



STARCYL

AIR CYLINDERS

...To boldly go where no cylinder
has gone before...



WWW.STARCYL.COM

- ☑ N.F.P.A. Interchangeable
- ☑ Flush mount std.
- ☑ 9 Bore sizes 1½" through 10"
- ☑ Strokes - available to any practical length
- ☑ 18 standard Mounting Styles
- ☑ Check Seal Cushions
- ☑ 250 PSI AIR
- ☑ Two Year Warranty
- ☑ Economic design

STAR3 SERIES

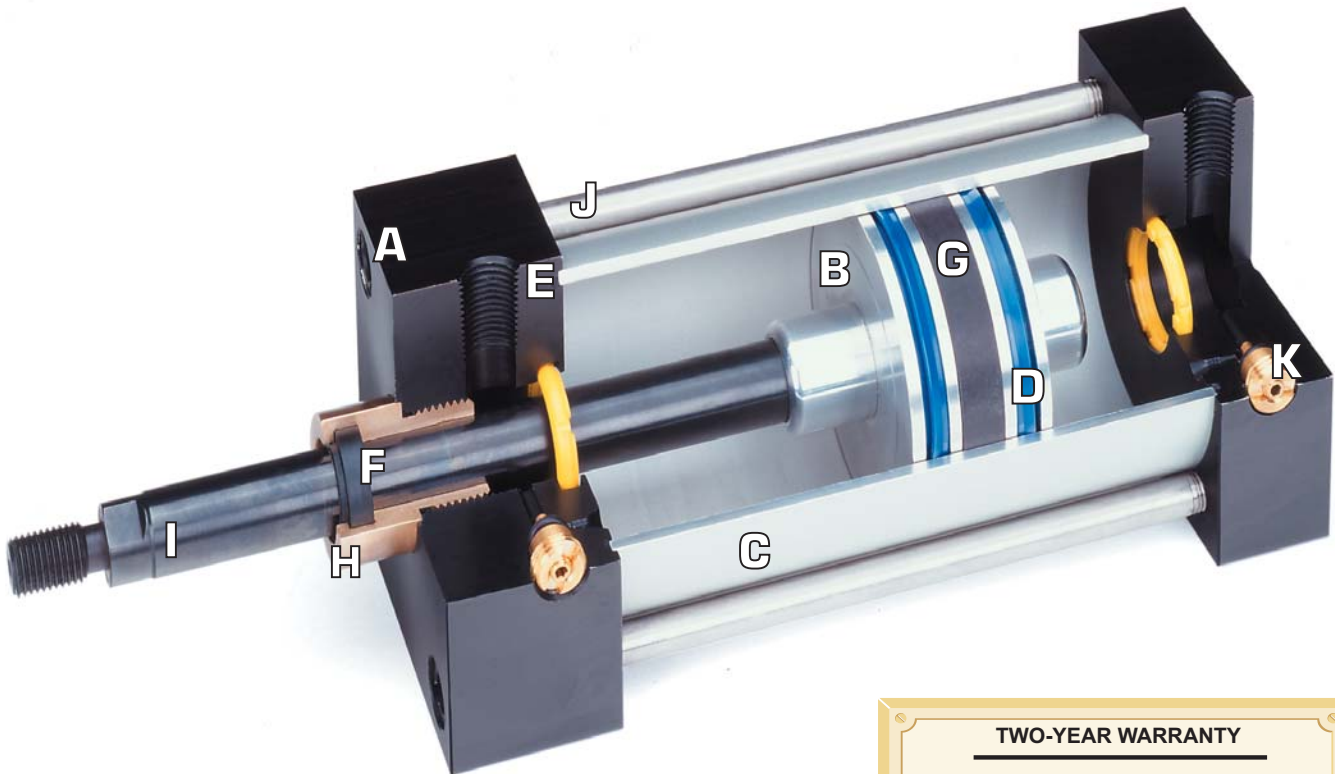


NFPA
Solutions through
motion technology
MEMBER

STAR3 CYLINDERS - Design features

- A Solid Aluminum Head & Cap**
Machined from solid aluminum bar stock (6061 T6) and black anodized for corrosion resistance. (Also available in Stainless Steel).
- B Piston**
Machined from solid aluminum bar stock (6061-T6). Offers long bearing support.
- C Hard Anodized ID Aluminum Tube**
(60 Rc) Provides superior wear resistance, and lower friction coefficient for maximum seal life. (Also available in Stainless Steel.)
- D Piston Seal**
Lip-type low friction urethane piston seals are pressure energized and wear compensating for low friction and long life (temperature: -10° to 200°F) (Viton™ also Available up to 400°F)
- E O-ring Tube End Seals**
Nitrile O-ring design is pressure compensating and reusable.
- F Rod lipseal/wiper**
Combination is completely self compensating for zero leakage at all pressures. Wipes dirt out for less maintenance and longer life of the cylinder. (Urethane)

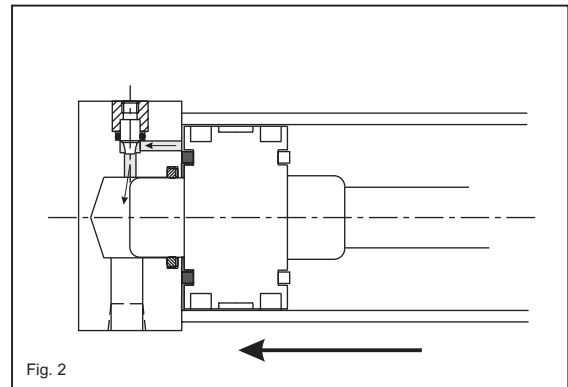
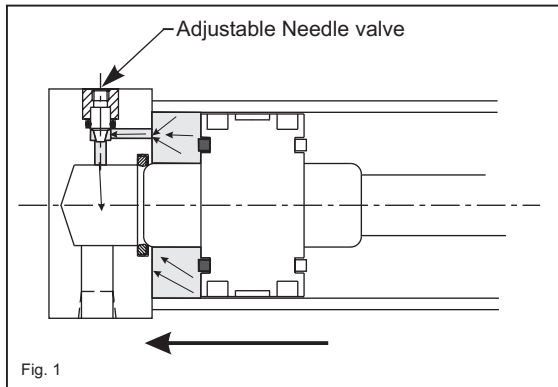
- G Piston Wear Ring**
Nylon material is design for low friction, and to ensure maximum wear in the cylinder in side load application. Eliminates metal-to-metal contact.
- H Rod Gland**
Bronze gland is externally removable without cylinder disassembly for easy maintenance. Design to provide maximum rod bearing. (Also available in Acetal)
- I Piston Rod**
High Strength steel. NITROCARBURIZING treatment on the rod gives better corrosion-resistant properties (out performs 12-micron (.0005 in.) chromium electroplating by ratio up to 20:1.), improved wear resistance, better lubrication retention, dent resistance without induction hardening (60Rc), environmentally Friendly, no surface pitting, flaking, or hydrogen embrittlement. The finish created by the process is a lustrous black. (Available in stainless steel)
- J Tie rods**
Corrosion resistant (Nitro carburizing), stress proof steel maintains uniform compression on tube end seals. (Stainless steel may be used)
- K Check seal Cushion and Needle valves**
(No charge adders - Standard on 1½" to 5" Bore)
Precision Cushion spuds combine with a new style of floating cushion seal provide smooth deceleration at end of the stroke. Needle valves makes adjustments easy. (brass or stainless steel)



TWO-YEAR WARRANTY

ALL STARCYL CYLINDERS ARE WARRANTED FOR A PERIOD OF TWO YEARS FROM DATE OF SHIPMENT FROM OUR PLANT, TO BE FREE FROM DEFECTS IN WORKMANSHIP AND MATERIAL UNDER CORRECT USE, NORMAL OPERATING CONDITIONS AND PROPER APPLICATIONS. THIS WARRANTY DOES NOT EXTEND TO GOODS DAMAGED, SUBJECT TO ACCIDENT, ABUSE OR MISUSE AFTER SHIPMENT FROM OUR FACTORY, NOR TO GOODS ALTERED OR REPAIRED BY ANYONE OTHER THAN AUTHORIZED STARCYL REPRESENTATIVES.
Full warranty details available on request.

STAR3 CYLINDERS - Dampening system, how it works...



The cushioning process begins when the Cushion piston (Spud) enters the dynamic sealing lips (Fig 1.). The seal moves to the back of the groove creating a seal on the inside diameter and on the back of the cushion seal. The exhaust port is closed by the cushion seal. Pressure increases between the piston and the cushion seal due to the movement of the piston toward the end of the cylinder. Cushioning is adjusted by controlling the flow through a throttle port which is regulated by the needle valve.

