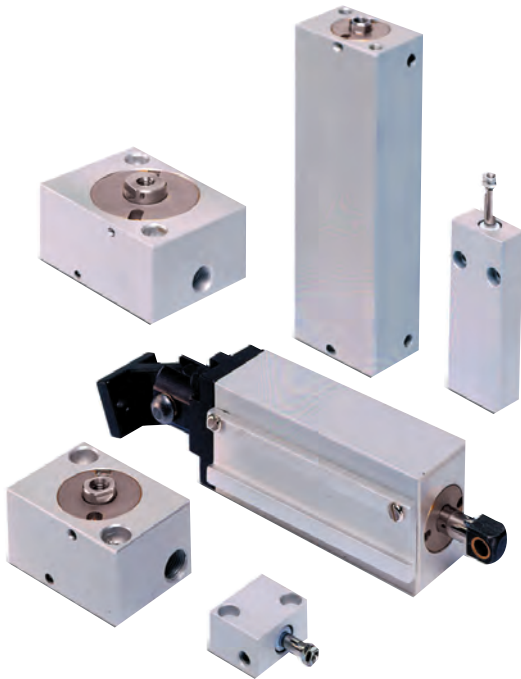


Metric Cylinders



COMPACT[®]
AUTOMATION PRODUCTS

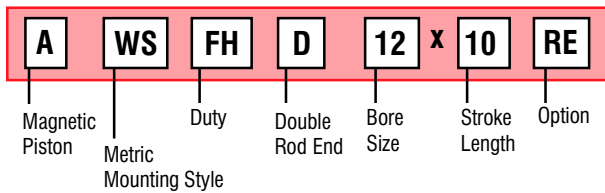


How To Order

Metric Cylinders

Creating a Part Number

Example: AWSFHD12x10RE



A *Optional* Magnetic Piston

WS Metric Mounting Style

FH *Optional* Duty Type

D *Optional* Double Rod End

12 Bore Size

10 Stroke Length

RE Option

Modifications Welcome

Special stroke lengths, port orientation, mounting configuration, rod ends.

Compact Air Products, Inc. • P.O. Box 499 • Westminster, SC 29693 • **Phone:** 864-647-9521 • **Fax:** 864-647-9574 **Website:** www.compactair.com • **E-Mail:** techsales@compactair.com

Compact® Metric Cylinders

Double Acting Compact® Cylinders, Single and Double Rod Ends
 Bores: 8mm*, 12mm, 20mm, 25mm, and 40mm
 (*double rod end is not available on 8mm bore.)



Standard Duty Metric Cylinders

Our most space efficient duty. Short rod bearing and thin piston design are for guided loads. Available with single or double rod end.



Heavy Duty Metric Cylinders

Ordering Suffix

FH Full Husky®

Longer rod bearing plus Tuf-Coat® PTFE piston are for heavy duty service. Available with single or double rod end.



Intermediate Duty Metric Cylinders

Ordering Suffix

HH Half Husky®

A combination of our standard and heavy duty. Long rod bearing and thin piston design are for medium duty service. Available with single rod end only.

Metric Cylinder Forces - kgf (lbf)

Bore	Piston Area mm ²	Pre-Calculated Force in kgf (lbf)				Pressure Rating BAR (PSI)	
		3 BAR	6 BAR	10 BAR	10 BAR	Pneumatic	Hydraulic
8	Push 50	1,5 (3.4)	3,1 (6.7)	4,1 (9.0)	NA	8 (117)	NA
	Pull 38	1,2 (2.6)	2,3 (5.1)	3,1 (6.8)	NA		
12	Push 113	3,5 (7.6)	6,9 (15.2)	9,2 (20.3)	11,5 (25.4)	8 (117)	NA
	Pull 85	2,6 (5.7)	5,2 (11.5)	6,9 (15.3)	8,7 (19.1)		
20	Push 314	9,6 (21.2)	19,2 (42.4)	25,6 (56.5)	32,0 (70.6)	15 (217)	30 (435)
	Pull 264	8,0 (17.7)	16,1 (35.5)	21,5 (47.4)	26,9 (59.3)		
25	Push 491	15,0 (33.1)	30,0 (66.2)	40,1 (88.3)	50,1 (110.4)	15 (217)	30 (435)
	Pull 412	12,6 (27.8)	25,2 (55.6)	33,6 (74.1)	42,0 (92.6)		
40	Push 1257	38,5 (84.8)	76,9 (169.6)	102,6 (226.1)	128,2 (282.7)	15 (217)	30 (435)
	Pull 1056	32,3 (71.2)	64,6 (142.5)	86,2 (190.0)	107,7 (237.5)		

Conversion Formulas

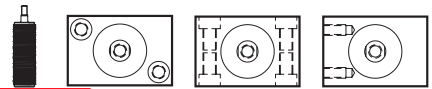
1 BAR = 0,0102 kgf/mm² = 14.5 PSI
 1 kgf = 2.2046 lbf

Example:

- 3 BAR x .0102 = .0306 kgf/mm²
- .0306 kgf/mm² x 50 mm² = 1.53 kgf
- 1.53 kgf x 2.2046 = 3.37 lbf

Styles

Icon shown on top of each dimensional page



Rectangle - End Mount

Non Magnetic Piston

Ordering Prefix **WS**



Magnetic Piston

Ordering Prefix **AWS**



Sensors Sold Separately
Flip to our Comtronic®
Limit Sensor catalog.



Base - Side Mount

Non Magnetic Piston

Ordering Prefix **WB**

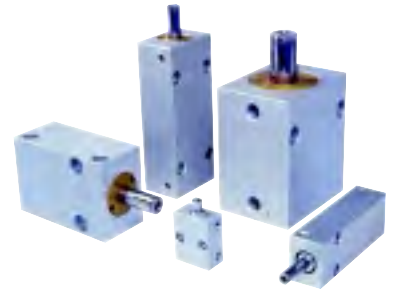


Magnetic Piston

Ordering Prefix **AWB**



Sensors Sold Separately
Flip to our Comtronic®
Limit Sensor catalog.



Thin - Side Mount

Non Magnetic Piston

Ordering Prefix **WT**



Magnetic Piston

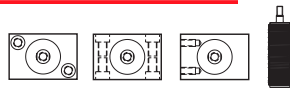
Ordering Prefix **AWT**



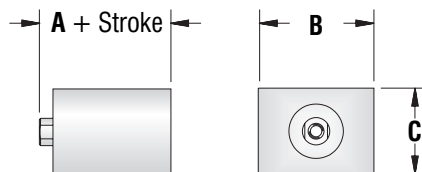
Sensors Sold Separately
Flip to our Comtronic®
Limit Sensor catalog.



Envelope Dimensions



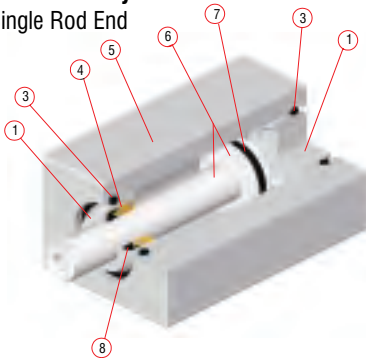
Compact® Metric Cylinders					
	A			B	C
Bore	Standard	Intermediate	Heavy		
8	16	21	26	23	13
12	19	24	29	25,5	19
20	23	28	33	39	26
25	23	28	33	47	33
40	31	36	41	65	49



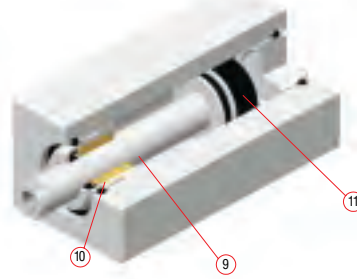
Components and Material

8mm and 12mm Bore Double Acting, Snap-Cap® Design

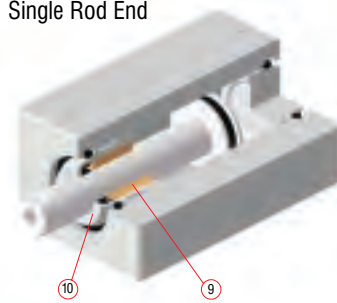
Standard Duty Single Rod End



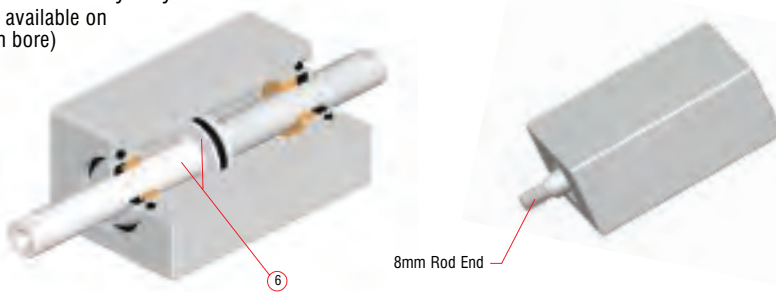
Heavy Duty Single Rod End



Intermediate Duty Single Rod End



Double Rod End Standard or Heavy Duty (Not available on 8mm bore)

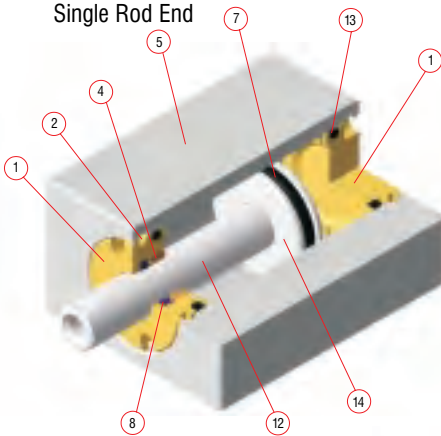


No.	Description	Material
1	End Cap	8mm: Plastic 12mm-40mm: Aluminum
3	Retainer Seal	O-ring
4	Rod Bearing	Bronze
5	Cylinder Body	Aluminum
6	Solid Piston Rod Assembly	Stainless Steel
7	Piston Seal	Low Friction Nitrile
8	Rod Seal	Low Friction Nitrile
9	Husky® Rod Bearing	Bronze
10	Husky® End Cap	Aluminum
11	Wear Collar	Aluminum with "TFE" Coating

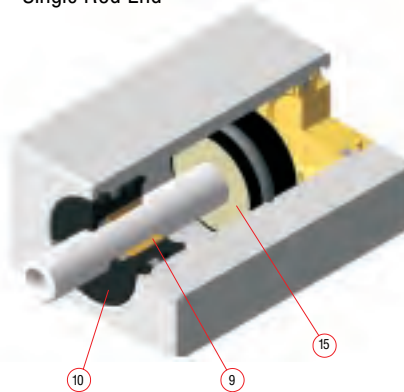
Snap-Cap®, Magnetic Piston and Hydraulic option cylinder constructions may deviate from above listing — consult factory for additional information.

20mm - 40mm Bore Double Acting, Retaining Wire Design

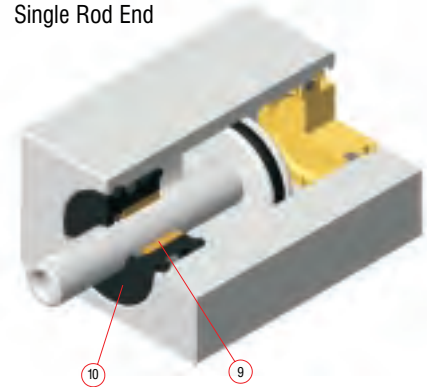
Standard Duty Single Rod End



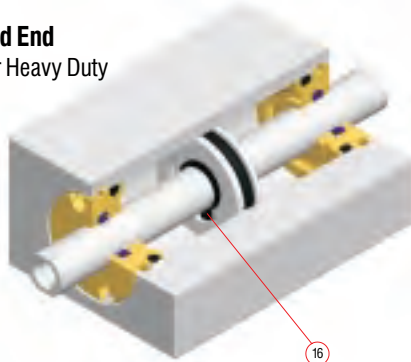
Heavy Duty Single Rod End



Intermediate Duty Single Rod End



Double Rod End Standard or Heavy Duty



No.	Description	Material
1	End Cap	Aluminum
2	Retaining Wire	Stainless Steel
4	Rod Bearing	Bronze
5	Cylinder Body	Aluminum
7	Piston Seal	Low Friction Nitrile
8	Rod Seal	Low Friction Nitrile
9	Husky® Rod Bearing	Bronze
10	Husky® End Cap	Aluminum
12	Tuf-Coat II® Piston Rod	Stainless Steel with Custom Finish
13	End Cap Seal	O-ring
14	Piston	Aluminum
15	Tuf-Coat® Piston	Aluminum with "TFE" Coating
16	Snap Ring	Carbon Steel Spring

Magnetic Piston and Hydraulic option cylinder constructions may deviate from above listing — consult factory for additional information.



