron, dry filtered air

Ordering Information

2.00	C	J	4MAP	U	1	4	A	C	6.000
Bore Size	Double Rod Cylinder	Series	Ports ⁴	Piston Rod Number	Special Modification	Cushion Cap End	Piston Rod Thread Type	Stroke Length	
1.50 ¹	Specify "K" only if double rod cylinder is required.	4MAP 4MA Rod Lock Cylinder	U NPTF R BSPP B BSPT T SAE	Specify rod code number for required diameter. ⁸	Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MAP with Linear Position Sensor Option) ⁷	C Cushioned Cap End "C" Is Required	A Standard (UNF unified thread) W BSF British Fine M * Metric	Specify stroke length required in inches. ¹⁰	
2.00									
2.50									
3.25									
4.00									
5.00									
6.00 ¹¹	Mounting Style								
8.00 ¹¹	Specify mounting style code (see table on following page).								
	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								
	Piston Type 11								
	2 Lipseals, No Magnetic Ring								
	3 Lipseals and Magnetic Ring (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								
	Seals								
	Blank Standard (nitrile seals)								
	V Fluorocarbon Seals ⁵								
	E Fluorocarbon Rod Wiper and Rod Seal Only ⁶								
	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)								
	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								

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

Notes:

- Not available with 1" rod diameter (rod number 2) for 1-1/2" bore. Not available with Linear Position Sensor Option (LPSF).
- 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".
- 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.
- Fluorocarbon seals for 4MAP are only for external chemical compatibility applications, not high temperature.
- Used for external chemical compatibility applications, not high temperature.
- For Linear Position Sensor Option (LPSF), please include the following information for the Special Modification item notes:
 - Sensor part number (please reference pages B72-B78)
 - Sensor position
 - Port position (if other than position 1)
 - Length of stop tubing, gross stroke and net stroke (if required)
- For additional information regarding this style, please reference page B79. If non-standard Rod Material and Gland Code is required with this option, please place an "S" for special in the Special Modification field and specify Rod Material and Gland Code in the item notes.
- 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.
- 6"-8" bore 4MAP can accept only Piston Types (blank) and 3. The (blank) piston for 6"-8" bores is aluminum, lipseals, no magnetic ring.

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

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

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.

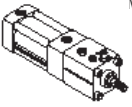
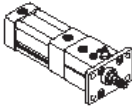
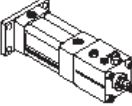
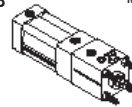
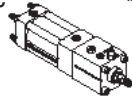
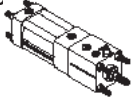
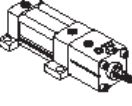
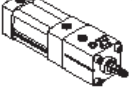
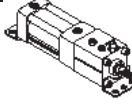
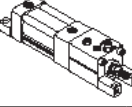


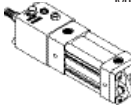
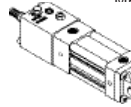
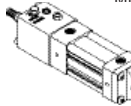
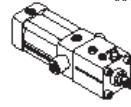
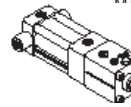
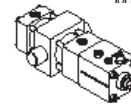
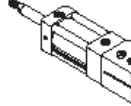
For inventory, lead times, and kit lookup, visit www.pdnplu.com

B42

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

Mounting Styles

Mounting Style	Nfpa Mounting	Description	Bore Size
T 	MX0	No Mount	4MAJ 1-1/2 - 8
		w/LPSF	2 - 8
		w/LPSF w/stop tube	2 - 8
J 	MF1	Head Rectangular Flange	4MAJ 1-1/2 - 6
		w/LPSF	2 - 6 *
		w/LPSF w/stop tube	2 - 6
H 	MF2	Cap Rectangular Flange	4MAJ 1-1/2 - 6
		w/LPSF	2 - 6 *
		w/LPSF w/stop tube	2 - 6 *
TB 	MX3	Tie Rods Extended Head End	4MAJ 1-1/2 - 8
		w/LPSF	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/LPSF	2 - 8
		w/LPSF w/stop tube	2 - 8
F 	MS4	Side Tap	4MAJ 1-1/2 - 8
		w/LPSF	2 - 8
		w/LPSF w/stop tube	2 - 8
CP 	MS1	Side End Angle	4MAJ 1-1/2 - 8
		w/LPSF	2 - 8
		w/LPSF w/stop tube	2 - 8
G 	MS7	Side End Lug	4MAJ 1-1/2 - 4
		w/LPSF	2 - 4
		w/LPSF w/stop tube	2 - 4

Mounting Style	Nfpa Mounting	Description	Bore Size
BB 	MD1	Cap Fixed Clevis	4MAJ 1-1/2 - 8
		w/LPSF	2 - 8 *
		w/LPSF w/stop tube	2 - 8 *
BC 	MD2	Cap Detachable Clevis	4MAJ 1-1/2 - 8
		w/LPSF	2 - 8 *
		w/LPSF w/stop tube	2 - 8 *
BE 	MP4	Cap Detachable Eye	4MAJ 1-1/2 - 6
		w/LPSF	2 - 6 *
		w/LPSF w/stop tube	2 - 6 *
D 	MT1	Head Trunnion	4MAJ 1-1/2 - 8
		w/LPSF	2 - 8
		w/LPSF w/stop tube	2 - 8
DB 	MT2	Cap Trunnion	4MAJ 1-1/2 - 8
		w/LPSF	2 - 8 *
		w/LPSF w/stop tube	2 - 8 *
DD 	MT4	Intermediate Trunnion	4MAJ 1-1/2 - 8
KT 	MT3	Double Rod End, No Mount	4MAJ 1-1/2 - 8
		w/LPSF	2 - 8
		w/LPSF w/stop tube	2 - 8

* May interfere with mounting. Please provide clearance for Linear Sensor overhang (see page B75).

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAP Series

ACVB Option

LPSF Option

P1D Series

P1F Series

2MNR Series

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 –
120 PSIG (8.2 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 –
33°F to 150°F (1°C to 65°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

Bore (inch)	Rod (inch)	No Mount Single Rod		No Mount Double Rod	
		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 (inch)	Weight (lbs) by Mounting Style							
	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	0.65	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 4MAP, 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 oxidized steel alloy

How to Select a 4MAP Cylinder

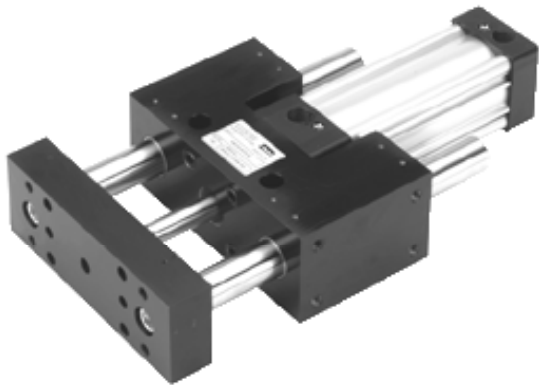
Parker cylinders are available based on air operating pressure. The many styles, sizes and optional features available assure that your application requirements are precisely met. To select a cylinder, follow these simple steps:

- 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 (4MAP with aluminum piston only) is required to prevent excessive bearing loads and wear.
High-column Loading	Determine if standard size piston rod is strong enough to accommodate intended load. Long Push Stroke 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.

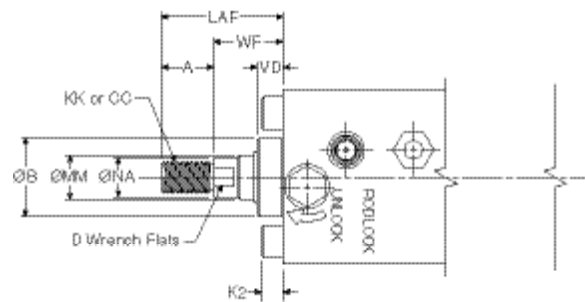
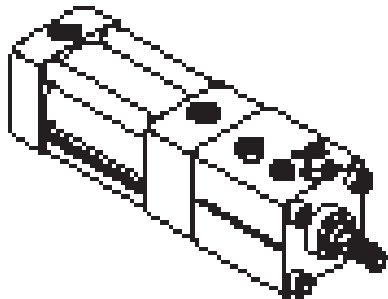
Options and Modifications:

- Piston Bumper Seals
- Piston Bumpers (1/4" Thick)
- Port and Cushion Adjust Relocation
- Port Thread Styles
- Multiple Ports
- Adjustable Sensors
- Analog Interface Profile (LPSF)
- 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

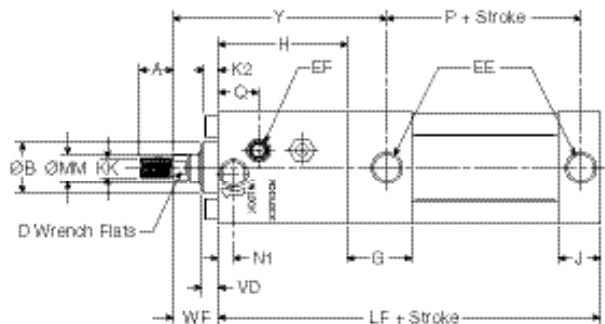
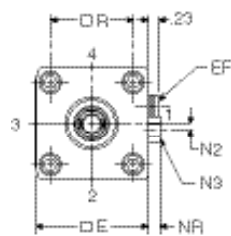


For a guided version of the 4MAP Series, please see the HB Series in Section E.

B
Tie Rod Pneumatic Cylinders
4MA Series
4MAP Series
ACVB Option
LPSF Option
P1D Series
P1F Series
2MNR Series

Style T**Tie Rod Pneumatic Cylinders
4MAP Series, Rod Lock Option****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				+0.000 -0.002 B	D	E	EE (NPTF)	EF (NPTF)	G	H	J		
			Style 8 CC	Style 4 & 9 KK	Style 6	A									AA	
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	2.927	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 - 12	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 - 12	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 - 12	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	LF	P
1-1/2	1	5/8	0.250	1.750	0.407	0.140	5/16	0.563	0.190	0.897	1.430	0.373	1.000	4.800	6.550	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	0.433	0.146	1/2	0.938	0.275	1.155	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

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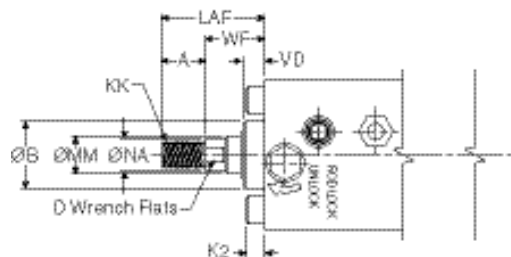
Rod End Thread Styles

Tie Rod Pneumatic Cylinders 4MAP Series, Rod Lock Option

Rod End

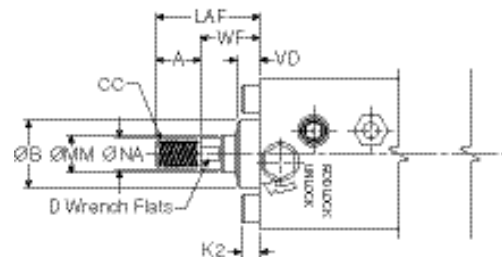
Thread Style 4

(NFPA Style SM)
Small Male



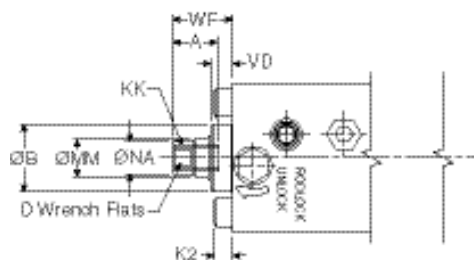
Thread Style 8

(NFPA Style IM)
Intermediate Male



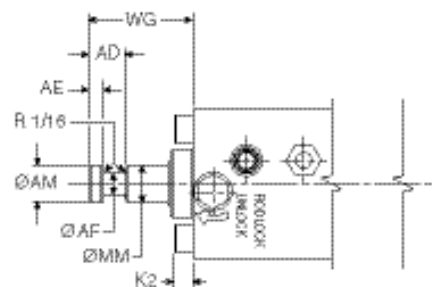
Thread Style 9

(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 6	A	AD	AE	AF	AM	B	D	K2	LAF	NA	VD	WF	WG
			Style 8 CC	Style 4 & 9 KK														
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	0.373	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	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 - 12	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 - 12	1.625	1.063	0.375	0.875	1.320	1.999	1-1/8	0.375	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 - 12	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



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B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

ACVB
Option

LPSF
Option

P1D
Series

P1F
Series

2MNR
Series

K-type Cylinder

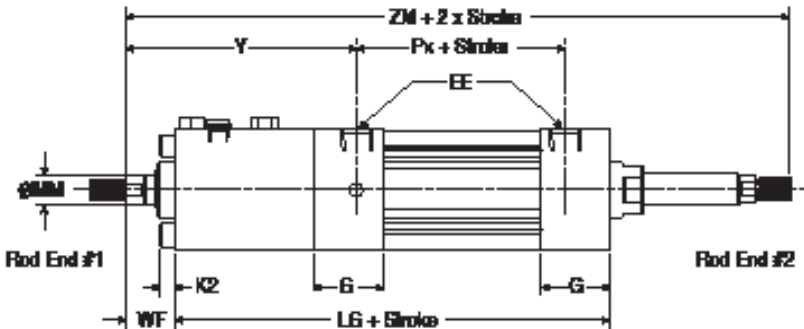
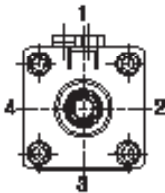
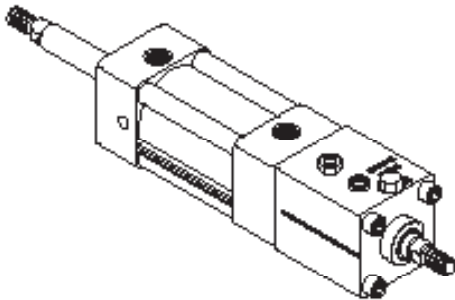
To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary dimensions from that drawing, return to this page and supplement the single rod end dimensions with those shown in the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

Tie Rod Pneumatic Cylinders
4MAP Series – 1-1/2" to 5" Bore Size

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

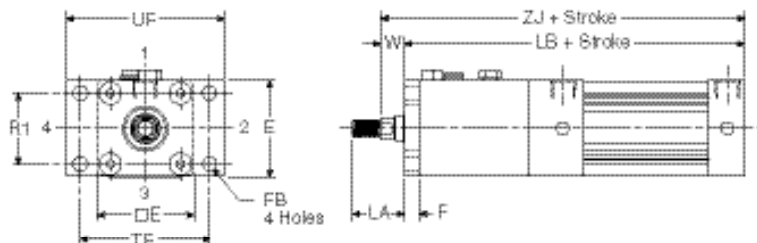
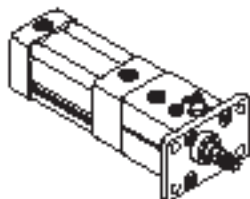
Double rod cylinders not available with composite piston type.