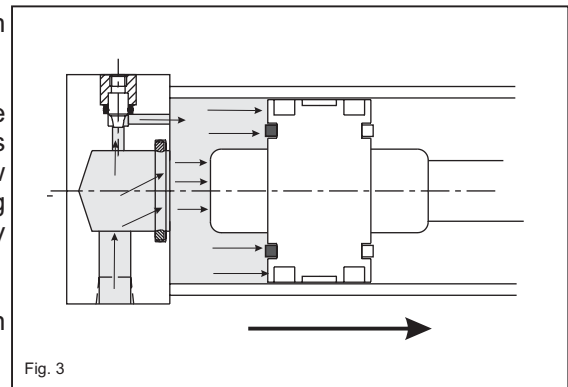
In addition Starcyl piston's design includes on both side a circular groove containing a dampening ring (bumper) which absorbs the remaining kinetic shock vibration and noise created by the impact (Fig. 2) giving a softer and quieter impact. With this design the cycle time can be increased by opening the needle valve of the air cushioning and let the bumpers absorb the rest.

These bumpers are effective only the last 0.020" to .030" of the cylinder's stroke and do not require an extra length adders. With the pressure the bumpers will be compressed to full stroke. (Urethane bumper are also used for heavy application)

At the end of the stroke (Fig. 2), pressure is equal on both sides of the cushion seal.

The return pressure moves the cushion axially (Fig. 3) until the stop cams reach the front of the groove. The pressure is allowed to by-pass the outside diameter of the seal to allow constant acceleration. In the same time, the Bumper Ring releases its compressive energy to propel the piston away from the end cap, producing an immediate breakaway.

The spud on the other end of the piston enters the cushion seal on the head end and then the process begins again.



SELECTING BORE SIZE

The following formula may be used in the selection of the proper bore size:

- Extended (push) force in pounds =
(bore area in sq. in.) x (pressure in psi)
- Retract (pull) force in pounds =
(bore area in sq. in.) - (Rod area in sq. in.) x (pressure in psi)

Exemple: 3¼ bore, standard rod size 1" & shop air pressure of 90 psi

Push force 8.296 (sq. in.) x 90 (pound / sq. in.) = 746.64 pounds
Pull force 8.296 (sq. in.) - 0.785 (sq. in.) x 90 (pound / sq. in.) = 675.99 pounds

BORE (IN.)	AREA (SQ. IN.)	ROD SIZE (IN.)	ROD AREA (SQ. IN.)
1.5	1.767	0.625	0.307
2	3.142	0.625	0.307
2.5	4.909	0.625	0.307
3.25	8.296	1.000	0.785
4	12.566	1.000	0.785
5	19.635	1.000	0.785
6	28.274	1.375	1.485
8	50.266	1.375	1.485
10	78.540	1.750	2.405

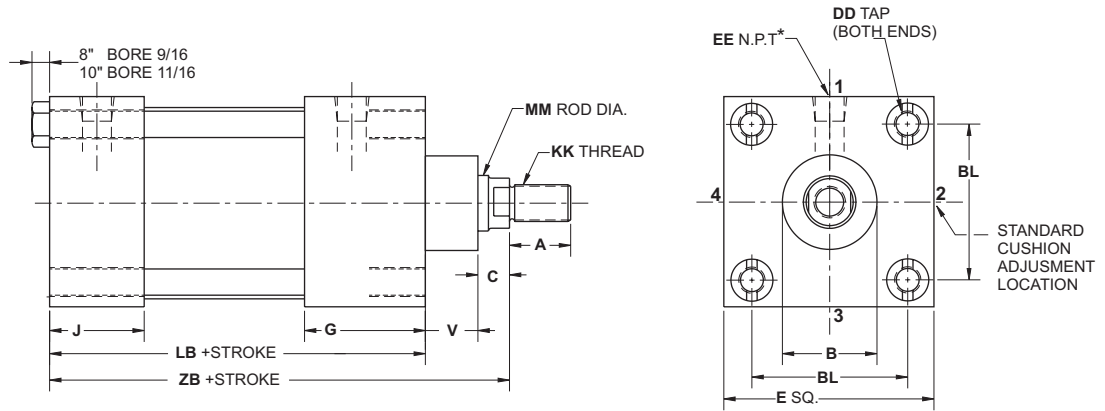
STAR3 CYLINDERS - Standard rod diameters

STAR3 SERIES

1 1/2" - 10" BORE
 Pressure rating:
 250 psi air
 or oil service.
 Stock stroke
 for 1 1/2" to 5" bores:
 1", 2", 3", 4", 5",
 6", 8", 10", 12".

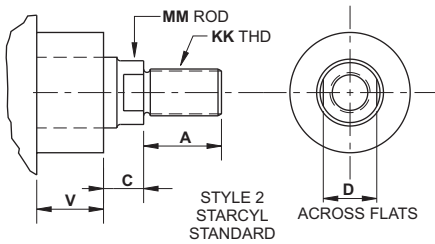
Stroke lengths to
 suit are available in
 all bore sizes

Model ST3 basic cylinder



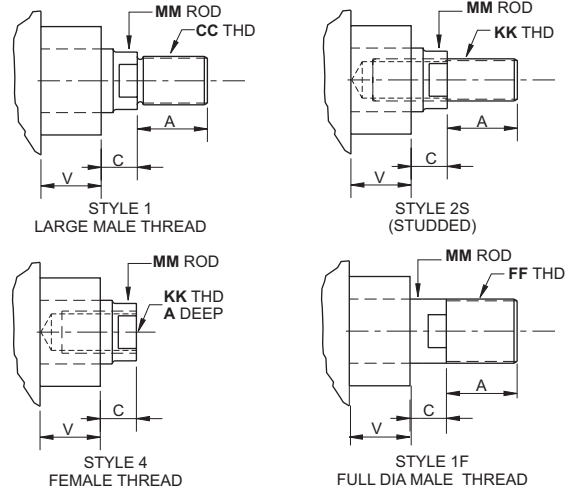
BORE	1 1/2	2	2 1/2	3 1/4	4	5	6	8	10
A	3/4	3/4	3/4	1 1/8	1 1/8	1 1/8	1 5/8	1 5/8	2
B	1 1/8	1 1/8	1 1/8	1 1/2	1 1/2	1 1/2	2	2	2 3/8
BL	1,43	1,84	2,19	2,78	3,32	4,12	4,88	6,44	7,92
C	3/8	3/8	3/8	1/2	1/2	1/2	5/8	5/8	3/4
DD	1/4-28	5/16-24	5/16-24	3/8-24	3/8-24	1/2-20	1/2-20	5/8-18	3/4-16
E	2	2 1/2	3	3 3/4	4 1/2	5 1/2	6 1/2	8 1/2	10 5/8
EE	3/8	3/8	3/8	1/2	1/2	1/2	3/4	3/4	1
G	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4	2	2	2 1/4
J	1	1	1	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	2
KK	7/16-20	7/16-20	7/16-20	3/4-16	3/4-16	3/4-16	1-14	1-14	1 1/4-12
LB	3 5/8	3 5/8	3 3/4	4 1/4	4 1/4	4 1/2	5	5 1/8	6 3/8
MM	5/8	5/8	5/8	1	1	1	1 3/8	1 3/8	1 3/4
V	5/8	5/8	5/8	7/8	7/8	7/8	1	1	1 1/8
ZB	4 5/8	4 5/8	4 3/4	5 5/8	5 5/8	5 7/8	6 5/8	6 3/4	8 1/4

STANDARD



Rod end style

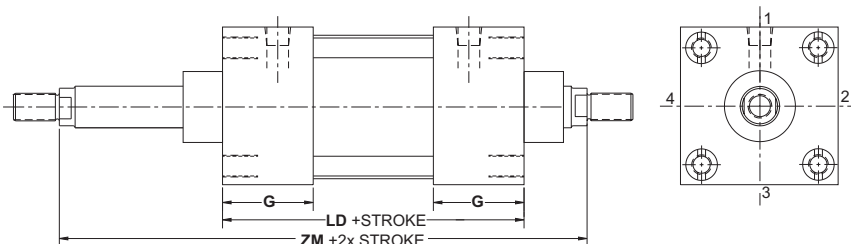
OPTIONAL



NOTE: STYLE #2 FURNISHED AS STANDARD UNLESS OTHERWISE SPECIFIED.

