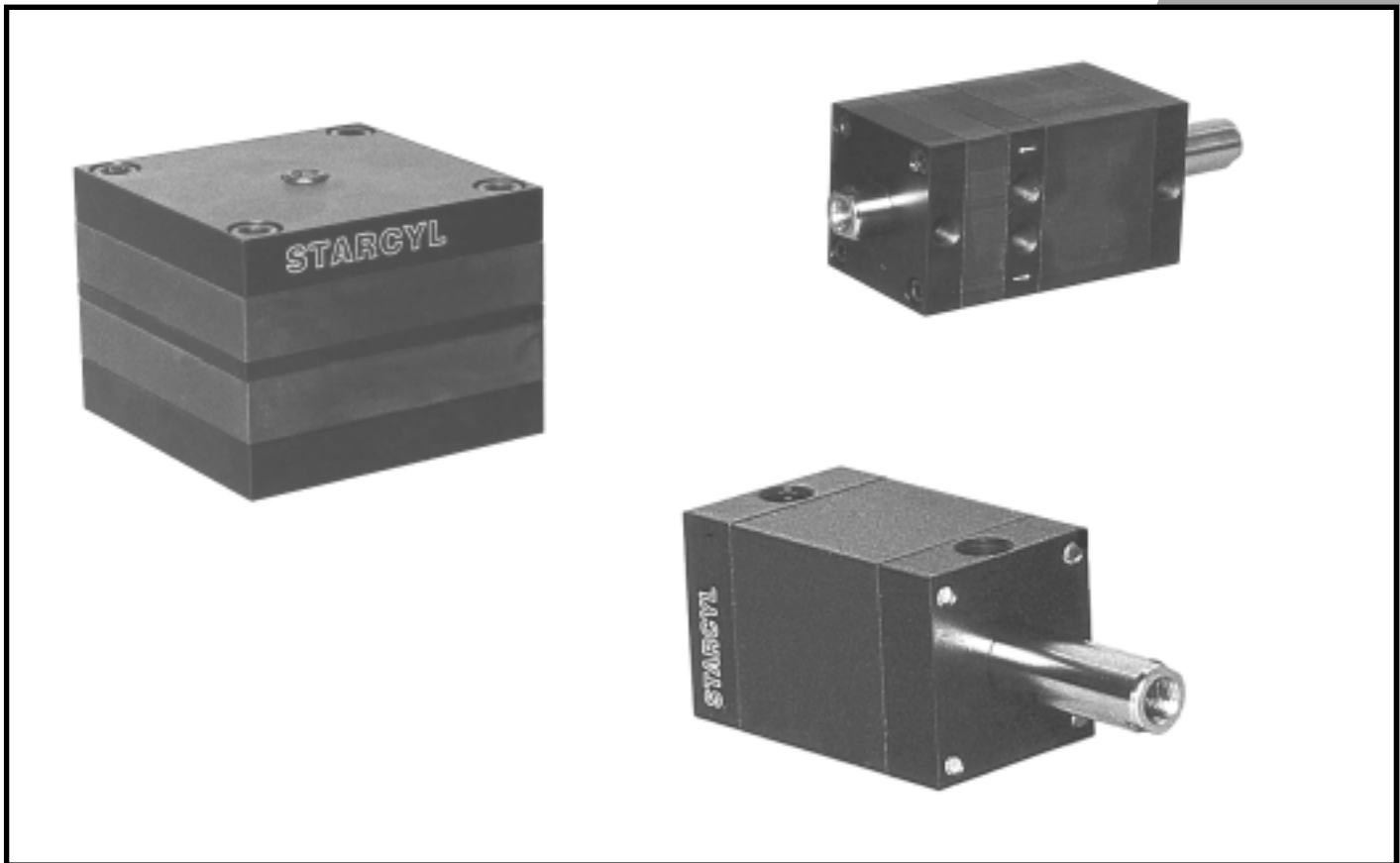


# STARCYL

## AIR CYLINDERS

[WWW.STARCYL.COM](http://WWW.STARCYL.COM)

## SPACE-SAVER



SINGLE OR MULTI-STAGE

**Not Enough Force  
Don't Change The Design  
Add A Stage !**

THE ONLY CYLINDER  
UPGRADABLE !

# STAR 1 SERIES

# QUALITY & PERFORMANCE ...

## THESE ARE SOME FEATURES OF STARCYL CYLINDERS ...

### Air inlet

The top and the front port are drilled with constant diameter to lower restriction and to ensure fast feed and fast stroke. Dual port are made standard for the cap.

### Piston and rod (lower & upper piston)

Made in one piece, in high strength steel, it prevents failure in hard working conditions.