Style KT Dimensions

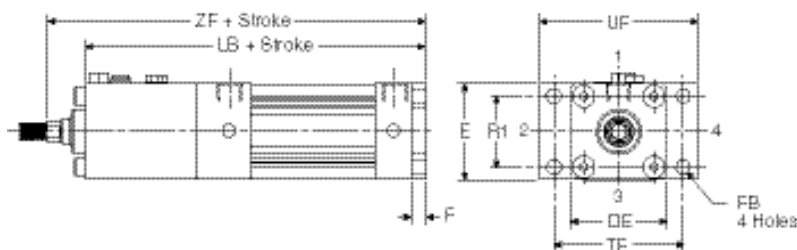
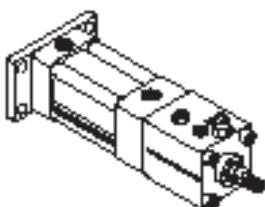
Bore Size	Rod No.	Rod Dia.	EE (NPTF)	G	K2	WF	Y	Add Stroke								Add 2X Stroke
		MM						LG	Pk	SAk	XAk	SSk	SNk	SEk	XEk	ZM
1-1/2	1	5/8	3/8	1.438	0.250	1.000	4.800	7.050	2.375	9.050	9.050	3.675	2.550	9.300	9.175	9.050
2	1	5/8	3/8	1.375	0.313	1.000	4.750	7.000	2.375	9.000	9.000	3.375	2.250	9.625	9.313	9.000
	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



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Head Rectangular FlangeStyle 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 $LA = W + A$.

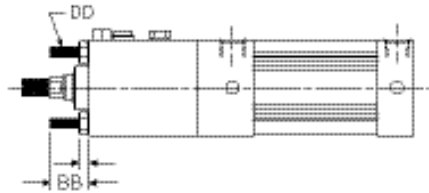
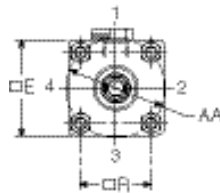
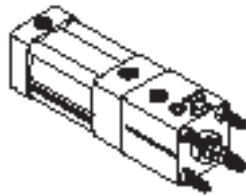
Cap Rectangular FlangeStyle H
(NFPA MF2)**Styles J and H Dimensions**

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	6.925	7.925	7.550
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

BTie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionP1D
SeriesP1F
Series2MNR
Series

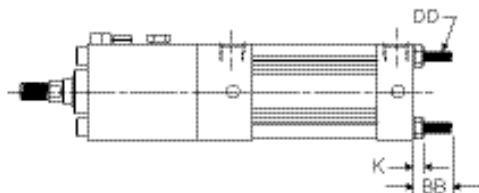
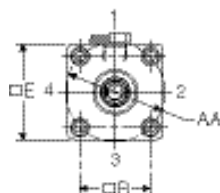
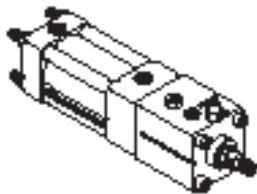
Tie Rods Extended Head End Mount

Style TB
(NFPA MX3)



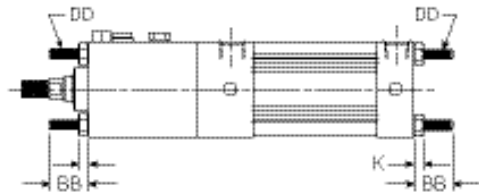
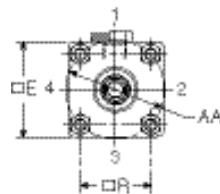
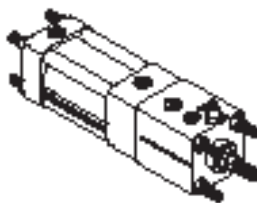
Tie Rods Extended Cap End Mount

Style TC
(NFPA MX2)



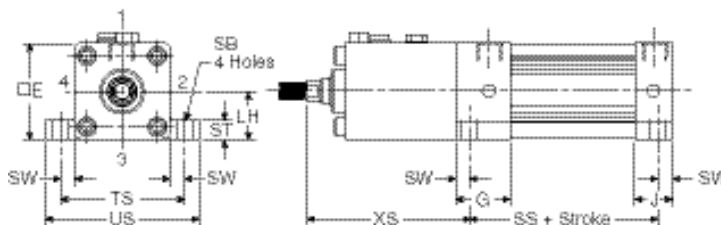
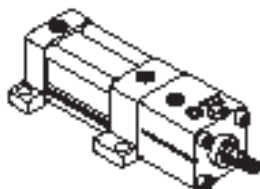
Tie Rods Extended Both Ends Mount

Style TD
(NFPA MX1)

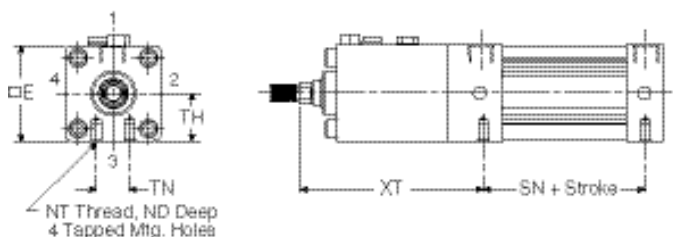
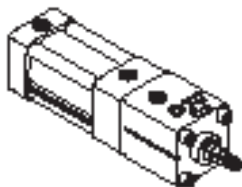


Styles TB, TC and TD Dimensions

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
	3	1	2.600	1.125	5/16 - 24	2.500	0.313	1.840
2	1	5/8	2.600	1.125	5/16 - 24	2.500	0.313	1.840
	3	1	3.100	1.125	5/16 - 24	3.000	0.313	2.190
2-1/2	1	5/8	3.100	1.125	5/16 - 24	3.000	0.313	2.190
	3	1	3.900	1.375	3/8 - 24	3.750	0.375	2.760
3-1/4	1	1	3.900	1.375	3/8 - 24	3.750	0.375	2.760
	3	1-3/8	4.700	1.375	3/8 - 24	4.500	0.375	3.320
4	1	1	4.700	1.375	3/8 - 24	4.500	0.375	3.320
	3	1-3/8	5.800	1.813	1/2 - 20	5.500	0.438	4.100
5	1	1	5.800	1.813	1/2 - 20	5.500	0.438	4.100
	3	1-3/8						

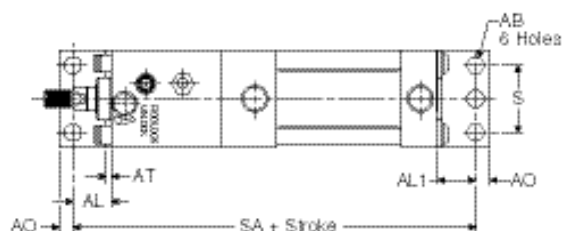
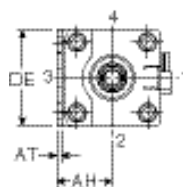
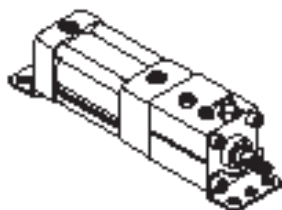
Style C, F**Tie Rod Pneumatic Cylinders**
4MAP Series – 1-1/2" to 5" Bore Size**Side Lug Mount**Style C
(NFPA MS2)**Style C Dimensions**

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	4.300	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

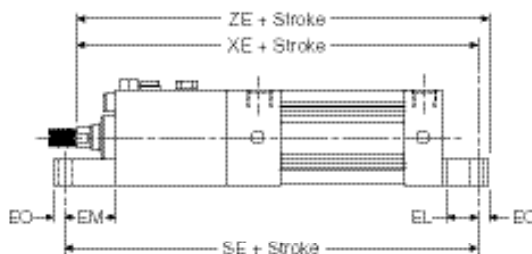
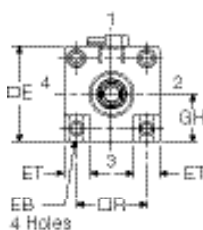
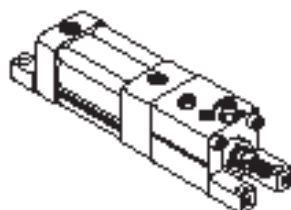
Side Tap MountStyle F
(NFPA MS4)**Style F Dimensions**

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	4.863	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

BTie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionP1D
SeriesP1F
Series2MNR
Series

Style CB, G**Tie Rod Pneumatic Cylinders**
4MAP Series – 1-1/2" to 5" Bore Size**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	8.550
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 MountStyle G
(NFPA MS7)**Style G Dimensions**

Bore Size	Rod No.	Rod Dia. MM	E	EB	EL	EM	EO	ET	+/- .003 GH R	SE	XE	Add Stroke ZE
1-1/2	1	5/8	2.000	0.281	0.750	1.125	0.250	0.563	0.993	1.430	8.425	8.550
2	1	5/8	2.500	0.344	0.938	1.313	0.313	0.688	1.243	1.840	8.750	8.750
	3	1	2.500	0.344	0.938	1.313	0.313	0.688	1.243	1.840	9.750	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	9.000
	3	1	3.000	0.344	1.063	1.438	0.313	0.813	1.493	2.190	10.250	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	11.375
	3	1-3/8	3.750	0.406	0.875	1.500	0.375	1.000	1.868	2.760	11.500	12.000
4	1	1	4.500	0.406	1.000	1.625	0.375	1.188	2.243	3.320	11.750	11.875
	3	1-3/8	4.500	0.406	1.000	1.625	0.375	1.188	2.243	3.320	12.000	12.375

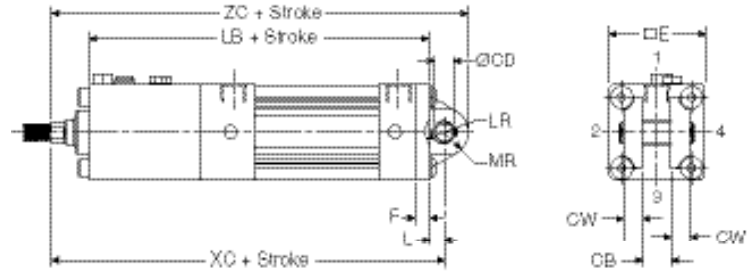
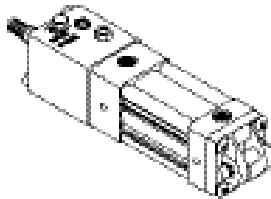
For inventory, lead times, and kit
lookup, visit www.pdnplu.com

B52

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

Cap Fixed Clevis Mount

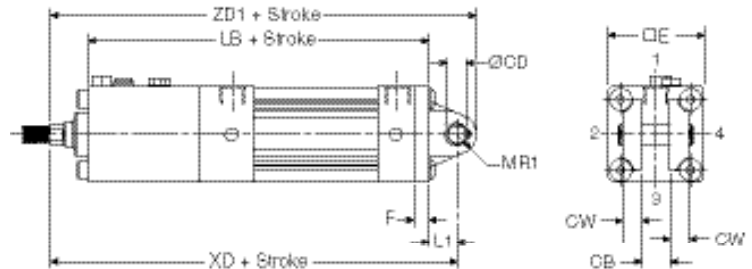
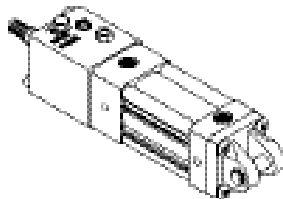
Style BB
(NFPA MP1)



NOTE: For maximum swivel angle of BB mount with rear mounting plate, please reference cylinder accessories on page B82.

