

# Pancake® Cylinders 2 1/2" (521) Bore Model Number

1

**Model Number Code**

Prefix Options

Leave blank if none desired

Stroke

Bore

Action

Suffix Options

**C** - **521** - **X** - **MR**

**Metric M**  
See pages 1.7, 1.49 & 1.52

**Bore Code**  
2 1/2" 521  
63.5mm 521

Standard Strokes			
Original Series			
Action	X XK XDR XDRK	O ODR	OP
Stroke			
1/8	AB	AB	AB
1/4	AA	AA	AA
1/2	A	A	A
3/4	B	B	B
1	C	C	C
1 1/2	D	D	-
2	E	-	-
3	F	-	-
4	G	-	-

**"T" Series**  
Includes PTFE piston bearing

Action	X XK	O	OP
Stroke			
1/4	TA	TA	TA
1/2	TB	TB	TB
3/4	TC	TC	TC
1 1/4	TD	TD	-
1 3/4	TE	-	-
2 3/4	TF	-	-
3 3/4	TG	-	-

Grey shading indicates sensors are not available.  
Strokes are NOT affected by magnetic piston Option "E"

Action	
<b>Single rod</b>	
Double acting	-X
Double acting, Nonrotating	
Internal guide pins - 150 psi max	-XK
Single acting, spring retracted	-O
Single acting, spring extended	-OP
<b>Double rod</b>	
Double acting	-XDR
Double acting, Nonrotating	
Internal guide pins - 150 psi max	-XDRK
Single acting, spring retracted	-ODR

See pages 1.5 & 1.6 for Action Information.  
See pages 1.48 & 1.51 for Standard Specifications

## HOW TO ORDER

- Under **Stroke** – select letter(s) for desired Series and Stroke.
  - Under **Bore** – select **521** for 2 1/2" bore.  
**Seven Other Bore Sizes are Available**
- | Bore   | Bore Code | See page |
|--------|-----------|----------|
| 1/2"   | 5         | 1.17     |
| 3/4"   | 7         | 1.23     |
| 1 1/8" | 121       | 1.29     |
| 1 5/8" | 221       | 1.35     |
| 2"     | 321       | 1.41     |
| 3"     | 721       | 1.53     |
| 4"     | 1221      | 1.59     |
- Under **Action** – select letter(s) for desired action.
  - Under **Prefix & Suffix Options** – select letter(s) for desired options and add to model number.

## EXAMPLES

- A-521-X**  
Original Series, 1/2" stroke - 2 1/2" Bore - Single Rod, Double Acting
- TC-521-X-MR**  
"T" Series, 3/4" Stroke - 2 1/2" Bore - Single Rod, Double Acting - Male Rod Thread

Suffix Options	
Male rod thread: Single rod	-MR
Double rod, rod end	-MR
Double rod, cap end	-MR1
Double rod, both ends	-MR2
PTFE seals	-T
Viton seals	-V
Quad seals	-Q
External guide, nonrotating for load guiding (See page 1.65)	-G
Hydraulic:	
Standard cover	-H
Thick cover	-HHC
Air service:	
Thick cover	-HC
1/4 NPT ports	-P14
Hole thru double rod shaft: 5/32" hole	-16
Plus size: 1/4" hole	-25
150 psi max	
Finish: ProCoat™ (Electroless Nickel)	-N
Stroke collar:	
1/4"	-C2
3/8"	-C3
1/2"	-C4
5/8"	-C5
3/4"	-C6
7/8"	-C7
Sound limiters:	
Rod end	-LF
Cap end	-LR
Both ends	-LFR
Rubber Bumpers:	
Rod end	-BF
Cap end	-BR
Both ends	-BFR
Adjustable extend stroke (Full stroke adjustment is standard)	-AS
Adjustable retract stroke (Over 1" adjustment add desired length, e.g. -RS2)	-RS
Clevis mount: Ports in-line with slot	-PM
Ports 90° to slot	-SM
Magnetic piston & sensor mounting slot(s) Order sensors separately. See page 1.14. Stroke length determines number of mounting slots. See page 1.14, 1.50, 1.52	-E

See pages 1.3 – 1.15 for general option information and pages 1.49, 1.50 & 1.52 for option specifications of 2 1/2" bore models.