Optional Magnetic Piston - Available on any cylinder, style or duty.

8mm - 40mm Components and Material

- A) The AccuGrain® Bore** is diamond honed and work hardened for roundness and precision tolerances. The AccuGrain® finish retains lubrication which enhances piston seal life. This trademark finish ensures low breakaway friction and seal longevity.
- B) Port Orifices** enter directly into the bore; no turns, tapers or cross drilling. Crisp, powerful response to pneumatic pressure provides speed, control, and faster cycle time.
- C) Lubrication** on Snap-Cap® design (8mm and 12mm) is silicone grease. Larger bores (20mm - 40mm) receive a Teflon® base grease. No additional lubrication is required, although it may be added. Other compounds are available.
- D) End Caps** ① ⑩ are machined of high grade aluminum alloy and anodized for protection against corrosion.
- 8mm & 12mm bore end caps feature our patented Snap-Cap® design with elastomeric retainer seal that aids in absorbing piston impact and extends cylinder life. 8mm bore utilizes a PET plastic rod end cap.
 - 20mm - 40mm bore and larger feature our patented wire retainer design.
- Optional urethane cushions may be added when additional impact resistance is required, available on 20mm - 40mm bore.*
- E) Retaining Wire** ② is a patented stainless wire-form end cap retainer. This design provides more security than common fasteners and tie rods. It is easily removed for maintenance, altering seal types, or seal replacement.
- F) Rod Bearing** ④ ⑨ varies according to duty and bore size.
- 8mm Bore Snap-Cap®
All duties - Our polyethylene rod end cap doubles as the rod bearing, allowing smooth, accurate, low friction linear movement.
 - 12mm - 40mm Bore
Standard Duty - Sintered bronze
Husky Duty - Long, oil impregnated bronze
- G) Cylinder Body** ⑤ is a thick-walled, diamond honed extrusion with a flat, clear anodized, clean exterior. Tight tolerances and concentricity guarantee longer life. Total Compact® envelope is up to 60% smaller than typical cylinders.

- H) Seals** ③ ⑦ ⑧ ⑬ are constructed of high grade, low friction, Nitrile materials. Optional seal materials include: HTV, HYD, and VHYD — See Seal Descriptions in 'Accessories' section.
- I) Piston Construction** ⑥ ⑭ ⑯
- 8mm & 12mm Bore
 - Single rod end cylinder is a solid one piece construction
 - 12mm double rod end cylinder has a set screw construction.
 - 20mm - 40mm Bore
 - Single rod end cylinder - the lightweight aluminum piston is attached to the rod with a flat head socket screw. A thread adhesive is used to assure sealing and secure the assembly from shock and vibration damage.
 - Double rod end cylinders - the piston and rod feature a snap-ring construction.

For strength and higher pressure ratings, alternate constructions are offered.

Additional Features:

- 100% rebuildable
- 100% bubble tested at 0,7 and 10 BAR before leaving the factory
- Pneumatic service - standard
Optional low pressure hydraulic service up to 30 BAR (435 PSI) on 20mm - 40mm bore.*
(*Hydraulic service available upon request only.)



8mm Bore

Snap-Cap® Design

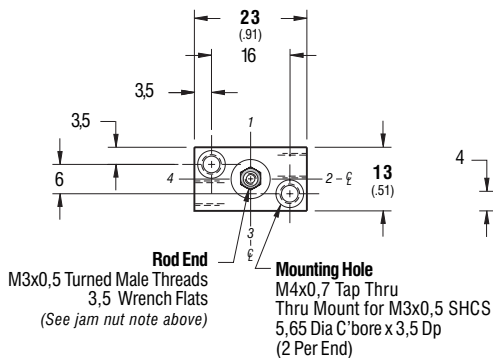
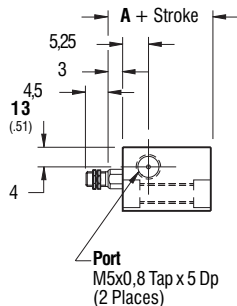
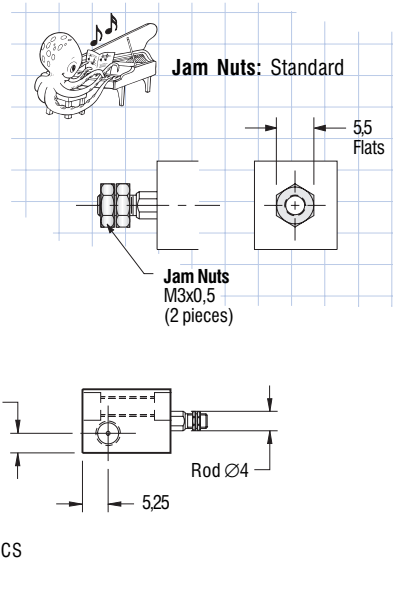
Non Magnetic and Magnetic Piston

<p>First Angle Projection</p>	<p>Double Acting</p>
<p>Fitting: 10-32 inch thread will fit and function in M5 port.</p>	

		Part Number		
Duty	Single Rod	Stock Stroke Length	A	
Non Magnetic Piston	Standard	WS8x____	5	16

Standard Mounting:

TF TR
TM TBE



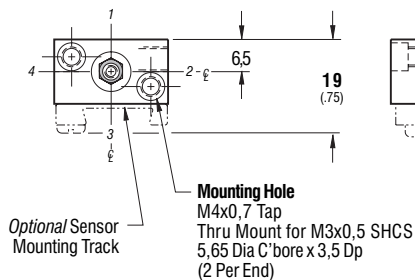
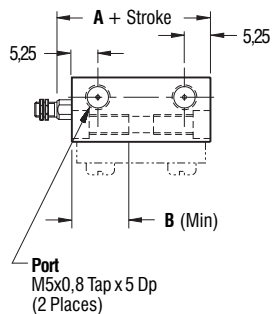
		Part Number		
Duty	Single Rod	Stock Stroke Length (in 5mm increments)	A	B
Non Magnetic Piston	Standard	WS8x____	10 - 15	16, 9,5
	Intermediate	WSHH8x____	5 - 10	21, 9,5
	Heavy	WSFH8x____	5	26, 9,5
Magnetic Piston	Standard	AWS8x____	5	26, 11,5

Standard Mounting:

TF TR TM TBE

This stroke length allows only one sensor.

—Information same as above except where noted—



		Part Number		
Duty	Single Rod	Stock Stroke Length (in 5mm increments)	A	
Non Magnetic Piston	Standard	WS8x____	20 - 25	16
	Intermediate	WSHH8x____	15 - 30	21
	Heavy	WSFH8x____	10 - 40	26
Magnetic Piston	Standard	AWS8x____	10 - 25	26
	Intermediate	AWSHH8x____	5 - 30	31
	Heavy	AWSFH8x____	5 - 30	36

Standard Mounting: TF
Optional Mounting: Specify suffix

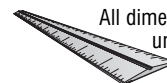
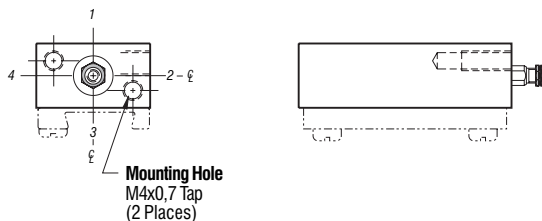
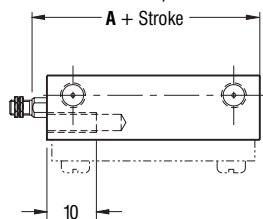
TR TBE TM*

*38mm body length and shorter

Body lengths 42mm and shorter allow only one sensor.



—Information same as above except where noted—





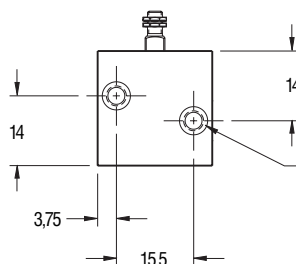
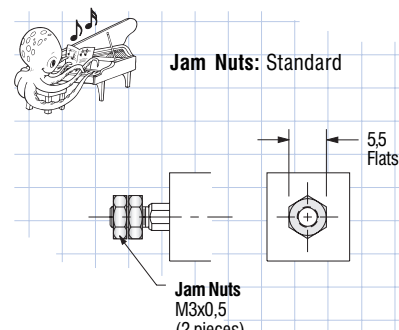
First Angle Projection Double Acting

Fitting: 10-32 inch thread will fit and function in M5 port.

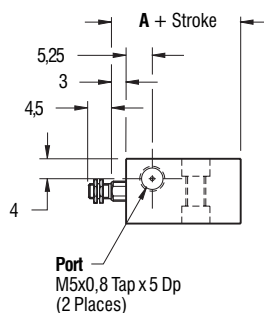
Snap-Cap® Design

8mm Bore Non Magnetic and Magnetic Piston

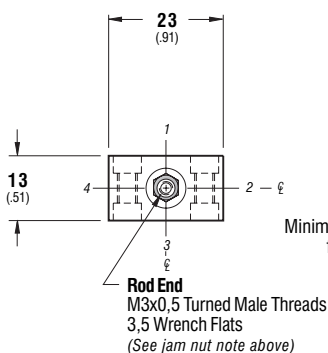
		Part Number		
Duty	Single Rod	Stock Stroke Length (in 5mm increments)	A	
Non Magnetic Piston	Standard	WB8x____	5 - 10	16
	Intermediate	WBHH8x____	5	21



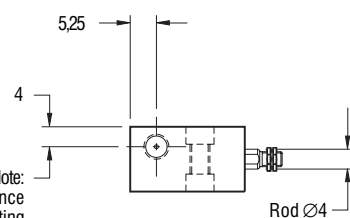
Mounting Hole
M4x0,7 Tap Thru
Thru Mount for M3x0,5 SHCS
5,65 Dia C' bore x 3,5 Dp
(2 Per Side)



Port
M5x0,8 Tap x 5 Dp
(2 Places)

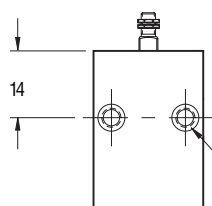


Note:
Minimal Clearance for Air Fitting

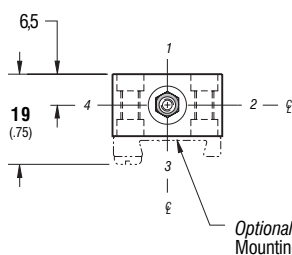
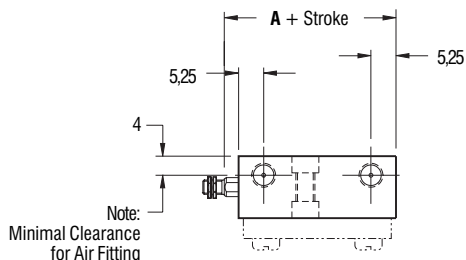


		Part Number		
Duty	Single Rod	Stock Stroke Length (in 5mm increments)	A	
Non Magnetic Piston	Standard	WB8x____	15 - 25	16
	Intermediate	WBHH8x____	10 - 30	21
	Heavy	WBFH8x____	5 - 40	26
Magnetic Piston	Standard	AWB8x____	5 - 25	26
	Intermediate	AWBHH8x____	5 - 30	31
	Heavy	AWBFH8x____	5 - 30	36

—Information same as above except where noted—



Mounting Hole
M4x0,7 Tap Thru
Thru Mount for M3x0,5 SHCS
5,65 Dia C' bore x 3,5 Dp
(2 Per Side)



All dimensions are in millimeters unless otherwise noted.



Part Number

Stroke

Option - See 'Accessories' section



8mm Bore

Snap-Cap® Design

Non Magnetic and Magnetic Piston

First Angle Projection



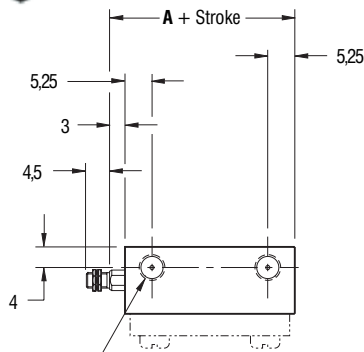
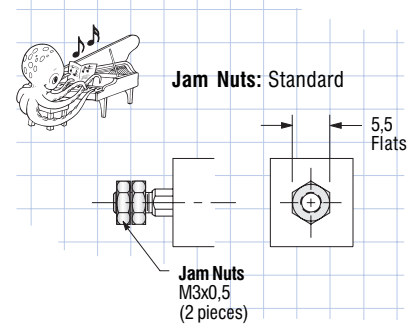
Double Acting



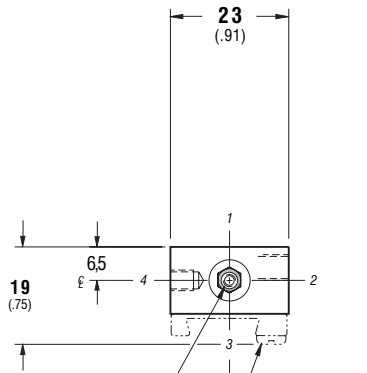
Fitting: 10-32 inch thread will fit and function in M5 port.