ROD DIA.	A	C	D	V	CC	FF	KK
5/8	3/4	3/8	1/2	5/8	1/2-20	5/8-18	7/16-20
1	1 1/8	1/2	7/8	7/8	7/8-14	1-14	3/4-16
1 3/8	1 5/8	5/8	1 3/16	1	1 1/4-12	1 3/8-12	1-14
1 3/4	2	3/4	1 1/2	1 1/8	1 1/2-12	1 3/4-12	1 1/4-12
2	2 3/8	7/8	1 3/4	1 1/8	1 3/4-12	2-12	1 1/2-12

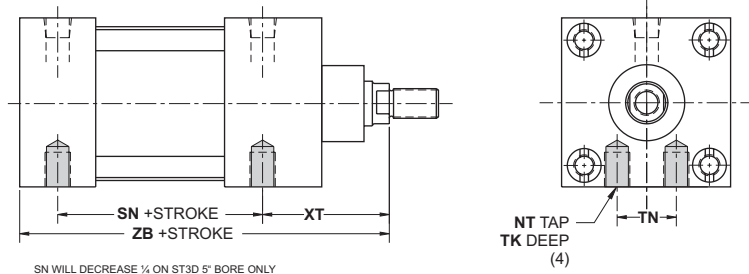
Model ST3D double rod end



BORE	G	LD	ZM
1 1/2	1 1/2	4	6 1/8
2	1 1/2	4	6 1/8
2 1/2	1 1/2	4 1/8	6 1/8
3 1/4	1 3/4	4 3/4	7 1/2
4	1 3/4	4 3/4	7 1/2
5	1 3/4	4 3/4	7 1/2
6	2	5 1/2	8 3/4
8	2	5 5/8	8 7/8
10	2 1/4	6 5/8	10 3/8

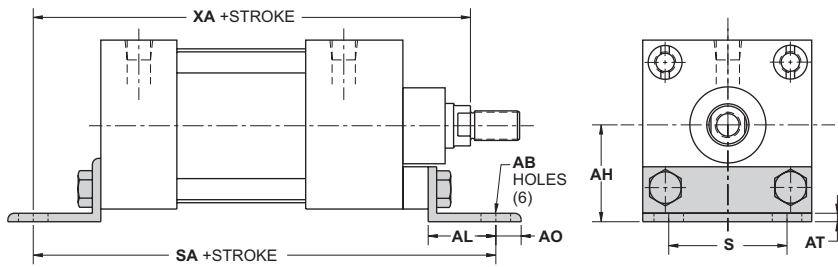
STAR3 CYLINDERS - Mounting options

MODEL ST3S4 BOTTOM TAP MOUNT (NFPA MS4)



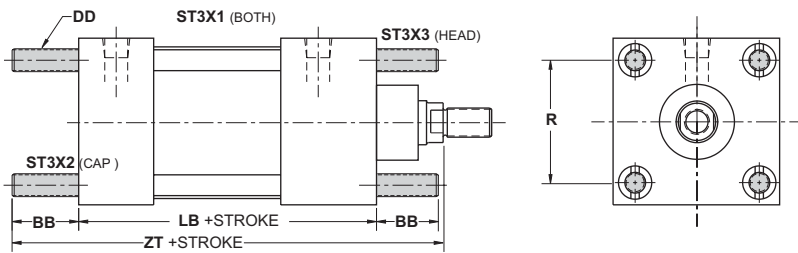
BORE	NT	TK	TN	SN	XT	ZB
1 1/2	1/4 - 20	3/8	5/8	2 1/4	1 15/16	4 5/8
2	5/16 - 18	1/2	7/8	2 1/4	1 15/16	4 5/8
2 1/2	3/8 - 16	5/8	1 1/4	2 3/8	1 15/16	4 3/4
3 1/4	1/2 - 13	3/4	1 1/2	2 5/8	2 7/16	5 5/8
4	1/2 - 13	3/4	2 1/16	2 5/8	2 7/16	5 5/8
5	5/8 - 11	1	2 11/16	2 7/8	2 7/16	5 7/8
6	3/4 - 10	1 1/8	3 1/4	3 1/8	2 13/16	6 5/8
8	3/4 - 10	1 1/8	4 1/2	3 1/4	2 13/16	6 3/4

MODEL ST3S1 ANGLE MOUNT (NFPA MS1)



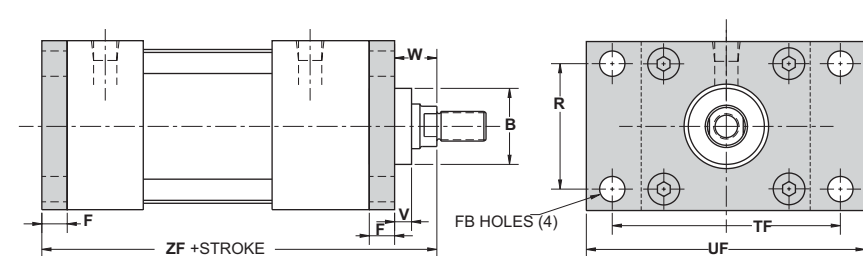
BORE	AB	AH	AL	AO	AT	S	SA
1 1/2	7/16	1 3/16	1	3/8	1/8	1 1/4	6
2	7/16	1 7/16	1	3/8	1/8	1 3/4	6
2 1/2	7/16	1 5/8	1	3/8	1/8	2 1/4	6 1/8
3 1/4	9/16	1 15/16	1 1/4	1/2	3/16	2 3/4	7 3/8
4	9/16	2 1/4	1 1/4	1/2	3/16	3 1/2	7 3/8
5	11/16	2 3/4	1 3/8	5/8	3/16	4 1/4	7 7/8
6	13/16	3 1/4	1 3/8	5/8	1/4	5 1/4	8 1/2

MODEL ST3X(x) TIE RODS EXTENDED MOUNT (NFPA MX1, MX2 & MX3)



BORE	BB	DD	LB	R	ZT
1 1/2	1	1/4-28	3 5/8	1.43	5 5/8
2	1 1/8	5/16-24	3 5/8	1.84	5 3/4
2 1/2	1 1/8	5/16-24	3 3/4	2.19	5 7/8
3 1/4	1 3/8	3/8-24	4 1/4	2.76	7
4	1 3/8	3/8-24	4 1/4	3.32	7
5	1 13/16	1/2-20	4 1/2	4.10	7 11/16
6	1 13/16	1/2-20	5	4.88	8 7/16
8	2 5/16	5/8-18	5 1/8	6.44	9 1/16

MODEL ST3F1 FRONT FLANGE MOUNT (NFPA MF1)

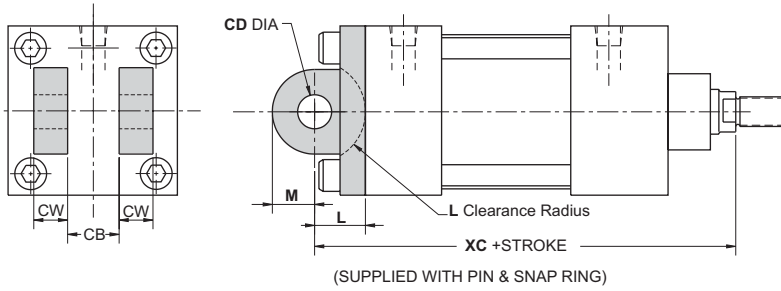


BORE	B	F	FB	R	TF	UF	V	W	ZF
1 1/2	1 1/8	3/8	5/16	1.43	2 3/4	2 3/8	1/4	5/8	5
2	1 1/8	3/8	3/8	1.84	3 3/8	4 1/8	1/4	5/8	5
2 1/2	1 1/8	3/8	3/8	2.19	3 7/8	4 5/8	1/4	5/8	5 1/8
3 1/4	1 1/2	5/8	7/16	2.76	4 11/16	5 1/2	1/4	3/4	6 1/4
4	1 1/2	5/8	7/16	3.32	5 7/16	6 1/4	1/4	3/4	6 1/4
5	1 1/2	5/8	9/16	4.10	6 5/8	7 5/8	1/4	3/4	6 1/2
6	2	3/4	9/16	4.88	7 5/8	8 5/8	1/4	7/8	7 3/8

MODEL ST3F2 REAR FLANGE MOUNT (NFPA MF2)

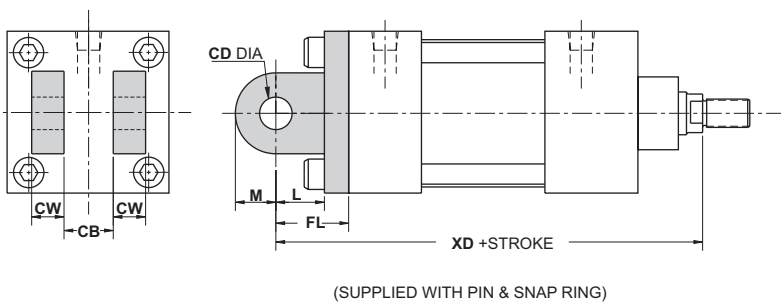
STAR3 CYLINDERS - Mounting options

MODEL ST3P1 CLEVIS MOUNT (NFPA MP1)