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	6.925	8.300	8.675	8.925	9.175
	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	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
2-1/2	1	5/8	0.750	0.501	0.500	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
3-1/4	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
4	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

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

ACVB
Option

LPSF
Option

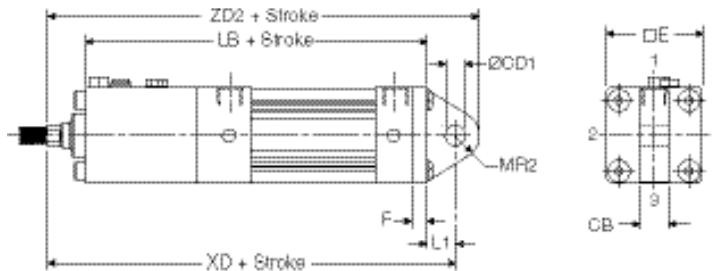
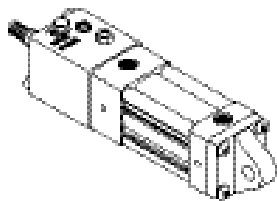
P1D
Series

P1F
Series

2MNR
Series

Cap Detachable Eye Mount

Style BE
(NFPA MP4)

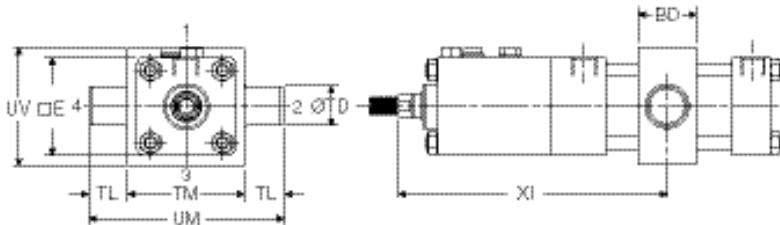
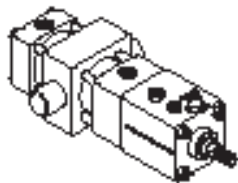


Style BE Dimensions

Bore Size	Rod No.	Rod Dia. MM	CB	+0.002 +0.004 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	6.925	8.675	9.300
	3	1	0.750	0.500	2.500	0.375	0.750	0.625	7.875	10.000	10.625
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	3.000	0.375	0.750	0.688	7.000	8.750	9.438
2-1/2	1	5/8	0.750	0.500	3.000	0.375	0.750	0.688	8.125	10.250	10.938
	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.

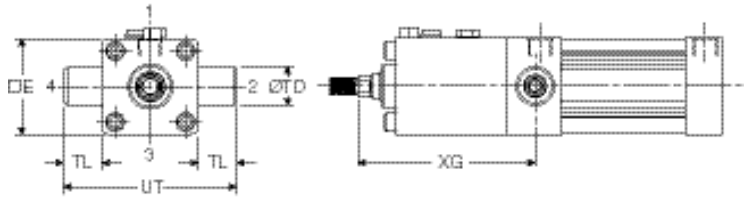
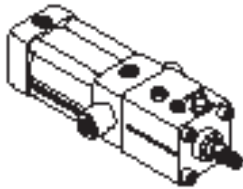
Style DD Dimensions

Bore Size	Rod No.	Rod Dia. MM	E	BD	+0.000 -0.001 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	5.990	3.250
	3	1	2.500	1.500	1.000	1.000	3.000	5.000	3.000	6.000	4.000
2	1	5/8	2.500	1.500	1.000	1.000	3.000	5.000	3.000	7.380	4.000
	3	1	2.500	1.500	1.000	1.000	3.000	5.000	3.000	7.380	4.000
2-1/2	1	5/8	3.000	1.500	1.000	1.000	3.500	5.500	3.500	5.970	3.875
	3	1	3.000	1.500	1.000	1.000	3.500	5.500	3.500	7.470	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

Note: Style DD requires minimum stroke per table.

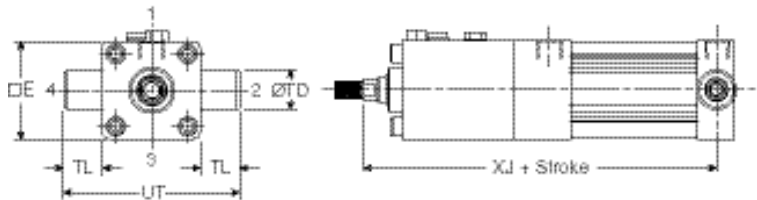
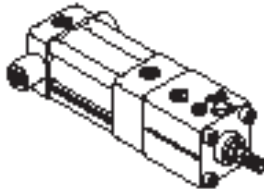
Head Trunnion Mount

Style D
(NFPA MT1)



Cap Trunnion Mount

Style DB
(NFPA MT2)



Styles D and DB Dimensions

Bore Size	Rod No.	Rod Dia. MM	E	+0.000 -0.001 TD	TL	UT	XG	XJ
1-1/2	1	5/8	2.000	1.000	1.000	4.000	4.675	7.050
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

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

ACVB
Option

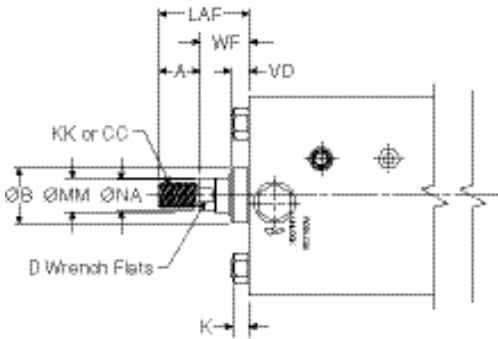
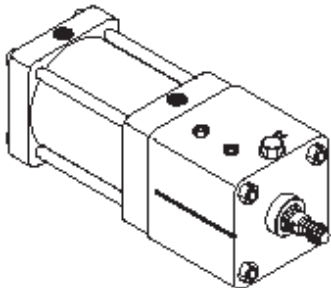
LPSF
Option

P1D
Series

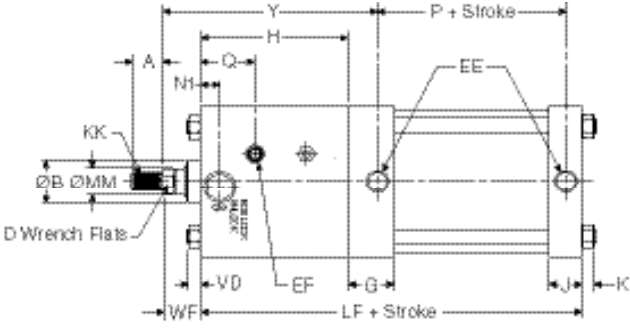
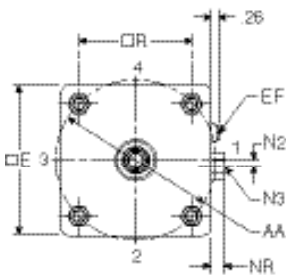
P1F
Series

2MNR
Series

No Mount
Style T
(NFPA MX0)



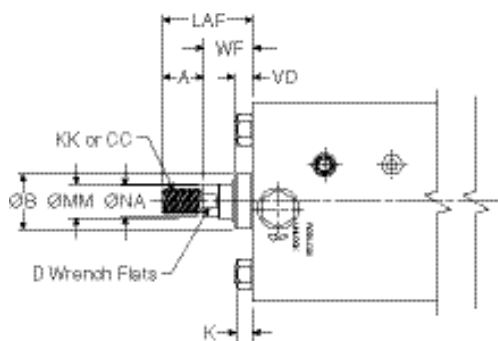
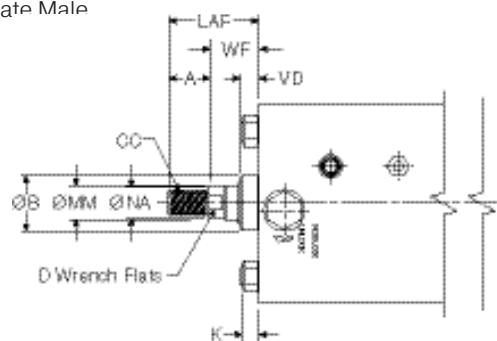
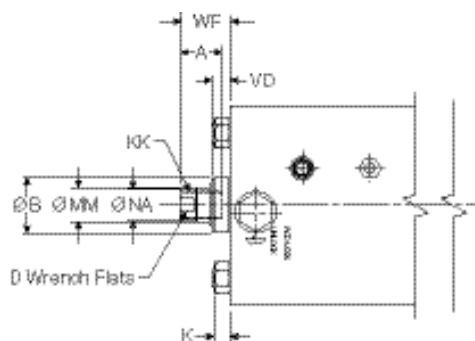
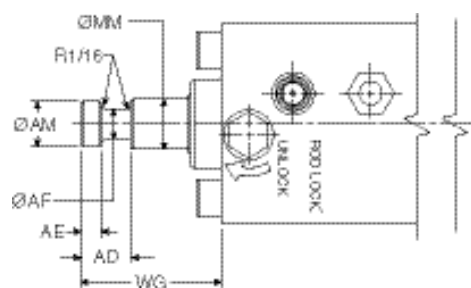
For dimensions of all standard rod end styles, see next page.



Style T Dimensions

Bore Size	Rod No.	Rod Dia. MM	Thread		Style 4 & 9 KK	Style 6	A	AA	B	D	E	EE (NPTF)	EF (NPTF)	G	H	J
			Style 8 CC	Style 4 & 9 KK												
6	1	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 12	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 - 12	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											Add stroke			
			K	LAF	N1	N2	Hex N3	NA	NR	Q	R	VD	WF	Y	LF	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 Styles**Tie Rod Pneumatic Cylinders
4MAP Series – 6" to 8" Bore Sizes****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 B82 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 6	A	AD	AE	AF	AM	B	D	K	LAF	NA	VD	WF	WG
			Style 8 CC	Style 4 & 9 KK														
6	1	1-3/8	1-1/4 - 12	1 - 14	1-3/8 - 12	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 - 12	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

BTie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionP1D
SeriesP1F
Series2MNR
SeriesFor inventory, lead times, and kit
lookup, visit www.pdnplu.com

B57

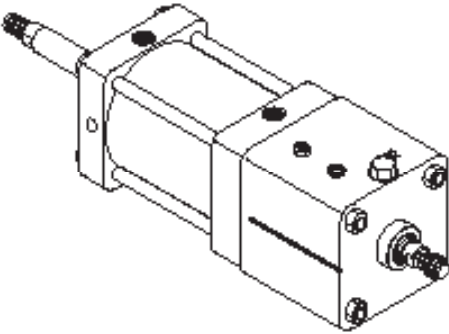
Parker Hannifin Corporation
Pneumatic Division
Wadsworth, Ohio
www.parker.com/pdn/rotary

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

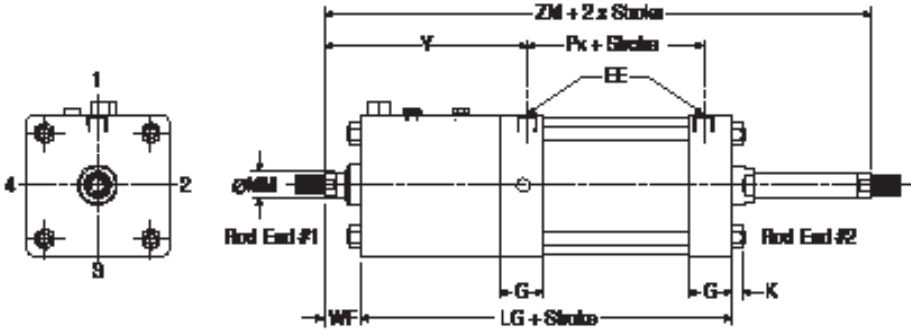
that LG replaces LF, PK replaces P, etc. The double rod end dimensions differ from, or are in addition to, those for single rod cylinders.

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

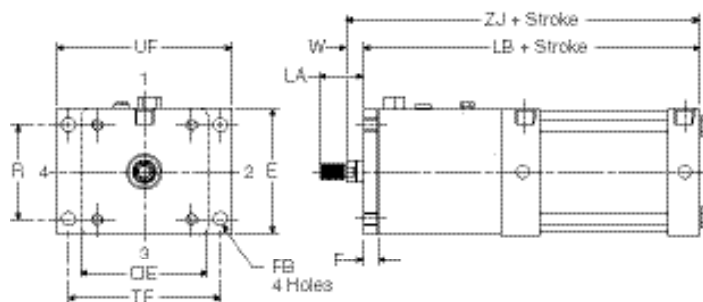
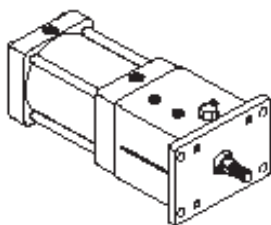


Style KT Dimensions

Bore Size	Rod No.	Rod Dia. MM	EE (NPTF)	G	K	WF	Y	Add Stroke						Add 2X Stroke ZM
								LG	PK	SAk	XAk	SSk	SNk	
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

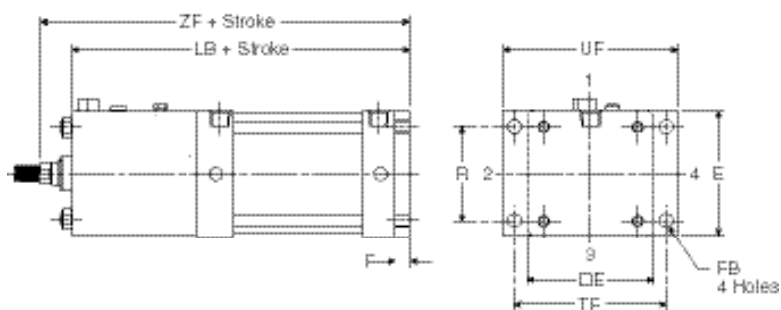
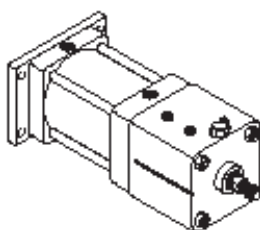
Style J
(NFPA MF1)
(only 6" Bore)



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)

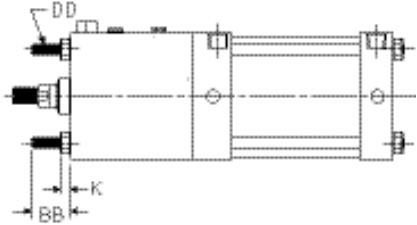
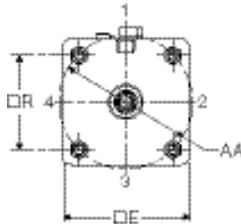
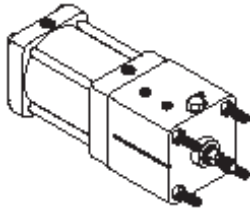
**Styles J and H Dimensions**