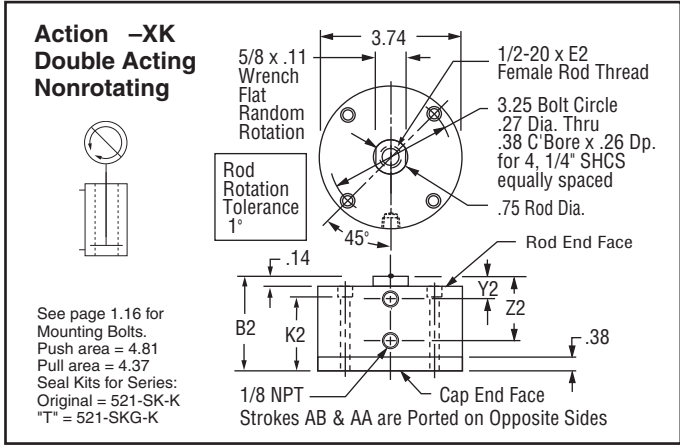
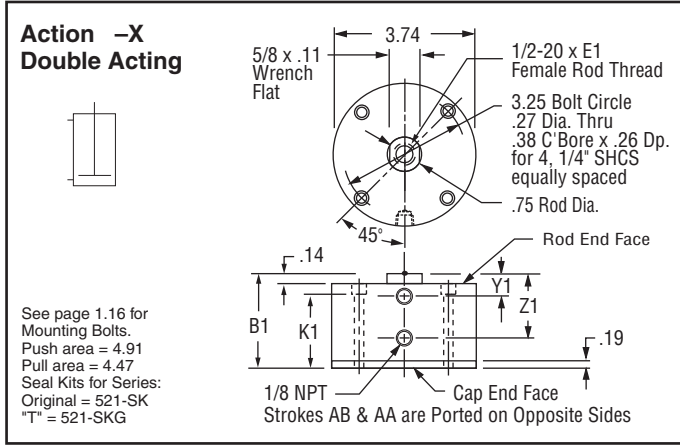
A complete library of cylinder CAD drawings is available from your local Fabco-Air Distributor or from the Fabco-Air web site – <http://www.fabco-air.com>

# Pancake® Cylinders

2-1/2" (521) Bore  
Single Rod

# Standard Specifications

1

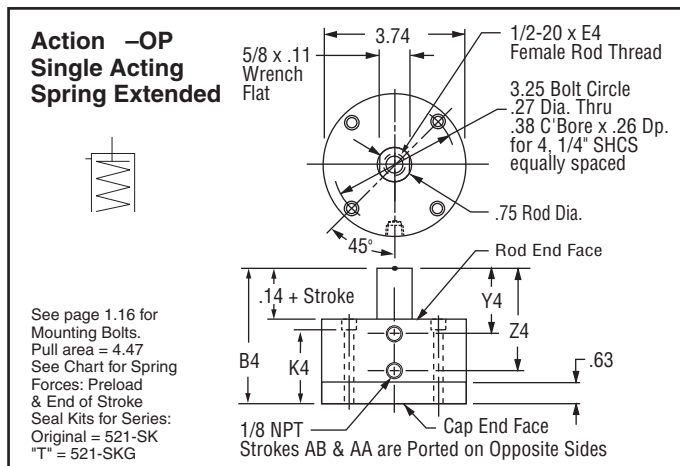
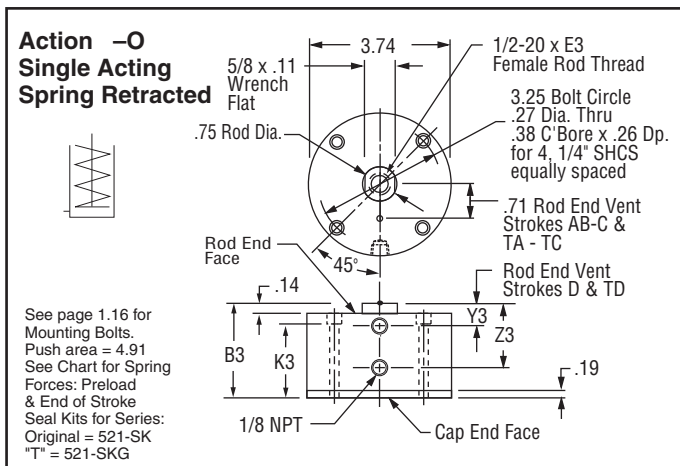