### MELONITE

(Nitrocarburizing) gives better corrosion-resistant properties (outperforms chrome plating by ratio up to 20:1. the finish created by the process is a lustrous black. (S.S. also can be used)

### Rod bushing

Oil-impregnated bronze rod bushing provides maximum support for the piston rod.

### Cap

Anodized aluminum alloy gives lightweight, high strength, corrosion resistance and great quality appearance.

Heavy duty cap is standard to ensure good performance in hard conditions.

### Cylinder bodies

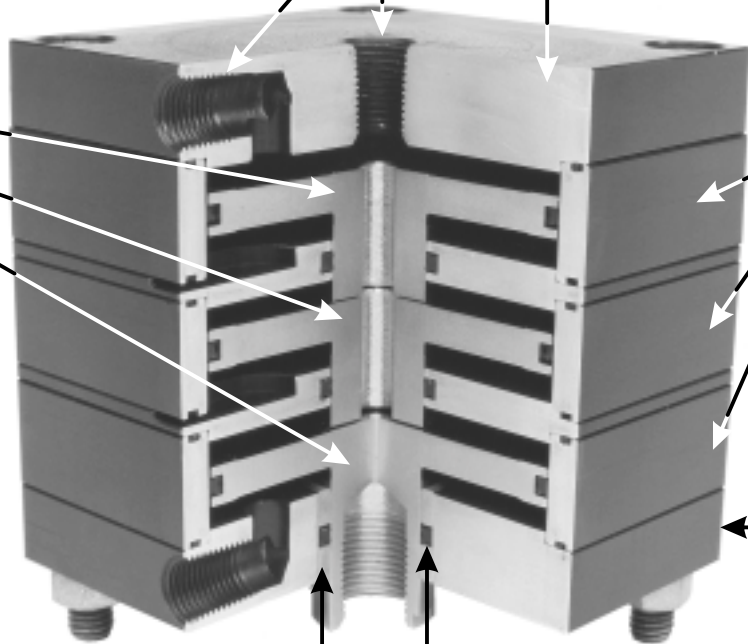
Hard anodized heavy wall aluminum alloy ensures maximum hardness and lowers the coefficient of friction.

### Head

Anodized aluminum alloy is lightweight, high strength, corrosion-resistant and offers great quality appearance.

### Piston rod seal

Quad ring gives the best seal and wipes dirt out for less maintenance and longer life of the



## MULTI-STAGE CYLINDERS HOW IT WORKS...

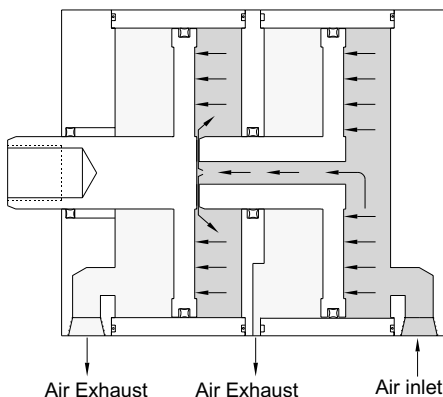
THE MULTI-STAGE CYLINDER IS A DOUBLE ACTING, SINGLE ROD END THAT MULTIPLY FORCE OUTPUT BY SUPPLYING AIR TO 2, 3, 4, ..., 8,... PISTONS ON EXTENSION.

IT SAVES SPACE AND ELIMINATES THE NEED FOR :

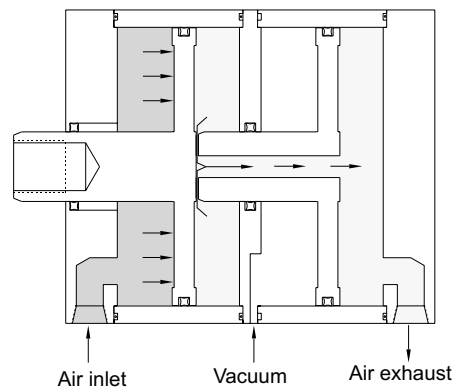
- HIGHER PRESSURE SYSTEM,
- AIR-OIL BOOSTER,
- BIGGER BORE CYLINDER,
- HYDRAULIC CYLINDERS.

ON THE RETURN STROKE, ONLY ONE PISTON IS POWERED, SAVING AIR VOLUME AND OPERATING COSTS; IT ALSO INCREASE WORKING SPEED.

