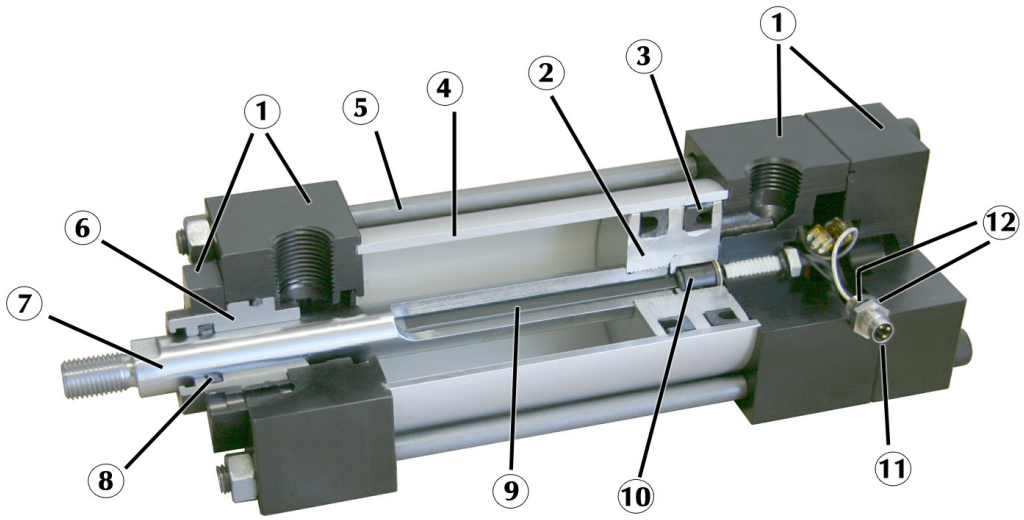
Position Feedback Low Friction (PFLF) Cylinder



1. **Head, Cap & Retainer:** Precision machined from high strength 6061-T6 aluminum alloy. Black anodized for corrosion resistance.
2. **Piston:** Precision machined from high strength aluminum alloy for light weight and extended cycle life.
3. **Piston Seals:** Seals are low friction and packed with special low friction non-migrating Teflon® based grease for permanent lubrication. Lip seals are pressure activated and wear compensating.
4. **Cylinder Tube:** Precision machined from 6063-T832 high tensile aluminum alloy and hard coat to 60 Rc for wear resistance and extended cycle life.
5. **Tie Rods:** Pre-stressed tie rod construction eliminates axial loading of cylinder tube and maintains compression on tube end seals.
6. **Bearing:** Precision machined from graphite filled cast iron and Teflon® coated to reduce friction and extend cycle life. Design allows increased lubrication in effective bearing area.
7. **Piston Rod:** Precision machined from high yield, polished and chrome plated steel.
8. **Rod Seal:** Seals are low friction and packed with special low friction non-migrating Teflon® based grease for permanent lubrication. Lip seals are pressure activated and wear compensating (rod wiper is omitted unless requested–see options note on performance).
9. **Linear Resistive Transducer (LRT) Probe:** The LRT probe is an anodized aluminum probe with Delrin® threaded flange, o-ring and back-up washer. The probe has infinite resolution, nonlinearity of ± 1 percent of full stroke and a rated life of 10 million cycles. Typical probe input is 10 VDC, input impedance required is 1 M Ohm with a temperature rating of 0 ° to +200 °F. Note: probe is subject to mechanical wear.
10. **Linear Resistive Transducer (LRT) Wiper:** The LRT wiper is completely assembled precision molded assembly with a rated life of up to 1,000 linear miles.
11. **Three Pin Connector:** This connector is supplied on all PFLF cylinders. The connector has a universal 8mm (3) pin DIN male connection.
12. **O-Rings:** To provide a positive seal to prevent any contaminates or liquids from entering cylinder cavity and affecting cylinder performance.

Features of the PFLF Cylinder

- Continuous position sensing
- Highly accurate: infinite resolution, linearity of ± 1 percent of full stroke, ± .001" mechanical repeatability
- Strokes up to 24"
- Easily repairable
- Electronic Position Controllers (usable with DC input electronic position controllers)
- SPCS-2/2T available
- Permanently lubricated seals
- Quick Connect (IP67) standard on all models.

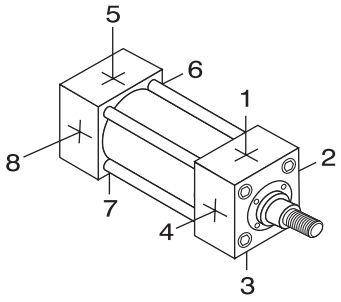
Position Feedback Low Friction (PFLF)

PFLF - MS4 - 4.00 x 10 - KK3 - MPR

Series	Substitute
Anodized Aluminum	**PFLF**

NFPA Mounts	Substitute
No Mount (1.50"- 8.00" Bore)	**MX0**
Rear Pivot Clevis (1.50"- 8.00" Bore)	**MP1**
Rear Pivot Clevis (1.50"- 6.00" Bore)	**MP2**
Rear Pivot Eye (1.50"- 4.00" Bore)	**MP4**
Front Trunnion (1.50"- 8.00" Bore)	**MT1**
Rear Trunnion (1.50"- 8.00" Bore)	**MT2**
Intermediate Trunnion (1.50"- 8.00" Bore)	**MT4**
Extended Tie-Rods (Head) (1.50"- 8.00" Bore)	**MX3**
Front Flange (1.50"- 6.00" Bore)	**MF1**
Rear Flange (1.50"- 6.00" Bore)	**MF2**
Front Mounting Holes (8.00" Bore)	**ME3**
Front and Rear End Foot (1.50"- 8.00" Bore)	**MS1**
Side Lug (1.50"- 8.00" Bore)	**MS2**
Bottom Tapped Holes (1.50"- 8.00" Bore)	**MS4**

Bore	Substitute
2.00	**1.50**
3.25	**2.50**
5.00	**4.00**
8.00	**6.00**



Cylinder Options	Substitute
.25" Urethane Bumper Both Ends	**B***
.25" Urethane Bumper Cap Only	**BC***
.25" Urethane Bumper Head Only	**BH***
Extended Piston Rod Thread - Specify (Example: A = 2")	**A =**
Extended Piston Rod - Specify (Example: C = 1.5")	**C =**
Large Male Rod Thread	**KK2**
Female Rod Thread	**KK3**
Full Diameter Male Rod Thread	**KK4**
Magnetic Piston for Reed Switches	**MPR**
Optional Port Location (Example: OP=3,7)	**OP**
Special Variations (Specify)	**XX**
Stroke	
2"-24" (1.50" - 2.50")	
3"-24" (3.25" - 8.00")	

* Urethane Bumpers add .25" per end of Cylinder

Options Available But Not Recommended (Will Affect Cylinder Performance)	Substitute
.25" Urethane Bumper Both Ends	**B***
Head Cushion	**H**
Metallic Rod Scraper	**MS**
Rod Wiper	**RW**