## Original Series

Stroke, Inches	1/8	1/4	1/2	3/4	1	1 1/2	2	3	4
Stroke, Letter	AB	AA	A	B	C	D	E	F	G
<b>Action -X Double Acting</b>									
B1	1.45	1.58	1.83	2.20	2.33	2.83	3.33	4.33	5.33
E1	.56	.63	.63	.88	.88	.88	.88	.88	.88
K1	1.05	1.18	1.43	1.80	1.93	2.43	2.93	3.93	4.93
Y1	.52	.52	.52	.64	.64	.64	.64	.64	.64
Z1	.89	1.02	1.27	1.64	1.77	2.27	2.77	3.77	4.77
Weight, lb.	1.43	1.50	1.67	2.00	2.03	2.38	2.73	3.46	4.19
<b>Action -XK Double Acting, Nonrotating</b>									
B2	1.64	1.77	2.02	2.39	2.52	3.02	3.52	4.52	5.52
E2	.56	.63	.63	.88	.88	.88	.88	.88	.88
K2	1.24	1.37	1.62	1.99	2.12	2.62	3.12	4.12	5.12
Y2	.52	.52	.52	.64	.64	.64	.64	.64	.64
Z2	.89	1.02	1.27	1.64	1.77	2.27	2.77	3.77	4.77
Weight, lb.	1.64	1.72	1.89	2.23	2.27	2.63	3.00	3.75	4.51
<b>Action -O Single Acting, Spring Retracted</b>									
B3	1.45	1.58	1.83	2.20	2.33	4.33	NA*	NA*	NA*
E3	.56	.63	.63	.88	.88	.88	NA*	NA*	NA*
K3	1.05	1.13	1.43	1.80	1.93	3.93	NA*	NA*	NA*
Y3	Rod End Face Vent					.64	NA*	NA*	NA*
Z3	.89	1.02	1.27	1.64	1.77	3.77	NA*	NA*	NA*
Weight, lb. 1.38	1.46	1.62	1.94	1.96	3.60	NA*	NA*	1.84	
Preload, lb. 12.0	6.2	7.0	5.0	4.7	7.3	NA*	NA*	13.1	
End of Stroke, lb.	18.0	18.0	20.0	15.5	20.0	20.0	NA*	NA*	NA*
<b>Action -OP Single Acting, Spring Extended</b>									
B4	2.02	2.27	2.77	3.39	3.77	NA*	NA*	NA*	NA*
E4	.56	.63	.63	.88	.88	NA*	NA*	NA*	NA*
K4	1.49	1.62	1.87	2.24	2.37	NA*	NA*	NA*	NA*
Y4	.65	.77	1.02	1.40	1.64	NA*	NA*	NA*	NA*
Z4	1.02	1.27	1.77	2.39	2.77	NA*	NA*	NA*	NA*
Weight, lb. 1.91	1.98	2.16	2.49	2.51	NA*	NA*	NA*	2.38	
Preload, lb. 6.2	2.5	5.5	5.0	5.2	NA*	NA*	NA*	11.2	
End of Stroke, lb.	12.0	12.0	18.5	15.5	20.5	NA*	NA*	NA*	NA*

