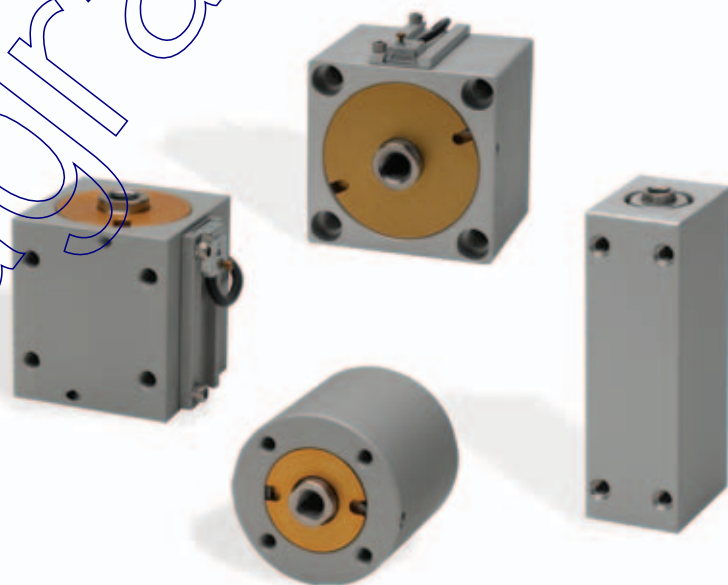


Compact Select Cylinders

Inch Series



Answer Engineering

COMPACT[®]

AUTOMATION PRODUCTS LLC

An **IMC** Company

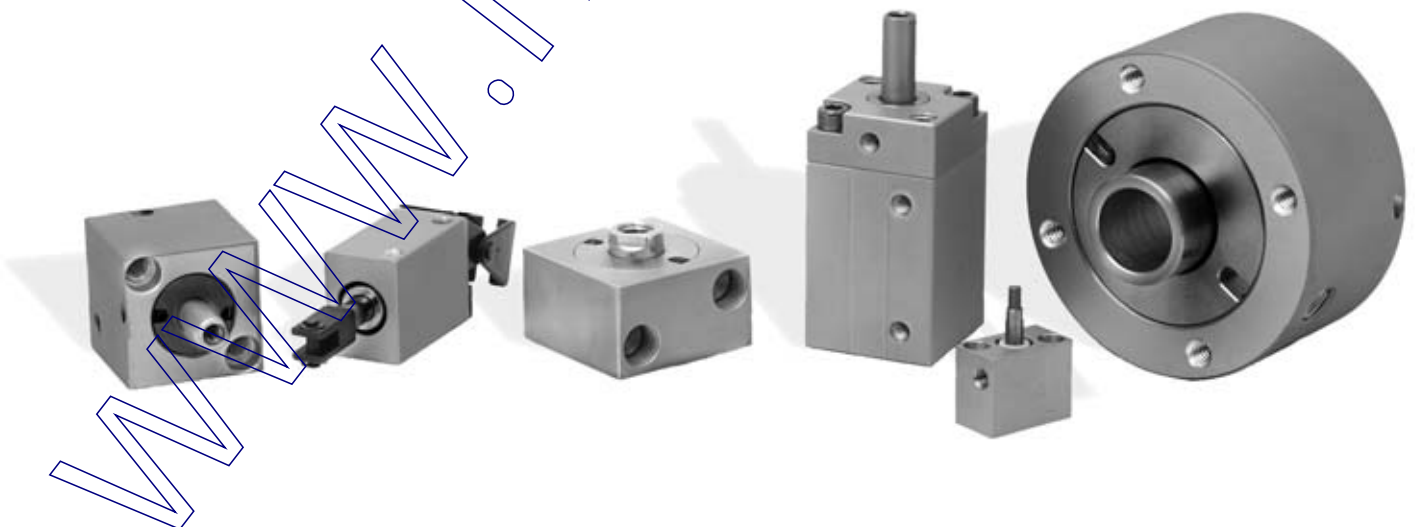
Table of Contents: Inch Series

Inch Series, Options and Accessories

Inch Series

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3-D Models available online at www.compactautomation.com



How to Order: Inch Series

Inch Series

Example: ASFHD118X1-FFHTV

MAGNETIC PISTON	MOUNTING STYLE	DUTY	DOUBLE ROD END	BORE SIZE	X	STROKE LENGTH	OPTION	OPTION
A	S	FH	D	118		1	XXX	XXX
1	2	3	4	5		6	7	8

1

Magnetic Piston (Optional)	
A	Magnetic piston cylinder with sensor mounting rail

NOTE: Leave blank for standard option.

2

Mounting Style	
S	Square, end mount
R	Round, end mount
B	Base, side mount
T	Thin, side mount

3

Duty (Optional)	
HH	Half Husky - Intermediate duty (available on single rod end only)
FH	Full Husky - Heavy duty

NOTE: Leave blank for standard option.

4

Double Rod End (Optional)	
D	Double rod end

5

Bore			
12	1/2"	212	2-1/2"
34	3/4"	3	3"
118	1-1/8"	4	4"
138	1-3/8"	5	5"
158	1-5/8"	6	6"
2	2"	8	8"

6

Stroke Length (Stroke lengths are available in 1/8" increments)	
See catalog pages for stroke availability for each bore size.	
Example: 1-1/8" = 118	
3/4" = 34	

7

Options (String option codes in alphabetical order to the right of the "-" including seal option)			
Mounting Options			
EB	End Bracket	SP	Short Pivot
FF	Front Flange	SRC	Short Rear Clevis
LP	Long Pivot	SRCE	Short Rear Clevis w/ Eye Mount
NM**	Nose Mount	TBE	Threads Both Ends
PS	Pivot Shaft	TF	Threads Front
RA	Reverse Assembly	TM	Thru Mount
RF	Rear Flange	TR	Threads Rear
SB	Side Bracket		
Rod End Options			
CBSS	Clevis Bracket Set Screw	HR1	Hollow Rod, Option 1
EX	Extension, Single Rod End	HR3	Hollow Rod, Option 3
EXD	Extension on Double Rod	MS/MSD	Male Stud/MS Double End
EXF	Front End Extension on Double Rod	NR*	Non-Rotating
		NT**	Jam Nut
EXR	Rear End Extension on Double Rod	RE	Rod Eye
		RES	Rod Eye, short head design
FT	Fine Threads	RW/RWD	Rod Wiper/Rod Wiper Double End
Other			
ADJ	Adjustable Retract Stroke	UB3	Urethane Bumper - Both ends
PA	Positive Alignment	UC1	Urethane Cushion - Front end
UB1	Urethane Bumper - Front end	UC2	Urethane Cushion - Rear end
UB2	Urethane Bumper - Rear end	UC3	Urethane Cushion - Both ends
Ports			
18NPT	1/8" National Pipe Thread Fine	14NPT	1/4" National Pipe Thread Fine

*NOTE: See Non-Rotating option on page 78.

**NOTE: See Nose Mount option page 86.

8

Seal Option		
Standard Buna-N 0° - 200°F (-18° - 93°C)		
Optional Seals		
Pneumatic		
HTV	High temperature viton	0° - 400°F (-18° - 204°C)
CRT*	Corrosion resistant Not recommended for use under 250° F	250° - 400°F (121° - 204°C)
ETP	Ethylene Propylene	-70° - 300°F (-57° - 150°C)
Hydraulic		
HYD*	Buna-N hydraulic	0° - 250°F (-18° - 121°C)
VHYD*	Viton hydraulic	0° - 400°F (-18° - 204°C)

*NOTE: Not available in 1/2" bore.

<p>CR3 - Corrosion Resistant 300 Series Stainless Steel</p> <p>Specify before part number. Available on 1/2 through 3". See pages 16 and 72 for details.</p>

Modifications Welcome

Special stroke lengths, port orientation, mounting configuration.

Forces, Ratings & Envelope Dimensions

Cylinder Force and Pressure Rating

Formula: Force (lbs.) = Piston Area (In²) x Pressure (PSI)

Example: 1.5 In² (Piston Area) x 150 PSI (Pressure) = 225 lbs. Force

Bore	Piston Area (In ²)	Pre-Calculated Force in Pounds			Pressure Rating (PSI)	
		60 PSI	80 PSI	100 PSI	Pneumatic	Hydraulic
1/2	Push .2	12	16	20	125	-
	Pull .15	9	12	15		
3/4	Push .44	26	35	44	250	500
	Pull .36	22	29	36		
1-1/8	Push 1.0	60	80	100	250	500
	Pull .8	48	64	80		
1-3/8	Push 1.5	90	120	150	250	500
	Pull 1.2	72	96	120		
1-5/8	Push 2.0	120	160	200	250	500
	Pull 1.7	102	136	170		
2	Push 3.1	186	248	310	250	500
	Pull 2.8	168	224	280		
2-1/2	Push 4.9	294	392	490	250	500
	Pull 4.5	270	360	450		
3	Push 7.0	420	560	700	250	500
	Pull 6.6	396	528	660		
4	Push 12.6	756	1008	1260	200	200
	Pull 12.1	726	968	1210		
5	Push 19.6	1176	1568	1960	200	-
	Pull 19.2	1152	1536	1920		
5" FH	Pull 18.8	1128	1504	1880		
6	Push 28.3	1698	2264	2830	200	-
	Pull 27.5	1650	2200	2750		
8	Push 50.3	3018	4024	5030	200	-
	Pull 49.5	2970	3960	4950		

Conversions

PSI to BAR

1 PSI = 0,069 bar

Example: 25 PSI x 0,069 = 1.73 BAR

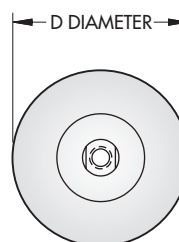
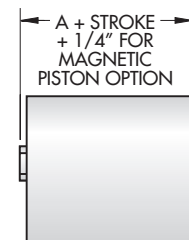
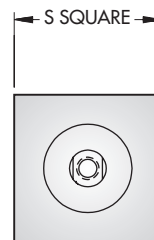
Pound to Kilograms

1 pound = 0,45 kilograms

Example: 5 lbs. x 0,45 = 2,25 kilograms

Envelope Dimensions

Bore	A			S	D
	Standard	Intermediate	Heavy		
1/2	0.69	0.81	0.94	1.00 X .75	1.13
3/4	0.81	1.06	1.31	1.25 Sq.	1.50
1-1/8	0.88	1.13	1.38	1.50 Sq.	1.88
1-3/8	1.13	1.38	1.63	1.75 Sq.	2.13
1-5/8	1.13	1.38	1.63	2.00 Sq.	2.38
2	1.25	1.50	1.75	2.50 Sq.	3.00
2-1/2	1.38	1.63	1.88	3.00 Sq.	3.50
3	1.63	1.88	2.13	3.50 Sq.	4.00
4	1.75	2.00	2.25	-	5.00
5	1.88	2.13	2.38	-	6.00
6	2.13	-	-	-	7.00
8	2.38	-	-	-	9.00



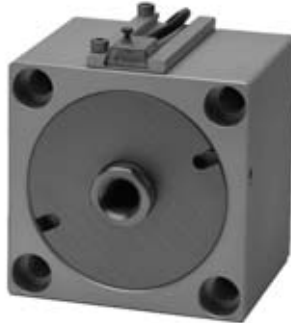
Square - End Mount - Cylinder

1/2" through 3" Bore

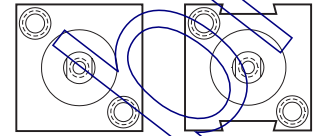
Non Magnetic Piston
Ordering Prefix **S**



Magnetic Piston
Ordering Prefix **AS**



Icon represents mounting style on each dimensional page.

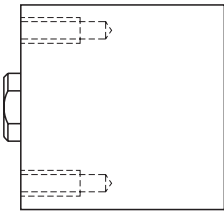


Sensors Sold Separately
See Sensors pages 87-88

Optional Mounting

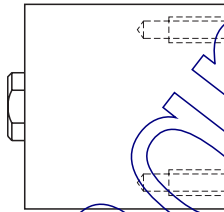
Square - end mount - cylinders have one or more of the following patterns as standard. **Each dimensional page lists standard and optional mounting suffix codes.**

Threads Front
Standard on all cylinders



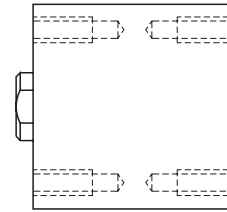
Tapped mounting holes on the rod end

Threads Rear
Ordering Suffix **TR**



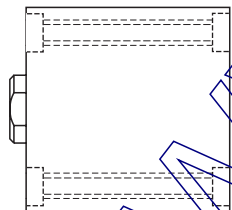
Tapped mounting holes opposite the rod end

Threads Both Ends
Ordering Suffix **TBE**



Tapped mounting holes on both ends

Thru Mount
Ordering Suffix **TM**



Counterbored mounting holes, both ends, for drop through bolt

Available on:

- 1/2" Bore through 1-1/8" **body** length
- 3/4" - 3" Bore through 2" **stroke** length

For longer stroke lengths - Check mounting screw availability.

Modifications welcome - consult factory.

Non magnetic piston cylinders - When 'TR' is specified or when using 'Bolt On Hardware' options, the cylinder may be reverse assembled, see Technical Data section page 93 for detailed explanation. To avoid changing port orientation, specify suffix: "TBE".

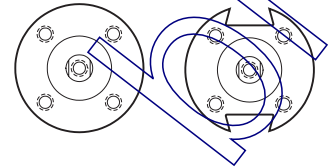
Round - End Mount - Cylinder

1/2" through 8" Bore

Non Magnetic Piston
Ordering Prefix **R**

Magnetic Piston
Ordering Prefix **AR**

Icon represents mounting style on each dimensional page.



Sensors Sold Separately
See Sensors pages 87-88

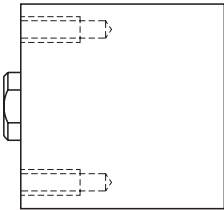


Optional Mounting

Round - end mount - cylinders have one or more of the following patterns as standard.

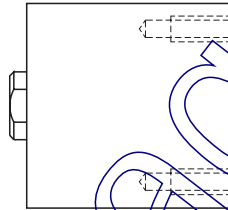
Each dimensional page lists standard and optional mounting suffix codes.

Threads Front
Standard on all cylinders



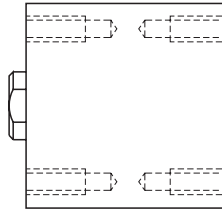
Tapped mounting holes on the rod end

Threads Rear
Ordering Suffix **TR**



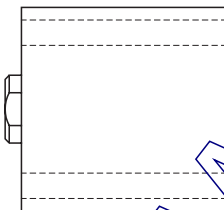
Tapped mounting holes opposite the rod end

Threads Both Ends
Ordering Suffix **TBE**



Tapped mounting holes on both ends

Thru Mount
Ordering Suffix **TM**



Thru mounting holes for drop through bolt

Available on:

- 3/4" - 8" Bore through 2" **stroke** length

For longer stroke lengths - Check mounting screw availability.

Modifications welcome - consult factory.

Non magnetic piston cylinders - When 'TR' is specified or when using 'Bolt On Hardware' options, the cylinder may be reverse assembled, see Technical Data section page 93 for detailed explanation. To avoid changing port orientation, specify suffix: "TBE".

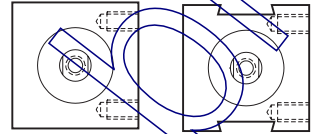
Base - Side Mount - Cylinder

1/2" through 3" Bore

Non Magnetic Piston
Ordering Prefix **B**

Magnetic Piston
Ordering Prefix **AB**

Icon represents mounting style on each dimensional page.



Sensors Sold Separately
See sensors pages 87-88

Optional Port Position

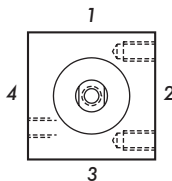
Base - side mount - cylinders have one standard mounting and port location, below are examples of optional positioning.

1/2" Bore Cylinder may be 'Reverse Assembled' consult factory - See Technical Data page 93 for detailed explanation.

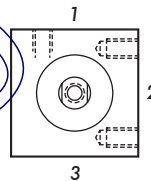
3/4" through 3" Bore

- Non Magnetic Piston Cylinders** Optional positions are available as shown below:
COMPACT® reserves the right to plug existing ports, without notification, unless specified otherwise.

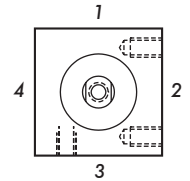
Standard Location
Example
Side number 4



Port Position 1
Example
Ordering Suffix **PP1**



Port Position 3
Example
Ordering Suffix **PP3**



- Magnetic Piston Cylinders**
Alternate port locations are available, consult factory for information.

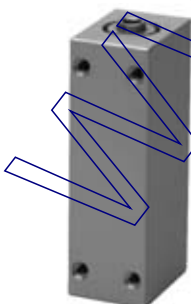
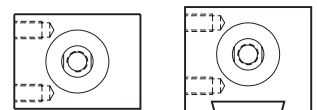
Thin - Side Mount - Cylinder

1/2" Bore Only

Non Magnetic Piston
Ordering Prefix **T**

Magnetic Piston
Ordering Prefix **AT**

Icon represents mounting style on each dimensional page.



Sensors Sold Separately
See Sensors pages 87-88

Duty Types

Double Acting COMPACT® Cylinders - Single and Double Rod End

Standard Duty



COMPACT® Cylinders

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

Heavy Duty

Ordering Suffix **FH**



Full Husky®

Longer rod bearing plus thicker piston are for heavy duty service. Available as single or double rod end.

Intermediate Duty

Ordering Suffix **HH**



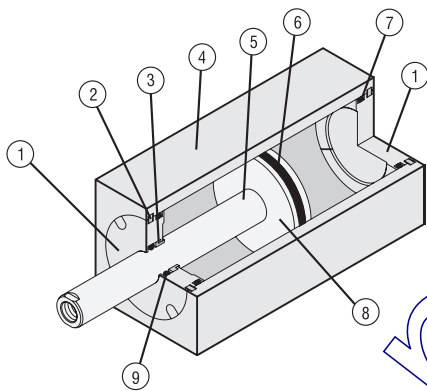
Half Husky®

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

Components and Material

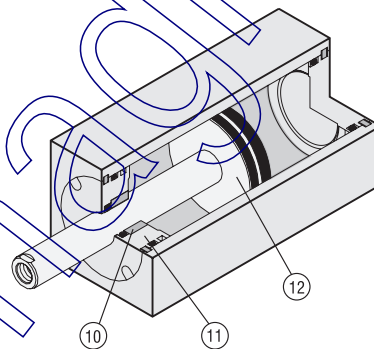
Standard Duty

Single Rod End



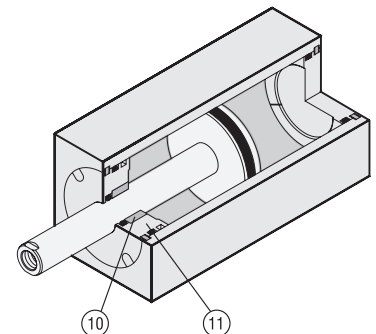
Heavy Duty

Single Rod End



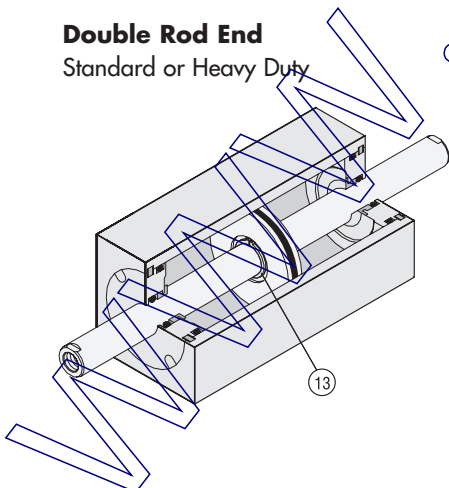
Intermediate Duty

Single Rod End



Double Rod End

Standard or Heavy Duty



	Description	Material
1	End Cap	Aluminum
2	Retaining Wire	Stainless Steel
3	Rod Bearing	Sintered bronze
4	Cylinder Body	Aluminum
5	Piston Rod	Stainless steel
6	Piston Seal	Low friction Nitrile
7	End Cap Seal	O-ring (Nitrile)
8	Piston	Aluminum
9	Rod Seal	Low friction Nitrile
10	Husky Rod Bearing	Bronze
11	Husky End Cap	Aluminum
12	Husky Piston	Aluminum
13	Snap Ring	Carbon spring steel

Optional Magnetic Piston - Available on any cylinder, style or duty. (Not shown.)

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

Components and Material

A.) 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.

B.) Factory Lubrication

Is standard on all cylinders and does not require air line induced lubrication, although additional air line lubrication may be used. Lubricated air that is compatible with petroleum based grease containing Teflon® is recommended. Non-lubricated air is recommended to operate the cylinder.

C.) End Caps

Are machined of high grade aluminum alloy and anodized for protection against corrosion.

- 1/2" bore end caps feature our patented Snap-Cap® design - resilient retainer seal that aids in absorbing piston impact.
- 3/4" bore and larger feature our patented wire retainer design.

Optional urethane cushions may be added when additional impact resistance is required, available on 3/4" - 3" bore.

D.) Retaining Wire

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 or seal replacement.

E.) Rod Bearing

Varies according to duty and bore size.

- 1/2" Bore Snap-Cap
All duties - Sintered bronze
- 3/4" through 5" Bore
All duties - Sintered bronze
- 6" through 8" Bore
All duties - Bearing bronze

F.) Cylinder Body

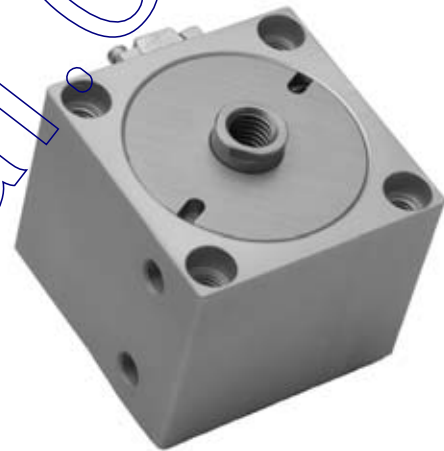
Is a thick-walled, clear anodized, aluminum extrusion. Tight tolerances and concentricity guarantee longer life. Total Compact® envelope is up to 60% smaller than typical cylinders.

G.) Seals

Are constructed of high grade, low friction, Nitrile materials. Optional seal materials, fluorocarbon and PTFE, are available - See Seal Descriptions in the Options section.

H.) Piston Construction

- 1/2" Bore is a solid one piece construction on both the single and double rod end cylinders.
- 3/4" through 8" Bore
 - Single rod end cylinders - 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. Consult factory for alternative double piston shaft assembly construction.



Modifications

Unique Application Examples

For technical assistance and quotes contact your local distributor or our Technical Sales Department (864) 647-9521.

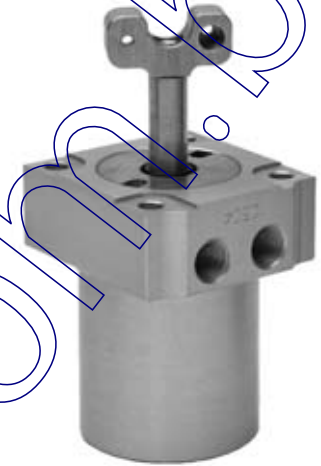
Standard Product

- Square End Mount Cylinder
- Standard duty
- Standard port style and location
- Standard rod end



Highly modified to meet the Customer's application requirements

- Modified Through Mount Cylinder
- Special duty including extended rod bearing and rod wiper
- Custom port style and location
- Special rod end with rod end attachment



Modifications... simple solutions to space problems.

We have over 50,000 files of modified or special cylinder designs. Examples range from simple porting changes to 100% custom designed cylinders.

Our standard product design is a simple, plain extrusion, which allows us to easily modify our product to meet many unusual or unique requirements. Our design also allows modifications at a cost effective price and quick delivery.

In the Modified Products section we offer two Request for Quote fax forms to assist in a quick quote on your specifications via your local distributor.



Simple Solutions

- Hollow piston rods
- Tunneled air ports
- Frame modifications
- Modified rod ends
- Multi-position cylinders
- Back-to-back cylinders
- Modified locations on: sensors, mounting and porting
- Multi-piston (multi force)



Complex Solutions

- Extreme space limitations
- Multi-cylinder blocks
- Pneumatic industrial hand tools
- Load bearing cylinders



Style "R"



End Mount

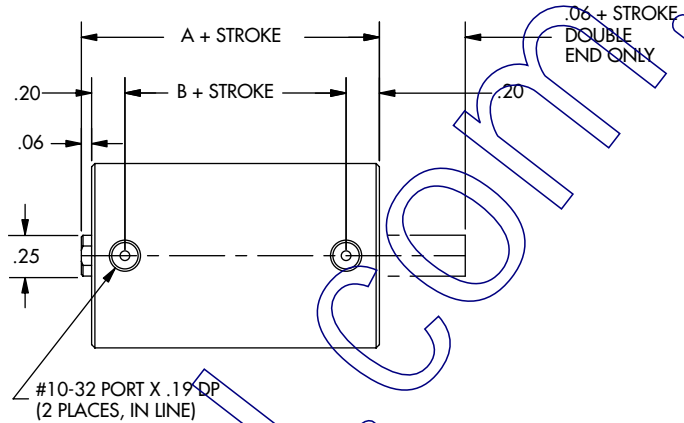
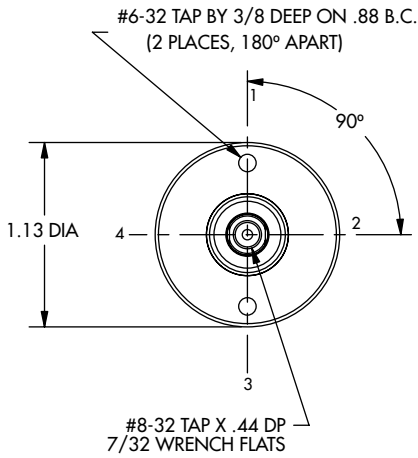
1/2" Bore Non Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A	B
	Single Rod	Double Rod			
Standard	R12x __	RD12x __	1/8 to 2 in 1/8" increments	.69	.22
Intermediate	RHH12x __		1/8 to 2 in 1/8" increments	.81	.34
Heavy	RFH12x __	RFHD12x __	1/8 to 2 in 1/8" increments	.94	.47

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TMF, TMR**



Style "AR"

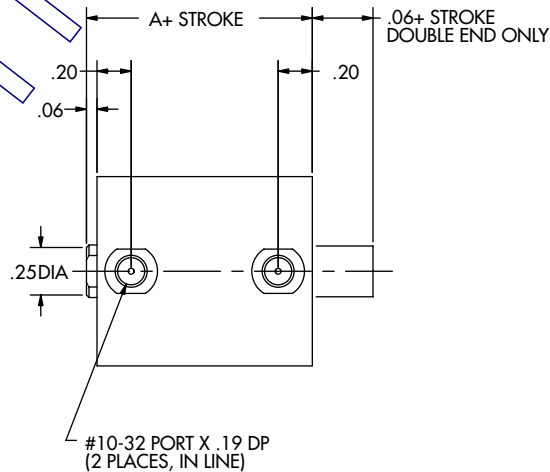
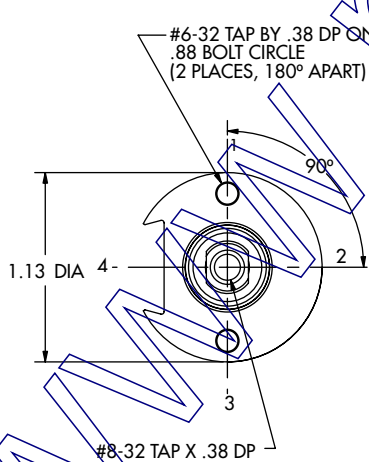


End Mount

1/2" Bore Magnetic Piston

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR12x __	ARD12x __	1/8 to 2 in 1/8" increments	.94
Intermediate	ARHH12x __		1/8 to 2 in 1/8" increments	1.06
Heavy	ARFH12x __	ARFHD12x __	1/8 to 2 in 1/8" increments	1.19

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TMF, TMR**



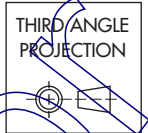
Due to physical size, body lengths 1-1/2" and shorter have only one sensor; Body length = A + stroke - .06. For modifications, consult factory.

Style "S"

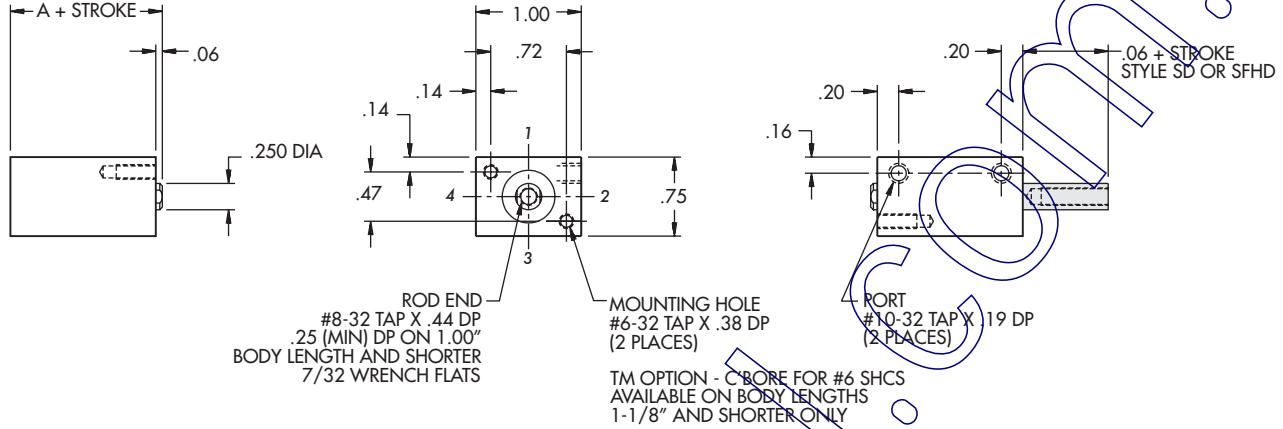


1/2" Bore Non Magnetic Piston Snap-Cap® Design

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S12x __	SD12x __	1/8 to 2 in 1/8" increments	.69
Intermediate	SHH12x __		1/8 to 2 in 1/8" increments	.81
Heavy	SFH12x __	SFHD12x __	1/8 to 2 in 1/8" increments	.94



Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**



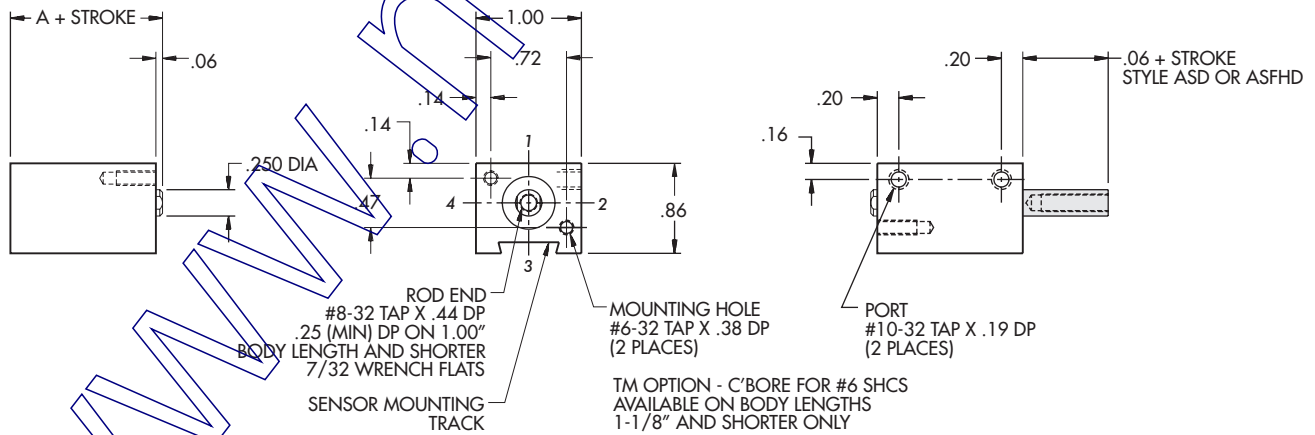
Style "AS"



1/2" Bore Magnetic Piston Snap-Cap® Design

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS12x __	ASD12x __	1/8 to 2 in 1/8" increments	.94
Intermediate	ASHH12x __		1/8 to 2 in 1/8" increments	1.06
Heavy	ASFH12x __	ASFHD12x __	1/8 to 2 in 1/8" increments	1.19

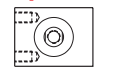
Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**



Due to physical size, body lengths 1-1/2" and shorter have only one sensor; Body length = A + stroke - .06. For modifications, consult factory.

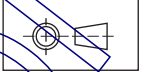
1/2" Bore Non Magnetic Piston Snap-Cap® Design

Style "T"

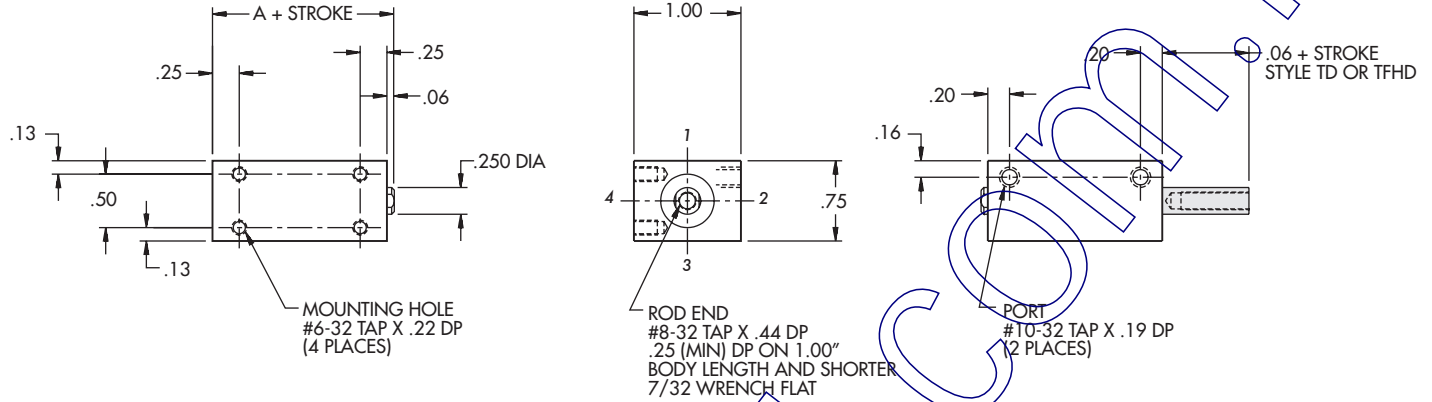


Side Mount

THIRD ANGLE PROJECTION

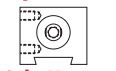


Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	T12x__	TD12x__	1/8 to 2 in 1/8" increments	.69
Intermediate	THH12x__		1/8 to 2 in 1/8" increments	.81
Heavy	TFH12x__	TFHD12x__	1/8 to 2 in 1/8" increments	.94



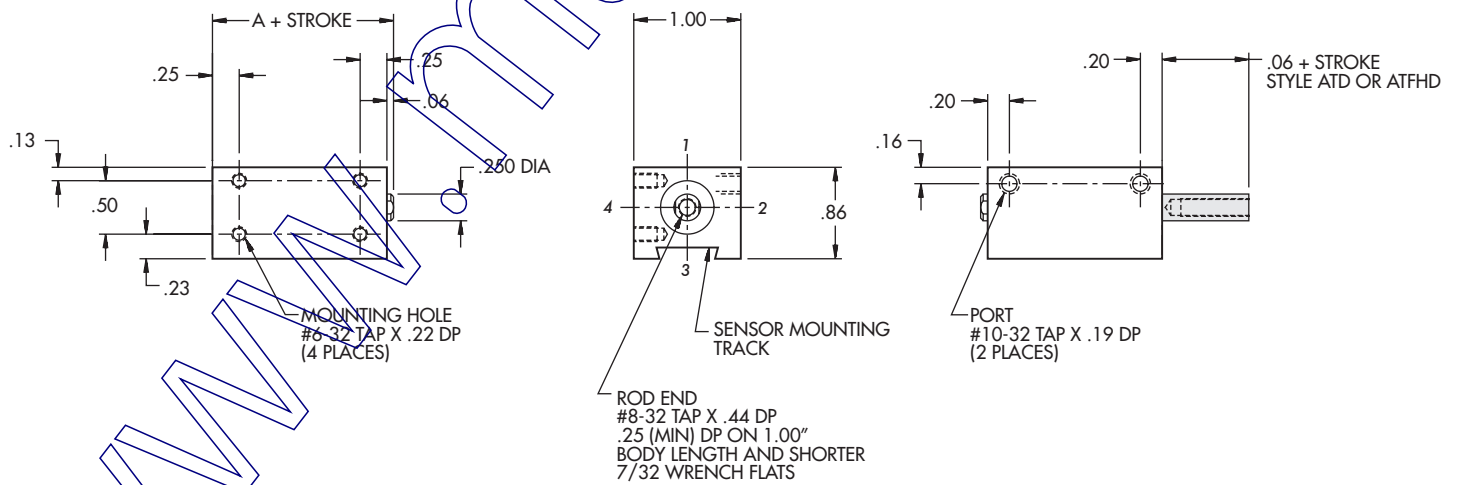
1/2" Bore Magnetic Piston Snap-Cap® Design

Style "AT"



Side Mount

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AT12x__	ATD12x__	1/8 to 2 in 1/8" increments	.94
Intermediate	ATHH12x__		1/8 to 2 in 1/8" increments	1.06
Heavy	ATFH12x__	ATFHD12x__	1/8 to 2 in 1/8" increments	1.19



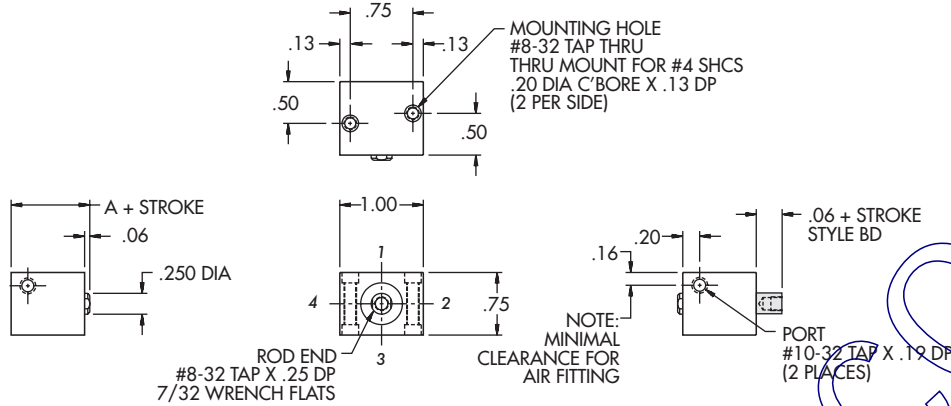
Due to physical size, body lengths 1-1/2" and shorter have only one sensor; Body length = A + stroke - .06. For modifications, consult factory.



1/2" Bore Non Magnetic Piston Snap-Cap® Design

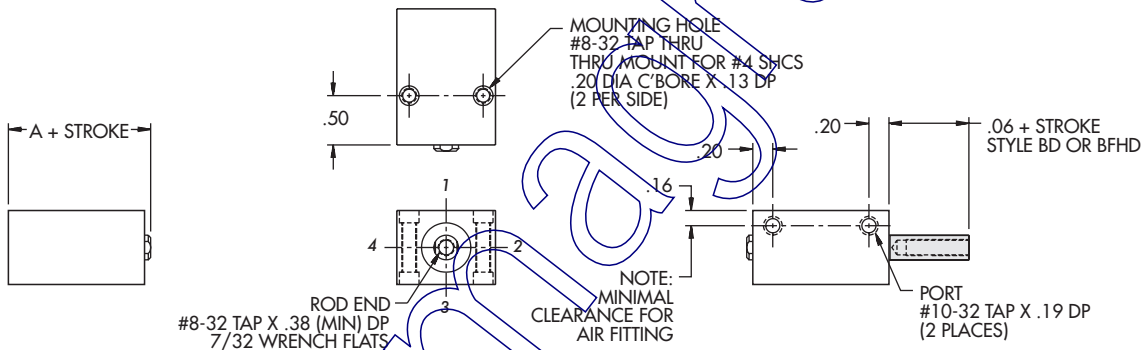
THIRD ANGLE PROJECTION

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B12x __	BD12x __	1/8, 1/4	.69
Intermediate	BHH12x __		1/8	.81



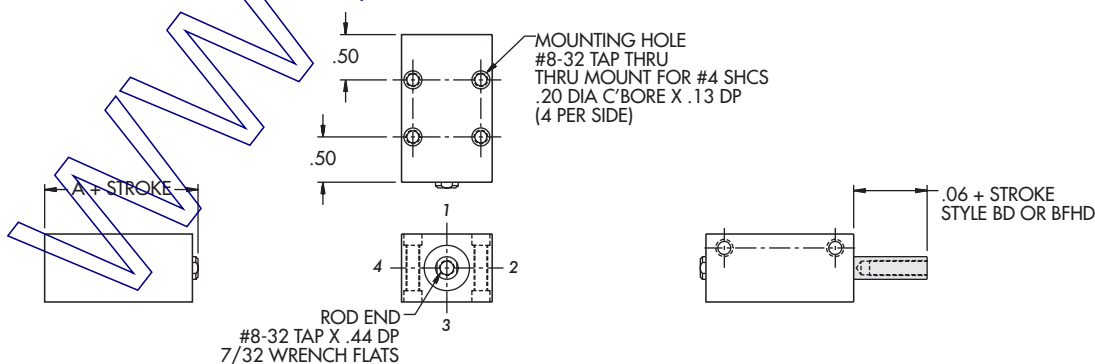
Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B12x __	BD12x __	3/8 to 1-1/4 in 1/8" increments	.69
Intermediate	BHH12x __		1/4 to 1-1/8 in 1/8" increments	.81
Heavy	BFH12x __	BFHD12x __	1/8 to 1 in 1/8" increments	.94

Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B12x __	BD12x __	1-3/8 to 2 in 1/8" increments	.69
Intermediate	BHH12x __		1-1/4 to 2 in 1/8" increments	.81
Heavy	BFH12x __	BFHD12x __	1-1/8 to 2 in 1/8" increments	.94

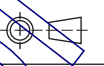
Information same as above except where noted.



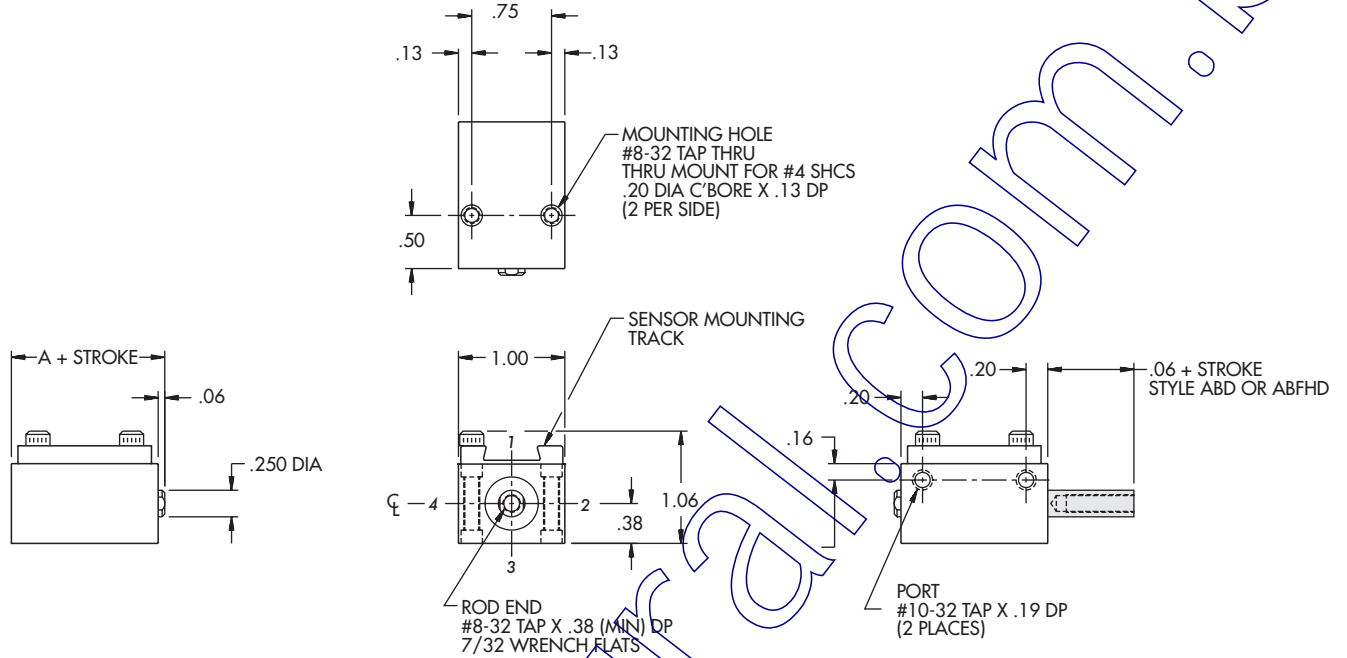


1/2" Bore Magnetic Piston Snap-Cap® Design

THIRD ANGLE PROJECTION

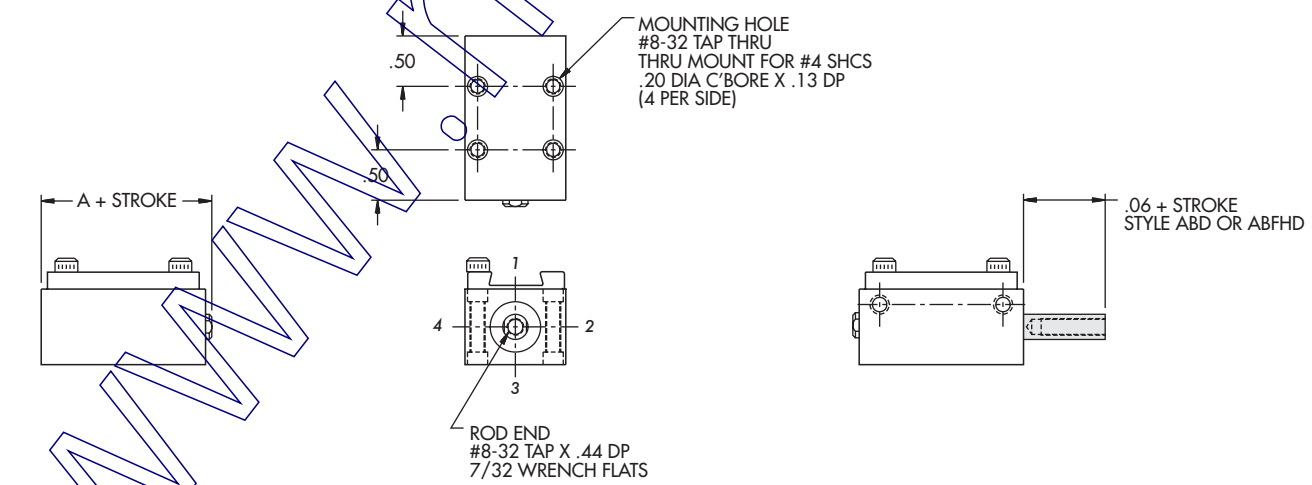


Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB12x__	ABD12x__	1/8 to 1 in 1/8" increments	.94
Intermediate	ABHH12x__		1/8 to 7/8 in 1/8" increments	1.06
Heavy	ABFH12x__	ABFHD12x__	1/8 to 3/4 in 1/8" increments	1.19



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB12x__	ABD12x__	1-1/8 to 2 in 1/8" increments	.94
Intermediate	ABHH12x__		1 to 2 in 1/8" increments	1.06
Heavy	ABFH12x__	ABFHD12x__	7/8 to 2 in 1/8" increments	1.19

Information same as above except where noted.



Due to physical size, body lengths 1-1/2" and shorter have only one sensor; Body length = A + stroke - .06. For modifications, consult factory.

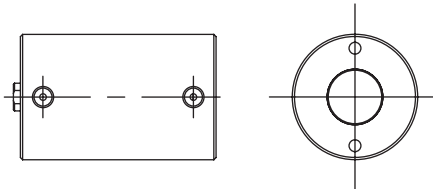
1/2" Bore Options

Conversion Formula: $C^{\circ} = (F^{\circ} - 32^{\circ}) \times .56$

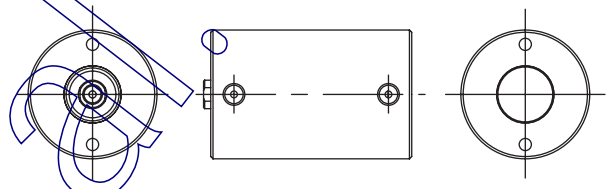
Type	Ordering Suffix	Rating	Description
Pneumatic Seals			
Nitrile	-	0° to 200°F -18° to 93°C	Most commonly used elastomer O-ring due to its excellent resistance to petroleum products, wear, tear and friction. Works with lubricated or non-lubricated air in the noted temperature range. Recommended for general purpose sealing with petroleum oils and fluids, water and silicone greases and oils.
Fluorocarbon	HTV	0° to 400°F -18° to 204°C	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.

1/2" Bore Round Body Cylinder Options

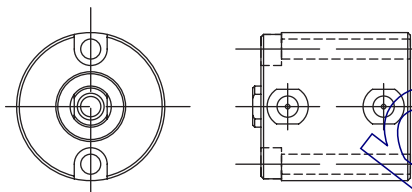
TR Mounting – Threads on Rear
(Optional; specify TR after bore and stroke.)



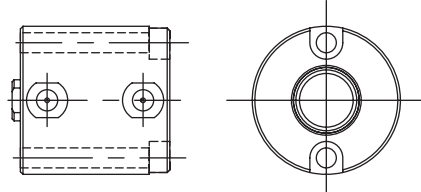
TBE Mounting – Threads On Both Ends
(Optional; specify TBE after bore and stroke.)



TMF Mounting – Thru-Mount (Front)
(Optional; specify TMF after bore and stroke.)
C'bored for #6 SHCS on shaft end only.
Available only on 1-1/8" body lengths and shorter.

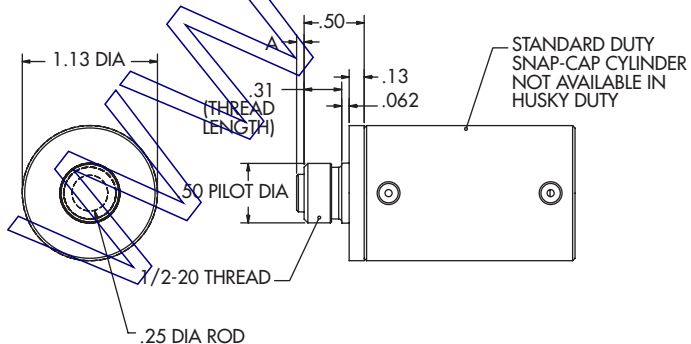


TMR Mounting – Thru-Mount (Rear)
(Optional; specify TMR after bore and stroke.)
C'bored for #6 SHCS on rear end only.
Available only on 1-1/8" body lengths and shorter.



Threaded Nose Mount

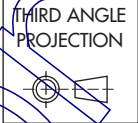
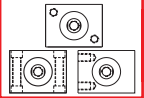
Threaded Nose Mounting for
"R" Series Cylinder Option NM



A= 1/16 on all Stroke Cylinders except:
A= 3/16 on 1-5/8" and 1-7/8" Stroke Standard Duty Cylinders
A= 3/16 on 1-3/8" and 1-5/8" Stroke Magnetic Standard Duty Cylinders

1/2" Bore Options

All Styles



Corrosion Resistant 300 Series Stainless Steel

Standard Duty Features:

- 100% 300 series stainless steel components – interior and exterior
- Plastic rod bearings

Intermediate and Heavy Duty Features:

- 100% 300 series stainless steel components – interior and exterior
- Plastic rod bearings

Magnetic Piston Cylinders:

- Bolt-on Mounting Track is aluminum only

Ordering: Specify "CR3" before cylinder part number

Delivery: Non-standard delivery, consult factory

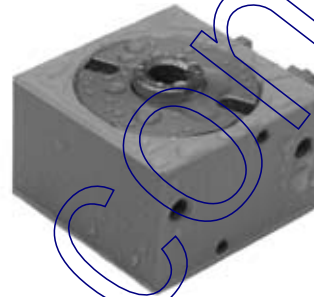
CR3

Ordering Prefix: CR3

Material: 300 Series stainless steel

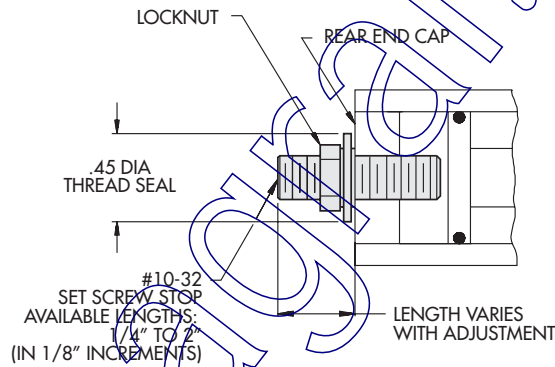
Applications:

- Chemical / Petroleum
- Medical Equipment
- Salt Water Exposure
- Clean Rooms
- Food Processing
- Electronic Assembly
- Nuclear
- Pharmaceutical



Adjustable Retract Stroke

DO NOT use with any pivoting applications



ADJ_

Specify Length

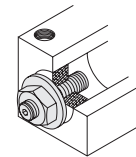
Ordering Suffix: ADJ_

Length: 1/4 - 2 in 1/8" increments

Rod: Single only

Temperature: 200°F Max.

Material: Aluminum endcap, steel locknut and thread seal



Positive Alignment Available on "S" and "R" style cylinders only

The alignment pocket and pilot are designed to fit between the cylinder and the mounting surface. This ensures accurate mounting and added shear strength.