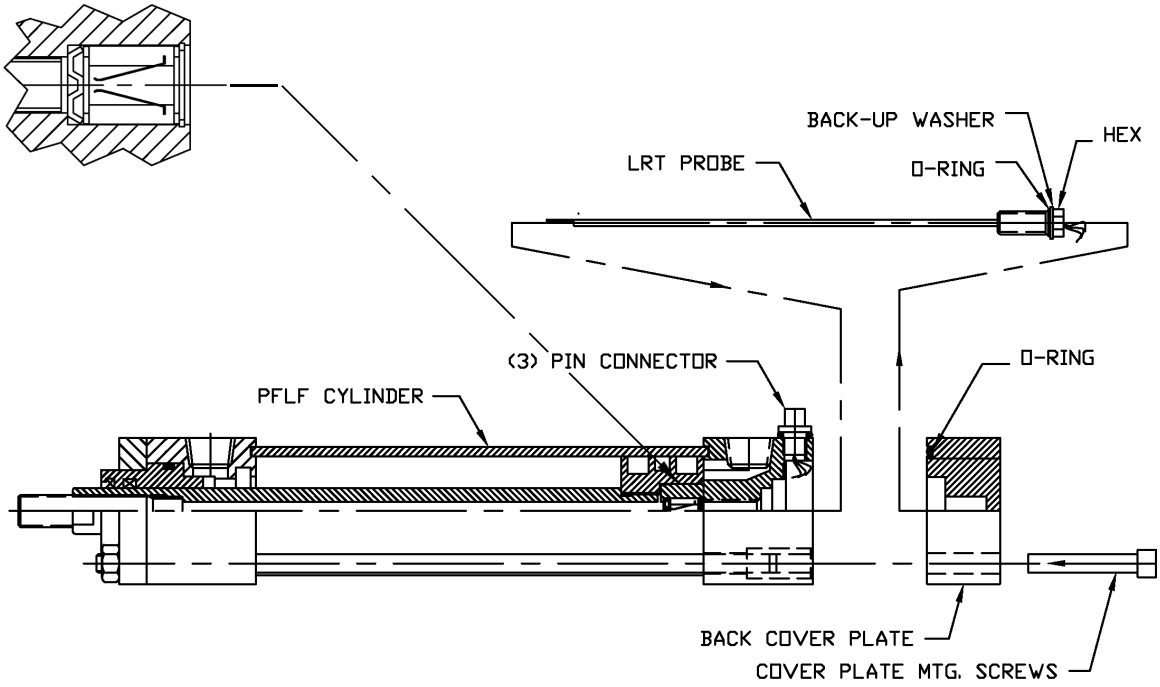
Standard Port Positions And Feedback Cable Connector Positions

- Ports - Positions 1 and 5
- Cushion Adjustment - Positions 2 and 6
- Specify Non-Standard Positions When Ordering

PFLF Mounts

MX0 1.50"-8.00" Bores	**MS4** 1.50"-8.00" Bores	**MP1** 1.50"-8.00" Bores	**MP2** 1.50"-6.00" Bores	**MP4** 1.50"-4.00" Bores
MT1 1.50"-8.00" Bores	**MT2** 1.50"-8.00" Bores	**MT4** 1.50"-8.00" Bores	**MF1** 1.50"-6.00" Bores	**MF2** 1.50"- 6.00" Bores
MX3 1.50"-8.00" Bores	**MS1** 1.50"-8.00" Bores	**MS2** 1.50"-8.00" Bores	**ME3** 8.00" Bore	Oversize rods and stainless steel cylinders available. Consult factory.

Position Feedback Low Friction (PFLF) Cylinder



The Position Feedback Cylinder contains a Linear Resistive Transducer (LRT) or potentiometer mounted in the cylinder rear head. The LRT probe, which has a resistive element on one side and a collector strip on the other, is inside the cylinder rod. A wiper assembly is installed in the piston. As the piston moves, an electrical circuit is created between the resistive element and collector strip. The resulting voltage is directed externally via wiring. The output voltage is proportional to the wiper position on the resistive element, which allows the cylinder position to be determined.

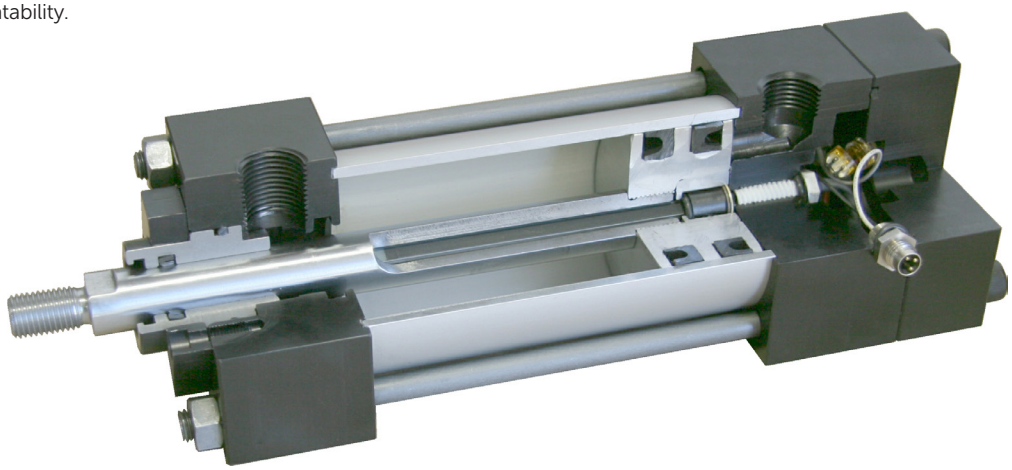
For example, in a 12-inch stroke cylinder, if the output voltage is 0 VDC when fully retracted and 10 VDC when fully extended, voltage readings of 2.5 and 5.833 VDC would indicate cylinder extensions of three inches and seven inches.

The accuracy of an LRT is determined by three factors: resolution, linearity and repeatability.

Resolution refers to the smallest change that can be detected on the LRT. The LRT has infinite resolution and can be divided into as many parts as the electronics allow. For example, with a 12-bit, 4096-part controller, the stroke could be divided into 4096 equal parts. When 10 VDC is placed on a 10" cylinder, the smallest detectable increment would be 10 VDC ÷ 4096 = 2.4 millivolts or 0.0024". Resolution is stroke sensitive (i.e. the longer the stroke, the less resolution).

Linearity refers to the maximum deviation of the output voltage to a straight line. The LRT's linearity is ± 1 percent of stroke.

Repeatability is the ability of the LRT to provide the same output voltage relative to a unique cylinder position each time the cylinder is cycled. Mechanical repeatability of the IMI Bimba NFPA Position Feedback Cylinder is ± 0.001".



Position Feedback Low Friction Cylinder – Dimensions

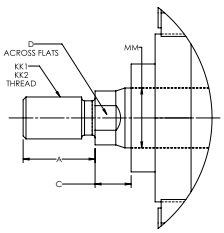
About Rod End Styles
Style 1 Male Rod End is STANDARD
Other NFPA Styles can be specified (see chart).

Need a rod end not listed? NO PROBLEM! Each Piston Rod is made-to-order and does not delay shipment. Coarse (UNC) threads, Metric threads or just plain rod ends are common. Thread lengths are also made-to-order (Specify: "A"=Length).

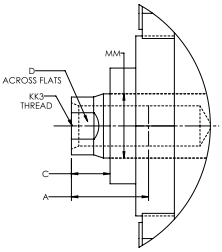
NEED SOMETHING NOT LISTED? Just send us a sketch. In most cases, quotes are turned around in one day!