## "T" Series

Stroke, Inches	1/4	1/2	3/4	1 1/4	1 3/4	2 3/4	3 3/4
Stroke, Letter	TA	TB	TC	TD	TE	TF	TG
<b>Action -X Double Acting</b>							
B1	1.83	2.20	2.33	2.83	3.33	4.33	5.33
E1	.63	.88	.88	.88	.88	.88	.88
K1	1.43	1.80	1.93	2.43	2.93	3.93	4.93
Y1	.52	.64	.64	.64	.64	.64	.64
Z1	1.27	1.64	1.77	2.27	2.77	3.77	4.77
Weight, lb.	1.89	2.22	2.25	2.60	2.95	3.68	4.41
<b>Action -XK Double Acting, Nonrotating</b>							
B2	2.02	2.39	2.52	3.02	3.52	4.52	5.52
E2	.63	.88	.88	.88	.88	.88	.88
K2	1.62	1.99	2.12	2.62	3.12	4.12	5.12
Y2	.52	.64	.64	.64	.64	.64	.64
Z2	1.27	1.64	1.77	2.27	2.77	3.77	4.77
Weight, lb.	2.11	2.45	2.50	2.85	3.22	4.00	4.73
<b>Action -O Single Acting, Spring Retracted</b>							
B3	1.83	2.20	2.33	4.33	NA*	NA*	NA*
E3	.63	.88	.88	.88	NA*	NA*	NA*
K3	1.43	1.80	1.93	3.93	NA*	NA*	NA*
Y3	Rod End Face Vent			.64	NA*	NA*	NA*
Z3	1.27	1.64	1.77	3.77	NA*	NA*	NA*
Weight, lb. 2.16	2.18	3.82	NA*	NA*	NA*		
Preload, lb. 10.6	8.0	9.5	NA*	NA*	NA*		
End of Stroke, lb.	20.0	15.5	20.0	20.0	NA*	NA*	NA*
<b>Action -OP Single Acting, Spring Extended</b>							
B4	2.52	3.14	3.52	NA*	NA*	NA*	NA*
E4	.63	.88	.88	NA*	NA*	NA*	NA*
K4	1.87	2.24	2.37	NA*	NA*	NA*	NA*
Y4	.77	1.14	1.39	NA*	NA*	NA*	NA*
Z4	1.52	2.14	2.52	NA*	NA*	NA*	NA*
Weight, lb. 2.71	2.73	NA*	NA*	NA*	NA*		
Preload, lb. 12.4	10.2	NA*	NA*	NA*	NA*		
End of Stroke, lb.	18.5	21.1	22.6	NA*	NA*	NA*	NA*



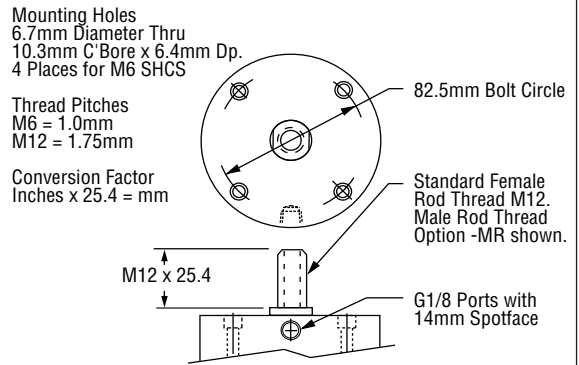
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**Prefix Option -M Metric Cylinder & Rod Thread 63.5mm Bore**  
Available on Original and "T" Series with Actions: -X, -XK, -O, -OP  
Also see *Option Information* on page 1.7.

Original Series									
Stroke mm	3.2	6.4	12.7	19.1	25.4	38.1	50.8	76.2	101.6
Stroke Letter	AB	AA	A	B	C	D	E	F	G

"T" Series							
Stroke mm	6.4	12.7	19.1	31.8	44.5	69.9	95.3
Stroke Letter	TA	TB	TC	TD	TE	TF	TG

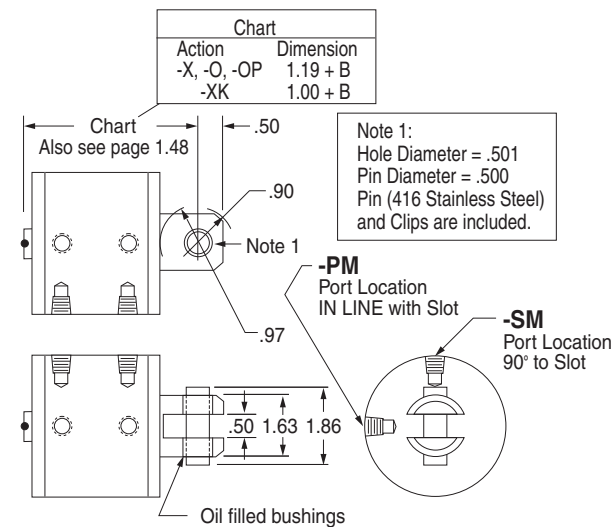


The **Suffix Options** charted on the right are available on Original and "T" Series with the Actions indicated (✓). They require no dimensional changes from the Standard Specifications on page 1.48. – Also see *Option Information* on pages 1.7 thru 1.15.