Bore Size	Rod No.	Rod Dia. MM	A	E	F	FB	LA	R	TF	UF	W	Add Stroke		
												LB	ZF	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

BTie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionP1D
SeriesP1F
Series2MNR
Series

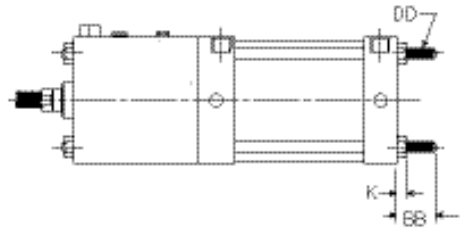
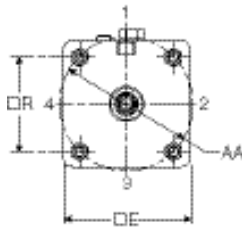
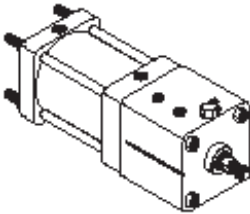
Tie Rods Extended Head End Mount

Style TB
(NFPA MX3)



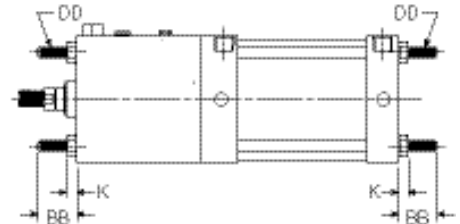
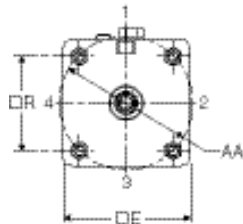
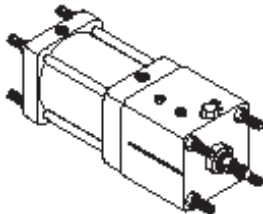
Tie Rods Extended Cap End Mount

Style TC
(NFPA MX2)



Tie Rods Extended Both Ends Mount

Style TD
(NFPA MX1)

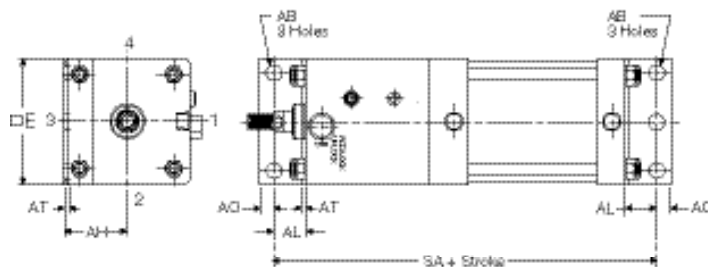
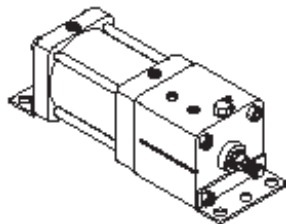


Styles TB, TC and TD Dimensions

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)

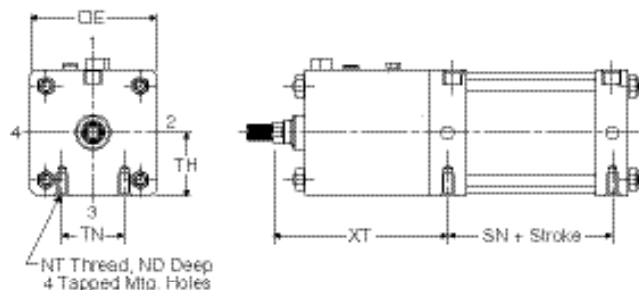
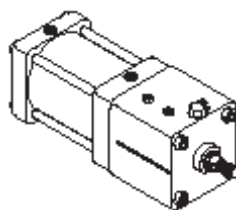


Style CB Dimensions

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)

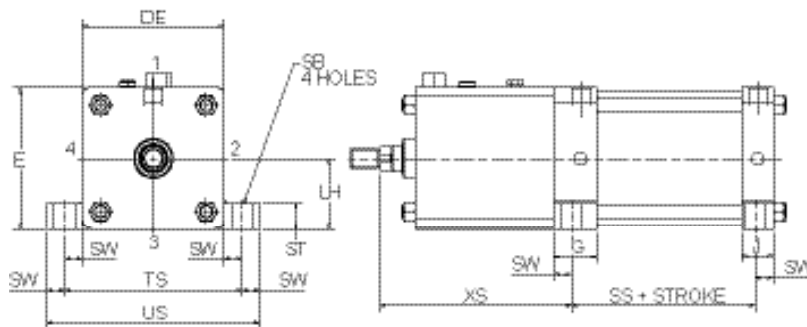
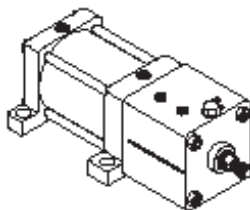


Style F Dimensions

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)



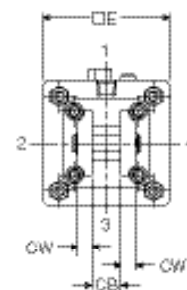
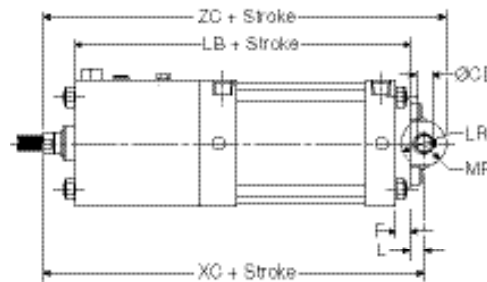
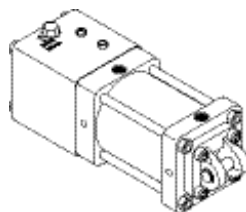
Style C Dimensions

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

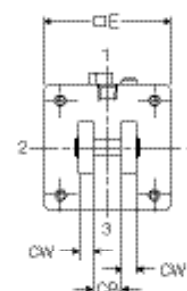
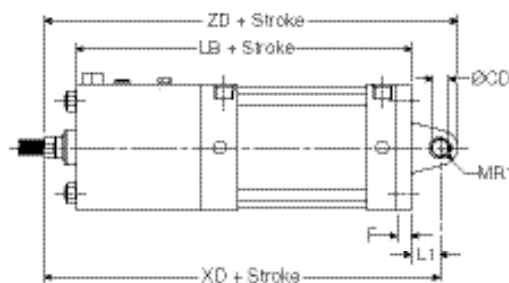
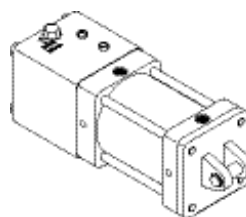
Style BB
 (NFPA MP1)

NOTE: For maximum swivel angle of BB mount with rear mounting plate, please reference cylinder accessories on page B82.



Cap Detachable Clevis

Style BC
 (NFPA MP2)

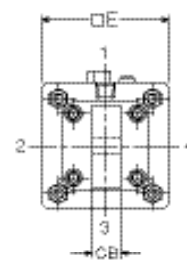
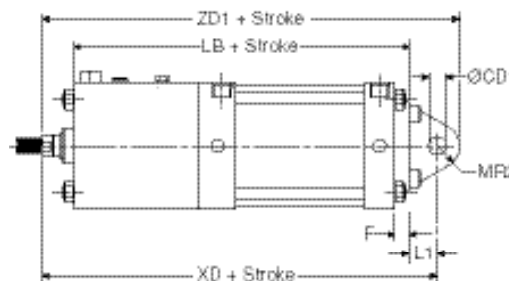
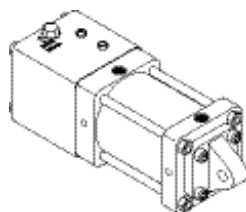


Styles BB and BC Dimensions

Bore Size	Rod No.	Rod Dia. MM	CB	+0.000 -0.002 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)

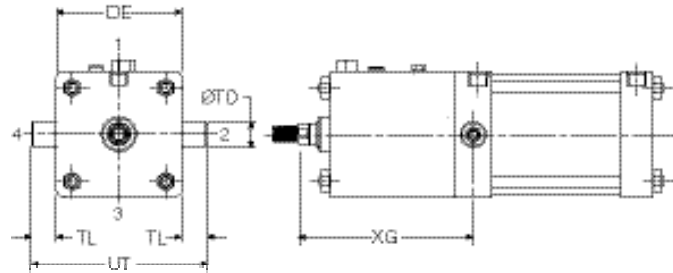
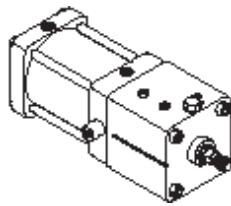


Style BE Dimensions

Bore Size	Rod No.	Rod Dia. MM	CB	+0.002 +0.004 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

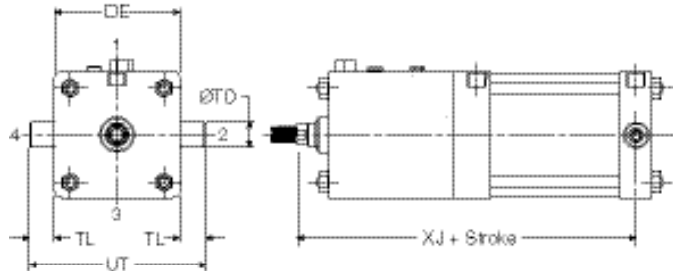
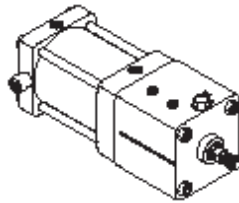
Head Trunnion Mount

Style D
(NFPA MT1)



Cap Trunnion Mount

Style DB
(NFPA MT2)

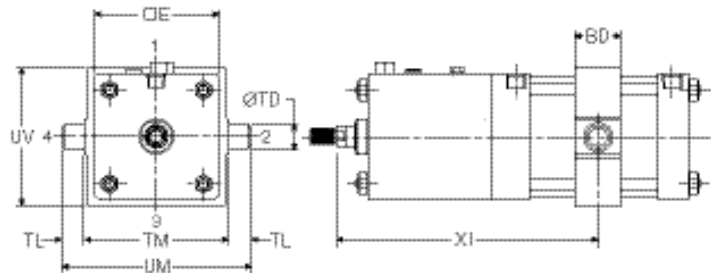
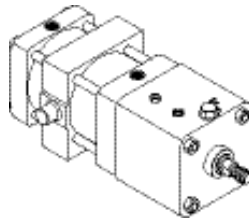


Styles D and DB Dimensions

Bore Size	Rod No.	Rod Dia. MM	E	$\begin{smallmatrix} +.000 \\ -.001 \\ TD \end{smallmatrix}$	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	$\begin{smallmatrix} +.000 \\ -.001 \\ TD \end{smallmatrix}$	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.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

B63

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

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

ACVB
Option

LPSF
Option

P1D
Series

P1F
Series

2MNR
Series

B	Tie Rod Pneumatic Cylinders
	4MA Series
	4MAP Series
	ACVB Option
	LPSF Option
	P1D Series
	P1F Series
	2MNR Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

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

Series	
4MA	

Ports	
U	NPTF

Piston Rod Number	
See 4MA section for more details.	

Stroke Length **	
Specify stroke length required in inches.	

Mounting Style	
Specify mounting style code per available 4MA mount.	

Cushion Head End	
Blank	Non-Cushioned Head End
C	Cushioned Head End

Seals	
Blank	Standard (nitrile seals)
E	Fluorocarbon Rod Wiper And Rod Seal Only
M	Metallic Rod Wiper, Nitrile Seals

Cushion Cap End	
Blank	Non-Cushioned Cap End
C	Cushioned Cap 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