Piston Rod End Styles

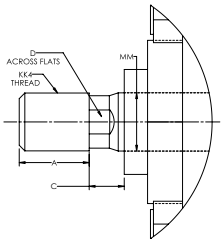
Style 1 & 2



Style 3*

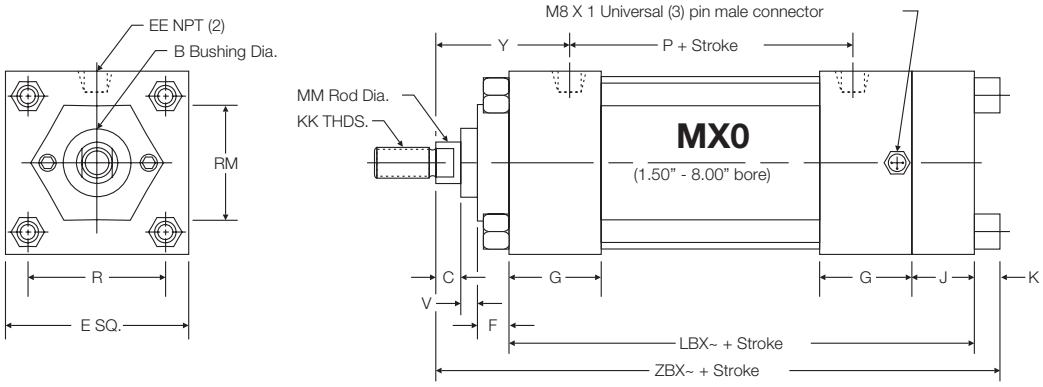


Style 4



Bore	Rod Diameter (MM)	Standard				Optional				C	D
		Style 1 - Male		Style 2 - Male		Style 3 - Female		Style 4 - Male			
		KK1	A	KK2	A	KK3	A	KK4	A		
1.50, 2.00, 2.50	0.625	7/16-20	0.750	1/2-20	0.750	7/16-20	0.750	5/8-18	0.750	0.375	0.500
3.25, 4.00, 5.00	1.000	3/4-16	1.125	7/8-14	1.125	3/4-16	1.125	1-14	1.125	0.500	0.875
6.00 & 8.00	1.375	1-14	1.625	1 1/4-12	1.625	1-14	1.625	1 3/8-12	1.625	0.625	1.125

* KK3 (Style 3 - Female) will have a recessed plug due to through hole in rod.



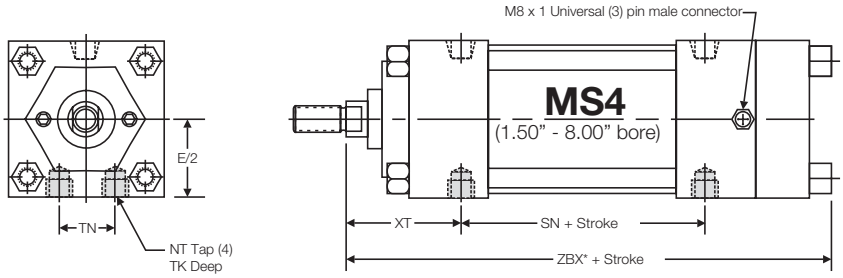
'MX0' PFLF Cylinder Dimensions - Standard Rod Only

Bore	Rod Diameter	A	B	C	E	EE	F	G	J	K	KK	LBX~	P	R	RM	V	Y	ZBX~
1.50	0.625	0.750	1.125	0.375	2.000	0.375	0.375	1.500	1.000	0.250	7/16-20	5.125	2.375	1.430	2.000 SQ.	0.250	1.875	6.375~
2.00	0.625	0.750	1.125	0.375	2.500	0.375	0.375	1.500	1.000	0.313	7/16-20	5.125	2.375	1.840	1.750 Hex	0.250	1.875	6.438~
2.50	0.625	0.750	1.125	0.375	3.000	0.375	0.375	1.500	1.000	0.313	7/16-20	5.250	2.500	2.190	1.750 Hex	0.250	1.875	6.563~
3.25	1.000	1.125	1.500	0.500	3.750	0.500	0.625	1.750	1.250	0.375	3/4-16	6.000	2.750	2.760	2.750*	0.250	2.375	7.750~
4.00	1.000	1.125	1.500	0.500	4.500	0.500	0.625	1.750	1.250	0.375	3/4-16	6.000	2.750	3.320	2.750*	0.250	2.375	7.750~
5.00	1.000	1.125	1.500	0.500	5.500	0.500	0.625	1.750	1.250	0.500	3/4-16	6.250	3.000	4.100	2.750*	0.250	2.375	8.125~
6.00	1.375	1.625	2.000	0.625	6.500	0.750	0.625	2.000	1.500	0.500	1-14	7.000	3.250	4.880	3.500*	0.375	2.750	9.125~
8.00	1.375	1.625	2.000	0.625	8.500	0.750	0.625	2.000	1.500	0.625	1-14	7.125	3.375	6.440	3.500*	0.375	2.750	9.375~

* RM dimension is round retainer diameter

~ Non-NFPA Dimensions

Position Feedback Low Friction Cylinder – Dimensions

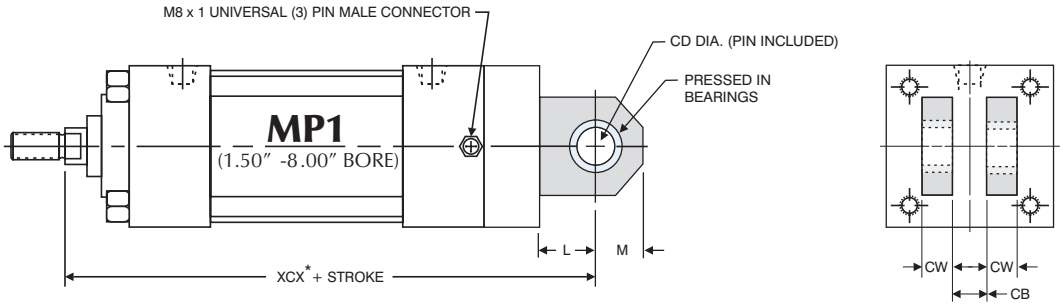


'MS4' PFLF Cylinder Dimensions - Standard Rod Only

Bore	Rod Diameter	E/2	NT	TK	TN	XT	SN	Add Stroke ZBX*
1.50	0.625 Standard	1.000	1/4-20	0.375	0.625	1.938	2.250	6.375
2.00	0.625 Standard	1.250	5/16-18	0.500	0.875	1.938	2.250	6.438
2.50	0.625 Standard	1.500	3/8-16	0.625	1.250	1.938	2.375	6.563
3.25	1.000 Standard	1.875	1/2-13	0.750	1.500	2.438	2.625	7.750
4.00	1.000 Standard	2.250	1/2-13	0.750	2.063	2.438	2.625	7.750
5.00	1.000 Standard	2.750	5/8-11	1.000	2.688	2.438	2.875	8.125
6.00	1.375 Standard	3.250	3/4-10	1.125	3.250	2.813	3.125	9.125
8.00	1.375 Standard	4.250	3/4-10	1.125	4.500	2.813	3.250	9.375

Note: All cylinder dimensions not shown are standard 'MX0' cylinder dimensions.