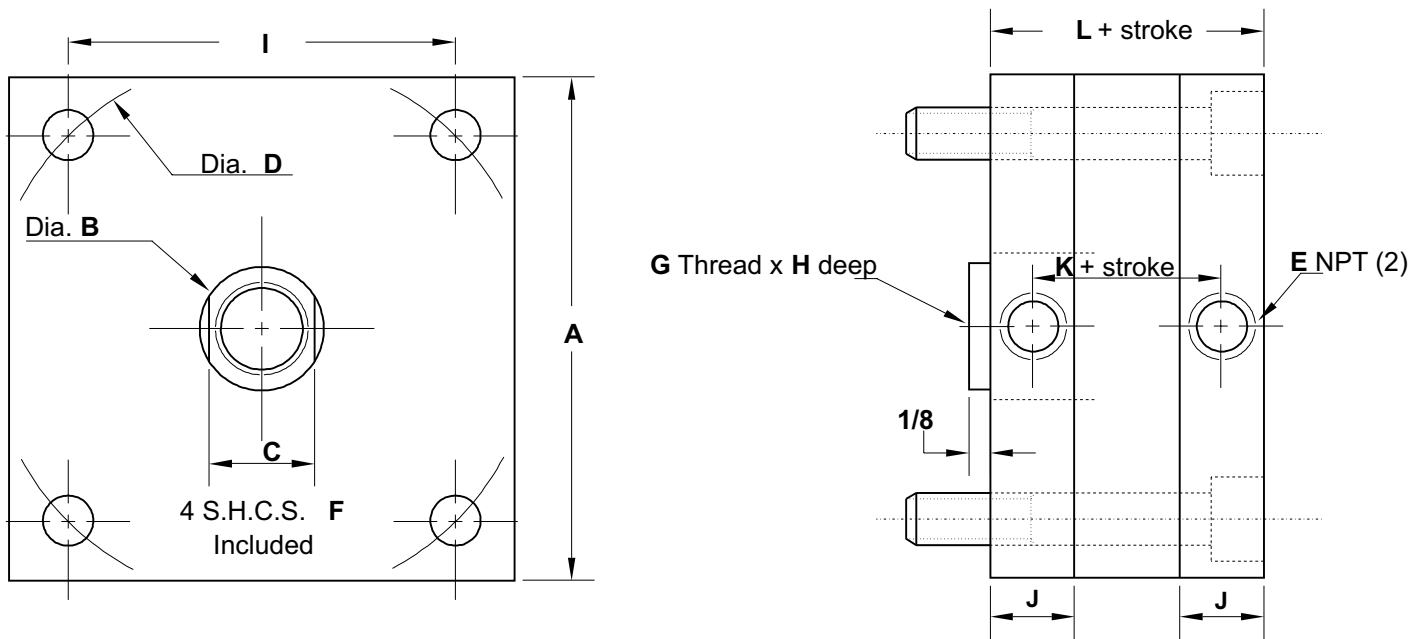
EXTENSION - AIR TO BOTH PISTONS



RETRACTION - AIR TO ONE PISTON ONLY



# STAR 1 DOUBLE ACTING (SINGLE OR MULTI STAGE)



STANDARD STROKE 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1½, 2

Bore dia.	A	B	C	D	E	F	G	H	I	J	K	L	adders for additional stage
9/16	1	1/4	7/32	0.875	#10-32	#4	#8-32	0.40	0.619	0.340	0.540	0.880	N/A
3/4	1 1/4	5/16	1/4	1.219	#10-32	#6	#10-32	0.44	0.862	0.340	0.540	0.880	N/A
1 1/16	1 1/2	1/2	7/16	1.687	1/8	#6	5/16-24	0.62	1.193	0.500	0.720	1.220	.350 + stroke
1 1/2	2	5/8	1/2	2.187	1/8	#10	3/8-24	0.62	1.547	0.500	0.720	1.220	.350 + stroke
2	2 1/2	3/4	5/8	2.687	1/8	#10	1/2-20	0.70	1.900	0.540	0.780	1.320	.390 + stroke
2 1/2	3	3/4	5/8	3.250	1/8	1/4	1/2-20	0.70	2.298	0.540	0.780	1.320	.390 + stroke
3	3 1/2	7/8	3/4	3.781	1/8	1/4	5/8-18	0.70	2.674	0.565	0.865	1.430	.450 + stroke
3 1/2	4	1	7/8	4.596	1/4	3/8*	3/4-16	0.70	3.250	0.690	1.040	1.730	.560 + stroke
4	4 1/2	1	7/8	4.937	1/4	3/8*	3/4-16	0.70	3.491	0.690	1.040	1.730	.560 + stroke

\* The standard bolt is 3/8, 5/16 bolt can be request for single stage. On some multi-stage cylinders, when the height of the bolts is greater than the standard, hex. Bolts or tie rods are used.