Alignment Pocket

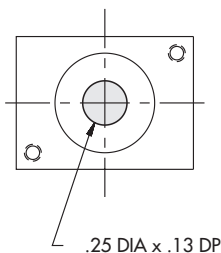
PA

- Provides positive means of locating cylinder centerline within .005"

Ordering Suffix: PA

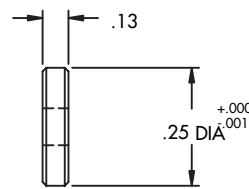
Style: "S" and "R"

Rod: Single



Alignment Pilot

Sold separately

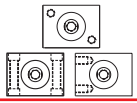


PL12

Part Number: PL12

Material: Stainless steel

All dimensions are in inches unless otherwise noted.

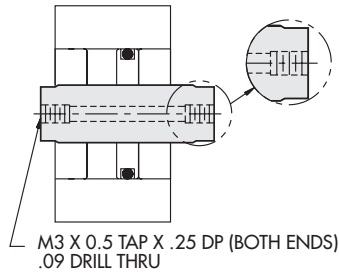


1/2" Bore Options

Hollow Rod Option

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

- Available on 1/4 - 2" stroke in 1/8" increments.



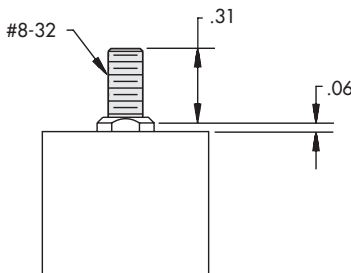
THIRD ANGLE PROJECTION

HR3

Ordering Suffix: HR3
Rod: Double only

Applications		
Example	YES	NO
Gases	✓	
Liquids	✓	
Vacuum	✓	
Linear / Rotary Cylinder	✓	
Clamp and Punch Cylinder	✓	
Blow Molding Cylinder	✓	
Hydraulic Cylinders		X
Non-Rotating Rods		X

Male Stud



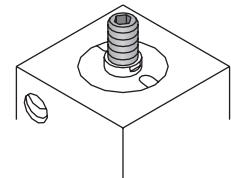
Double ended unit has stud in front end only.

If male stud is desired on *both* ends, specify **MSD**.

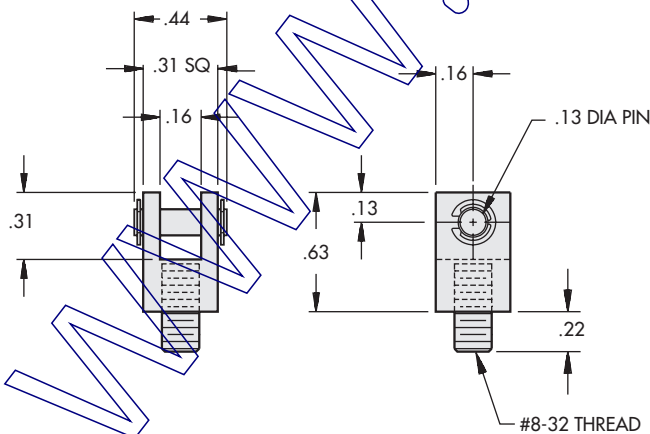
Male stud thread: Same pitch and diameter as female rod top

MS516

Ordering Suffix: MS516
Material: Steel black oxide



Clevis Bracket with Set Screw



THIRD ANGLE PROJECTION

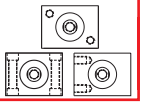


CBSS12

Ordering Suffix: CBSS12
Material: Steel black oxide with case hardened pin and clips

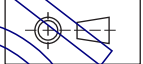


All dimensions are in inches unless otherwise noted.

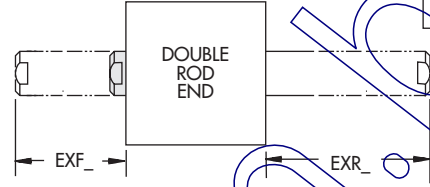
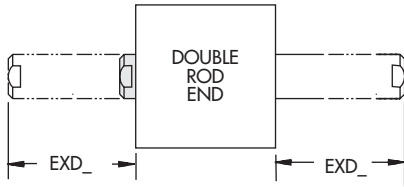
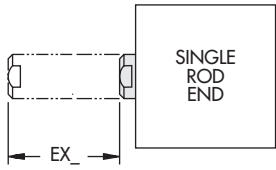


1/2 Bore Options

THIRD ANGLE PROJECTION



Rod End Extension



Extended equally at both ends

- For special extension or length - consult factory
- Not a screw on component
- Female tap does not change

Single Rod End

Double Rod End

EX_
Specify Length

EXD_
Specify Length

Extension Front End

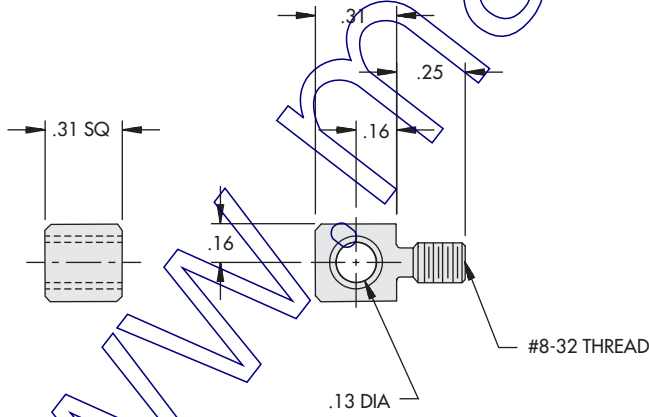
Extension Rear End

EXF_
Specify Length

EXR_
Specify Length

Ordering Suffix: EX_, EXD_, EXF_ or EXR_
Length: 1/8 - 1 in 1/8" increments

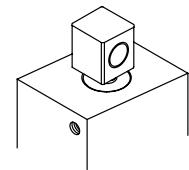
Rod Eye



Screws flush with cylinder rod face

RE

Ordering Suffix: RE
Material: Steel black oxide with sintered bronze bearing

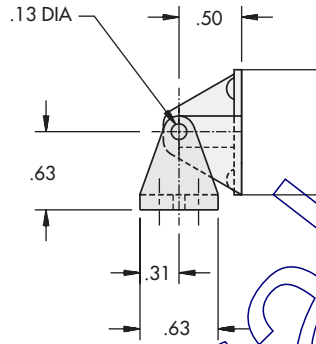
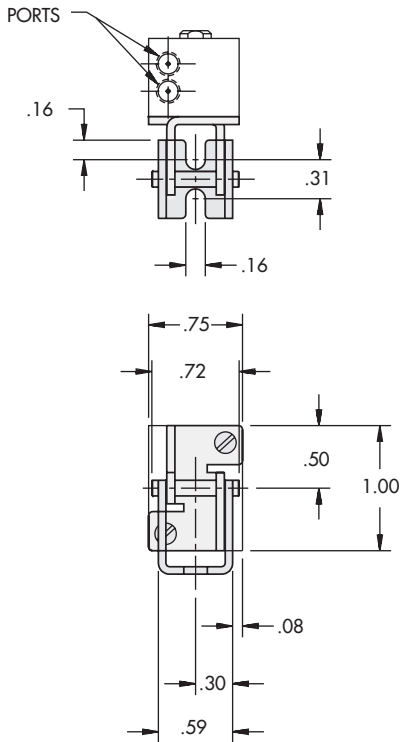


All dimensions are in inches unless otherwise noted.



1/2" Bore Options

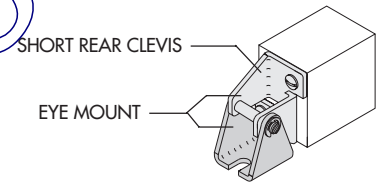
Short Rear Clevis with Eye Mount



SRCE

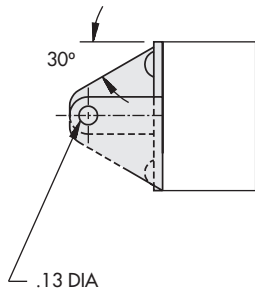
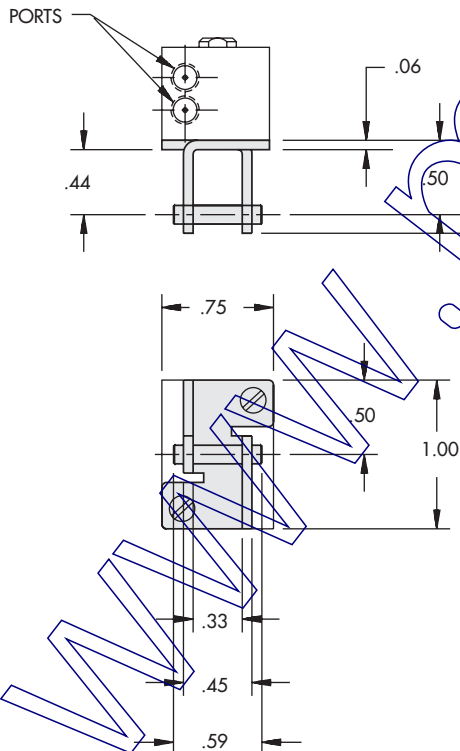
- Ordering Suffix:** SRCE
Style: "S" only
Rod: Single only
Pivot: 180°
Material: Short Rear Clevis:
 See Below
 Eye Mount:
 Steel black oxide

THIRD ANGLE PROJECTION



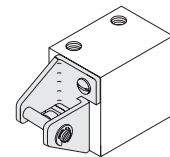
Cylinder is reverse assembled with magnetic piston option.

Short Rear Clevis



SRC

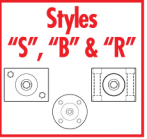
- Ordering Suffix:** SRC
Style: "S" only
Rod: Single only
Material: Short Rear Clevis:
 Steel black oxide
 with case hardened
 pin and clips



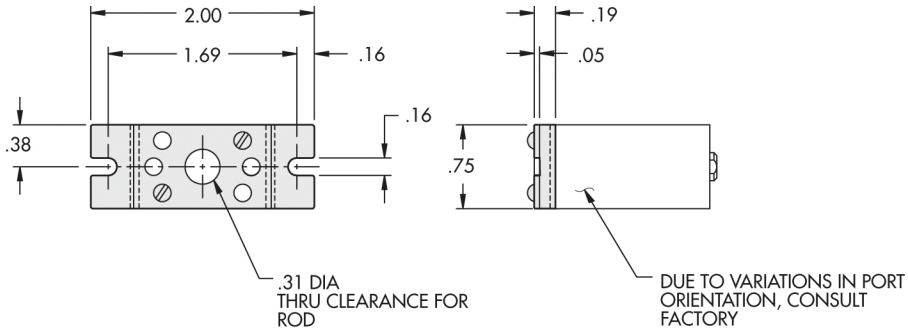
Cylinder is reverse assembled with magnetic piston option.

All dimensions are in inches unless otherwise noted.

1/2" Bore Options



Flange Mount (shown as Rear Flange)



Front Flange

FF

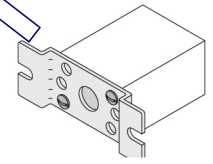
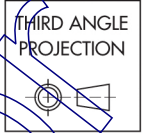
Rear Flange

RF

Ordering Suffix: FF or RF

Style: "S" and "R"

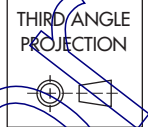
Material: Steel black oxide



www.magral.com

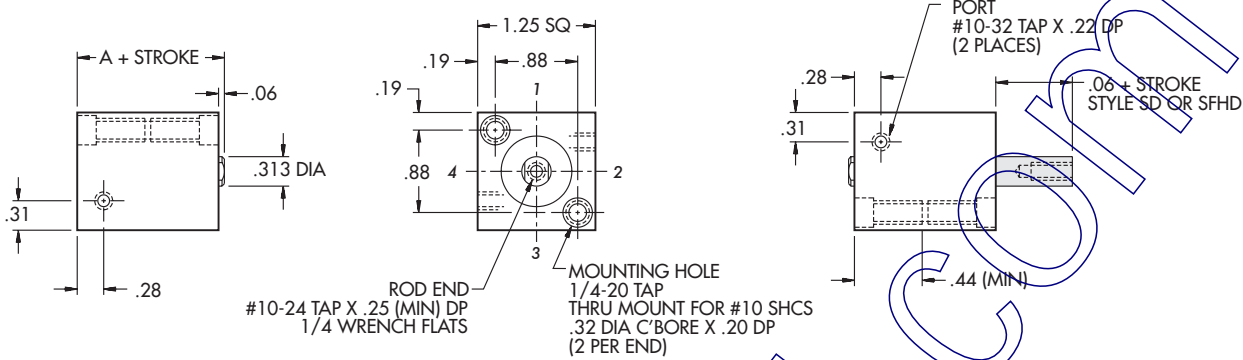


3/4" Bore Non Magnetic Piston



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S34x __	SD34x __	1/8 to 3/4 in 1/8" increments	.81
Intermediate	SHH34x __		1/8 to 1/2 in 1/8" increments	1.06
Heavy	SFH34x __	SFHD34x __	1/8, 1/4	1.31

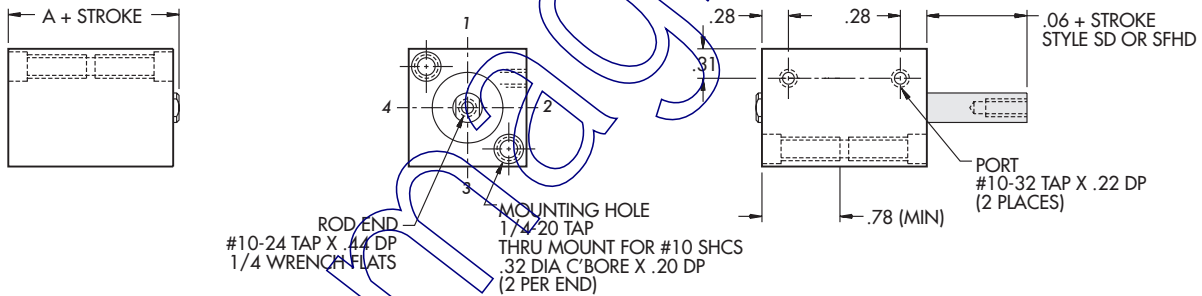
Standard Mounting: **TF, TR, TBE, TM** Optional Porting: **1/8-27 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S34x __	SD34x __	7/8, 1	.81
Intermediate	SHH34x __		5/8, 3/4	1.06
Heavy	SFH34x __	SFHD34x __	3/8, 1/2	1.31

Standard Mounting: **TF, TR, TBE, TM** Optional Porting: **1/8-27 NPTF**

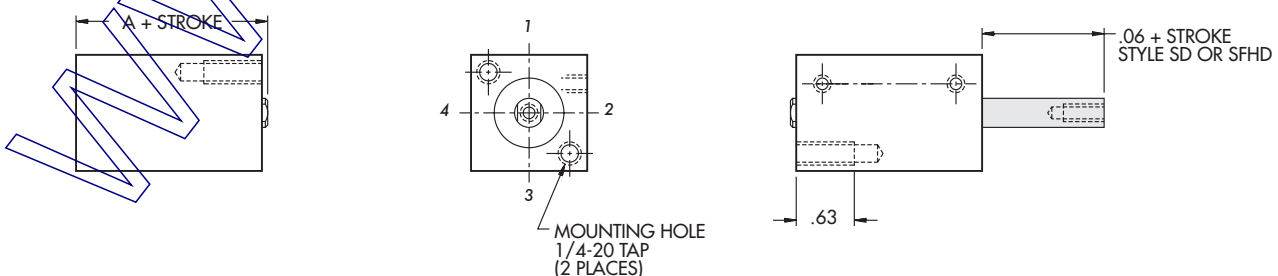
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S34x __	SD34x __	1-1/8 to 6 in 1/8" increments	.81
Intermediate	SHH34x __		7/8 to 6 in 1/8" increments	1.06
Heavy	SFH34x __	SFHD34x __	5/8 to 6 in 1/8" increments	1.31

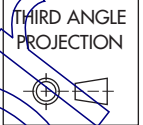
Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/8-27 NPTF**

Information same as above except where noted.



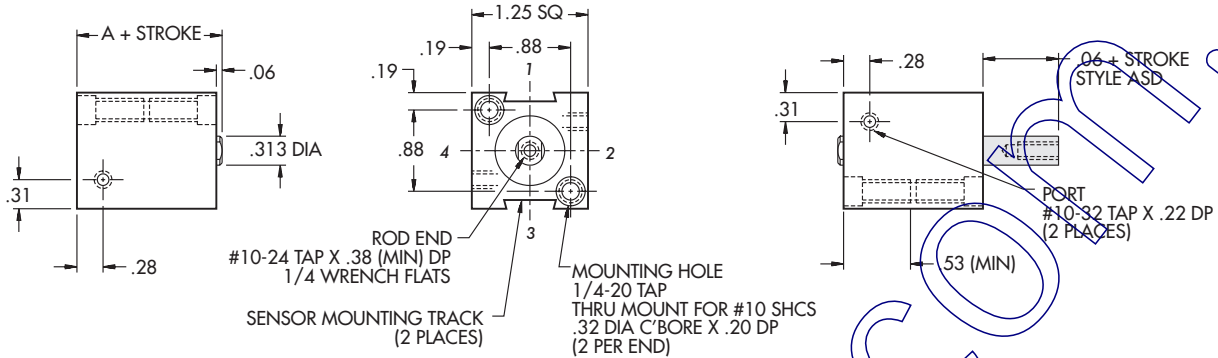


3/4" Bore Magnetic Piston



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS34x __	ASD34x __	1/8 to 1/2 in 1/8" increments	1.06
Intermediate	ASHH34x __		1/8, 1/4	1.31

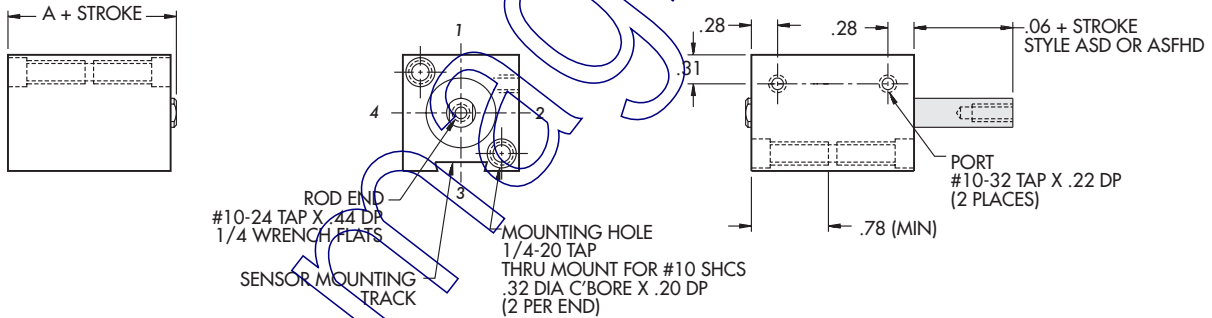
Standard Mounting: **TF, TR, TBE, TM** Optional Porting: **1/8-27 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS34x __	ASD34x __	5/8 to 3/4 in 1/8" increments	1.06
Intermediate	ASHH34x __		3/8 to 1/2 in 1/8" increments	1.31
Heavy	ASFH34x __	ASFHD34x __	1/8 to 1/4 in 1/8" increments	1.56

Standard Mounting: **TF, TR, TBE, TM** Optional Porting: **1/8-27 NPTF**

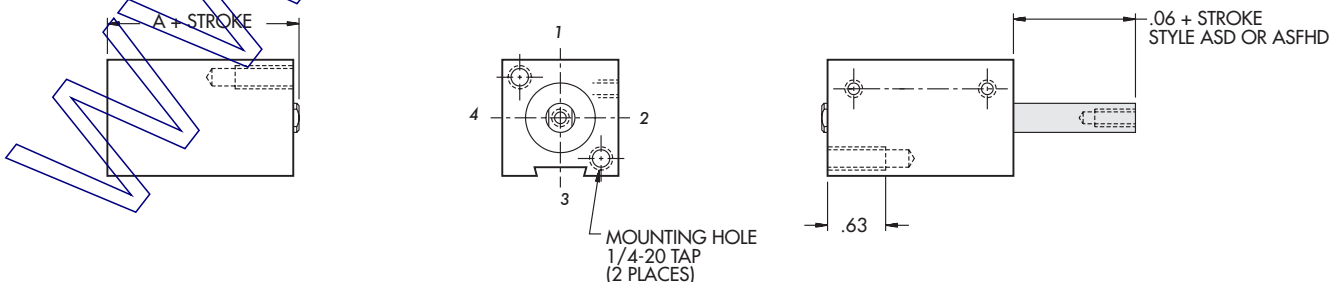
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS34x __	ASD34x __	7/8 to 6 in 1/8" increments	1.06
Intermediate	ASHH34x __		5/8 to 6 in 1/8" increments	1.31
Heavy	ASFH34x __	ASFHD34x __	3/8 to 6 in 1/8" increments	1.56

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/8-27 NPTF**

Information same as above except where noted.



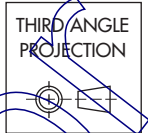
Style "B"



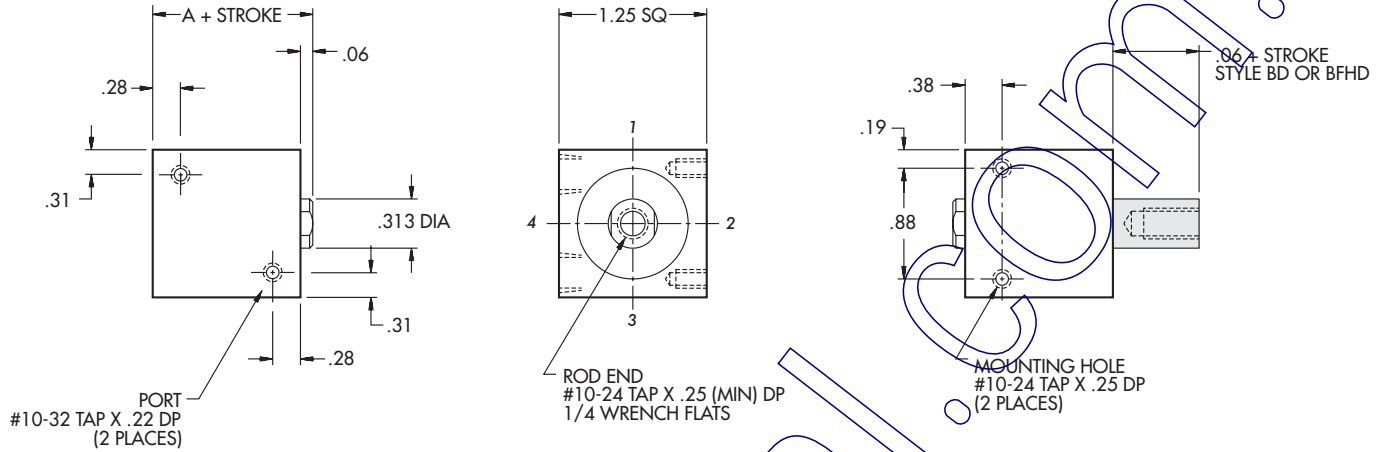
Side Mount

3/4" Bore Non Magnetic Piston

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B34x __	BD34x __	1/8 to 3/4 in 1/8" increments	.81
Intermediate	BHH34x __		1/8 to 1/2 in 1/8" increments	1.06
Heavy	BFH34x __	BFHD34x __	1/8, 1/4	1.31



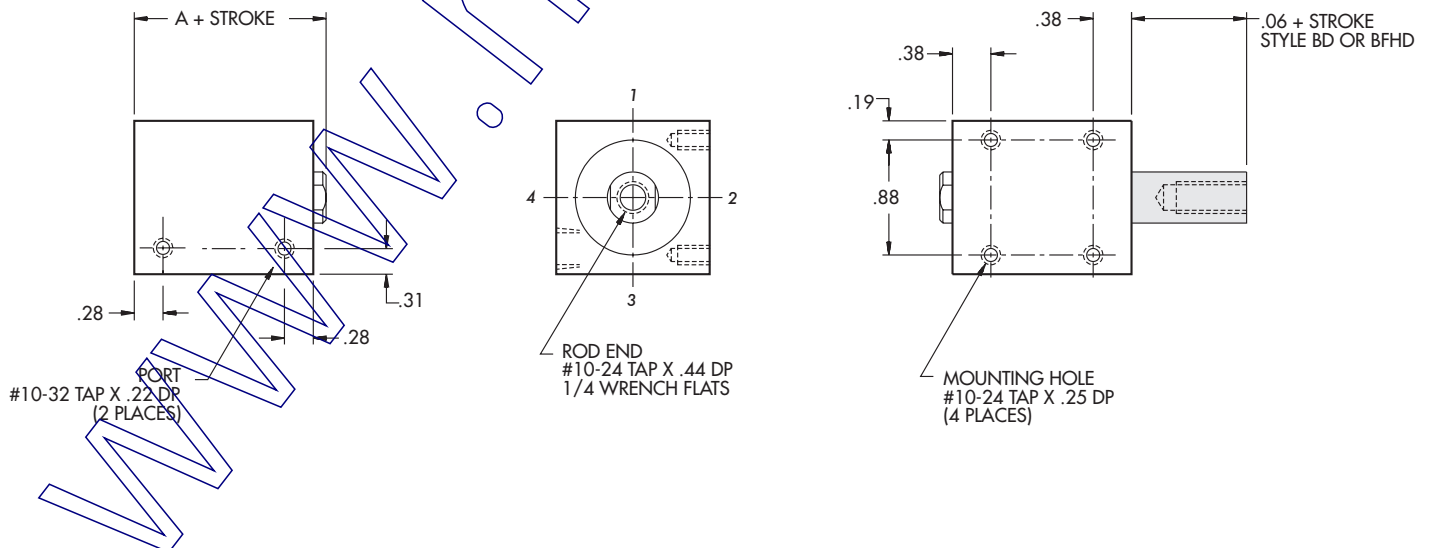
Optional Porting: **1/8-27 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B34x __	BD34x __	7/8 to 6 in 1/8" increments	.81
Intermediate	BHH34x __		5/8 to 6 in 1/8" increments	1.06
Heavy	BFH34x __	BFHD34x __	3/8 to 6 in 1/8" increments	1.31

Optional Porting: **1/8-27 NPTF**

Information same as above except where noted.



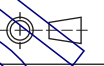
3/4" Bore Magnetic Piston

Style "AB"



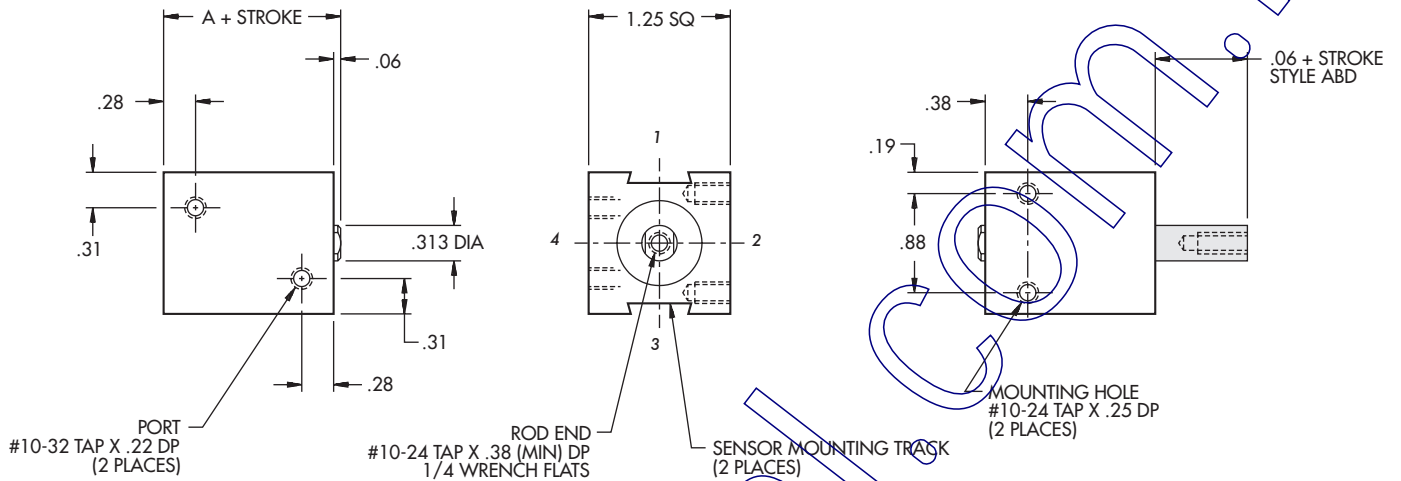
Side Mount

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB34x__	ABD34x__	1/8 to 1/2 in 1/8" increments	1.06
Intermediate	ABHH34x__		1/8, 1/4	1.31

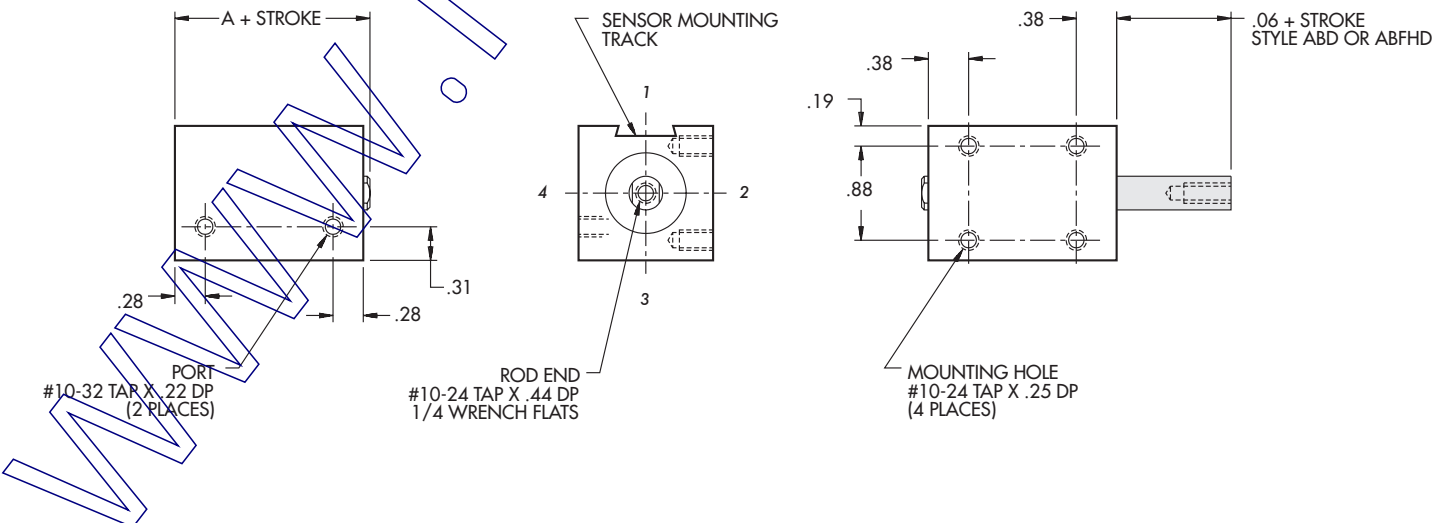
Optional Porting: **1/8-27 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB34x__	ABD34x__	5/8 to 6 in 1/8" increments	1.06
Intermediate	ABHH34x__		3/8 to 6 in 1/8" increments	1.31
Heavy	ABFH34x__	ABFHD34x__	1/8 to 6 in 1/8" increments	1.56

Optional Porting: **1/8-27 NPTF**

Information same as above except where noted.



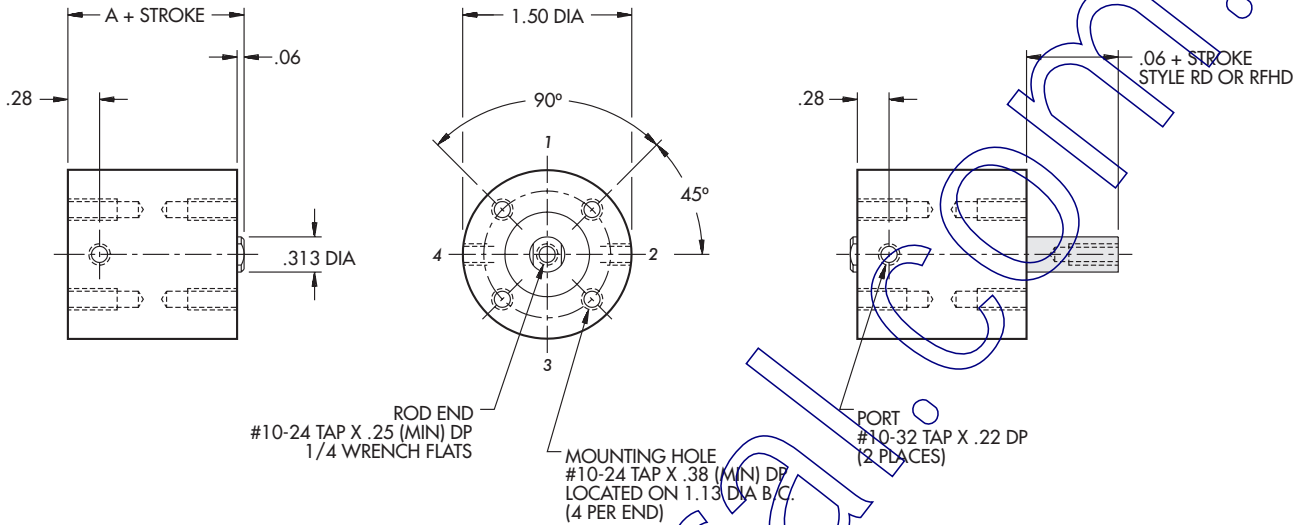


3/4" Bore Non Magnetic Piston

THIRD ANGLE PROJECTION

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R34x __	RD34x __	1/8 to 3/4 in 1/8" increments	.81
Intermediate	RHH34x __		1/8 to 1/2 in 1/8" increments	1.06
Heavy	RFH34x __	RFHD34x __	1/8, 1/4	1.31

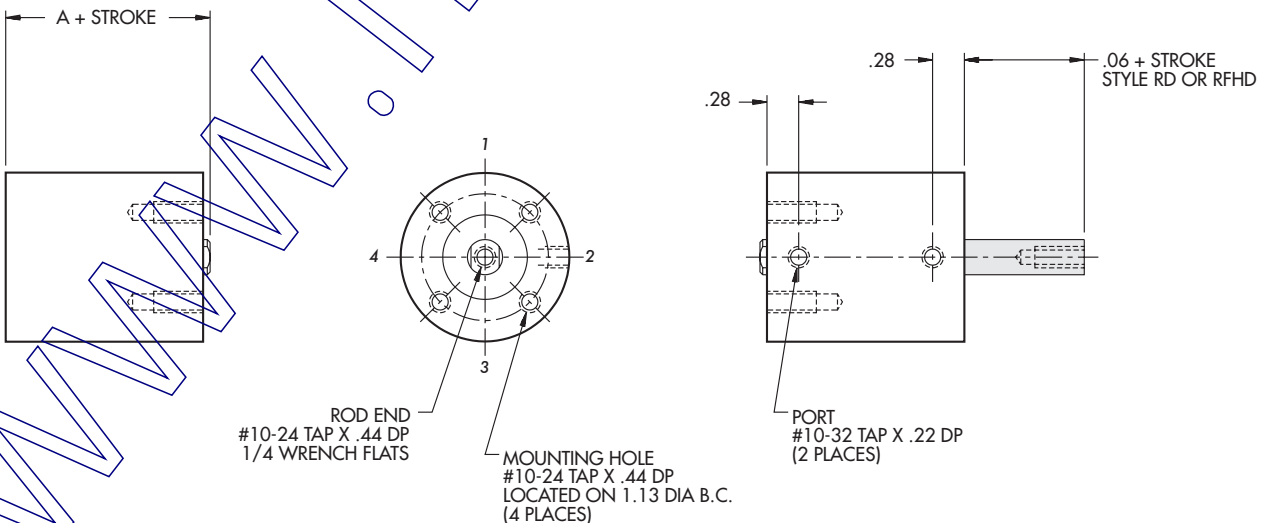
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/8-27 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R34x __	RD34x __	7/8 to 6 in 1/8" increments	.81
Intermediate	RHH34x __		5/8 to 6 in 1/8" increments	1.06
Heavy	RFH34x __	RFHD34x __	3/8 to 6 in 1/8" increments	1.31

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/8-27 NPTF**

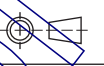
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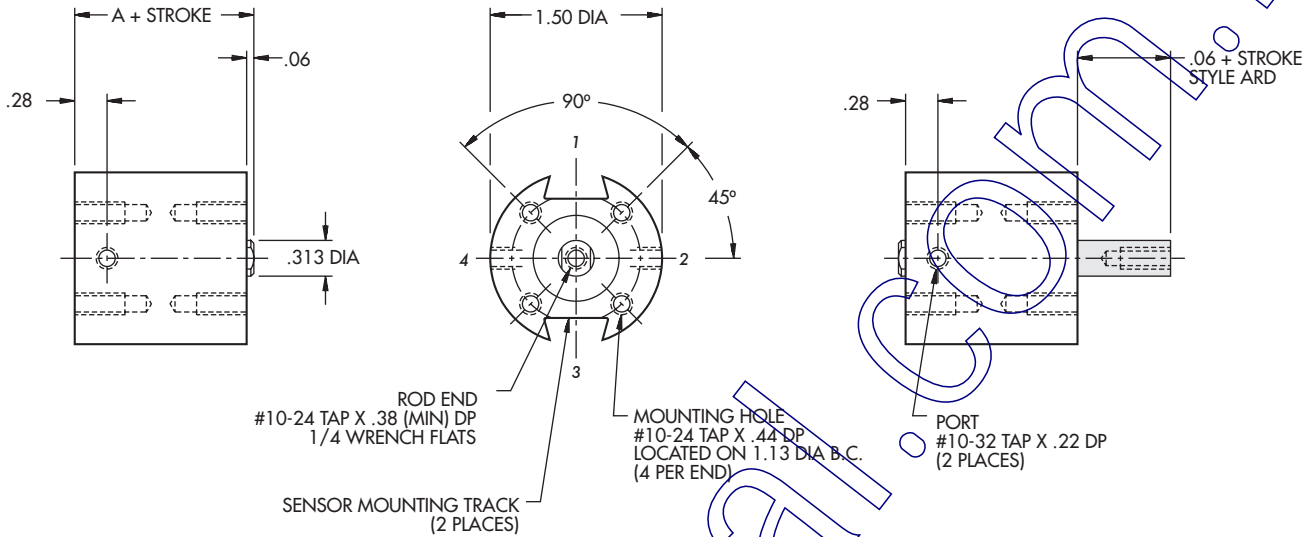
3/4" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR34x__	ARD34x__	1/8 to 1/2 in 1/8" increments	1.06
Intermediate	ARHH34x__		1/8, 1/4	1.31

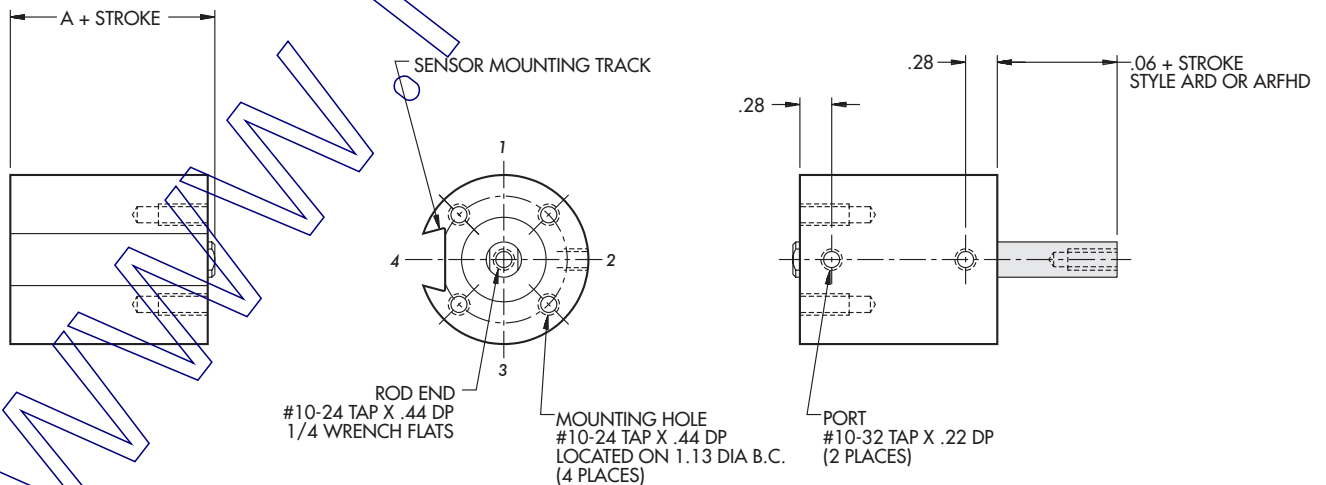
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/8-27 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR34x__	ARD34x__	5/8 to 6 in 1/8" increments	1.06
Intermediate	ARHH34x__		3/8 to 6 in 1/8" increments	1.31
Heavy	ARFH34x__	ARFHD34x__	1/8 to 6 in 1/8" increments	1.56

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/8-27 NPTF**

Information same as above except where noted.



Style "S"



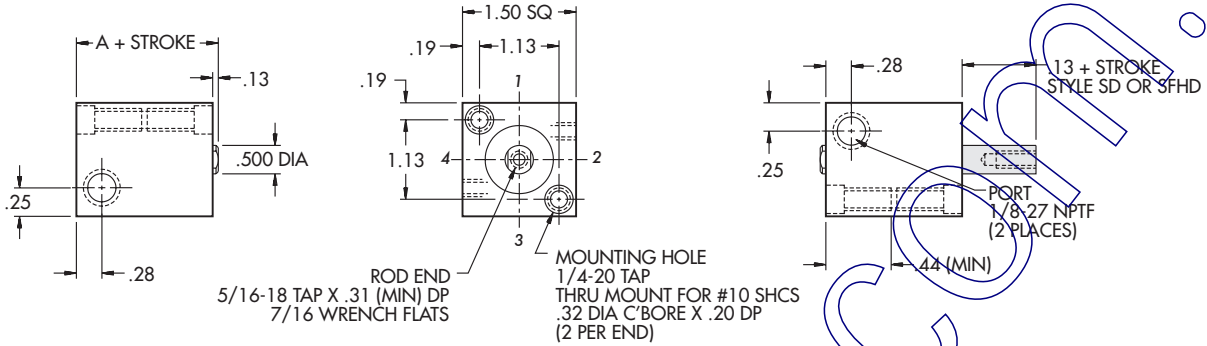
End Mount

1-1/8" Bore Non Magnetic Piston

THIRD ANGLE PROJECTION

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S118x __	SD118x __	1/8 to 3/4 in 1/8" increments	.88
Intermediate	SHH118x __		1/8 to 1/2 in 1/8" increments	1.13
Heavy	SFH118x __	SFHD118x __	1/8 to 1/4 in 1/8" increments	1.38

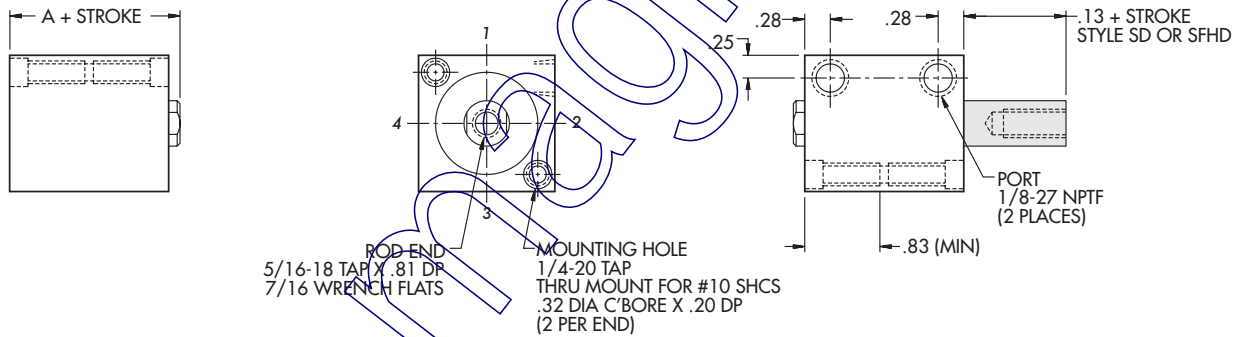
Standard Mounting: **TF, TR, TBE, TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S118x __	SD118x __	7/8, 1	.88
Intermediate	SHH118x __		5/8, 3/4	1.13
Heavy	SFH118x __	SFHD118x __	3/8, 1/2	1.38

Standard Mounting: **TF, TR, TBE, TM**

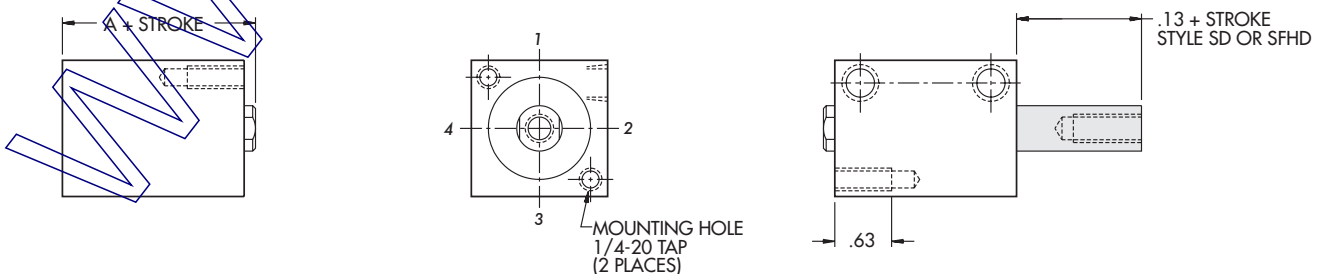
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S118x __	SD118x __	1-1/8 to 6 in 1/8" increments	.88
Intermediate	SHH118x __		7/8 to 6 in 1/8" increments	1.13
Heavy	SFH118x __	SFHD118x __	5/8 to 6 in 1/8" increments	1.38

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted.





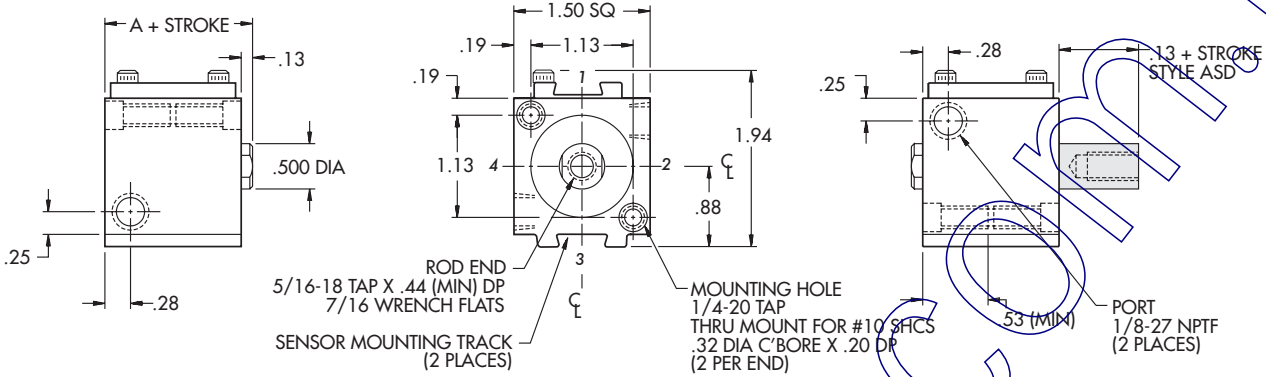
1-1/8" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS118x __	ASD118x __	1/8 to 1/2 in 1/8" increments	1.13
Intermediate	ASHH118x __		1/8 to 1/4 in 1/8" increments	1.38

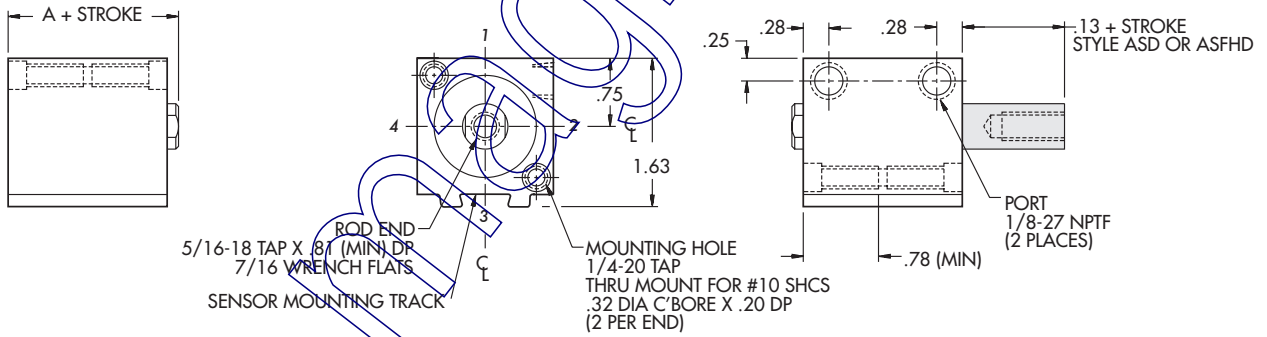
Standard Mounting: **TF, TR, TBE, TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS118x __	ASD118x __	5/8, 3/4	1.13
Intermediate	ASHH118x __		3/8, 1/2	1.38
Heavy	ASFH118x __	ASFHD118x __	1/8, 1/4	1.63

Standard Mounting: **TF, TR, TBE, TM**

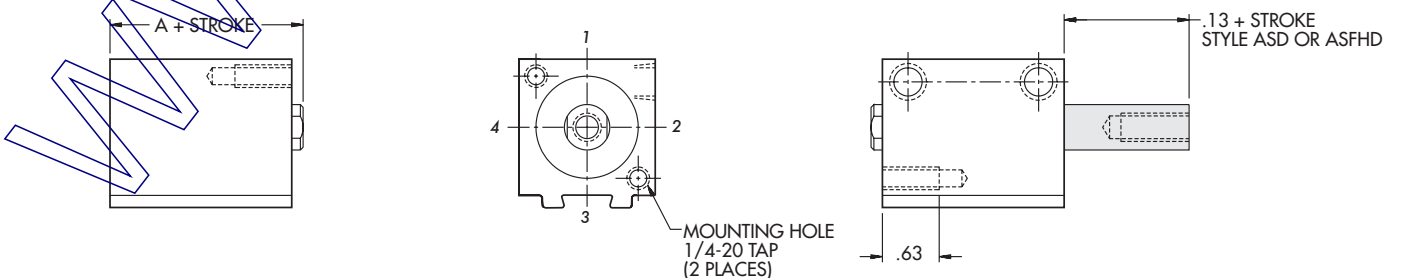
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS118x __	ASD118x __	7/8 to 6 in 1/8" increments	1.13
Intermediate	ASHH118x __		5/8 to 6 in 1/8" increments	1.38
Heavy	ASFH118x __	ASFHD118x __	3/8 to 6 in 1/8" increments	1.63

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted.



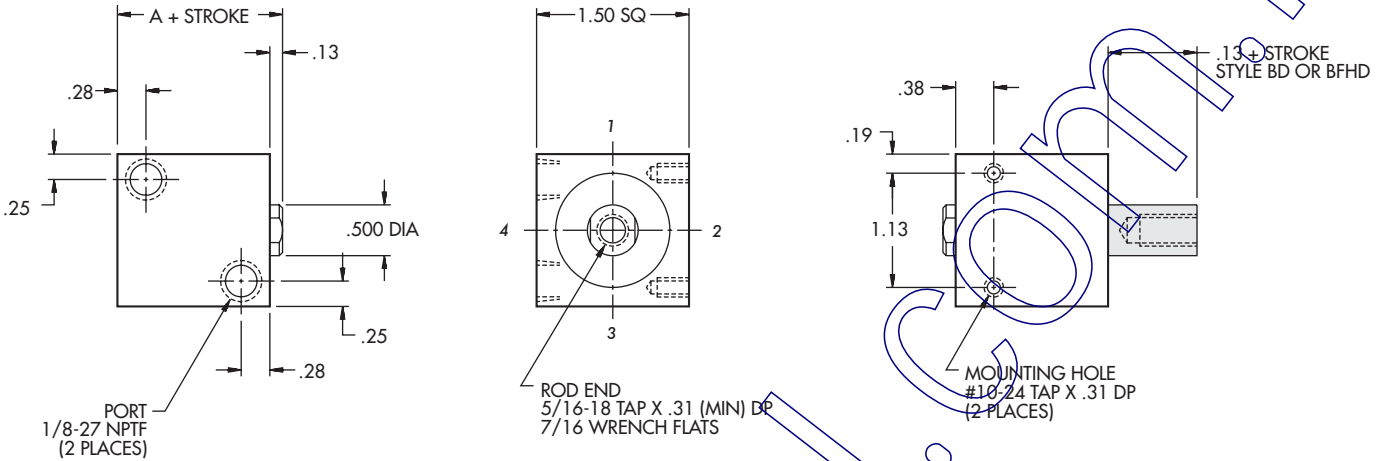
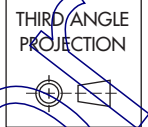
Style "B"



Side Mount

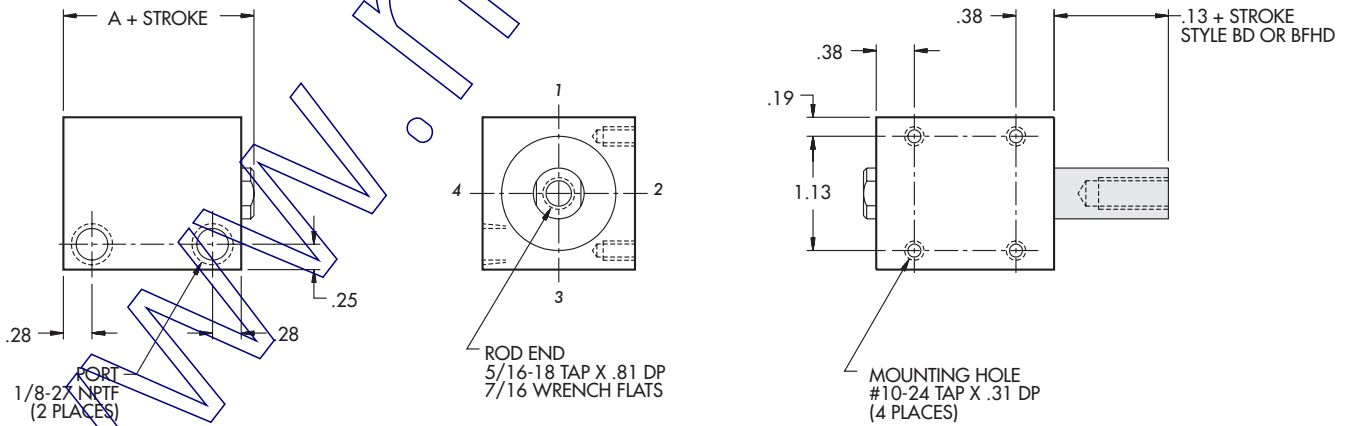
1-1/8" Bore Non Magnetic Piston

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B118x __	BD118x __	1/8 to 3/4 in 1/8" increments	.88
Intermediate	BHH118x __		1/8 to 1/2 in 1/8" increments	1.13
Heavy	BFH118x __	BFHD118x __	1/8, 1/4	1.38



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B118x __	BD118x __	7/8 to 6 in 1/8" increments	.88
Intermediate	BHH118x __		5/8 to 6 in 1/8" increments	1.13
Heavy	BFH118x __	BFHD118x __	3/8 to 6 in 1/8" increments	1.38

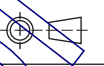
Information same as above except where noted.