* Non-NFPA Dimensions



'MP1' PFLF Cylinder Dimensions - Standard Rod Only

Bore	Rod Diameter	CB	CD	CW	L	M	Add Stroke XCX*
1.50	0.625 Standard	0.750	0.500	0.500	0.750	0.625	6.875
2.00	0.625 Standard	0.750	0.500	0.500	0.750	0.625	6.875
2.50	0.625 Standard	0.750	0.500	0.500	0.750	0.625	7.000
3.25	1.000 Standard	1.250	0.750	0.625	1.250	0.875	8.625
4.00	1.000 Standard	1.250	0.750	0.625	1.250	0.875	8.625
5.00	1.000 Standard	1.250	0.750	0.625	1.250	0.875	8.875
6.00	1.375 Standard	1.500	1.000	0.750	1.500	1.000	10.125
8.00	1.375 Standard	1.500	1.000	0.750	1.500	1.000	10.250

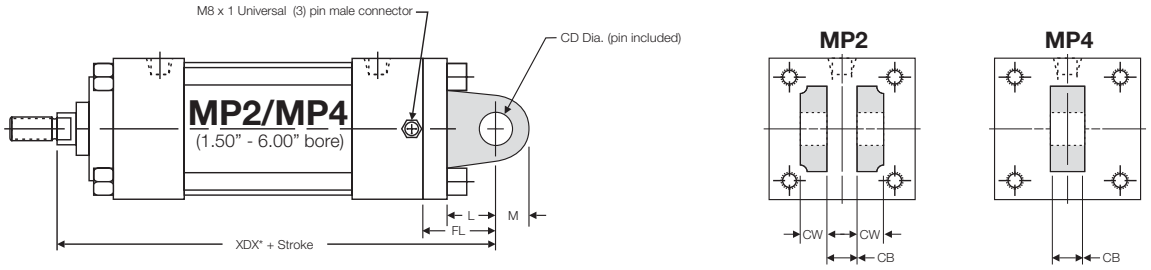
Note: All cylinder dimensions not shown are standard 'MX0' cylinder dimensions.

1.50" & 2.00" bore MP1 extruded mounts are through tie rod construction.

2.50" bore and larger the rear MP1 cap is bolted on.

* Non-NFPA Dimensions

Position Feedback Low Friction Cylinder – Dimensions



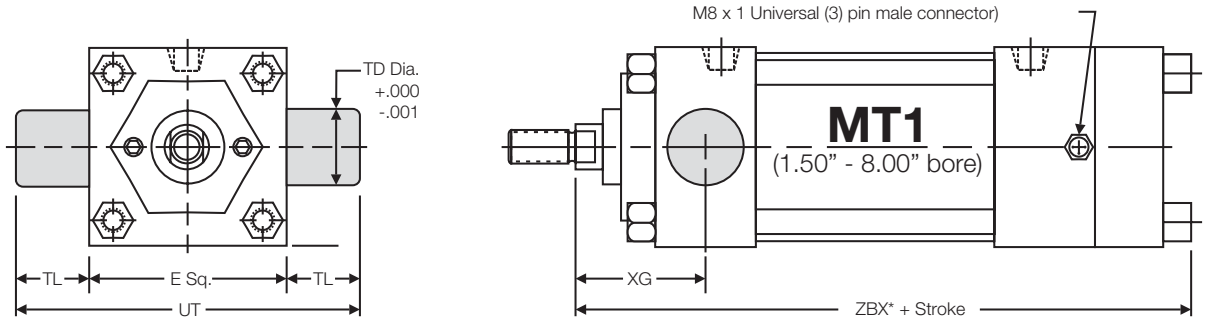
‘MP2’ & ‘MP4’ Cast PFLF Cylinder Dimensions - Standard Rod Only								
Bore	Rod Diameter	CB	CD	CW	L	M	FL	Add Stroke XDX*
1.50	0.625 Standard	0.750	0.500	0.500	0.750	0.625	1.125	6.250
2.00	0.625 Standard	0.750	0.500	0.500	0.750	0.625	1.125	6.250
2.50	0.625 Standard	0.750	0.500	0.500	0.750	0.625	1.125	6.375
3.25	1.000 Standard	1.250	0.750	0.625	1.250	0.875	1.875	8.000
4.00	1.000 Standard	1.250	0.750	0.625	1.250	0.875	1.875	8.000
5.00	1.000 Standard	1.250	0.750	0.625	1.250	0.875	1.875	8.250
6.00	1.375 Standard	1.500	1.000	0.750	1.500	1.000	2.250	9.375

Note: All cylinder dimensions not shown are standard ‘MX0’ cylinder dimensions.

MP4 cast mount not available for 5.00” & 6.00” bores.

Special welded mounts are available. Consult factory for more information.

* Non-NFPA dimensions

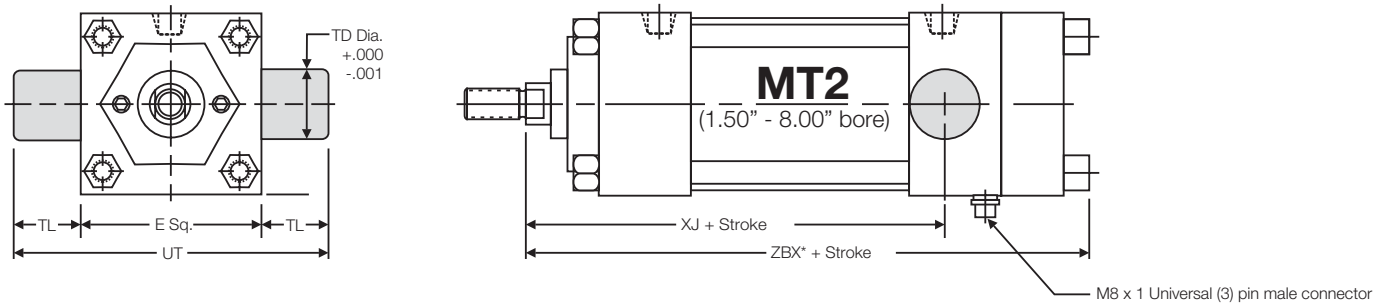


‘MT1’ PFLF Cylinder Dimensions - Standard Rod Only							
Bore	Rod Diameter	E	TD	TL	UT	XG	Add Stroke XDX*
1.50	0.625 Standard	2.000	1.000	1.000	4.000	1.750	6.375
2.00	0.625 Standard	2.500	1.000	1.000	4.500	1.750	6.438
2.50	0.625 Standard	3.000	1.000	1.000	5.000	1.750	6.563
3.25	1.000 Standard	3.750	1.000	1.000	5.750	2.250	7.750
4.00	1.000 Standard	4.500	1.000	1.000	6.500	2.250	7.750
5.00	1.000 Standard	5.500	1.000	1.000	7.500	2.250	8.125
6.00	1.375 Standard	6.500	1.375	1.375	9.250	2.625	9.125
8.00	1.375 Standard	8.500	1.375	1.375	11.250	2.625	9.375

Note: All cylinder dimensions not shown are standard ‘MX0’ cylinder dimensions.