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

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

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

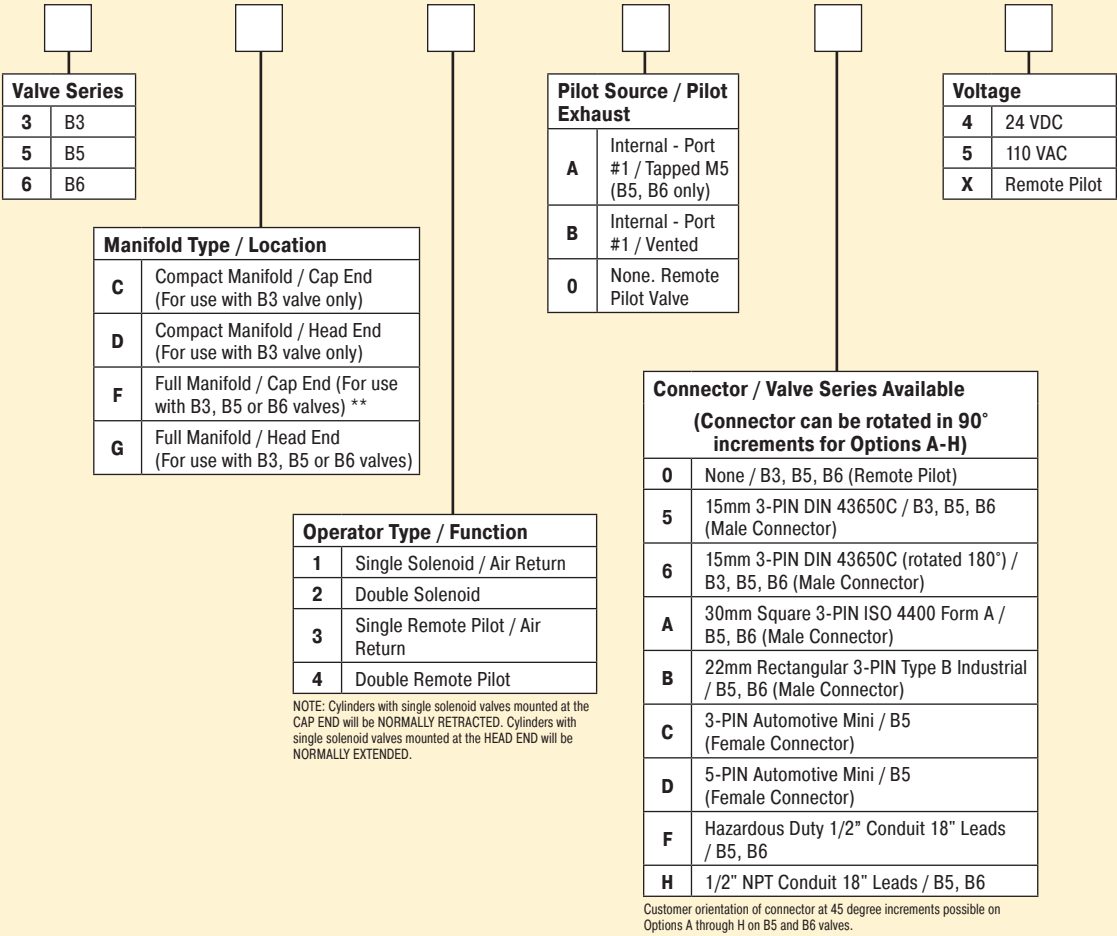
*** See Table on page B5.**

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

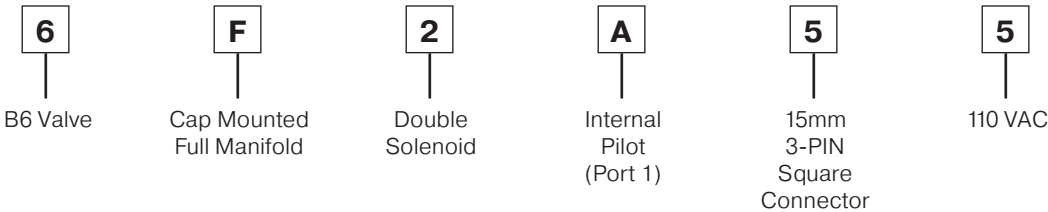
ACVB Minimum Stroke Requirements**	
Bore	4MA
Compact Manifold	
1.50	0.500
2.00	0.500
2.50	0.438
Full Manifold	
1.50	5.813
2.00	5.813
2.50	5.750

ACVB Series Valve/Manifold Codes

B	Tie Rod Pneumatic Cylinders	4MA Series	4MAP Series	ACVB Option	LPSPF Option	P1D Series	P1F Series	2MNR Series



Example: 6 F 2 A 5 5



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.

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

ACVB
Option

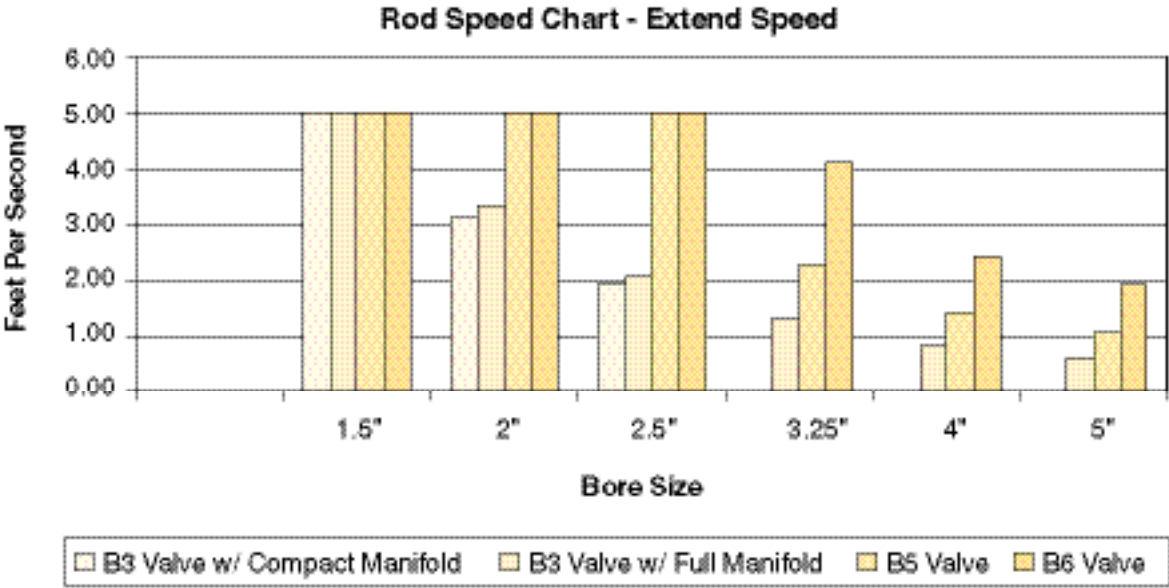
LPSF
Option

P1D
Series

P1F
Series

2MNR
Series

B	Tie Rod Pneumatic Cylinders	
	4MA Series	4MAP Series
Option	ACVB	
	LPSF Option	P1D Series
Series	P1F Series	
	2MNR Series	



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**

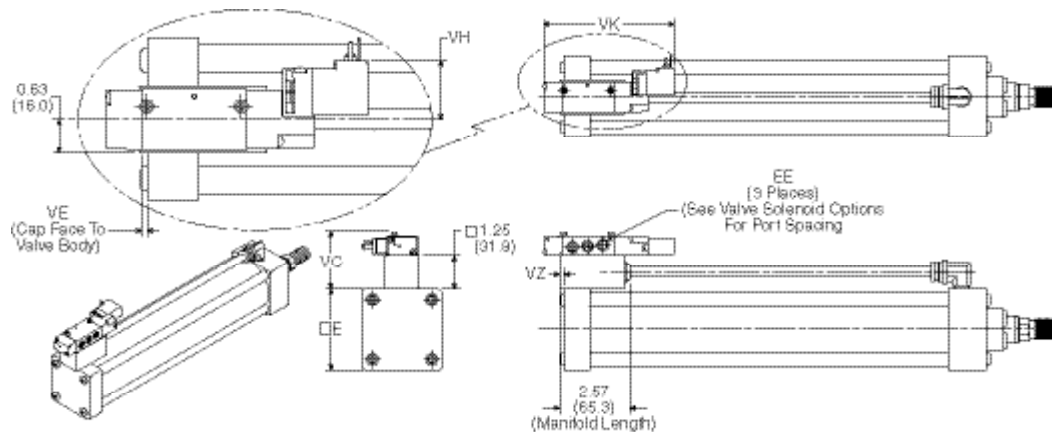
- Specify necessary valve and manifold
- Choose type of control required
- Choose type of connection and voltage required

* 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.

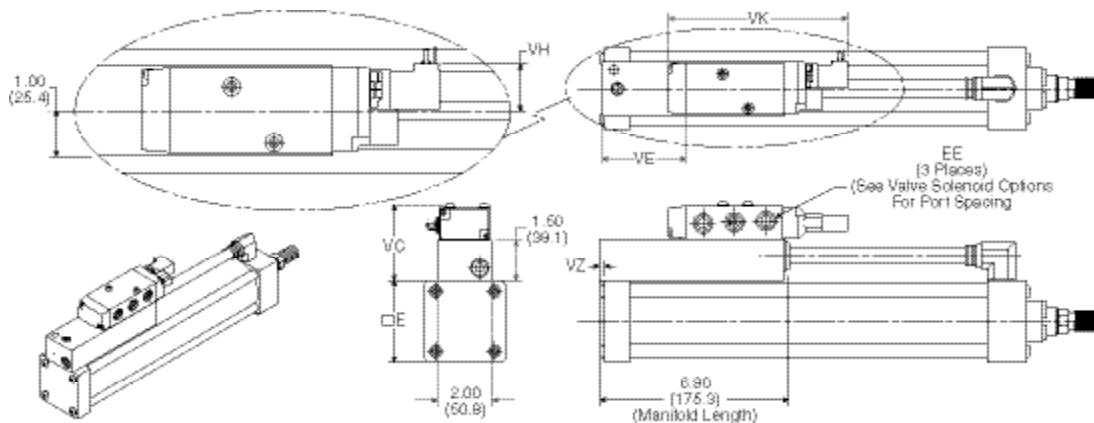


For inventory, lead times, and kit lookup, visit www.pdnplu.com

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)
			B3	3.78 (96.3)	0.23 (5.8)
			B5	3.48 (88.4)	0.13 (3.3)
		Full	B6	2.97 (75.4)	0.13 (3.3)
			B3	0.17 (4.3)	0.23 (5.8)
			B3	3.78 (96.3)	0.13 (3.3)
2	2-1/2	Compact	B5	3.36 (85.3)	0.13 (3.3)
			B6	2.97 (75.4)	0.13 (3.3)
		Full	B3	0.17 (4.3)	0.23 (5.8)
			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)
			B3	3.78 (96.3)	0.13 (3.3)
			B5	3.36 (85.3)	0.13 (3.3)
		Full	B6	2.97 (75.4)	0.13 (3.3)
			B3	3.90 (99.1)	0.00
			B5	3.48 (88.4)	0.00
3-1/4	3-3/4	Full	B6	3.10 (78.7)	0.00
			B3	3.90 (99.1)	0.00
			B5	3.48 (88.4)	0.00
		Full	B6	3.10 (78.7)	0.00
			B3	3.90 (99.1)	0.00
			B5	3.48 (88.4)	0.00
4	4-1/2	Full	B6	3.10 (78.7)	0.00
			B3	3.90 (99.1)	0.00
			B5	3.48 (88.4)	0.00
		Full	B6	3.10 (78.7)	0.00
			B3	3.90 (99.1)	0.00
			B5	3.48 (88.4)	0.00
5	5-1/2	Full	B6	3.10 (78.7)	0.00
			B3	3.90 (99.1)	0.00
			B5	3.48 (88.4)	0.00
		Full	B6	3.10 (78.7)	0.00
			B3	3.90 (99.1)	0.00
			B5	3.48 (88.4)	0.00

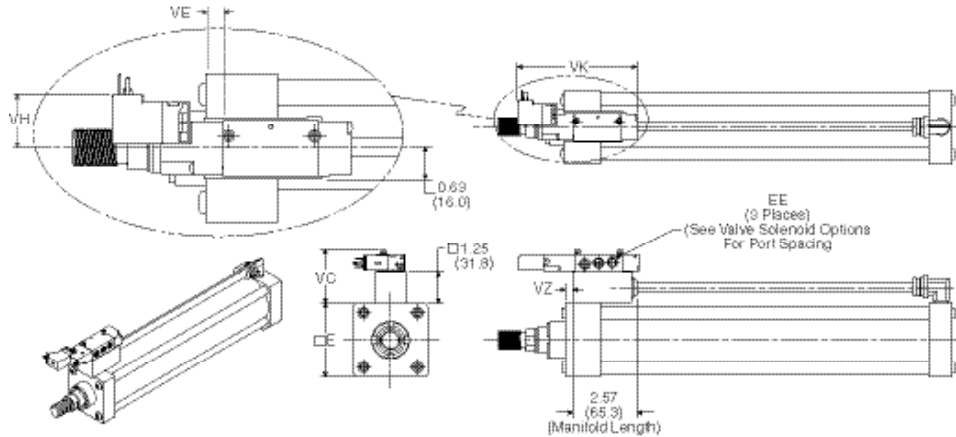
Valve	EE (NPTF)	VH	VK	VC	
B3	1/8	1.09 (27.7)	4.67 (118.6)	Compact Manifold	2.12 (53.8)
				Full Manifold	2.37 (60.2)
B5	1/4	1.12 (28.4)	5.78 (146.8)	Full Manifold	2.81 (71.4)
B6	3/8	1.12 (28.4)	6.67 (169.4)	Full Manifold	2.81 (71.4)

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

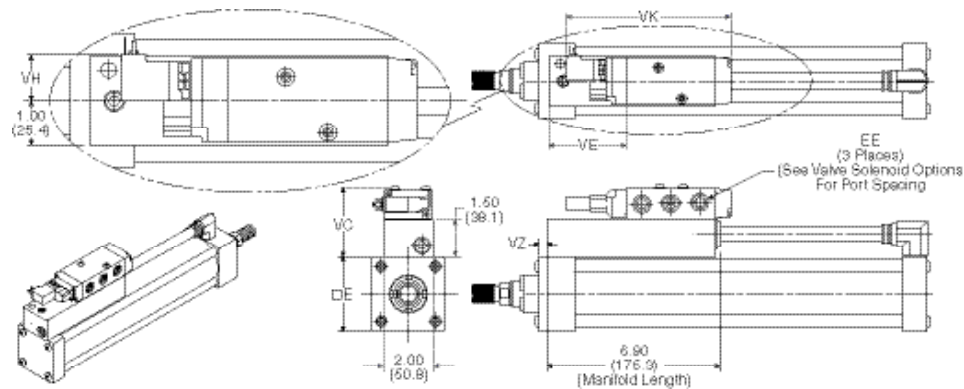
** VZ = Dimension from edge of endcap to edge of manifold.

Note: Dimensions shown are for a single solenoid enclosure with Option 5. For other valve or enclosure option dimensions, see pages B71-B72.