	T	V	Q	H	N	C1-C7	LF	LR	LFR	BF	BR	BFR	P14
-X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-XK	NA	✓	✓	✓	✓	✓	NA	✓	✓	✓	✓	✓	✓
-O	NA	✓	✓	✓	✓	NA	NA	✓	✓	NA	✓	NA	✓
-OP	NA	✓	✓	✓	✓	✓	✓	✓	✓	✓	NA	NA	✓

### Suffix Options -PM & -SM Clevis Mount

Available On Original and "T" Series with Actions: -X, -XK, -O, -OP  
Also see *Option Information* on page 1.13.



### RC-Chart Rod Clevis and Pin

Threaded Stud mates with Female Rod thread in the **Pancake®** Cylinders.  
Slot and Pin Mate with EM-121 Eye Bracket shown below.

Materials:  
Clevis – Steel, Black Oxide  
Stud – Steel  
Pin – 416 Stainless Steel  
Pin & Clips are included

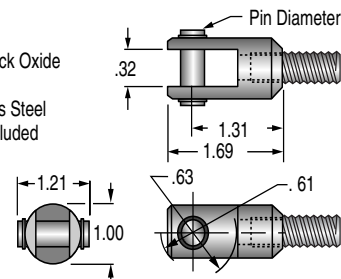
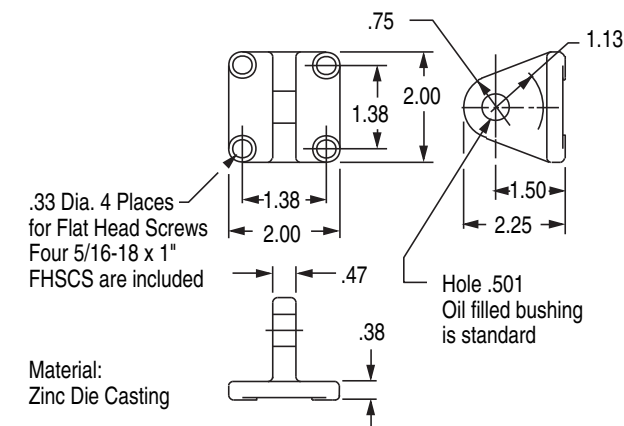


CHART  
1/2-20 x Thread Length  
Metric M12 x Thread Length

Rod Clevis Number	Strokes	Thread Length
RC-54	AB	.39"
RC-56	AA-G	.62"
MRC-54	MAB	9.9mm
MRC-56	MAA-MG	15.7mm

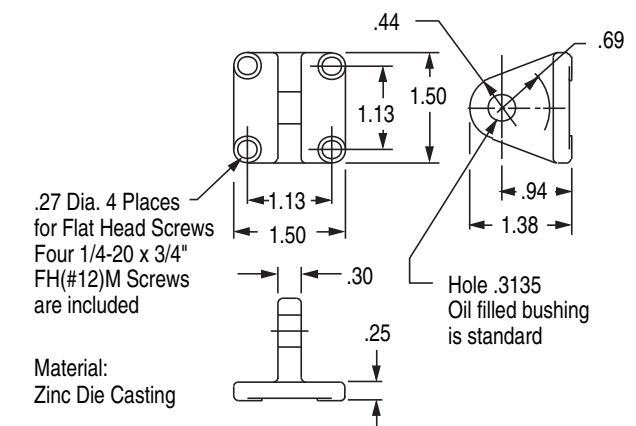
### EM-521 Eye Bracket Kit

Mates with Clevis Mount shown above.  
Order separately.



### EM-121 Eye Bracket Kit

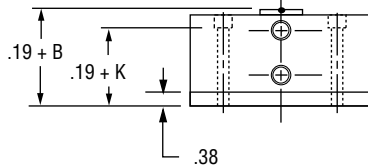
Mates with any Rod Clevis shown above.  
Order separately.



### Suffix Option -HHC Hydraulic & -HC Air

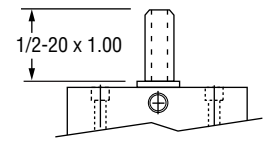
Available on Original and "T" Series with Action -X, -O.

Also see *Option Information* on page 1.9 for Pressure and Mounting details.