* Non-NFPA Dimensions

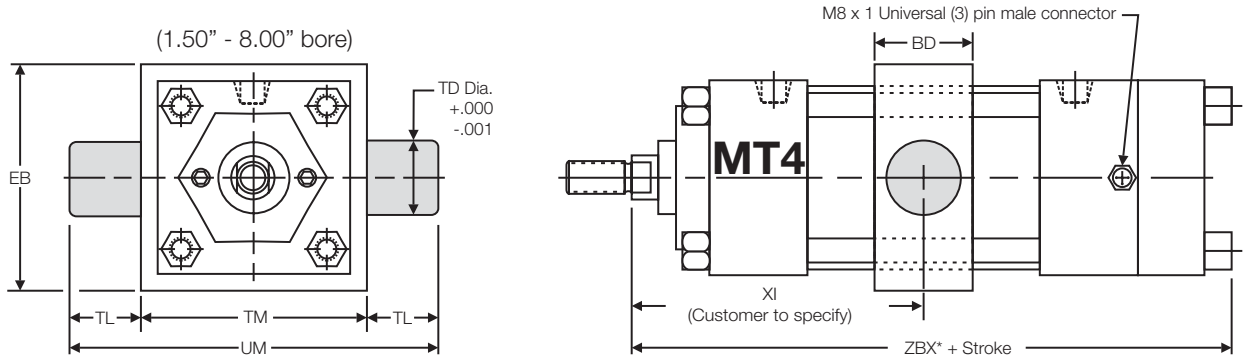
Position Feedback Low Friction Cylinder – Dimensions



'MT2' PFLF Cylinder Dimensions - Standard Rod Only							
Bore	**Rod Diameter**	**E**	**TD**	**TL**	**UT**	**XJ**	**Add Stroke ZBX***
1.50	0.625 Standard	2.000	1.000	1.000	4.000	4.125	6.375
2.00	0.625 Standard	2.500	1.000	1.000	4.500	4.125	6.438
2.50	0.625 Standard	3.000	1.000	1.000	5.000	4.250	6.563
3.25	1.000 Standard	3.750	1.000	1.000	5.750	5.000	7.750
4.00	1.000 Standard	4.500	1.000	1.000	6.500	5.000	7.750
5.00	1.000 Standard	5.500	1.000	1.000	7.500	5.250	8.125
6.00	1.375 Standard	6.500	1.375	1.375	9.250	5.875	9.125
8.00	1.375 Standard	8.500	1.375	1.375	11.250	6.000	9.375

Note: All cylinder dimensions not shown are standard 'MX0' cylinder dimensions.

* Non-NFPA Dimensions

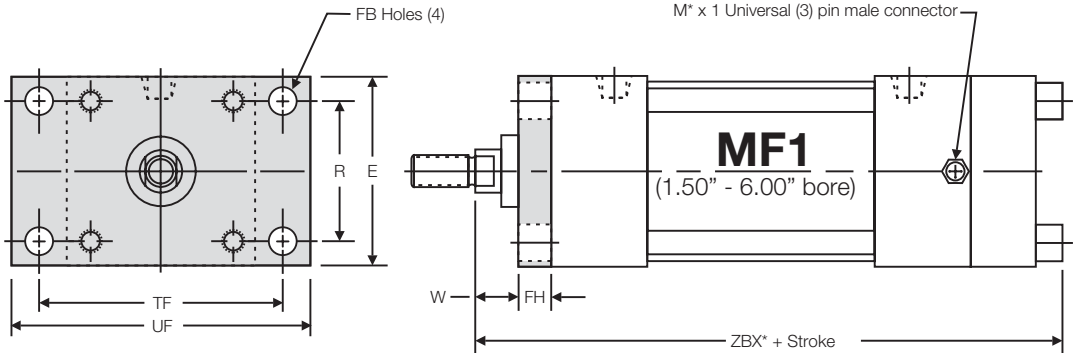


'Mt4' PFLF Cylinder Dimensions - Standard Rod Only									
Bore	**Rod Diameter**	**BD**	**EB**	**TD**	**TL**	**TM**	**UM**	**XI**	**Add Stroke ZBX***
1.50	0.625 Standard	1.250	2.500	1.000	1.000	2.500	4.500	CUSTOMER TO SPECIFY	6.375
2.00	0.625 Standard	1.500	3.000	1.000	1.000	3.000	5.000		6.438
2.50	0.625 Standard	1.500	3.500	1.000	1.000	3.500	5.500		6.563
3.25	1.000 Standard	2.000	4.250	1.000	1.000	4.500	6.500		7.750
4.00	1.000 Standard	2.000	5.000	1.000	1.000	5.250	7.250		7.750
5.00	1.000 Standard	2.000	6.000	1.000	1.000	6.250	8.250		8.125
6.00	1.375 Standard	2.000	7.000	1.375	1.375	7.625	10.375		9.125
8.00	1.375 Standard	2.500	9.500	1.375	1.375	9.750	12.500		9.375

Note: All cylinder dimensions not shown are standard 'MX0' cylinder dimensions.

* Non-NFPA Dimensions

Position Feedback Low Friction Cylinder – Dimensions

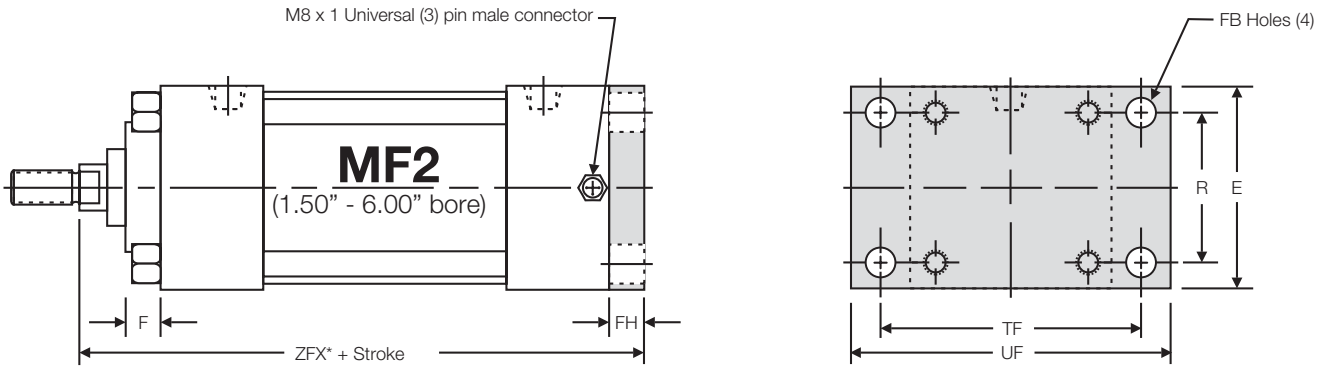


'MF1' PFLF Cylinder Dimensions - Standard Rod Only

Bore	Rod Diameter	E	FB	FH	R	TF	UF	W	Add Stroke ZBX*
1.50	0.625 Standard	2.000	0.313	0.375	1.430	2.750	3.375	0.625	6.375
2.00	0.625 Standard	2.500	0.375	0.375	1.840	3.375	4.125	0.625	6.438
2.50	0.625 Standard	3.000	0.375	0.375	2.190	3.875	4.625	0.625	6.563
3.25	1.000 Standard	3.750	0.438	0.625	2.760	4.688	5.500	0.750	7.750
4.00	1.000 Standard	4.500	0.438	0.625	3.320	5.438	6.250	0.750	7.750
5.00	1.000 Standard	5.500	0.563	0.625	4.100	6.625	7.625	0.750	8.125
6.00	1.375 Standard	6.500	0.563	0.750	4.880	7.625	8.625	0.875	9.125

Note: All cylinder dimensions not shown are standard 'MX0' cylinder dimensions.