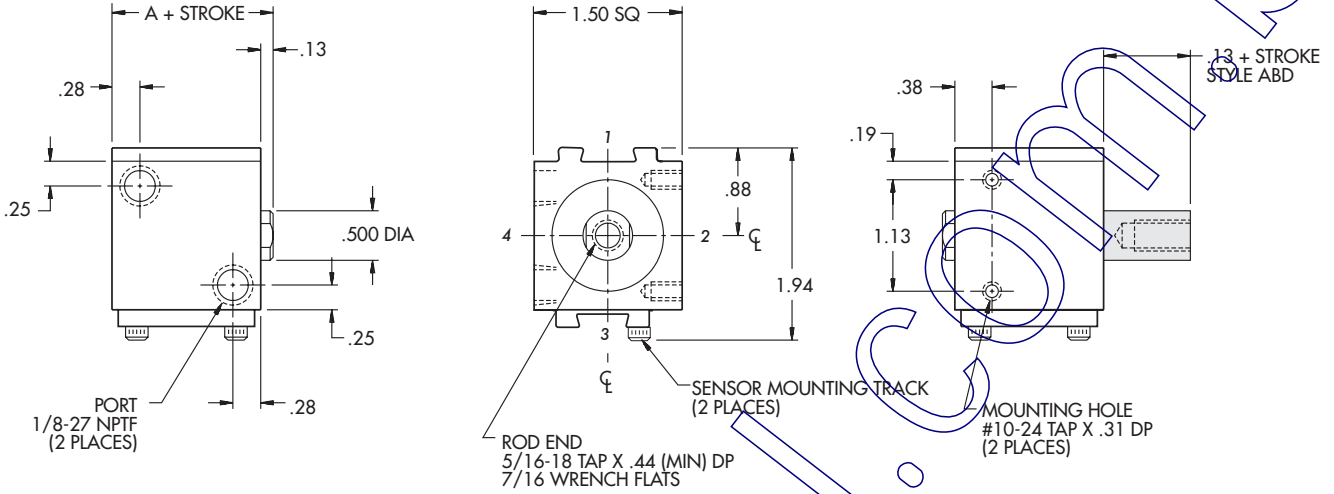


1-1/8" Bore Magnetic Piston

THIRD ANGLE PROJECTION

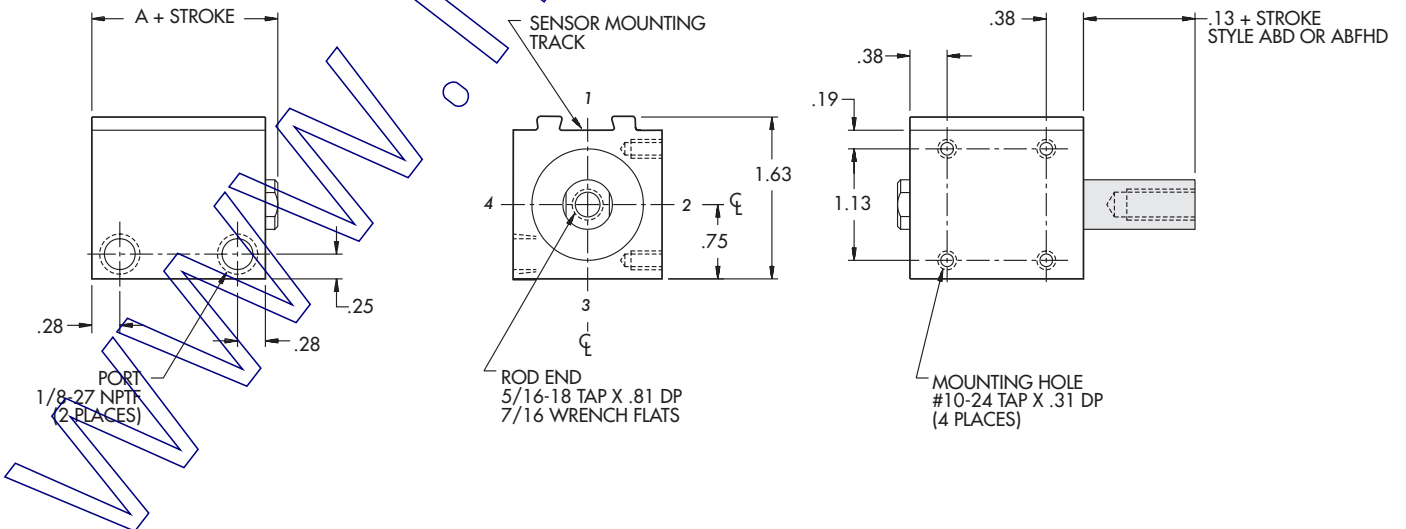


Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB118x__	ABD118x__	1/8 to 1/2 in 1/8" increments	1.13
Intermediate	ABHH118x__		1/8, 1/4	1.38



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB118x__	ABD118x__	5/8 to 6 in 1/8" increments	1.13
Intermediate	ABHH118x__		3/8 to 6 in 1/8" increments	1.38
Heavy	ABFH118x__	ABFHD118x__	1/8 to 6 in 1/8" increments	1.63

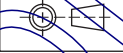
Information same as above except where noted.





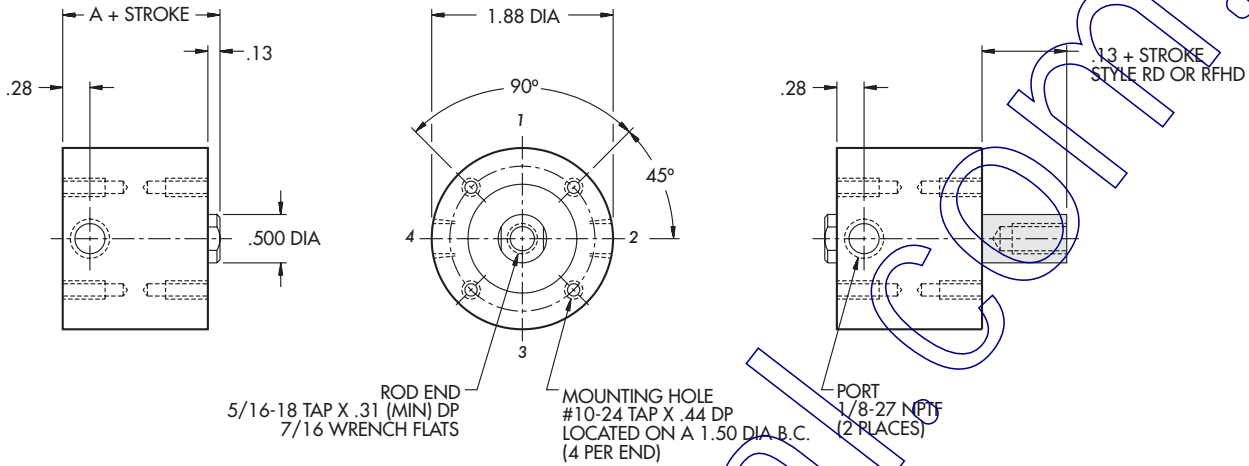
1-1/8" Bore Non Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R118x __	RD118x __	1/8 to 3/4 in 1/8" increments	.88
Intermediate	RHH118x __		1/8 to 1/2 in 1/8" increments	1.13
Heavy	RFH118x __	RFHD118x __	1/8, 1/4	1.38

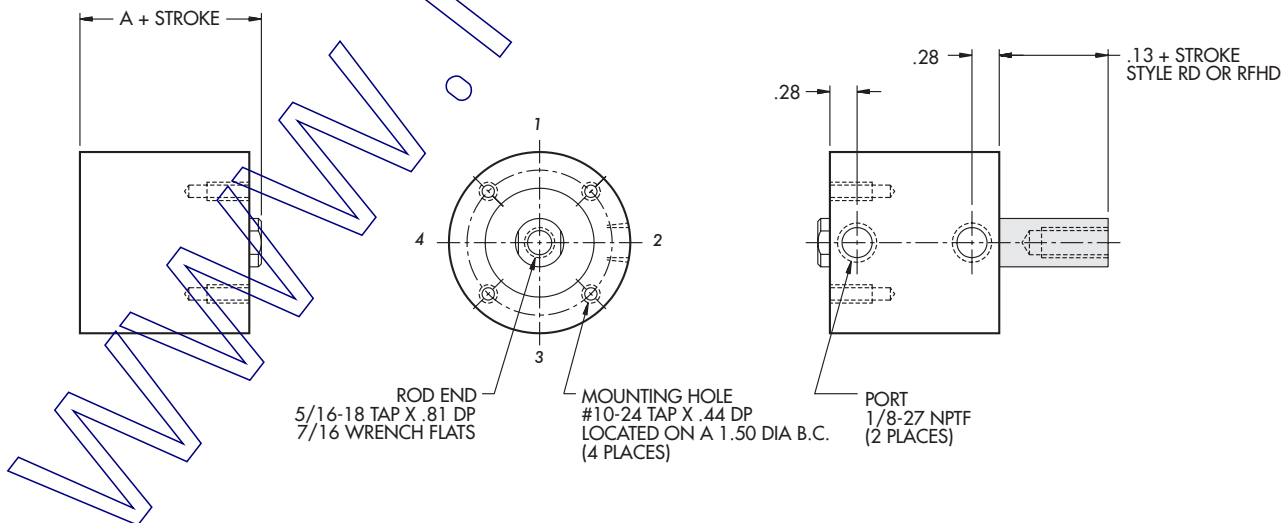
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R118x __	RD118x __	7/8 to 6 in 1/8" increments	.88
Intermediate	RHH118x __		5/8 to 6 in 1/8" increments	1.13
Heavy	RFH118x __	RFHD118x __	3/8 to 6 in 1/8" increments	1.38

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted.





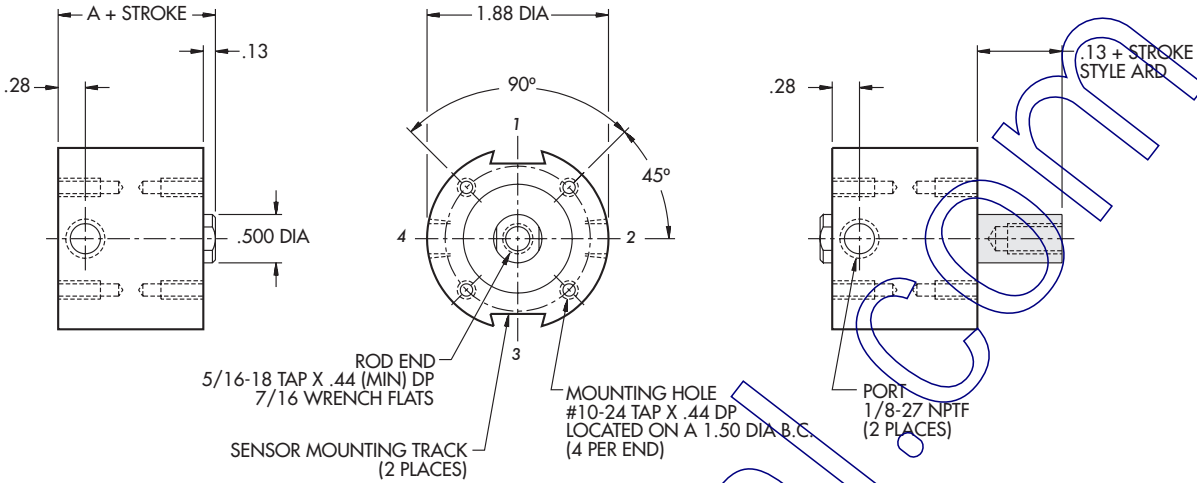
1-1/8" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR118x__	ARD118x__	1/8 to 1/2 in 1/8" increments	1.13
Intermediate	ARHH118x__		1/8, 1/4	1.38

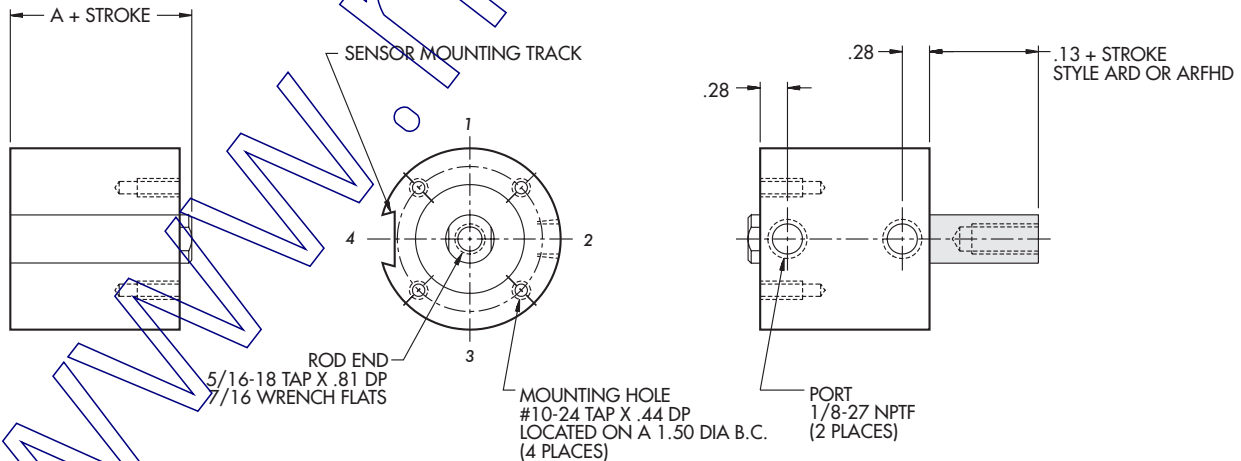
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR118x__	ARD118x__	5/8 to 6 in 1/8" increments	1.13
Intermediate	ARHH118x__		3/8 to 6 in 1/8" increments	1.38
Heavy	ARFH118x__	ARFHD118x__	1/8 to 6 in 1/8" increments	1.63

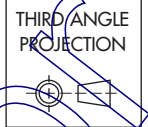
Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted.



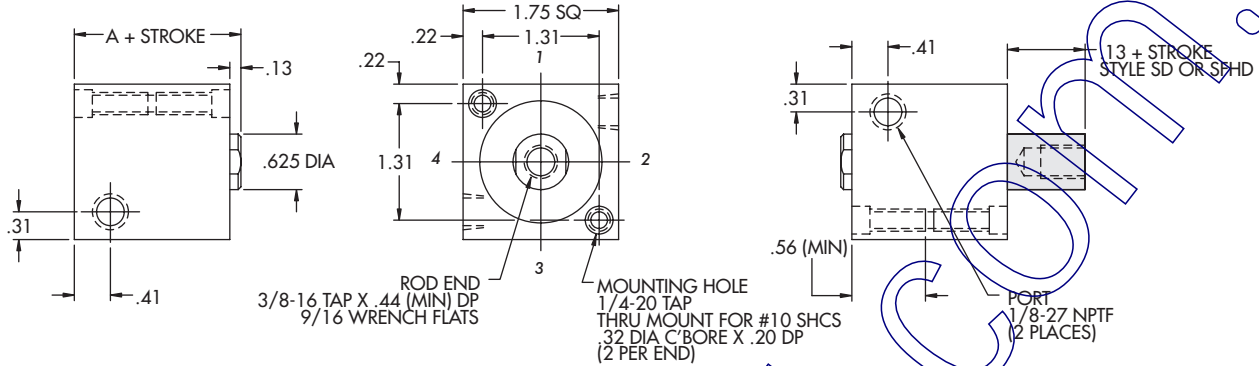


1-3/8" Bore Non Magnetic Piston



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S138x __	SD138x __	1/8 to 3/4 in 1/8" increments	1.13
Intermediate	SHH138x __		1/8 to 1/2 in 1/8" increments	1.38
Heavy	SFH138x __	SFHD138x __	1/8, 1/4	1.63

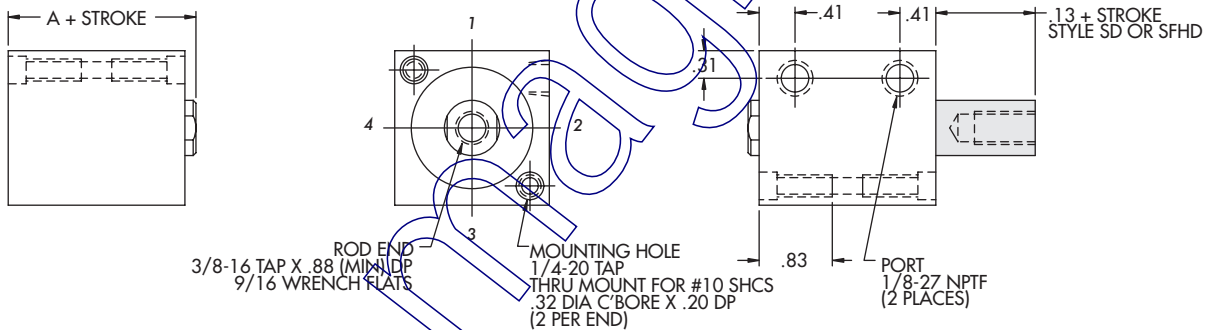
Standard Mounting: **TF, TR, TBE, TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S138x __	SD138x __	7/8, 1	1.13
Intermediate	SHH138x __		5/8, 3/4	1.38
Heavy	SFH138x __	SFHD138x __	3/8, 1/2	1.63

Standard Mounting: **TF, TR, TBE, TM**

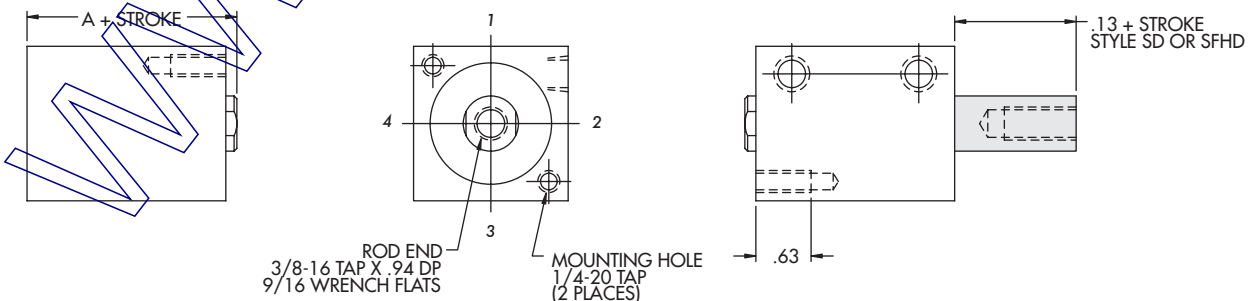
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S138x __	SD138x __	1-1/8 to 6 in 1/8" increments	1.13
Intermediate	SHH138x __		7/8 to 6 in 1/8" increments	1.38
Heavy	SFH138x __	SFHD138x __	5/8 to 6 in 1/8" increments	1.63

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

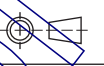
Information same as above except where noted.





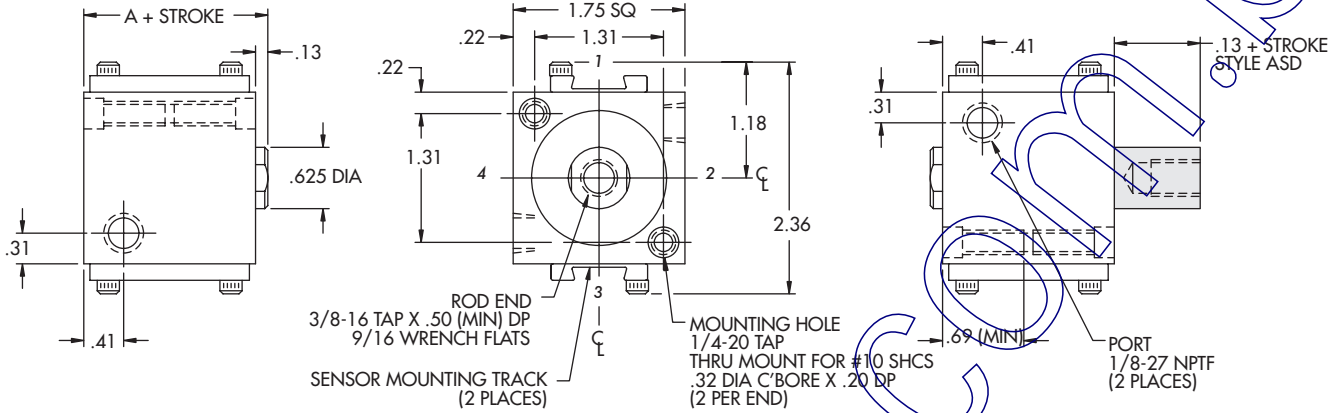
1-3/8" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS138x __	ASD138x __	1/8 to 1/2 in 1/8" increments	1.38
Intermediate	ASHH138x __		1/8, 1/4	1.63

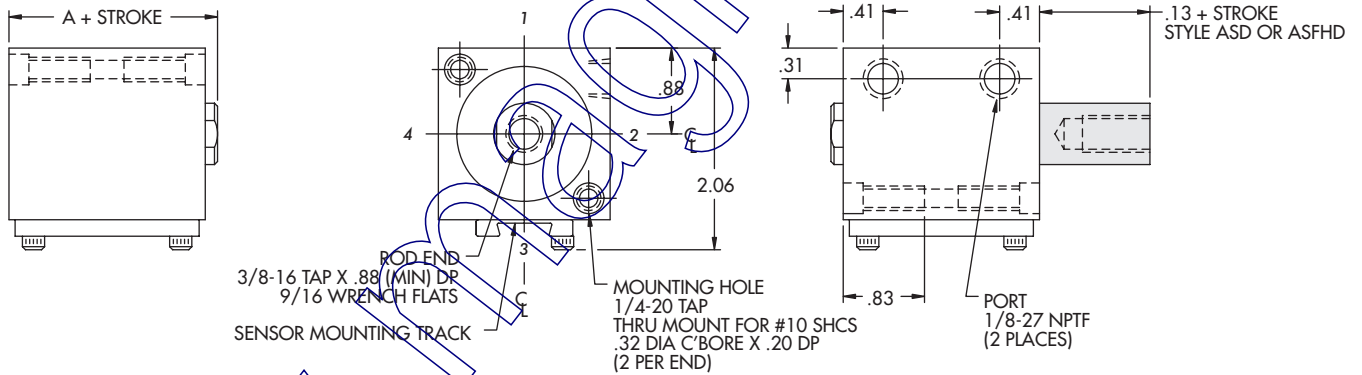
Standard Mounting: **TF, TR, TBE, TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS138x __	ASD138x __	5/8, 3/4	1.38
Intermediate	ASHH138x __		3/8, 1/2	1.63
Heavy	ASFH138x __	ASFHD138x __	1/8, 1/4	1.88

Standard Mounting: **TF, TR, TBE, TM**

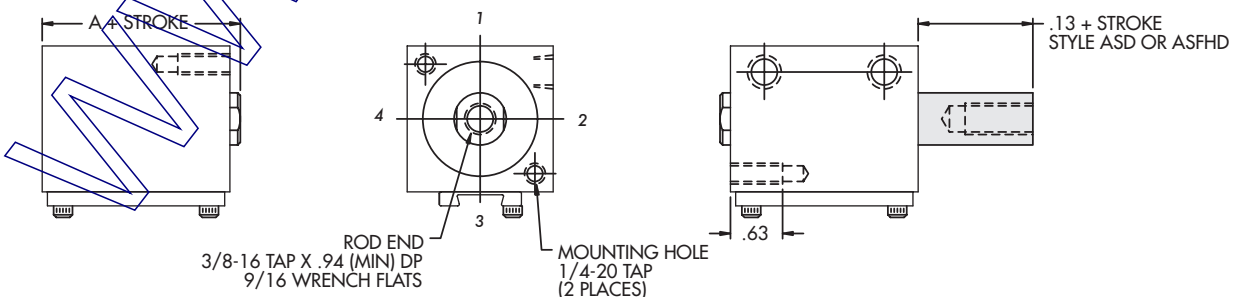
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS138x __	ASD138x __	7/8 to 6 in 1/8" increments	1.38
Intermediate	ASHH138x __		5/8 to 6 in 1/8" increments	1.63
Heavy	ASFH138x __	ASFHD138x __	3/8 to 6 in 1/8" increments	1.88

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted.



Style "B"

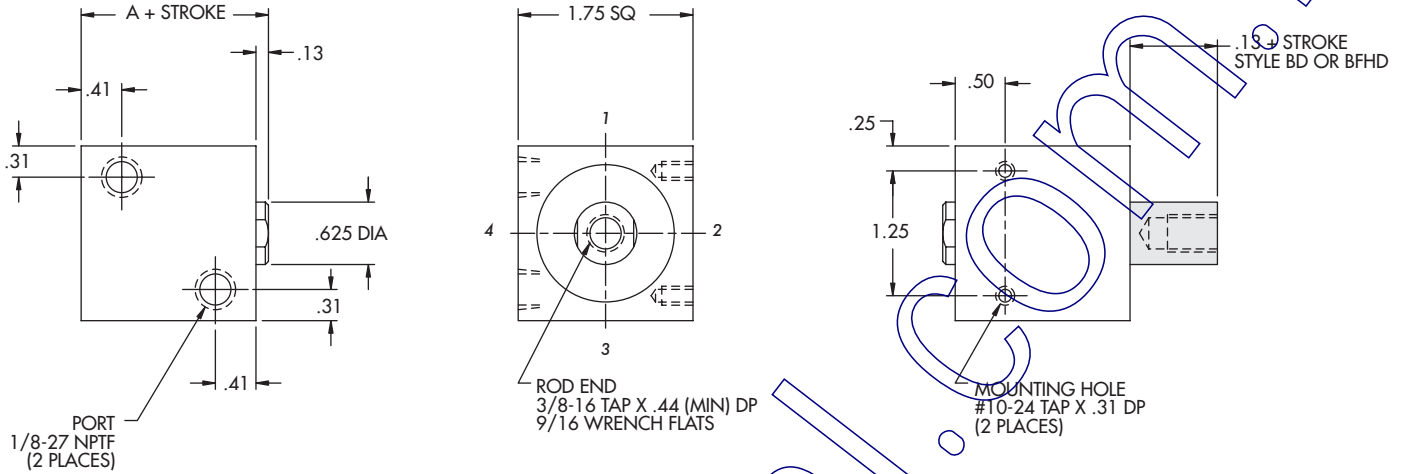


Side Mount

1-3/8" Bore Non Magnetic Piston

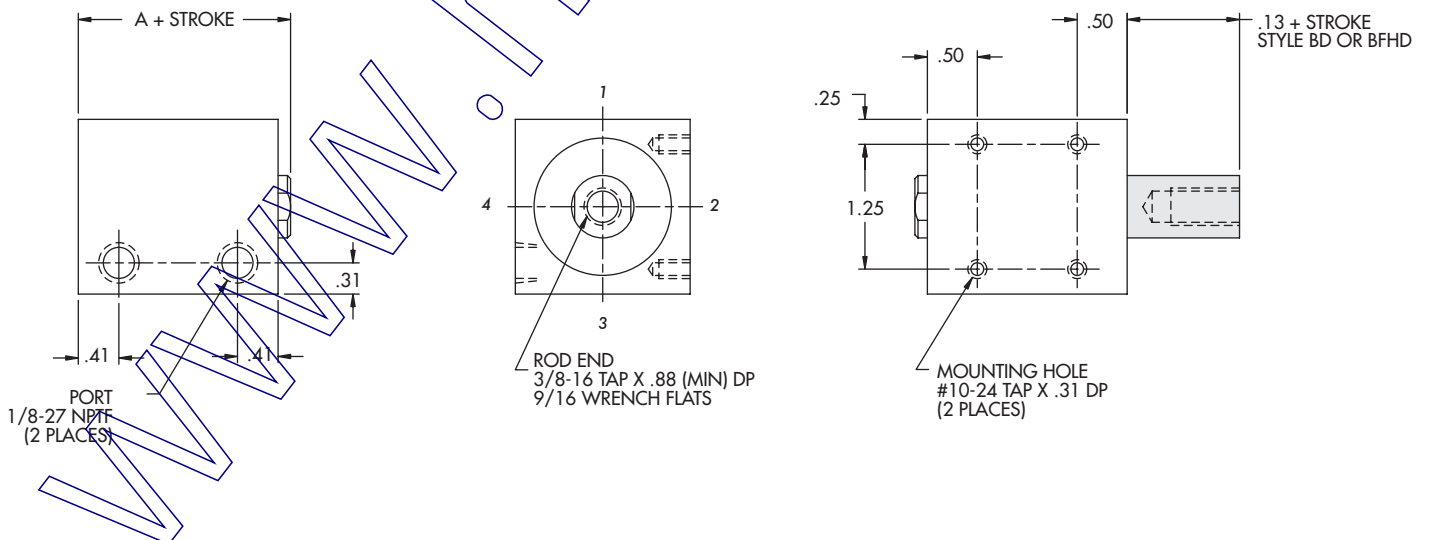
Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B138x __	BD138x __	1/8 to 3/4 in 1/8" increments	1.13
Intermediate	BHH138x __		1/8 to 1/2 in 1/8" increments	1.38
Heavy	BFH138x __	BFHD138x __	1/8, 1/4	1.63

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B138x __	BD138x __	7/8 to 6 in 1/8" increments	1.13
Intermediate	BHH138x __		5/8 to 6 in 1/8" increments	1.38
Heavy	BFH138x __	BFHD138x __	3/8 to 6 in 1/8" increments	1.63

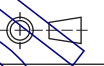
Information same as above except where noted.



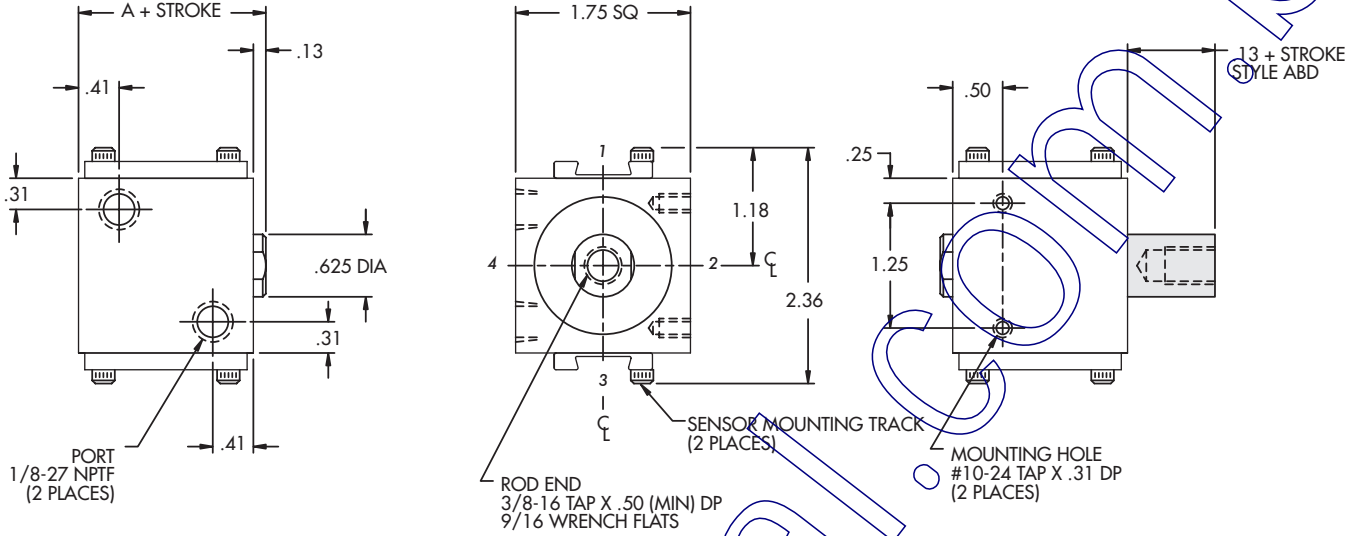


1-3/8" Bore Magnetic Piston

THIRD ANGLE PROJECTION

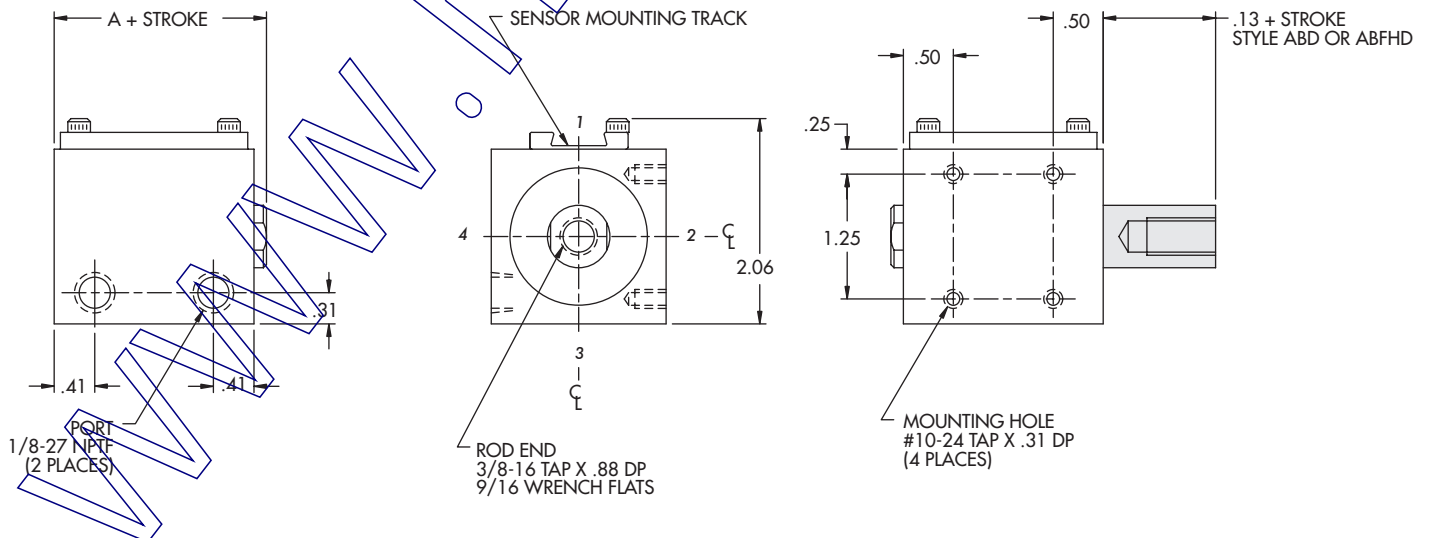


Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB138x __	ABD138x __	1/8 to 1/2 in 1/8" increments	1.38
Intermediate	ABHH138x __		1/8, 1/4	1.63



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB138x __	ABD138x __	5/8 to 6 in 1/8" increments	1.38
Intermediate	ABHH138x __		3/8 to 6 in 1/8" increments	1.63
Heavy	ABFH138x __	ABFHD138x __	1/8 to 6 in 1/8" increments	1.88

Information same as above except where noted.



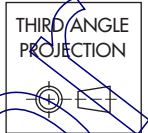
Style "R"



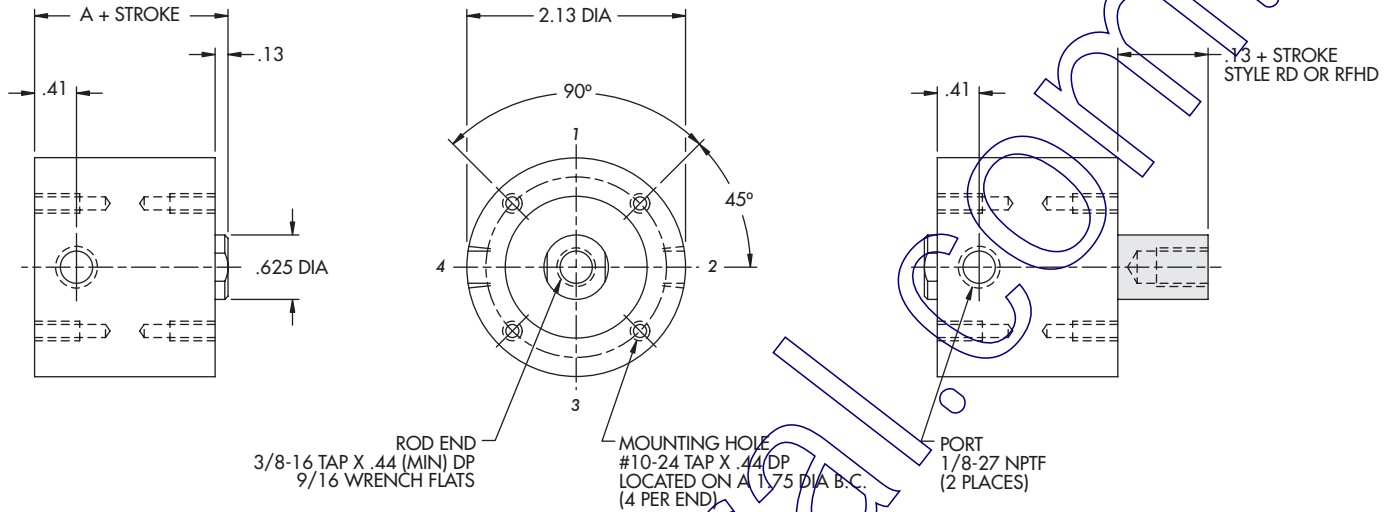
End Mount

1-3/8" Bore Non Magnetic Piston

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R138x __	RD138x __	1/8 to 3/4 in 1/8" increments	1.13
Intermediate	RHH138x __		1/8 to 1/2 in 1/8" increments	1.38
Heavy	RFH138x __	RFHD138x __	1/8, 1/4	1.63

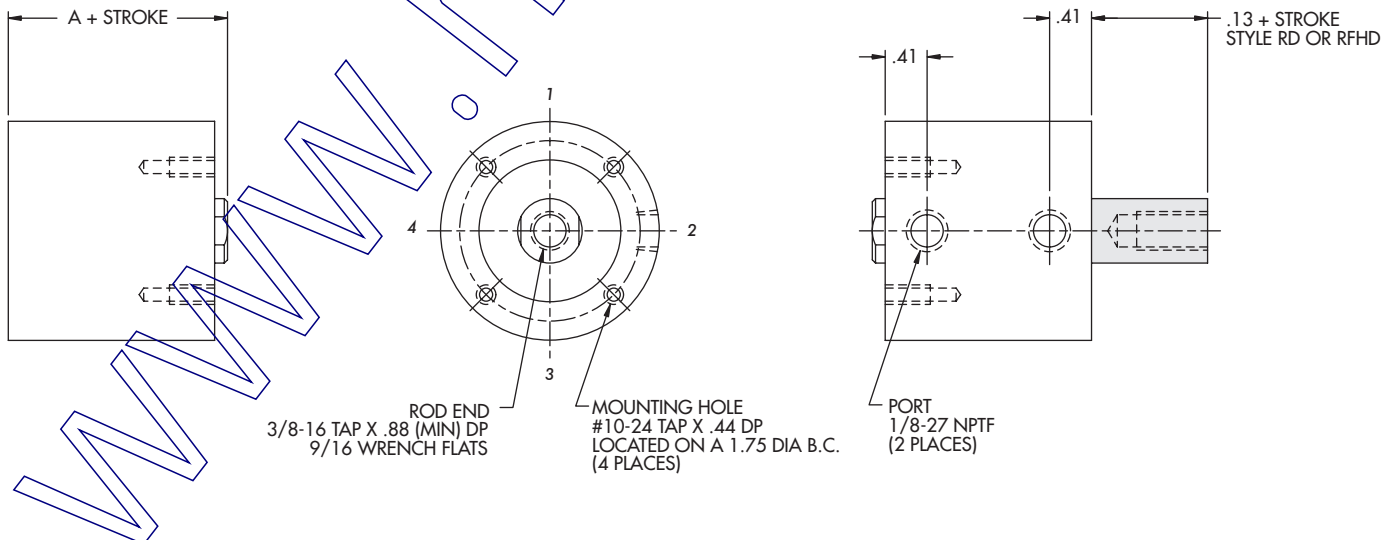


Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R138x __	RD138x __	7/8 to 6 in 1/8" increments	1.13
Intermediate	RHH138x __		5/8 to 6 in 1/8" increments	1.38
Heavy	RFH138x __	RFHD138x __	3/8 to 6 in 1/8" increments	1.63

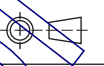
Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**
 Information same as above except where noted.





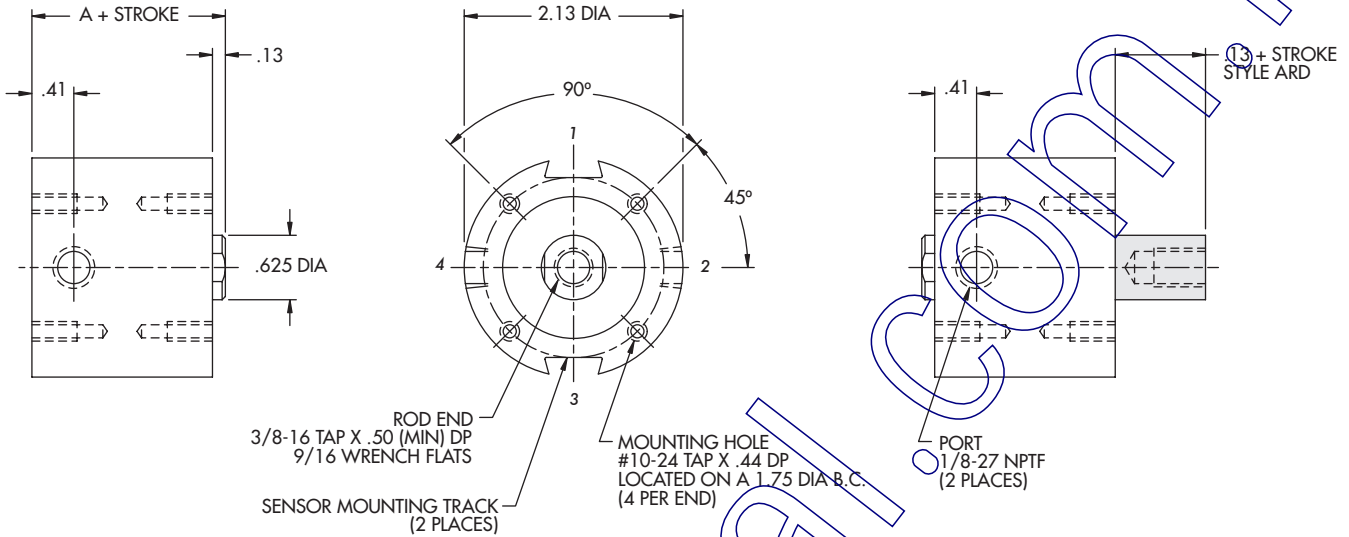
1-3/8" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR138x__	ARD138x__	1/8 to 1/2 in 1/8" increments	1.38
Intermediate	ARHH138x__		1/8, 1/4	1.63

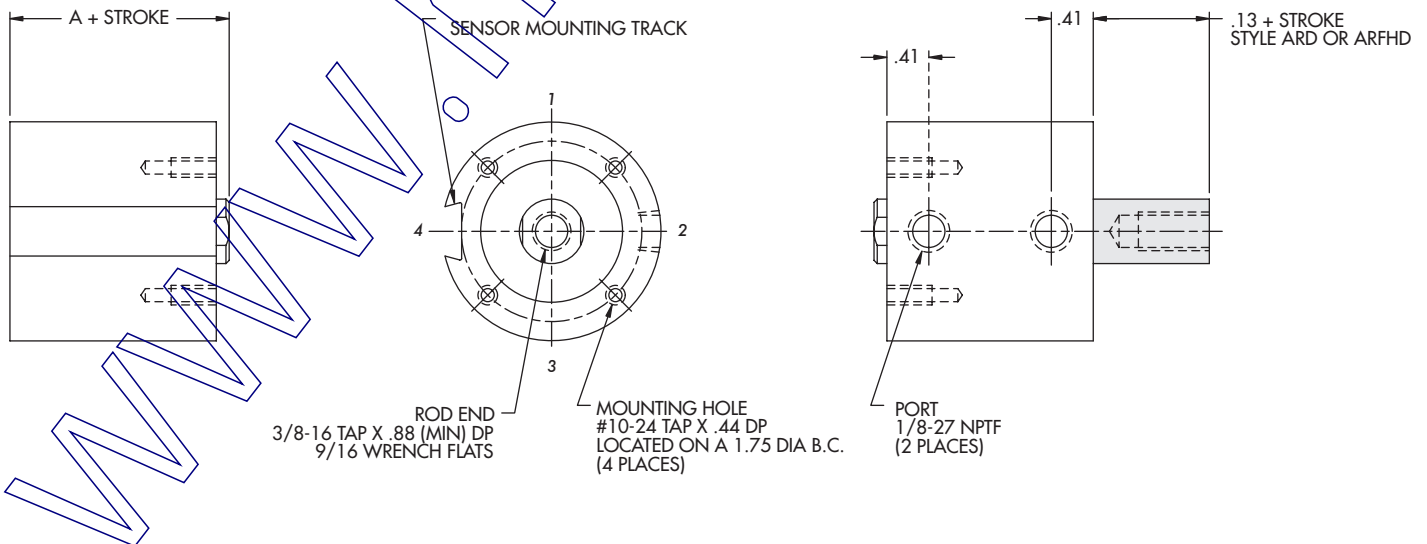
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR138x__	ARD138x__	5/8 to 6 in 1/8" increments	1.38
Intermediate	ARHH138x__		3/8 to 6 in 1/8" increments	1.63
Heavy	ARFH138x__	ARFHD138x__	1/8 to 6 in 1/8" increments	1.88

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted

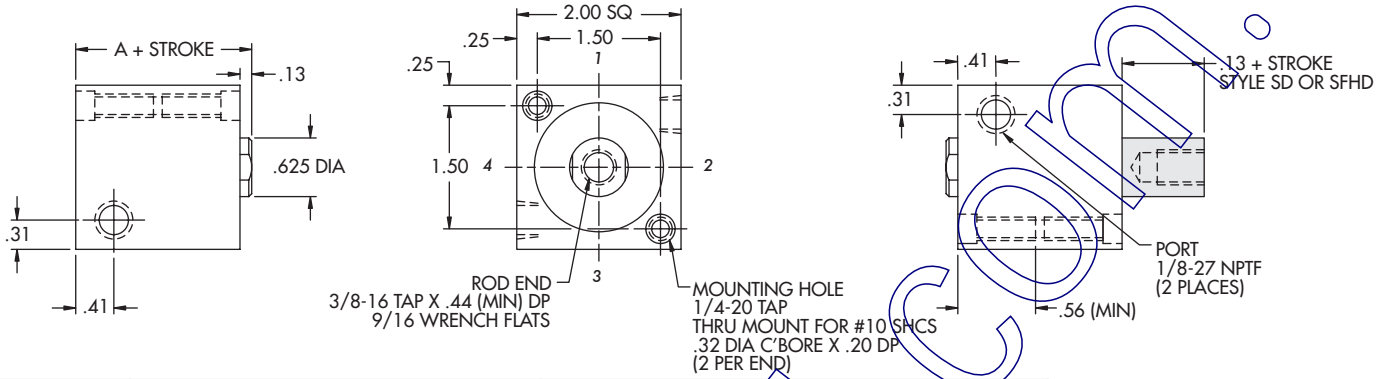




1-5/8" Bore Non Magnetic Piston

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S158x __	SD158x __	1/8 to 3/4 in 1/8" increments	1.13
Intermediate	SHH158x __		1/8 to 1/2 in 1/8" increments	1.38
Heavy	SFH158x __	SFHD158x __	1/8, 1/4	1.63

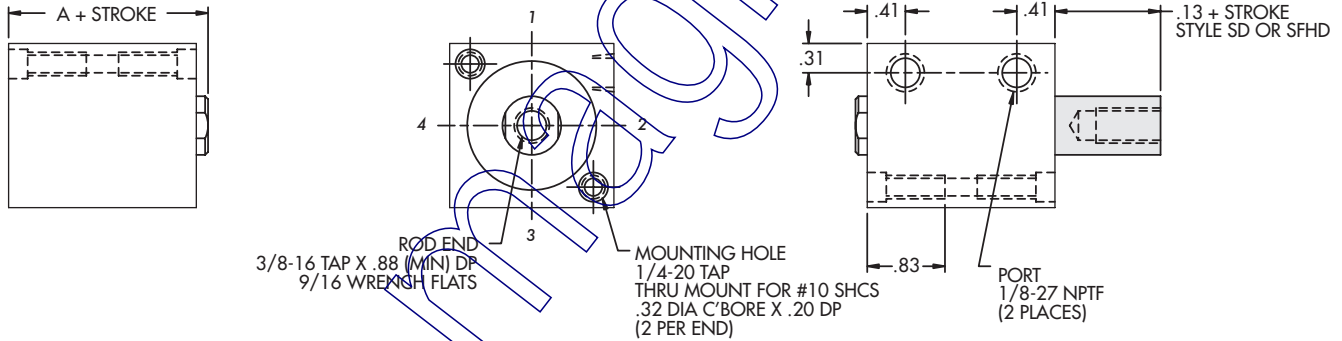
Standard Mounting: **TF, TR, TBE, TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S158x __	SD158x __	7/8, 1	1.13
Intermediate	SHH158x __		5/8, 3/4	1.38
Heavy	SFH158x __	SFHD158x __	3/8, 1/2	1.63

Standard Mounting: **TF, TR, TBE, TM**

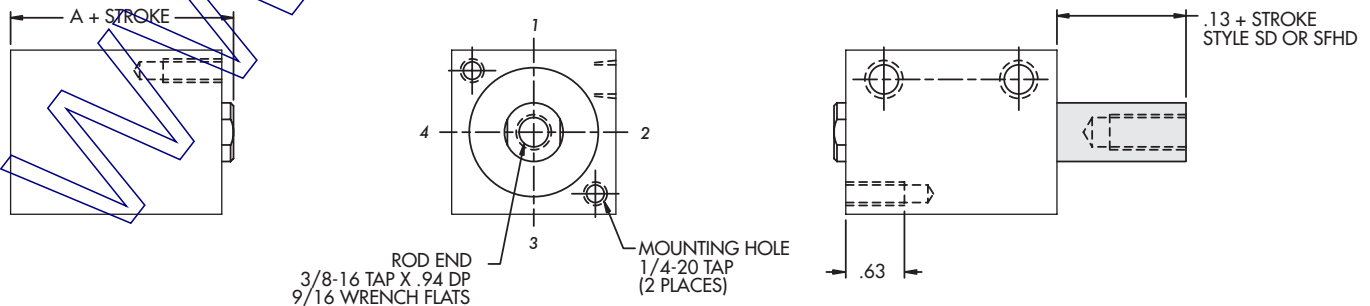
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S158x __	SD158x __	1-1/8 to 6 in 1/8" increments	1.13
Intermediate	SHH158x __		7/8 to 6 in 1/8" increments	1.38
Heavy	SFH158x __	SFHD158x __	5/8 to 6 in 1/8" increments	1.63

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

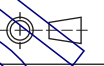
Information same as above except where noted.