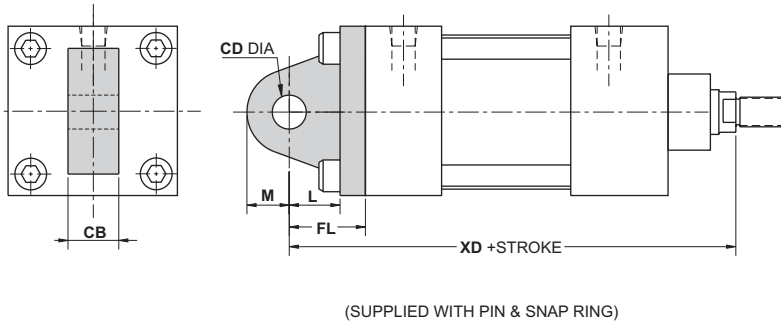
BORE	CB	CD	CW	L	M	XC
1 1/2	3/4	1/2	1/2	3/4	5/8	5 3/8
2	3/4	1/2	1/2	3/4	5/8	5 3/8
2 1/2	3/4	1/2	1/2	3/4	5/8	5 1/2
3 1/4	1 1/4	3/4	5/8	1 1/4	7/8	6 7/8
4	1 1/4	3/4	5/8	1 1/4	7/8	6 7/8
5	1 1/4	3/4	5/8	1 1/4	7/8	7 1/8
6	1 1/2	1	3/4	1 1/2	1 1/4	8 1/8
8	1 1/2	1	3/4	1 1/2	1	8 1/4
10	2	1 3/8	1	2 1/8	1	10 3/8

MODEL ST3P2 DETACHABLE CLEVIS MOUNT (NFPA MP2)



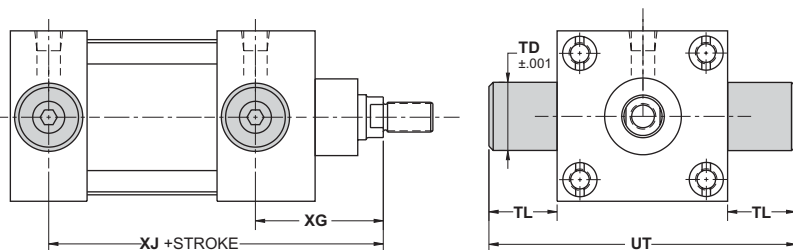
BORE	CB	CD	CW	FL	L	M	XD
1 1/2	3/4	1/2	1/2	1 1/8	3/4	5/8	5 3/4
2	3/4	1/2	1/2	1 1/8	3/4	5/8	5 3/4
2 1/2	3/4	1/2	1/2	1 1/8	3/4	5/8	5 7/8
3 1/4	1 1/4	3/4	5/8	1 7/8	1 1/4	7/8	7 1/2
4	1 1/4	3/4	5/8	1 7/8	1 1/4	7/8	7 1/2
5	1 1/4	3/4	5/8	1 7/8	1 1/4	7/8	7 3/4
6	1 1/2	1	3/4	2 1/4	1 1/2	1 1/8	8 7/8

MODEL ST3P4 DETACHABLE EYE MOUNT (NFPA MP4)



BORE	CB	CD	FL	L	M	XD
1 1/2	3/4	1/2	1 1/8	3/4	5/8	5 3/4
2	3/4	1/2	1 1/8	3/4	5/8	5 3/4
2 1/2	3/4	1/2	1 1/8	3/4	5/8	5 7/8
3 1/4	1 1/4	3/4	1 7/8	1 1/4	7/8	7 1/2
4	1 1/4	3/4	1 7/8	1 1/4	7/8	7 1/2
5	1 1/4	3/4	1 7/8	1 1/4	7/8	7 3/4
6	1 1/2	1	2 1/4	1 1/2	1 1/8	8 7/8

MODEL ST3T1 HEAD TRUNNION MOUNT (NFPA MT1)

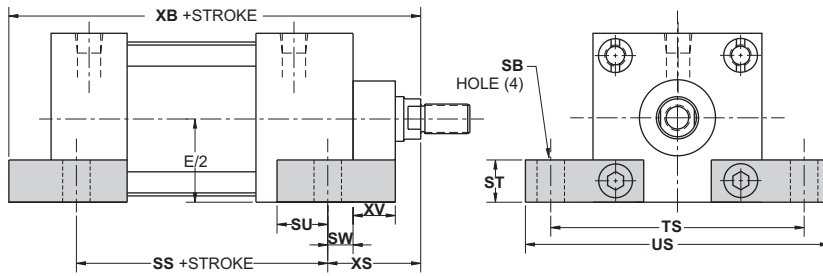


BORE	TD	TL	UT	ST3T1	ST3T2
				XG	XJ
1 1/2	1	1	4	1 3/4	4 1/8
2	1	1	4 1/2	1 3/4	4 1/8
2 1/2	1	1	5	1 3/4	4 1/4
3 1/4	1	1	5 3/4	2 1/4	5
4	1	1	6 1/2	2 1/4	5
5	1	1	7 1/2	2 1/4	5 1/4
6	1 3/8	1 3/8	9 1/4	2 5/8	5 7/8
8	1 3/8	1 3/8	11 1/4	2 5/8	6

MODEL ST3T2 CAP TRUNNION MOUNT (NFPA MT2)

STAR3 CYLINDERS - Standard Rod Dia.

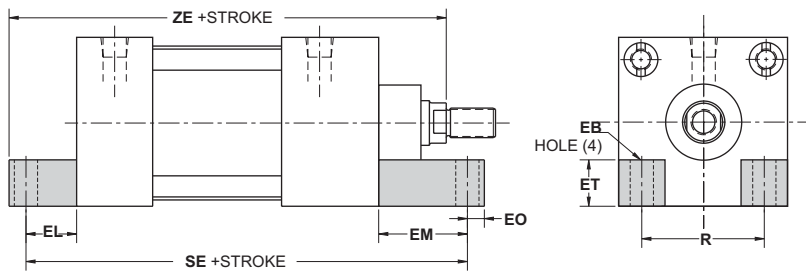
MODEL ST3S2 LUG MOUNT (NFPA MS2)



BORE	SB	SS	ST	SU	SW	TS	US	XB	XS	XV
1 1/2	13/32	2 7/8	1/2	15/16	3/8	2 3/4	3 1/2	5 1/8	1 3/8	1/2
2	13/32	2 7/8	5/8	15/16	3/8	3 1/4	4	5 1/4	1 3/8	5/8
2 1/2	13/32	3	3/4	15/16	3/8	3 3/4	4 1/2	5 3/8	1 3/8	5/8
3 1/4	17/32	3 1/4	7/8	1 1/4	1/2	4 3/4	5 3/4	6 3/8	1 7/8	3/4
4	17/32	3 3/4	1	1 1/4	1/2	5 1/2	6 1/2	6 3/8	1 7/8	3/4
5	25/32	3 1/8	1 1/4	1 9/16	11/16	6 7/8	8 1/4	6 13/16	2 1/16	15/16
6	25/32	3 5/8	1 1/2	1 9/16	11/16	7 7/8	9 1/4	7 9/16	2 5/16	15/16
8	25/32	3 3/4	1 5/8	1 9/16	11/16	9 7/8	11 1/4	7 13/16	2 5/16	1 1/16

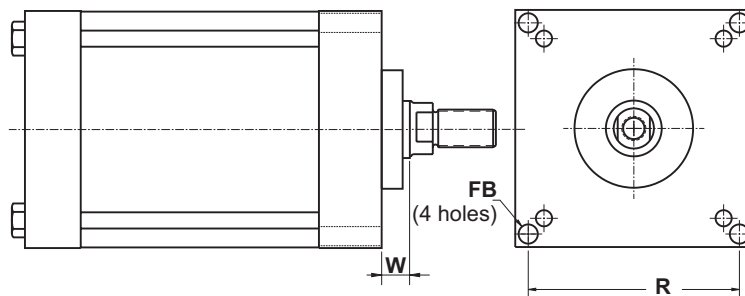
FOR DOUBLE ROD END CYLINDERS ADD 1/2" TO SS DIMENSION EXCEPT ON 5" BORE ADD 1/4".