		Part Number		
Duty		Single Rod	Stock Stroke Length (in 5mm increments)	A
Non Magnetic Piston	Standard	WT8x_____	10 - 25	16
	Intermediate	WTHH8x_____	5 - 30	21
	Heavy	WTFH8x_____	5 - 40	26
Magnetic Piston	Standard	AWT8x_____	5 - 25	26
	Intermediate	AWTHH8x_____	5 - 30	31
	Heavy	AWTFH8x_____	5 - 30	36

Body lengths 42mm and shorter allow only one sensor.

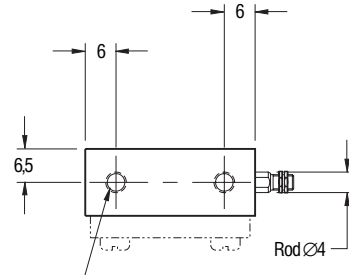


Port
M5x0,8 Tap x 5 Dp
(2 Places)

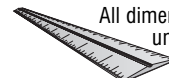


Rod End
M3x0,5 Turned Male Threads
3,5 Wrench Flats
(See jam nut note above)

Optional Sensor Mounting Track



Mounting Hole
M4x0,7 Tap x 4,5 Dp
(2 Places)





First Angle Projection Double Acting

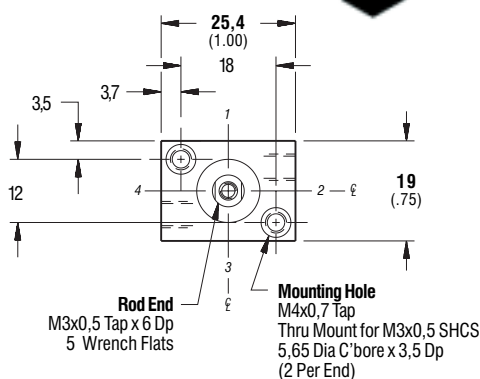
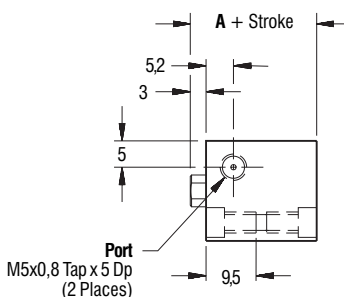
Fitting: 10-32 inch thread will fit and function in M5 port.

Snap-Cap® Design

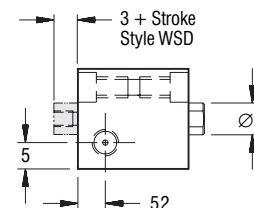
12mm Bore Non Magnetic and Magnetic Piston

Duty	Part Number		Stock Stroke Length (in 5mm increments)	A
	Single Rod	Double Rod		
Non Magnetic Piston	Standard	WS12x___ WSD12x___	5	19

Standard Mounting: TF TR TM TBE

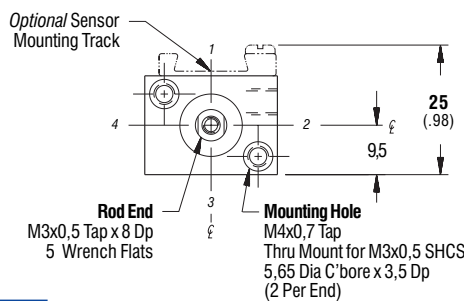
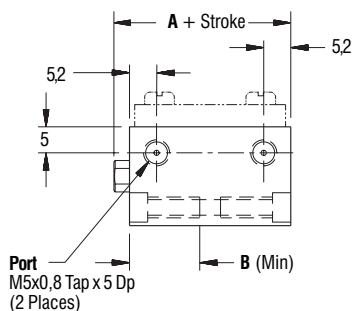


This stroke length allows only one sensor.

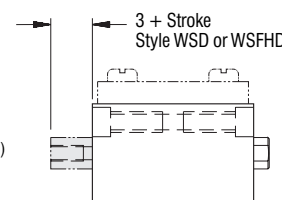


Duty	Part Number		Stock Stroke Length (in 5mm increments)	A	B
	Single Rod	Double Rod			
Non Magnetic Piston	Standard	WS12x___ WSD12x___	10 - 15	19	11,5
	Intermediate	WSHH12x___	5 - 10	24	11,5
	Heavy	WSFH12x___ WSFHD12x___	5	29	13,5
Magnetic Piston	Standard	AWS12x___ AWSD12x___	5	29	13,5

Standard Mounting: TF TR TM TBE



This stroke length allows only one sensor.



—Information same as above except where noted—

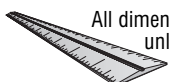
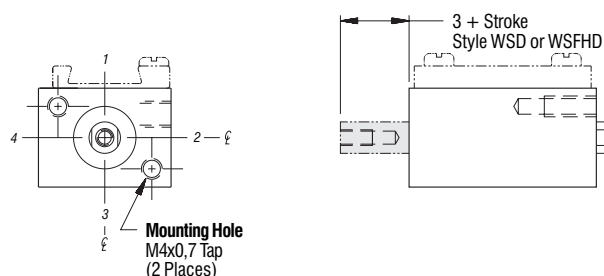
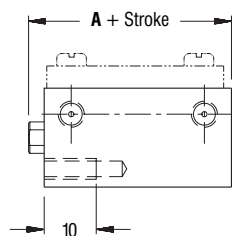
Duty	Part Number		Stock Stroke Length (in 5mm increments)	A
	Single Rod	Double Rod		
Non Magnetic Piston	Standard	WS12x___ WSD12x___	20 - 50	19
	Intermediate	WSHH12x___	15 - 50	24
	Heavy	WSFH12x___ WSFHD12x___	10 - 50	29
Magnetic Piston	Standard	AWS12x___ AWSD12x___	10 - 50	29
	Intermediate	AWSHH12x___	5 - 50	34
	Heavy	AWSFH12x___ AWSFHD12x___	5 - 50	39

Standard Mounting: TF
Optional Mounting: Specify suffix

TR TBE TM*

*41mm body length and shorter

Body lengths 45mm and shorter allow only one sensor.



All dimensions are in millimeters unless otherwise noted.

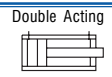
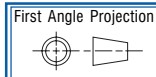
Part Number X Stroke Option - See 'Accessories' section



12mm Bore

Snap-Cap® Design

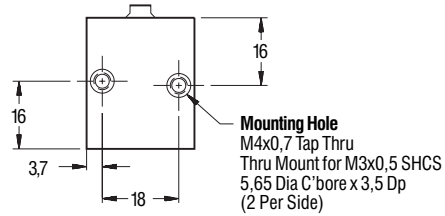
Non Magnetic and Magnetic Piston



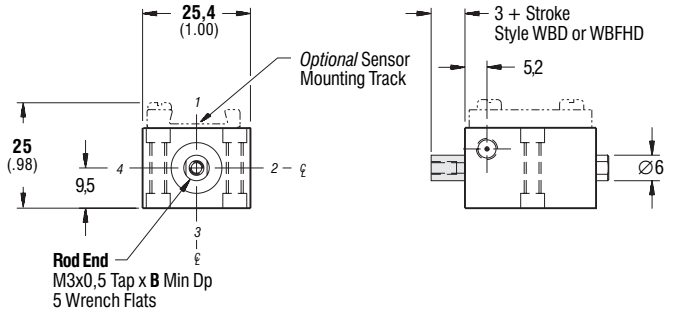
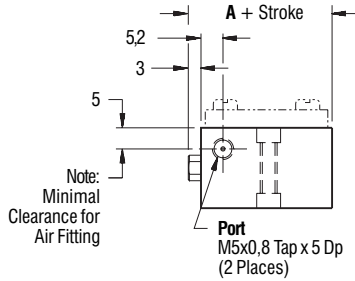
Fitting: 10-32 inch thread will fit and function in M5 port.

12mm Bore • 12mm Bore • 12mm Bore • 12mm Bore • 12mm Bore

		Part Number		Stock Stroke Length (in 5mm increments)	A	B
Duty		Single Rod	Double Rod			
Non Magnetic Piston	Standard	WB12x___	WBD12x___	5 - 15	19	6
	Intermediate	WBHH12x___		5 - 10	24	8
	Heavy	WBFH12x___	WBFHD12x___	5	29	8
Magnetic Piston	Standard	AWB12x___	AWBD12x___	5	29	8



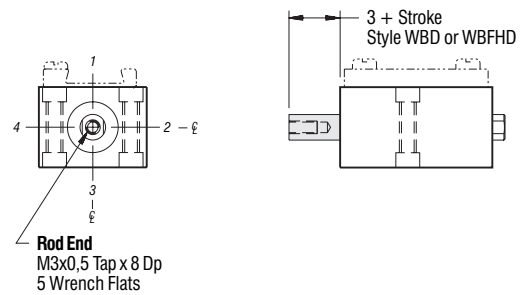
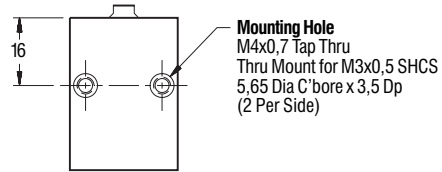
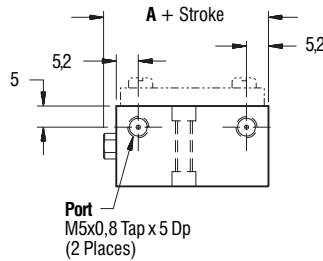
This stroke length allows only one sensor.



		Part Number		Stock Stroke Length (in 5mm increments)	A
Duty		Single Rod	Double Rod		
Non Magnetic Piston	Standard	WB12x___	WBD12x___	20 - 50	19
	Intermediate	WBHH12x___		15 - 50	24
	Heavy	WBFH12x___	WBFHD12x___	10 - 45	29
Magnetic Piston	Standard	AWB12x___	AWBD12x___	10 - 50	29
	Intermediate	AWBHH12x___		5 - 50	34
	Heavy	AWBFH12x___	AWBFHD12x___	5 - 45	39

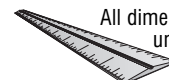
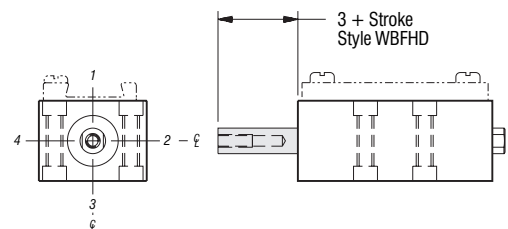
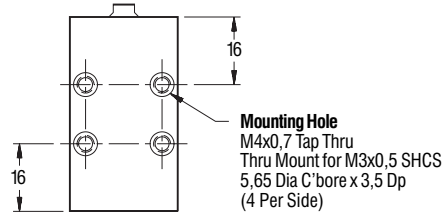
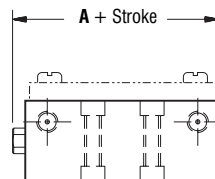
—Information same as above except where noted—

Body lengths 45mm and shorter allow only one sensor.



		Part Number		Stock Stroke Length (in 5mm increments)	A
Duty		Single Rod	Double Rod		
Non Magnetic Piston	Heavy	WBFH12x___	WBFHD12x___	50	29
Magnetic Piston	Heavy	AWBFH12x___	AWBFHD12x___	50	39

—Information same as above except where noted—





First Angle Projection

Double Acting

Fitting: 10-32 inch thread will fit and function in M5 port.