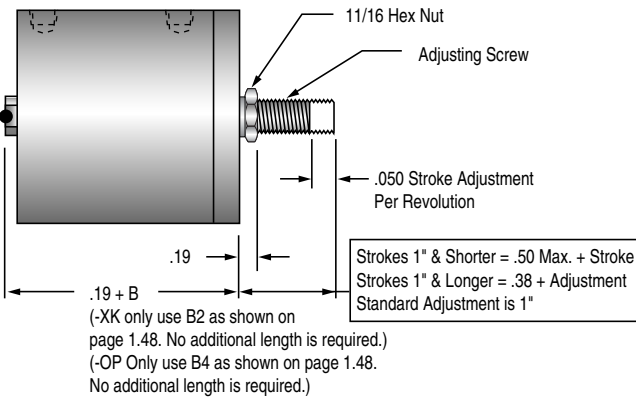
### Suffix Option -MR Male Rod Thread

Available on Original and "T" Series with Actions: -X, -XK, -O, -OP. Also see *Option Information* on page 1.8.



### Suffix Option -RS Adjustable Retract Stroke

Available on Original and "T" Series with Actions: -X, -XK, -O, -OP. Also see *Option Information* on page 1.11.



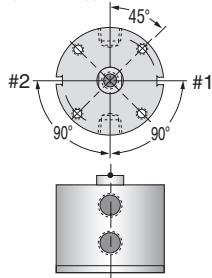
### Suffix Option -E Specifies Magnetic Piston and Dovetail Mounting Slot(s)

Strokes are NOT affected by magnetic piston.

**– Sensors Must be Ordered Separately**  
**See Sensor Models Available page 1.14**

#### 2 1/2" (521) Bore

Sensors available for "AA" & "TA" strokes and longer. Stroke AA is ported on opposite sides.



1/4" 60° Dovetail Profile of Sensor & Mounting Slot.

#### Quick Reference to Standard Strokes

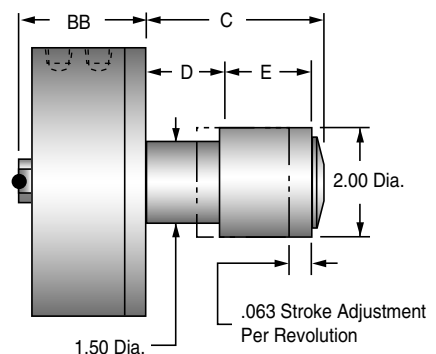
Use the appropriate Stroke Letter in the Model Number

Available on Original Series		Available on "T" Series	
Stroke	Action X, XK	Stroke	Action X, XK
1/4	AA	1/4	TA
1/2	A	1/2	TB
3/4	B	3/4	TC
1	C		
1 1/2	D	1 1/4	TD
2	E	1 3/4	TE
3	F	2 3/4	TF
4	G	3 3/4	TG

### Suffix Option -AS Adjustable Extend Stroke

Available on Original Series with Actions: -X, -XK, -O. Also see *Option Information* on page 1.11.

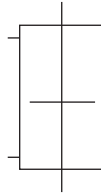
Stroke Inches	1/8	1/4	1/2	3/4	1	1-1/2	2	3	4	
Stroke Letter	AB	AA	A	B	C	D	E	F	G	
Actions: -X, -XK	BB	2.02	2.14	2.39	2.77	2.89	3.39	3.89	4.89	5.89
Actions: -O	BB	2.02	2.14	2.39	2.77	2.89	4.89	NA	NA	NA
C	1.67	1.91	2.41	2.91	3.41	4.41	5.41	7.41	9.41	
D	0.63	0.75	1.00	1.25	1.50	2.00	2.50	3.50	4.50	
E	0.88	1.00	1.25	1.50	1.75	2.25	2.75	3.75	4.75	



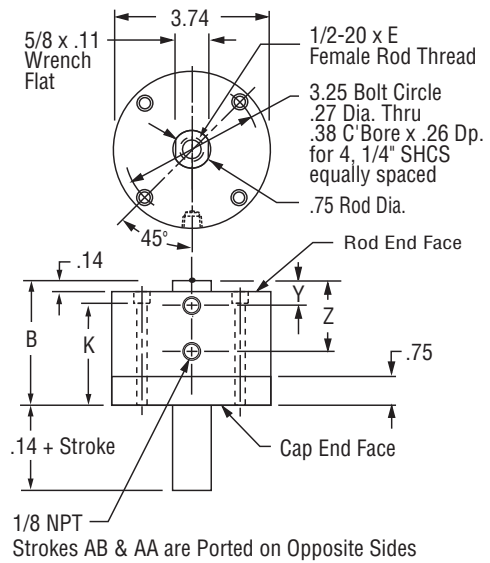
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### Action –XDR Original Series Double Rod, Double Acting