## HOW TO CALCULATE MULTI-STAGE CYLINDER HEIGHT ?

EX: 3 STAGES, 2" BORE, 1" STROKE

**BASIC STAGE** = L + STROKE - 1.320 + 1" = 2.320

**ADD STAGE** = .390 + STROKE = .390 + 1" = 1.390 X 2 (2 ADD STAGES) = 2.780

**TOTAL** = 2.320 + 2.780 = 5.100

BORE DIA.	PULL FORCE	PUSH FORCES (lbs) WITH MULTI-STAGES (100 PSI)						
		1 stage	2 stages	3 stages	4 stages	5 stages	6 stages	adders for add. stages
9/16	20	25	Not Available					
3/4	37	44	Not Available					
1/16	69	89	168	247	325	405	483	78
1 1/2	146	177	336	495	654	813	971	158
2	270	314	600	885	1171	1456	1742	285
2 1/2	447	491	953	1415	1877	2340	2802	462
3	647	707	1370	2034	2698	3361	4025	663
3 1/2	884	962	1869	2776	3683	4590	5498	907
4	1178	1257	2458	3660	4861	6063	7265	1201

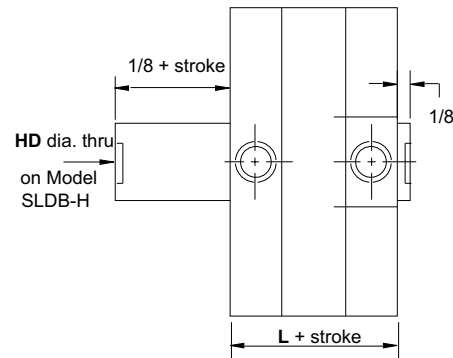
# STAR 1 CYLINDERS TYPE

## SLDB DOUBLE ROD

(Not available in multi-stage cylinders)  
CODE SLDB or SLDB-H (hollow rod)

Bore Dia.	HD (SLDB-H) hollow rod	L
9/16	†	1.240
3/4	9/64	1.240
1 1/16	7/32	1.580
1 1/2	9/32	1.580
2	3/8	1.660
2 1/2	3/8	1.660
3	7/16	1.735
3 1/2	1/2	2.230
4	1/2	2.230

†: Hollow rod not available

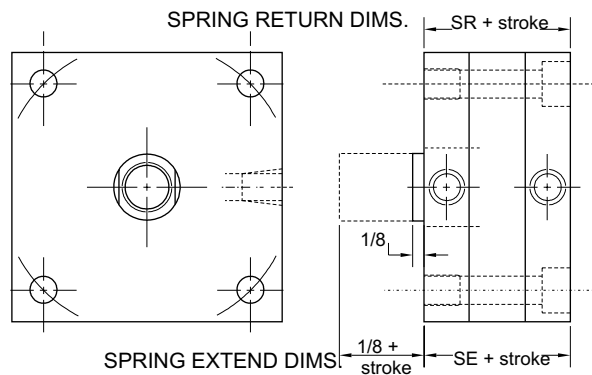


## SLSR SPRING RETURN

## SLSE SPRING EXTEND

MUST BE USED WITH MOUNTING OPTION. (SIDE TAPPED, ETC..)

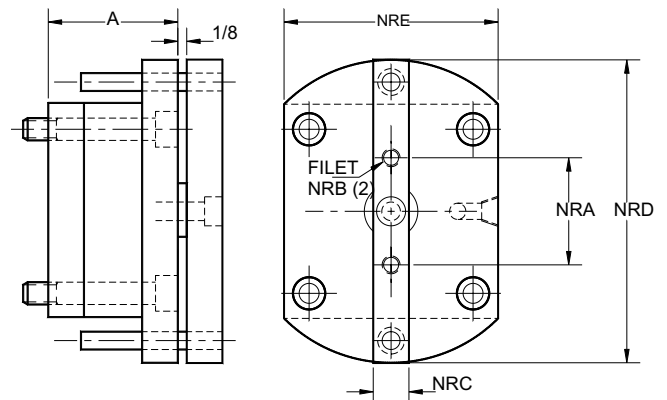
1/8" to 1" Stroke	
Bore dia.	SE or SR
9/16	1.13
3/4	1.13
1 1/16	1.47
1 1/2	1.47
2	1.57
2 1/2	1.57
3	1.68
3 1/2	1.98
4	1.98



1 1/8" to 2" Stroke	
Bore dia.	SE or SR
9/16	1.38
3/4	1.38
1 1/16	1.72
1 1/2	1.72
2	1.82
2 1/2	1.82
3	1.93
3 1/2	2.23
4	2.23

## SLNR NON-ROTATING

BORE DIA.	L	NRA	NRB	NRC	NRD	NRE
1 1/2	1.220	1 1/2	1/4 - 20	1/2	2 7/8	2
2	1.320	1 7/8	1/4 - 20	5/8	3 1/2	2 1/2
2 1/2	1.320	1 7/8	1/4 - 20	5/8	4 1/4	3
3	1.430	2	5/16 - 18	3/4	5	3 1/2
3 1/2	1.730	2	5/16 - 18	3/4	5 5/8	4
4	1.730	2	5/16 - 18	3/4	6 3/8	4 1/2