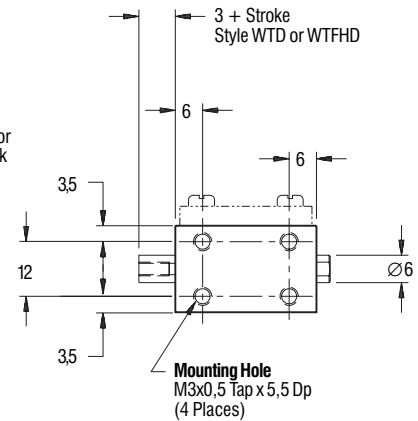
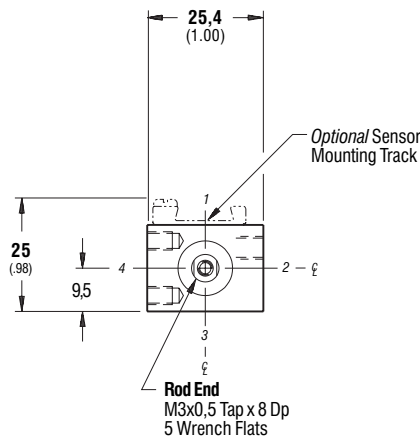
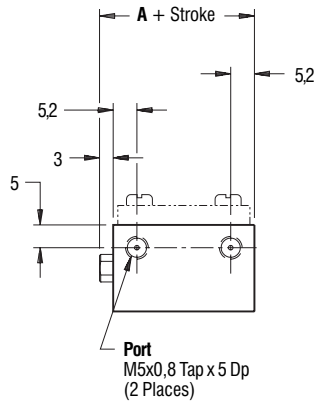
Snap-Cap® Design

12mm Bore Non Magnetic and Magnetic Piston

		Part Number		Stock Stroke Length (in 5mm increments)	A
Duty		Single Rod	Double Rod		
Non Magnetic Piston	Standard	WT12x_____	WTD12x_____	10 - 50	19
	Intermediate	WTHH12x_____		5 - 50	24
	Heavy	WTFH12x_____	WTFHD12x_____	5 - 50	29
Magnetic Piston	Standard	AWT12x_____	AWTD12x_____	5 - 50	29
	Intermediate	AWTHH12x_____		5 - 50	34
	Heavy	AWTFH12x_____	AWTFHD12x_____	5 - 50	39



Body lengths 45mm and shorter allow only one sensor.



12mm Bore • 12mm Bore • 12mm Bore • 12mm Bore • 12mm Bore • 12mm Bore

All dimensions are in millimeters unless otherwise noted.

x

Part Number

Stroke

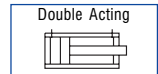
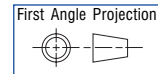
Option - See 'Accessories' section



20mm Bore

End Mount

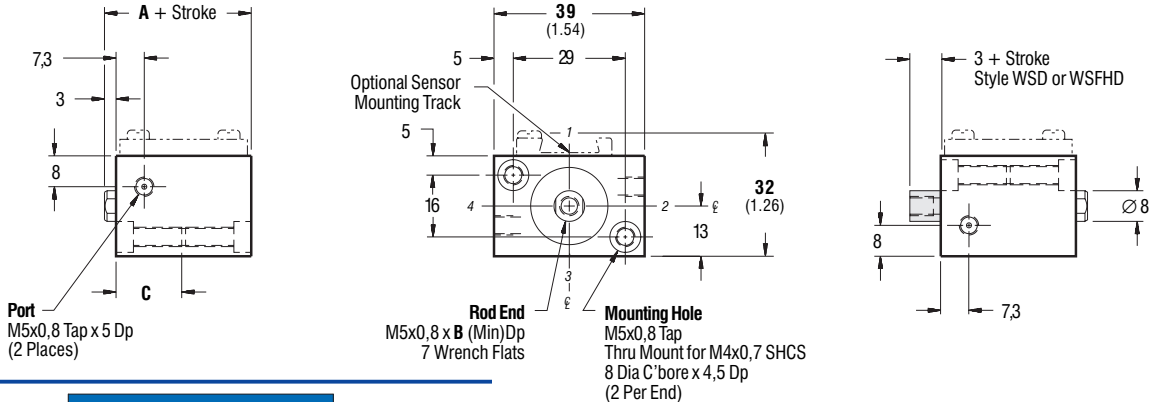
Non Magnetic and Magnetic Piston



20mm Bore • 20mm Bore • 20mm Bore • 20mm Bore • 20mm Bore

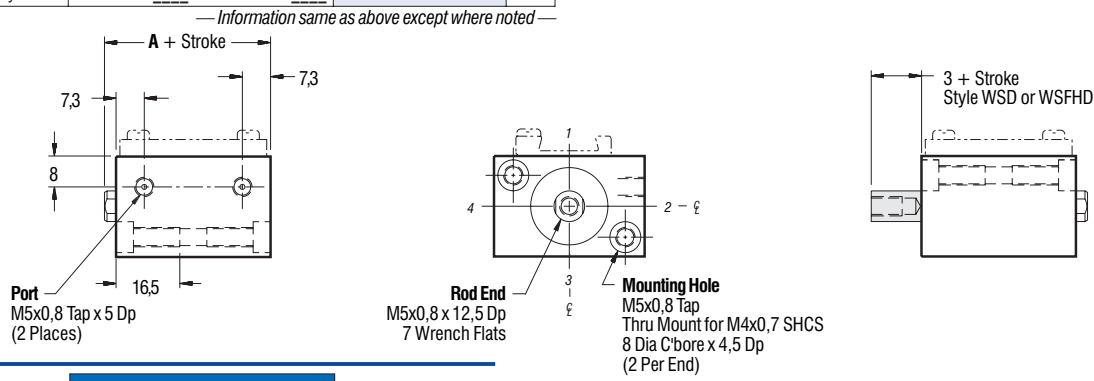
		Part Number		Stock Stroke Length in 5mm increments	A	B per 5mm, respectively	C
Duty		Single Rod	Double Rod				
Non Magnetic Piston	Standard	WS20x	WSD20x	5, 10, 15	23	8, 10, 12,5	12,5
	Intermediate	WSHH20x		5, 10	28	10, 12,5	15
	Heavy	WSFH20x	WSFHD20x	5	33	12,5	17,5
Magnetic Piston	Standard	AWS20x	AWSD20x	5	33	10	17,5

Standard Mounting:
TF TR TM TBE



		Part Number		Stock Stroke Length in 5mm increments	A
Duty		Single Rod	Double Rod		
Non Magnetic Piston	Standard	WS20x	WSD20x	20 - 25	23
	Intermediate	WSHH20x		15 - 20	28
	Heavy	WSFH20x	WSFHD20x	10 - 15	33
Magnetic Piston	Standard	AWS20x	AWSD20x	10 - 15	33
	Intermediate	AWSHH20x		5 - 10	38
	Heavy	AWSFH20x	AWSFHD20x	5	43

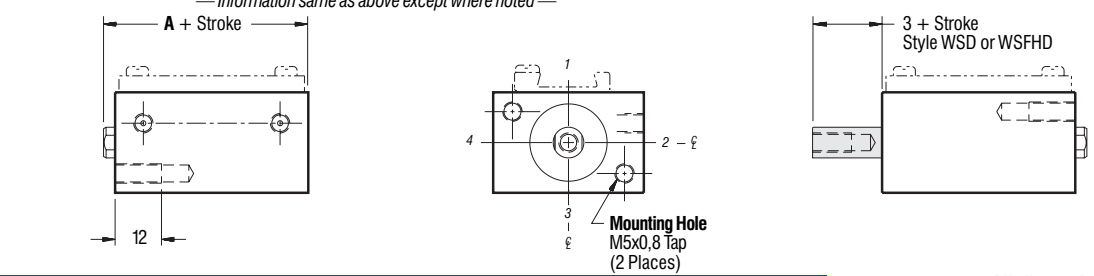
Standard Mounting:
TF TR TM TBE



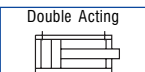
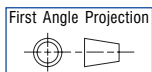
		Part Number		Stock Stroke Length in 5mm increments	A
Duty		Single Rod	Double Rod		
Non Magnetic Piston	Standard	WS20x	WSD20x	30 - 100	23
	Intermediate	WSHH20x		25 - 100	28
	Heavy	WSFH20x	WSFHD20x	20 - 100	33
Magnetic Piston	Standard	AWS20x	AWSD20x	20 - 100	33
	Intermediate	AWSHH20x		15 - 100	38
	Heavy	AWSFH20x	AWSFHD20x	10 - 100	43

Standard Mounting: **TF**
Optional Mounting: Specify suffix

TR TBE TM*
*70mm body length and shorter



All dimensions are in millimeters unless otherwise noted.

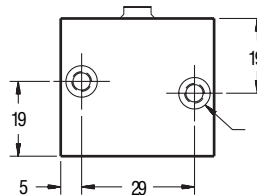


20mm Bore

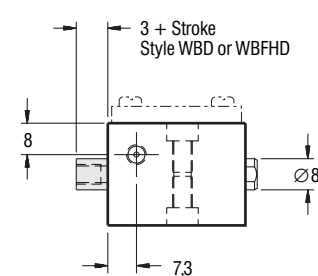
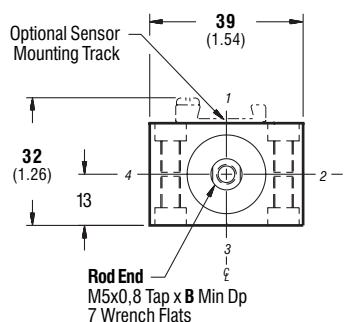
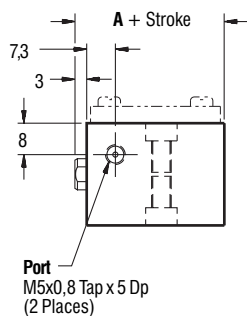
Non Magnetic and Magnetic Piston

20mm Bore • 20mm Bore • 20mm Bore • 20mm Bore • 20mm Bore • 20mm Bore

Duty	Part Number		Stock Stroke Length (in 5mm increments)	A	B per 5mm respectively
	Single Rod	Double Rod			
Non Magnetic Piston	Standard	WB20x___ WBD20x___	5, 10, 15	23	8, 10, 12,5
	Intermediate	WBHH20x___	5, 10	28	10, 12,5
	Heavy	WBFH20x___ WBFHD20x___	5	33	12,5
Magnetic Piston	Standard	AWB20x___ AWBD20x___	5	33	10

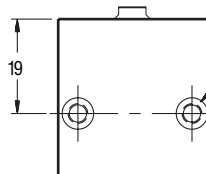
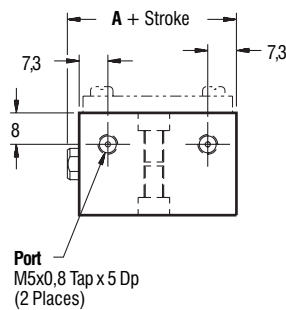
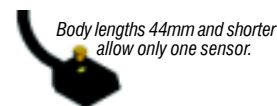


Mounting Hole
M5x0,8 Tap x 8 Dp
Thru Mount for M4x0,7 SHCS
8 Dia C' bore x 4,5 Dp
(2 Per Side)

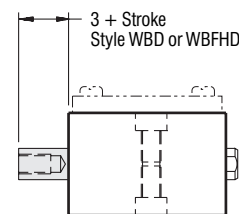
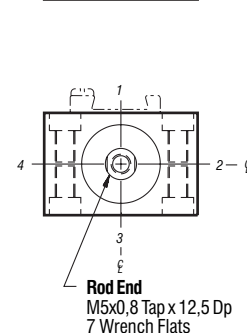


Duty	Part Number		Stock Stroke Length (in 5mm increments)	A
	Single Rod	Double Rod		
Non Magnetic Piston	Standard	WB20x___ WBD20x___	20 - 55	23
	Intermediate	WBHH20x___	15 - 50	28
	Heavy	WBFH20x___ WBFHD20x___	10 - 45	33
Magnetic Piston	Standard	AWB20x___ AWBD20x___	10 - 45	33
	Intermediate	AWBHH20x___	5 - 40	38
	Heavy	AWBFH20x___ AWBFHD20x___	5 - 35	43

— Information same as above except where noted —

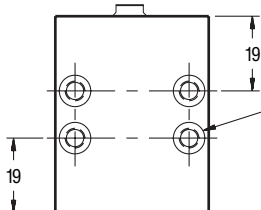
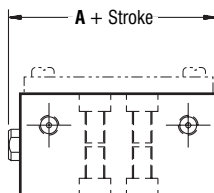


Mounting Hole
M5x0,8 Tap x 8 Dp
Thru Mount for M4x0,7 SHCS
8 Dia C' bore x 4,5 Dp
(2 Per Side)

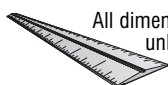
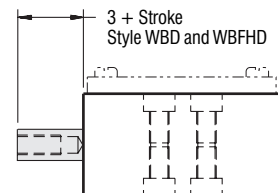
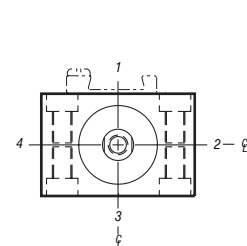


Duty	Part Number		Stock Stroke Length (in 5mm increments)	A
	Single Rod	Double Rod		
Non Magnetic Piston	Standard	WB20x___ WBD20x___	60 - 100	23
	Intermediate	WBHH20x___	55 - 100	28
	Heavy	WBFH20x___ WBFHD20x___	50 - 100	33
Magnetic Piston	Standard	AWB20x___ AWBD20x___	50 - 100	33
	Intermediate	AWBHH20x___	45 - 100	38
	Heavy	AWBFH20x___ AWBFHD20x___	40 - 100	43

— Information same as above except where noted —



Mounting Hole
M5x0,8 Tap x 8 Dp
Thru Mount for M4x0,7 SHCS
8 Dia C' bore x 4,5 Dp
(4 Per Side)



All dimensions are in millimeters unless otherwise noted.