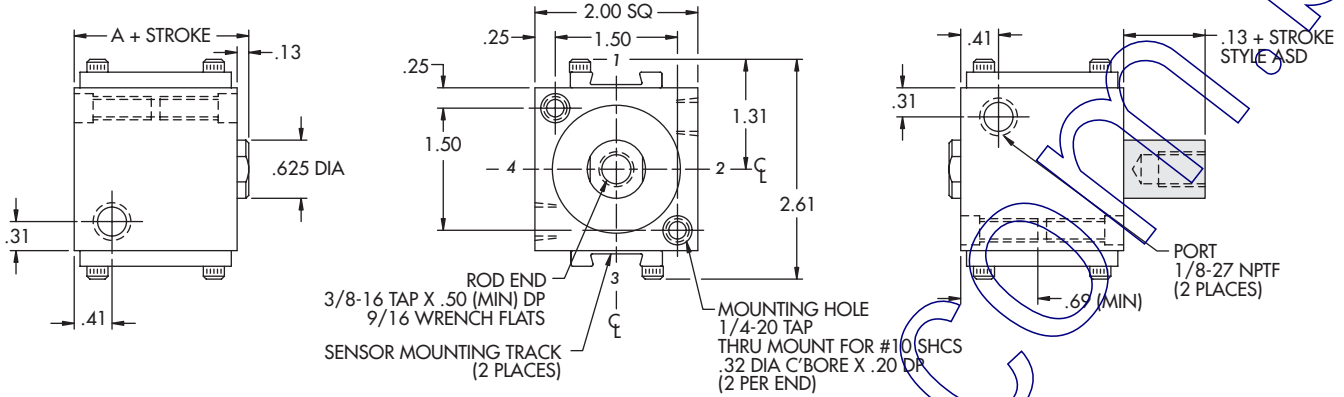
1-5/8" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS158x__	ASD158x__	1/8 to 1/2 in 1/8" increments	1.38
Intermediate	ASHH158x__		1/8, 1/4	1.63

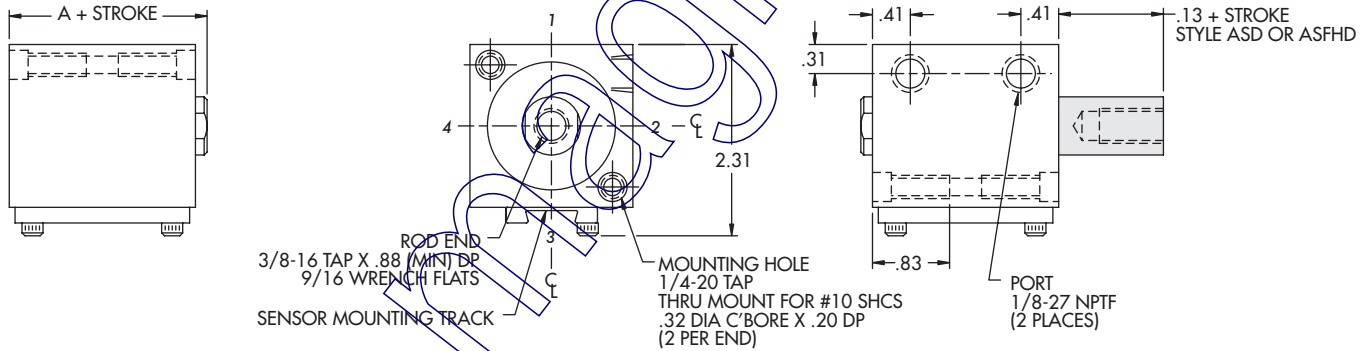
Standard Mounting: **TF, TR, TBE, TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS158x__	ASD158x__	5/8, 3/4	1.38
Intermediate	ASHH158x__		3/8, 1/2	1.63
Heavy	ASFH158x__	ASFHD158x__	1/8, 1/4	1.88

Standard Mounting: **TF, TR, TBE, TM**

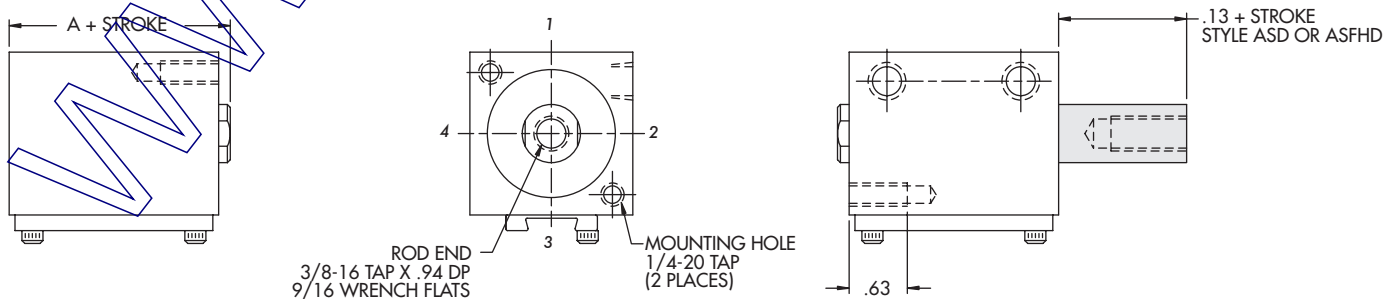
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS158x__	ASD158x__	7/8 to 6 in 1/8" increments	1.38
Intermediate	ASHH158x__		5/8 to 6 in 1/8" increments	1.63
Heavy	ASFH158x__	ASFHD158x__	3/8 to 6 in 1/8" increments	1.88

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted.



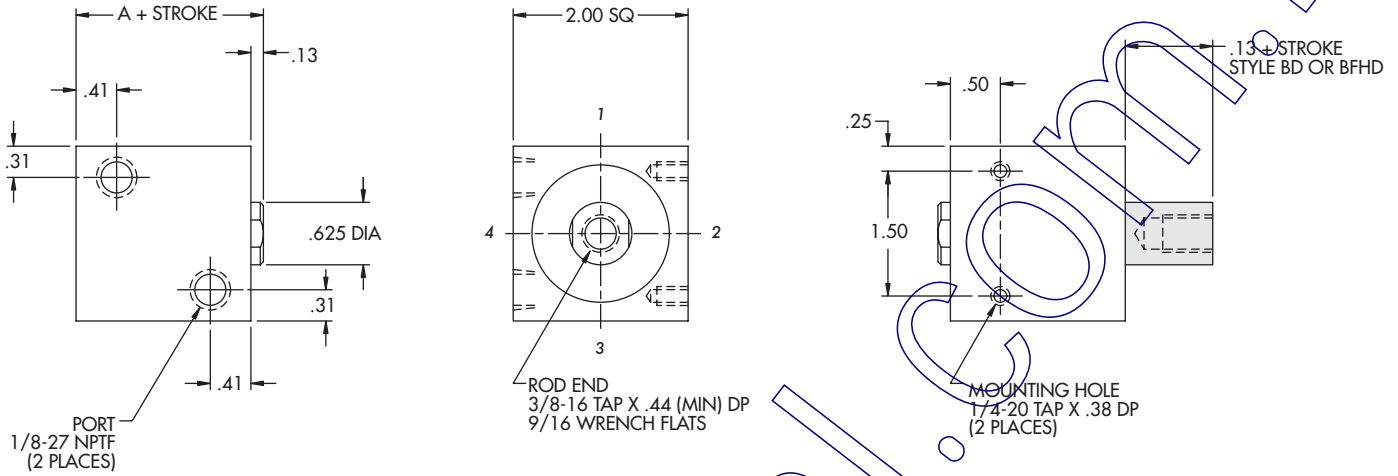
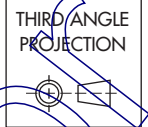
Style "B"



Side Mount

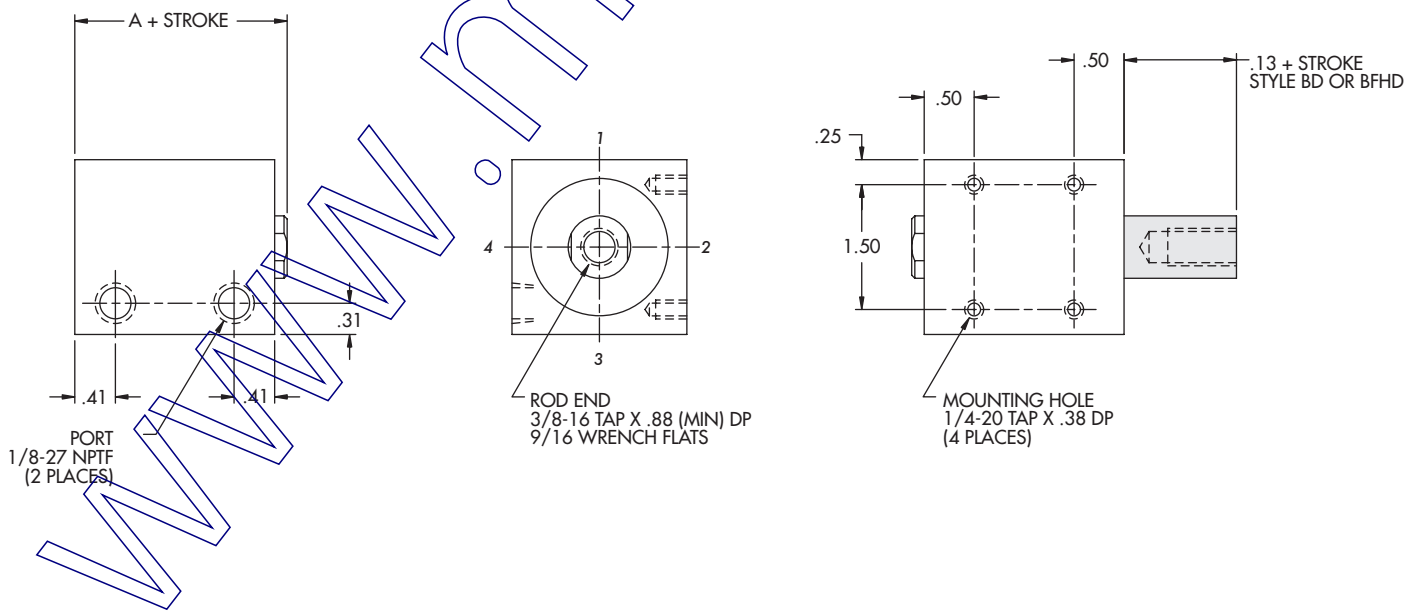
1-5/8" Bore Non Magnetic Piston

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B158x __	BD158x __	1/8 to 3/4 in 1/8" increments	1.13
Intermediate	BHH158x __		1/8 to 1/2 in 1/8" increments	1.38
Heavy	BFH158x __	BFHD158x __	1/8, 1/4	1.63



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B158x __	BD158x __	7/8 to 6 in 1/8" increments	1.13
Intermediate	BHH158x __		5/8 to 6 in 1/8" increments	1.38
Heavy	BFH158x __	BFHD158x __	3/8 to 6 in 1/8" increments	1.63

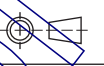
Information same as above except where noted.



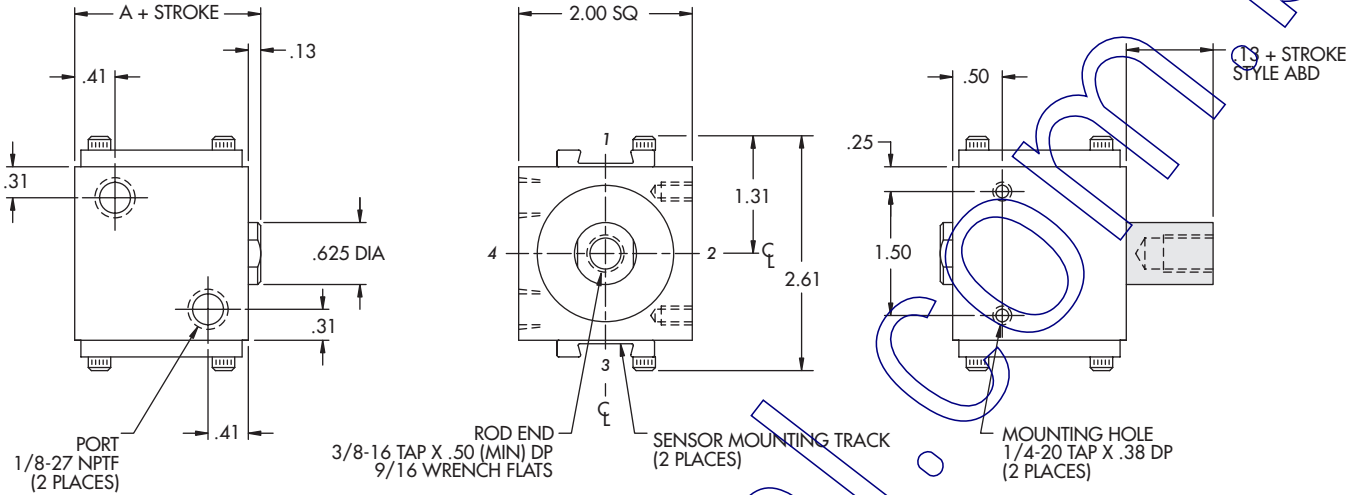


1-5/8" Bore Magnetic Piston

THIRD ANGLE PROJECTION

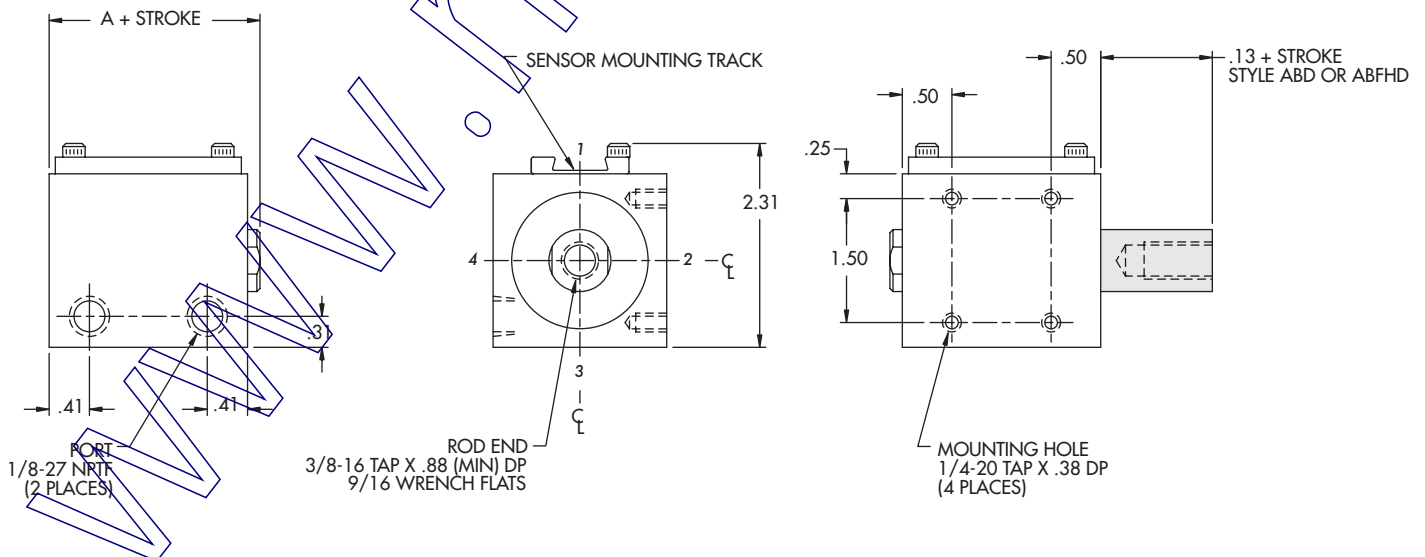


Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB158x __	ABD158x __	1/8 to 1/2 in 1/8" increments	1.38
Intermediate	ABHH158x __		1/8, 1/4	1.63



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB158x __	ABD158x __	5/8 to 6 in 1/8" increments	1.38
Intermediate	ABHH158x __		3/8 to 6 in 1/8" increments	1.63
Heavy	ABFH158x __	ABFHD158x __	1/8 to 6 in 1/8" increments	1.88

Information same as above except where noted.

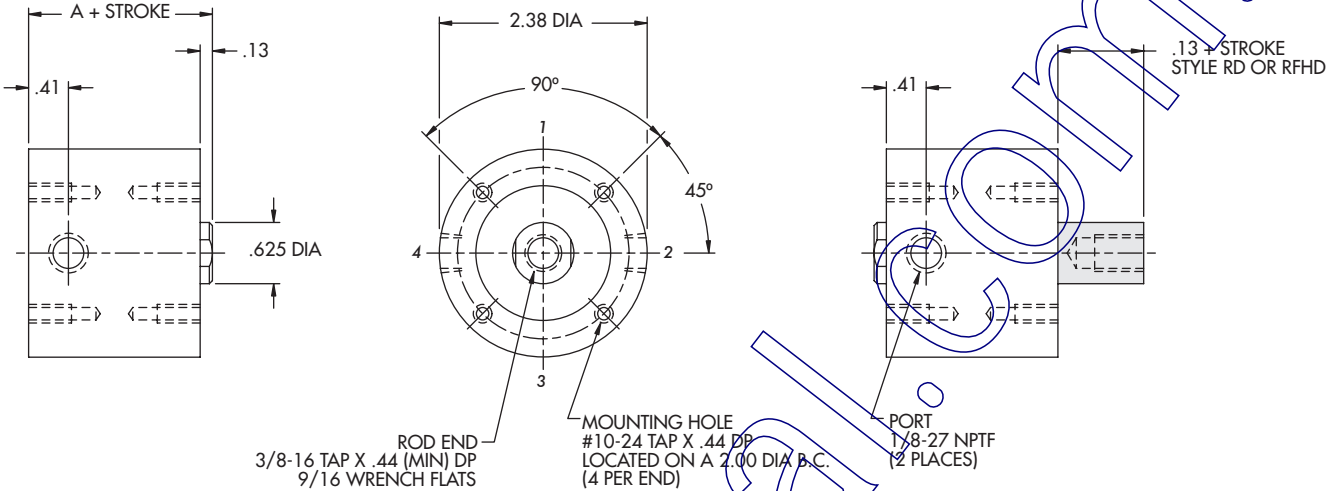




1-5/8" Bore Non Magnetic Piston

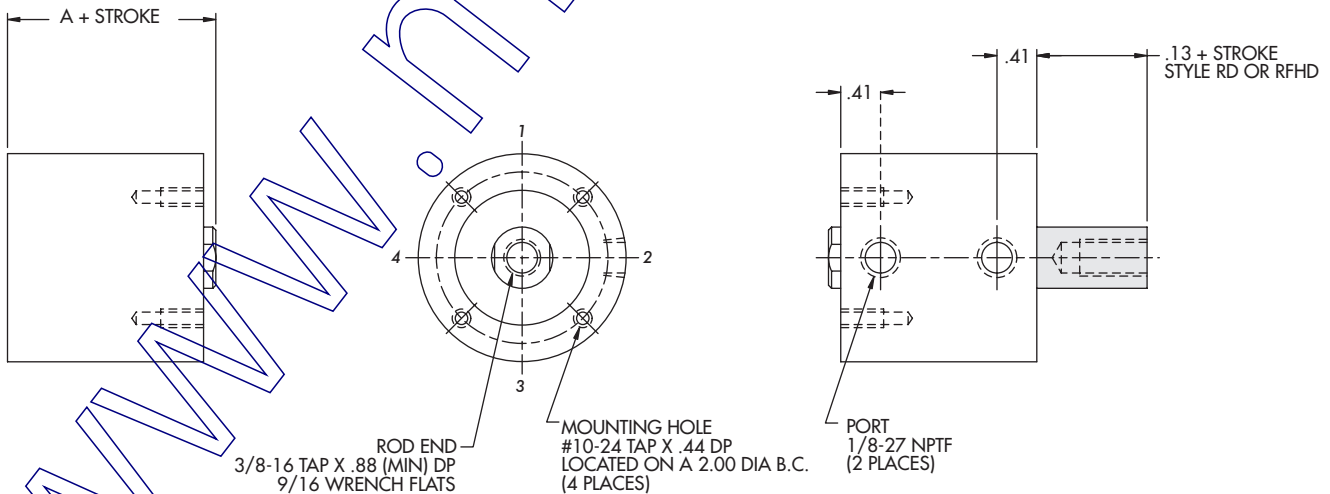
Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R158x __	RD158x __	1/8 to 3/4 in 1/8" increments	1.13
Intermediate	RHH158x __		1/8 to 1/2 in 1/8" increments	1.38
Heavy	RFH158x __	RFHD158x __	1/8, 1/4	1.63

Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R158x __	RD158x __	7/8 to 6 in 1/8" increments	1.13
Intermediate	RHH158x __		5/8 to 6 in 1/8" increments	1.38
Heavy	RFH158x __	RFHD158x __	3/8 to 6 in 1/8" increments	1.63

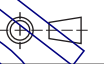
Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**
 Information same as above except where noted.





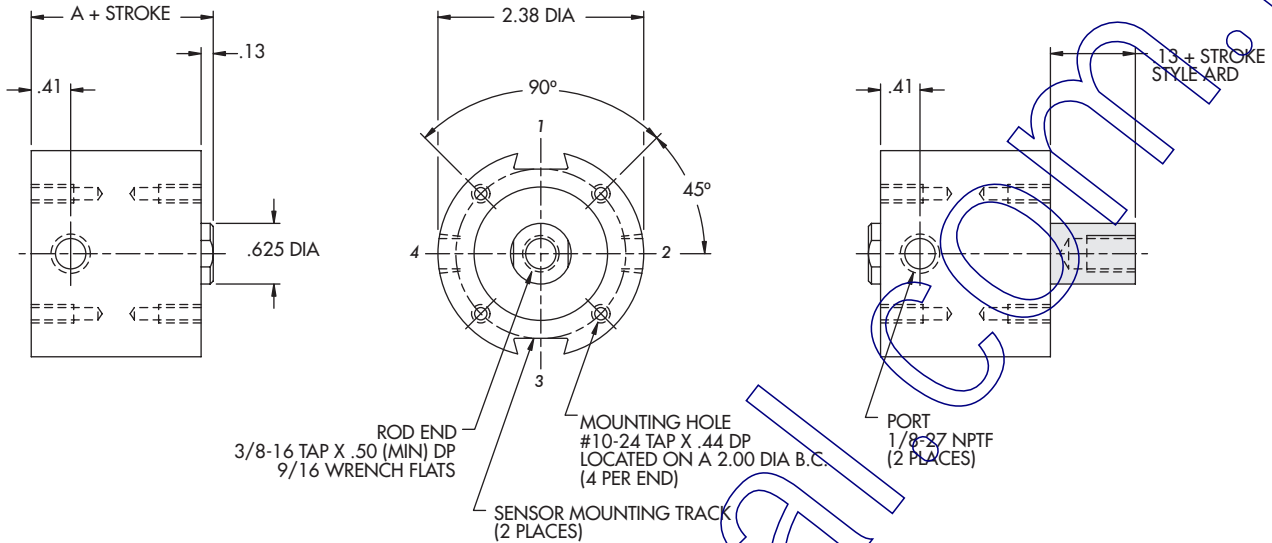
1-5/8" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR158x__	ARD158x__	1/8 to 1/2 in 1/8" increments	1.38
Intermediate	ARHH158x__		1/8, 1/4	1.63

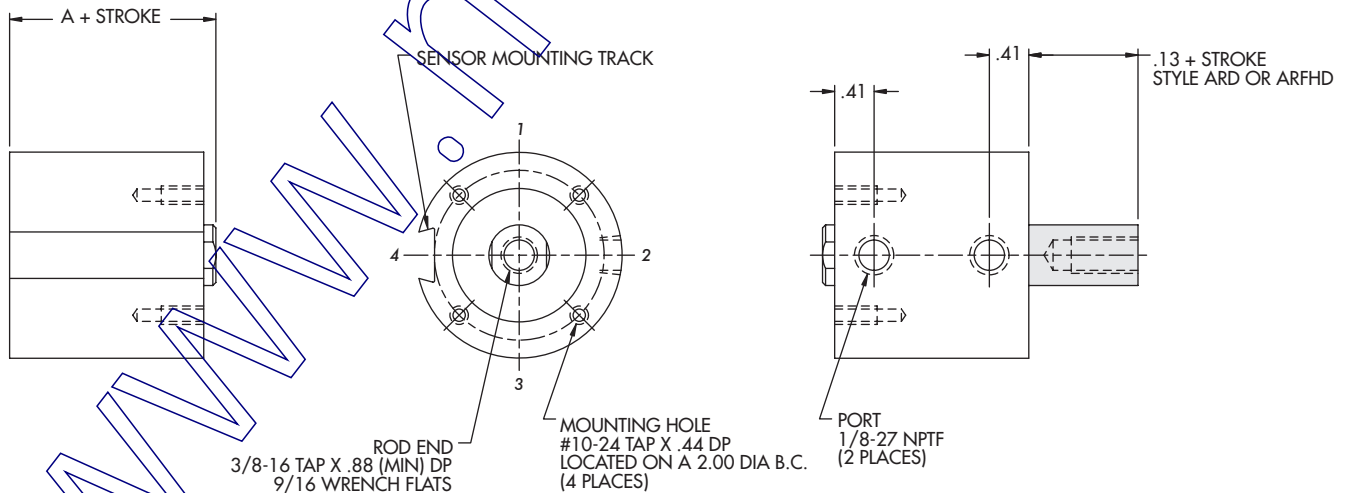
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR158x__	ARD158x__	5/8 to 6 in 1/8" increments	1.38
Intermediate	ARHH158x__		3/8 to 6 in 1/8" increments	1.63
Heavy	ARFH158x__	ARFHD158x__	1/8 to 6 in 1/8" increments	1.88

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted.



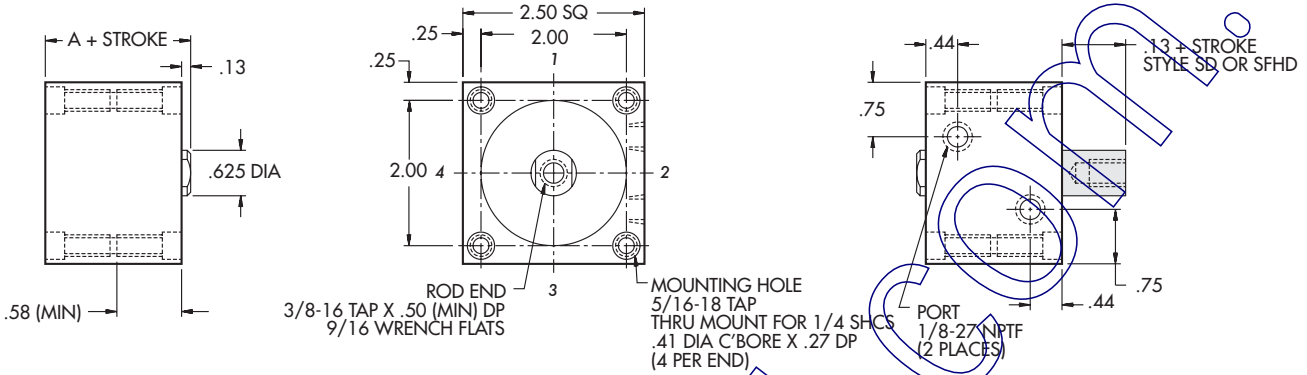


2" Bore Non Magnetic Piston

THIRD ANGLE PROJECTION

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S2x __	SD2x __	1/8 to 3/4 in 1/8" increments	1.25
Intermediate	SHH2x __		1/8 to 1/2 in 1/8" increments	1.50
Heavy	SFH2x __	SFHD2x __	1/8, 1/4	1.75

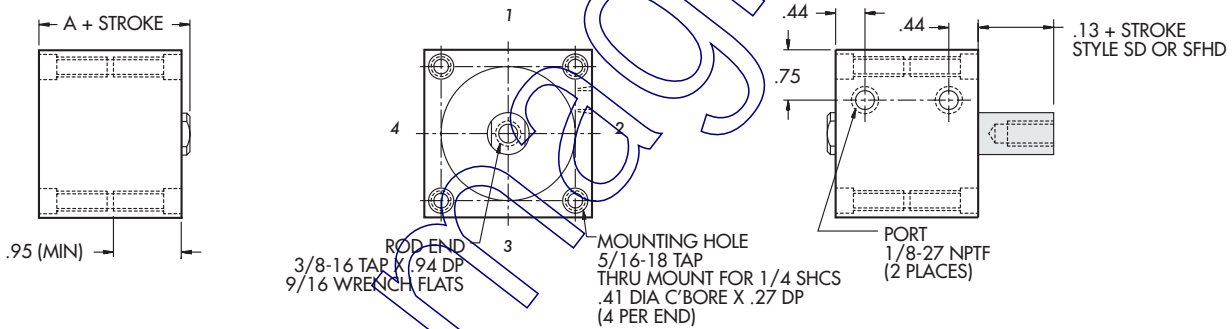
Standard Mounting: **TF, TR, TBE, TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S2x __	SD2x __	7/8 to 1-1/2 in 1/8" increments	1.25
Intermediate	SHH2x __		5/8 to 1-1/4 in 1/8" increments	1.50
Heavy	SFH2x __	SFHD2x __	3/8 to 1 in 1/8" increments	1.75

Standard Mounting: **TF, TR, TBE, TM**

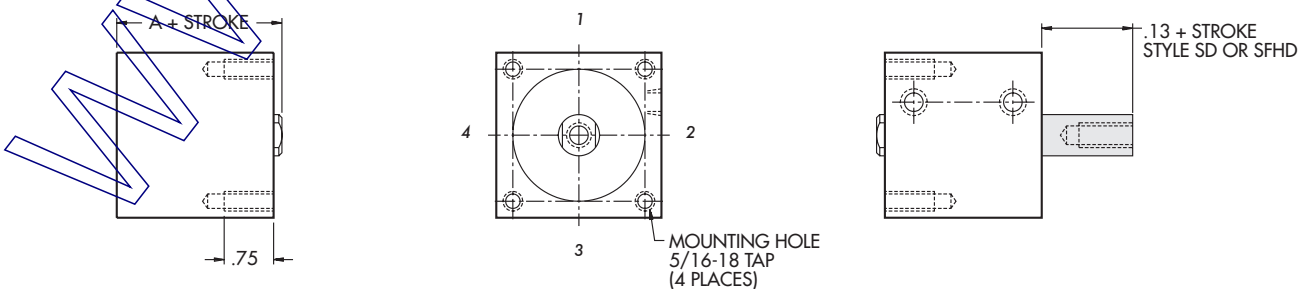
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S2x __	SD2x __	1-5/8 to 6 in 1/8" increments	1.25
Intermediate	SHH2x __		1-3/8 to 6 in 1/8" increments	1.50
Heavy	SFH2x __	SFHD2x __	1-1/8 to 6 in 1/8" increments	1.75

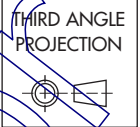
Standard Mountings: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted.



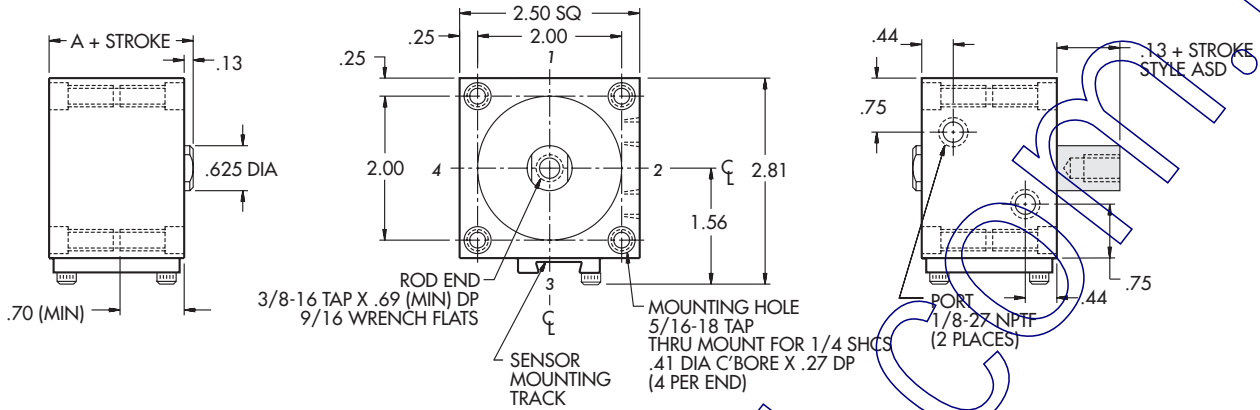


2" Bore Magnetic Piston



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS2x __	ASD2x __	1/8 to 1/2 in 1/8" increments	1.50
Intermediate	ASHH2x __		1/8, 1/4	1.75

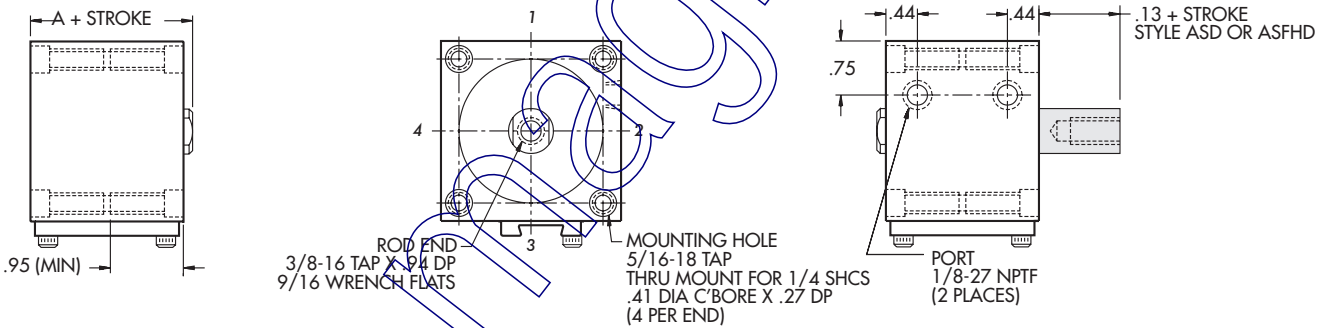
Standard Mounting: **TF, TR, TBE, TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS2x __	ASD2x __	5/8 to 1-1/4 in 1/8" increments	1.50
Intermediate	ASHH2x __		3/8 to 1 in 1/8" increments	1.75
Heavy	ASFH2x __	ASFHD2x __	1/8 to 3/4 in 1/8" increments	2.00

Standard Mounting: **TF, TR, TBE, TM**

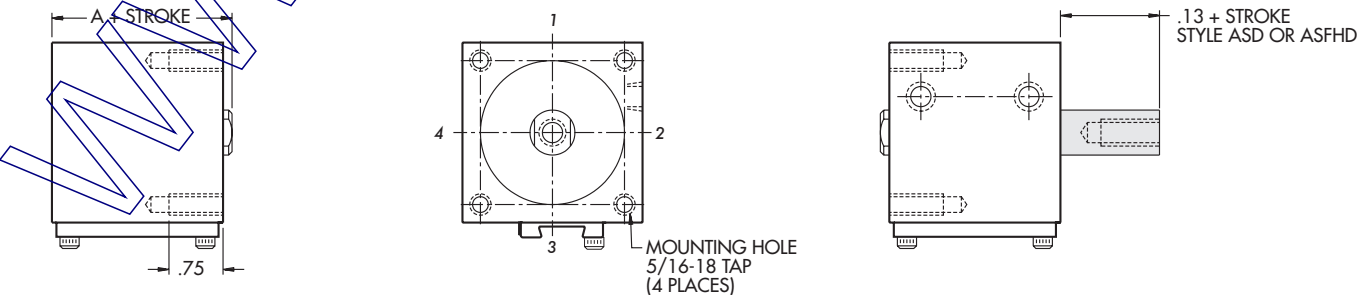
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS2x __	ASD2x __	1-3/8 to 6 in 1/8" increments	1.50
Intermediate	ASHH2x __		1-1/8 to 6 in 1/8" increments	1.75
Heavy	ASFH2x __	ASFHD2x __	7/8 to 6 in 1/8" increments	2.00

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted.

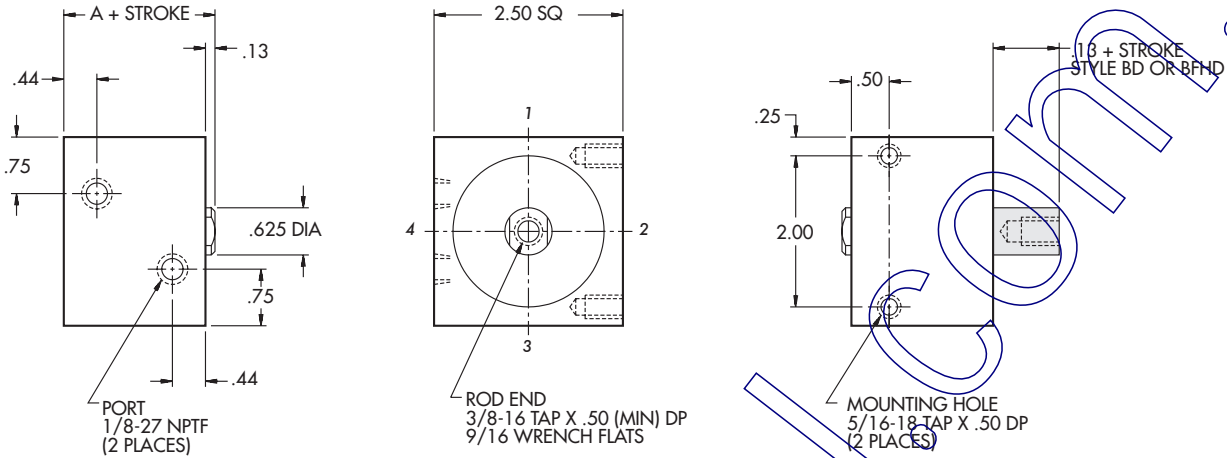




2" Bore Non Magnetic Piston

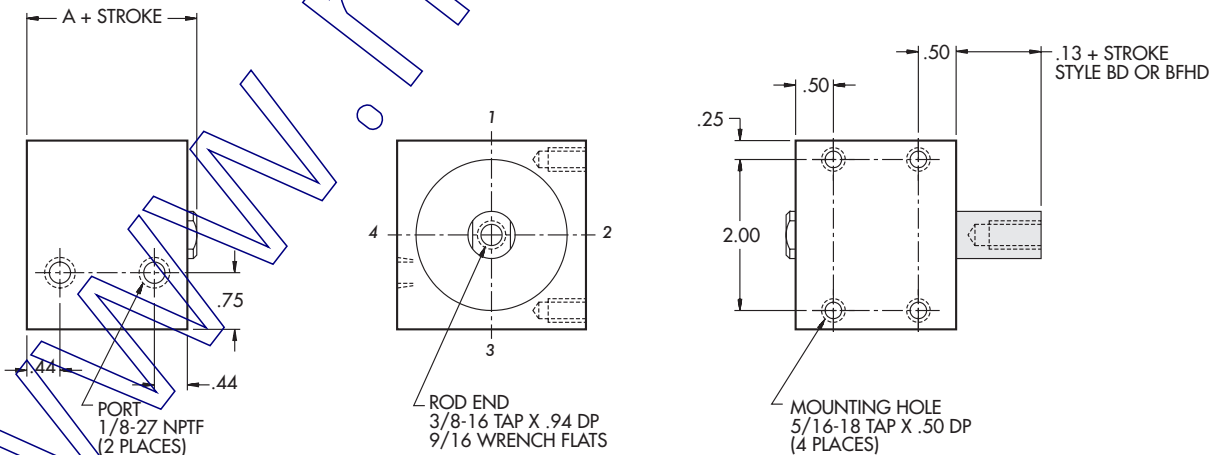
THIRD ANGLE PROJECTION

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B2x __	BD2x __	1/8 to 3/4 in 1/8" increments	1.25
Intermediate	BHH2x __		1/8 to 1/2 in 1/8" increments	1.50
Heavy	BFH2x __	BFHD2x __	1/8, 1/4	1.75



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B2x __	BD2x __	7/8 to 6 in 1/8" increments	1.25
Intermediate	BHH2x __		5/8 to 6 in 1/8" increments	1.50
Heavy	BFH2x __	BFHD2x __	3/8 to 6 in 1/8" increments	1.75

Information same as above except where noted.



2" Bore Magnetic Piston

Style "AB"

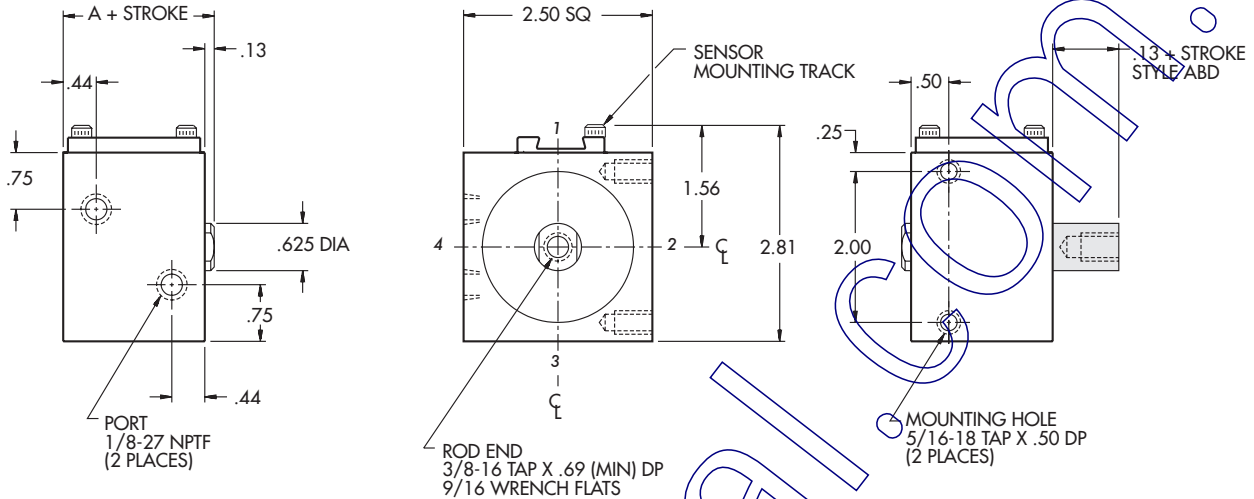


Side Mount

THIRD ANGLE PROJECTION

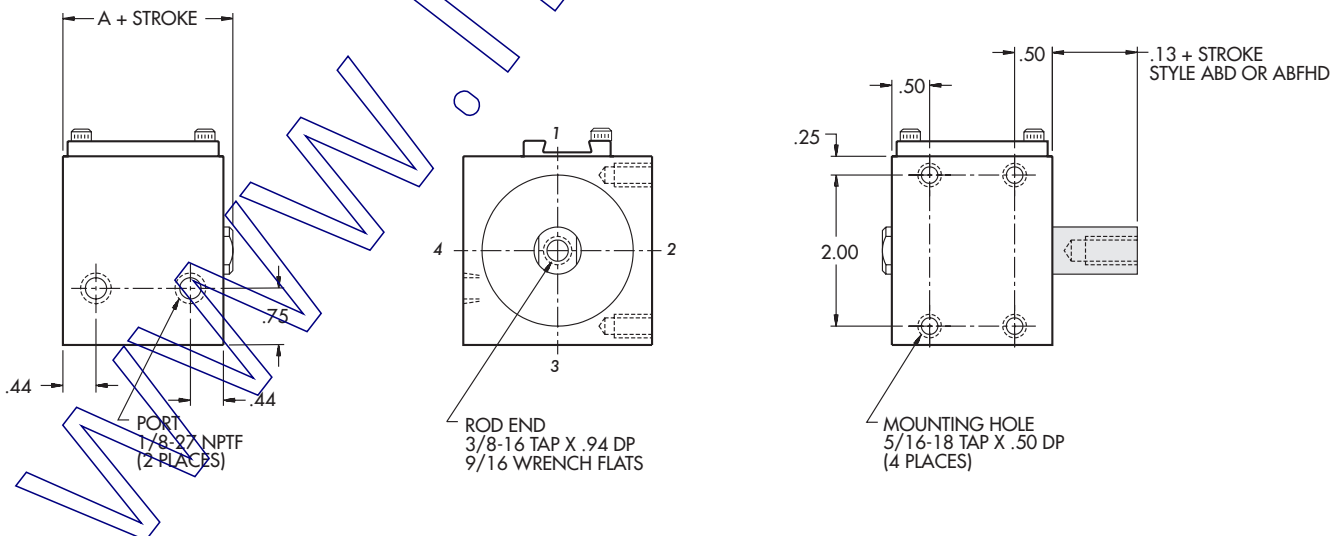


Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB2x__	ABD2x__	1/8 to 1/2 in 1/8" increments	1.50
Intermediate	ABHH2x__		1/8, 1/4	1.75



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB2x__	ABD2x__	5/8 to 6 in 1/8" increments	1.50
Intermediate	ABHH2x__		3/8 to 6 in 1/8" increments	1.75
Heavy	ABFH2x__	ABFHD2x__	1/8 to 6 in 1/8" increments	2.00

Information same as above except where noted.



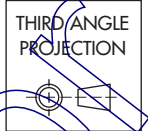
Style "R"



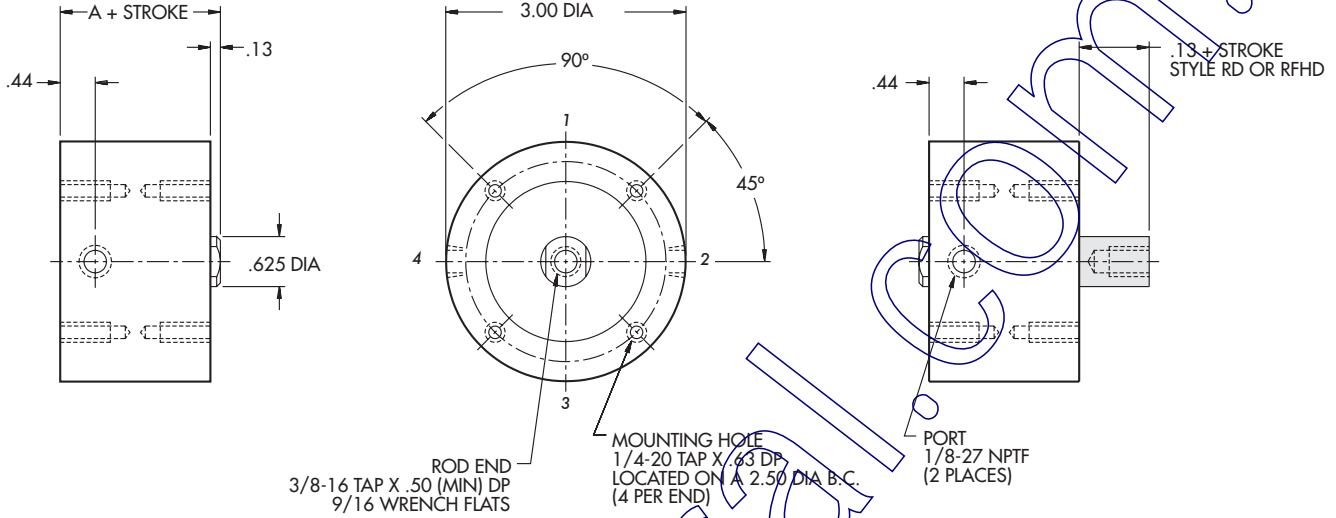
End Mount

2" Bore Non Magnetic Piston

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R2x __	RD2x __	1/8 to 3/4 in 1/8" increments	1.25
Intermediate	RHH2x __		1/8 to 1/2 in 1/8" increments	1.50
Heavy	RFH2x __	RFHD2x __	1/8, 1/4	1.75



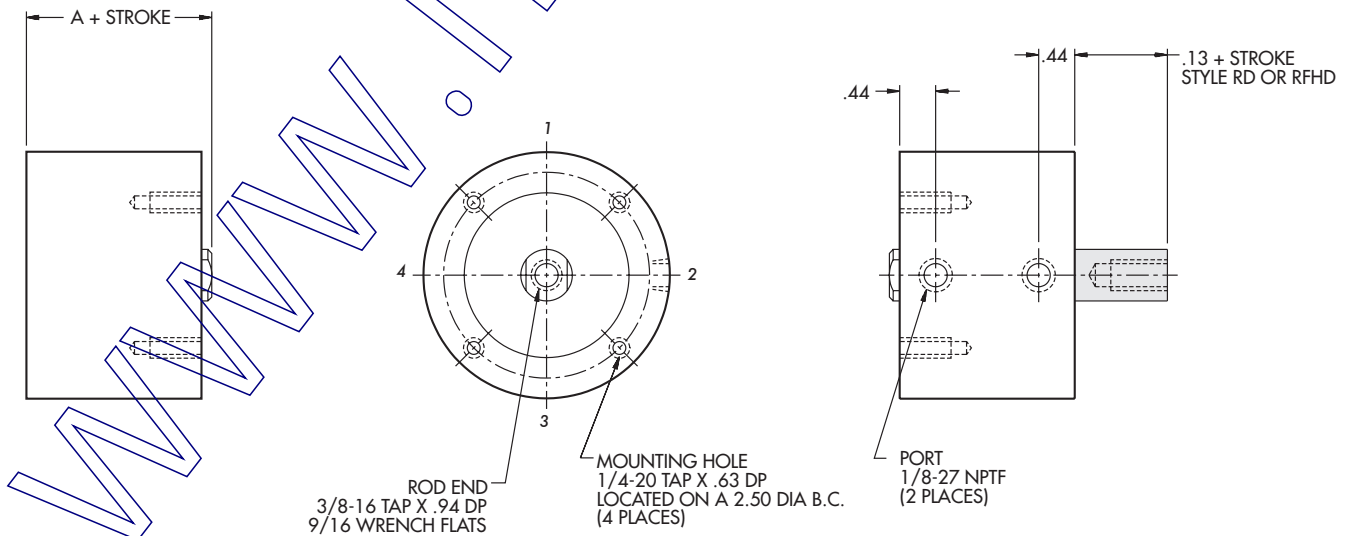
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R2x __	RD2x __	7/8 to 6 in 1/8" increments	1.25
Intermediate	RHH2x __		5/8 to 6 in 1/8" increments	1.50
Heavy	RFH2x __	RFHD2x __	3/8 to 6 in 1/8" increments	1.75

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

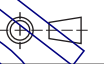
Information same as above except where noted.





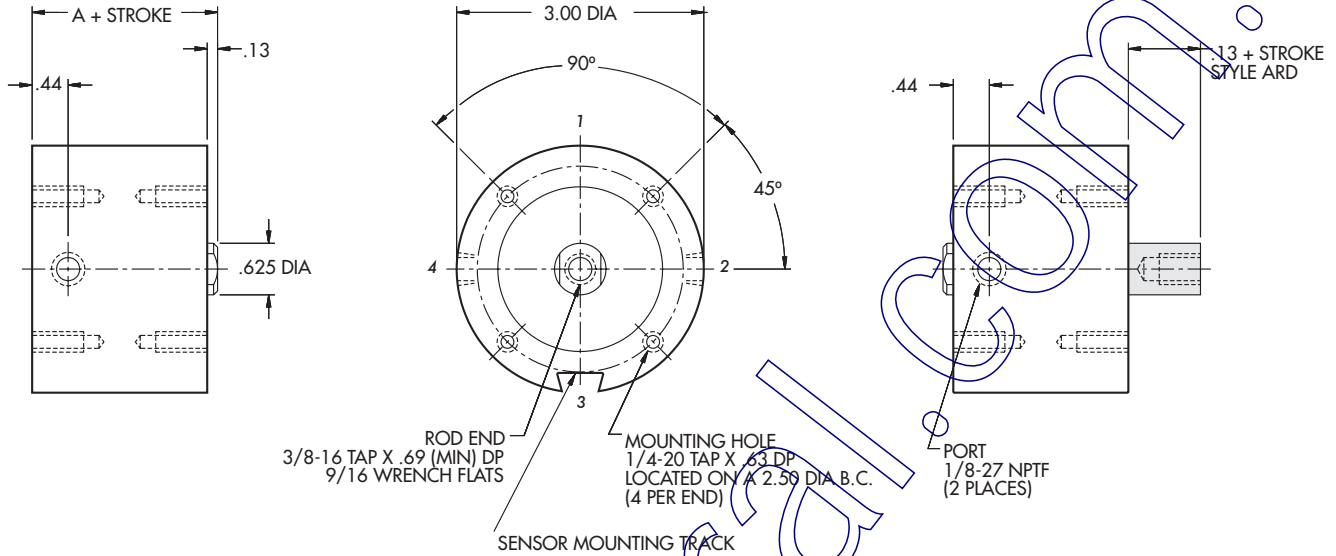
2" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR2x__	ARD2x__	1/8 to 1/2 in 1/8" increments	1.50
Intermediate	ARHH2x__		1/8, 1/4	1.75

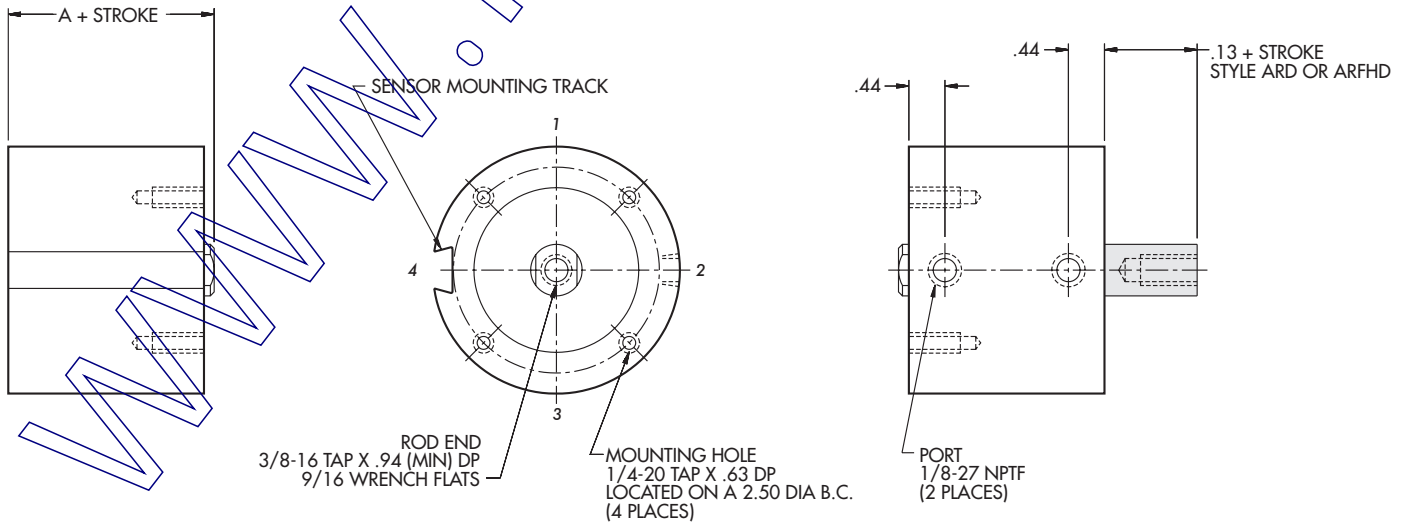
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR2x__	ARD2x__	5/8 to 6 in 1/8" increments	1.50
Intermediate	ARHH2x__		3/8 to 6 in 1/8" increments	1.75
Heavy	ARFH2x__	ARFHD2x__	1/8 to 6 in 1/8" increments	2.00

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted.