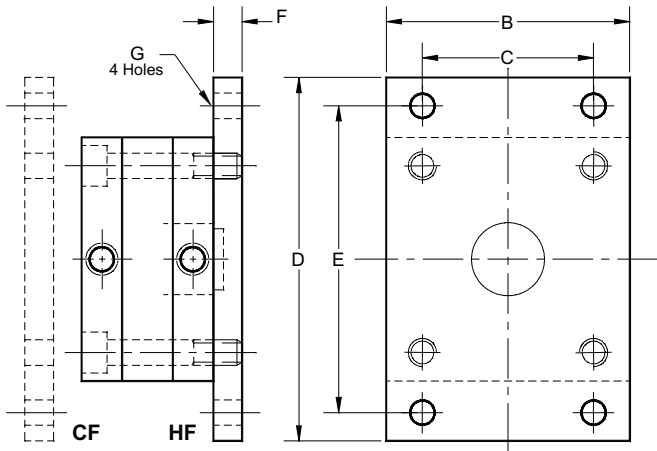


\* CAN BE USED WITH MULTI-STAGES AND OTHER MOUNTING OPTIONS.

# STAR 1

## CYLINDERS MOUNTING

### CF CM CAP & HEAD RECTANGULAR FLANGE

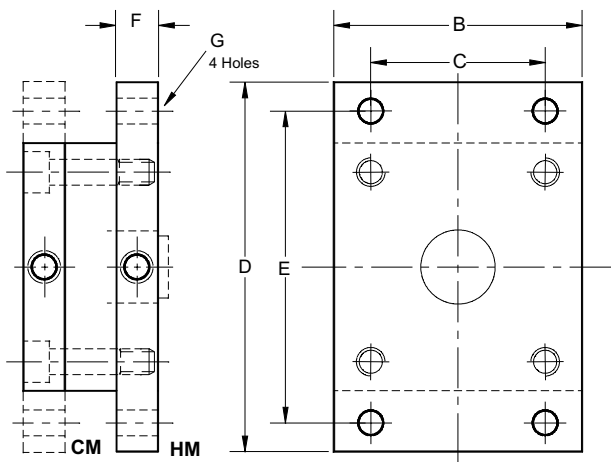


Bore Dia.	B	C	D	E	F	G
9/16	1	0.619	1 3/4	1 3/8	1/4	1/8
3/4	1 1/4	0.862	2	1 5/8	1/4	5/32
1 1/16	1 1/2	1.193	2 1/4	1 7/8	3/8	5/32
1 1/2	2	1.547	2 7/8	2 7/16	3/8	13/64
2	2 1/2	1.900	3 3/4	3 1/8	3/8	13/64
2 1/2	3	2.298	4 1/2	3 3/4	3/8	9/32
3	3 1/2	2.674	5	4 1/4	5/8	9/32
3 1/2	4	3.250	6	5	5/8	11/32
4	4 1/2	3.491	6 1/2	5 1/2	5/8	11/32

CF: Cap flange

HF: Head flange

### CM HM RECTANGULAR CAP & HEAD MOUNTING

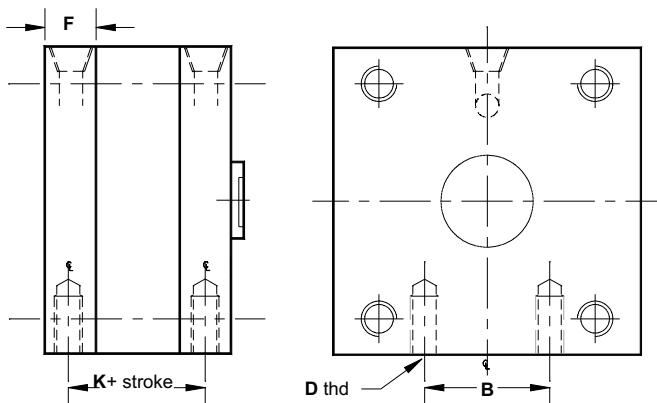


Bore Dia.	B	C	D	E	F	G
9/16	1	0.619	1 3/4	1 3/8	0.340	1/8
3/4	1 1/4	0.862	2	1 5/8	0.340	5/32
1 1/16	1 1/2	1.193	2 1/4	1 7/8	0.500	5/32
1 1/2	2	1.547	2 7/8	2 7/16	0.500	13/64
2	2 1/2	1.900	3 3/4	3 1/8	0.540	13/64
2 1/2	3	2.298	4 1/2	3 3/4	0.540	9/32
3	3 1/2	2.674	5	4 1/4	0.565	9/32
3 1/2	4	3.250	6	5	0.690	11/32
4	4 1/2	3.491	6 1/2	5 1/2	0.690	11/32