Part Number X

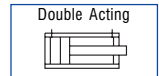
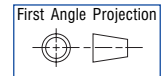
Stroke Option - See 'Accessories' section



20mm Bore

Side Mount

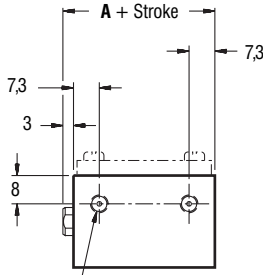
Non Magnetic and Magnetic Piston



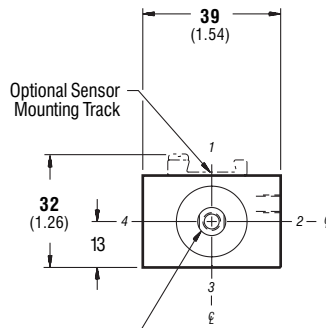
20mm Bore • 20mm Bore • 20mm Bore • 20mm Bore • 20mm Bore

		Part Number		Stock Stroke Length (in 5mm increments)	A
Duty		Single Rod	Double Rod		
Non Magnetic Piston	Standard	WT20x_____	WTD20x_____	20 - 100	23
	Intermediate	WTHH20x_____		15 - 100	28
	Heavy	WTFH20x_____	WTFHD20x_____	10 - 100	33
Magnetic Piston	Standard	AWT20x_____	AWTD20x_____	10 - 100	33
	Intermediate	AWTHH20x_____		5 - 100	38
	Heavy	AWTFH20x_____	AWTFHD20x_____	5 - 100	43

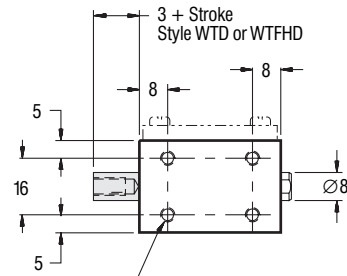
Body lengths 44mm and shorter
allow only one sensor.



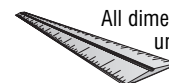
Port
M5x0.8 Tap x 5 Dp
(2 Places)

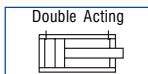
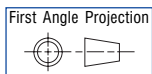


Rod End
M5x0.8 Tap x 12.5 Dp
7 Wrench Flats



Mounting Hole
M4x0.7 Tap x 8.5 Dp
(4 Places)



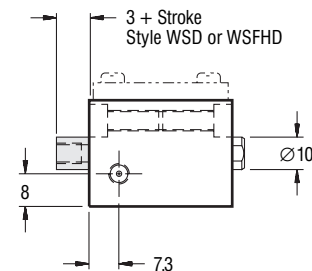
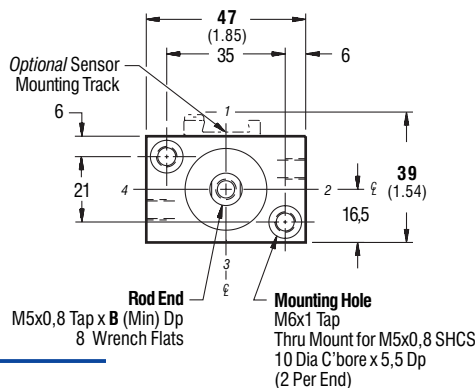
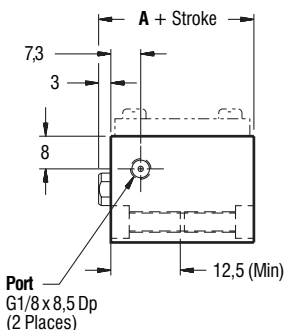


25mm Bore

Non Magnetic and Magnetic Piston

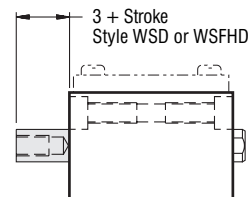
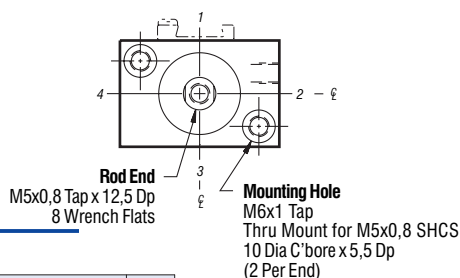
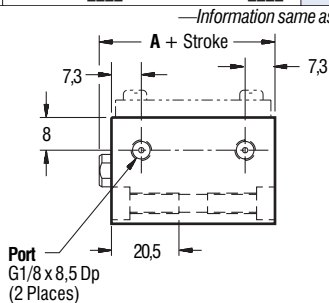
		Part Number		Stock Stroke Length in 5mm increments	A	B per 5mm respectively
Duty		Single Rod	Double Rod			
Non Magnetic Piston	Standard	WS25x___	WSD25x___	5, 10, 15	23	8, 10, 12,5
	Intermediate	WSHH25x___		5, 10	28	10, 12,5
	Heavy	WSFH25x___	WSFHD25x___	5	33	12,5
Magnetic Piston	Standard	AWS25x___	AWSD25x___	5, 10	28	10
	Intermediate	AWSHH25x___		5	33	12,5

Standard Mounting:
TF TR TM TBE



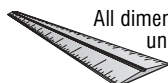
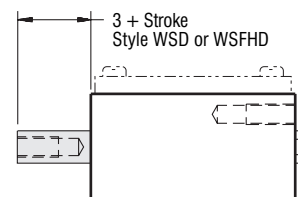
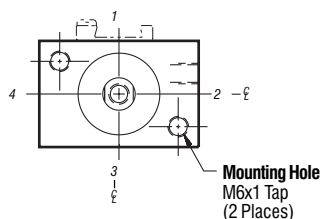
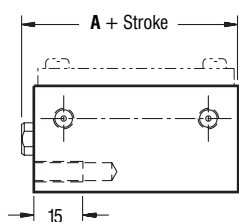
		Part Number		Stock Stroke Length (in 5mm increments)	A
Duty		Single Rod	Double Rod		
Non Magnetic Piston	Standard	WS25x___	WSD25x___	20 - 25	23
	Intermediate	WSHH25x___		15 - 20	28
	Heavy	WSFH25x___	WSFHD25x___	10 - 15	33
Magnetic Piston	Standard	AWS25x___	AWSD25x___	15 - 20	28
	Intermediate	AWSHH25x___		10 - 15	33
	Heavy	AWSFH25x___	AWSFHD25x___	5 - 10	38

Standard Mounting:
TF TR TM TBE



		Part Number		Stock Stroke Length (in 5mm increments)	A
Duty		Single Rod	Double Rod		
Non Magnetic Piston	Standard	WS25x___	WSD25x___	30 - 100	23
	Intermediate	WSHH25x___		25 - 100	28
	Heavy	WSFH25x___	WSFHD25x___	20 - 100	33
Magnetic Piston	Standard	AWS25x___	AWSD25x___	25 - 100	28
	Intermediate	AWSHH25x___		20 - 100	33
	Heavy	AWSFH25x___	AWSFHD25x___	15 - 100	38

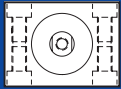
Standard Mounting: TF
Optional Mounting: Specify suffix
TR TBE TM*
*70mm body length and shorter



All dimensions are in millimeters unless otherwise noted.

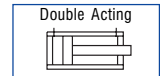
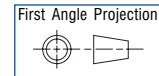
Part Number X

Stroke Option - See 'Accessories' section



25mm Bore

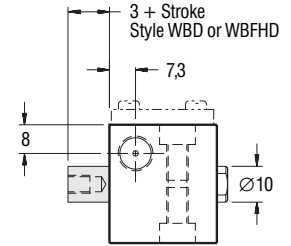
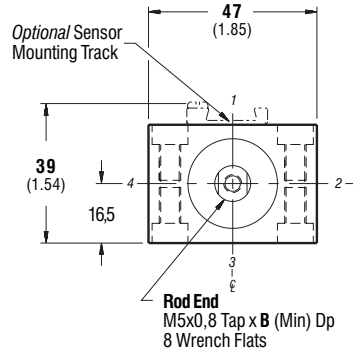
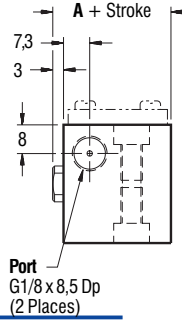
Side Mount Non Magnetic and Magnetic Piston



25mm Bore • 25mm Bore • 25mm Bore • 25mm Bore • 25mm Bore

Duty	Part Number		Stock Stroke Length (in 5mm increments)	A	B per 5mm respectively
	Single Rod	Double Rod			
Non Magnetic Piston	Standard	WB25x___ WBD25x___	5, 10, 15	23	8, 10, 12,5
	Intermediate	WBHH25x___	5, 10	28	10, 12,5
	Heavy	WBFH25x___ WBFHD25x___	5	33	12,5
Magnetic Piston	Standard	AWB25x___ AWBD25x___	5, 10	28	10, 12,5
	Intermediate	AWBHH25x___	5	33	12,5

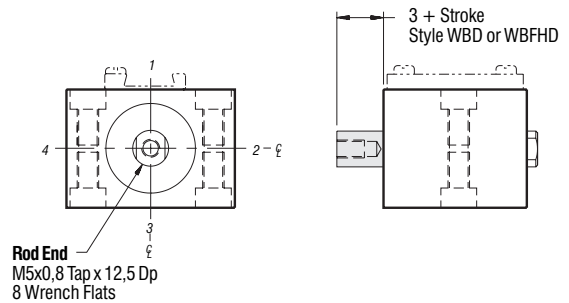
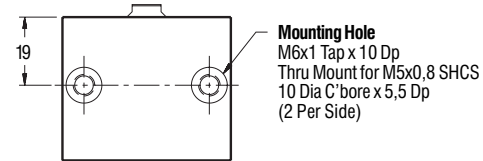
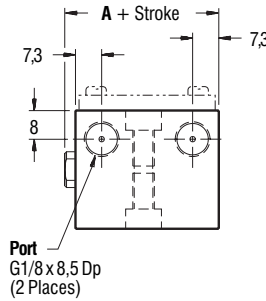
This stroke length allows only one sensor.



Duty	Part Number		Stock Stroke Length (in 5mm increments)	A
	Single Rod	Double Rod		
Non Magnetic Piston	Standard	WB25x___ WBD25x___	20 - 55	23
	Intermediate	WBHH25x___	15 - 50	28
	Heavy	WBFH25x___ WBFHD25x___	10 - 45	33
Magnetic Piston	Standard	AWB25x___ AWBD25x___	15 - 50	28
	Intermediate	AWBHH25x___	10 - 45	33
	Heavy	AWBFH25x___ AWBFHDx25___	5 - 40	38

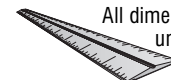
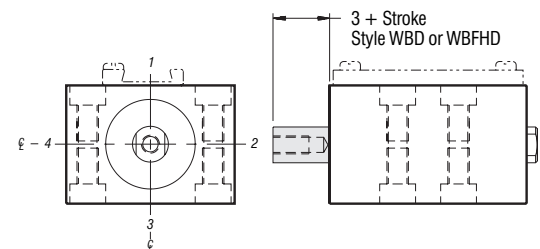
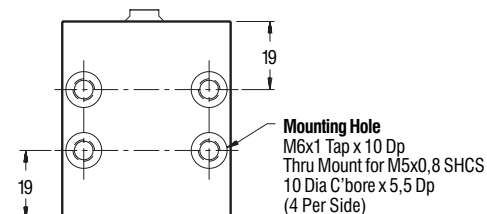
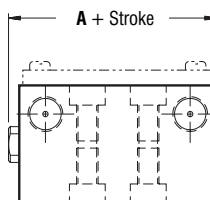
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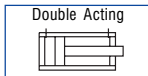
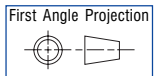
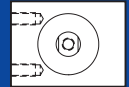
Body lengths 44mm and shorter allow only one sensor.