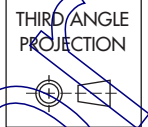
Style "S"



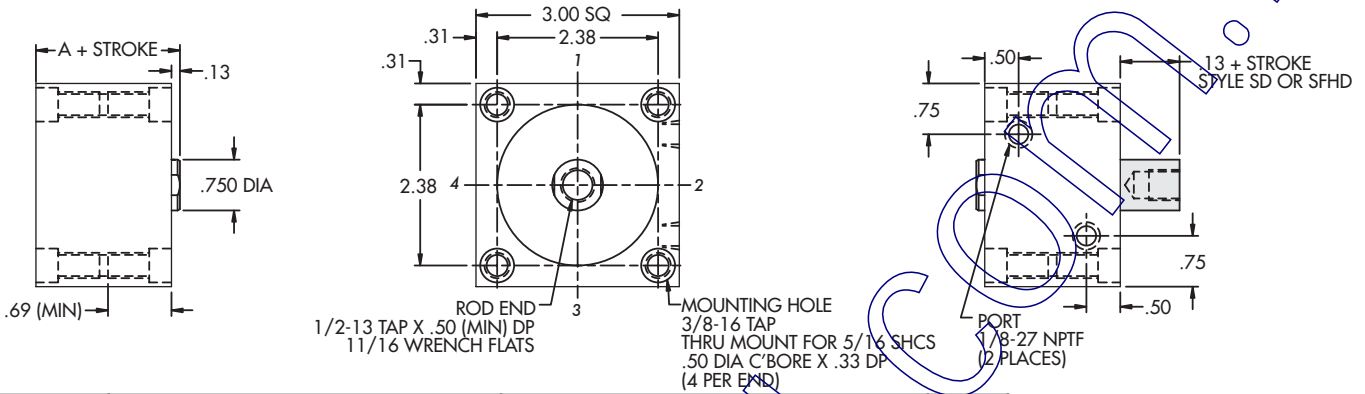
End Mount

2-1/2" Bore Non Magnetic Piston

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S212x __	SD212x __	1/8 to 3/4 in 1/8" increments	1.38
Intermediate	SHH212x __		1/8 to 1/2 in 1/8" increments	1.63
Heavy	SFH212x __	SFHD212x __	1/8, 1/4	1.88



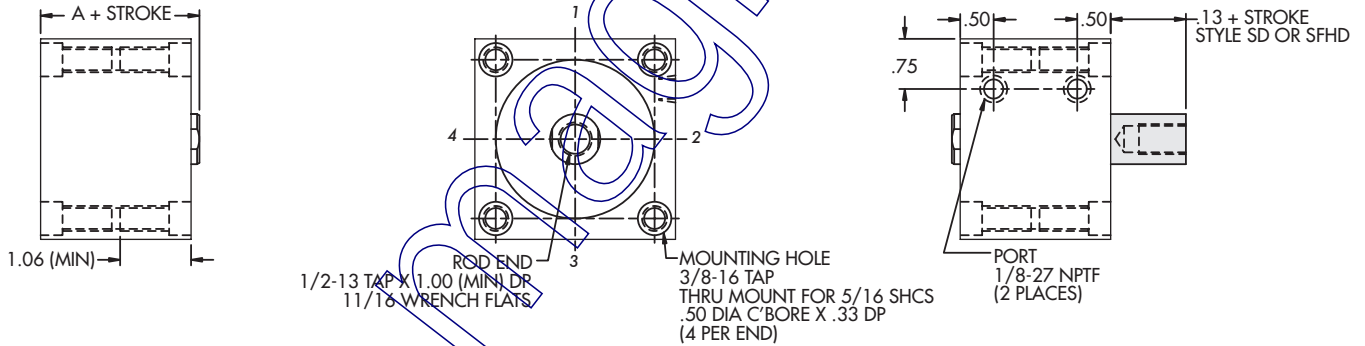
Standard Mounting: **TF, TR, TBE, TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S212x __	SD212x __	7/8 to 1-1/2 in 1/8" increments	1.38
Intermediate	SHH212x __		5/8 to 1-1/4 in 1/8" increments	1.63
Heavy	SFH212x __	SFHD212x __	3/8 to 1 in 1/8" increments	1.88

Standard Mounting: **TF, TR, TBE, TM**

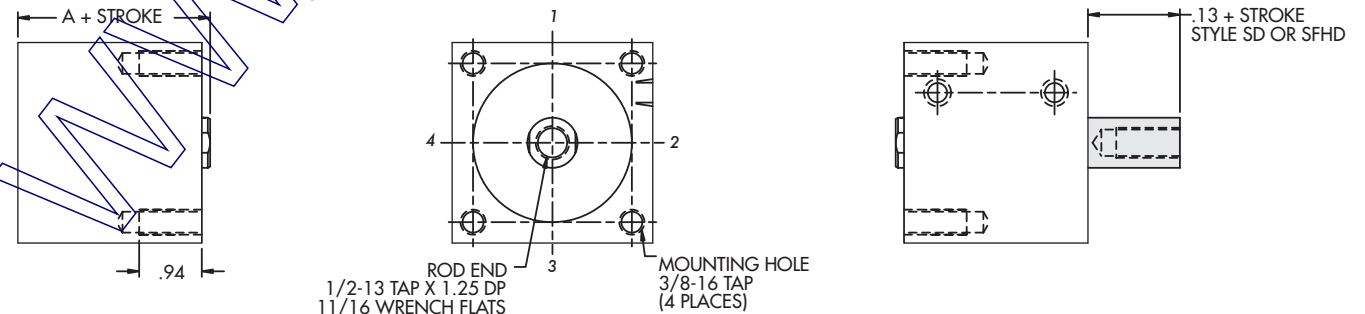
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S212x __	SD212x __	1-5/8 to 6 in 1/8" increments	1.38
Intermediate	SHH212x __		1-3/8 to 6 in 1/8" increments	1.63
Heavy	SFH212x __	SFHD212x __	1-1/8 to 6 in 1/8" increments	1.88

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted.





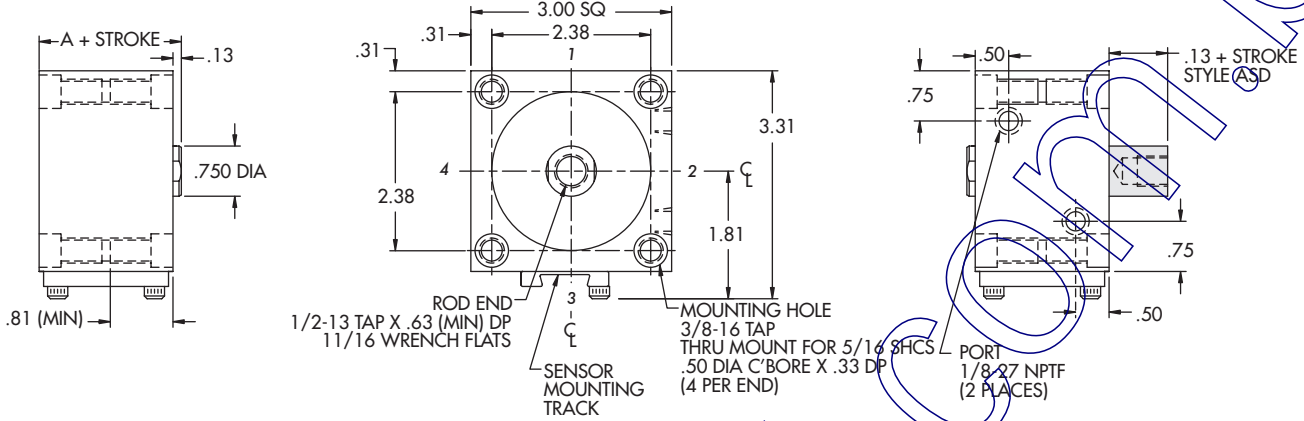
2-1/2" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS212x __	ASD212x __	1/8 to 1/2 in 1/8" increments	1.63
Intermediate	ASHH212x __		1/8, 1/4	1.88

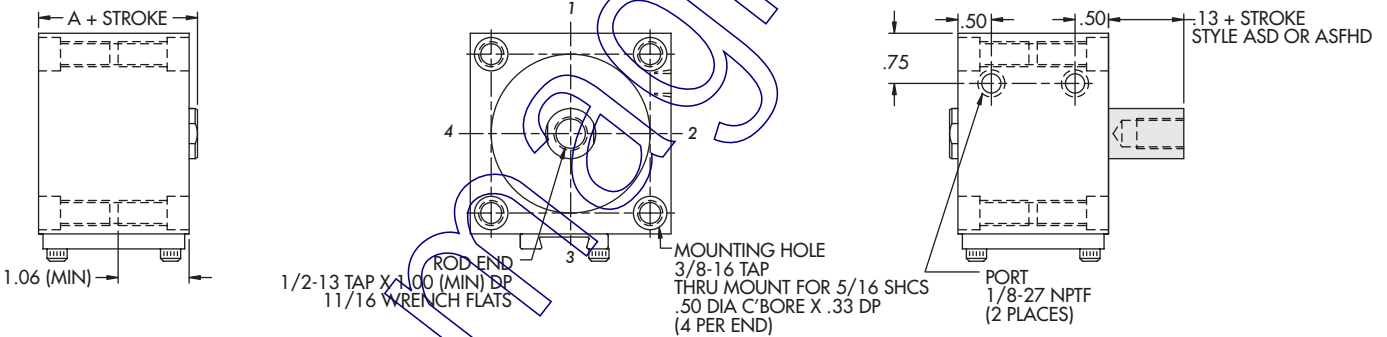
Standard Mounting: **TF, TR, TBE, TM**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS212x __	ASD212x __	5/8 to 1-1/4 in 1/8" increments	1.63
Intermediate	ASHH212x __		3/8 to 1 in 1/8" increments	1.88
Heavy	ASFH212x __	ASFHD212x __	1/8 to 3/4 in 1/8" increments	2.13

Standard Mounting: **TF, TR, TBE, TM**

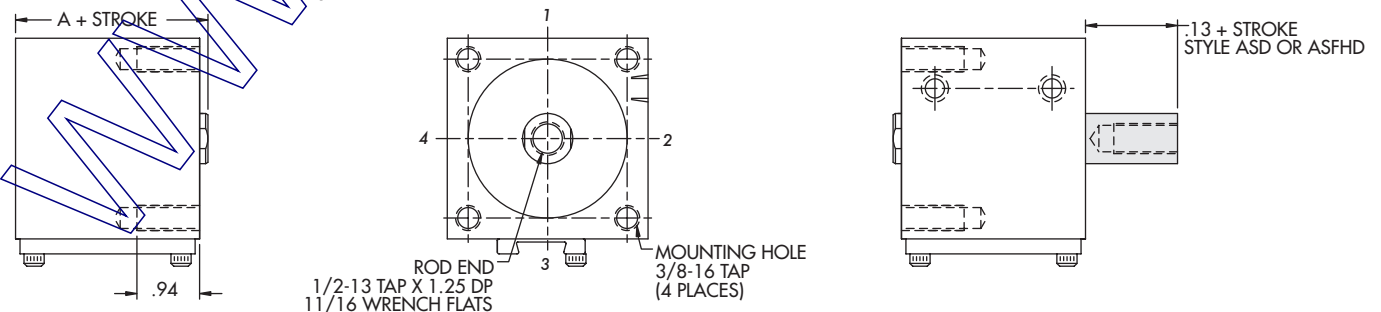
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS212x __	ASD212x __	1-3/8 to 6 in 1/8" increments	1.63
Intermediate	ASHH212x __		1-1/8 to 6 in 1/8" increments	1.88
Heavy	ASFH212x __	ASFHD212x __	7/8 to 6 in 1/8" increments	2.13

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM**

Information same as above except where noted.



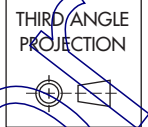
Style "B"



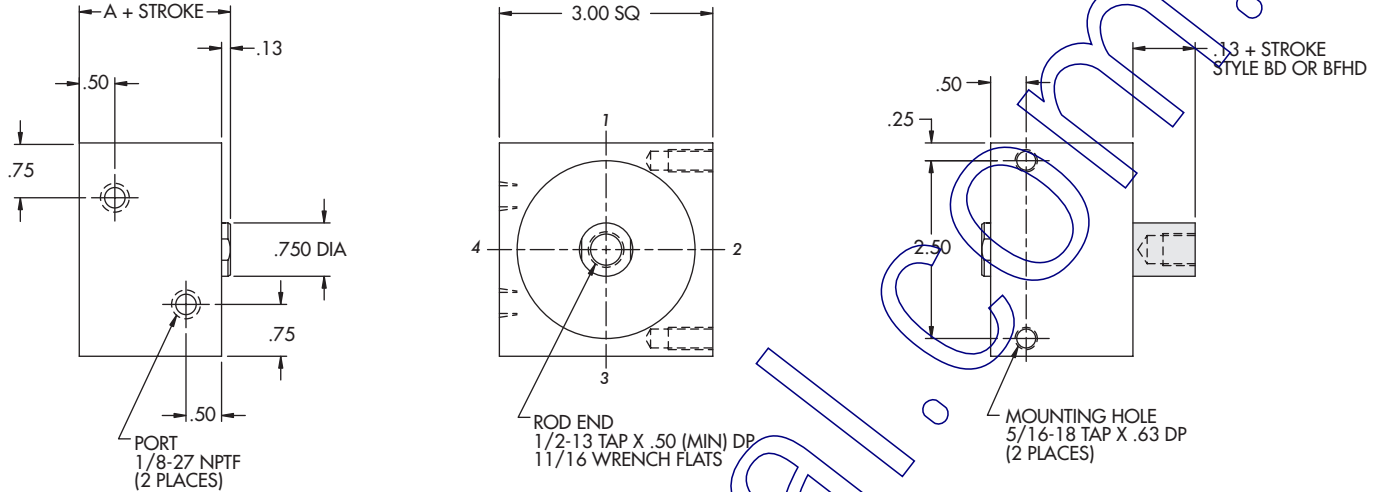
Side Mount

2-1/2" Bore Non Magnetic Piston

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B212x __	BD212x __	1/8 to 3/4 in 1/8" increments	1.38
Intermediate	BHH212x __		1/8 to 1/2 in 1/8" increments	1.63
Heavy	BFH212x __	BFHD212x __	1/8, 1/4	1.88



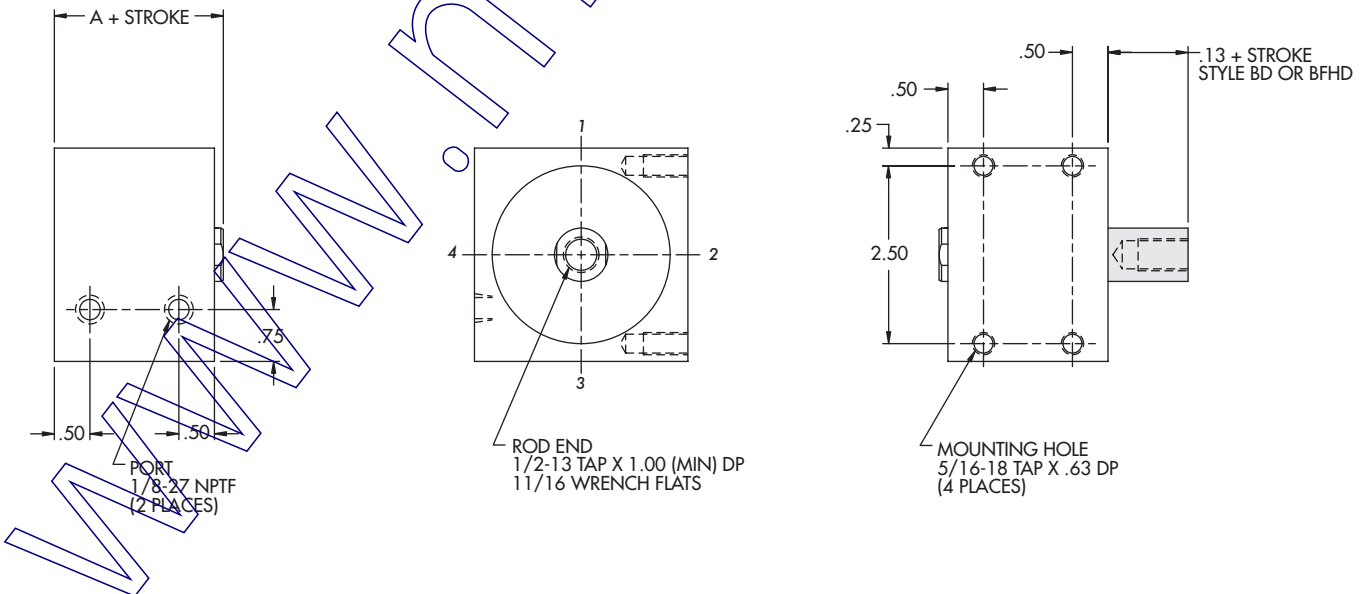
Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B212x __	BD212x __	7/8 to 6 in 1/8" increments	1.38
Intermediate	BHH212x __		5/8 to 6 in 1/8" increments	1.63
Heavy	BFH212x __	BFHD212x __	3/8 to 6 in 1/8" increments	1.88

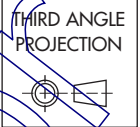
Optional Porting: **1/4-18 NPTF**

Information same as above except where noted.



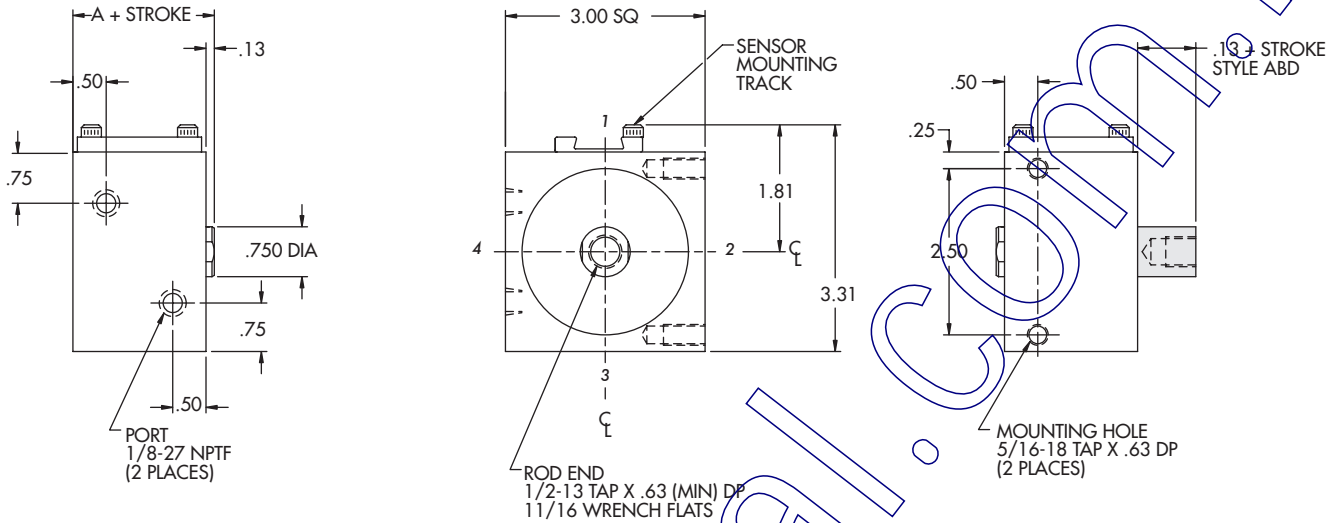


2-1/2" Bore Magnetic Piston



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB212x __	ABD212x __	1/8 to 1/2 in 1/8" increments	1.63
Intermediate	ABHH212x __		1/8, 1/4	1.88

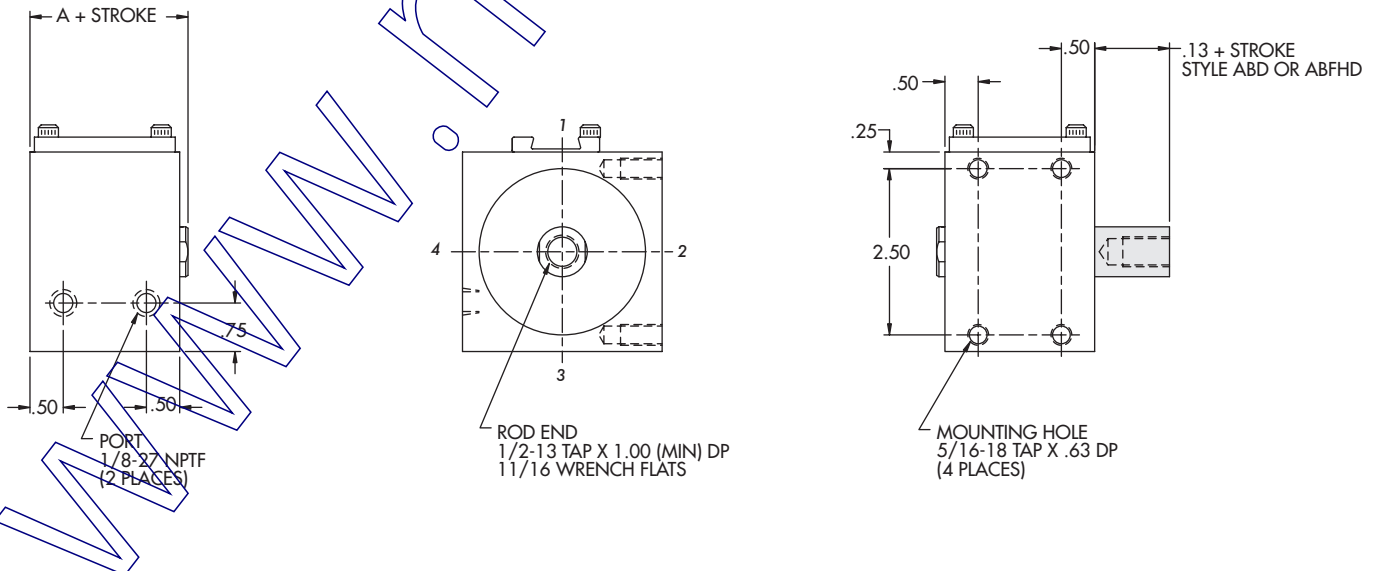
Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB212x __	ABD212x __	5/8 to 6 in 1/8" increments	1.63
Intermediate	ABHH212x __		3/8 to 6 in 1/8" increments	1.88
Heavy	ABFH212x __	ABFHD212x __	1/8 to 6 in 1/8" increments	2.13

Optional Porting: **1/4-18 NPTF**

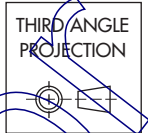
Information same as above except where noted.



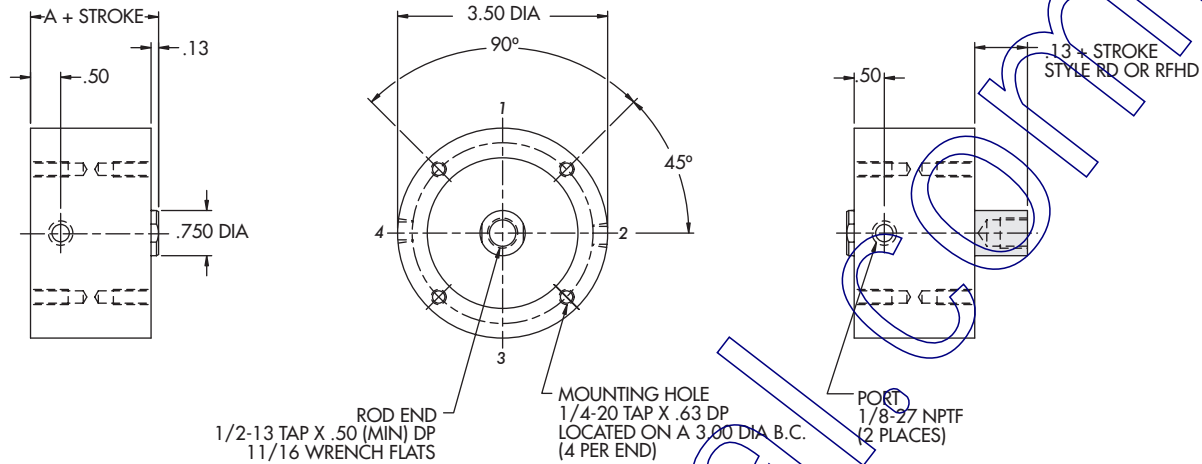


2-1/2" Bore Non Magnetic Piston

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R212x __	RD212x __	1/8 to 3/4 in 1/8" increments	1.38
Intermediate	RHH212x __		1/8 to 1/2 in 1/8" increments	1.63
Heavy	RFH212x __	RFHD212x __	1/8, 1/4	1.88

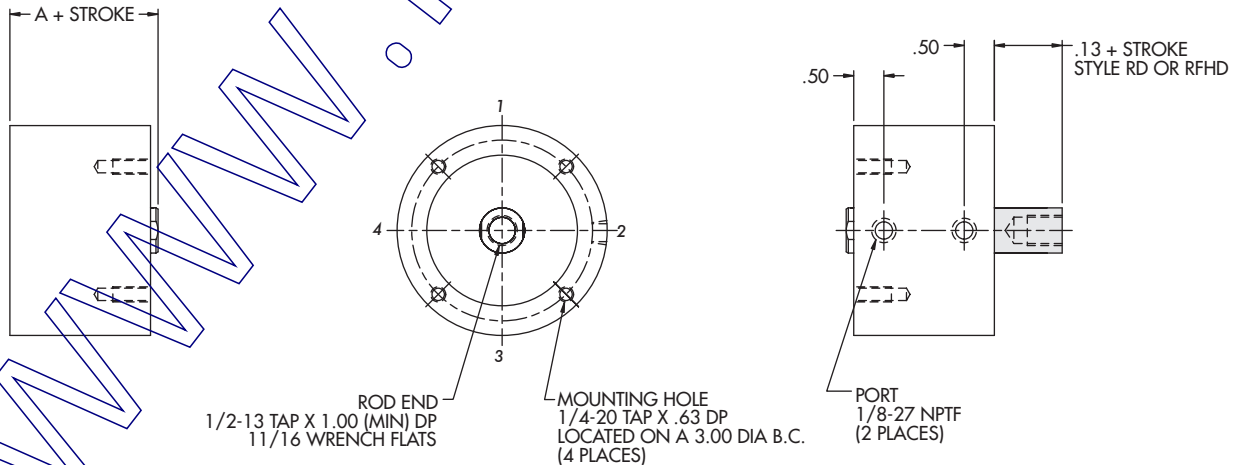


Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R212x __	RD212x __	7/8 to 6 in 1/8" increments	1.38
Intermediate	RHH212x __		5/8 to 6 in 1/8" increments	1.63
Heavy	RFH212x __	RFHD212x __	3/8 to 6 in 1/8" increments	1.88

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**
 Information same as above except where noted.





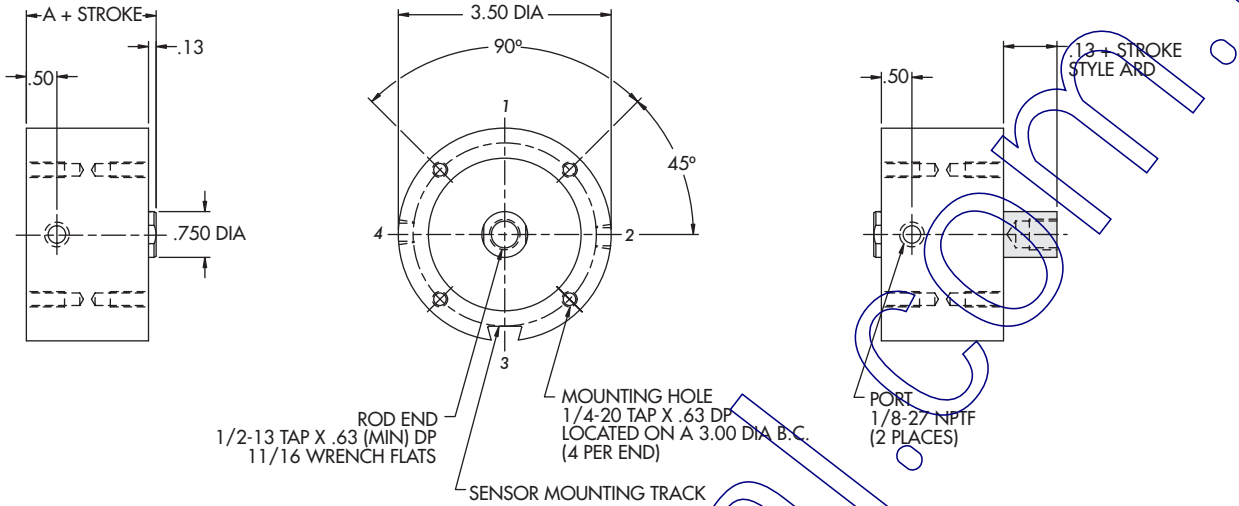
2-1/2" Bore Magnetic Piston

THIRD ANGLE PROJECTION



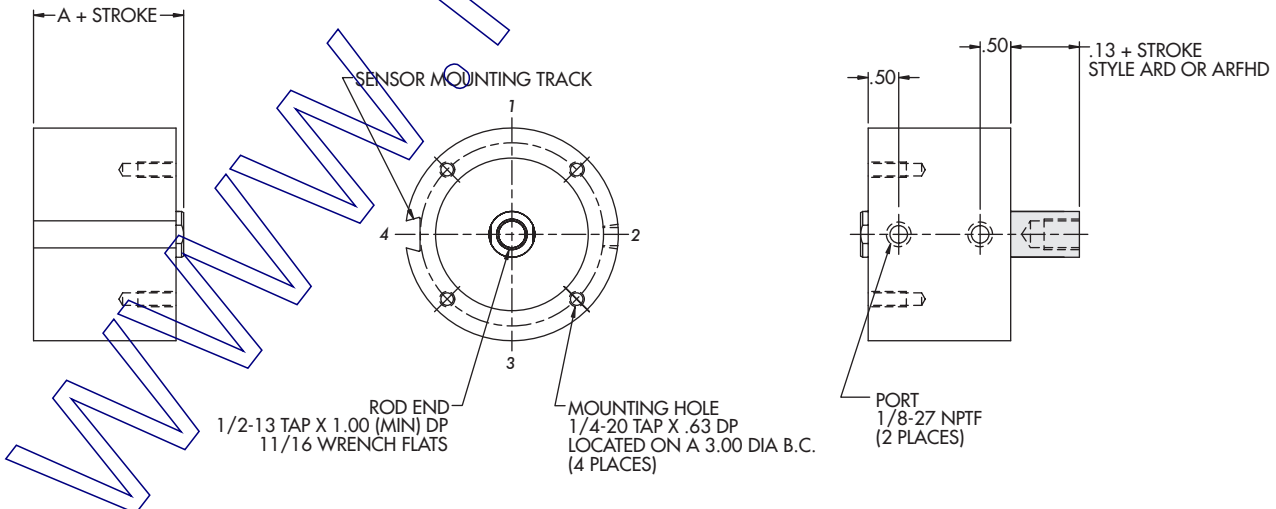
Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR212x__	ARD212x__	1/8 to 1/2 in 1/8" increments	1.63
Intermediate	ARHH212x__		1/8, 1/4	1.88

Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR212x__	ARD212x__	5/8 to 6 in 1/8" increments	1.63
Intermediate	ARHH212x__		3/8 to 6 in 1/8" increments	1.88
Heavy	ARFH212x__	ARFHD212x__	1/8 to 6 in 1/8" increments	2.13

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**
 Information same as above except where noted.

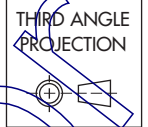


Style "S"



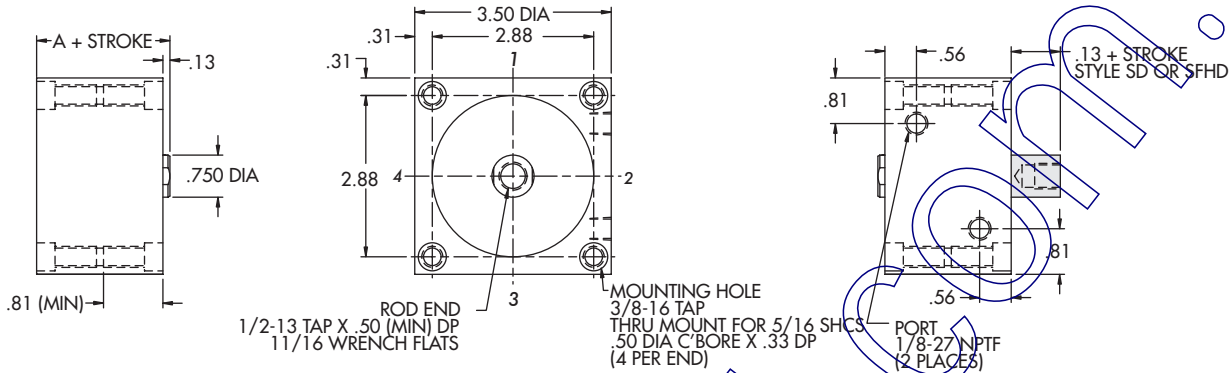
End Mount

3" Bore Non Magnetic Piston



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S3x __	SD3x __	1/8 to 3/4 in 1/8" increments	1.63
Intermediate	SHH3x __		1/8 to 1/2 in 1/8" increments	1.88
Heavy	SFH3x __	SFHD3x __	1/8, 1/4	2.13

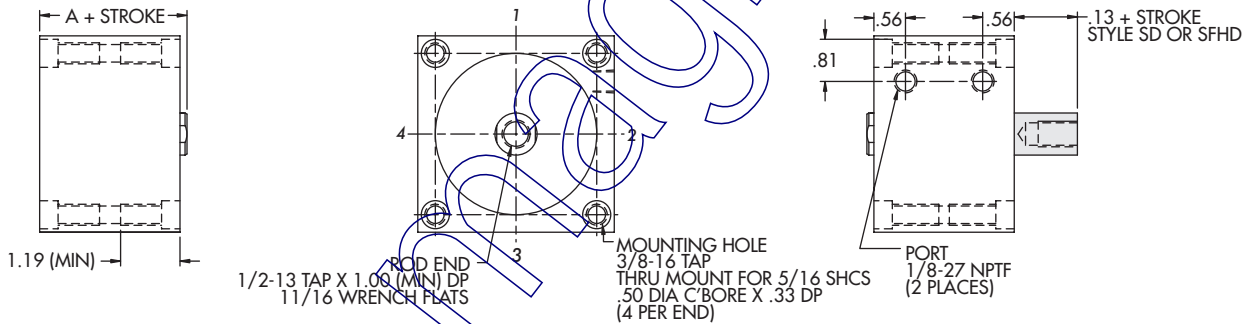
Standard Mounting: **TF, TR, TBE, TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S3x __	SD3x __	7/8 to 1-1/2 in 1/8" increments	1.63
Intermediate	SHH3x __		5/8 to 1-1/4 in 1/8" increments	1.88
Heavy	SFH3x __	SFHD3x __	3/8 to 1 in 1/8" increments	2.13

Standard Mounting: **TF, TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

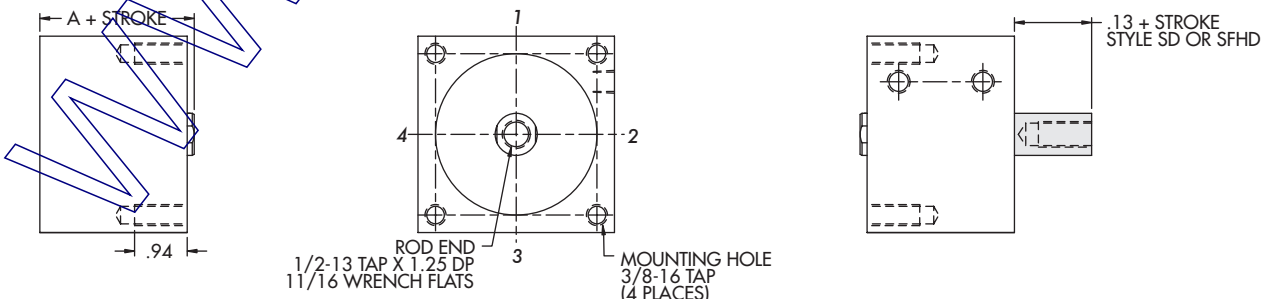
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	S3x __	SD3x __	1-5/8 to 6 in 1/8" increments	1.63
Intermediate	SHH3x __		1-3/8 to 6 in 1/8" increments	1.88
Heavy	SFH3x __	SFHD3x __	1-1/8 to 6 in 1/8" increments	2.13

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

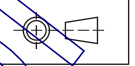
Information same as above except where noted.





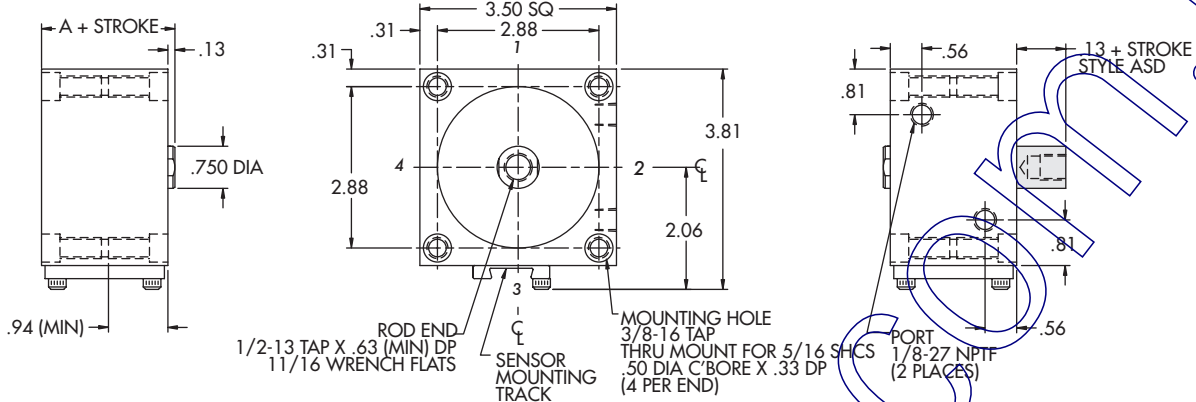
3" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS3x ___	ASD3x ___	1/8 to 1/2 in 1/8" increments	1.88
Intermediate	ASHH3x ___		1/8, 1/4	2.13

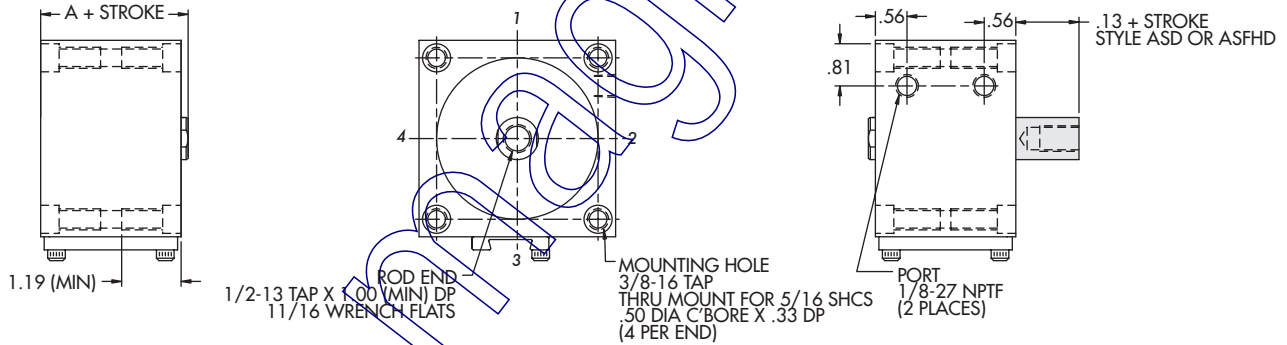
Standard Mounting: **TF, TR, TBE, TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS3x ___	ASD3x ___	5/8 to 1-1/4 in 1/8" increments	1.88
Intermediate	ASHH3x ___		3/8 to 1 in 1/8" increments	2.13
Heavy	ASFH3x ___	ASFHD3x ___	1/8 to 3/4 in 1/8" increments	2.38

Standard Mounting: **TF, TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

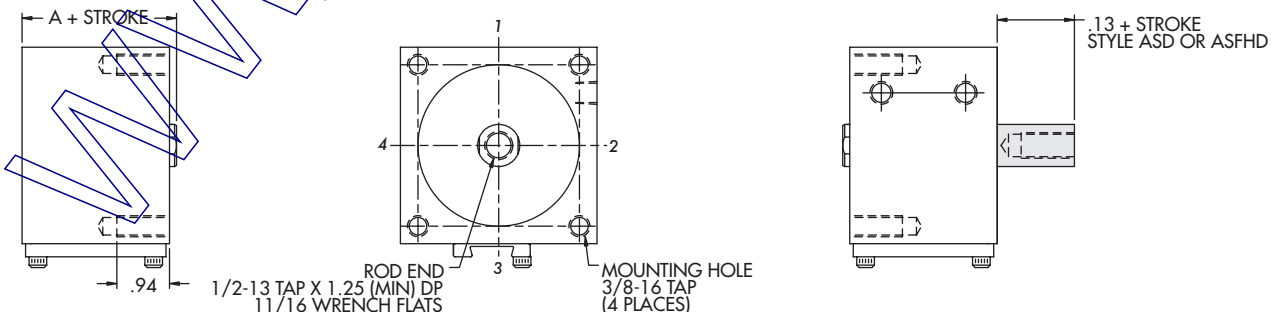
Information same as above except where noted.



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AS3x ___	ASD3x ___	1-3/8 to 6 in 1/8" increments	1.88
Intermediate	ASHH3x ___		1-1/8 to 6 in 1/8" increments	2.13
Heavy	ASFH3x ___	ASFHD3x ___	7/8 to 6 in 1/8" increments	2.38

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

Information same as above except where noted.



Style "B"



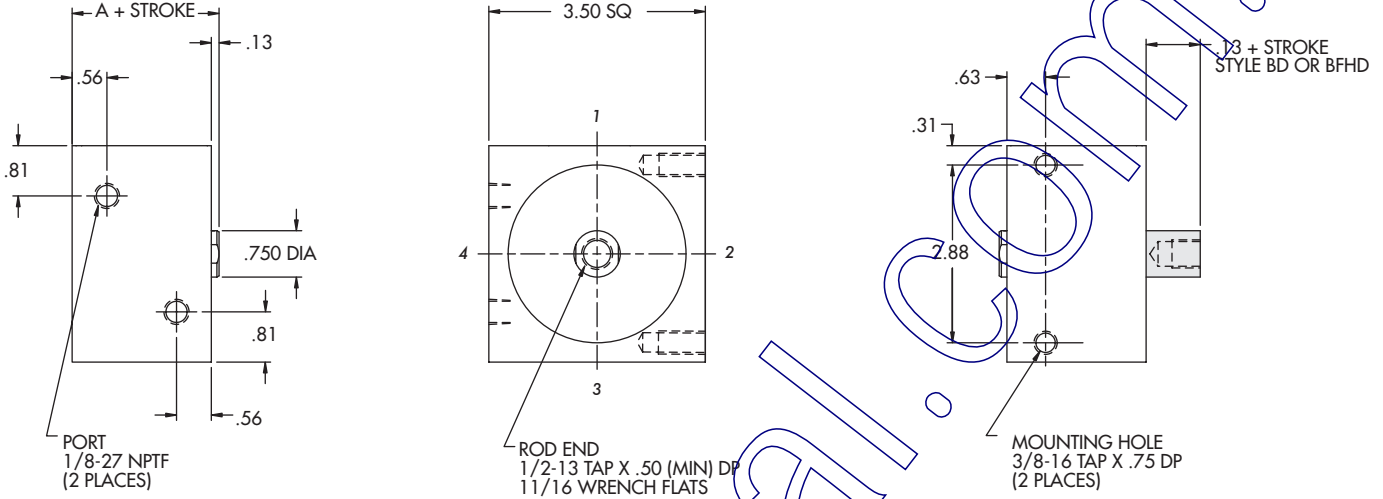
Side Mount

3" Bore Non Magnetic Piston

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B3x __	BD3x __	1/8 to 3/4 in 1/8" increments	1.63
Intermediate	BHH3x __		1/8 to 1/2 in 1/8" increments	1.88
Heavy	BFH3x __	BFHD3x __	1/8, 1/4	2.13

THIRD ANGLE PROJECTION

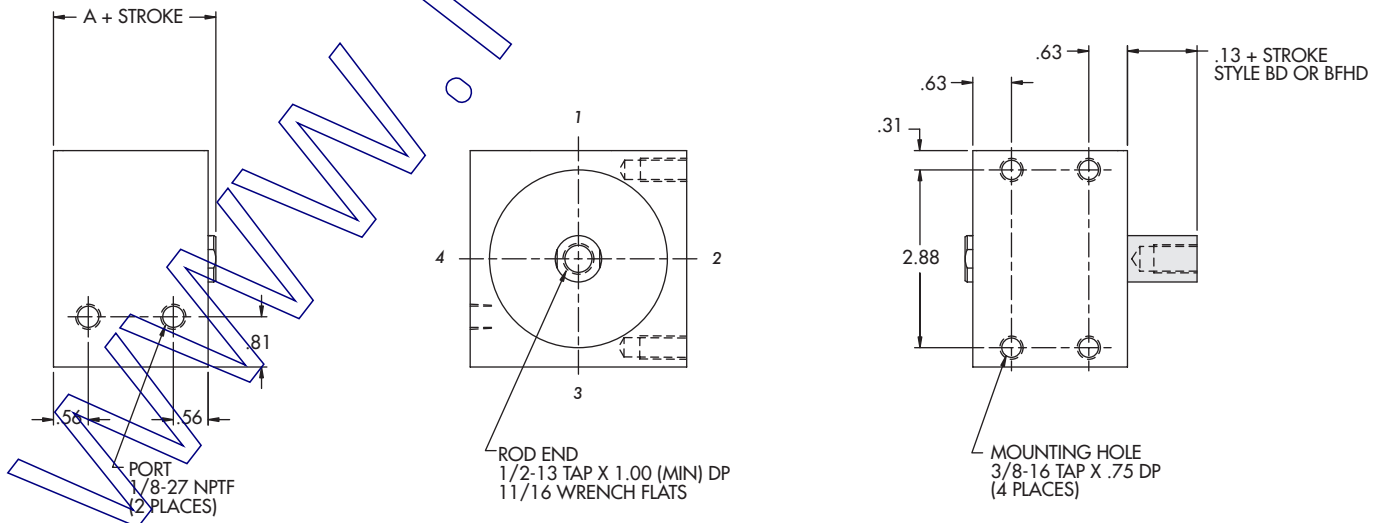
Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	B3x __	BD3x __	7/8 to 6 in 1/8" increments	1.63
Intermediate	BHH3x __		5/8 to 6 in 1/8" increments	1.88
Heavy	BFH3x __	BFHD3x __	3/8 to 6 in 1/8" increments	2.13

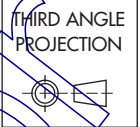
Optional Porting: **1/4-18 NPTF**

Information same as above except where noted.



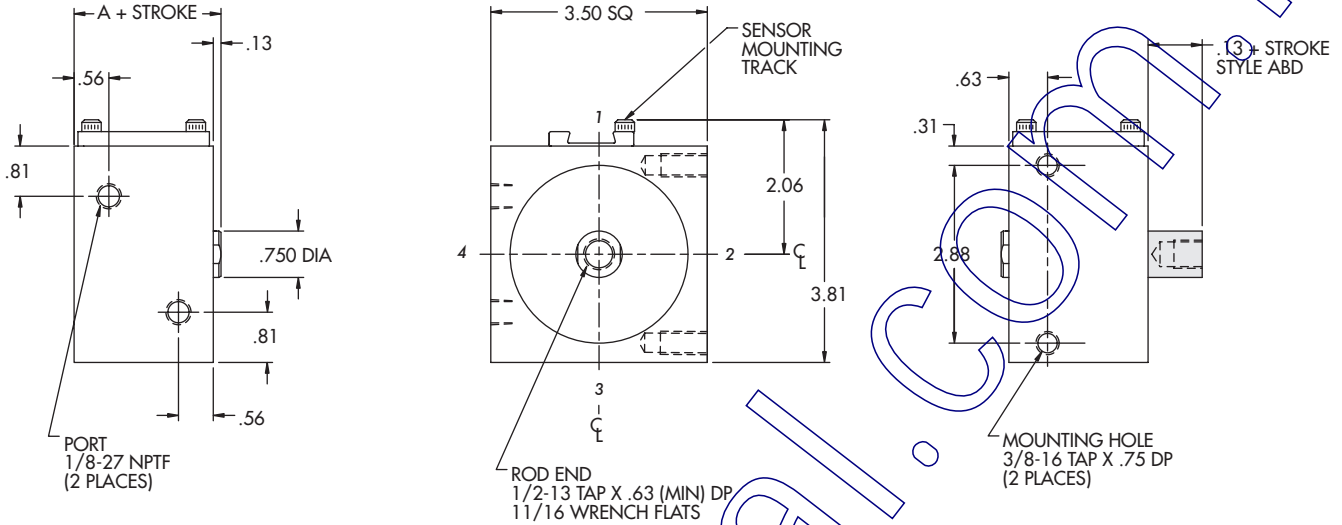


3" Bore Magnetic Piston



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB3x __	ABD3x __	1/8 to 1/2 in 1/8" increments	1.88
Intermediate	ABHH3x __		1/8, 1/4	2.13

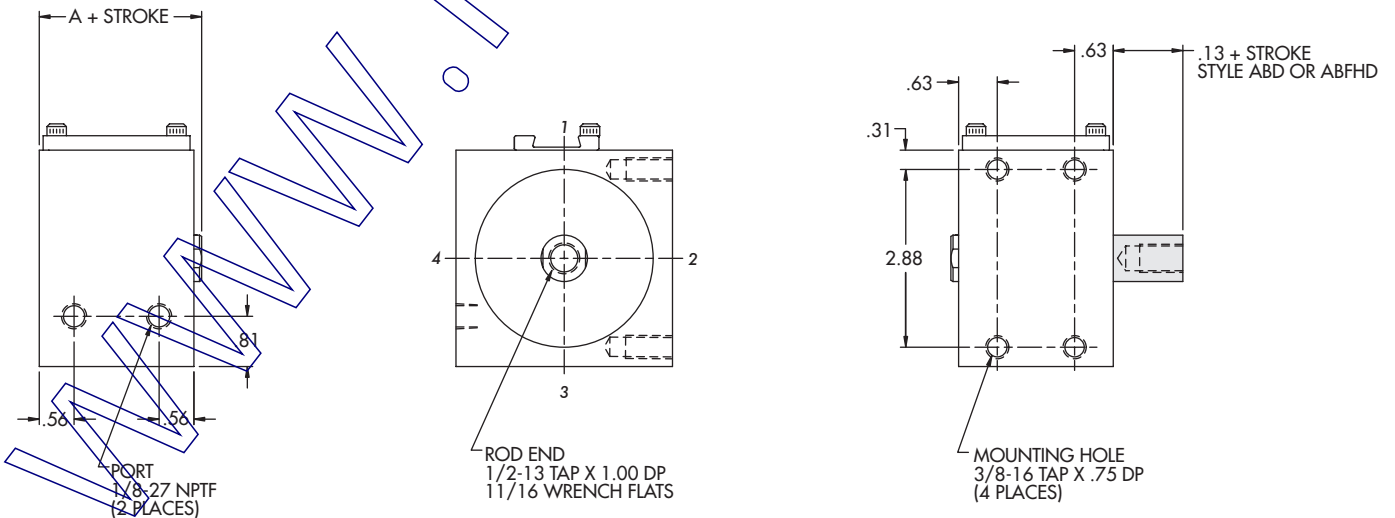
Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AB3x __	ABD3x __	5/8 to 6 in 1/8" increments	1.88
Intermediate	ABHH3x __		3/8 to 6 in 1/8" increments	2.13
Heavy	ABFH3x __	ABFHD3x __	1/8 to 6 in 1/8" increments	2.38

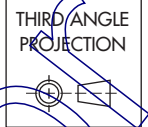
Optional Porting: **1/4-18 NPTF**

Information same as above except where noted.



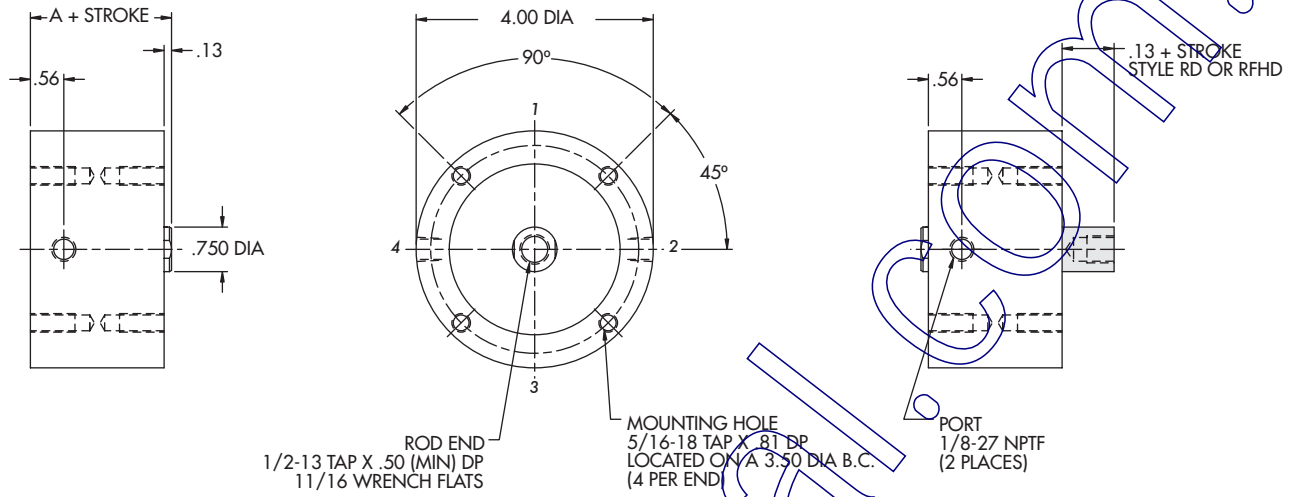


3" Bore Non Magnetic Piston



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R3x __	RD3x __	1/8 to 3/4 in 1/8" increments	1.63
Intermediate	RHH3x __		1/8 to 1/2 in 1/8" increments	1.88
Heavy	RFH3x __	RFHD3x __	1/8, 1/4	2.13

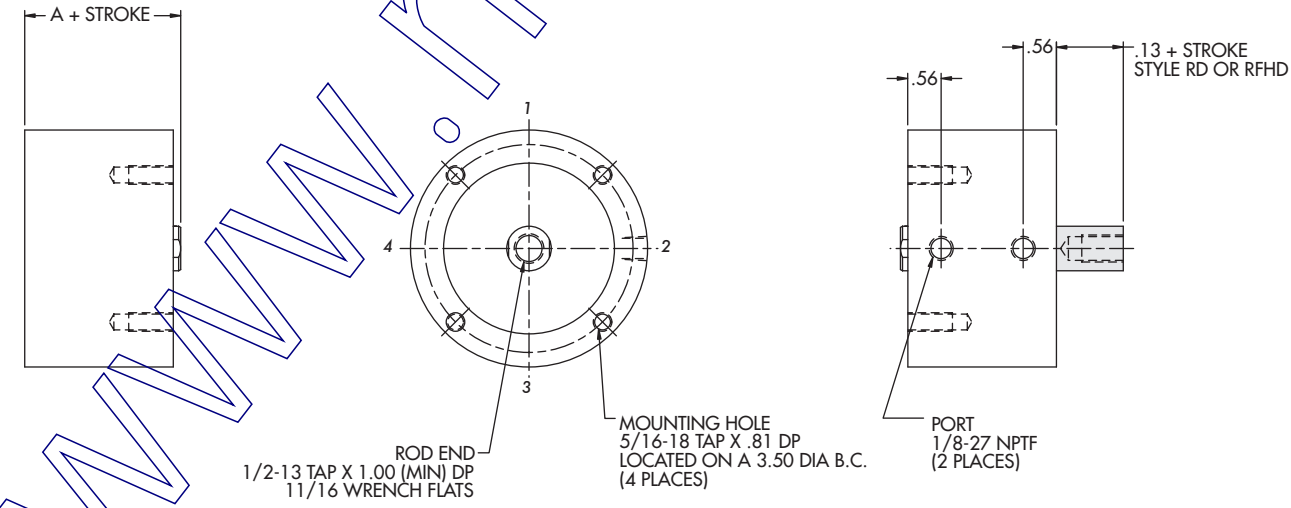
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R3x __	RD3x __	7/8 to 6 in 1/8" increments	1.63
Intermediate	RHH3x __		5/8 to 6 in 1/8" increments	1.88
Heavy	RFH3x __	RFHD3x __	3/8 to 6 in 1/8" increments	2.13

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

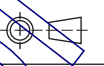
Information same as above except where noted.