MODEL ST3S7 END LUG MOUNT (NFPA MS7)



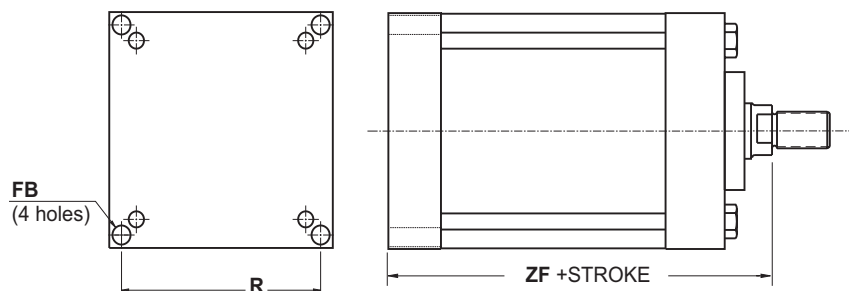
BORE	EB	EL	EM	EO	ET	SE	ZE	R
1 1/2	9/32	3/4	1 1/8	1/4	9/16	5 1/2	5 5/8	1.43
2	11/32	15/16	1 5/16	5/16	11/16	5 7/8	5 7/8	1.84
2 1/2	11/32	1 1/16	1 7/16	5/16	13/16	6 1/4	6 1/8	2.19
3 1/4	13/32	7/8	1 1/2	3/8	1	6 5/8	6 7/8	2.78
4	13/32	1	1 5/8	3/8	1 3/16	6 7/8	7	3.32
5	17/32	1 1/16	1 11/16	9/16	1 3/8	7 1/4	7 1/2	4.12
6	17/32	1	1 3/4	5/8	1 5/8	7 3/4	8 1/4	4.88
8	21/32	1 1/8	1 1/8	3/4	2	7 3/8	8 3/4	6.44

MODEL ST3E3 SQUARE HEAD MOUNT (NFPA ME3)



BORE	8	10
FB	11/16	13/16
R	7.57	9.4
W	1 5/8	1 7/8
ZF	6 3/4	8 1/4

MODEL ST3E4 SQUARE CAP MOUNT (NFPA ME4)



BORE	8	10
FB	11/16	13/16
R	7.57	9.4
W	1 5/8	1 7/8
ZF	6 3/4	8 1/4

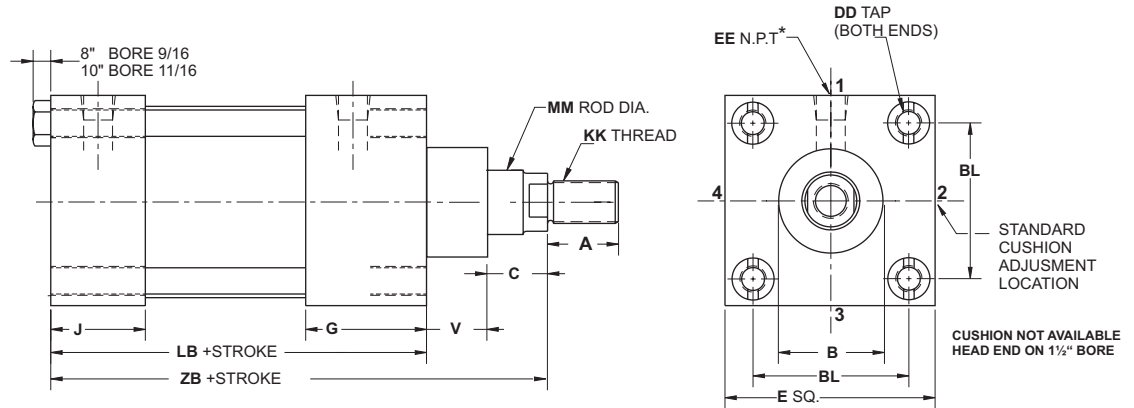
STAR30 CYLINDERS - OVERSIZE rod diameters

STAR3 SERIES

1 1/2" - 10" BORE
Pressure rating:
250 psi air
or oil service.

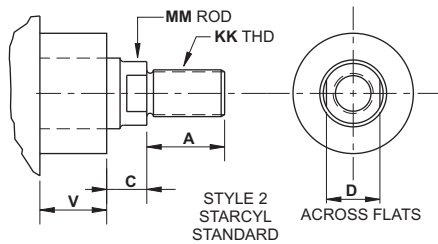
Stroke lengths to
suit are available in
all bore sizes

Model ST30 basic cylinder Flush Mount



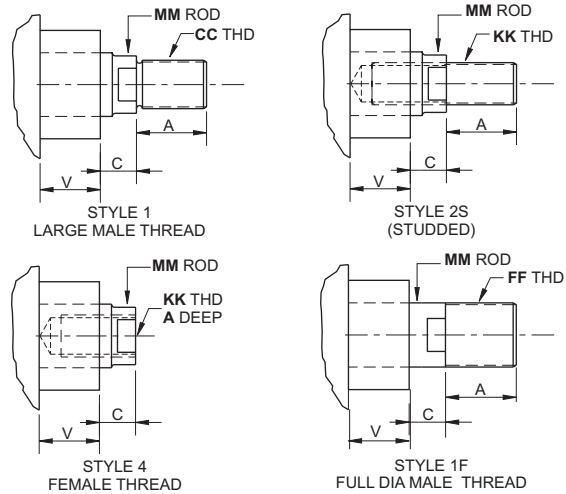
BORE	1 1/2	2	2 1/2	3 1/4	4	5	6	8	10
A	1 1/8	1 1/8	1 1/8	1 5/8	1 5/8	1 5/8	2	2	2 1/4
B	1 1/2	1 1/2	1 1/2	2	2	2	2 3/8	2 3/8	2 5/8
BL	1,43	1,84	2,19	2,78	3,32	4,12	4,88	6,44	7,92
C	1/2	1/2	1/2	5/8	5/8	5/8	3/4	3/4	7/8
DD	1/4-28	5/16-24	5/16-24	3/8-24	3/8-24	1/2-20	1/2-20	5/8-18	3/4-16
E	2	2 1/2	3	3 3/4	4 1/2	5 1/2	6 1/2	8 1/2	10 5/8
EE	3/8	3/8	3/8	1/2	1/2	1/2	3/4	3/4	1
G	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4	2	2	2 1/4
J	1	1	1	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	2
KK	3/4-16	3/4-16	3/4-16	1-14	1-14	1-14	1 1/4-12	1 1/4-12	1 1/2-12
LB	3 5/8	3 5/8	3 3/4	4 1/4	4 1/4	4 1/2	5	5 1/8	6 3/8
MM	1	1	1	1 3/8	1 3/8	1 3/8	1 3/4	1 3/4	2
V	7/8	7/8	7/8	1	1	1	1 1/8	1 1/8	1 1/8
ZB	5	5	5 1/8	5 7/8	5 7/8	6 1/8	6 7/8	7	8 3/8

STANDARD



Rod end style

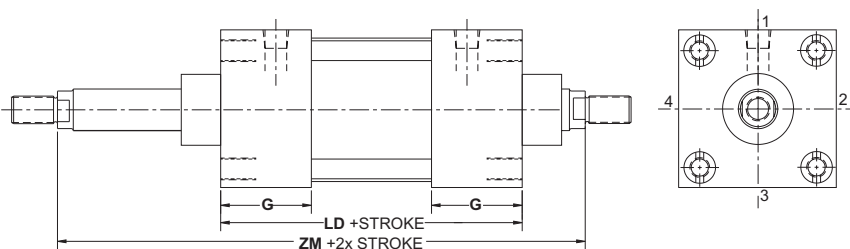
OPTIONAL



NOTE: STYLE #2 FURNISHED AS STANDARD UNLESS OTHERWISE SPECIFIED.

ROD DIA.	A	C	D	V	CC	FF	KK
1	1 1/8	1/2	7/8	7/8	7/8-14	1-14	3/4-16
1 3/8	1 5/8	5/8	1 3/16	1	1 1/4-12	1 3/8-12	1-14
1 3/4	2	3/4	1 1/2	1 1/8	1 1/2-12	1 3/4-12	1 1/4-12
2	2 5/8	7/8	1 3/4	1 1/8	1 3/4-12	2-12	1 1/2-12

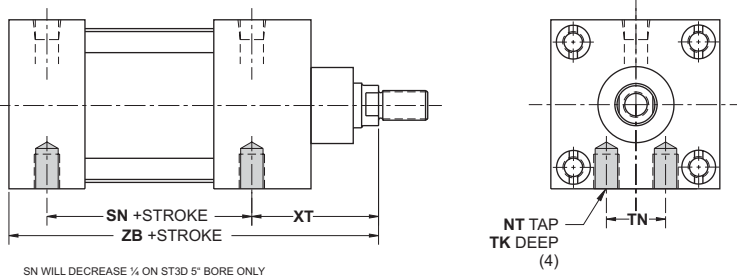
Model ST30D double rod end



BORE	G	LD	ZM
1 1/2	1 1/2	4 7/8	6 7/8
2	1 1/2	4 7/8	6 7/8
2 1/2	1 1/2	5	7
3 1/4	1 3/4	6	8
4	1 3/4	6	8
5	1 3/4	6	8
6	2	7	9 1/4
8	2	7 1/8	9 3/8
10	2 1/4	8 1/8	10 5/8