Duty	Part Number		Stock Stroke Length (in 5mm increments)	A
	Single Rod	Double Rod		
Non Magnetic Piston	Standard	WB25x___ WBD25x___	60 - 100	23
	Intermediate	WBHH25x___	55 - 100	28
	Heavy	WBFH25x___ WBFHD25x___	50 - 100	33
Magnetic Piston	Standard	AWB25x___ AWBD25x___	55 - 100	28
	Intermediate	AWBHH25x___	50 - 100	33
	Heavy	AWBFH25x___ AWBFHDx25___	45 - 100	38

—Information same as above except where noted—

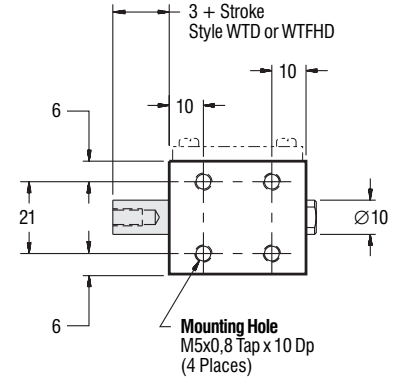
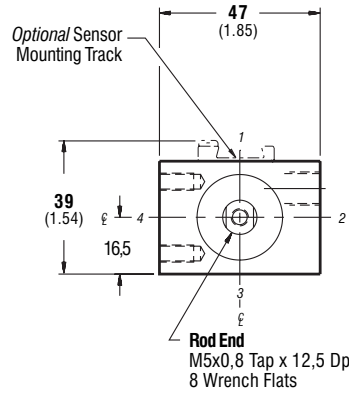
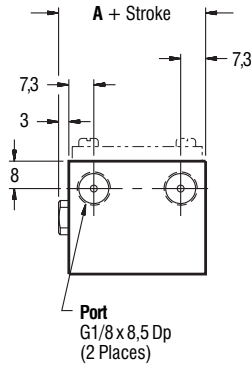




25mm Bore

Non Magnetic and Magnetic Piston

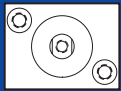
Duty		Part Number		Stock Stroke Length (in 5mm increments)	A
		Single Rod	Double Rod		
Non Magnetic Piston	Standard	WT25x____	WTD25x____	20 - 100	23
	Intermediate	WTHH25x____		15 - 100	28
	Heavy	WTFH25x____	WTFHD25x____	10 - 100	33
Magnetic Piston	Standard	AWT25x____	AWTD25x____	15 - 100	28
	Intermediate	AWTHH25x____		10 - 100	33
	Heavy	AWTFH25x____	AWTFHD25x____	5 - 100	38



25mm Bore • 25mm Bore • 25mm Bore • 25mm Bore • 25mm Bore • 25mm Bore

All dimensions are in millimeters unless otherwise noted.

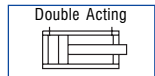
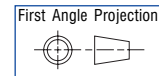
Part Number X Stroke Option - See 'Accessories' section



40mm Bore

End Mount

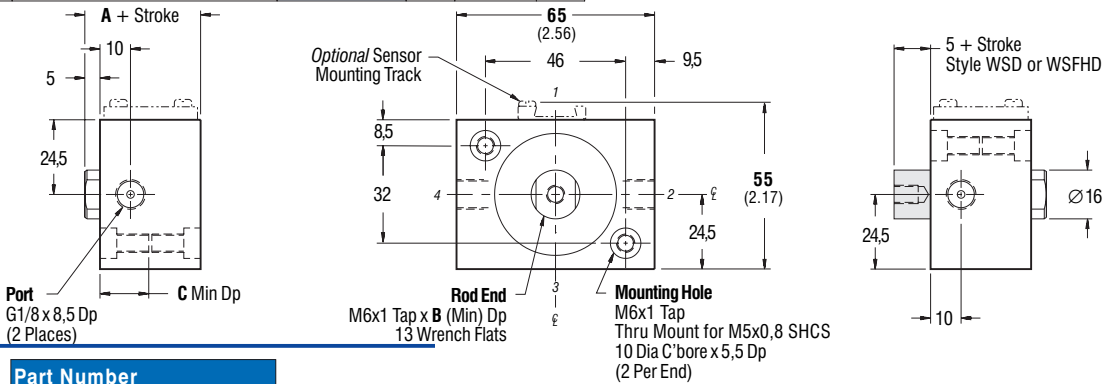
Non Magnetic and Magnetic Piston



40mm Bore • 40mm Bore • 40mm Bore • 40mm Bore • 40mm Bore

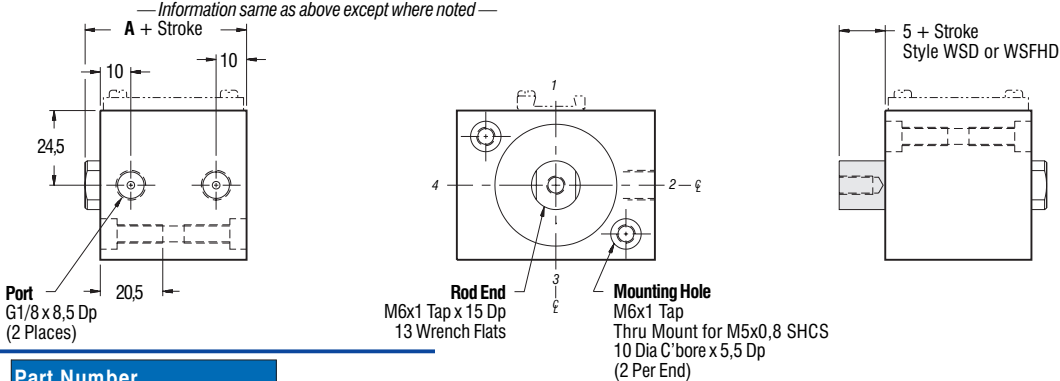
		Part Number		Stock Stroke Length in 5mm increments	A	B per 5mm respectively	C
Duty		Single Rod	Double Rod				
Non Magnetic Piston	Standard	WS40x	WSD40x	5, 10, 15	31	9, 12, 14	15,5
	Intermediate	WSHH40x		5, 10	36	12, 14	18
	Heavy	WSFH40x	WSFHD40x	5	41	14	20,5
Magnetic Piston	Standard	AWS40x	AWSD40x	5, 10	36	12, 14	18
	Intermediate	AWSHH40x		5	41	14	20,5

Standard Mounting:
TF TR TM TBE



		Part Number		Stock Stroke Length (in 5mm increments)	A
Duty		Single Rod	Double Rod		
Non Magnetic Piston	Standard	WS40x	WSD40x	20 - 25	31
	Intermediate	WSHH40x		15 - 20	36
	Heavy	WSFH40x	WSFHD40x	10 - 15	41
Magnetic Piston	Standard	AWS40x	AWSD40x	15 - 20	36
	Intermediate	AWSHH40x		10 - 15	41
	Heavy	AWSFH40x	AWSFHD40x	5 - 10	46

Standard Mounting:
TF TR TM TBE

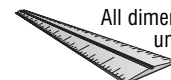
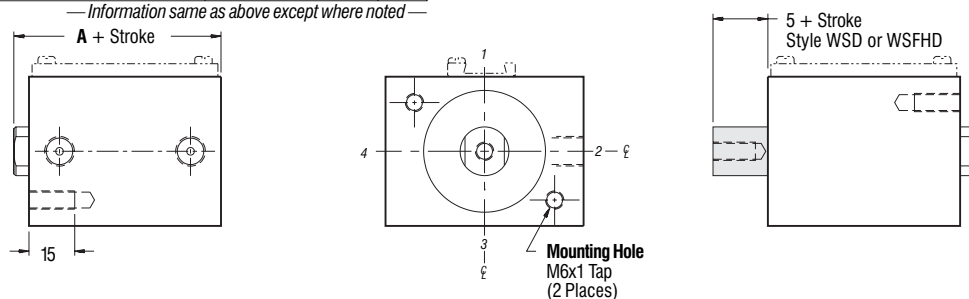


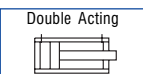
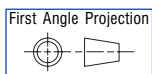
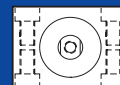
		Part Number		Stock Stroke Length (in 5mm increments)	A
Duty		Single Rod	Double Rod		
Non Magnetic Piston	Standard	WS40x	WSD40x	30 - 100	31
	Intermediate	WSHH40x		25 - 100	36
	Heavy	WSFH40x	WSFHD40x	20 - 100	41
Magnetic Piston	Standard	AWS40x	AWSD40x	25 - 100	36
	Intermediate	AWSHH40x		20 - 100	41
	Heavy	AWSFH40x	AWSFHD40x	15 - 100	46

Standard Mounting: TF
Optional Mounting: Specify suffix

TR TBE TM*

*76mm body length and shorter





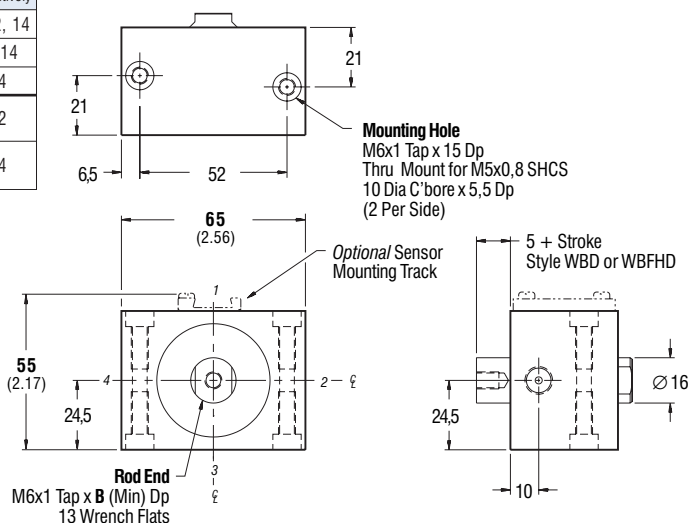
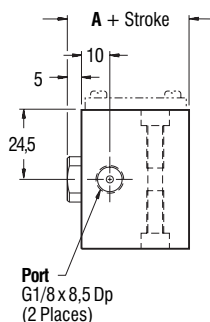
40mm Bore

Non Magnetic and Magnetic Piston Side Mount

40mm Bore • 40mm Bore • 40mm Bore • 40mm Bore • 40mm Bore • 40mm Bore

		Part Number		Stock Stroke Length (in 5mm increments)	A	B per 5mm respectively
Duty		Single Rod	Double Rod			
Non Magnetic Piston	Standard	WB40x_____	WBD40x_____	5, 10, 15	31	9, 12, 14
	Intermediate	WBHH40x_____		5, 10	36	12, 14
	Heavy	WBFH40x_____	WBFHD40x_____	5	41	14
Magnetic Piston	Standard	AWB40x_____	AWBD40x_____	5, 10	36	12
	Intermediate	AWBHH40x_____		5	41	14

This stroke length allows only one sensor.

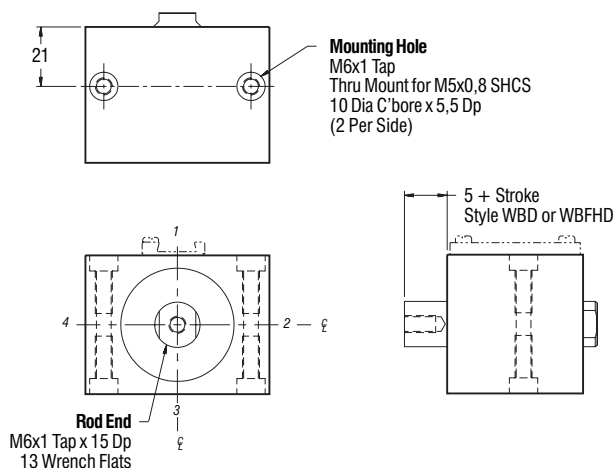
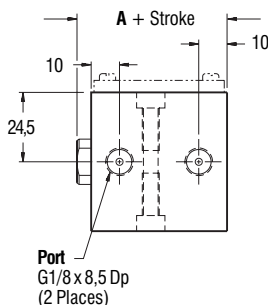


		Part Number		Stock Stroke Length (in 5mm increments)	A
Duty		Single Rod	Double Rod		
Non Magnetic Piston	Standard	WB40x_____	WBD40x_____	20 - 55	31
	Intermediate	WBHH40x_____		15 - 50	36
	Heavy	WBFH40x_____	WBFHD40x_____	10 - 45	41
Magnetic Piston	Standard	AWB40x_____	AWBD40x_____	15 - 50	36
	Intermediate	AWBHH40x_____		10 - 45	41
Heavy	AWBFH40x_____	AWBFHD40x_____	5 - 40	46	

Information same as above except where noted

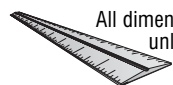
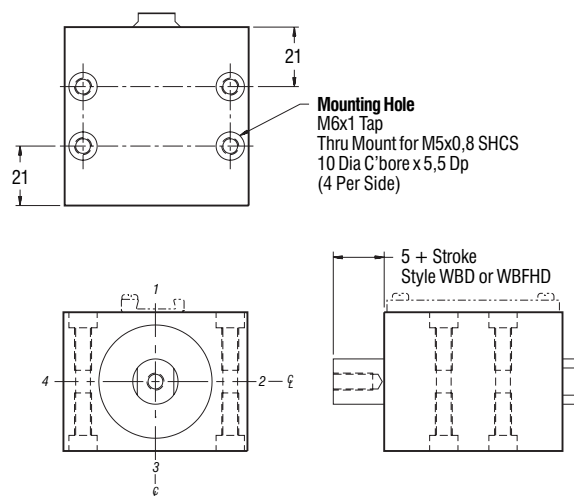
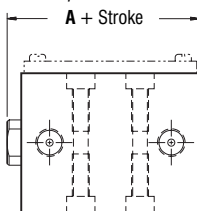


Body lengths 50mm and shorter allow only one sensor.