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)
			B3	4.21 (106.9)	0.31 (7.9)
			B5	3.79 (96.3)	0.31 (7.9)
		Full	B6	3.41 (86.6)	0.31 (7.9)
			B3	0.26 (6.6)	0.20 (5.1)
			B3	4.21 (106.9)	0.31 (7.9)
2	2-1/2	Compact	B5	3.79 (96.3)	0.31 (7.9)
			B6	3.41 (86.6)	0.31 (7.9)
		Full	B3	0.33 (8.4)	0.27 (6.9)
			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)
		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)
		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)

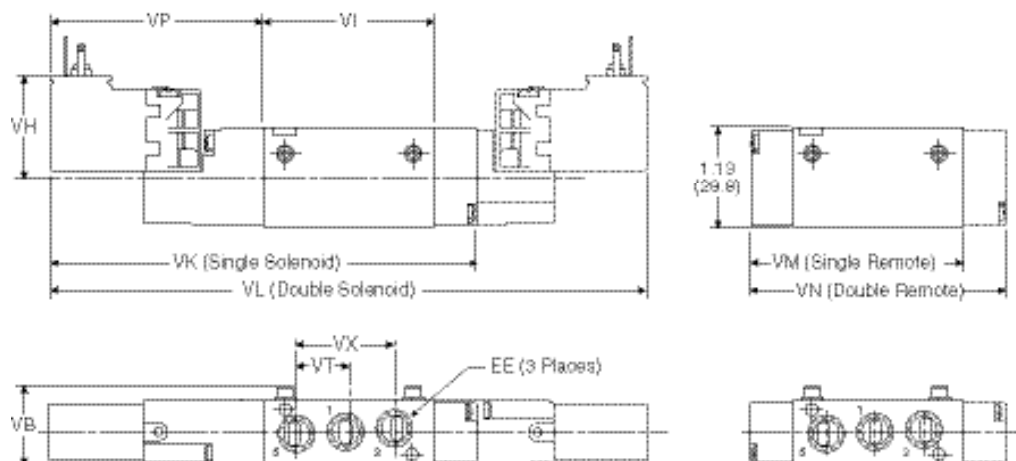
Valve	EE (NPTF)	VH	VK	VC
B3	1/8	1.09 (27.7)	4.67 (118.6)	Compact Manifold
				2.12 (53.8)
B5	1/4	1.12 (28.4)	5.78 (146.8)	Full Manifold
				2.37 (60.2)
B6	3/8	1.12 (28.4)	6.67 (169.4)	Full Manifold
				2.81 (71.4)

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

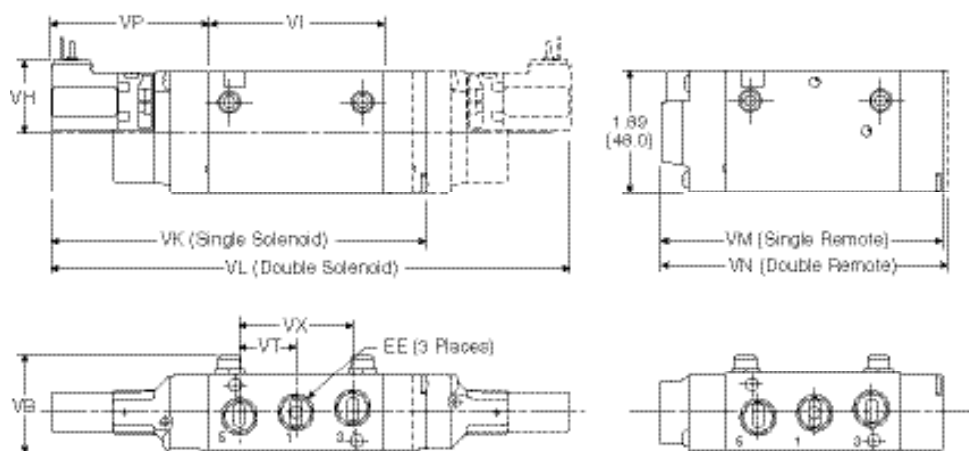
**VZ = Dimension from edge of endcap to edge of manifold.

Note: single solenoid enclosure 5 shown. For other valve or options, see pages B71-B72.

B3 Valve



B5 and B6 Valve



Valve Dimensions

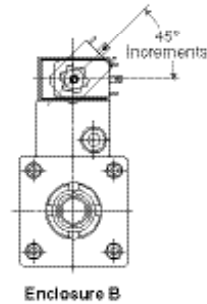
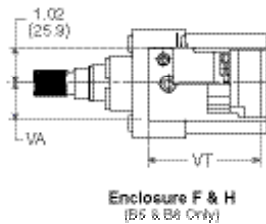
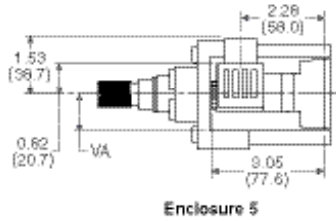
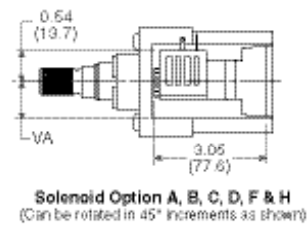
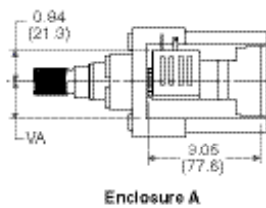
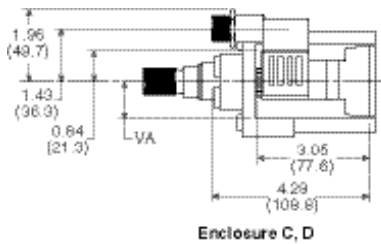
Valve	EE (NPTF)	VB	VH	VI	VK	VL	VM	VN	VP	VT	VX
B3	1/8	0.87 (22.1)	1.09 (27.7)	1.93 (49.0)	4.67 (118.6)	6.44 (163.6)	3.12 (79.2)	3.33 (84.6)	2.25 (57.2)	0.56 (14.2)	1.12 (28.4)
B5	1/4	1.31 (33.3)	1.12 (28.4)	2.70 (68.6)	5.78 (146.8)	7.51 (190.8)	4.37 (111.0)	4.70 (119.4)	2.40 (61.0)	0.88 (22.4)	1.75 (44.5)
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)

B

Tie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionP1D
SeriesP1F
Series2MNR
Series

Optional Electrical Connections

B	Tie Rod Pneumatic Cylinders	4MA Series	4MAP Series	ACVB Option	LPSP Option	P1D Series	P1F Series	2MNR Series

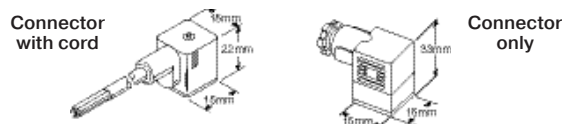


Optional Electrical Connections Dimensions

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)

Female Electrical Connectors

15mm 3-Pin DIN 43650C



	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”)

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

* LED with surge suppression.

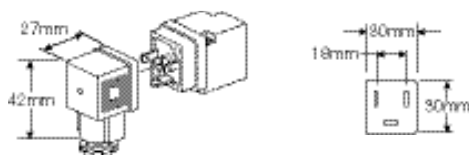
Note: Max ø6.5mm cable size required for connector w/o 6' (2m) cord. IP65 rated when properly installed.

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”)

	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.

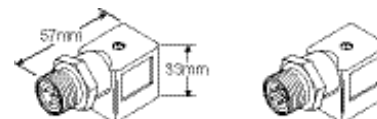
Note: Max ø6.5mm cable size required for connector w/o 6' (2m) cord. IP65 rated when properly installed.

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)

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

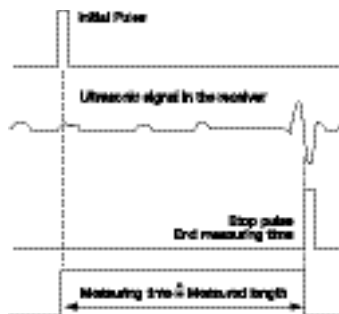
— 79 = 24VDC & 24VAC
83 = 120VAC

B

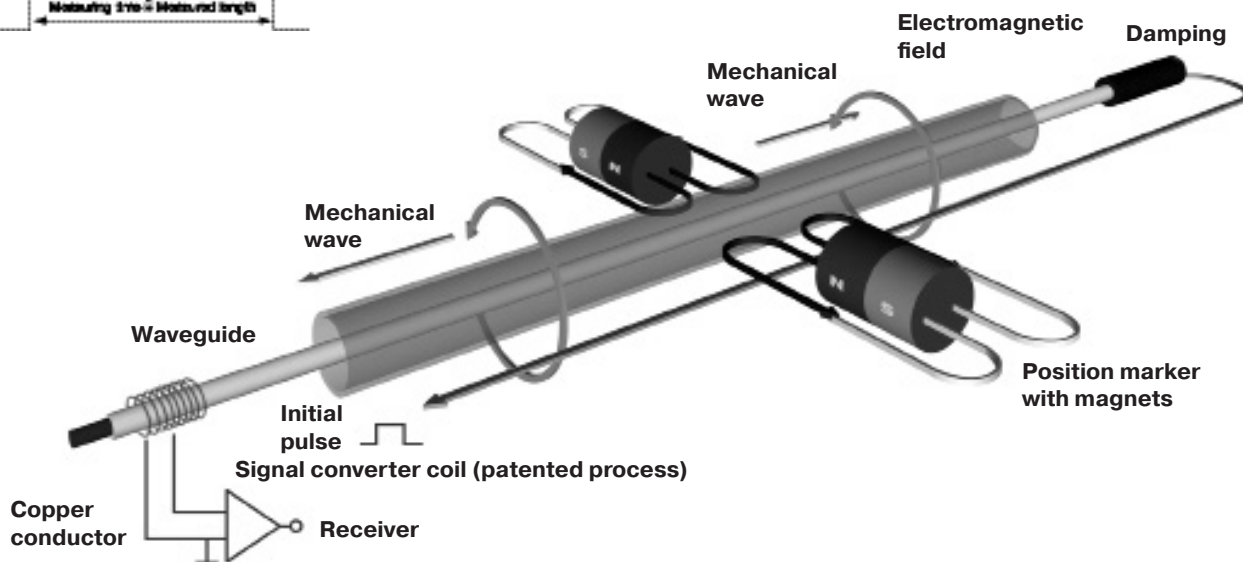
Tie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionP1D
SeriesP1F
Series2MNR
Series

Linear Position Sensor for Continuous Position Feedback

B

Tie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionPID
SeriesPIF
Series2MNR
Series

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 magnetostrictive 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.

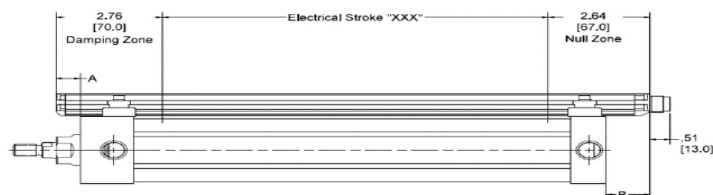
Quality

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

Analog Interface Profile Series

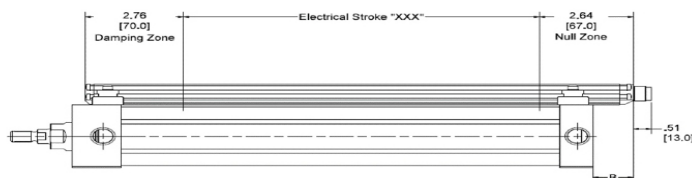
The drawings below show that the Linear Position Sensor is longer than the cylinder of the same stroke length. The sensor overhang on the head end of the cylinder, as indicated by dimension A, may be eliminated by adding stop tubing, which effectively increases the gross stroke of the cylinder. The recommended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

NO STOP TUBE



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

WITH STOP TUBE

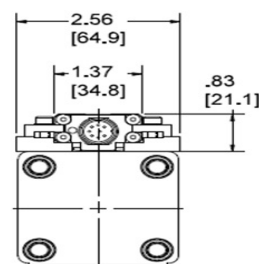
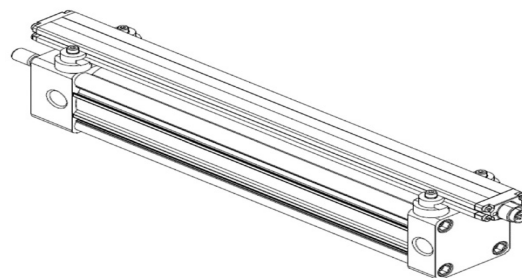


Example B: To eliminate sensor overhang on the head end of a 2.0" bore cylinder, add 0.75" of recommended stop tube length. The cylinder gross stroke becomes 12.75" and the net stroke remains 12". Specify a sensor with an electrical stroke of 12". Note that the electrical stroke equals cylinder **net** stroke length.

Tie Rod Pneumatic Cylinders 4MA with LPSF

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.



Example C: To eliminate sensor overhang on the head end of a 5.0" bore cylinder, add 0.50" of recommended stop tube length. The cylinder gross stroke becomes 12.50" 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.