* Non-NFPA Dimensions



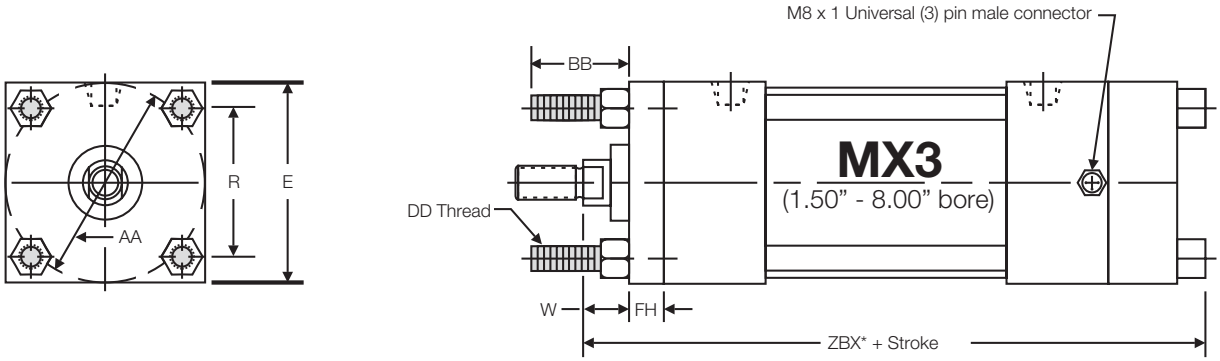
'MF2' PFLF Cylinder Dimensions - Standard Rod Only

Bore	Rod Diameter	E	FB	FH	R	TF	UF	F	Add Stroke ZFX*
1.50	0.625 Standard	2.000	0.313	0.375	1.430	2.750	3.375	0.375	5.500
2.00	0.625 Standard	2.500	0.375	0.375	1.840	3.375	4.125	0.375	5.500
2.50	0.625 Standard	3.000	0.375	0.375	2.190	3.875	4.625	0.375	5.625
3.25	1.000 Standard	3.750	0.438	0.625	2.760	4.688	5.500	0.625	6.750
4.00	1.000 Standard	4.500	0.438	0.625	3.320	5.438	6.250	0.625	6.750
5.00	1.000 Standard	5.500	0.563	0.625	4.100	6.625	7.625	0.625	7.000
6.00	1.375 Standard	6.500	0.563	0.750	4.880	7.625	8.625	0.625	7.875

Note: All cylinder dimensions not shown are standard 'MX0' cylinder dimensions.

* Non-NFPA Dimensions

Position Feedback Low Friction Cylinder – Dimensions



‘MX3’ PFLF Cylinder Dimensions - Standard Rod Only

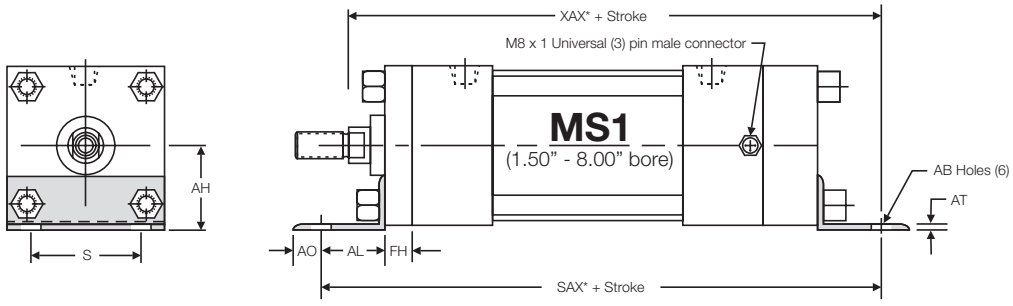
Bore	Rod Diameter	E	FH	R	AA	BB	DD	W	Add Stroke ZBX*
1.50	0.625 Standard	2.000	0.375	1.430	2.020	1.000	1/4-28	0.625	6.375
2.00	0.625 Standard	2.500	0.375	1.840	2.600	1.125	5/16-24	0.625	6.438
2.50	0.625 Standard	3.000	0.375	2.190	3.100	1.125	5/16-24	0.625	6.563
3.25	1.000 Standard	3.750	0.625	2.760	3.900	1.375	3/8-24	0.750	7.750
4.00	1.000 Standard	4.500	0.625	3.320	4.700	1.375	3/8-24	0.750	7.750
5.00	1.000 Standard	5.500	0.625	4.100	5.800	1.813	1/2-20	0.750	8.125
6.00	1.375 Standard	6.500	0.750	4.880	6.900	1.813	1/2-20	0.875	9.125
8.00	1.375 Standard	8.500	0.625**	6.440	9.100	2.313**	5/8-18	1.625	9.375

Note: All cylinder dimensions not shown are standard ‘MX0’ cylinder dimensions.

* Non-NFPA Dimensions

** 8.00" Bore has round retainer, not a full square retainer as smaller bores.

"BB" dimension is from head.



‘MS1’ PFLF Cylinder Dimensions - Standard Rod Only

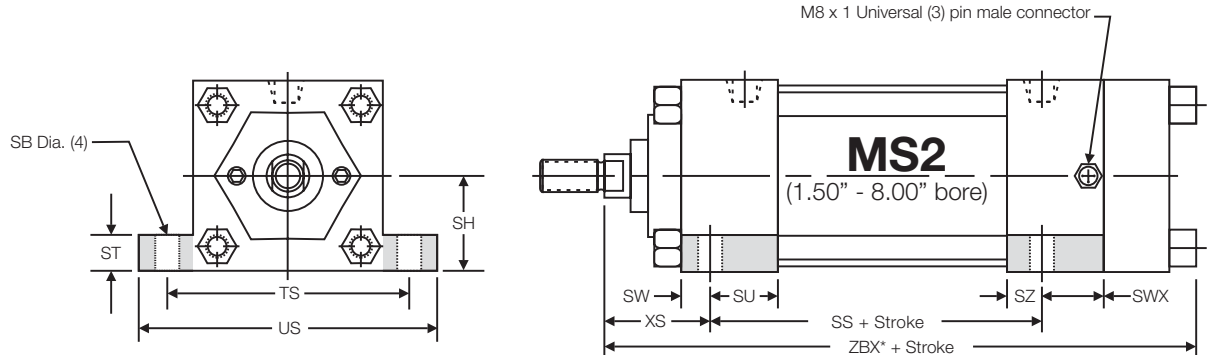
Bore	Rod Diameter	AB	AH	AL	AO	AT	FH	S	Add Stroke SAX*	Add Stroke XAX*
1.50	0.625 Standard	0.438	1.188	1.000	0.375	0.125	0.375	1.250	7.500	7.125
2.00	0.625 Standard	0.438	1.438	1.000	0.375	0.125	0.375	1.750	7.500	7.125
2.50	0.625 Standard	0.438	1.625	1.000	0.375	0.125	0.375	2.250	7.625	7.250
3.25	1.000 Standard	0.563	1.938	1.250	0.500	0.125	0.625	2.750	9.125	8.625
4.00	1.000 Standard	0.563	2.250	1.250	0.500	0.125	0.625	3.500	9.125	8.625
5.00	1.000 Standard	0.688	2.750	1.375	0.625	0.188	0.625	4.250	9.625	9.000
6.00	1.375 Standard	0.813	3.250	1.375	0.625	0.188	0.750	5.250	10.500	10.000
8.00	1.375 Standard	0.813	4.250	1.813	0.688	0.250	0.625**	7.125	10.750	10.563

Note: All cylinder dimensions not shown are standard ‘MX0’ cylinder dimensions.