		Part Number		Stock Stroke Length (in 5mm increments)	A
Duty		Single Rod	Double Rod		
Non Magnetic Piston	Standard	WB40x_____	WBD40x_____	60 - 100	31
	Intermediate	WBHH40x_____		55 - 100	36
	Heavy	WBFH40x_____	WBFHD40x_____	50 - 100	41
Magnetic Piston	Standard	AWB40x_____	AWBD40x_____	55 - 100	36
	Intermediate	AWBHH40x_____		50 - 100	41
Heavy	AWBFH40x_____	AWBFHD40x_____	45 - 100	46	

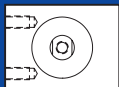
Information same as above except where noted



All dimensions are in millimeters unless otherwise noted.

Part Number X

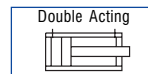
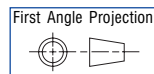
Stroke Option - See 'Accessories' section



40mm Bore

Side Mount

Non Magnetic and Magnetic Piston



40mm Bore • 40mm Bore • 40mm Bore • 40mm Bore • 40mm Bore • 40mm Bore

Duty	Part Number		Stock Stroke Length (in 5mm increments)	A
	Single Rod	Double Rod		
Non Magnetic Piston	Standard	WT40x_____	20 - 100	31
	Intermediate	WTHH40x_____	15 - 100	36
	Heavy	WTFH40x_____	WTFHD40x_____	10 - 100
Magnetic Piston	Standard	AWT40x_____	15 - 100	36
	Intermediate	AWTHH40x_____	10 - 100	41
	Heavy	AWTFH40x_____	AWTFHD40x_____	5 - 100



Body lengths 50mm and shorter allow only one sensor.

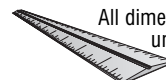
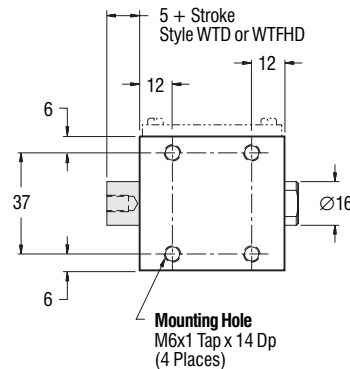
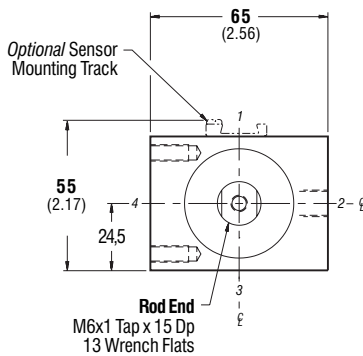
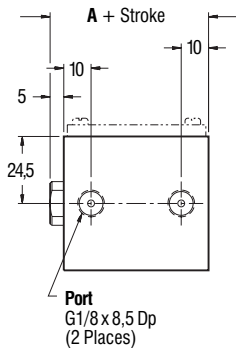


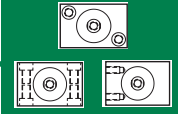
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RCE - Rear Clevis with Eye Mount	
RCHE - Rear Clevis with Eye Mount (horizontal version)	
RC - Rear Clevis	
RCH - Rear Clevis (horizontal version)	

Seal Descriptions

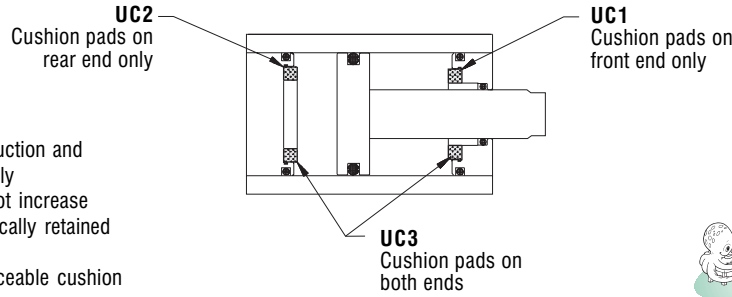
Conversion Formula: $C^{\circ} = (F^{\circ} - 32^{\circ}) \times 5/9$

Type	Bore	Ordering Suffix	Rating	Description
Pneumatic Seals				
Nitrile	8mm thru 40mm	Standard	-18° to 93° C 0° to 200° F	Most commonly used elastomer O-ring due to its excellent resistance to petroleum products, wear, tear and friction. Works with lubricated or non-lubricated air in the noted temperature range. Recommended for general purpose sealing with petroleum oils and fluids, water and silicone greases and oils.
Fluorocarbon	12mm thru 40mm	HTV	-18° to 204° C 0° to 400° F	Used mainly for elevated temperatures, harsh environments where some coolants, solvents, cleaning agents or other chemicals will contact the seal gland. Lower compression set is characteristic. For your specific requirements, consult factory.
Hydraulic Seals				
Nitrile	20mm thru 40mm	HYD	-18° to 121° C 0° to 250° F	Seal material is Nitrile and Urethane. Moderate resistance to abrasion, high pressure and shock. Low temperature decreases flexibility. Recommended for hydraulic fluids, dilute acids, and water.
Fluorocarbon & Nitrile		VHYD	-18° to 204° C 0° to 400° F	Seal material is fluorocarbon and PTFE. This option is designed to operate over an extremely wide elevated temperature range, harsh environment or with any non-oil based synthetic hydraulic fluids.



Urethane Cushion Pads

- Designed for noise reduction and minor piston impact only
- Cylinder length does not increase
- Cushion pads mechanically retained within the endcap
- Repairable part - replaceable cushion pads



UC

Example: UC1, UC2, UC3

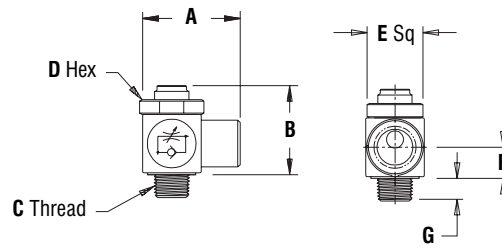
Ordering Suffix UC
Bore 20mm - 40mm
Temperature -18° - 66° C
Service Pneumatic only
Material Polyurethane



This option **does not** replace external shock absorbers needed for high loads.

Flow Controls

Model #	A	B	C	D	E	F	G
MO5 MI5 NV5	17,46	15,08	M5	7,94	9,53	5,56	3,18
MOG18 MIG18 NVG18	25,4	23,37	1/8-28 (G1/8)	14,29	14,29	8,13	6,10
MOG14 MIG14 NVG14	28,58	26,42	1/4-19 (G1/4)	17,46	17,46	9,65	6,60



"Flip" to our Flow Control flier for more information.



Hollow Rod

Our hollow rod option is available for applications that require passage through a double ended rod.

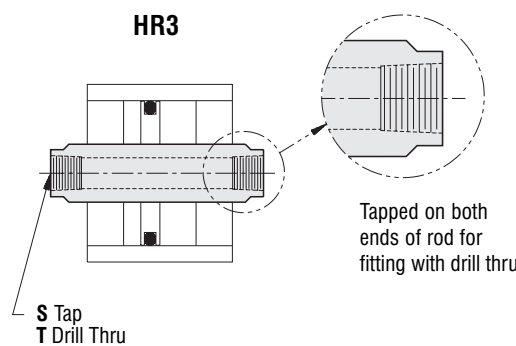
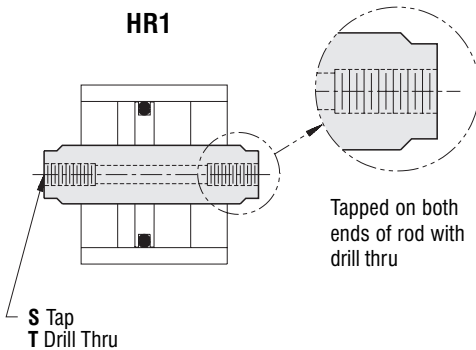


Not for use with Hydraulic cylinders or Non-Rotating rods

HR

Specify option 1 or 3

Ordering Suffix HR
Bore 20mm - 40mm only
Duty Standard and Full Husky only
Rod Service Applications Double only
 Pneumatic only
 Gases, Liquids, Vacuum, Linear/Rotary, Clamp & Punch, Blow Molding



Bore	HR1		HR3	
	S Tap	T Drill Thru	S Tap	T Drill Thru
20	M5x0,8 x 12,5 Dp	4,3	NA	NA
25	M5x0,8 x 12,5 Dp	4,3	NA	NA
40	M6x1,0 x 15 Dp	5,2	G 1/8	8,5

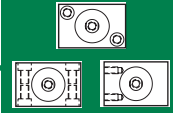
Styles	Stock Stroke Lengths									
	5	10	15	20	25	30	35	40	45	50
WSD, WBD, WTD		✓		✓	✓	✓		✓		✓
WSFHD, WBFHD, WTFHD	✓		✓	✓	✓		✓		✓	✓
AWSD, AWBD, AWTD		✓		✓	✓	✓		✓		✓
AWSFHD, AWBFHD, AWTfHD	✓		✓	✓	✓		✓		✓	✓

SPECIALS: Consult factory with ID requirements, thread information, pipe taps, etc.

x
 Cylinder Part Number Stroke Option

Rod End & Flange Options

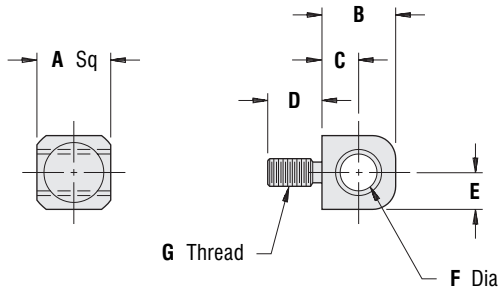
All Styles



12mm - 40mm Bore

RE / FF / RF

Rod Eye



RE

Ordering Suffix RE
Pressure Rating 12mm: thru 8 BAR
 20mm - 40mm: thru 15 BAR
Material CRS with black oxide finish and sintered bronze bearing

Bore	A	B	C	D	E	F	G
12	8	8	4	6	4	3	M3x0,5
20	9,5	10	5	10	4,8	5	M5x0,8
25	9,5	10	5	10	4,8	5	M5x0,8
40	16	16	8	12	8	8	M6x1

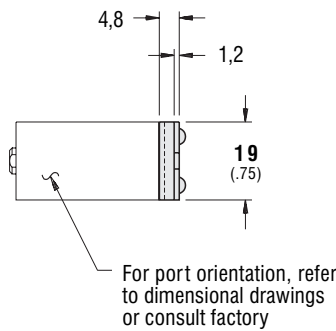
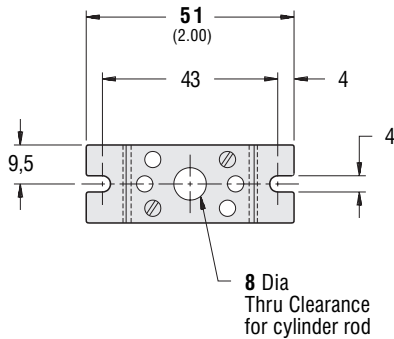


- Rod eye screws flush with cylinder rod face



Flange Mount (Shown as Rear Flange)

12mm Bore



Front Flange

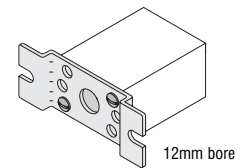
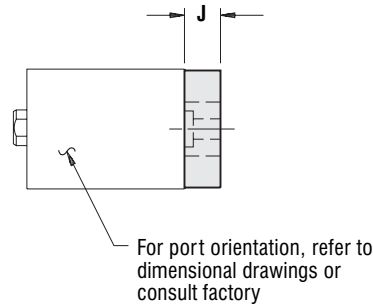
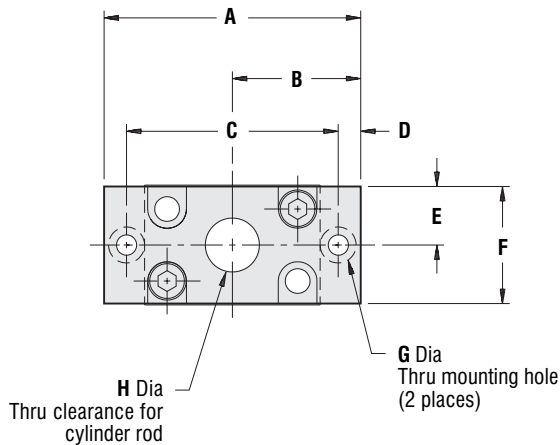
FF

Rear Flange

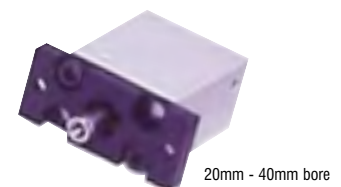
RF

Ordering Suffix FF or RF
Bore 12mm - 40mm
Style "S" only
Material 12mm: Steel black oxide
 20mm - 40mm: Aluminum black anodized

20mm - 40mm Bore



Bore	A	B	C	D	E	F	G	H	J
20	57	28,5	47	5	12,7	25,5	4,5	12	8
25	69	34,5	57	6	15,9	31,8	5,5	16	9,5
40	87	43,5	75	6	22,2	44,5	5,5	24	9,5



X
 Cylinder Part Number Stroke Option

COMPACT® Metric Cylinders

Accessories • Accessories • Accessories • Accessories • Accessories

Simple solution to a mounting or porting interference. Compact® cylinders are symmetrical and easily assembled in reverse. When specifying "RA", the mounting and porting orientations will change; see examples below.