Bore	Rod Code	Rod Diameter	No Stop Tube		With Stop Tube		
			A	B	Stop Tube Length	A1	B
2	1	5/8	0.74	1.13	0.75	0	1.13
	3	1					
2-1/2	1	5/8	0.71	1.06	0.75	0	1.06
	3	1					
3-1/4	1	1	0.44	0.83	0.50	0	0.83
	3	1-3/8					
4	1	1	0.44	0.83	0.50	0	0.83
	3	1-3/8					
5	1	1	0.32	0.69	0.50	0	0.69
	3	1-3/8					
6	1	1-3/8	0.00	0.50	Not Required	0	0.50
	3	1-3/4					
8	1	1-3/8	0.00	0.40	Not Required	0	0.40
	3	1-3/4					



For inventory, lead times, and kit lookup, visit www.pdnplu.com

B75

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

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

ACVB
Option

LPSF
Option

P1D
Series

P1F
Series

2MNR
Series

Analog Interface Profile Series

Tie Rod Pneumatic Cylinders
4MA with LPSF

Electrical Connection

Polarity reversal protected	Ub up to 30 V DC
Short-circuit protection	Signal output against GND and against 30V DC

Electrical Data

Current consumption max at 24 V DC	k = A, 1 AND l = A, 1 and o = 0: 80 mA
	k = A, 1 AND l = A, 1 and o = A: 90 mA
	k = E, 5 AND l = E, 5 AND o = 0: 110 mA
	k = E, 5 AND l = E, 5 AND o = A: 120 mA
Inrush current	≤ 3 A/0.5 ms
Operating voltage Ub	10...30 VDC
Output signal adjustable	m = 1,2,4: -
	m = B, C: with Softwaretool
Overvoltage protection	Ub up to 36 V DC
Switch-on delay max.	500 ms
	500 V DC
Voltage-proof up to (GND to housing)	

Environmental Conditions

Ambient temperature	-25° C...85° C
Cable temperature, fixed routing	-40° C...90° C
Cable temperature, flexible routing	-5° C...90° C
IP Rating	IP67 with connector
Relative humidity	≤ 90%, non-condensing
Storage temperature	-25° C...100° C
Temperature coefficient typ.	≤ 30 ppm/K at 50% of nominal stroke 500mm

S32 Pin Assignments	Pin	Signal - Voltage	Signal - Current
Output Signals	1	NC	Output 1
	2	0 V	0 V
	3	Output 2	Output 2
	4	C/Q (communication line)	C/Q (communication line)
	5	Output 1	NC
Supply Voltage	6	GND	GND
	7	+ UB	+ UB
	8	NC	NC

Connect shield to housing.

Cable outlet axial	Color	Signal
	GY	0 V
	PK	Output 2
	GN	Output 1
	BU	GND
	BN	+ UB
	WH	C/Q (communication line)

Material

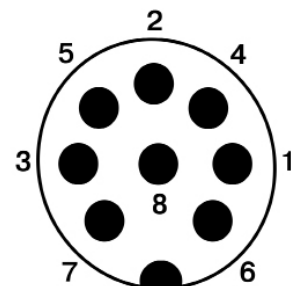
Cable flame-resistant	IEC 60332-1
Cable jacket, material	PUR
Cover material	Zinc, Die casting
Housing material	Aluminum, Anodized
Housing material, surface protection	Anodized

Mechanical Data

Overall Length	nnnn + 137 mm
Speed detectable max.	10 m/s

Range/Distance

Linearity deviation	nnnn = 0050...0500 ± 60 µm
	nnnn ≥ 0500: ± 0.012% FS
Measuring length	25...4000 mm
Null point	67 mm
Repeat accuracy	nnnn ≤ 0500: ≤ ± 10 µm
	nnnn >0500: ≤ ± 0.002% FS
Resolution, position	k = A, 1: 183 µV at least 4 µm
	k = C, E, 3, 5: 351 nA at least 4 µm
Sampling frequency max.	o = A AND n = 25...240: 4000 Hz
	o = A AND n = 241...590: 2000 Hz
	o = A AND n = 591...1270: 1000 Hz
	o = 0 AND n = 25...1270: 1000 Hz
	o = 0, A, AND n = 1271...2650: 500 Hz
	o = 0, A AND n = 2641...4000: 250 Hz



Sensor Ordering Code

BTL PF0400

0500

C15A

A1

B0-000

S32

Nominal Stroke

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

Differential Start/Stop, Trailing Edge Active

Electrical Connection

A1

Voltage output 0-10 V*

E5

Current output 4-20 mA*

Electrical Connection

S32

8-pin Quick Disconnect Metal Connector

CA5

Cable, 5 meter (PUR)

*Electrical stroke = net cylinder stroke (1" increments)

*User selectable rising or falling

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

S32 Cables

Length

5M	BKS-S32M-05
10M	BKS-S32M-10

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAP Series

ACVB Option

LPSF Option

P1D Series

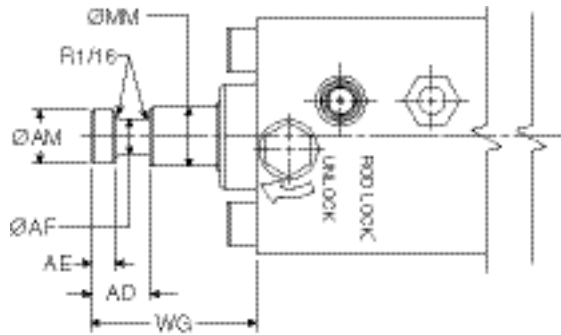
P1F Series

2MNR Series

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	0.936	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.

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

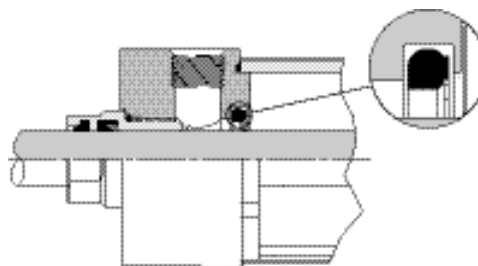
For Increased Productivity and Maximum Performance

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.

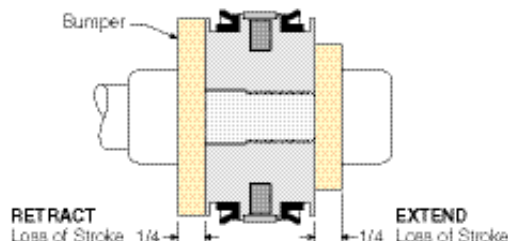
The basic cushion design is available at both ends without change in envelope or mounting dimensions. A captive cushion adjusting needle is supplied for easy, precise adjustment on all bore sizes.



Bumpers

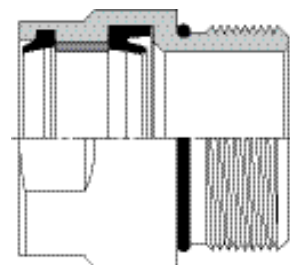
Impact dampening conventional bumpers can be provided on one or both sides of the piston with a 1/4" stroke loss per bumper. This style of bumper is ideal for applications subjected to high speeds where cycle time may discourage the use of cushions.

Available in 1-1/2" - 5" bore sizes for 4MA, 4ML and 4MAP 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.



B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAP
Series

ACVB
Option

LPSF
Option

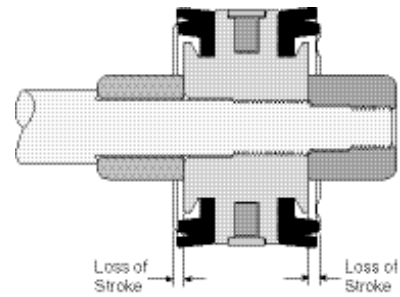
P1D
Series

P1F
Series

2MNR
Series

Bumper Seal Option

Impact dampening Bumper Seals are now optional on all 4MA and 4MAP cylinders from 1-1/2" to 5" bore. The Bumper Seal piston combines the features of low-friction, rounded lipseals and impact-dampening 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.



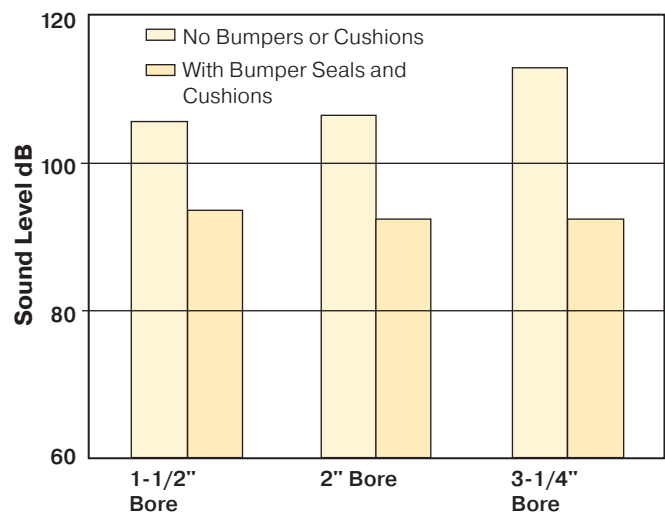
Summary of Accelerometer Test Results

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

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)

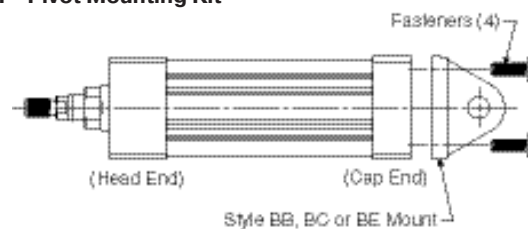
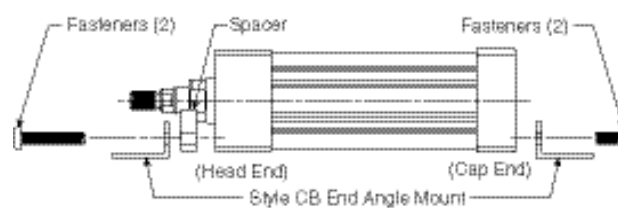
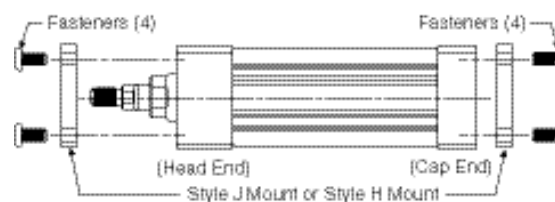
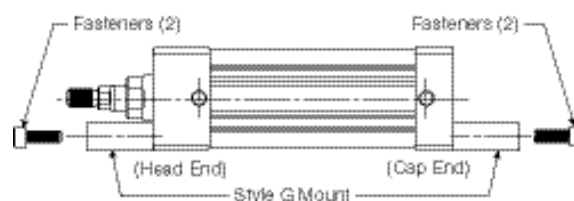
The end angles bolt to the front and rear of the cylinder end caps. The spacer plate** provided is to be assembled at the rod end under the angle plate. Line up the two holes of the spacer plate and angle plate with the two fastener holes in the cylinder head. If 2 different length fasteners are in the 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)	H (MF2)	BB (MP1)	BC (MP2)	BE (MP4)	CB (MS1)	G (MS7)	Kit Fastener Torque Units	
	Head Rectangular Flange	Cap Rectangular Flange	Cap Fixed Clevis	Cap Detachable Clevis	Cap Detachable Eye	Side End Angles	Side End Lug	USA	Metric
	Kit Number	Kit Number	Kit Number	Kit Number	Kit Number	Kit Number	Kit Number	inch-lbs	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



For inventory, lead times, and kit lookup, visit www.pdnplu.com

B81

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

BTie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionPID
SeriesPIF
Series2MNR
Series

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:

- 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.
- Disconnect any attachments to the piston rod end thread.
- Lubricate the rod with Lube-A-Cyl (included in kit).
- Unscrew the gland cartridge from the head using the appropriate wrench (see D1 dimension in catalog).
- Slide the gland cartridge off the piston rod.
- Verify that the gland-to-head o-ring (#45) is also removed from the head.

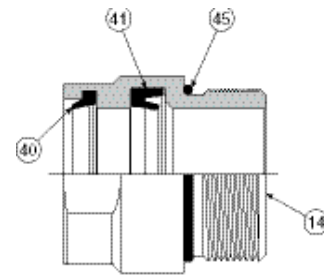
To install the new gland cartridge onto the cylinder:

- Re-inspect the surface of the piston rod for scratches, dents and other surface damage, and repair if necessary.
- Clean and lubricate the surface of the piston rod with Lube-A-Cyl (included in kit).
- Lubricate the rod wiper (#40), rod seal (#41), o-ring (#45) and the inside surfaces of the gland cartridge with Lube-A-Cyl.
- 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.
- Torque the gland cartridge to the specifications shown below. Tools are available to assist this process (see below).

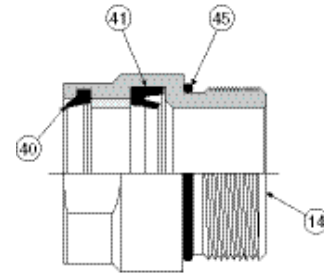
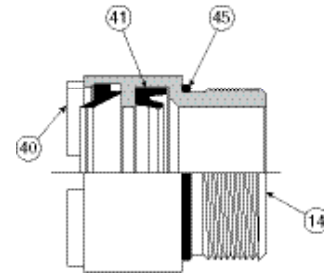
Note: Make sure the gland cartridge is sufficiently tight. Failure to do so may result in loosening during operation.

Rod Dia.	Metallic Rod Wiper Gland	
	Gland Wrench	Spanner Wrench
5/8	0695900000	0116760000
1	0695910000	0116760000
1-3/8	0695920000	0117030000
1-3/4	0695930000	0116770000

Bore size	Rod dia.	Rod no.	Standard Rod Gland Cartridge Kit Includes 1 Each Of Symbol 14, 40, 41 & 45		HI LOAD Rod Gland Cartridge Kit Includes 1 Each Of Symbol 14, 40, 41 & 45		Metallic Rod Wiper Gland Cartridge Kit Includes 1 Each Of Symbol 14, 40, 41 & 45		Gland to Head Torque Units	
			Nitrile Seals Kit Number	Fluorocarbon Seals Kit Number	Nitrile Seals Kit Number	Fluorocarbon Seals Kit Number	Nitrile & Pur Seals Kit Number	Fluorocarbon Seals Kit Number	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



Standard Rod Gland

HI LOAD Rod Gland
(includes composite bearing)

Metallic Rod Wiper Gland

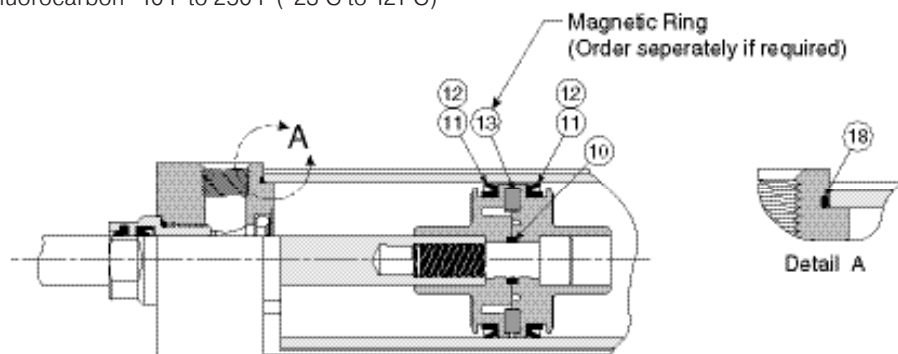
Every gland cartridge kit contains 1 each of the following:

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

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 (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.