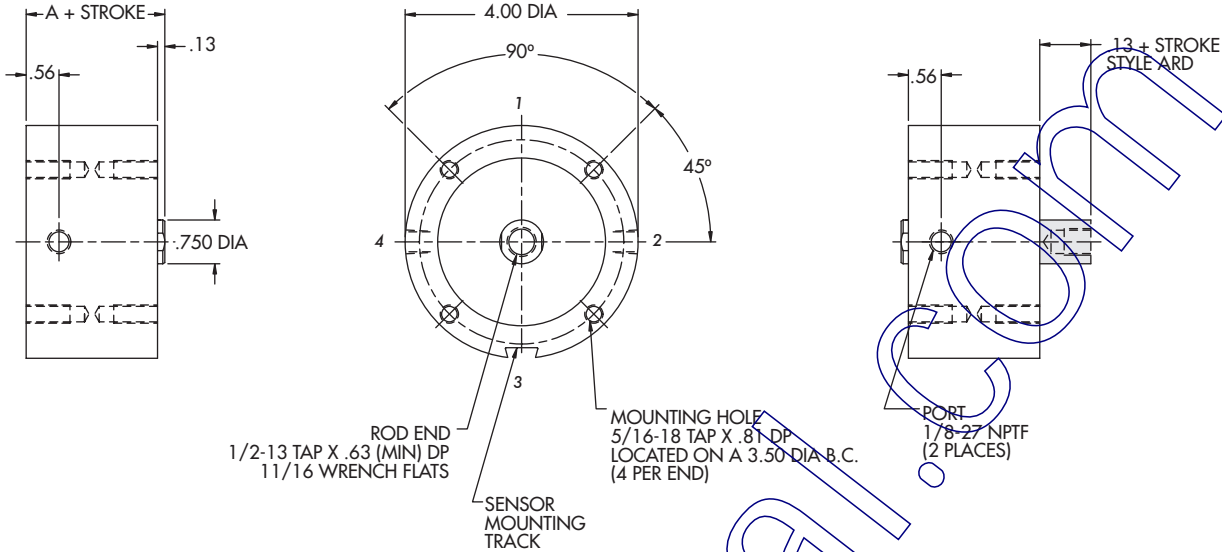
3" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR3x__	ARD3x__	1/8 to 1/2 in 1/8" increments	1.88
Intermediate	ARHH3x__		1/8, 1/4	2.13

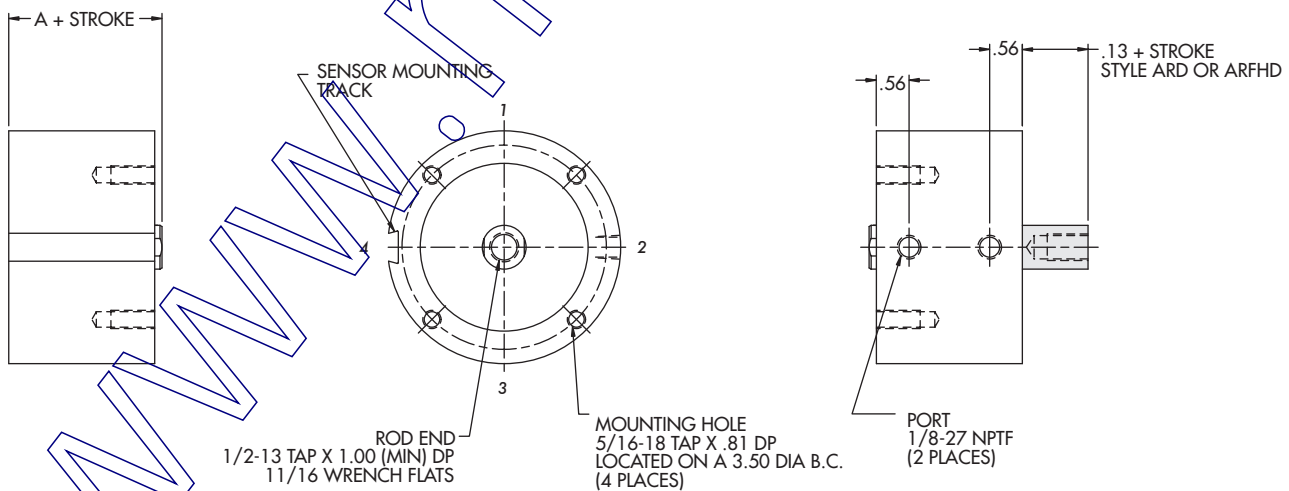
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR3x__	ARD3x__	5/8 to 6 in 1/8" increments	1.88
Intermediate	ARHH3x__		3/8 to 6 in 1/8" increments	2.13
Heavy	ARFH3x__	ARFHD3x__	1/8 to 6 in 1/8" increments	2.38

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

Information same as above except where noted.



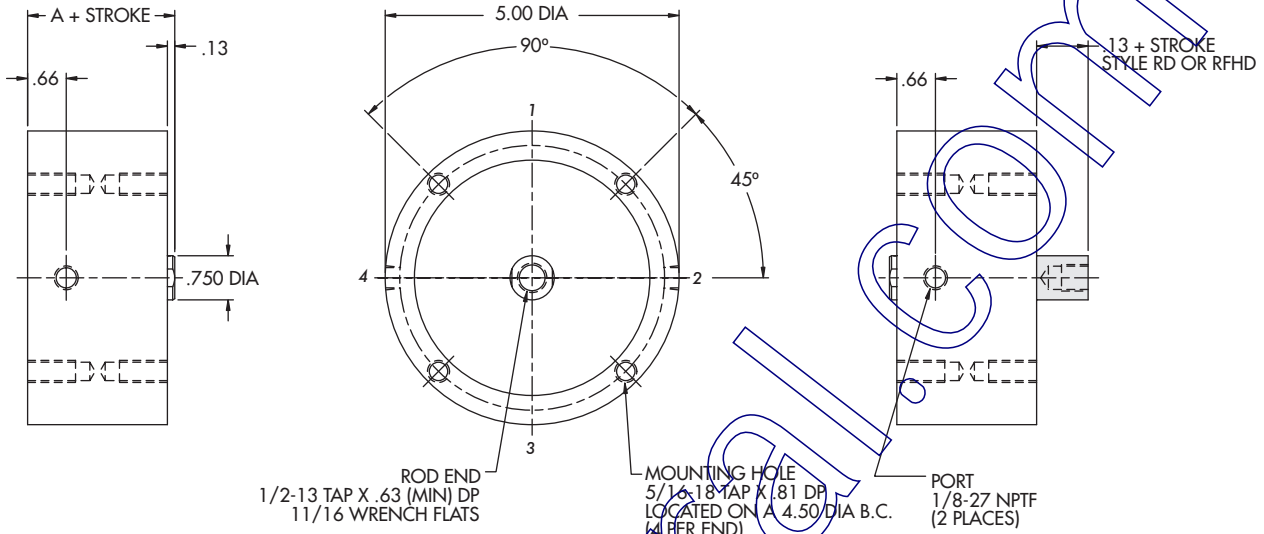


4" Bore Non Magnetic Piston

THIRD ANGLE PROJECTION

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R4x __	RD4x __	1/8 to 3/4 in 1/8" increments	1.75
Intermediate	RHH4x __		1/8 to 1/2 in 1/8" increments	2.00
Heavy	RFH4x __	RFHD4x __	1/8, 1/4	2.25

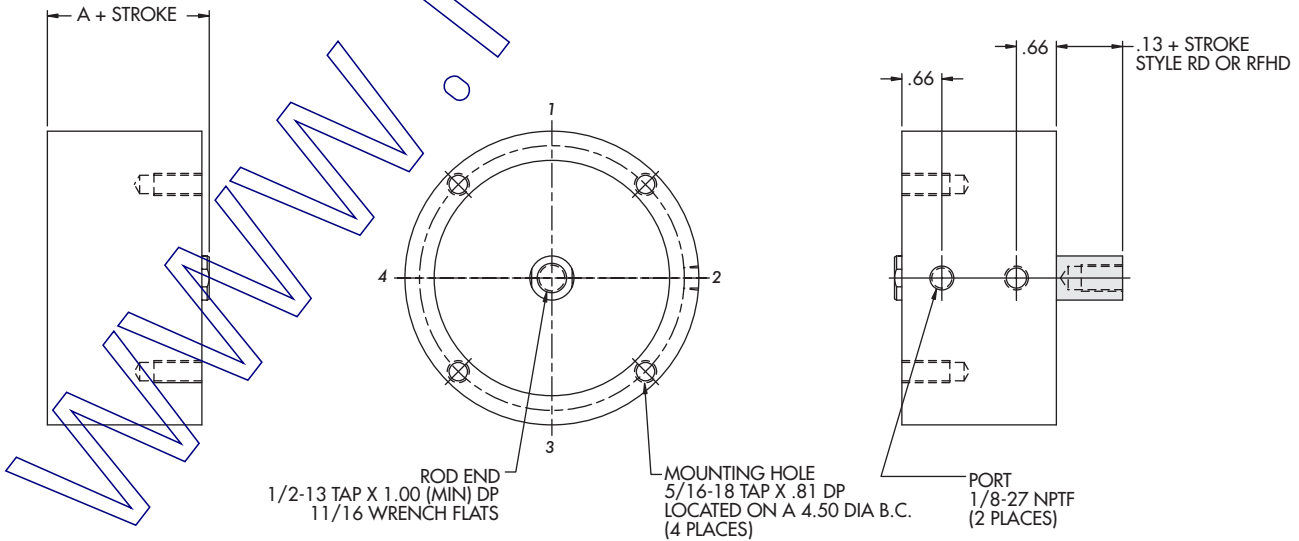
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R4x __	RD4x __	7/8 to 6 in 1/8" increments	1.75
Intermediate	RHH4x __		5/8 to 6 in 1/8" increments	2.00
Heavy	RFH4x __	RFHD4x __	3/8 to 6 in 1/8" increments	2.25

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

Information same as above except where noted.





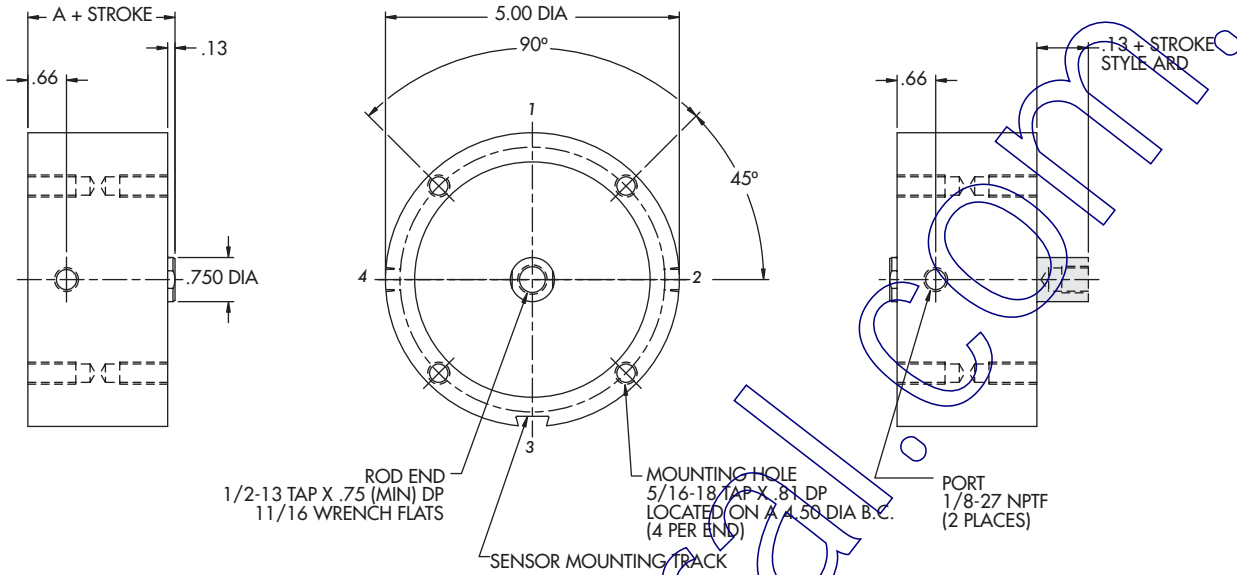
4" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR4x__	ARD4x__	1/8 to 1/2 in 1/8" increments	2.00
Intermediate	ARHH4x__		1/8, 1/4	2.25

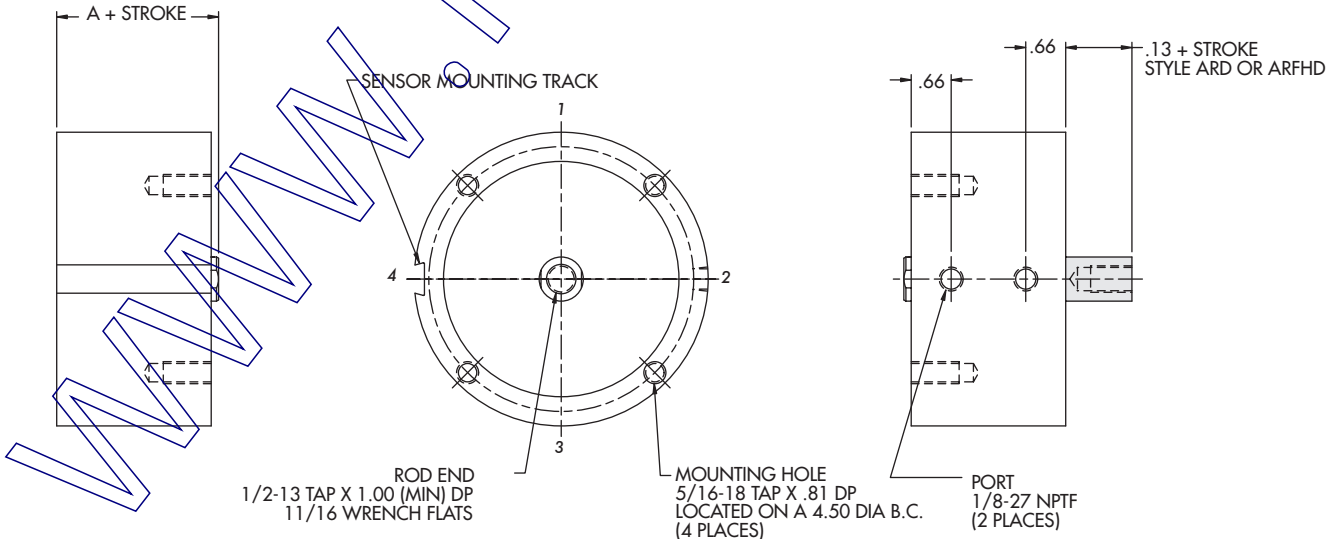
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR4x__	ARD4x__	5/8 to 6 in 1/8" increments	2.00
Intermediate	ARHH4x__		3/8 to 6 in 1/8" increments	2.25
Heavy	ARFH4x__	ARFHD4x__	1/8 to 6 in 1/8" increments	2.50

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

Information same as above except where noted.



Style "R"

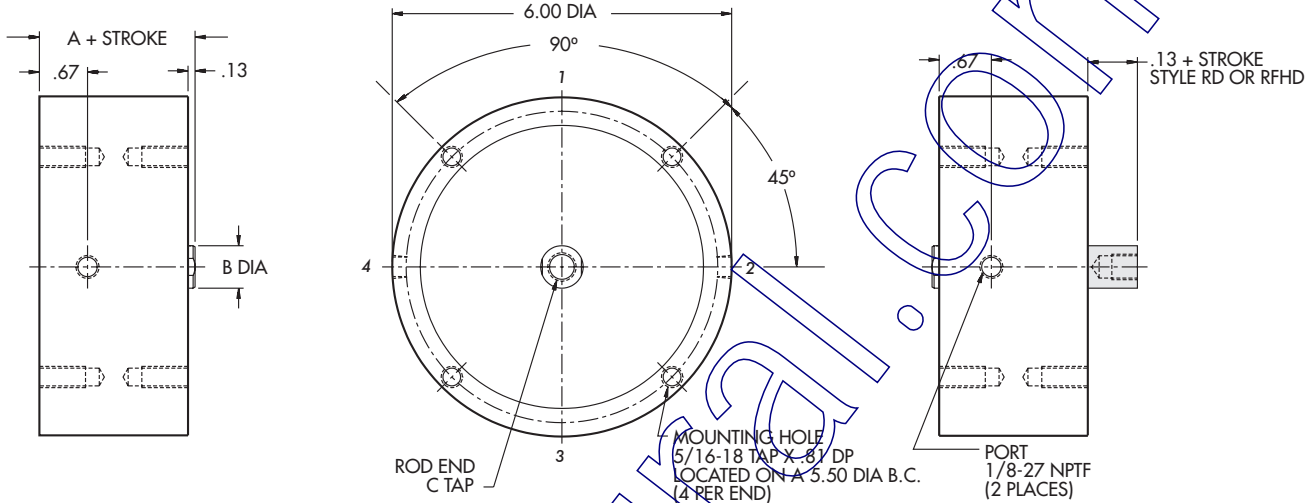


End Mount

5" Bore Non Magnetic Piston

Duty	Part Number		Standard Stroke Length	A	B	C	THIRD ANGLE PROJECTION
	Single Rod	Double Rod					
Standard	R5x __	RD5x __	1/8 to 3/4 in 1/8" increments	1.88	.750	1/2-13 x .63 (Min.) Dp 11/16 Wrench Flats	
Intermediate	RHH5x __		1/8 to 1/2 in 1/8" increments	2.13	.750	1/2-13 x .75 (Min.) Dp 11/16 Wrench Flats	
Heavy	RFH5x __	RFHD5x __	1/8, 1/4	2.38	1.000	5/8-18 x .88 (Min.) Dp 15/16 Wrench Flats	

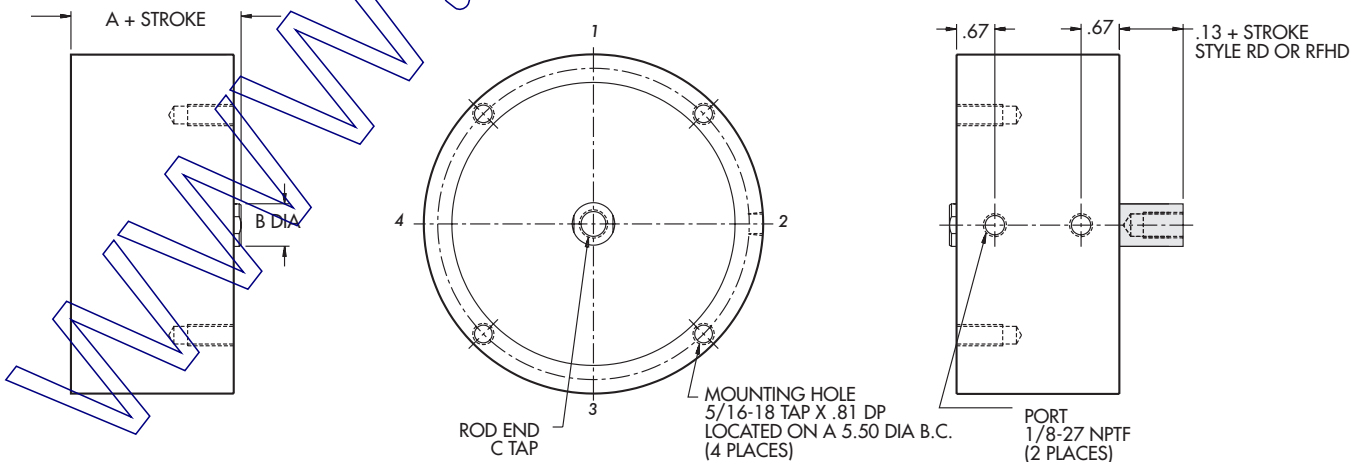
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A	B	C
	Single Rod	Double Rod				
Standard	R5x __	RD5x __	7/8 to 6 in 1/8" increments	1.88	.750	1/2-13 x .1.00 (Min.) Dp 11/16 Wrench Flats
Intermediate	RHH5x __		5/8 to 6 in 1/8" increments	2.13	.750	1/2-13 x 1.00 (Min.) Dp 11/16 Wrench Flats
Heavy	RFH5x __	RFHD5x __	3/8 to 6 in 1/8" increments	2.38	1.000	5/8-18 x 1.00 (Min.) Dp 15/16 Wrench Flats

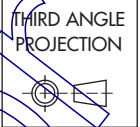
Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

Information same as above except where noted.



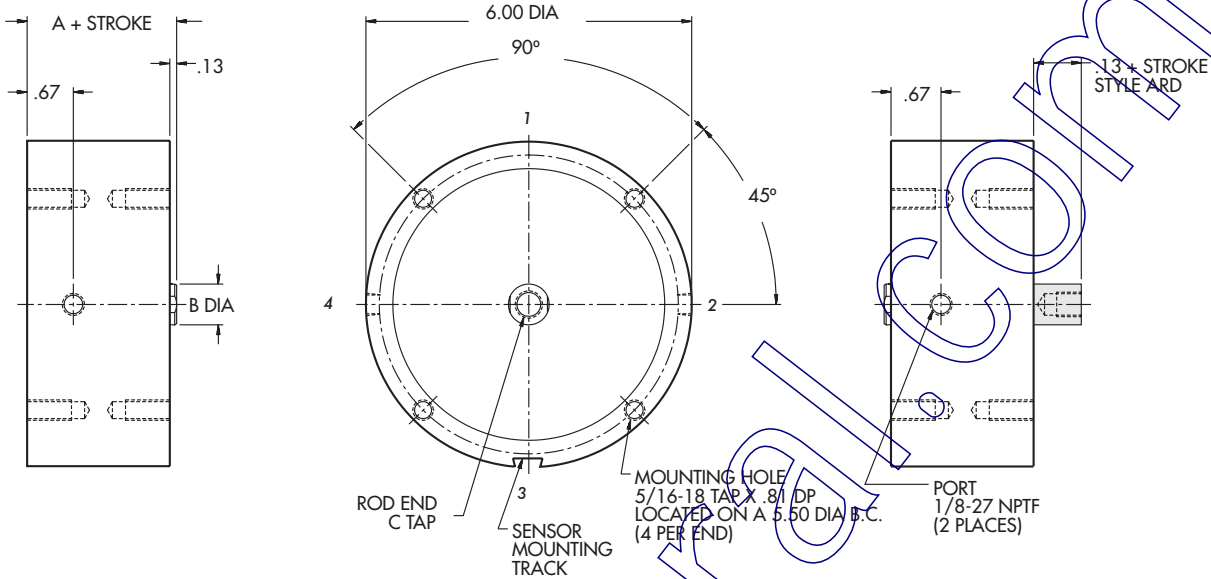


5" Bore Magnetic Piston



Duty	Part Number		Standard Stroke Length	A	B	C
	Single Rod	Double Rod				
Standard	AR5x__	ARD5x__	1/8 to 1/2 in 1/8" increments	2.13	.750	1/2-13 x .75 (Min.) Dp 11/16 Wrench Flats
Intermediate	ARHH5x__		1/8, 1/4	2.38	.750	1/2-13 x .88 (Min.) Dp 11/16 Wrench Flats

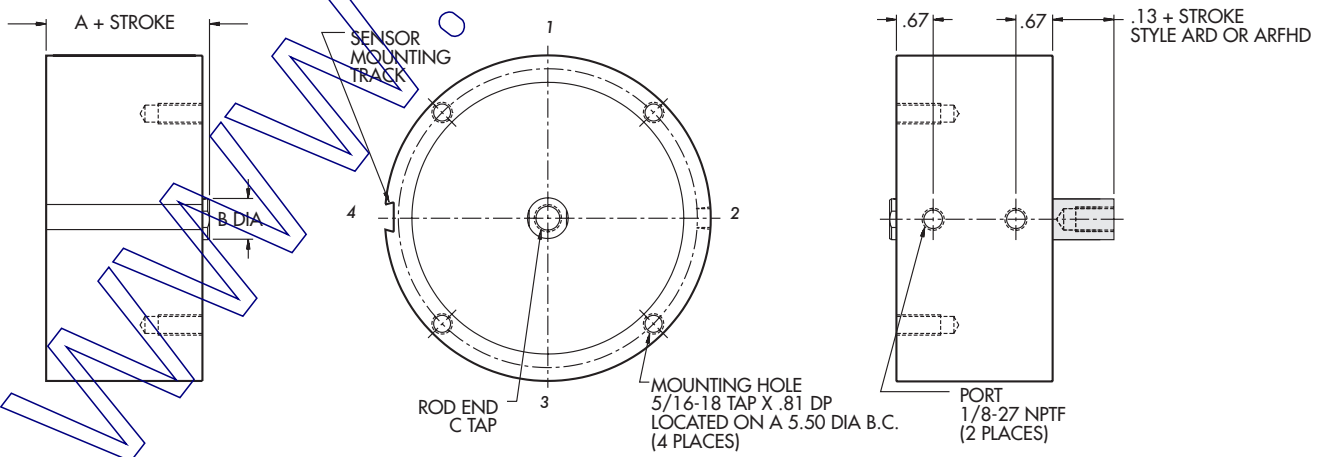
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A	B	C
	Single Rod	Double Rod				
Standard	AR5x__	ARD5x__	5/8 to 6 in 1/8" increments	2.13	.750	1/2-13 x .1.00 (Min.) Dp 11/16 Wrench Flats
Intermediate	ARHH5x__		3/8 to 6 in 1/8" increments	2.38	.750	1/2-13 x 1.00 (Min.) Dp 11/16 Wrench Flats
Heavy	ARFH5x__	ARFHD5x__	1/8 to 6 in 1/8" increments	2.63	1.000	5/8-18 x 88 (Min.) Dp 15/16 Wrench Flats

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

Information same as above except where noted.

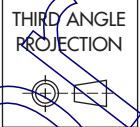


Style "R"



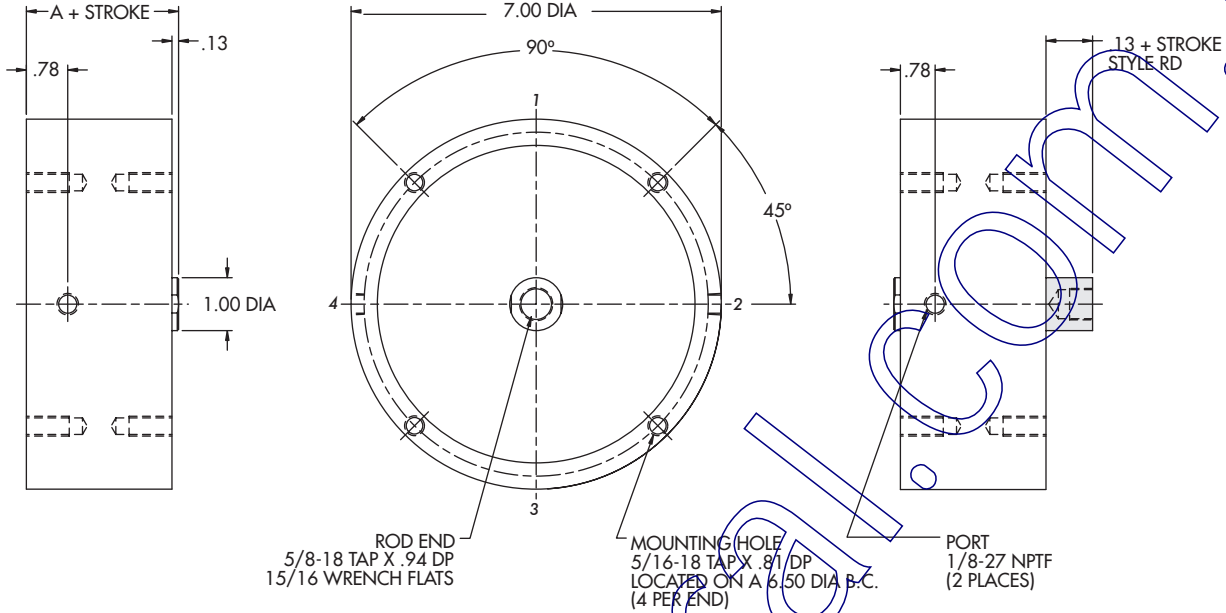
End Mount

6" Bore Non Magnetic Piston



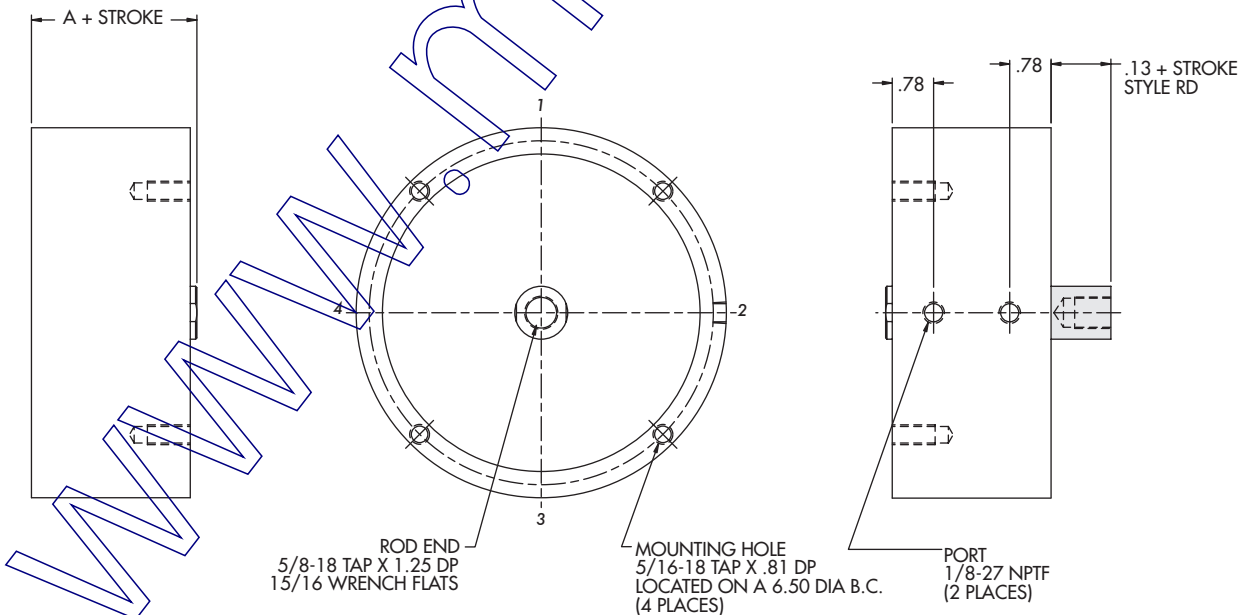
Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R6x__	RD6x__	1/8 to 1/2 in 1/8" increments	2.13

Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R6x__	RD6x__	5/8 to 6 in 1/8" increments	2.13

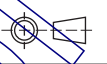
Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**
 Information same as above except where noted.





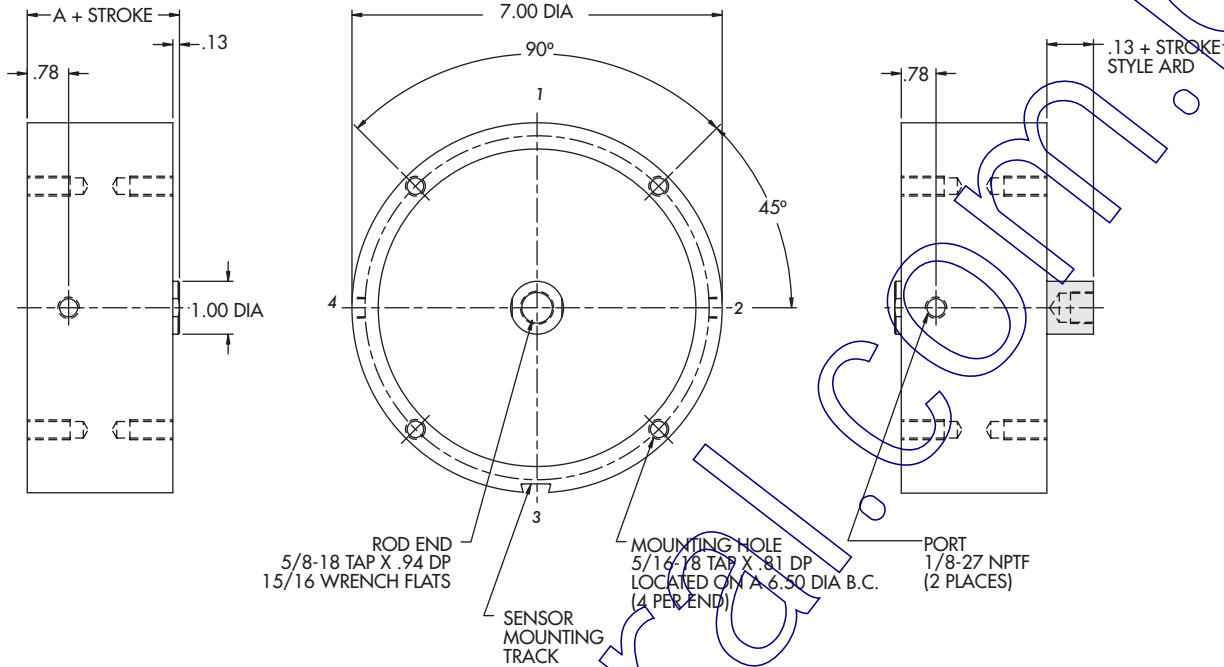
6" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR6x__	ARD6x__	1/8, 1/4	2.38

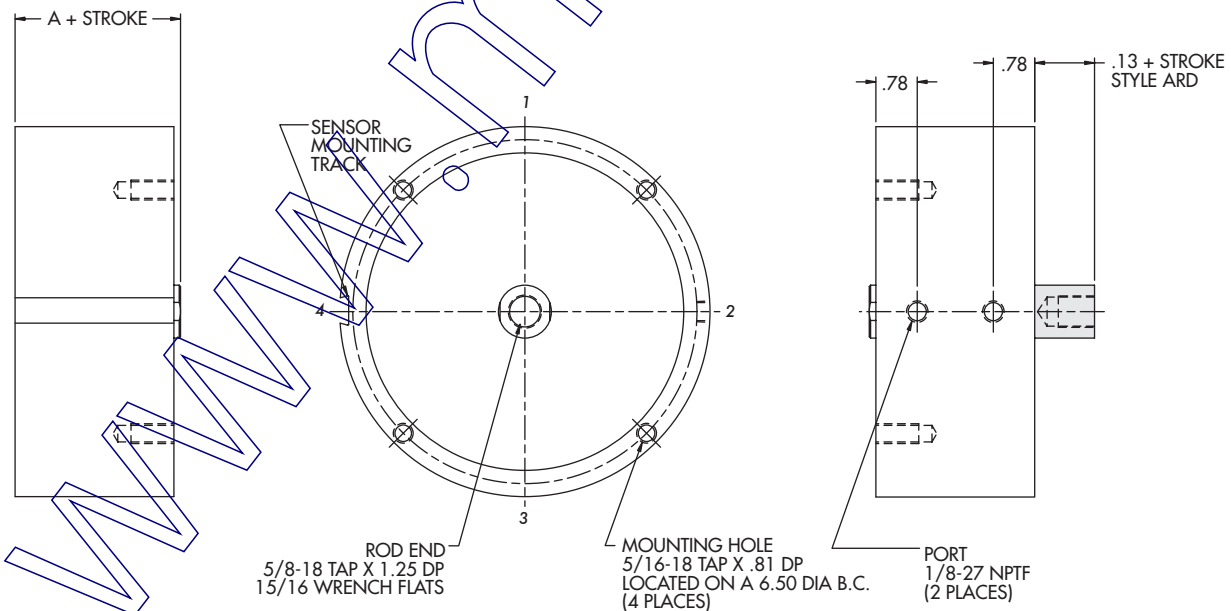
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR6x__	ARD6x__	3/8 to 6 in 1/8" increments	2.38

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

Information same as above except where noted.



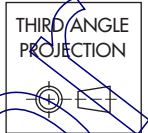
Style "R"



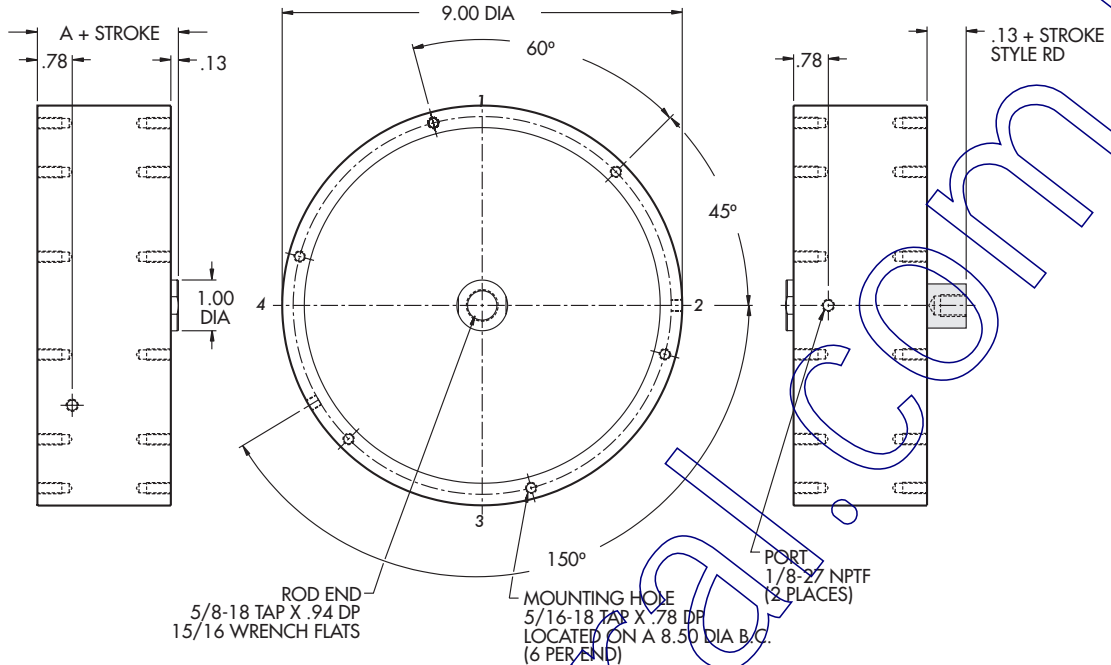
End Mount

8" Bore Non Magnetic Piston

Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R8x __	RD8x __	1/8 to 1/2 in 1/8" increments	2.38



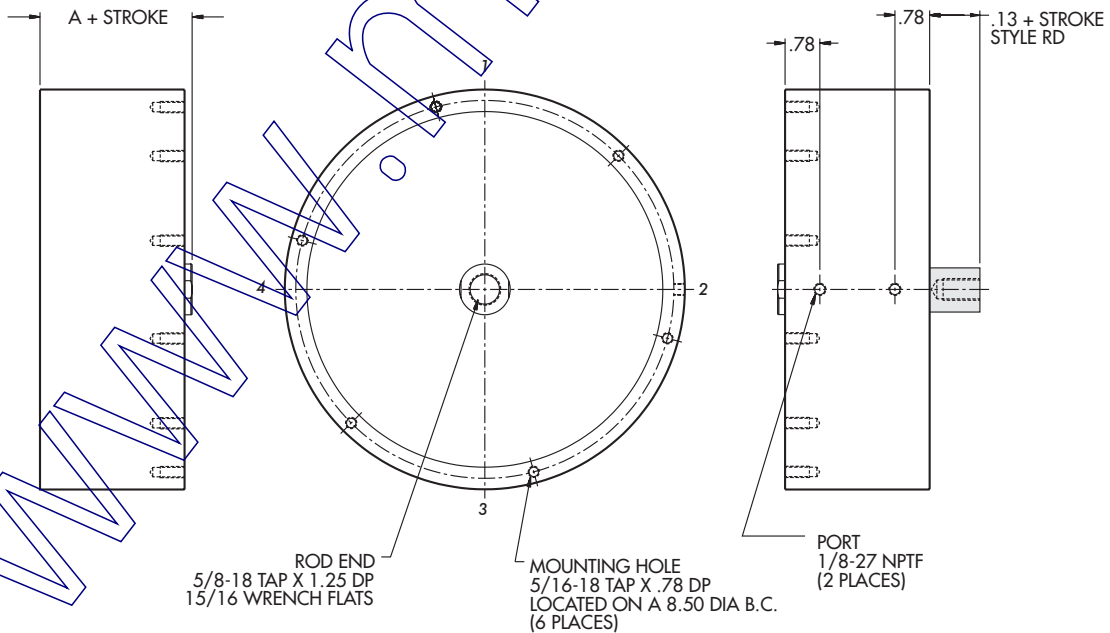
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	R8x __	RD8x __	5/8 to 6 in 1/8" increments	2.38

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

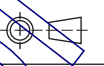
Information same as above except where noted.





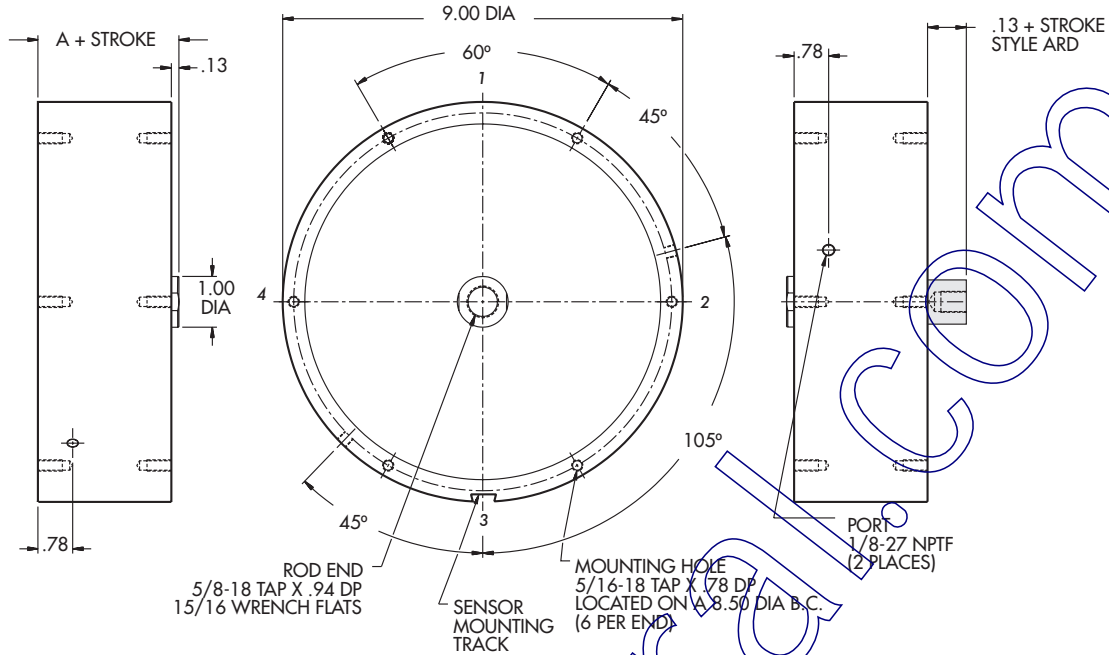
8" Bore Magnetic Piston

THIRD ANGLE PROJECTION



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR8x__	ARD8x__	1/8, 1/4	2.63

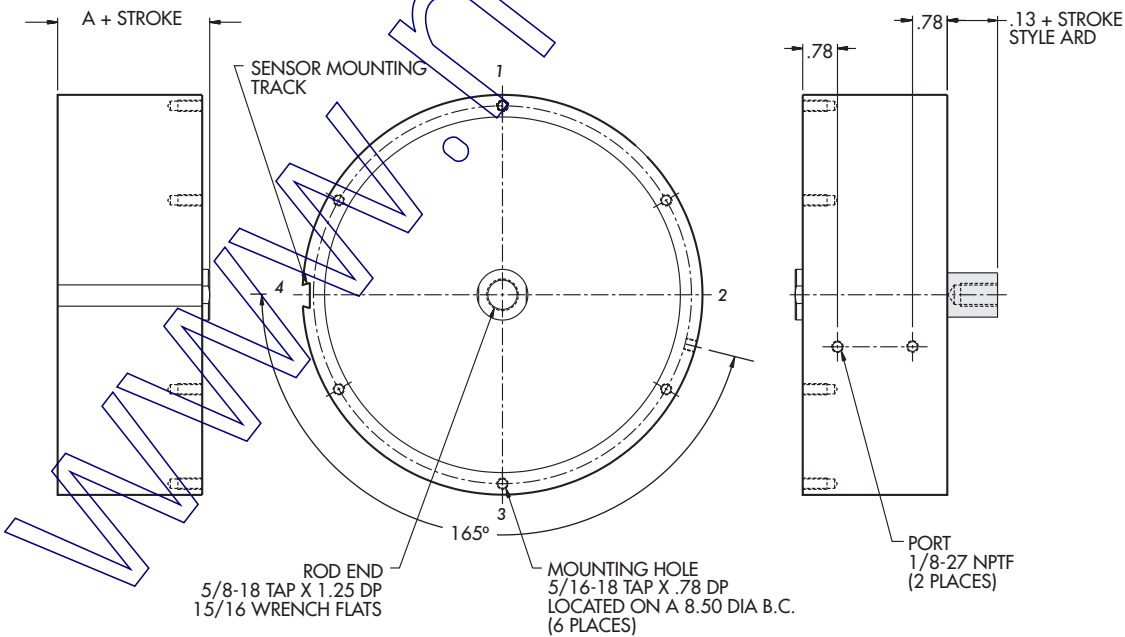
Standard Mounting: **TF, TR, TBE** Optional Mounting: **TM** Optional Porting: **1/4-18 NPTF**



Duty	Part Number		Standard Stroke Length	A
	Single Rod	Double Rod		
Standard	AR8x__	ARD8x__	3/8 to 6 in 1/8" increments	2.63

Standard Mounting: **TF** Optional Mounting: **TR, TBE, TM** Optional Porting: **1/4-18 NPTF**

Information same as above except where noted.



Seal Descriptions

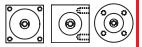
Conversion Formula: $C^{\circ} = (F^{\circ} - 32^{\circ}) \times 5/9$

Type	Ordering Suffix	Rating	Description
Pneumatic Seals			
Nitrile	-	0° to 200°F -18° to 93°C	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	HTV	0° to 400°F -18° to 204°C	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.
PTFE*	CRT	250° to 400°F 121° to 204°C	Specified for extreme temperatures and harsh atmosphere where rubber seals are not suitable. Best compression set is at high temperature. PTFE seals are not guaranteed to be leak free and higher breakaway is typical. Overall strength does not compare favorably to rubber in abrasion resistance.
Ethylene Propylene	ETP	-70° to 300°F -57° to 150°C	Used for sealing water, phosphate-ester hydraulic fluids, glycol base brake fluids, silicone oils and grease, many acids, solvents. Not compatible with mineral oil products. Consult factory for specific applications.
Hydraulic Seals			
Nitrile*	HYD	0° to 250°F -18° to 121°C	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*	VHYD	0° to 400°F -18° to 204°C	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.

*Available through 4" bore only

3/4" - 3" Bore Options

All Styles



Corrosion Resistant 300 Series Stainless Steel

Standard Duty Features:

- 100% 300 series stainless steel components – interior and exterior
- Viton® seals (Teflon® seals, suffix "CRT", are optional)
- Plastic rod bearings

Intermediate and Heavy Duty Features:

- 100% 300 series stainless steel components – interior and exterior
- Viton® seals (Teflon® seals, suffix "CRT", are optional)
- UHMW plastic rod bearings

Optional - A Crystalline PET Thermoplastic Polyester rod bearing is available for use in clean-room environments. Consult Factory for details.

Magnetic Piston Cylinders:

- Bolt-on Mounting Track is aluminum only

Ordering: Specify "CR3" **before** cylinder part number
Available on 3/4" through 3"

Delivery: Non-standard delivery, consult factory

CR3

Ordering Prefix: CR3

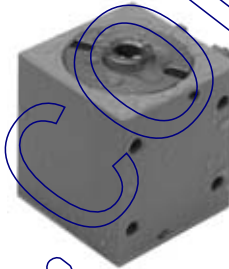
Bore: 3/4" - 3"

Material: 300 Series stainless steel

Stroke: 1/8 - 4 in 1/8" increments

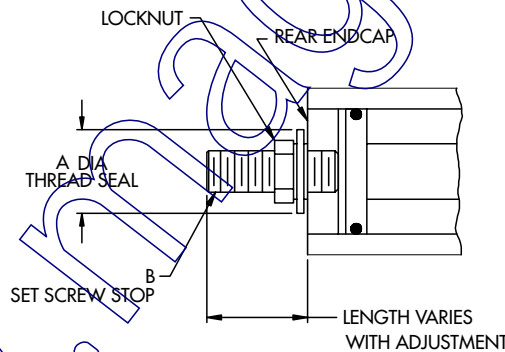
Applications:

Chemical / Petroleum
Medical Equipment
Salt Water Exposure
Clean Rooms
Food Processing
Electronic Assembly
Nuclear
Pharmaceutical



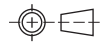
Adjustable Retract Stroke

Bore	A	B
3/4	.56	1/4-20
1-1/8	.75	3/8-16
1-3/8		
1-5/8		
2	1.00	1/2-13
2-1/2		
3	1.38	3/4-10
4		
5		
6		
8		



- DO NOT use with any pivoting applications

THIRD ANGLE PROJECTION



ADJ_

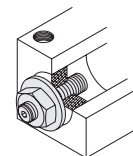
Specify Length

Ordering Suffix: ADJ_

Length: 1/8 - 2 in 1/8" increments

Rod: Single only
Temperature: 200°F Max.

Material: Aluminum endcap, steel locknut and thread seal

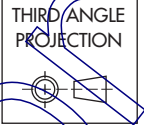
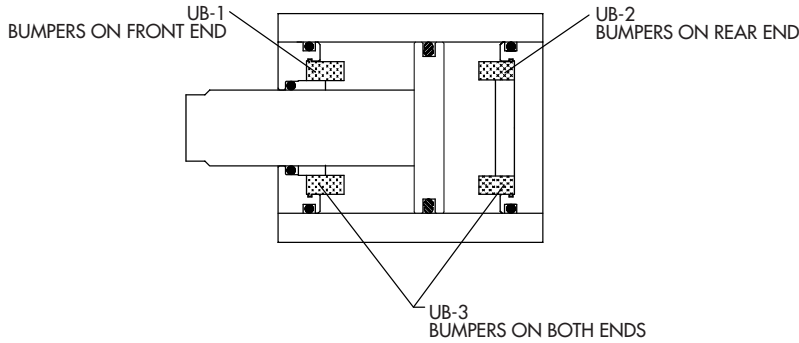


All dimensions are in inches unless otherwise noted.



3/4" - 3" Bore Options

Urethane Bumper Pads



UB_

Example: UB1, UB2, UB3

Ordering Suffix: UB_

Bore: 3/4" - 3"

Temperature: 0° - 150°F

Service: Pneumatic only

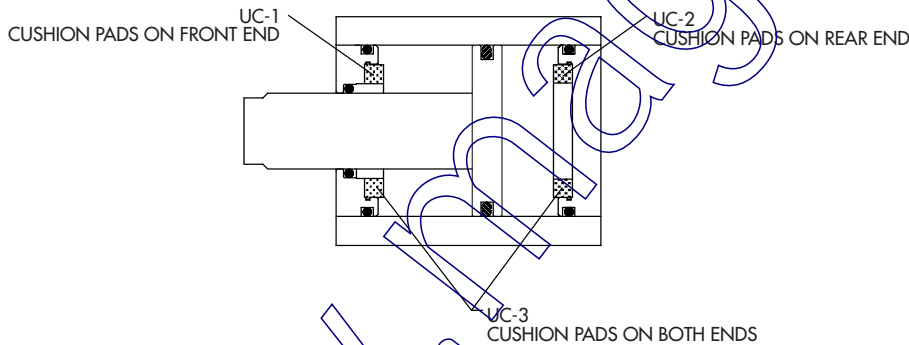
Material: Polyurethane

NOTE: UB1 not available with CR3 or NR option

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

- Designed for noise reduction and minor piston impact only
- Cylinder length does not increase
- Stroke is decreased by 1/8" per bumper
- Bumper Pads mechanically retained within the endcap
- Repairable part - replaceable bumper pads

Urethane Cushion Pads



UC_

Example: UC1, UC2, UC3

Ordering Suffix: UC_

Bore: 3/4" - 3"

Temperature: 0° - 150°F

Service: Pneumatic only

Material: Polyurethane

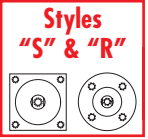
NOTE: UC1 not available with CR3 or NR option

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

- 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

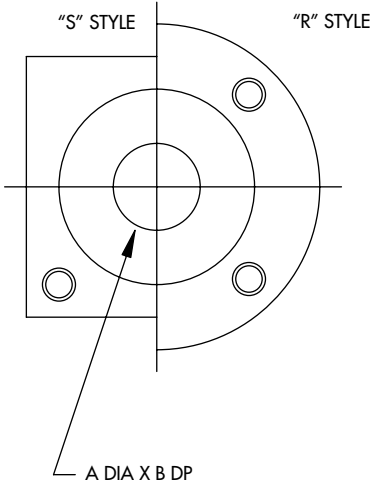
All dimensions are in inches unless otherwise noted.