CM: Cap rectangular mounting

HM: Head rectangular mounting

### ST SIDE TAPPED



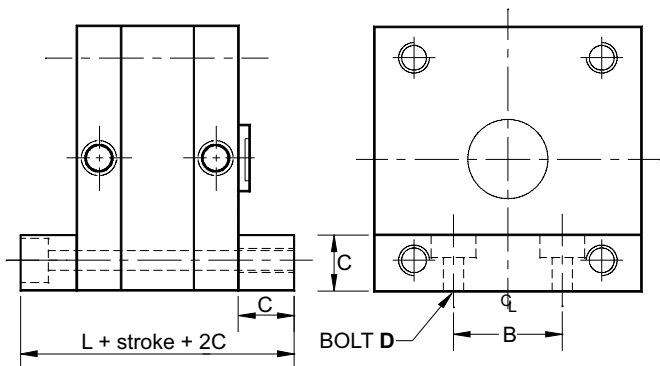
Bore Dia.	B	D	F	K
9/16	†	4-40	0.340	0.540
3/4	†	6-32	0.340	0.540
1 1/16	.800	6-32	0.500	0.720
1 1/2	1 1/8	10-24	0.500	0.720
2	1 3/8	10-24	0.540	0.780
2 1/2	1 5/8	1/4 - 20	0.540	0.780
3	2	1/4 - 20	0.565	0.865
3 1/2	2 3/8	5/16 - 18	0.690	1.040
4	2 5/8	5/16 - 18	0.690	1.040

† : 1 central bolt for 9/16 and 3/4 dia.

# STAR 1

## CYLINDERS MOUNTING

### SB SIDE BLOCK

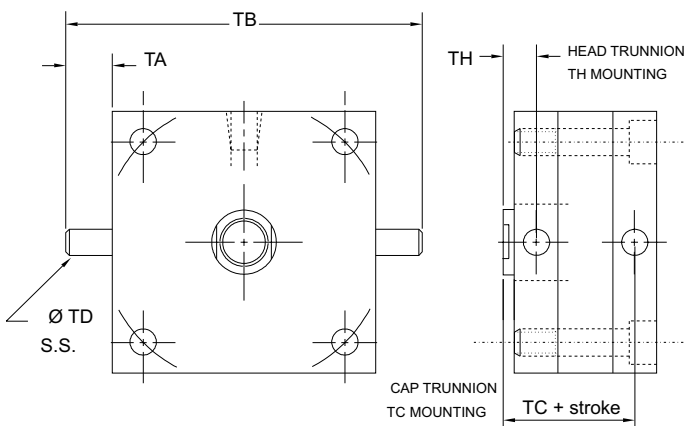


Bore Dia.	B	C	D	L
9/16	†	5/16	4-40	0.880
3/4	†	5/16	6-32	0.880
1 1/16	.675	5/16	6-32	1.220
1 1/2	7/8	1/2	10-24	1.220
2	1 1/4	5/8	10-24	1.320
2 1/2	1 3/8	5/8	¼ - 20	1.320
3	1 3/4	3/4	¼ - 20	1.430
3 1/2	2 3/8	1	5/16 - 18	1.730
4	2 5/8	1	5/16 - 18	1.730

† : 1 central bolt for 9/16 and 3/4 dia.

### TC or HC CAP OR HEAD TRUNNION

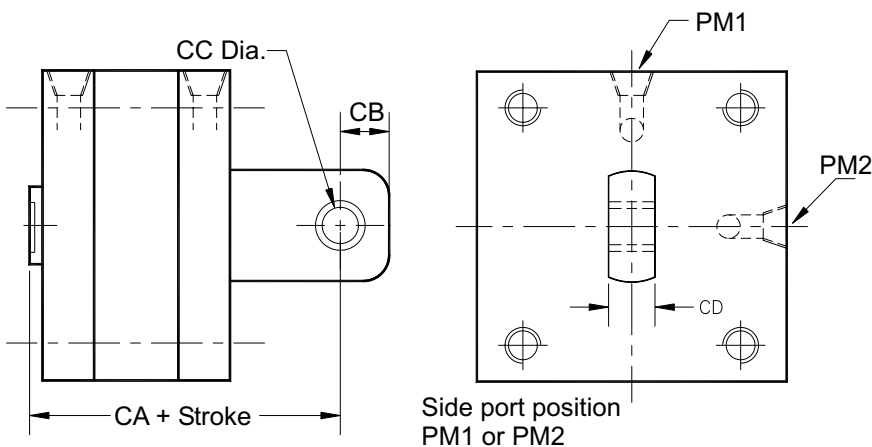
NOT AVAILABLE WITH MULTI-STAGE AS STANDARD



Bore dia.	TA	TB	TC	TD	TH
9/16 & 3/4	Not Available				
1 1/16	1/2	2½	1.095	0.250	0.375
1 1/2	1/2	3	1.095	0.250	0.375
2	1/2	3½	1.175	0.250	0.395
2 1/2	5/8	4¼	1.175	0.312	0.395
3	5/8	4¾	1.273	0.312	0.408
3 1/2	3/4	5½	1.510	0.375	0.470
4	3/4	6	1.510	0.375	0.470

### PM1 or PM2 PIVOT MOUNT

Available with multi-stage cylinders.