See page 1.16 for  
Mounting Bolts  
Force Area = 4.47  
Seal Kit = 521-SK

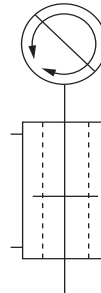


Stroke, Inches	1/8	1/4	1/2	3/4	1	1-1/2	2	3	4
Stroke, Letter	AB	AA	A	B	C	D	E	F	G
B	2.02	2.14	2.39	2.77	2.89	3.39	3.89	4.89	5.89
E	.56	.63	.63	.88	.88	.88	.88	.88	.88
K	1.63	1.75	2.00	2.38	2.50	3.00	3.50	4.50	5.50
Y	.52	.52	.52	.64	.64	.64	.64	.64	.64
Z	.89	1.02	1.27	1.64	1.77	2.27	2.77	3.77	4.77
Weight, lb.	2.20	2.29	2.48	2.82	2.83	3.28	3.67	4.60	5.40

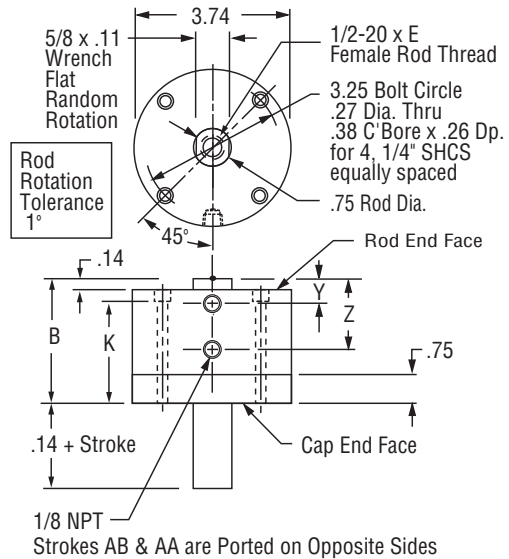


### Action –XDRK Original Series Double Rod, Double Acting, Nonrotating

See page 1.16 for  
Mounting Bolts  
Force Area = 4.37  
Seal Kit = 521-SK-K

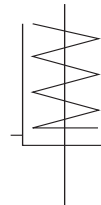


Stroke, Inches	1/8	1/4	1/2	3/4	1	1-1/2	2	3	4
Stroke, Letter	AB	AA	A	B	C	D	E	F	G
B	2.02	2.14	2.39	2.77	2.89	3.39	3.89	4.89	5.89
E	.56	.63	.63	.88	.88	.88	.88	.88	.88
K	1.63	1.75	2.00	2.38	2.50	3.00	3.50	4.50	5.50
Y	.52	.52	.52	.64	.64	.64	.64	.64	.64
Z	.89	1.02	1.27	1.64	1.77	2.27	2.77	3.77	4.77
Weight, lb.	2.34	2.43	2.63	2.97	2.99	3.45	3.85	4.79	5.62