3/4" - 8" Bore Options



Positive Alignment Pocket

The alignment pocket and pilot are designed to fit between the cylinder and the mounting surface. This ensures accurate mounting and added shear strength.



Bore	A	B
3/4	.31	.13
1-1/8	.50	.13
1-3/8	.63	.19
1-5/8	.75	.25
2	.75	.25
2-1/2	.75	.25
3	.75	.25
4	1.50	.31
5	1.50	.31
6	1.50	.31
8	1.50	.31

PA

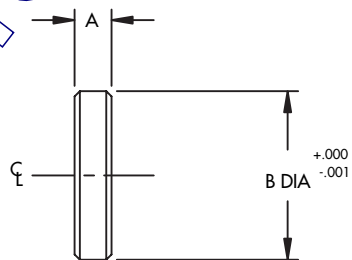
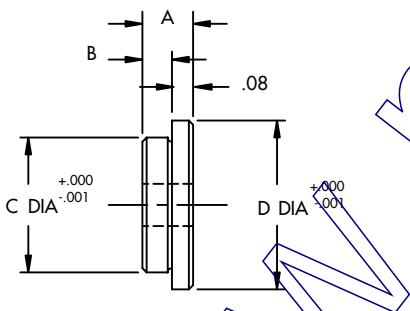
Ordering Suffix: PA
Style: "S" and "R" only
Rod: Single only

- Provides positive means of locating cylinder centerline within .005"

Positive Alignment sold separately

Dual Diameter

Common Diameter



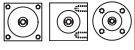
PL

Part Number: PL_
Rod: Single only
Material: Stainless steel

Bore	Part Number	A	B	C	D
1-1/8	PL118-05	.17	.09	.25	.50
	PL118-07	.19	.11	.31	.50
1-3/8	PL158-07	.19	.11	.31	.63
1-5/8	PL158-11	.19	.11	.50	.63

Bore	Part Number	A	B
3/4	PL12L	.20	.31
1-1/8	PL118L	.20	.50
1-3/8	PL158L	.30	.63
1-5/8			
2	PL2L	.41	.75
2-1/2			
3			
4	PL4L	.50	1.50
5			
6			
8			

All dimensions are in inches unless otherwise noted.



3/4" - 8" Bore Options

Hollow Rod

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

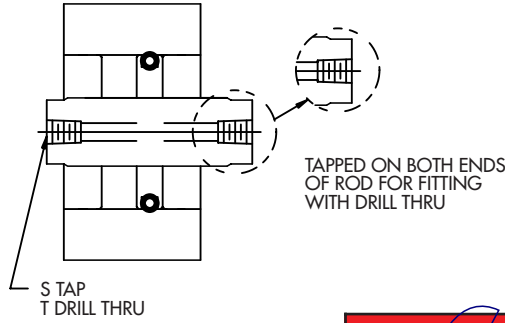
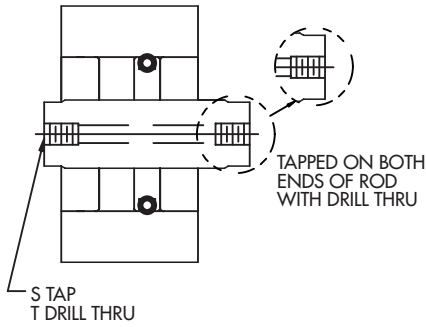
THIRD ANGLE PROJECTION



HR1

HR3

HR



Specify Length

Ordering Suffix: HR_ 3/4" - 2" only
Bore: Standard and Full Husky only
Duty: Double only
Rod: Pneumatic only
Service: 1/8 - 2 in 1/8" increments
Stroke:

Bore	HR1		HR3	
	S Tap	T Drill Thru	S Tap	T Drill Thru
3/4	#10-24 x 3/8 Dp.	.14	#10-32 x 3/8 Dp	.16
1-1/8	5/16-18 x 5/8 Dp.	.25		
1-3/8			1/8-27 NPTF	.34
1-5/8	3/8-16 x 3/4 Dp.	.31		
2				

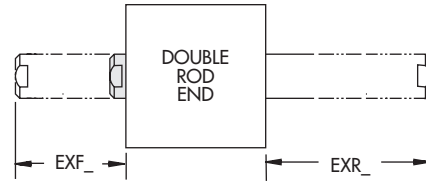
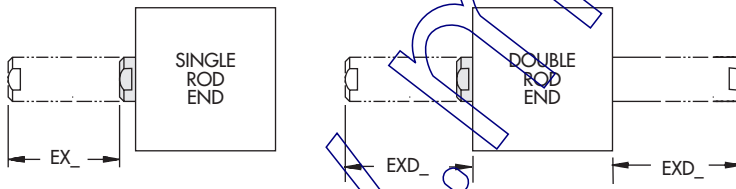
Modifications Welcome

Special stroke lengths, port orientation, mounting configuration.

Applications		
Example	YES	NO
Gases	✓	
Liquids	✓	
Vacuum	✓	
Linear / Rotary Cylinder	✓	
Clamp and Punch Cylinder	✓	
Blow Molding Cylinder	✓	
Hydraulic Cylinders		X
Non-Rotating Rods		X

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

Rod End Extension



Extended equally at both ends

- For special extension or length - consult factory
- Not a screw on component
- Female tap does not change

Single Rod End

EX_

Specify Length

Double Rod End

EXD_

Specify Length

Extension Front End

EXF_

Specify Length

Extension Rear End

EXR_

Specify Length

Ordering Suffix: EX_, EXD_, EXF_ or EXR_

Length: 1/8 - 1 in 1/8" increments

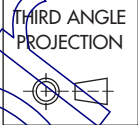
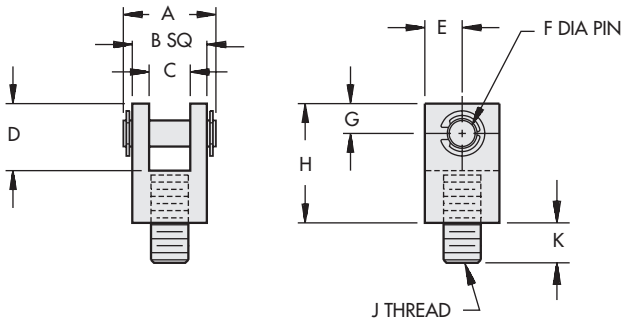
All dimensions are in inches unless otherwise noted.

3/4" - 8" Bore Options

All Styles



Clevis Bracket / Set Screw



CBSS_

Specify Screw Length

Ordering Suffix: CBSS

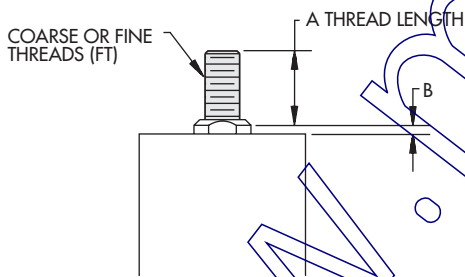
Material: Steel black oxide with case hardened pin and clips

Example: CBSS78 = 7/8" screw length

Bore	A	B	C	D	E	F	G	H	J	K	Screw Length	
											Standard	Optional
3/4	.69	.50	.28	.44	.25	.19	.19	.88	#10-24	.34	3/4	Up to 2" in 1/8" increments
1-1/8	.81	.63	.34	.56	.31	.25	.25	1.00	5/16-18	.34	3/4	
1-3/8	1.00	.75	.41	.69	.38	.31	.31	1.13	3/8-16	.34	3/4	
1-5/8												
2	1.25	1.00	.53	.81	.50	.38	.38	1.38	1/2-13	.47	1	
2-1/2												
3												
4												
5	2.31	2.00	.66	2.06	1.00	.75	1.00	3.00	5/8-18	.84	1-3/4	
FH5												
6												
8												



Male Stud



Bore	A		B
	MIN	MAX	
3/4	.38	2	.06
1-1/8	.63		.13
1-3/8	.75		.13
1-5/8			
2	1.00		.13
2-1/2			
3			
4			
5			
6			
8			

Coarse thread

MS

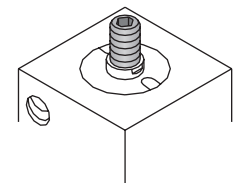
Fine thread

FTMS

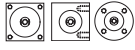
Ordering Suffix: MS or FTMS

Material: Steel black oxide
Length: Specify length

Double ended unit has stud in front end only.
If male stud is desired on both ends, specify **MSD** or **FTMSD**.
Male stud thread: Same pitch and diameter as female rod tap

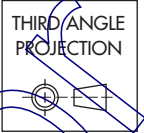
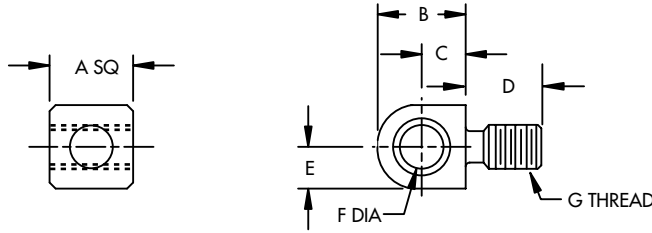


All dimensions are in inches unless otherwise noted.



3/4" - 8" Bore Options

Rod Eye



RE(S)

Ordering Suffix: RES - 3/4" bore only

Ordering Suffix: RE - 3/4" - 8" bore

Pressure Rating: 3/4" - 3" bore: thru 250 PSI

4" bore: thru 200 PSI

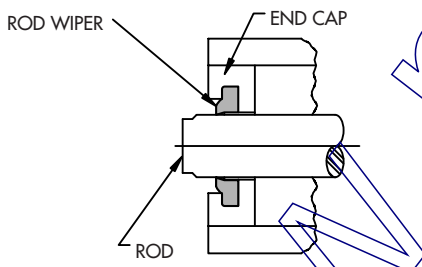
5" - 8" bore: thru 200 PSI

(pneumatic only)
Steel black oxide with sintered bronze bearing

Material:

Bore	A	B	C	D	E	F	G	
3/4	.38	.38	.19	.31	.19	.19	#10-24	RES - Short Head Design
	.38	.88	.69	.31	.19	.19	#10-24	RE - Standard Design
1-1/8	.50	.50	.25	.30	.25	.25	5/16-18	
1-3/8								
1-5/8	.63	.63	.31	.42	.31	.31	3/8-18	
2								
2-1/2	1.00	1.00	.50	.88	.50	.50	1/2-13	
3								
4	1.00	1.00	.50	.88	.50	.50	1/2-13	
5								
FH5								
6	1.50	2.50	1.75	.94	.75	.75	5/8-18	
8								

Rod Wiper



- Husky duty only
- Cylinder length does not increase
- Positioned below cylinder face

RW

Ordering Suffix: RW

Bore: 3/4" - 5"

Duty: Husky only

Temperature: 200°F Max.

Material: 3/4" bore: Buna

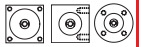
O-ring

1-1/8" - 5"

bore:

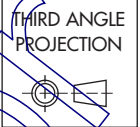
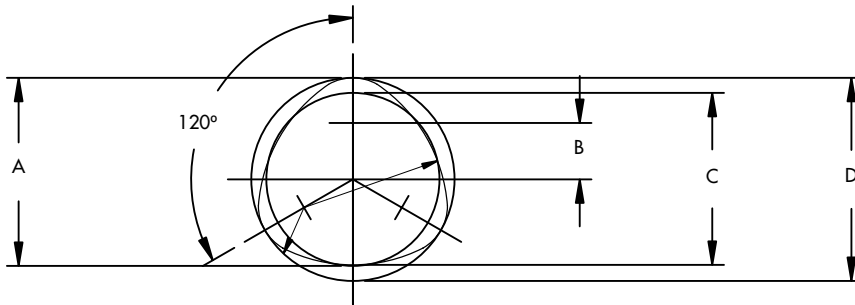
Urethane wiper

All dimensions are in inches unless otherwise noted.



3/4" - 8" Bore Options

Non-Rotating Option



NR

- Ordering Suffix:** NR
- Duty:** Husky recommended Under 1" recommended
- Stroke:** Under 1" recommended
- Service:** Pneumatic only
- Material:** 303 stainless steel rod, brass, or bronze bearing

- The non-rotating option requires air line lubrication to prevent bearing and rod wear.
- Female threads not shown for clarity
- Lobe orientation on the rod is random
- Double rod end model has polygon on front end only
- +/- 1° radial movement should be expected, do not torque the bearing

Ordering suffix should immediately follow stroke length.
Ex: ASFHD118X12NR-RF

Applications		
Example	YES	NO
Basic Orientation	✓	
Workholding Fixtures	✓	
Marking	✓	
Presses	✓	
Parts Ejectors	✓	
Elevators	✓	
Robotic End Effectors	✓	
Custom Escapements	✓	
Clamping	✓	
Long Strokes		X
Pivoting Applications		X
Side Loads		X
Torque Loads		X
Off Center Loads		X

Nominal Sizes (inches)				
Nominal Dia.	A	B	C	D
5/16	.31	.07	.29	.33
1/2	.50	.11	.47	.53
5/8	.63	.15	.59	.67
3/4	.75	.19	.70	.80
1	1.00	.30	.92	1.08
These dimensions are for drafting purposes only				

The unique three sided polygon rod often eliminates the need for external alignment devices.



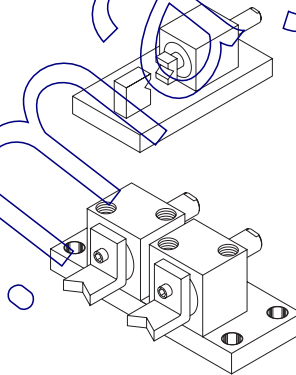
Basic Workholding Fixtures

- Double rod end will decrease deflection by 35%

Custom Escapements

- Double acting, independently controlled pneumatic escapements
- Square body design allows close center line positioning

NOTE: For load bearing applications see our Guided Cylinder product line



Fine Thread Rod Tap

Standard Course Thread	#10-24	5/16-18	3/8-16	1/2-13
Optional Fine Thread ("FT")	#10-32	5/16-24	3/8-24	1/2-20

NOTE: FT is standard on 5" full husky through 8" bore.

All dimensions are in inches unless otherwise noted.

FT

Ordering Suffix: FT

Modifications Welcome

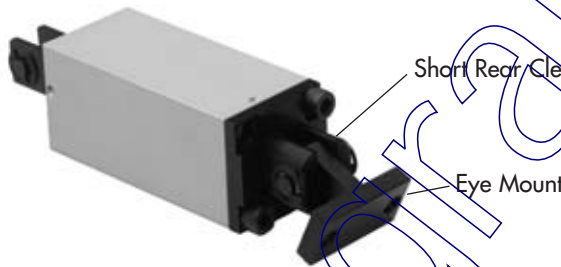
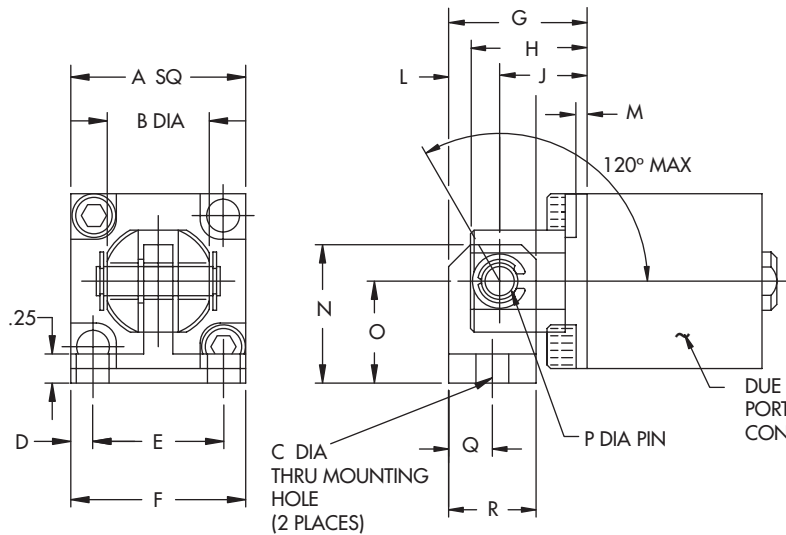
Special stroke lengths, port orientation, mounting configuration.



3/4" - 3" Bore Options

Short Rear Clevis with Eye Mount

NOTE: Mount can be rotated 90°



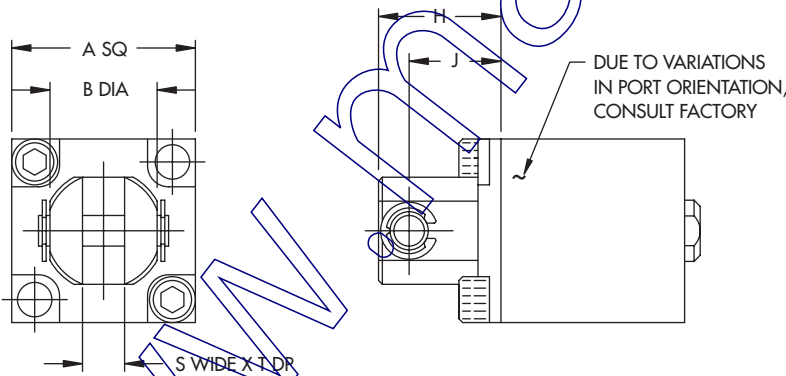
THIRD ANGLE PROJECTION

SRCE

- Ordering Suffix:** SRCE
- Bore:** 3/4" - 3"
- Style:** "S" only
- Rod:** Single only
- Service:** Pneumatic only
- Rating:** 3/4" - 2" bore: thru 250 PSI
2-1/2" - 3" bore: thru 100 PSI
- Pivot:** 120°
- Material:** Short Rear Clevis: See Below
Eye Mount: 3/4" bore: Aluminum black anodized with sintered bronze bearing
1-1/8" - 2-1/2" bore: Aluminum black anodized with steel bearing
3" bore: Steel black oxide with steel bearing

Short Rear Clevis

NOTE: Mount can be rotated 90°



SRC

- Ordering Suffix:** SRC
- Bore:** 3/4" - 3"
- Style:** "S" only
- Rod:** Single only
- Material:** Aluminum black anodized with sintered bronze bearings and case hardened pin and clips

Bore	A	B	C	D	E	F	G	H	J	L	M	N	O	P	Q	R	S	T
3/4	1.25	.89	.28	.19	.88	1.25	1.19	.83	.69	.50	.19	1.00	.75	.19	.38	.75	.28	.56
1-1/8	1.50	.88	.28	.19	1.13	1.50	1.19	1.00	.75	.44	.19	1.19	.88	.25	.38	.75	.34	.69
1-3/8	1.75	1.25	.28	.25	1.50	2.00	1.44	1.19	.81	.63	.19	2.00	1.63	.31	.50	1.00	.41	.88
1-5/8	2.00	1.25	.28	.25	1.50	2.00	1.44	1.19	.81	.63	.19	2.00	1.63	.31	.50	1.00	.41	.88
2	2.50	1.25	.34	.25	1.50	2.00	1.88	1.38	1.00	.88	.31	2.00	1.63	.31	.63	1.25	.41	.94
2-1/2	3.00	2.00	.41	.31	1.38	2.00	2.00	1.56	1.13	.88	.31	2.00	1.63	.38	.63	1.25	.53	1.13
3	3.50	2.00	.41	.31	1.38	2.00	2.25	1.56	1.13	1.13	.31	2.25	1.88	.38	.75	1.50	.53	1.13

All dimensions are in inches unless otherwise noted.

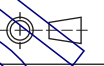
3/4" - 3" Bore Options

Style "S"



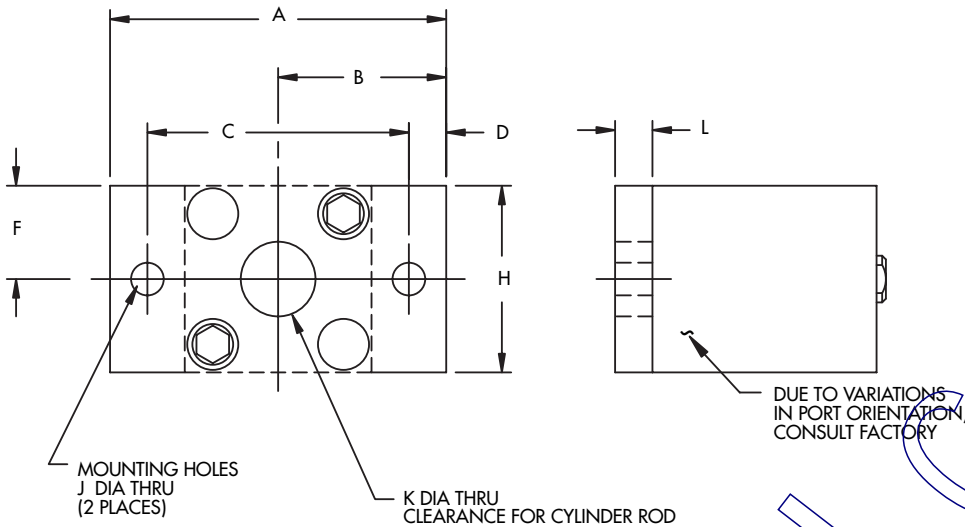
End Mount

THIRD ANGLE PROJECTION



Flange Mount (Shown as Rear Flange)

3/4" - 1-5/8" Bore



Front Flange

FF

or

Rear Flange

RF

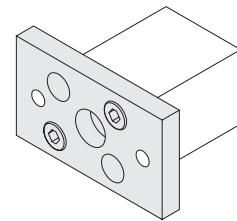
Ordering Suffix: FF or RF

Bore: 3/4" - 3"

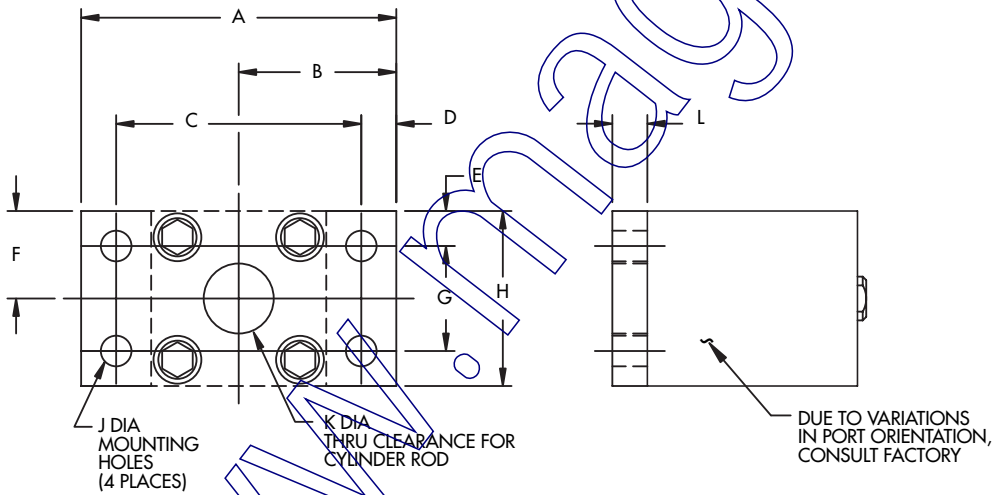
Style: "S" only

Rotation: 90°

Material: Aluminum black anodized



2" - 3" Bore



- FF/RF can be rotated 90°

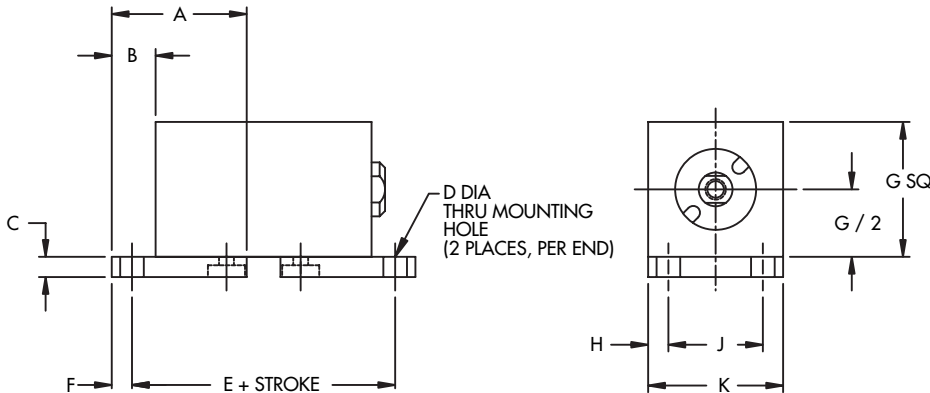
Bore	A	B	C	D	E	F	G	H	J	K	L
3/4	2.25	1.13	1.75	.25	-	.63	-	1.25	.22	.50	.25
1-1/8	2.50	1.25	2.00	.25	-	.75	-	1.50	.22	.75	.25
1-3/8	2.75	1.38	2.25	.25	-	.88	-	1.75	.22	.88	.25
1-5/8	3.00	1.50	2.50	.25	-	1.00	-	2.00	.22	1.13	.25
2	3.50	1.75	3.00	.25	.25	1.25	2.00	2.50	.28	1.38	.38
2-1/2	4.13	2.06	3.50	.31	.31	1.50	2.38	3.00	.34	1.63	.38
3	4.63	2.31	4.00	.31	.31	1.75	2.88	3.50	.34	2.13	.38

All dimensions are in inches unless otherwise noted.



3/4" - 3" Bore Options

End Bracket



THIRD ANGLE PROJECTION

EB

Ordering Suffix: EB
Bore: 3/4" - 3"
Style: "B" only
Material: Aluminum black anodized

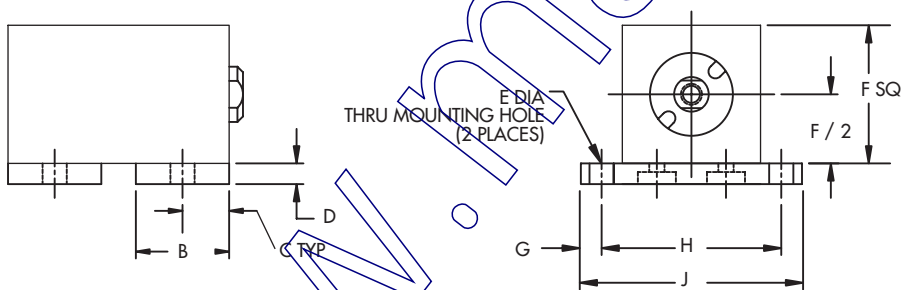
Number of brackets required:

- Two mounting holes = 1 bracket
- Four mounting holes = 2 brackets

Bore	A	B	C	D	E	F	G	H	J	K
3/4	1.13	.38	.19	.22	SEE NOTE BELOW	.19	1.25	.19	.88	1.25
1-1/8	1.13	.38	.19	.22		.19	1.50	.19	1.13	1.50
1-3/8	1.50	.50	.25	.28		.25	1.75	.25	1.25	1.75
1-5/8	1.50	.50	.25	.28		.25	2.00	.25	1.50	2.00
2	1.50	.50	.31	.34		.25	2.50	.25	2.00	2.50
2-1/2	1.50	.50	.31	.34		.25	3.00	.25	2.50	3.00
3	2.00	.63	.38	.41		.31	3.50	.31	2.88	3.50

NOTE: Please consult factory. Body lengths differ depending on duty type, magnetic option, etc.; therefore, this dimension will vary with each cylinder.

Side Bracket



SB

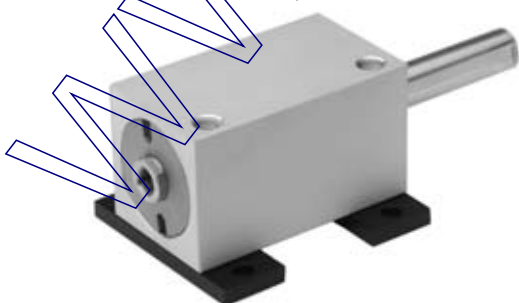
Ordering Suffix: SB
Bore: 3/4" - 3"
Style: "B" only
Material: Aluminum black anodized

Number of brackets required:

- Two mounting holes = 1 bracket
- Four mounting holes = 2 brackets

Bore	B	C	D	E	F	G	H	J
3/4	.75	.38	.19	.22	1.25	.19	1.88	2.25
1-1/8	.75	.38	.19	.22	1.50	.25	2.00	2.50
1-3/8	1.00	.50	.25	.28	1.75	.25	2.25	2.75
1-5/8	1.00	.50	.25	.28	2.00	.25	2.50	3.00
2	1.00	.50	.31	.34	2.50	.25	3.00	3.50
2-1/2	1.00	.50	.31	.34	3.00	.25	3.50	4.00
3	1.25	.63	.38	.41	3.50	.31	4.13	4.75

All dimensions are in inches unless otherwise noted.



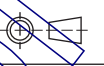
3/4" - 8" Bore Options

Style "R"



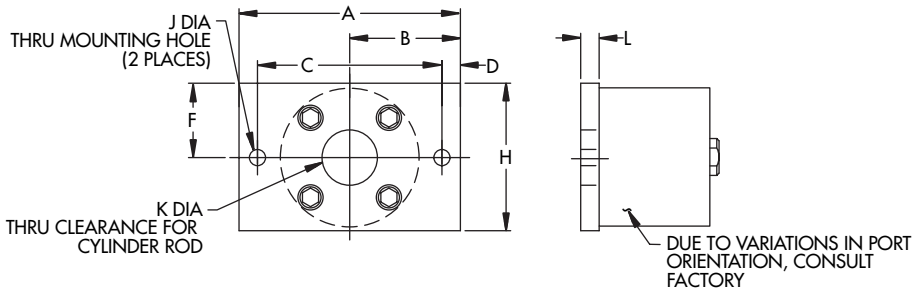
End Mount

THIRD ANGLE PROJECTION



Flange Mount (Shown as Rear Flange)

3/4" - 1-1/8" Bore



Front Flange

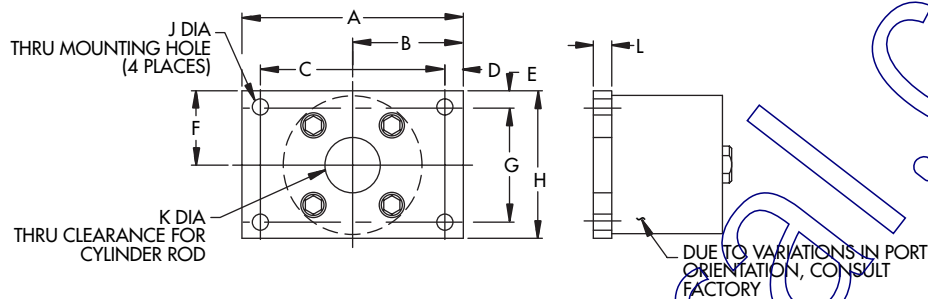
FF

or

Rear Flange

RF

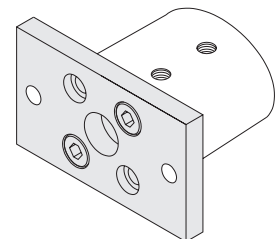
1-3/8" - 4" Bore



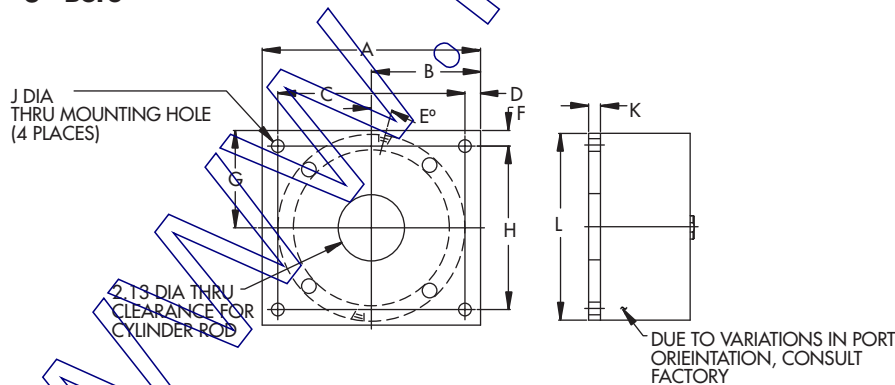
Ordering Suffix: FF or RF
Style: "R" only
Material: 3/4" - 5" bore: Aluminum black anodized
 6" & 8" bore: Steel black oxide

- 3/4" - 6" Flange can be rotated 90°

Bore	A	B	C	D	E	F	G	H	J	K	L
3/4	2.50	1.25	2.00	.25	-	.75	-	1.50	.22	.50	.25
1-1/8	3.00	1.50	2.50	.25	-	1.00	-	2.00	.22	.75	.25
1-3/8	2.38	1.19	1.94	.22	.22	1.00	1.56	2.00	.22	.88	.25
1-5/8	2.50	1.25	2.00	.25	.25	1.25	2.00	2.50	.22	1.13	.25
2	3.00	1.50	2.50	.25	.25	1.50	2.50	3.00	.28	1.38	.38
2-1/2	3.50	1.75	2.88	.31	.31	1.75	2.88	3.50	.28	1.63	.38
3	4.00	2.00	3.38	.31	.31	2.00	3.38	4.00	.34	2.13	.38
4	5.00	2.50	4.25	.38	.38	2.50	4.25	5.00	.34	2.13	.50



5" - 8" Bore



- 8" Flange can be rotated 60°

Bore	A	B	C	D	E°	F	G	H	J	K	L
5	7.00	3.50	6.00	.50	0°	.50	3.00	5.00	.41	.38	6.00
6	7.00	3.50	6.00	.50	8°	.50	3.00	5.00	.41	.38	6.00
8	9.50	4.75	8.00	.75	15°	.75	4.00	6.50	.53	.50	8.00

All dimensions are in inches unless otherwise noted.

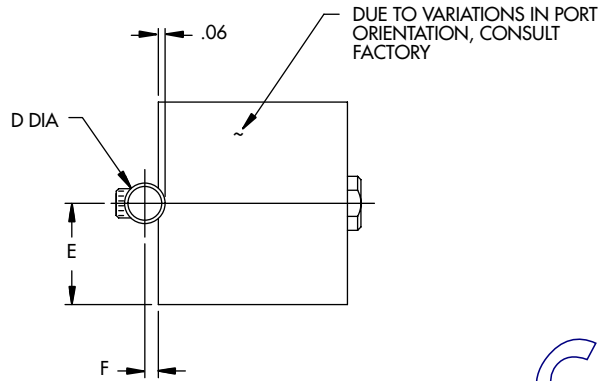
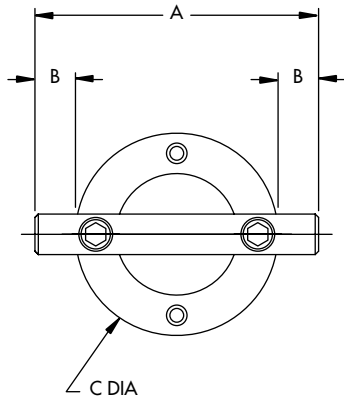
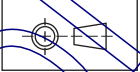


3/4" - 8" Bore Options

Pivot Shaft

3/4" - 4" Bore

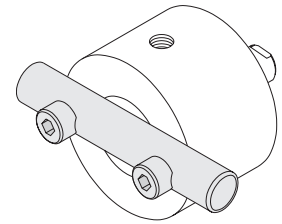
THIRD ANGLE PROJECTION



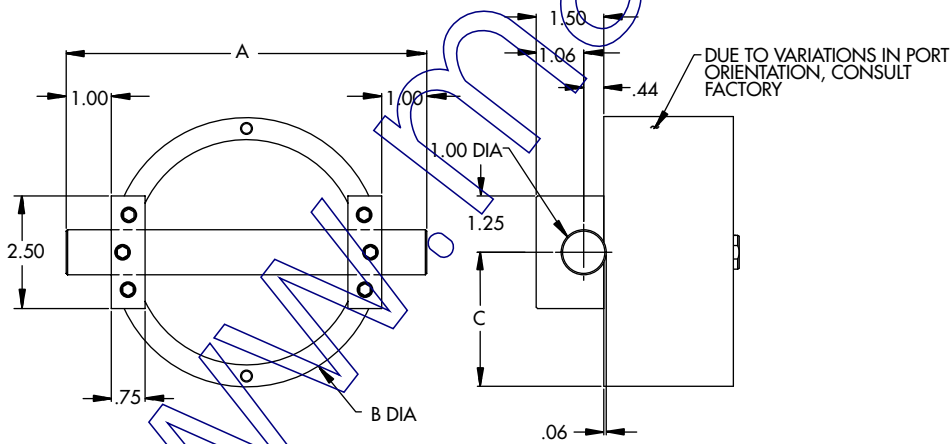
PS

Ordering Suffix: PS
Rod: Single only
Style: "R" only
Material: Steel black oxide shaft. 5" - 8" bore with aluminum mounting bracket.

Bore	A	B	C	D	E	F
3/4	2.25	.34	1.50	.38	.75	.13
1-1/8	2.63	.34	1.88	.38	.94	.13
1-3/8	2.88	.34	2.13	.38	1.06	.13
1-5/8	3.13	.34	2.38	.38	1.19	.13
2	4.25	.59	3.00	.50	1.50	.19
2-1/2	4.75	.59	3.50	.50	1.75	.19
3	5.25	.59	4.00	.63	2.00	.25
4	6.25	.59	5.00	.63	2.50	.25



5" - 8" Bore



Bore	A	B	C
5	8.00	6.00	3.00
6	9.00	7.00	3.50
8	11.00	9.00	4.50

All dimensions are in inches unless otherwise noted.

3/4" - 8" Bore Options

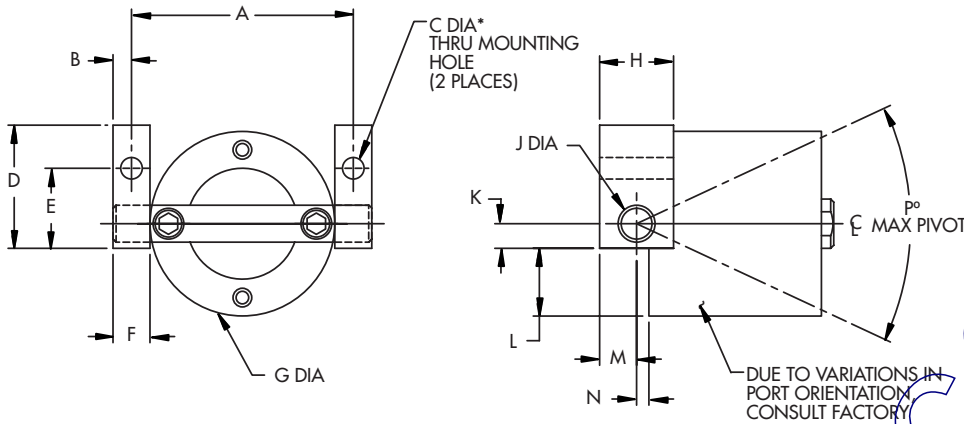
Style "R"



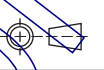
End Mount

Short Pivot Mount

3/4" - 4" Bore

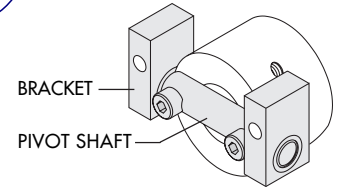


THIRD ANGLE PROJECTION



SP

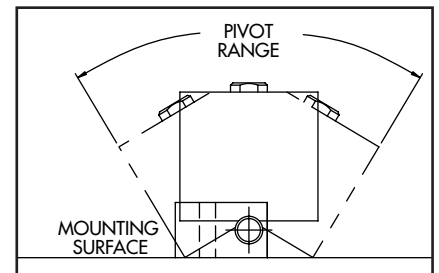
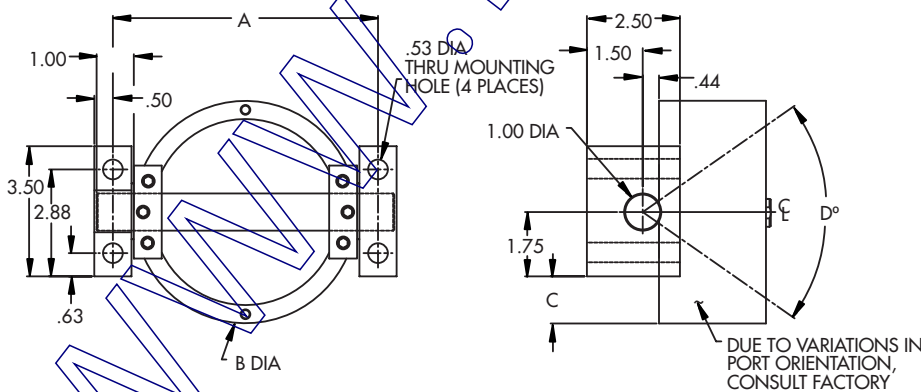
Ordering Suffix: SP
Rod: Single only
Style: "R" only
Pivot: See table below
Material: Steel black oxide pivot shaft, aluminum black anodized bracket with sintered bronze bearings



*4" bore = 4 mounting holes. Consult factory for mounting hole locations.

Bore	A	B	C	D	E	F	G	H	J	K	L	M	N	P°
3/4	1.88	.19	.22	1.25	.81	.38	1.50	.75	.38	.38	.75	.38	.13	75°
1-1/8	2.25	.19	.22	1.25	.81	.38	1.88	.75	.38	.38	.56	.38	.13	60°
1-3/8	2.50	.19	.22	1.25	.81	.38	2.13	.75	.38	.38	.69	.38	.13	55°
1-5/8	2.75	.19	.22	1.25	.81	.38	2.38	.75	.38	.38	.81	.38	.13	50°
2	3.63	.31	.41	2.00	1.19	.63	3.00	1.25	.50	.50	1.00	.63	.19	60°
2-1/2	4.13	.31	.41	2.00	1.19	.63	3.50	1.25	.50	.50	1.25	.63	.19	50°
3	4.63	.31	.41	2.50	1.63	.63	4.00	1.50	.63	.75	1.25	.75	.25	45°
4	5.75	.38	.41	3.50	2.13	.75	5.00	1.50	.63	1.13	1.38	.88	.25	35°

5" - 8" Bore



Bore	A	B	C	D°
5	7.25	6.00	1.25	55°
6	8.25	7.00	1.75	45°
8	10.25	9.00	2.75	35°

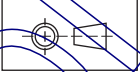
All dimensions are in inches unless otherwise noted.



3/4" - 4" Bore Options

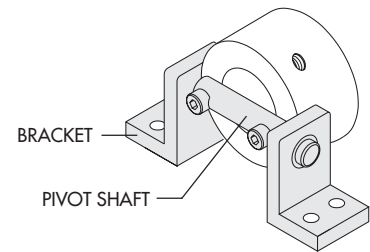
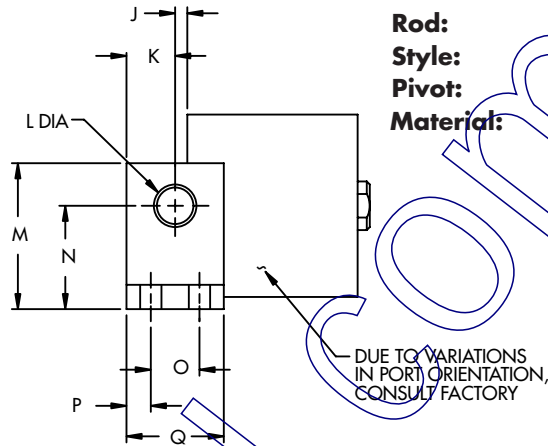
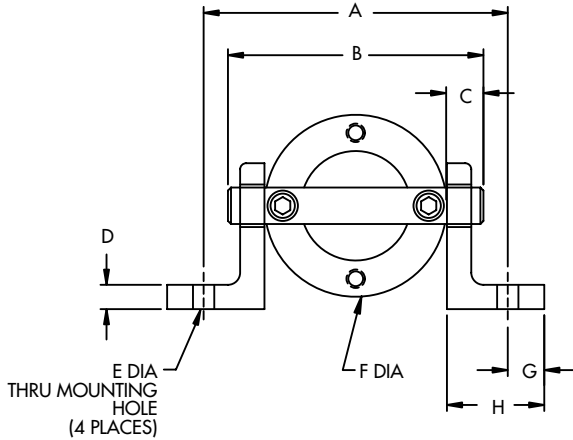
Long Pivot Mount

THIRD ANGLE PROJECTION



LP

Ordering Suffix: LP
Bore: 3/4" - 4"
Rod: Single only
Style: "R" only
Pivot: 180°
Material: Steel black oxide pivot shaft with aluminum black anodized brackets and sintered bronze bearings



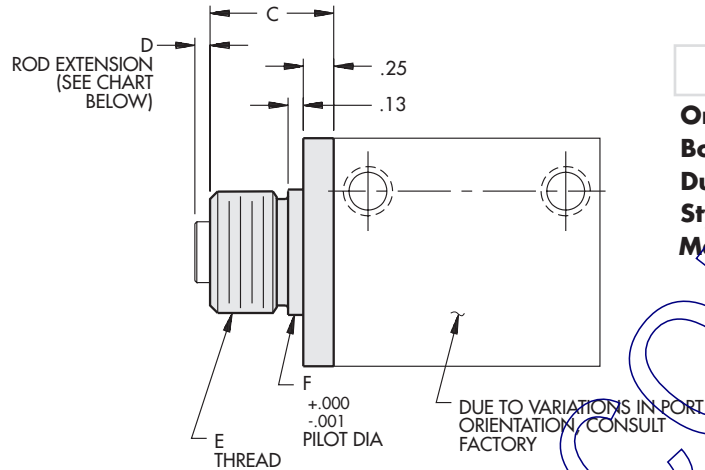
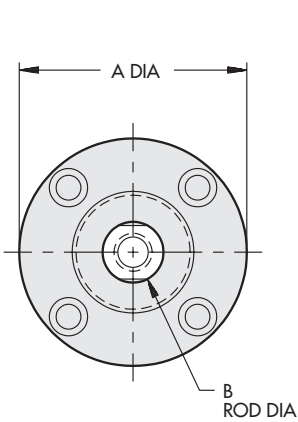
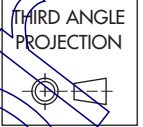
Bore	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q
3/4	2.75	2.25	.34	.25	.22	1.50	.38	1.00	.13	.50	.38	1.50	1.06	.50	.25	1.00
1-1/8	3.13	2.63	.34	.25	.22	1.88	.38	1.00	.13	.50	.38	1.50	1.06	.50	.25	1.00
1-3/8	3.38	2.88	.34	.25	.22	2.13	.38	1.00	.13	.50	.38	2.00	1.25	.50	.25	1.00
1-5/8	4.38	3.13	.34	.38	.28	2.38	.50	1.50	.13	.50	.38	2.50	1.63	.50	.25	1.00
2	5.00	4.25	.59	.38	.28	3.00	.50	1.50	.19	.50	.50	2.50	1.63	.50	.25	1.00
2-1/2	5.25	4.75	.59	.38	.34	3.50	.50	1.38	.19	.75	.50	3.00	2.13	.75	.38	1.50
3	5.75	5.25	.59	.38	.34	4.00	.50	1.38	.25	.75	.63	3.00	2.13	.75	.38	1.50
4	7.25	6.25	.59	.50	.41	5.00	.63	1.75	.25	1.00	.63	3.50	2.63	1.00	.50	2.00

All dimensions are in inches unless otherwise noted.



3/4" - 5" Bore Options

Nose Mount



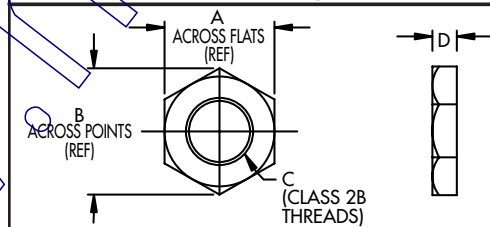
NM

Ordering Suffix: NM
Bore: 3/4" - 5"
Duty: Standard only
Style: "R" only
Material: 3/4" bore: Brass
 1-1/8" - 5" bore: Aluminum black anodized with sintered bronze bearing



Bore	A	B	C	D	E	F
3/4	1.50	.31	1.00	See Rod Extension Chart Below	3/4-16 x 5/8	.750
1-1/8	1.88	.50	1.00		1-14 x 5/8	.999
1-3/8	2.13	.63	1.00		1-1/4-12 x 5/8	1.249
1-5/8	2.38	.63	1.00		1-1/4-12 x 5/8	1.249
2	3.00	.63	1.00		1-1/4-12 x 5/8	1.249
2-1/2	3.50	.75	1.50		1-1/2-12 x 1-1/8	1.499
3	4.00	.75	1.50		1-1/2-12 x 1-1/8	1.499
4	5.00	.75	1.50		2-12 x 1-1/8	1.999
5	6.00	.75	1.50		2-12 x 1-1/8	1.999

Optional Jam Nut (order separately)



Part No.	A	B	C	D
34NT	1.13	1.27	3/4-16	.19
1NT	1.50	1.69	1-14	.19
114NT	1.88	2.11	1-1/4-12	.25
112NT	2.25	2.53	1-1/2-12	.25
2NT	3.00	3.39	2-12	.25

"D" - Rod Extension Chart

Bore	Piston Type	Stroke														
		1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2	1-5/8	1-3/4	1-7/8 & up
3/4" thru 2"	Non-magnetic	STD+.13	STD	STD+.13	STD	STD+.13	STD	STD+.25	STD	STD	STD+.25	STD	STD	STD	STD+.25	STD
	STD+.25															
2-1/2" thru 5"	Non-magnetic	STD+.13	STD	STD+.13	STD+.25	STD	STD+.13	STD+.25	STD	STD	STD+.25	STD	STD	STD	STD+.25	STD
	STD+.25															

Chart STD = .06 on 3/4" bore
 = .13 on 1-1/8" bore and longer

All dimensions are in inches unless otherwise noted.

Sensors

Standard Limit Sensors

- Low Cost and Compact® size
- Dual LED indicators for power and signal
- Circuit protection for surge and polarity
- High-flex robotic grade cable with 4,8mm (3/16") bend radius. 105 strand primaries.
- CE compliant / IP67 and NEMA 6P rated
- 100% solid state device for maximum life
- 3 cord options

(Shown with Quick Disconnect Option)



3 Prong Plug

#WSKLP, #WSCLP, #WSKLP3, #WSCLP3

Part No.		Sensor Type (Wiring diagrams and definitions on page 88)	Cord Types		
			Quick Disconnect	1 Meter	3 Meter
Sinking	WSKL	NPN			
	WSKLP		✓*		
	WSKL-3				✓
	WSKLP3		✓*		
Sourcing	WSCL	PNP		✓	
	WSCLP		✓*		
	WSCL-3				✓
	WSCLP3		✓*		

*Mating 3 socket receptacle available, part # R3
"3" denotes 3 meter cable

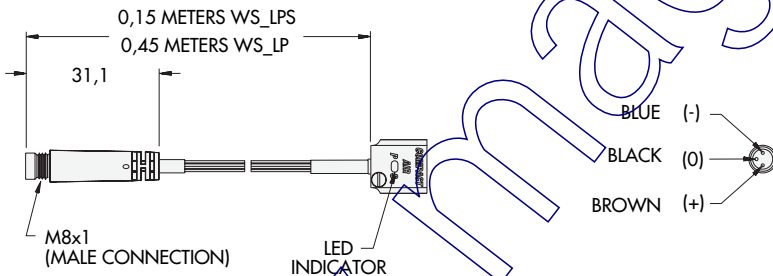
WS_LP

WS_LPS

Optional Quick Disconnect Sensor Cable with threaded, sealed connectors

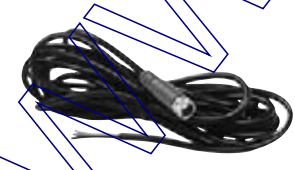
Part Number - Specify K or C

Plug - 3 Prong



3 Socket Mating Cable

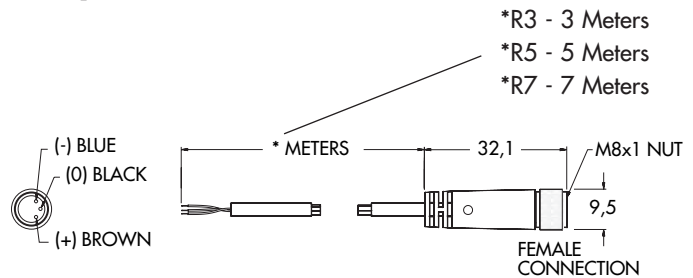
For use with:
#WSKLP, #WSCLP, #WSKLP3, #WSCLP3,



Part Number
R3
R5
R7

Sold Separately

Receptacle - 3 Socket



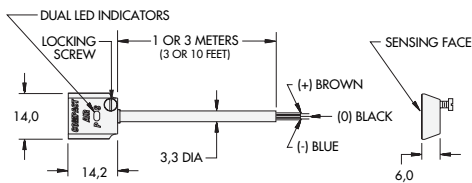
Comtronic® Sensors Dimensional Information

Must specify 'K' (sinking) or 'C' (sourcing) when ordering

Part Number - Specify K or C

WS_L WS_L-3

"3" denotes 3 meter cable



Part No. WSKL-3 - Sinking output with 3 meter cable.

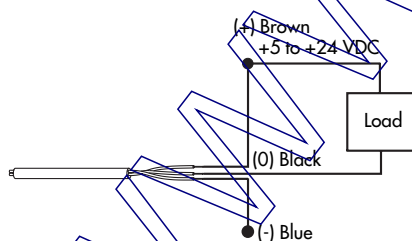


Specifications		
Parameters	Comtronic® Standard Limit Sensors	
	NPN (sinking)	PNP (sourcing)
Part Number	WSKL, WSKL-3, WSKLP, WSKLPS	WSCL, WSCL-3, WSCLP, WSCLPS
Operating Voltage	5-24 VDC	
Current Consumption		
On	16mA (at 24V)	14mA (at 24V)
Off	7mA (at 24V)	7mA (at 24V)
Switching Current	100mA Max	
Voltage Drop	1.5 V Max @ 100mA	
Operating Frequency	1 KHz Max	
Switch Logic	Sinking, Normally Open	Sourcing, Normally Open
LED Function		
Green	Power On	
Red	Switch Active (Magnet Present)	
Operating Temperature	0°C to 70°C	
Circuit Protection	Reverse Polarity / Surge Absorber	
Environmental Certifications	IEC standard IP67, NEMA 6P	
Wire Type	High flex, 24 AWG / 105 strand primary	
Housing Material	Zinc diecast	
Housing Color Code	Black	Silver
Shock Resistance	30G Max	
Vibration Strength	9G Max	

Wiring Diagrams and Definitions

For units with flying leads

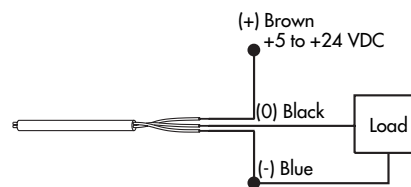
NPN Output Sinking (K)



- Ideal for complex controls utilizing multiple power supplies.