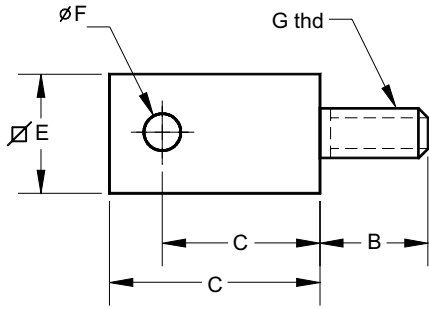


Bore dia.	CA	CB	CC	CD
9/16	1.505	1/4	3/16	3/8
3/4	1.505	1/4	3/16	3/8
1 1/16	1.845	1/4	3/16	3/8
1 1/2	2.155	7/16	3/8	3/4
2	2.312	7/16	3/8	3/4
2 1/2	2.312	7/16	3/8	3/4
3	2.830	9/16	5/8	1
3 1/2	3.135	9/16	5/8	1
4	3.135	9/16	5/8	1

Side port position  
PM1 or PM2

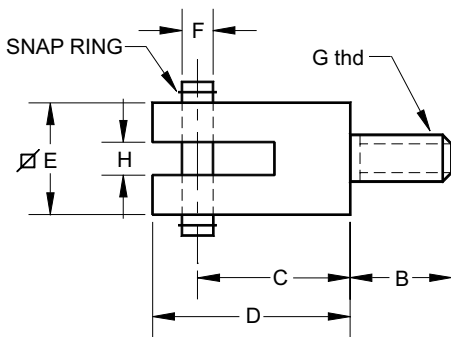
# STAR 1 CYLINDERS ACCESSORIES

## RP ROD PIVOT



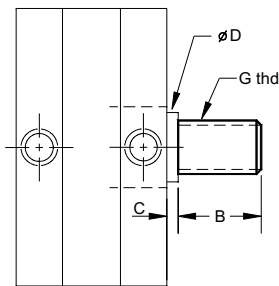
CODE	Bore dia.	B	C	D	E	F	G
RP-01	9/16	3/8	15/32	21/32	3/8	3/16	8 - 32
RP-02	3/4	3/8	15/32	21/32	3/8	3/16	10 - 32
RP-03	1 1/16	9/16	15/32	21/32	3/8	3/16	5/16-24
RP-04	1 1/2	5/8	23/32	1 1/8	3/4	3/8	3/8 - 24
RP-05	2	11/16	23/32	1 1/8	3/4	3/8	1/2 - 20
RP-05	2 1/2	11/16	23/32	1 1/8	3/4	3/8	1/2 - 20
RP-06	3	3/4	1	1 1/2	1	1/2	5/8 - 18
RP-07	3 1/2	3/4	1	1 1/2	1	1/2	3/4 - 16
RP-07	4	3/4	1	1 1/2	1	1/2	3/4 - 16

## RC ROD CLEVIS



CODE	Bore dia.	B	C	D	E	F	G	H
RC-01	9/16	3/8	3/4	1	1/2	3/16	8 - 32	0.190
RC-02	3/4	3/8	3/4	1	1/2	3/16	10 - 32	0.190
RC-03	1 1/16	9/16	7/8	1 5/32	3/4	3/16	5/16-24	0.250
RC-04	1 1/2	5/8	1 1/4	1 5/8	1	3/8	3/8 - 24	0.320
RC-05	2	11/16	1 1/4	1 5/8	1	3/8	1/2 - 20	0.320
RC-06	2 1/2	11/16	1 1/4	1 5/8	1	3/8	1/2 - 20	0.320
RC-06	3	3/4	1 1/4	1 5/8	1	1/2	5/8 - 18	0.320
RC-07	3 1/2	3/4	1 5/8	2 1/8	1	1/2	3/4 - 16	0.500
RC-07	4	3/4	1 5/8	2 1/8	1	1/2	3/4 - 16	0.500