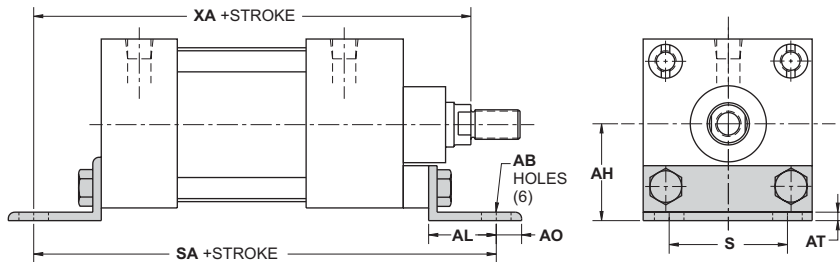
STAR30 CYLINDERS - Oversize rod diameters

MODEL ST30S4 BOTTOM TAP MOUNT (NFPA MS4)



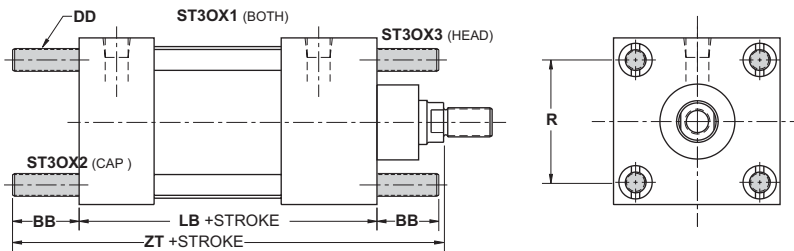
BORE	NT	TK	TN	SN	XT	ZB
2	5/16 - 18	1/2	7/8	2 1/4	2 5/16	5
2 1/2	3/8 - 16	5/8	1 1/4	2 3/8	2 5/16	5 1/8
3 1/4	1/2 - 13	3/4	1 1/2	2 5/8	2 11/16	5 7/8
4	1/2 - 13	3/4	2 1/16	2 5/8	2 11/16	5 7/8
5	5/8 - 11	1	2 11/16	2 7/8	2 11/16	6 1/8
6	3/4 - 10	1 1/8	3 1/4	3 1/8	3 1/16	6 7/8
8	3/4 - 10	1 1/8	4 1/2	3 1/4	3 1/16	7

MODEL ST30S1 ANGLE MOUNT (NFPA MS1)



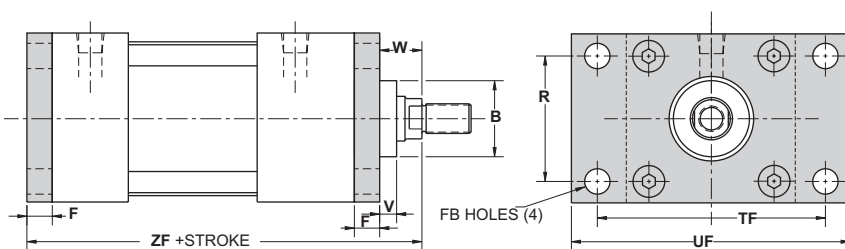
BORE	AB	AH	AL	AO	AT	S	SA	XA
1 1/2	7/16	1 3/16	1	3/8	1/8	1 1/4	6	6
2	7/16	1 7/16	1	3/8	1/8	1 3/4	6	6
2 1/2	7/16	1 5/8	1	3/8	1/8	2 1/4	6 1/8	6 1/8
3 1/4	9/16	1 15/16	1 1/4	1/2	3/16	2 3/4	7 3/8	7 1/8
4	9/16	2 1/4	1 1/4	1/2	3/16	3 1/2	7 3/8	7 1/8
5	11/16	2 3/4	1 3/8	5/8	3/16	4 1/4	7 7/8	7 1/2
6	13/16	3 1/4	1 3/8	5/8	1/4	5 1/4	8 1/2	8 1/4

MODEL ST30X(x) TIE RODS EXTENDED MOUNT (NFPA MX1, MX2 & MX3)



BORE	BB	DD	LB	R	ZT
1 1/2	1	1/4-28	3 5/8	1.43	5
2	1 1/8	5/16-24	3 5/8	1.84	6 1/8
2 1/2	1 1/8	5/16-24	3 3/4	2.19	6 1/4
3 1/4	1 3/8	3/8-24	4 1/4	2.76	7 1/4
4	1 3/8	3/8-24	4 1/4	3.32	7 1/4
5	1 13/16	1/2-20	4 1/2	4.10	7 15/16
6	1 13/16	1/2-20	5	4.88	8 11/16
8	2 5/16	5/8-18	5 1/8	6.44	9 5/16
10	2 11/16	3/4-16	6 3/8	7.92	11 1/16

MODEL ST30F1 FRONT FLANGE MOUNT (NFPA MF1)

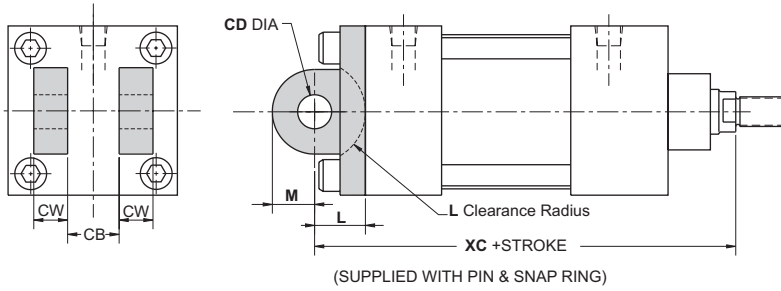


BORE	B	F	FB	R	TF	UF	V	W	ZF
1 1/2	1 5/16	3/8	5/16	1.43	2 3/4	3 3/8	1/2	1	5 3/8
2	1 1/2	3/8	3/8	1.84	3 3/8	4 1/8	1/2	1	5 3/8
2 1/2	1 1/2	3/8	3/8	2.19	3 7/8	4 5/8	1/2	1	5 1/2
3 1/4	2	5/8	7/16	2.76	4 11/16	5 1/2	3/8	1	6 1/2
4	2	5/8	7/16	3.32	5 7/16	6 1/4	3/8	1	6 1/2
5	2	5/8	9/16	4.10	6 5/8	7 5/8	3/8	1	6 3/4
6	2 3/8	3/4	9/16	4.88	7 5/8	8 5/8	3/8	1 1/8	7 5/8

MODEL ST30F2 REAR FLANGE MOUNT (NFPA MF2)

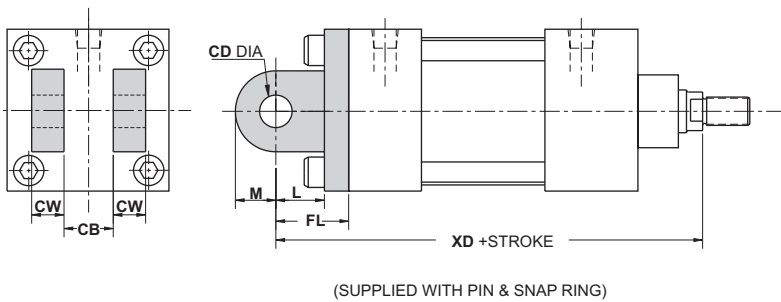
STAR30 CYLINDERS - Oversize Rod Dia.

MODEL ST3OP1 CLEVIS MOUNT (NFPA MP1)



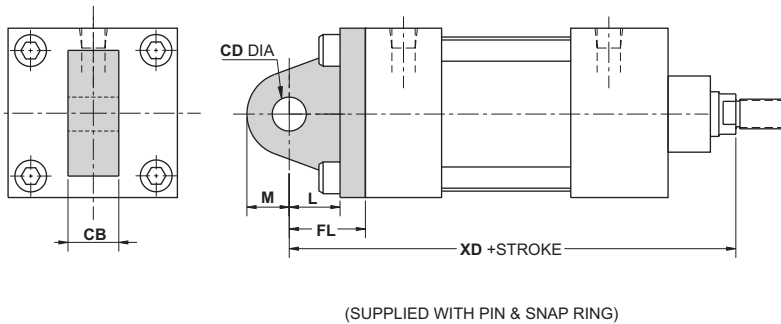
BORE	CB	CD	CW	L	M	XC
1 1/2	3/4	1/2	3/8	3/4	5/8	5 3/4
2	3/4	1/2	1/2	3/4	5/8	5 3/4
2 1/2	3/4	1/2	1/2	3/4	5/8	5 7/8
3 1/4	1 1/4	3/4	3/4	1 1/4	7/8	7 1/8
4	1 1/4	3/4	3/4	1 1/4	7/8	7 1/8
5	1 1/4	3/4	3/4	1 1/4	7/8	7 3/8
6	1 1/2	1	1	1 1/2	1 1/8	8 3/8
8	1 1/2	1	3/4	1 1/2	1	8 1/2
10	2	1 3/8	1	2 1/8	1	10 1/2

MODEL ST3OP2 DETACHABLE CLEVIS MOUNT (NFPA MP2)