** 8.00" bore cylinders have round retainer, bracket bolted to head.

* Non-NFPA Dimensions

Position Feedback Low Friction Cylinder – Dimensions

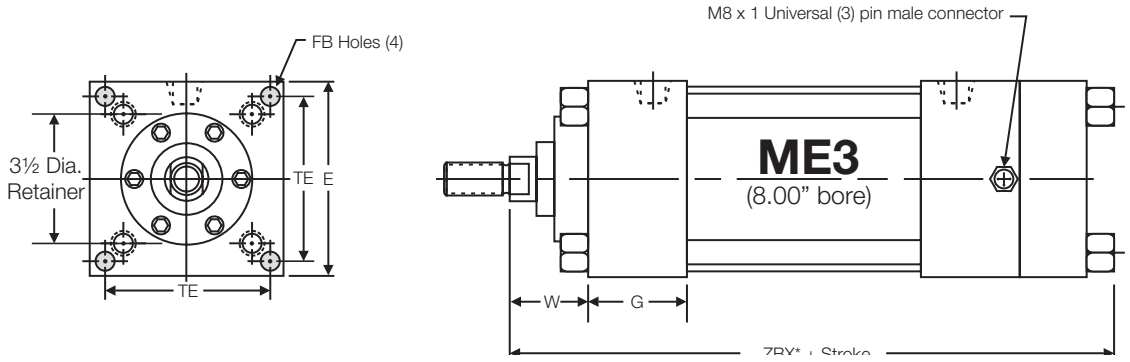


'MS2' PFLF Cylinder Dimensions - Standard Rod Only

Bore	Rod Diameter	SB	SH	ST	SU	SW	SZ	TS	US	XS	SWX*	Add Stroke SS	Add Stroke ZBX*
1.50	0.625 Standard	0.438	1.000	0.500	1.125	0.375	0.625	2.750	3.500	1.375	0.875	2.875	6.375
2.00	0.625 Standard	0.438	1.250	0.500	1.125	0.375	0.625	3.250	4.000	1.375	0.875	2.875	6.438
2.50	0.625 Standard	0.438	1.500	0.500	1.125	0.375	0.625	3.750	4.500	1.375	0.875	3.000	6.563
3.25	1.000 Standard	0.563	1.875	0.750	1.250	0.500	0.750	4.750	5.750	1.875	1.000	3.250	7.750
4.00	1.000 Standard	0.563	2.250	0.750	1.250	0.500	0.750	5.500	6.500	1.875	1.000	3.250	7.750
5.00	1.000 Standard	0.813	2.750	1.000	1.063	0.688	0.563	6.875	8.250	2.063	1.188	3.125	8.125
6.00	1.375 Standard	0.813	3.250	1.000	1.313	0.688	0.813	7.875	9.250	2.313	1.188	3.625	9.125
8.00	1.375 Standard	0.813	4.250	1.000	1.313	0.688	0.813	9.875	11.250	2.313	1.188	3.750	9.375

Note: All cylinder dimensions not shown are standard 'MX0' cylinder dimensions.

* Non-NFPA dimensions



'ME3' PFLF Cylinder Dimensions - Standard Rod Only

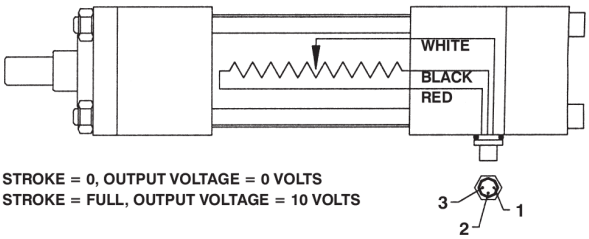
Bore	Rod Diameter	E	TE	W	G	FB	Add Stroke ZBX*
8.00	1.375 Standard	8.500	7.570	1.625	2.000	0.688	9.375

Note: All cylinder dimensions not shown are standard 'MX0' cylinder dimensions.

* Non-NFPA dimensions

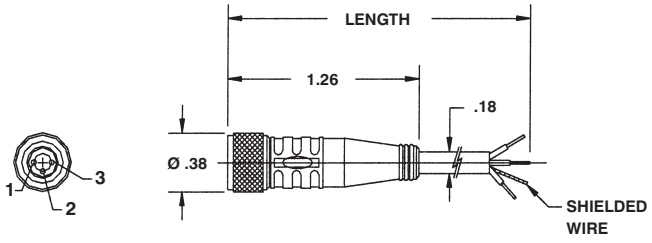
Position Feedback Low Friction Cylinder – Specifications

Repeatability:	±.001" Cylinder Only Refer to specifications in the following sections for positioning or measuring repeatability. Power supply ripple and A/D error will reduce repeatability when PFLF is utilized with industrial control systems.
Nonlinearity:	± 1% of full stroke
Resolution:	Infinite
Signal Input:	10 VDC typical
Input Impedance Required:	1 MOhm
Signal Output:	> 0 to slightly less than FS signal input (The internal electrical stroke is slightly larger than the mechanical stroke of the cylinder)
Rated Life of Probe:	up to 10 million cycles
Rated Life of Wiper:	up to 1000 linear miles
Pressure Rating:	150 PSI
Temperature Rating: (Cylinder & Probe)	0° to 200°F
Maximum Speed:	25 in/sec
Interface:	8mm DIN connector
NEMA:	6 (IP67)
Resistance Rating:	1kΩ resistance/inch

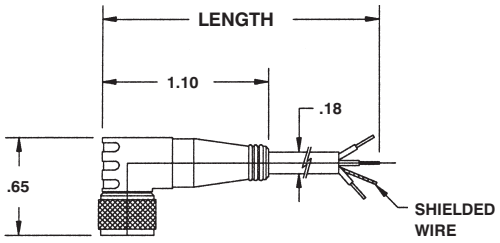


Wire Description	Probe/Plug Wire Colors	Plug Pin Numbers	Quick Connect Cable/Wire Colors
Input (+)	Red	3	Blue
Ground (-)	Black	2	Black
Output	White	1	Brown

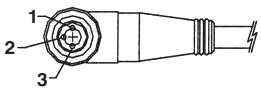
Straight-Models
C4-S-T (2m), C4X-S-T (5m)



Right Angle-Models
C5-S-T (2m), C5X-S-T (5m)



CONDUCTOR COLORS:
1 - BROWN
2 - BLACK
3 - BLUE

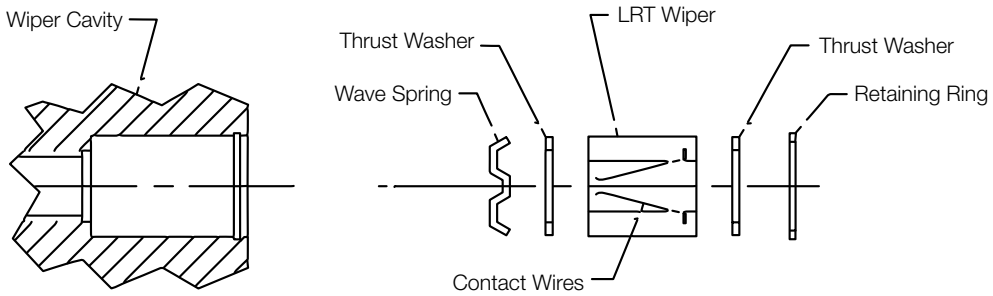


Cable: 24 AWG. PVC insulated, fine stranded copper conductors, with Gray PVC jacket with stripped and tinned ends