A "sinking" output sensor complete a circuit by connecting the load to ground. Sinking output sensors in a sequence can have different supply voltages. The ground is their common factor.

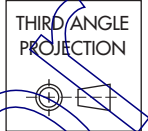
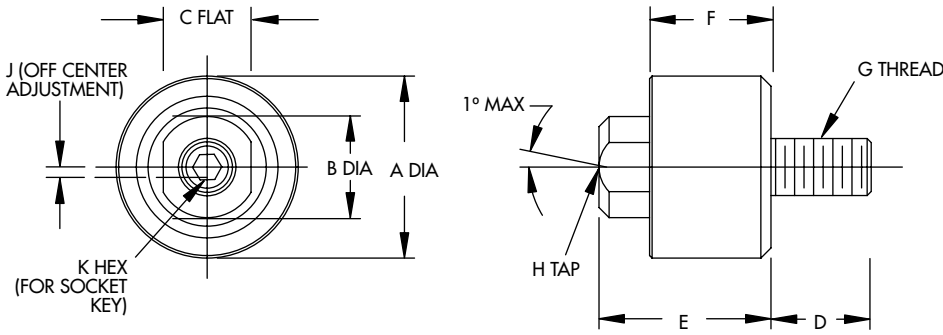
PNP Output Sourcing (C)



- Ideal for single power supply applications.

A "sourcing" output sensor completes a circuit by connecting the load to the supply current. All sourcing output sensors must have the same supply voltage.

Rod End Alignment Coupler Inch Sizes



Material: Hardened steel
Finish: Black Oxide Finish
Maximum Temperature Rating: 200°F (93.3°C)

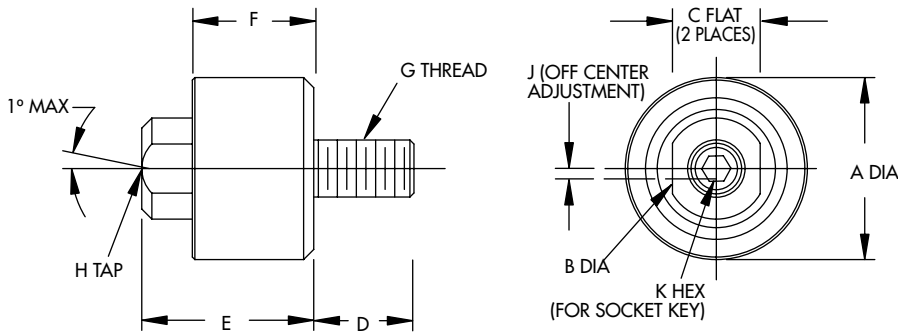
NOTE: Do not use alignment couplers on pivoting applications.

Sold separately - Not attached to the cylinder.

All dimensions are in inches.

Applicable Compact Air Cylinders	Screw Size	Part Number	Male Thread	Female Thread	A	B	C	D	E	F	G Male Thread	H Female Thread x Depth	J	K	Unit Weight (oz.)	Axial Load Ratings (lbs.)									
1/2"	# 8	ACCC8	Coarse		9/16	1/4	7/32	5/16	7/16	11/32	# 8-32	#8-32 x 1/4	1/64	5/64	0.4	180									
3/4"	#10	ACCC10	Coarse		9/16	5/16	1/4	11/32	9/16	13/32	# 10-24	#10-24 x 5/16	1/64	3/32	0.5	180									
		ACCF10	Coarse	Fine							# 10-24	#10-32 x 5/16													
		ACFF10	Fine								# 10-32	#10-32 x 5/16													
		ACFC10	Fine	Coarse							# 10-32	#10-24 x 5/16													
-	1/4"	ACCC14	Coarse		15/16	1/2	7/16	13/32	13/16	9/16	# 1/4-20	1/4-20 x 1/2	1/32	1/8	1.6	450									
		ACCF14	Coarse	Fine							# 1/4-20	1/4-28 x 1/2													
1-1/8"	5/16"	ACCC516	Coarse		15/16	1/2	7/16	11/16	13/16	9/16	# 5/16-18	5/16-18 x 5/8	1/64	5/32	1.6	580									
		ACCF516	Coarse	Fine							# 5/16-18	5/16-24 x 5/8													
		ACFF516	Fine								# 5/16-24	5/16-24 x 5/8													
		ACFC516	Fine	Coarse							# 5/16-24	5/16-18 x 5/8													
1-1/8"	5/16"	ACCC516L	Coarse		1-1/8	5/8	9/16	9/16	1-1/32	3/4	# 5/16-18	5/16-18 x 5/8	1/32	5/32	3.2	580									
		ACCF516L	Coarse	Fine							# 5/16-18	5/16-24 x 5/8													
		ACFF516L	Fine								# 5/16-24	5/16-24 x 5/8													
		ACFC516L	Fine	Coarse							# 5/16-24	5/16-18 x 5/8													
1-3/8" 1-5/8" 2.0"	3/8"	ACCC38	Coarse		1-1/8	5/8	9/16	19/32	1-1/32	3/4	# 3/8-16	3/8-16 x 5/8	1/32	3/16	3.2	830									
		ACCF38	Coarse	Fine							# 3/8-16	3/8-24 x 5/8													
		ACFF38	Fine								# 3/8-24	3/8-24 x 5/8													
		ACFC38	Fine	Coarse							# 3/8-24	3/8-16 x 5/8													
2-1/2" 3.0" 4.0" 5.0"	7/16"	ACCF716	Coarse	Fine	1-9/16	3/4	11/16	3/4	1-3/8	1-1/8	1/2-13	7/16-20 x 13/16	1/16	1/4	8.8	1690									
		ACFF716	Fine								1/2-20	7/16-20 x 13/16													
	ACCC12	Coarse		1-9/16							3/4	11/16					3/4	1-3/8	1-1/8	1/2-13	1/2-13 x 13/16	1/16	1/4	8.8	1690
	ACCF12	Coarse	Fine																	1/2-13	1/2-20 x 13/16				
	ACFF12	Fine																		1/2-20	1/2-20 x 13/16				
	ACFC12	Fine	Coarse																	1/2-20	1/2-13 x 13/16				
6.0" 8.0"	5/8"	ACCC58	Coarse		2-1/4	1.0	15/16	15/16	1-3/4	1-1/2	# 5/8-11	5/8-11 x 1.0	1/16	5/16	24.0	3220									
		ACCF58	Coarse	Fine							# 5/8-11	5/8-18 x 1.0													
		ACFF58	Fine								# 5/8-18	5/8-18 x 1.0													
		ACFC58	Fine	Coarse							# 5/8-18	5/8-11 x 1.0													

Rod End Alignment Coupler Combination Sizes



FIRST ANGLE PROJECTION

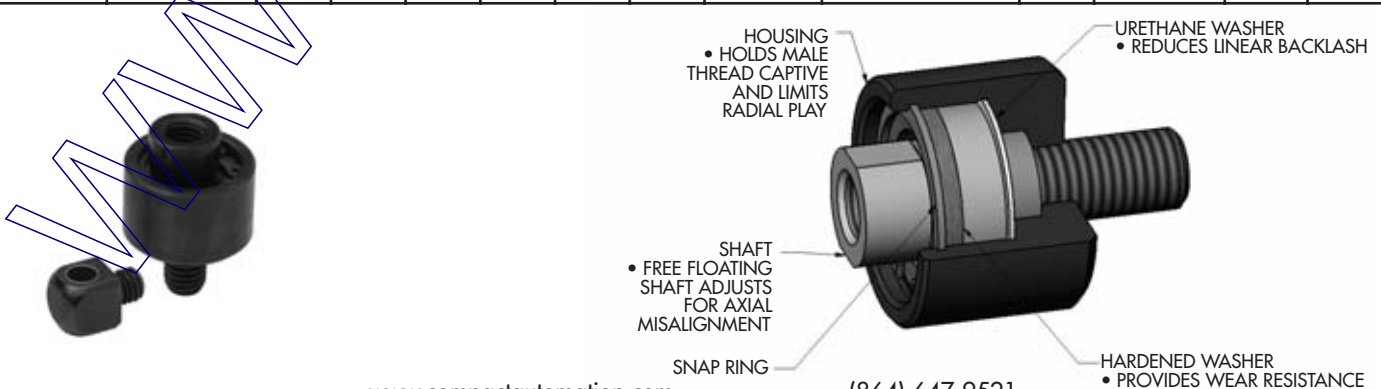
Material: Hardened steel
Finish: Black Oxide Finish
Maximum Temperature Rating: 200°F (93.3°C)

NOTE: Do not use alignment couplers on pivoting applications.

Sold separately - Not attached to the cylinder.

All dimensions are in millimeters except where noted.

Applicable Compact Air Cylinder	Part Number	A	B	C	D	E	F	G Male Thread	H Female Thread X Depth	J	K mm (Inch)	Unit Weight (Grams)	Axial Load Rating (N)
1/2" & 10mm	WACC8-M4	14,3	6,1	5,0	8,0	11,2	8,7	#8-32	M4x0,7 x 6	0,4	1,98 (5/64)	11,4	815
10mm	WACM4-C8	14,0	6,35	5,6	6,0	12,5	10,0	M4x0,7	#8-32 x 1/4		2,5 (.098)		
3/4"	WACC10-M5	14,3	7,6	7,0	8,7	14,5	10,3	#10-24	M5x0,8 x 8	0,4	2,38 (3/32)	14,2	815
	WACF10-M5							#10-32					
20mm 25mm	WACM5-C10	14,0	7,9	6,35	8,0	15,2	11,0	M5x0,8	#10-24 x 5/16	0,4	3,0 (.118)		
	WACM5-F10								#10-32 x 5/16				
-	WACC14-M6	23,8	12,4	10,0	10,3	20,8	14,3	1/4-20	M6x1 x 13	0,8	3,18 (1/8)	45,4	2045
	WACM6-C14	24,0	12,7	11,1	9,7	21,5	15,0	M6x1	1/4-20 x 1/2				
	WACM6-F14								1/4-28 x 1/2				
1-1/8"	WACC516-M8	23,8	12,4	10,0	17,5	20,8	14,3	5/16-18	M8x1,25 x 13	0,4	3,97 (5/32)	45,4	2580
	WACF516-M8							5/16-24					
-	WACM8-C516	24,0	12,7	11,1	11,7	22,5	16,0	M8x1,25	5/16-18 x 5/8	0,4	5,0 (.197)		
	WACM8-F516								5/16-24 x 5/8				
1-3/8 1-5/8 2.0"	WACC38-M10	28,6	15,6	13,0	15,1	26,3	19,1	3/8-16	M10x1,5 x 15	0,8	4,76 (3/16)	90,7	3700
	WACF38-M10							3/8-24					
-	WACM10-C38	28,0	15,9	14,3	16	26,5	20,0	M10x1,5	3/8-16 x 5/8	0,8	7,0 (.276)		
	WACM10-F38								3/8-24 x 5/8				
2-1/2 3.0 4.0 5.0"	WACM12-F716	39,0	19,1	17,5	17,9	36,5	30,0	M12x1,75	7/16-20 x 13/16	1,6	8,0 (.315)	250,0	7540
	WACC12-M12	39,7	18,8	16,0	19,1	35,1	28,6	1/2-13	M12x1,75 x 19				
	WACF12-M12							1/2-20					
	WACM12-C12	39,0	19,1	17,5	17,9	36,5	30,0	M12x1,75	1/2-13 x 13/16				
	WACM12-F12								1/2-20 x 13/16				



Flow Controls

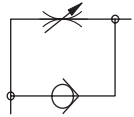
Unique Inch to Metric Combinations

- Inch Sizes: #10-32, 1/8NPTF, 1/4NPTF
- Metric Sizes: M5, G1/8, G1/4
- #10-32 valves available with a space saving integral barb for 1/8" I.D. tubing.

- Meter Out style valves can be factory installed to your Compact Automation cylinders, guided cylinders, gripper, etc... at no extra charge. See Factory Installed below.

3 Flow Paths

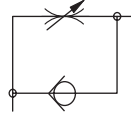
Style "MO" Meter Out



- Metered Output
- Free Flow Input



Style "MI" Meter In



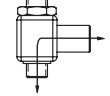
- Metered Input
- Free Flow Output



Style "NV" Needle Valve Meter Both Ways



- Metered Input
- Metered Output



Precision Control

- A unique needle design minimizes turbulence and improves flow control ability.
- A super fine pitch needle thread provides the finest adjustment available.
- Captive needle cannot be adjusted out of the housing.

Sizes	Needle Pitch	Number of Turns
# 10-32	80 TPI	6
M5 x .8	.32mm	
1/8NPTF	60 TPI	8
G1/8	.42mm	
1/4NPTF	56 TPI	8
G1/4	.45mm	

Model Numbers*

Port Thread	"MO" Color Code: Black			"MI" Color Code: Red			"NV" Color Code: Silver		
	Model #	Male Thread	Female Thread	Model #	Male Thread	Female Thread	Model #	Male Thread	Female Thread
# 10-32 M5	MO10	# 10-32	# 10-32	MI10	# 10-32	# 10-32	NV10	# 10-32	# 10-32
	MO5	M5	M5	MI5	M5	M5	NV5	M5	M5
	MO10-5	# 10-32	M5	MI10-5	# 10-32	M5	NV10-5	# 10-32	M5
	MO10B	M5	# 10-32	MI5-10	M5	# 10-32	NV5-10	M5	# 10-32
	MO10B	# 10-32	1/8" barb	MI10B	# 10-32	1/8" barb	NV10B	# 10-32	1/8" barb
1/8-27NPTF G1/8	MO5B	M5	1/8" barb	MI5B	M5	1/8" barb	NV5B	M5	1/8" barb
	MO18	1/8NPTF	1/8NPTF	MI18	1/8NPTF	1/8NPTF	NV18	1/8NPTF	1/8NPTF
	MOG18	G1/8	G1/8	MIG18	G1/8	G1/8	NVG18	G1/8	G1/8
	MO18-G18	1/8NPTF	G1/8	MI18-G18	1/8NPTF	G1/8	NV18-G18	1/8NPTF	G1/8
1/4-18NPTF G1/4	MOG18-18	G1/8	1/8NPTF	MIG18-18	G1/8	1/8NPTF	NVG18-18	G1/8	1/8NPTF
	MO14	1/4NPTF	1/4NPTF	MI14	1/4NPTF	1/4NPTF	NV14	1/4NPTF	1/4NPTF
	MOG14	G1/4	G1/4	MIG14	G1/4	G1/4	NVG14	G1/4	G1/4
	MO14-G14	1/4NPTF	G1/4	MI14-G14	1/4NPTF	G1/4	NV14-G14	1/4NPTF	G1/4
	MOG14-14	G1/4	1/4NPTF	MIG14-14	G1/4	1/4NPTF	NVG14-14	G1/4	1/4NPTF

NPTF = National Pipe Thread Dry Seal (1/8NPTF and 1/4 NPTF)

"G" = BSPP British Standard Pipe Parallel (G1/8 and G1/4)

1/8" Barb is for 1/8" ID polyurethane or vinyl tubing

* = All model numbers are available with the Knob Option, add suffix "K" to the end of the part number.

Factory Installed

Compact Automation Products will factory install any "MO" model flow control at no charge.

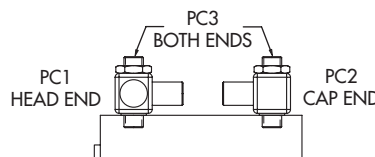
How to Order:

- 1.) Verify "MO" model number required from the chart above.
- 2.) Choose factory installation: "PC1" Head end only, "PC2" Cap end only, "PC 3" Head and cap end
- 3.) Remove "MO" from model number and add "PC" option to the end

Factory Installed part number example: G18-18PC3
Flow control required: MOG18-18
Install at: head and cap end PC3
(Remove MO add PC3 to end)

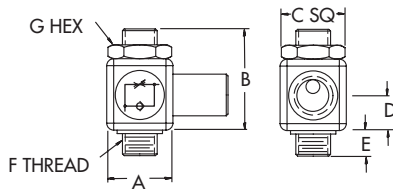
Specify our unique Inch to Metric or Metric to Inch combination flow controls factory installed to convert cylinder ports.

For example, metric cylinder part number WS25x25 - G18-18PC3 would place two metered output flow controls on the cylinder and allow for the use of 1/8-27 NPTF fittings.



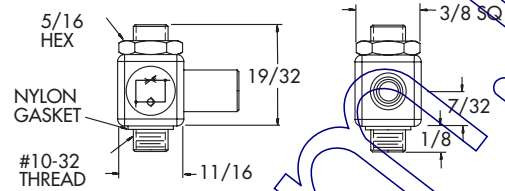
Dimension Information Minimum body length for two port controls - 7/8"

Inch Version



Barb Fitting for #10-32 or M5 only

#10-32 or M5 Male to Barb for 1/8" I.D. tubing

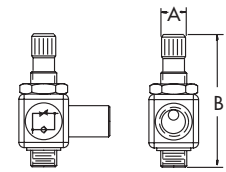


Model #	A	B	C	D	E	F	G
MO10 MI10 NV10	5/8	19/32	13/8	7/32	1/8	# 10-32	5/16
MO18 MI18 NV18	1.0	1.9	9/16	.40	.18	1/8-27 NPTF	9/16
MO14 MI14 NV14	1-1/8	1.2	11/16	.50	.23	1/4-18 NPTF	11/16

Model Number Examples	MO10B	MI10B	NV10B
	MO5B	MI5B	NV5B

Knob Option Available with any valve

Inch Version



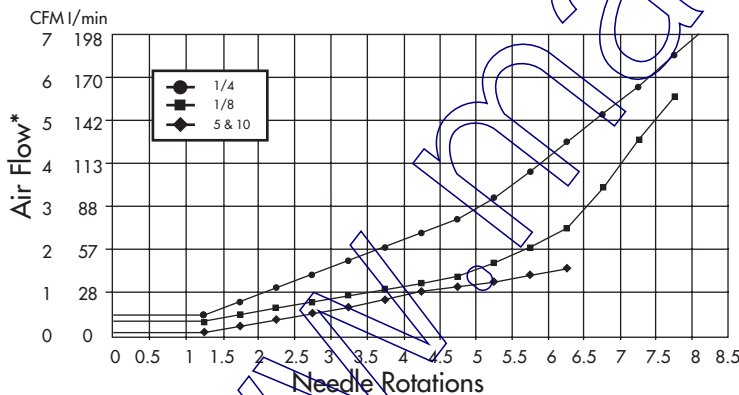
Combination

Important Note

The combination units with Inch and Metric threads are modular versions of both drawings.

Model Number	MO10K MI10K NV10K	MO18K MI18K NV18K	MO14K MI14K NV14K
A	5/32	15/64	19/64
B (max.)	29/32	1-5/16	1-5/8

Flow Chart



Cv Factor

Cv = Volume of water in gallons at 60°F (15°C) that will flow per minute through the valve with a pressure differential of 1 PSI across the valve.

Style	Flow Direction (Fully open)	# 10-32 M5	1/8-27 G1/8	1/4-18 G1/4
MO	Free Cv	.08	.25	.42
	Metered Cv	.05	.20	.38
MI	Free Cv	.07	.23	.40
	Metered Cv	.06	.22	.39
NV	Metered Cv	.05	.24	.38

* At 60 PSI (4.1 BAR) and 60°F (15°C)

Materials and Technical Data

Size	Housing	Inner Housing	Needle	Seals	Pressure Ratings	Captive Needle	360° Swivel	Gasket Material
M5 # 10-32	Nickel Plated Brass	Nickel Plated Brass	Stainless Steel	Buna-N 0°F to 200°F -15°C to 90°C	0 to 175 PSI 0 to 12 BAR	Yes	Yes- Prior to tightening 1/8NPTF and 1/4NPTF swivel after mounting	Nylon 0°F to 200°F -15°C to 90°C
1/8 and 1/4	Anodized Aluminum							

Reverse Assembly

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.

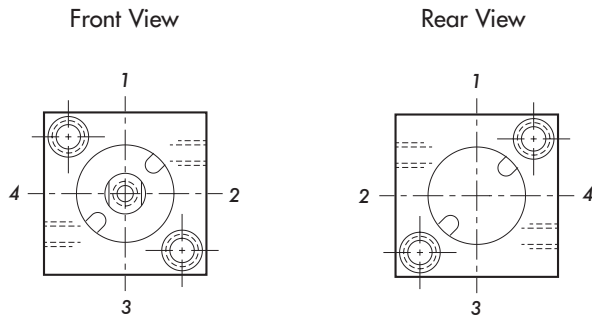
Reverse Assembly

Ordering
Suffix

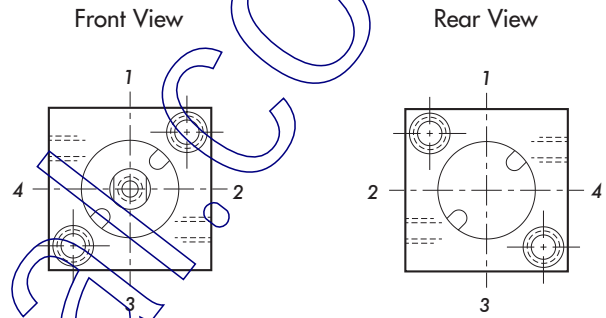
RA

Example 3/4" Bore Short Stroke

Standard Assembly



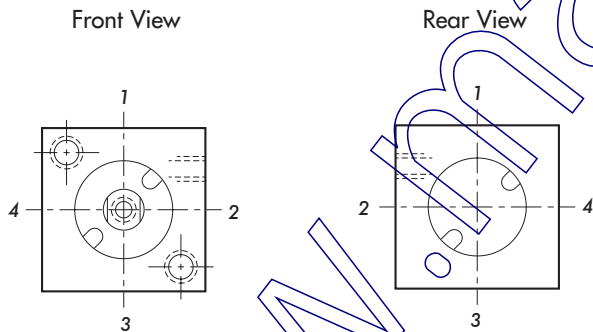
Reverse Assembly



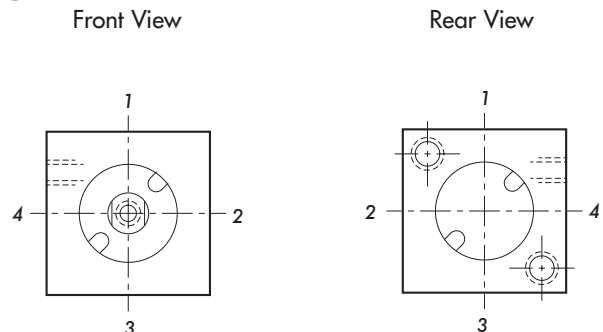
Orientation of porting and mounting change

Example 3/4" Bore Long Stroke

Standard Assembly



Reverse Assembly



Orientation of porting and mounting change

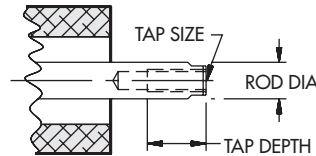
Reminder: This option is **not** applicable to Magnetic Piston cylinders.

Rod Tap Information

1/2" - 8"
Bore

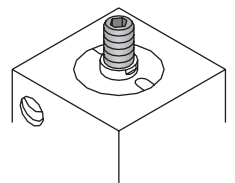
Usable Female Rod Thread

On magnetic piston style cylinders, refer to 1/4" longer **stroke** when determining tap depth.



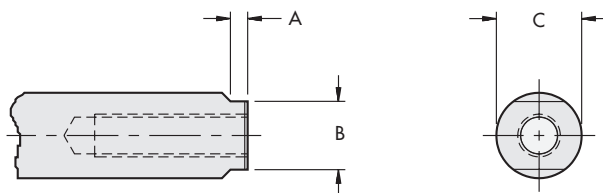
Bore	Rod Diameter	Rod Tap		Duty	Tap Depths (Stroke)								
		Standard	Optional Suffix: FT		1/8	1/4	3/8	1/2	5/8	3/4	7/8	1" and longer	
1/2	.25	#8-32	-	Standard	.25	.25	.38	.44	.44	.44	.44	.44	.44
				Intermediate	.25	.38	.44	.44	.44	.44	.44	.44	.44
				Heavy	.25	.38	.44	.44	.44	.44	.44	.44	.44
3/4	.31	#10-24	#10-32	Standard	.25	.38	.38	.44	.44	.44	.44	.44	
				Intermediate	.38	.44	.44	.44	.44	.44	.44	.44	
				Heavy	.44	.44	.44	.44	.44	.44	.44	.44	
1-1/8	.50	5/16-18	5/16-24	Standard	.31	.38	.44	.50	.63	.69	.81	.81	
				Intermediate	.44	.50	.63	.69	.81	.81	.81	.81	
				Heavy	.63	.69	.81	.81	.81	.81	.81	.81	
1-3/8	.63	3/8-16	3/8-24	Standard	.44	.44	.50	.50	.69	.81	.88	.94	
				Intermediate	.50	.50	.69	.81	.88	.94	.94	.94	
				Heavy	.69	.81	.88	.94	.94	.94	.94	.94	
1-5/8	.63	3/8-16	3/8-24	Standard	.44	.44	.50	.50	.69	.81	.88	.94	
				Intermediate	.50	.50	.69	.81	.88	.94	.94	.94	
				Heavy	.69	.81	.88	.94	.94	.94	.94	.94	
2	.63	3/8-16	3/8-24	Standard	.50	.50	.69	.69	.81	.88	.94	.94	
				Intermediate	.69	.69	.81	.88	.94	.94	.94	.94	
				Heavy	.81	.88	.94	.94	.94	.94	.94	.94	
2-1/2	.75	1/2-13	1/2-20	Standard	.50	.63	.63	.75	.88	1.00	1.00	1.25	
				Intermediate	.63	.75	.88	1.00	1.00	1.25	1.25	1.25	
				Heavy	.88	1.00	1.00	1.25	1.25	1.25	1.25	1.25	
3	.75	1/2-13	1/2-20	Standard	.50	.63	.63	.75	.88	1.00	1.00	1.25	
				Intermediate	.63	.75	.88	1.00	1.00	1.25	1.25	1.25	
				Heavy	.88	1.00	1.00	1.25	1.25	1.25	1.25	1.25	
4	.75	1/2-13	1/2-20	Standard	.63	.75	.75	.88	.88	.88	1.00	1.25	
				Intermediate	.75	.88	.88	.88	1.00	1.25	1.25	1.25	
				Heavy	.88	.88	1.00	1.25	1.25	1.25	1.25	1.25	
5	.75	1/2-13	1/2-20	Standard	.63	.75	.75	.88	.88	.88	1.00	1.25	
				Intermediate	.75	.88	.88	.88	1.00	1.25	1.25	1.25	
	1.00	5/8-18	Heavy	.88	.94	1.00	1.25	1.25	1.25	1.25	1.25		
6	1.00	5/8-18	-	Standard	.75	.81	.88	.94	1.00	1.00	1.25	1.25	
8	1.00	5/8-18	-	Standard	.75	.81	.88	.94	1.00	1.00	1.25	1.25	

For low cost male thread see the Accessories section, Male Stud on page 76.



Usable Wrench Flats

Bore	A	B Flat	C Dia
1/2	.06	.22	.25
3/4	.06	.25	.31
1-1/8	.13	.44	.50
1-3/8, 1-5/8, 2"	.13	.56	.63
2-1/2, 3, 4, 5"	.13	.69	.75
5FH, 6, 8"	.13	.94	1.00



Cylinder Weight

Approximate Unit Weights (Ounces)

Ounces to Grams (Ounces x 28.349 = Grams)

Example: AS34x214

A Magnetic Piston .55
 S34 Square 3/4" bore 2.0
 x
 214 # of 1/8" increments 3.6 (.2x18)
 6.15 ounces

Rectangular and Square body styles

	Duty	Non-Magnetic Piston					Magnetic Piston Adder				
		Standard		Intermediate	Heavy		Standard		Intermediate	Heavy	
		Single	Double	Single	Single	Double	Single	Double	Single	Single	Double
1/2	Zero stroke	.90	.95	1.10	1.20	1.20	.45	.50	.40	.40	.40
	per 1/8" stroke	.15	.20	.15	.15	.20					
3/4	Zero stroke	2.00	2.10	3.00	3.80	4.00	.55	.60	.70	.85	.90
	per 1/8" stroke	.20	.30	.20	.20	.30					
1-1/8	Zero stroke	3.10	3.30	4.40	5.70	6.10	.75	.80	1.20	1.55	1.60
	per 1/8" stroke	.30	.50	.30	.30	.50					
1-3/8	Zero stroke	5.50	6.10	7.40	9.50	10.10	.95	1.00	1.65	2.10	2.35
	per 1/8" stroke	.50	.60	.50	.50	.60					
1-5/8	Zero stroke	6.80	7.40	9.10	11.20	12.0	1.20	1.20	2.10	2.65	3.00
	per 1/8" stroke	.60	.70	.60	.60	.70					
2	Zero stroke	11.80	12.10	15.30	18.40	19.00	.95	1.65	1.85	3.05	3.50
	per 1/8" stroke	.90	1.00	1.00	.90	1.00					
2-1/2	Zero stroke	18.40	19.40	23.30	27.60	29.00	2.30	2.35	4.55	6.35	6.80
	per 1/8" stroke	1.20	1.50	1.20	1.20	1.50					
3	Zero stroke	30.40	31.10	36.70	42.30	43.60	3.20	3.25	6.10	8.80	9.00
	per 1/8" stroke	1.80	2.10	1.80	1.80	2.10					

Round body styles

	Duty	Non-Magnetic Piston					Magnetic Piston Adder				
		Standard		Intermediate	Heavy		Standard		Intermediate	Heavy	
		Single	Double	Single	Single	Double	Single	Double	Single	Single	Double
1/2	Zero stroke	1.1	1.2	1.3	1.5	1.5	1.6	1.7	1.8	2	2
	per 1/8" stroke	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
3/4	Zero stroke	2.20	2.20	3.20	4.00	4.10	.11	.16	.25	.43	.44
	per 1/8" stroke	.30	.40	.30	.30	.40					
1-1/8	Zero stroke	3.70	4.00	5.10	6.40	6.80	.38	.40	.78	1.14	1.22
	per 1/8" stroke	.50	.60	.50	.50	.60					
1-3/8	Zero stroke	6.30	6.90	8.30	10.10	10.90	.59	.62	1.26	1.73	1.96
	per 1/8" stroke	.60	.70	.60	.60	.70					
1-5/8	Zero stroke	7.80	8.20	10.00	12.00	12.80	.89	.90	1.79	2.36	2.70
	per 1/8" stroke	.70	.80	.70	.70	.80					
2	Zero stroke	13.10	13.40	16.60	19.70	20.30	.80	1.51	1.72	2.91	3.35
	per 1/8" stroke	1.00	1.10	1.00	1.00	1.10					
2-1/2	Zero stroke	19.60	20.60	24.30	28.80	30.10	2.27	2.31	4.49	6.30	6.75
	per 1/8" stroke	1.10	1.40	1.10	1.10	1.40					
3	Zero stroke	30.50	31.20	36.80	42.40	43.70	3.37	3.41	6.24	8.93	9.15
	per 1/8" stroke	1.10	1.60	1.10	1.10	1.60					
4	Zero stroke	51.50	53.00	60.60	68.90	71.30	5.07	5.01	9.89	14.86	14.65
	per 1/8" stroke	1.60	1.90	1.60	1.60	1.90					
5	Zero stroke	79.30	80.90	88.10	105.70	109.20	8.09	8.19	15.89	23.01	22.93
	per 1/8" stroke	1.90	2.20	1.90	1.90	2.20					
6	Zero stroke	124.20	127.50	-	-	-	12.00	11.27	-	-	-
	per 1/8" stroke	2.40	2.90	-	-	-					
8	Zero stroke	229.10	233.00	-	-	-	19.28	18.27	-	-	-
	per 1/8" stroke	3.10	3.50	-	-	-					

Accessory Weight

1/2" - 8"
Bore

Approximate Unit Weights (Ounces)

Accessories													
Suffix	Description	Bore											
		1/2	3/4	1-1/8	1-3/8	1-5/8	2	2-1/2	3	4	5	6	8
ADJ	Adjustable Retract Stroke	.37	.61	1.53	1.97	2.31	5.09	5.96	10.10	CF	CF	CF	CF
CBSS	Clevis Bracket	.26	.79	1.37	2.17	2.17	2.17	4.18	4.18	4.18	4.18	39.84	39.84
EB	End Bracket (flange)	.19	.36	.44	.94	1.31	2.01	2.35	4.66	-	-	-	-
FF	Front Flange ("S") style only)	.28	.84	1.11	1.78	1.74	4.85	5.31	9.10	-	-	-	-
FF	Front Flange ("R") style only)	.28	1.28	2.03	1.77	1.89	4.72	5.59	9.10	16.26	61.90	157.0	157.0
LP	Long Pivot Mount	-	2.63	2.79	3.26	5.58	7.21	13.27	14.31	42.57	-	-	-
MS	Male Stud	.04	.06	.24	.43	.43	.43	.96	.96	1.12	1.12	1.90	1.90
NM	Nose Mount	.25	3.43	2.09	3.05	3.78	5.67	9.76	12.33	24.00	33.83	-	-
PS	Pivot Shaft	-	.94	1.10	1.22	1.31	3.28	6.43	7.70	27.00	33.14	39.75	46.51
RE	Rod Eye	.13	.51	.54	1.01	1.01	1.01	3.82	3.82	3.82	3.82	21.80	21.80
RF	Rear Flange ("S") style only)	.28	.84	1.11	1.78	1.74	4.85	5.31	9.10	-	-	-	-
RF	Rear Flange ("R") style only)	.28	1.28	2.03	1.77	1.89	4.72	5.59	9.10	16.26	61.90	157.00	157.00
SB	Side Bracket (flange)	.19	.43	.49	.99	1.26	1.89	2.15	3.94	-	-	-	-
SP	Short Pivot Mount	-	1.96	2.12	2.25	2.34	7.59	10.74	14.17	37.70	55.83	62.44	69.20
SRC	Short Rear Clevis	.28	.86	1.52	2.97	3.35	5.54	10.91	12.88	-	-	-	-
SRCE	Short Rear Clevis with Eye Mount	.50	1.37	2.19	4.36	4.75	7.28	12.69	19.36	-	-	-	-

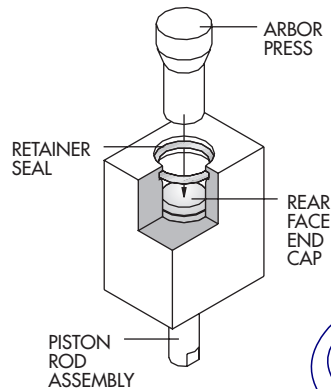
CF = Consult Factory

www.magr

Disassembly

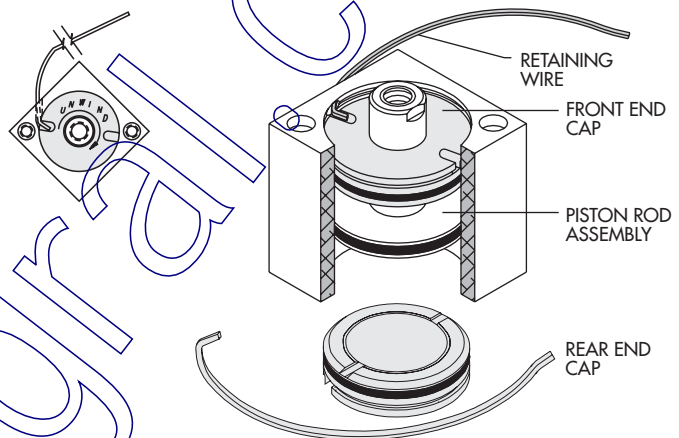
1/2" Bore (Snap Cap)

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.



3/4" - 8" 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. Clean all grooves with a soft cloth.
3. Lightly lubricate seal grooves, reset seals and lubricate again.
4. Repeat above steps, in reverse, to reassemble.
5. Bubble test cylinder to assure air tight seal.

Double Rod Instructions - 3/4" through 8"

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.

Repair Kits

Repair Kits							Tools		Lubrication
Bore	Pneumatic Seals			Hydraulic Seals			Assembly Wrench	Flat Wrench	
	Rod End	Standard	Viton®	Teflon®	Hydraulic	Viton® Hyd			
1/2	Single	RK12	RKV12	-	-	-	-	FW1S	Lube One Lubricates approximately 30 medium size cylinders.
	Double	RKD12	RKDV12	-	-	-			
3/4	Single	RK34	RKV34	RKT34	RKH34	RKVH34	W1	FW1S	
	Double	RKD34	RKDV34	RKDT34	RKDH34	RKDVH34			
1-1/8	Single	RK118	RKV118	RKT118	RKH118	RKVH118	W1	FW1S	
	Double	RKD118	RKDV118	RKDT118	RKDH118	RKDVH118			
1-3/8	Single	RK138	RKV138	RKT138	RKH138	RKVH138	W1	FW2S	
	Double	RKD138	RKDV138	RKDT138	RKDH138	RKDVH138			
1-5/8	Single	RK158	RKV158	RKT158	RKH158	RKVH158	W1	FW2S	
	Double	RKD158	RKDV158	RKDT158	RKDH158	RKDVH158			
2	Single	RK2	RKV2	RKT2	RKH2	RKVH2	W2	FW2S	
	Double	RKD2	RKDV2	RKDT2	RKDH2	RKDVH2			
2-1/2	Single	RK212	RKV212	RKT212	RKH212	RKVH212	W2	FW2S	
	Double	RKD212	RKDV212	RKDT212	RKDH212	RKDVH212			
3	Single	RK3	RKV3	RKT3	RKH3	RKVH3	W2	FW2S	
	Double	RKD3	RKDV3	RKDT3	RKDH3	RKDVH3			
4	Single	RK4	RKV4	RKT4	RKH4	RKVH4	W2	FW2S	
	Double	RKD4	RKDV4	RKDT4	RKDH4	RKDVH4			
5	Single	RK5	RKV5	-	-	-	W2	FW3S	
	Double	RKD5	RKDV5	-	-	-			
FH5	Single	RKFH5	RKFHV5	-	-	-	W3	FW3S	
	Double	RKFHD5	RKFHDV5	-	-	-			
6	Single	RK6	RKV6	-	-	-	W3	FW3S	
	Double	RKD6	RKDV6	-	-	-			
8	Single	RK8	RKV8	-	-	-	W3	FW3S	
	Double	RKD8	RKDV8	-	-	-			

Part No. FWS
Includes one each
FW1S, FW2S, FW3S

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

All Repair Kits Include:

- Endcap Seals
- Shaft Seals
- Piston Seals
- Retaining Wire*
- Lubrication (1 to 4 milliliters)
- Snap Rings - RKD kits only
- Magnets

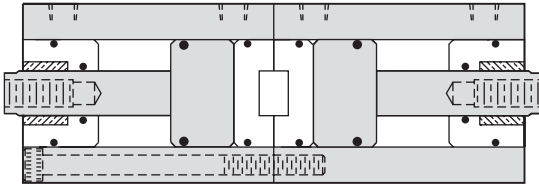
*3/4" through 1-5/8" Bore Repair Kits only
2" Bore and larger -- must be ordered separately.

Application Ideas

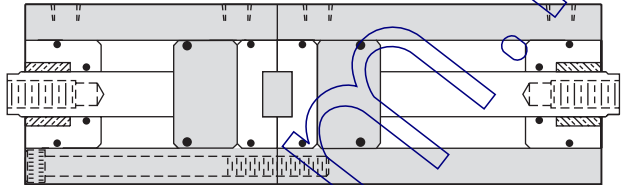
With only minor modification to Compact® cylinder bodies and rod ends, these non-standard cylinder can be built and delivered quickly and cost effectively in any quantity.

Back-to-Back 3 or 4 positions

Equal stroke increments provide 3 positions.



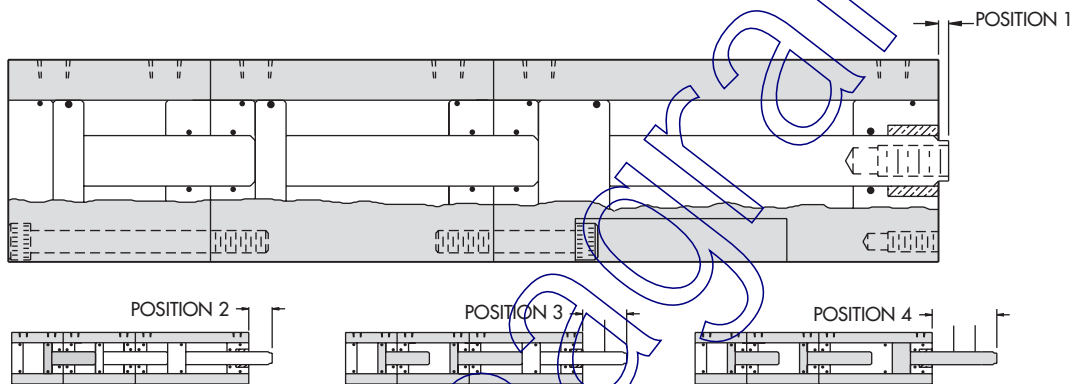
Unequal stroke increments provide 3 or 4 positions, depending on sequence of operation.



- Back-to-back assemblies feature a pilot locator between the cylinder to assure positive alignment.
- Cylinder must have support when used in a non-vertical application.
- 4-way valve circuit required for each cylinder.

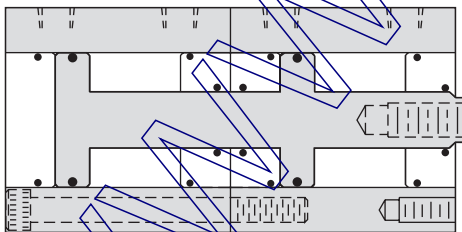
Multi-Position 3 or more positions

Three or more stroke increments can be achieved with "in line" multi-position cylinders.



- Precise valve circuit design is critical.
- Front cylinder must include all previous cylinder increments. Example: Increments include 1" + 1" + 1". Front cylinder stroke 3", middle cylinder 2", back cylinder 1".

Multi-Piston High Output



- Numerous pistons can be coupled to achieve extra output in limited space applications.
- Individual cylinders with a common rod, as shown in this diagram, can provide multiple output for push and pull.

For design assistance and quotes contact your local distributor or our Technical Sales Department at (864) 647-9521.

Modifications to fit Customer Requirements

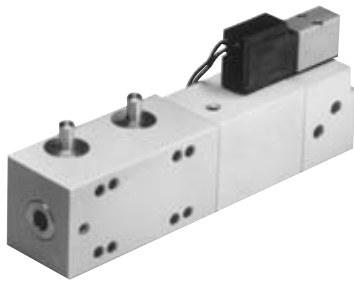
Compact Automation Product's Technical Sales team understands the ever-changing industry.

Each modified design is its own, requiring application - specific parts and know-how. We at Compact Automation Products pride ourselves in our ability to create or modify a cylinder to fit your application.

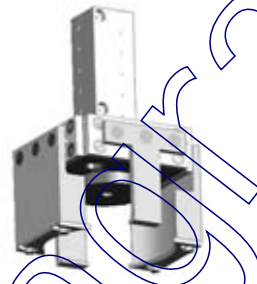
Do you have an unusual space situation, material requirement, or other specific need you think is hopeless?

If you think it can't be done, we think IT CAN.

For your convenience, see the Request for Quote form, on pages 101 and 102.



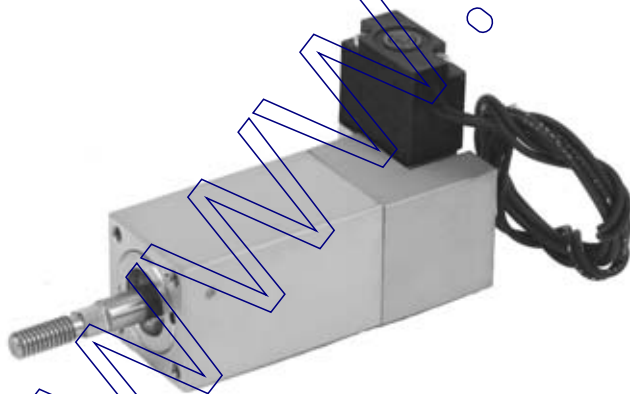
Medical Device
Twin Pinion/Common Rack 90° Actuator



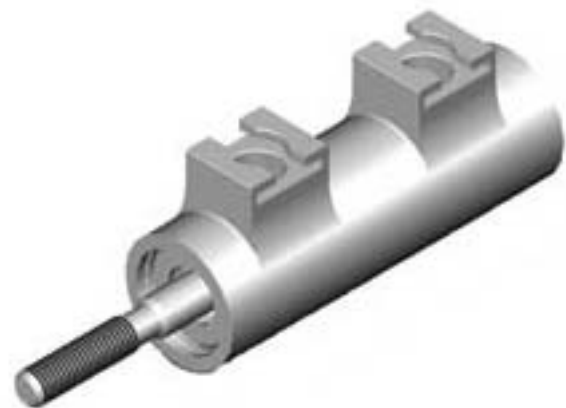
Food Processing Machine
Multi-axis gripper with all Stainless Steel components



Semi Conductor Industry
Heavily modified frame and oversized hollow rod



PCB Machine Tool
Direct mounted control valve



Entertainment Industry Animation Cylinder
Custom stainless steel body for hydraulic service

Request for Quote

Modified Cylinder Proposal

Date Requested _____

Date Quoted _____

From

Company Name _____

City _____ State _____

Contact _____

Phone _____ Fax _____

E-mail _____

To

Compact Automation Products, Inc.

Contact (if known) _____

Current Compact Distributor _____

Contact _____

- All modified and special purpose air cylinders are manufactured from our standard product lines -
To ensure a quick and accurate quote, please include all requirements.

Round or Square Style Cylinder

Basic Cylinder Part Number Required: _____

Prototype:

Yes No

Quantity:

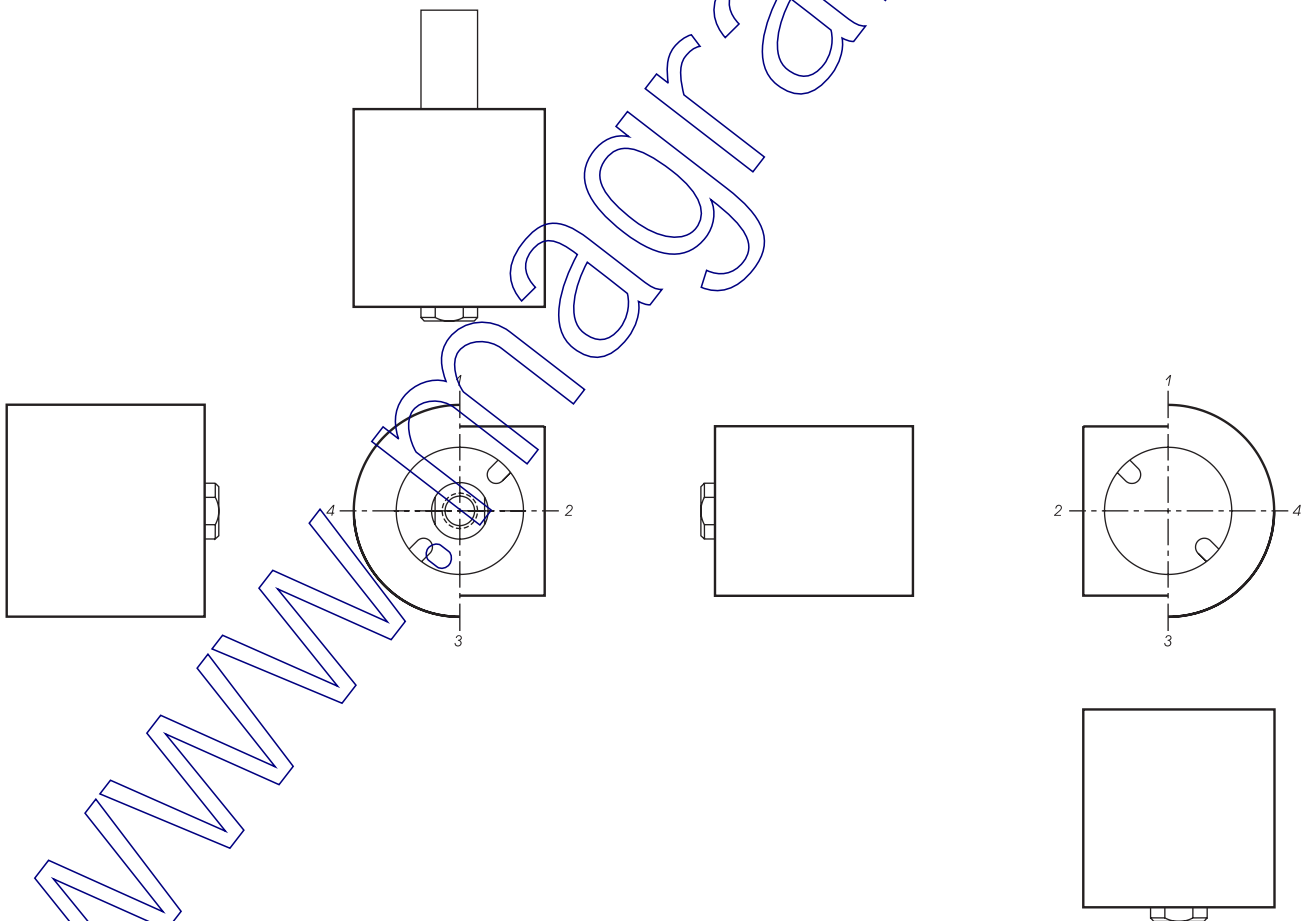
1 - 9 pcs.

10 - 24 pcs.

25 - 49 pcs.

50 - 99 pcs.

other: _____



Modified Hollow Rod Cylinder Proposal

Date Requested _____
Date Quoted _____

From
Company Name _____
City _____ State _____
Contact _____
Phone _____ Fax _____
E-mail _____

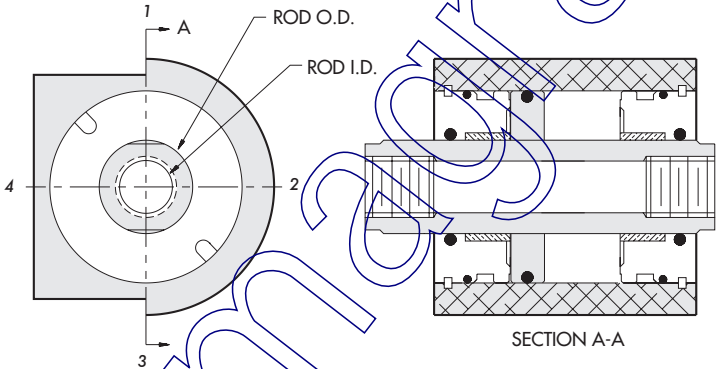
To
Compact Automation Products, Inc.
Contact (if known) _____
Current Compact Distributor _____
Contact _____

- All modified and special purpose air cylinders are manufactured from our standard product lines -
To ensure a quick and accurate quote, please include all requirements.

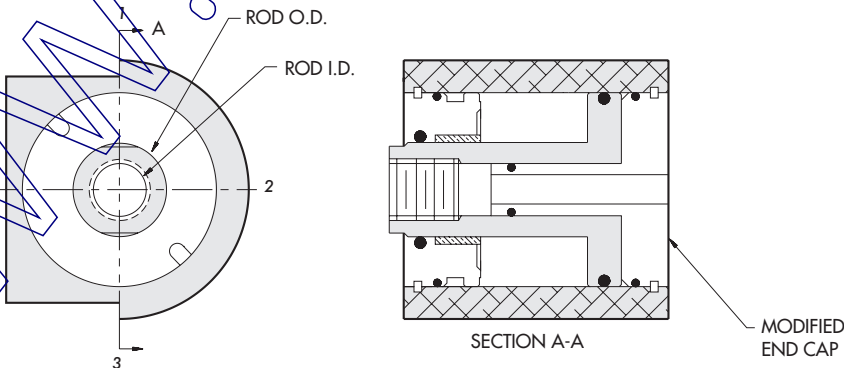
Round or Square Style Cylinder
Basic Cylinder Part Number Required: _____
Hollow Rod Requirements:
Base Rod Material
 Stainless Steel
 Other _____

Prototype: Yes No
Quantity:
 1 - 9 pcs.
 10 - 24 pcs.
 25 - 49 pcs.
 50 - 99 pcs.
other: _____

Double Rod End



Single Rod End Concept only



Special Conditions and Limited Warranty

Determination of the suitability of any information or product for the application contemplated by any user or the manner of that use is the sole responsibility of the user.

Compact Automation Products, LLC reserves the right to improve or change designs without notice.

All orders are subject to acceptance by the factory sales department.

Compact Automation Products, LLC agrees to repair or replace to the original purchaser any standard parts or products for a period of 12 months from date of shipment which Compact Automation Products, LLC determines upon inspection to be defective in workmanship or material. Wear components including but not limited to seals and bearings are excluded from this warranty.

Under no circumstance may merchandise be returned without written authorization from the factory.

This warranty is void in the event the product has been tampered with, altered, or serviced by unauthorized personnel.

Compact Automation Products, LLC's, total responsibility for any claims, damages, losses or liabilities related to the product covered thereunder shall not exceed the purchase price of such product. In no event shall Compact Automation Products, LLC be liable for any special, indirect, incidental or consequential damages of any character, including but not limited to loss of use of productive facilities or equipment, lost profit, property damage, transportation, installation or removal or lost production whether suffered by purchaser or third party. Compact Automation Products, LLC disclaims all liability for any and all cost, claims demands, charges, expenses, and other damages, either direct or indirect, incident to all property damage arising out of any cause of action based on strict liability. This warranty gives you specific legal rights and you may have other rights, which vary from state to state.

Answer Engineering
COMPACT[®]
AUTOMATION PRODUCTS LLC
An **IMC** Company

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Just imagine...
How Compact's
Answer Engineering can work for you!