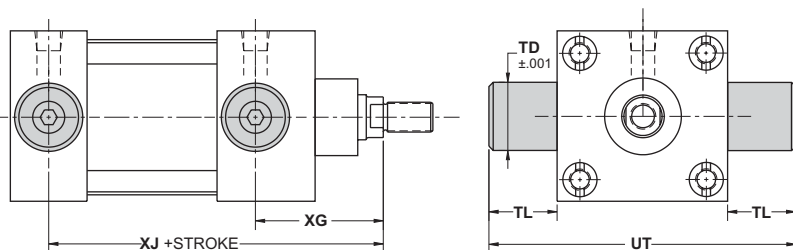
BORE	CB	CD	CW	FL	L	M	XD
1 1/2	3/4	1/2	3/8	1 1/8	3/4	5/8	6 1/8
2	3/4	1/2	1/2	1 1/8	3/4	5/8	6 1/8
2 1/2	3/4	1/2	1/2	1 1/8	3/4	5/8	6 1/4
3 1/4	1 1/4	3/4	3/4	1 7/8	1 1/4	7/8	7 3/4
4	1 1/4	3/4	3/4	1 7/8	1 1/4	7/8	7 3/4
5	1 1/4	3/4	3/4	1 7/8	1 1/4	7/8	8
6	1 1/2	1	1	2 1/4	1 1/2	1 1/8	9 1/8

MODEL ST3OP4 DETACHABLE EYE MOUNT (NFPA MP4)



BORE	CB	CD	FL	L	M	XD
1 1/2	3/4	1/2	1 1/8	3/4	5/8	6 1/8
2	3/4	1/2	1 1/8	3/4	5/8	6 1/8
2 1/2	3/4	1/2	1 1/8	3/4	5/8	6 1/4
3 1/4	1 1/4	3/4	1 7/8	1 1/4	7/8	7 3/4
4	1 1/4	3/4	1 7/8	1 1/4	7/8	7 3/4
5	1 1/4	3/4	1 7/8	1 1/4	7/8	8
6	1 1/2	1	2 1/4	1 1/2	1 1/8	9 1/8

MODEL ST3OT1* HEAD TRUNNION MOUNT (NFPA MT1)



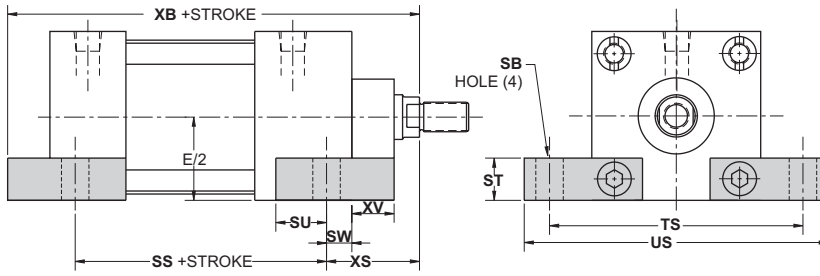
BORE	TD	TL	UT	ST3T1	ST3T2
				XG	XJ
1 1/2	1	1	4	n/a	4 1/2
2	1	1	4 1/2	2 1/8	4 1/2
2 1/2	1	1	5	2 1/8	4 5/8
3 1/4	1	1	5 3/4	2 1/2	5 1/4
4	1	1	6 1/2	2 1/2	5 1/4
5	1	1	7 1/2	2 1/2	5 1/2
6	1 3/8	1 3/8	9 1/4	2 7/8	6 1/8
8	1 3/8	1 3/8	11 1/4	2 7/8	6 1/4

MODEL ST3OT2 CAP TRUNNION MOUNT (NFPA MT2)

*No Oversize rod on 1/2" bore MT1

STAR30 CYLINDERS - Oversize Rod Dia. Mounting options

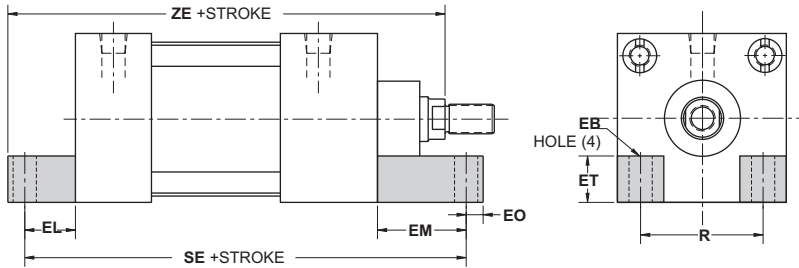
MODEL ST3OS2 LUG MOUNT (NFPA MS2)



BORE	SB	SS	ST	SU	SW	TS	US	XB	XS	XV
1 1/2	13/32	2 7/8	1/2	15/16	3/8	2 3/4	3 1/2	5 1/2	1 3/8	1/2
2	13/32	2 7/8	5/8	15/16	3/8	3 1/4	4	5 5/8	1 3/4	5/8
2 1/2	13/32	3	3/4	15/16	3/8	3 3/4	4 1/2	5 3/4	1 3/4	5/8
3 1/4	17/32	3 1/4	7/8	1 1/4	1/2	4 3/4	5 3/4	6 5/8	2 1/8	3/4
4	17/32	3 1/4	1	1 1/4	1/2	5 1/2	6 1/2	6 5/8	2 1/8	3/4
5	25/32	3 1/8	1 1/4	1 9/16	11/16	6 7/8	8 1/4	7 1/16	2 5/16	15/16
6	25/32	3 5/8	1 1/2	1 9/16	11/16	7 7/8	9 1/4	7 13/16	2 9/16	15/16
8	25/32	3 3/4	1 5/8	1 9/16	11/16	9 7/8	11 1/4	8 1/16	2 9/16	1 1/16

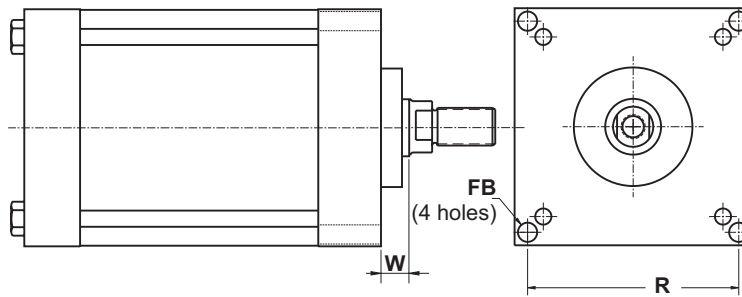
FOR DOUBLE ROD END CYLINDERS ADD 1/2" TO SS DIMENSION EXCEPT ON 5" BORE ADD 1/4".

MODEL ST3OS7 END LUG MOUNT (NFPA MS7)



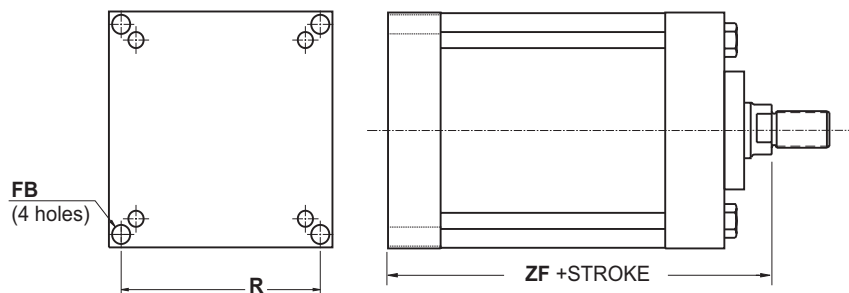
BORE	EB	EL	EM	EO	ET	SE	ZE	R
2	11/32	15/16	1 5/16	5/16	11/16	5 7/8	6 1/4	1.84
2 1/2	11/32	1 1/16	1 7/16	5/16	13/16	6 1/4	6 1/2	2.19
3 1/4	13/32	7/8	1 1/2	3/8	1	6 5/8	7 1/8	2.76
4	13/32	1	1 5/8	3/8	1 3/16	6 7/8	7 1/4	3.32
5	17/32	1 1/16	1 11/16	9/16	1 3/8	7 1/4	7 1/2	4.12
6	17/32	1	1 3/4	5/8	1 5/8	7 3/4	8 1/4	4.88
8	21/32	1 1/8	1 1/8	3/4	2	7 3/8	8 3/4	6.44

MODEL ST3OE3 SQUARE HEAD MOUNT (NFPA ME3)



BORE	8	10
FB	11/16	13/16
R	7.57	9.4
W	1 7/8	2
ZF	7	8 3/8

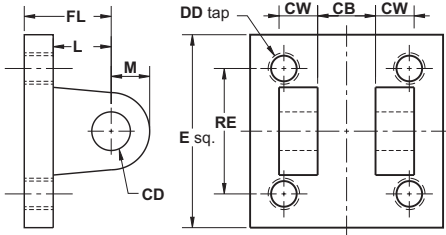
MODEL ST3OE4 SQUARE CAP MOUNT (NFPA ME4)