Note: All models have a M8 x 1 female

Position Feedback Low Friction Cylinder – Components/Repair Kits

LRT Wiper Replacement Kit



Part Number	Description	Remarks
PFLF-Wk2	Position Feedback Wiper Kit	Kit To Consist Of The Following: (1) Wave Spring, (1) LTR Wiper, (1) Guide Washer, (1) Retaining Ring, (3) Wire Connectors & Wiper/Probe Installation Instruction Sheet

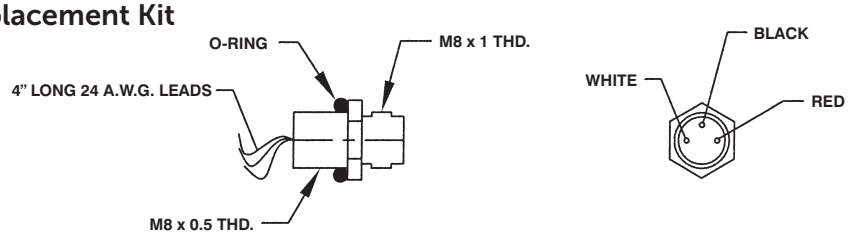
LRT Probe Replacement Kit

PROBE WIRE COLORS:
RED = SUPPLY (+)
BLACK = GROUND (-)
WHITE = OUTPUT

Part Number	Description	Remarks
PFLF-PRK-Stroke	Position Feedback Probe Replacement Kit	Kit To Consist Of The Following: One (1) LRT Probe With O-Ring & Back-Up Washer, Three (3) Wire Connectors & Wiper/Probe Installation Instruction Sheet

Replacement LRT probe ordering example: 8.00" stroke PFLF cylinder, replacement probe would be PART NO. PFLF-PRK-8.
Fractional stroke length cylinders use the next whole number. Example: 8.50" stroke replacement probe would be PFLF-PRK-9.

(3) Pin Connector Replacement Kit



Part Number	Description	Remarks
PFLF-CK	Position Feedback Connector Kit	Kit To Consist Of The Following: One (1) 3 Pin Connector With O-Ring & Three (3) Wire Connectors

PFLF Basic Cylinder Seal Kits

Bore	Part Number
1.50	PFLFSK625-150
2.00	PFLFSK625-200

Bore	Part Number
2.50	PFLFSK625-250
3.25	PFLFSK100-325

Bore	Part Number
4.00	PFLFSK100-400
5.00	PFLFSK100-500

Bore	Part Number
6.00	PFLFSK137-600
8.00	PFLFSK137-800

Replacement PFLF cylinder seal kit to consist of the following: two low friction piston seals, two tube end seals, one rod seal, one bushing o-ring and one container of low friction grease. Note: basic seal kit DOES NOT include wiper, probe or connector kits

SPCS-2 Servo Pneumatic Control System

The SPCS-2 provides a robust solution to accurate continuous closed loop pneumatic positioning. Easily installed and configured, this servo pneumatic control provides positioning accuracy with loads over 1,000 pounds and average velocity as high as 20 inches per second. Use the SPCS-2 with any TRD position feedback actuators (PFLF or a cylinder fitted with Balluff Transducers) bore sizes 1.50" - 12.00" to create a solution to your motion control application.

The SPCS-2 is typically utilized when the application requires product flexibility by providing on the fly adjustments. Manufacturing application examples: to adjust a machine's tooling, positioning gates, to position a product for further processing or to inspect its size to confirm it is within the required specification. Pneumatic control systems can achieve higher load carrying and speed capabilities than electric actuators. The SPCS-2 is a flexible, low cost motion control system that can be used on a variety of pneumatic actuator bore sizes.

How to Order

Part Number	Description
SPCS-2	Servo Pneumatic Control System
SPCS-CBL-PWR-CMD	2 meter female connector, both ends
SPCS-CBL-FBK	2 meter female/strip wire

Horizontal Application - Average Velocity				
Bore	**At Maximum Payload (in/sec)***	**Maximum Payload (lbs)**	**At 50% Maximum Payload (in/sec)**	**At 25% Maximum Payload (in/sec)**
1.50	10	100	20	30
2.00	15	200	20	30
2.50	15	315	25	30
3.25	15	450	20	20
4.00	8.5	300	9	10
5.00	4.5	400	5.5	7
6.00	4.5	800	4.5	5
8.00	2.5	1000+	2.5	2.75
10.00	1.75	1000+	1.75	1.75
12.00	1.0	1000+	1.0	1.0

Vertical Application - Average Velocity				
Bore	**At Maximum Payload (in/sec)***	**Maximum Payload (lbs)**	**At 50% Maximum Payload (in/sec)**	**At 25% Maximum Payload (in/sec)**
1.50	70	10	60	60
2.00	50	30	40	60
2.50	15	95	30	30
3.25	20	135	20	20
4.00	8	200	10	11
5.00	4	300	5	7
6.00	3.25	800	4	4.5
8.00	2	1000	2.5	2.5
10.00	2	1000+	2.0	2.0
12.00	1.25	1000+	1.0	1.0

*Average velocity at Max. Payload without overshoot

Bores 1.50" - 3.25" use low friction seals without rod wiper

Bores 4.00" - 12.00" use standard seals with rod wiper

Low friction seals greatly enhance performance on smaller bores. Using standard seals will decrease max payload and velocity.

Note: if velocity is decreased, payloads can be increased and if payloads are decreased, velocity can be increased.

Position Feedback Low Friction Cylinder – Dimensions

SPCS-2 Compared to PCS

SPCS-2	PCS
Can move 450 lbs with a 3.25" bore cylinder at 20 in/sec (no overshoot)	Can move 200 lbs with a 3.25" bore cylinder at 2 in/sec.
Operating pressure range from 0 to 150	Operating pressure range from 70 to 80 PSI
	Accuracy ± 1% of full actuator stroke
PFLF, MTS, and Balluff Compatible	PFLF and Balluff Compatible
Bore sizes 1.50" to 12.00"	Bore sizes 1.50" to 4.00"

SPCS will accept 0-10V or 4-20mA feedback signal (programmable).

	SPCS-2		PCS	
Bore	**Maximum Payload (lbs)**	**Average Velocity (in/sec)***	**Maximum Payload (lbs)**	**Average Velocity (in/sec)***
1.50	100	10	50	5.5
2.00	200	15	90	6.5
2.50	315	15	120	2
3.25	400	15	200	2
4.00	400	8.5	360	2

*Average velocity without overshoot.

Fail Safe Question: Can the valve be set to extend the cylinder in the event of a power loss?

Answer: Default position adjustment.

– 1. Remove the side plate.

– 2. When no power is applied to the valve, the default position is neutral and it will float in the last commanded position.

- a. To set the default position to an extended rod, turn the setscrew counterclockwise 1/4 or more turns.
- b. To set the default position to a retracted rod, turn the setscrew clockwise 1/4 or more turns.

Additional info: When changing default position, cylinder will begin to move after 1/4 turn of the setscrew. Turning the setscrew about 3/4 turn will reach maximum velocity. Maximum velocity with no power will generally be less than five inches per second.

Note: As system pressure bleeds, any retracting force applied to the rod will move it.