This option is **not** applicable to Magnetic Piston cylinders.

RA

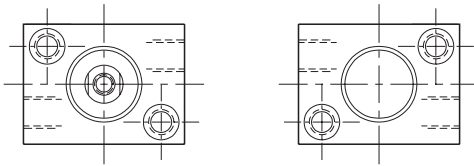
Ordering Suffix RA
Bore 8mm - 40mm

Example 12mm Bore Short Stroke

Standard Assembly

Front View

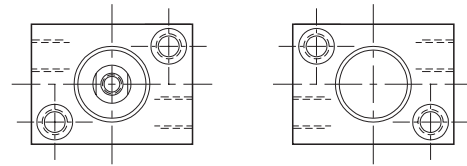
Rear View



Reverse Assembly

Front View

Rear View



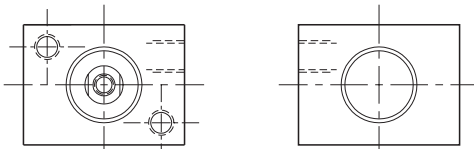
Orientation of mounting and porting change

Example 12mm Bore Long Stroke

Standard Assembly

Front View

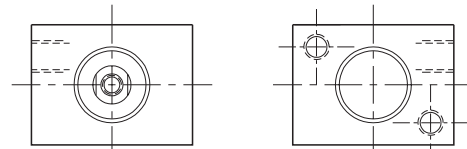
Rear View



Reverse Assembly

Front View

Rear View



Orientation of mounting and porting change

Reminder: Not applicable on Magnetic Piston cylinders.



Rod Tap Depth

8mm - 40mm
Bore

Usable Female Rod Thread

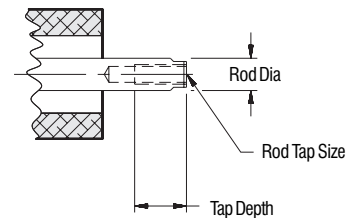
On magnetic piston style cylinders, refer to longer **stroke** when determining tap depth.

- 12mm - 20mm use 10mm longer stroke
- 25mm - 40mm use 5mm longer stroke

Bore	Rod Diameter	Standard Rod Tap	Duty	Tap Depths				
				Stroke (in millimeters)				
				5	10	15	20	25 & longer
8	4	NA	Standard	All duty types and strokes have M3 turned male threads as a standard rod end option.				
			Intermediate					
			Heavy					
12	6	M3x0,5	Standard	6				
			Intermediate					
			Heavy					
20	8	M5x0,8	Standard	8	10	12,5	12,5	12,5
			Intermediate	10	12,5	12,5	12,5	12,5
			Heavy	12,5	12,5	12,5	12,5	12,5
25	10	M5x0,8	Standard		10	12,5	12,5	12,5
			Intermediate	10	12,5	12,5	12,5	12,5
			Heavy	12,5	12,5	12,5	12,5	12,5
40	16	M6x1	Standard	9	12	14	15	15
			Intermediate	12	14	15	15	15
			Heavy	14	15	15	15	15



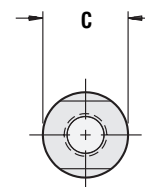
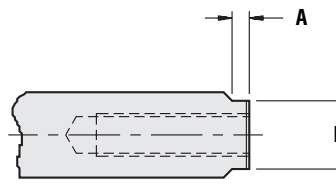
For low cost male thread, "Flip" to 'Accessories' section - Male Stud



Usable Wrench Flats

Bore	A	B Flat	C Dia
8*	3	3,5	4
12	3	5	6
20	3	7	8
25	3	8	10
40	5	13	16

* Turned male threads not shown



Technical Data • Technical Data • Technical Data • Technical Data • Technical Data

Unit Weights

Cylinder Unit Weights (approximate weight in grams)

Bore	Duty Rod End	Non-Magnetic Piston					Magnetic Piston				
		Standard		Intermediate	Heavy		Standard		Intermediate	Heavy	
		Single	Double	Single	Single	Double	Single	Double	Single	Single	Double
8	Zero stroke	10,1	NA	13	16,5	NA	23,3	NA	28,2	34	NA
	per 5mm stroke	4	NA	4	4	NA	5	NA	5	5	NA
12	Zero stroke	22,6	24,5	28,1	33	44,4	44,6	39,2	52,7	62,4	68
	per 5mm stroke	5		5	5	7		7			7
20	Zero stroke	55,5	62,3	63,1	78,6	80	68,3	79,7	83,1	108,9	136,5
	per 5mm stroke	12	11	12	12	12	13	12	13	13	12
25	Zero stroke	83,2	88,9	95	122,5	132,6	115,8	106,3	135,3	143,6	156,5
	per 5mm stroke	17	16	17	17	19	18	19	18	18	19
40	Zero stroke	242,1	253	276,5	294,3	344,7	262,2	253	308	353,6	316,8
	per 5mm stroke	32	35	32	32	35	33	35	33	33	35



Example: AS12x15

AS12 - Magnetic 12mm bore = 44.60 g
 15 - 15mm stroke = 6.00 x 3 = 18.00 g
 44.60 + 18.00 = **62.60 grams**

Grams to Ounces (Grams x .03527 = Ounces)
 62.60 x .03527 = 2.208 ounces

Accessory Unit Weights (approximate weight in grams)

Suffix	Description	Bore				
		8	12	20	25	40
FF	Front Flange	—	10,80	28,35	49,70	83,25
MS	Male Stud	—	,45	1,65	1,65	3,80
RE	Rod Eye	—	3,30	6,05	6,05	25,25
RF	Rear Flange	—	10,80	28,35	47,30	83,25
RC/RCH	Rear Clevis	—	9,85	67,40	76,50	177,00
RCE/RCHE	Rear Clevis with Eye Mount	—	—	48,25	64,55	130,80

Grams to Ounces Conversion Formula

- Grams x .03527 = Ounces
 Example: 10,80 x .03527 = .38 ounces

Repair Kits

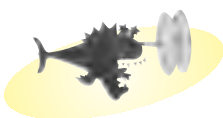


Repair Kits apply to Non
Magnetic and Magnetic
piston cylinders — any duty.

Repair Kits, 8mm thru 40mm Bore

Bore	Rod End	Repair Kits				Tools			Lubrication
		Pneumatic Seals		Hydraulic Seals		Urethane Cushions	Assembly Wrench	Flat Wrench	
		Standard	Viton®	Hydraulic	Viton® Hyd.				
8	Single	RKW8	—	—	—	—	—	WFW0S	Lube-1 (Description: 5.3 oz. tube) Lubricates approximately 30 medium size cylinders
12	Single	RKW12	RKWV12	—	—	—	—	WFW1S	
	Double	RKWD12	RKWDV12						
20	Single	RKW20	RKWV20	RKWH20	RKWVH20	RKWD20UC	MW-1	WFW2S	
	Double	RKWD20	RKWDV20	RKWDH20	RKWDVH20				
25	Single	RKW25	RKWV25	RKWH25	RKWVH25	RKWD25UC	MW-1	WFW2S	
	Double	RKWD25	RKWDV25	RKWDH25	RKWDVH25				
40	Single	RKW40	RKWV40	RKWH40	RKWVH40	RKWD40UC	W-2	WFW2S	
	Double	RKWD40	RKWDV40	RKWDH40	RKWDVH40				

Part No. WFS
Includes one each:
WFW0S, WFW1S, WFW2S



NEW!

All universal repair kits now include magnets.

All Repair Kits Include:

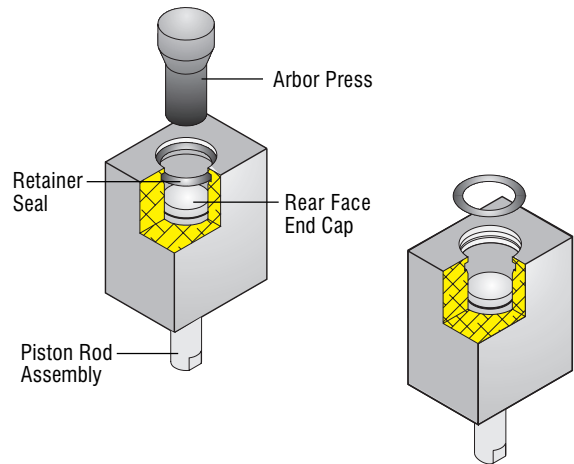
- Endcap Seals
- Shaft Seals
- Piston Seals
- Retaining Wire *
- Nyliner Bearing
- Magnet
- Lubrication (1 to 4 milliliters)
- Snap Rings - *RDK kits only*

* 20mm - 40mm only

Disassembly

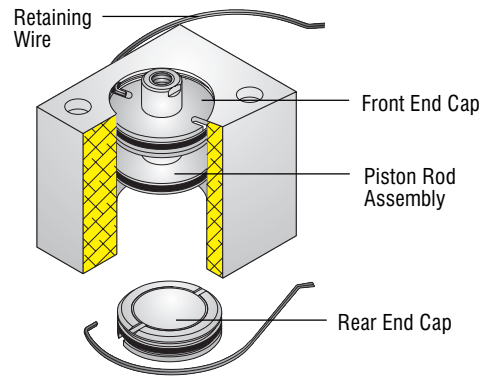
8mm - 12mm Bore

1. Place cylinder under small arbor press, rear end cap up, apply 15 pounds of force.
2. Push the end cap down into the cylinder frame, retainer seal will remain in groove.
3. With an o-ring tool, remove the retainer seal.
4. Push the piston rod assembly up to remove the rear face end cap.
5. Do not remove the piston rod assembly.
6. Turn cylinder over.
7. Repeat steps 1-3, push rod end cap out with piston rod assembly and remove both.



20mm - 40mm Bore

1. Place cylinder in vise, rear end cap up.
2. Place spanner wrench pins in notches of the end cap.
3. Turn clockwise — the retaining wire will back out of the cylinder.
4. Stop turning when wire becomes loose.
5. Push the end cap down into the frame.
6. Remove the wire by pulling the hooked end from the cylinder bore.
7. Push the piston rod assembly up to remove the end cap.
8. Do not remove piston rod assembly.
9. Turn cylinder over.
10. Repeat steps 1-6, push front end cap out with piston rod assembly and remove both.



General Repair Instructions

1. Remove any seal that becomes visible during repair with an o-ring tool.
2. Remove magnet only if magnet appears damaged or broken.
3. Replace magnet in mag groove, taking care to position painted side of magnet toward piston.
4. Clean all grooves with a soft cloth.
5. Lightly lubricate seal grooves, reset seals and lubricate again.
6. Repeat above steps, in reverse, to reassemble.
7. Bubble test cylinder to assure air tight seal.

Double Rod Instructions - 20mm through 40mm

1. Using snap ring pliers, remove first snap ring.
2. Remove piston from rod and remove snap ring from opposite side.
3. Remove inner piston seal with an o-ring tool and reset seals as detailed above.
4. Reset snap ring with flat side facing out from center.
5. Place piston over seal.
6. Reset opposite snap ring with flat side facing out from center.
7. Reassemble and bubble test.