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.

Bore size	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) Only With Nitrile Seals Part Number	Torque Units Endcap Fastener Or Tie Rod	
	Nitrile Seals Kit Number	Fluorocarbon Seals Kit Number	Nitrile Seals Kit Number	Fluorocarbon Seals Kit 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



For inventory, lead times, and kit lookup, visit www.pdnplu.com

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.

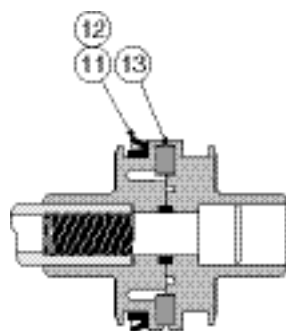
Assemble both cap and head, complete with cylinder body O-Rings (sym. # 18), to each end of the cylinder body. Install end cap fasteners and tighten to appropriate torque, using opposite corner to corner torquing sequence.

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:

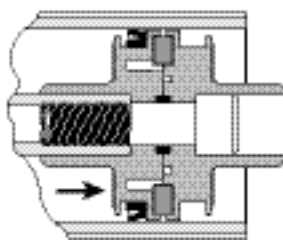
After all the piston seals have been installed on the piston and the piston is in the cylinder body, fit the cap with its O-ring (sym. # 18) in position onto the cylinder body. Then "stud" into the trunnion collar the four tie rods that connect the cap to the trunnion collar. Hand tighten the four tie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

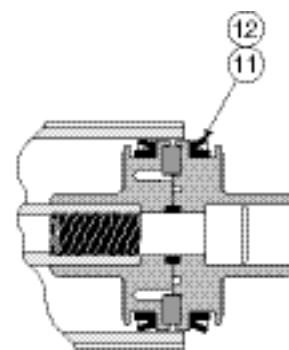
As a check, to be certain the trunnion mount will not interfere with cylinder operation, move the piston and rod assembly by hand to determine whether there is any tendency for the piston to bind at the spot where the trunnion collar is located. If any binding is noticeable, readjust the tie rods.



Detail "1"



Detail "2"

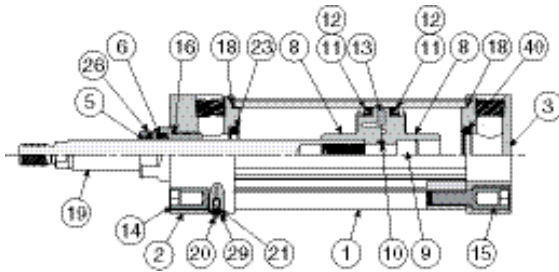


Detail "3"

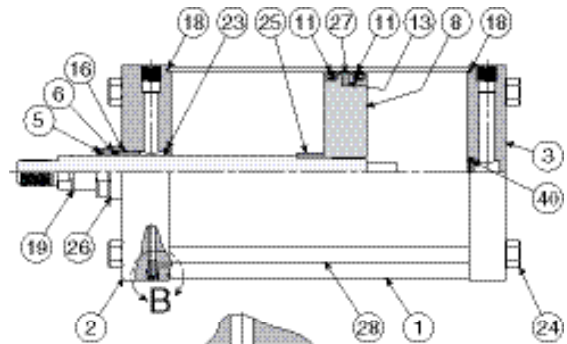
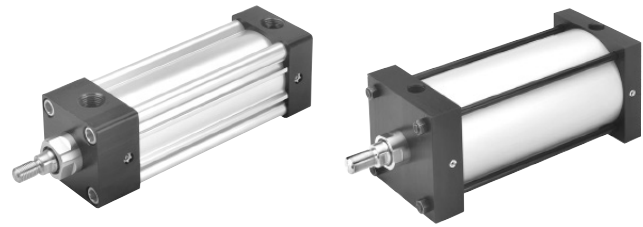
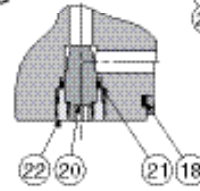
4MA Complete Cylinder Kits (All parts to service entire cylinder)**Pneumatic service only**

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 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)



For inventory, lead times, and kit lookup, visit www.pdnplu.com

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

BTie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionPID
SeriesP1F
Series2MNR
Series

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:

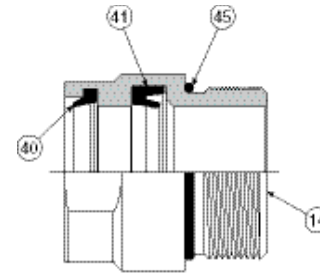
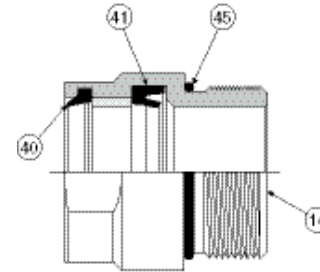
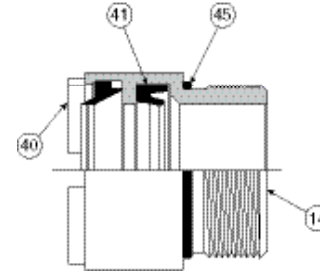
1. Inspect the piston rod to be sure it is free of burrs or other foreign material that would prevent sliding the gland off the rod.
2. Disconnect any attachments to the piston rod end thread.
3. Lubricate the rod with clean light oil.
4. Unscrew the gland cartridge from the head using the appropriate 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:

7. Re-inspect the surface of the piston rod for scratches, dents and other surface damage, and repair if necessary.
8. Clean and lubricate the surface of the piston rod with clean light oil.
9. Lubricate the rod wiper (#40), rod seal (#41), o-ring (#45) and the inside surfaces of the gland cartridge with clean light oil.
10. 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.
11. 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.

Rod Dia.	Metallic Rod Wiper Gland	
	Gland Wrench	Spanner Wrench
5/8	0695900000	0116760000
1	0695910000	0116760000
1-3/8	0695920000	0117030000
1-3/4	0695930000	0116770000

**Standard Rod Gland****HI LOAD Rod Gland (includes composite bearing)****Metallic Rod Wiper Gland**

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		Hi Load Rod Gland Cartridge Kit Includes 1 Each Of Symbol 14, 40, 41 & 45		Metallic Rod Wiper Gland Cartridge Kit Includes 1 Each Of Symbol 14, 40, 41 & 45		Gland To Head Torque Units	
			Nitrile & Pur Seals Kit Number	Fluorocarbon Seals Kit Number	Nitrile & Pur Seals Kit Number	Fluorocarbon Seals Kit Number	Nitrile & Pur Seals Kit Number	Fluorocarbon Seals Kit Number	USA Ft-Lbs	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

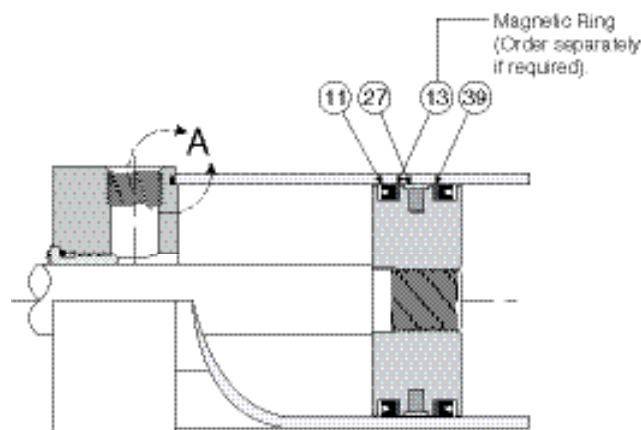


For inventory, lead times, and kit lookup, visit www.pdnplu.com

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)

**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

Bore Size	PK - Piston Seal Kit, Standard Lipseals Includes 2 Each Of Symbol 11, 39 & 18 Wear Band (#27) For Aluminum Piston Included		Part Number	Endcap Fastener Or Tie Rod Torque Units	
	Nitrile Seals Kit Number	Fluorocarbon Seals Kit 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



For inventory, lead times, and kit lookup, visit www.pdnplu.com

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

BTie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionP1D
SeriesP1F
Series2MNR
Series

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.

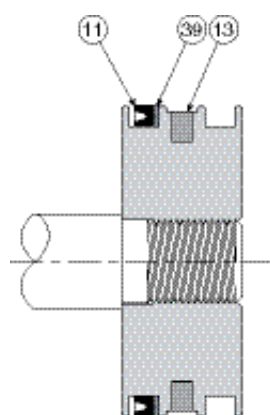
Assemble both cap and head, complete with cylinder body O-Rings (sym. # 18), to each end of the cylinder body. Install end cap fasteners and tighten to appropriate torque, using opposite corner to corner torquing sequence. After screws are torqued, firmly torque the rod gland against the head.

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:

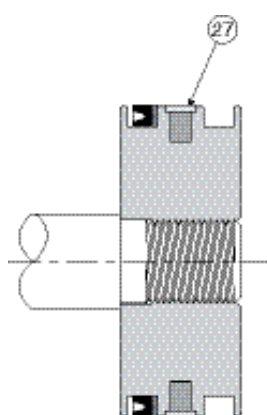
After all the piston seals have been installed on the piston and the piston is in the cylinder body, fit the cap with its O-ring (sym. # 18) in position onto the cylinder body. Then “stud” into the trunnion collar the four tie rods that connect the cap to the trunnion collar. Hand tighten the four tie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

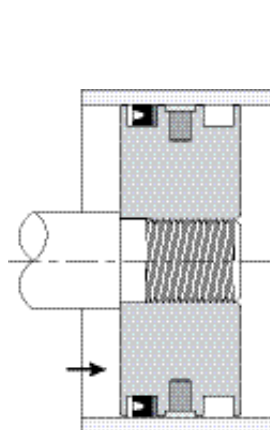
As a check, to be certain the trunnion mount will not interfere with cylinder operation, move the piston and rod assembly by hand to determine whether there is any tendency for the piston to bind at the spot where the trunnion collar is located. If any binding is noticeable, readjust the tie rods.



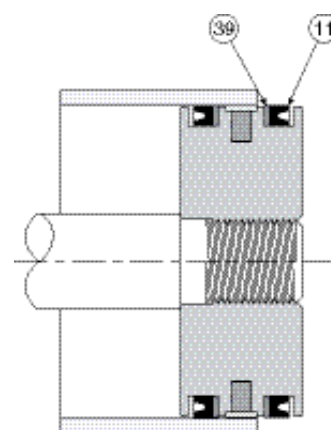
Detail “1”



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.

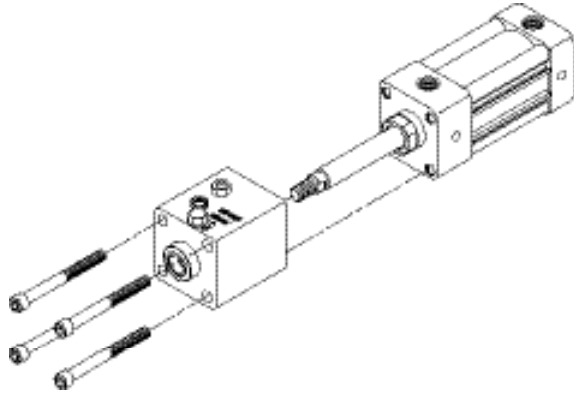
This kit is a combination of the Standard Gland Kit and Standard Piston Seal Kit. Please refer to the pages or bulletins of these individual kits for service instructions.



Bore Size	Rod Dia.	Rod No.	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	
			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		

B

Tie Rod Pneumatic
Cylinders4MA
Series4MAP
SeriesACVB
OptionLPSF
OptionP1D
SeriesP1F
Series2MNR
Series

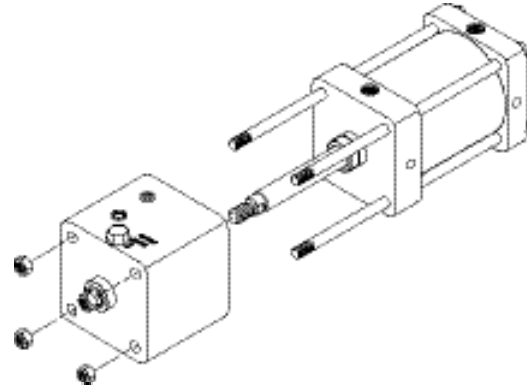
Rod Lock Removal and Re-assembly**1-1/2" to 5" Bores**

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

1. Remove the 4MAP 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

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

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

6. Remove all dirt and debris from the mating features of the rod lock, base cylinder, fasteners (or nuts) and threads.
7. 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.
8. 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.
9. 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.
10. Using a calibrated torque wrench, tighten the fasteners or nuts to the final torque specification using the same corner-to-corner sequence.
11. 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 pdn.technical@support.parker.com for any assistance.