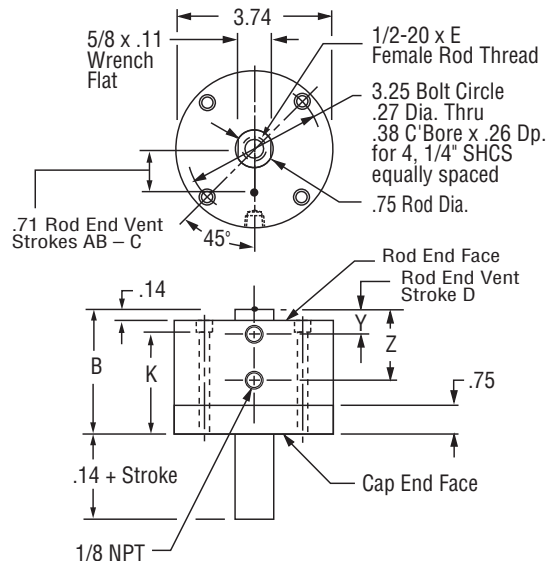


### Action –ODR Original Series Double Rod, Single Acting, Spring Retracted

See page 1.16 for  
Mounting Bolts  
Force Area = 4.47  
Seal Kit = 521-SK



Stroke, Inches	1/8	1/4	1/2	3/4	1	1-1/2
Stroke, Letter	AB	AA	A	B	C	D
B	2.02	2.14	2.39	2.77	2.89	4.89
E	.56	.63	.63	.88	.88	.88
K	1.63	1.75	2.00	2.38	2.50	4.50
Y	Rod End Face Vent					.64
Z	.89	1.02	1.27	1.64	1.77	3.77
Weight, lb.	2.14	2.23	2.41	2.76	2.77	4.52
Spring Return Forces, lb.						
Preload	12.0	6.3	7.0	5.0	4.8	7.3
End of Stroke	18.0	18.0	20.0	15.5	20.0	20.0



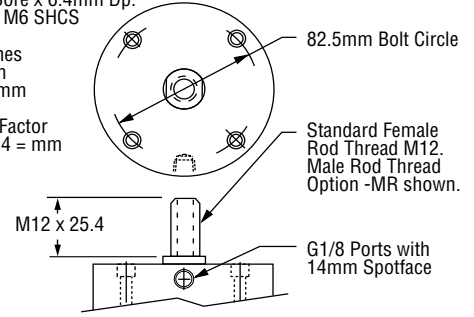
### Prefix Option -M Metric Cylinder & Rod Thread, 63.5mm Bore

Available on Original Series with Actions: -XDR, -XDRK, -ODR  
Also see *Option Information* on page 1.7.

Mounting Holes  
6.7mm Diameter Thru  
10.3mm C Bore x 6.4mm Dp.  
4 Places for M6 SHCS

Thread Pitches  
M6 = 1.0mm  
M12 = 1.75mm

Conversion Factor  
Inches x 25.4 = mm



Stroke mm	3.2	6.4	12.7	19.1	25.4	38.1	50.8	76.2	101.6
Stroke Letter	AB	AA	A	B	C	D	E	F	G

The **Suffix Options** charted on the right are available on Original Series with the Actions indicated (✓). They require no dimensional changes from the Standard Specifications on page 1.51. – Also see *Option Information* on pages 1.7 thru 1.15.

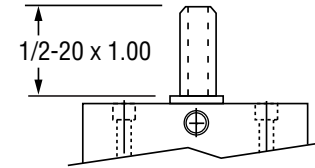
	T	V	Q	H	N	C1-C7	LF	LR	LFR	BF	BR	BFR	P14	16	25
-XDR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-XDRK	NA	✓	✓	✓	✓	✓	NA	✓	NA	✓	✓	✓	✓	✓	✓
-ODR	NA	✓	✓	✓	✓	NA	NA	✓	NA	NA	✓	NA	✓	✓	✓

### Suffix Options -MR, -MR1, -MR2 Male Rod Thread

Available on Original Series with Actions -XDR, -XDRK, -ODR.

- For Rod End only use **-MR**
- For Cap End only use **-MR1**
- For Both Ends use **-MR2**

Also see *Option Information* on Page 1.8.



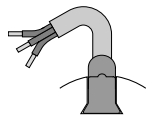
### Suffix Option -E Specifies Magnetic Piston and Dovetail Mounting Slot(s)

Strokes are NOT affected by magnetic piston.

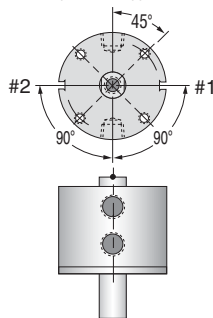
**– Sensors Must be Ordered Separately**  
**See Sensor Models Available page 1.14**

#### 2 1/2" (521) Bore

Sensors available for "AA" strokes and longer.  
Stroke AA is ported on opposite sides.



1/4" 60° Dovetail Profile of Sensor & Mounting Slot.



**Quick Reference to Standard Strokes**  
Use the appropriate Stroke Letter in the Model Number

#### Available on Original Series

Stroke	Action	
	XDR	XDRK
1/4	-----	AA
1/2	-----	A
3/4	-----	B
1	-----	C
1 1/2	-----	D
2	-----	E
3	-----	F
4	-----	G

Sensor Slots at Positions #1 and #2

Sensor Slot at Position #1 only