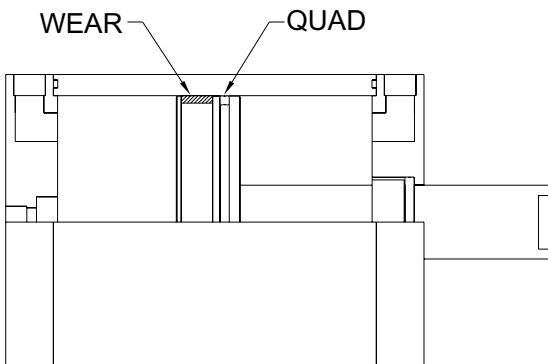
## MR MALE ROD END



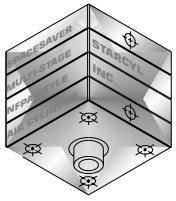
CODE	Bore Dia.	B	C	D	G
MR-01	9/16	3/8	1/8	1/4	8 - 32
MR-02	3/4	3/8	1/8	5/16	10 - 32
MR-03	1 1/16	9/16	1/8	1/2	5/16-24
MR-04	1 1/2	5/8	1/8	5/8	3/8 - 24
MR-05	2	11/16	1/8	3/4	1/2 - 20
MR-05	2 1/2	11/16	1/8	3/4	1/2 - 20
MR-06	3	3/4	1/8	7/8	5/8 - 18
MR-07	3 1/2	3/4	1/8	1	3/4 - 16
MR-07	4	3/4	1/8	1	3/4 - 16

## W WEAR RING

( to avoid metal to metal contact)



Bore Dia.	Length adds
9/16	N/a
3/4	N/a
1 1/16	0.360
1 1/2	0.360
2	0.340
2 1/2	0.340
3	0.305
3 1/2	0.500
4	0.500



# STARCYL

## AIR CYLINDERS

### HOW TO ORDER...

TYPE	
SL	DOUBLE ACTING, SINGLE END ROD
SLSR	SINGLE ACTION, SPRING RETURN
SLSE	SINGLE ACTION, SPRING EXTEND
SLDB	DOUBLE END ROD
SLNR	NON ROTATING
SLAS-x	ADDITIONAL STAGE KIT

BORE SIZE	
0560	9/16
1060	1 1/16
1500	1 1/2
2000	2
2500	2 1/2
3000	3
3500	3 1/2
4000	4

STROKE LENGTH	
02	1/8
06	3/8
08	1/2
12	3/4
16	1
32	2
...	Etc

SL - 4000 - 16 - S3 - CF - RP

STAGES	
NO CODE	1 STAGE
S2	2 STAGES
S3	3 STAGES
S4	4 STAGES
S5	5 STAGES
S6	6 STAGES
S7	Etc.

MOUNTING OPTIONS	
NO CODE	BASIC MODEL
CF	CAP FLANGE
HF	HEAD FLANGE
CM	CAP RECT. MOUNTING
HM	HEAD RECT. MOUNTING
ST	SIDE TAPPED
SB	SIDE BLOCK
TC	CAP TRUNNION
TH	HEAD TRUNNION
PMx	PIVOT MOUNT

OPTIONS	
NO CODE	BASIC MODEL
RPxx	ROD PIVOT
RCxx	ROD CLEVIS
MRxx	MALE ROD END
TBxx	TRUNNION BRACKET
CBxx	CLEVIS BRACKET
R	MULTI-STAGE RETRACT
B	BUMPER
RE	ROD EXTENSION 1/2"
W	WEAR RING †

† : Protect your cylinder against side load in adding a piston wear ring.

Number **SL-4000-16-S3-CF-RP** is a double acting cylinder, 4" bore, 1" stroke, 3 stages, cap flange with rod pivot.

For ordering additional stages, add the code of your cylinder after the kit code (SLAS-x). Ex. **SLAS-2-4000-16-S2**: is 2 additional stage kits for your cylinder 4" bore, 1" stroke, 2 stages. After assembly you will have a cylinder with 4 stages.

FOR SPECIAL ORDER, ADD PREFIX **SP** TO CYLINDER CODE. EX. **SP-SL-4000-03-S2**.

#### TWO-YEAR WARRANTY

ALL STARCYL CYLINDERS ARE WARRANTED TO BE FREE FROM DEFECTS IN MATERIAL OR MANUFACTURE FOR TWO YEARS FROM DATE OF SHIPMENT. THIS WARRANTY DOES NOT COVER PRODUCTS WHICH HAVE BEEN SUBJECT TO MISUSE, NEGLIGENCE, ACCIDENTS, MISAPPLICATION OR TAMPERING IN A WAY SO AS TO AFFECT THEIR NORMAL PERFORMANCE.

YOUR STARCYL DISTRIBUTOR:

**STARCYL**  
USA 1-877-STARCYL

**WWW.STARCYL.COM**

TEL: 1-450-661-1212  
FAX: 1-450-661-0094