BORE	8	10
FB	11/16	13/16
R	7.57	9.4
W	1 7/8	2
ZF	7	8 3/8

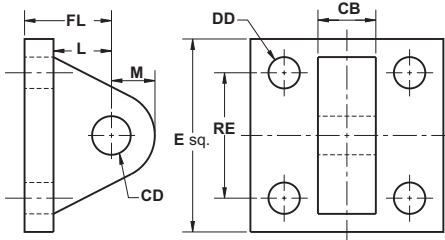
STAR3 CYLINDERS - Mounting options & NFPA accessories

NFPA Clevis Bracket



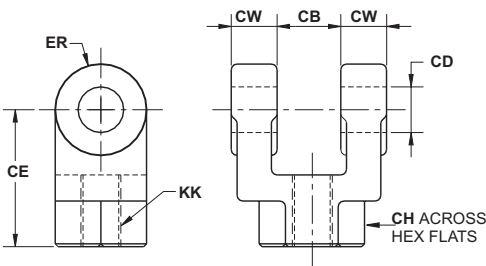
PART #	CB	CD	CW	DD	E	FL	L	M	RE	USED ON BORES
CB-05	.765	1/2	1/2	3/8-24	2 1/2	1 1/8	3/4	1/2	1 5/8	1 1/2 - 2 - 2 1/2"
CB-07	1.265	3/4	5/8	1/2-20	3 1/2	1 7/8	1 1/4	3/4	2 9/16	3 1/4 - 4 - 5"
CB-10	1.515	1	3/4	5/8-18	4 1/2	2 1/4	1 1/2	1	3 1/4	6 - 8"
CB-13	2.032	1 3/8	1	5/8-18	5	3	2 1/8	1 3/8	3 13/16	8 - 10"
CB-17	2.531	1 3/4	1 1/4	7/8-14	6 1/2	3 1/8	2 1/4	1 3/4	4 15/16	10"

NFPA Eye Bracket



PART #	CB	CD	DD	E	FL	L	M	RE	USED ON BORES
EB-05	.75	1/2	13/32	2 1/2	1 1/8	3/4	1/2	1 5/8	1 1/2 - 2 - 2 1/2"
EB-07	1.25	3/4	17/32	3 1/2	1 7/8	1 1/4	3/4	2 9/16	3 1/4 - 4 - 5"
EB-10	1.50	1	21/32	4 1/2	2 1/4	1 1/2	1	3 1/4	6 - 8"
EB-13	2.00	1 3/8	21/32	5	3	2 1/8	1-3/8	3 13/16	8 - 10"
EB-17	2.50	1 3/4	29/32	6 1/2	3 1/8	2 1/4	1-3/4	4 15/16	10"

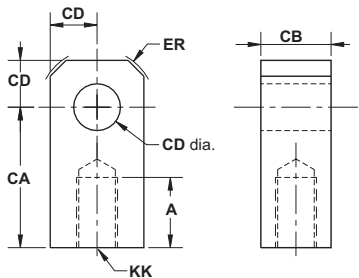
NFPA rod clevis



PART #	CB	CD	CE	CH	CW	ER	KK	L
RC-05	.765	1/2	1 1/2	1	1/2	1/2	7/16-20	3/4
RC-07	1.265	3/4	2 3/8	1 1/4	5/8	3/4	3/4-16	1 1/4
RC-10	1.515	1	3 1/8	1 1/2	3/4	1	1-14	1 1/2
RC-13	2.032	1 3/8	4 1/8	2	1	1 3/8	1 1/4-12	2 1/8

OTHER SIZE ARE AVAILABLE, ASK YOUR DISTRIBUTOR OR FACTORY.
(RC-17 KK=1 1/2-12, RC-20 KK=1-7/8-12, RC-25 KK=2 1/4-12, ETC)

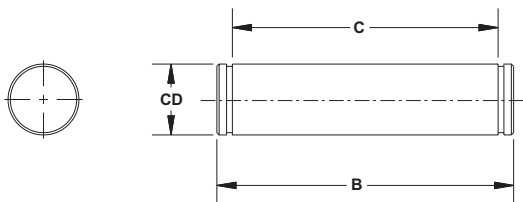
NFPA rod eye



PART #	A	CA	CB	CD	ER	KK
RE-05	3/4	1 1/2	3/4	1/2	5/8	7/16-20
RE-07	1 1/8	2 1/16	1 1/4	3/4	7/8	3/4-16
RE-10	1 5/8	2 13/16	1 1/2	1	1 3/16	1-14
RE-13	2	3 7/16	2	1 3/8	1 9/16	1 1/4-12

OTHER SIZE ARE AVAILABLE, ASK YOUR DISTRIBUTOR OR FACTORY.
(RE-17 KK=1 1/2-12, RE-20 KK=1-7/8-12, RE-25 KK=2 1/4-12, ETC)

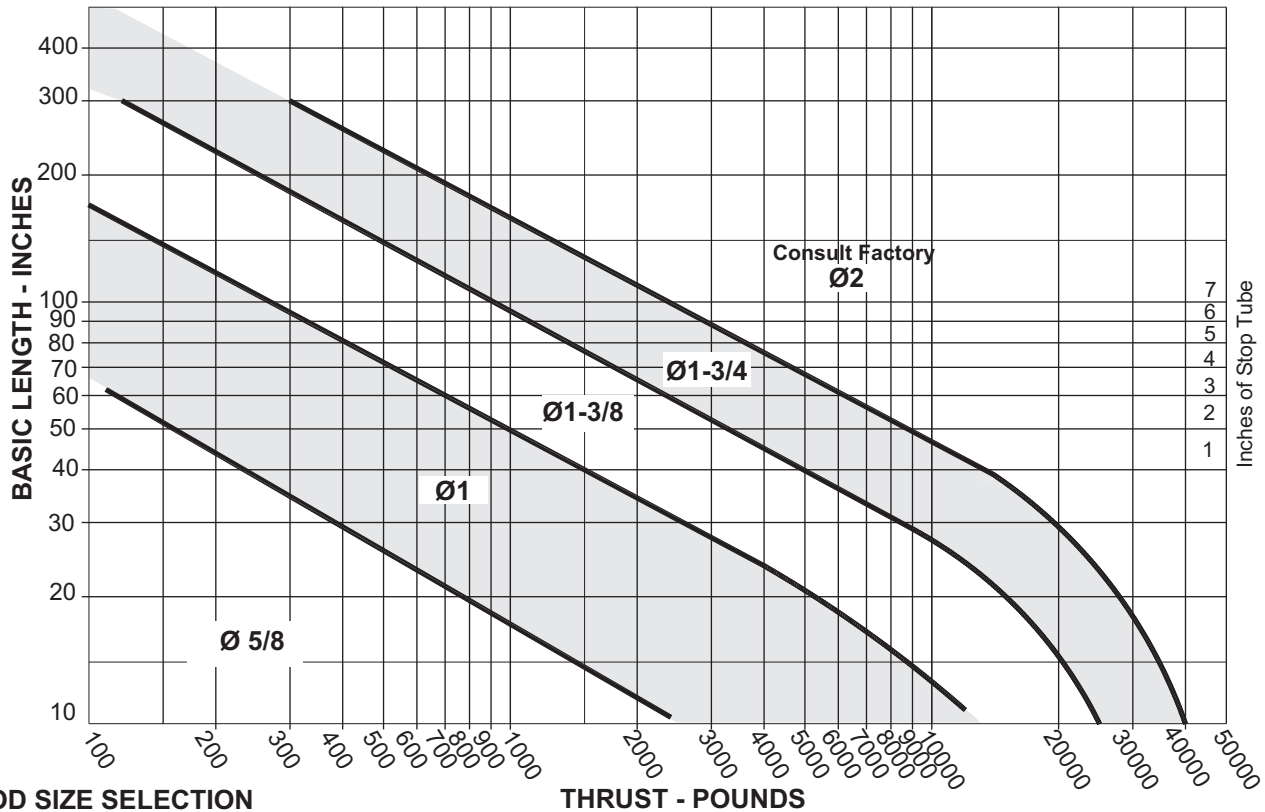
PIN



PART #	B	C	CD
P-05	2.094	1.875	.500
P-07	2.875	2.625	.750
P-10	3.375	3.125	1.000
P-13	4.485	4.187	1.375
P-17	5.547	5.188	1.750
P-20	5.547	5.188	2.000

STAR3 CYLINDERS - Rod & Stop Tube Selection

ROD DIAMETER CHART



ROD SIZE SELECTION

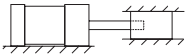
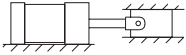
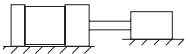
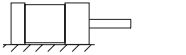



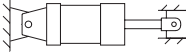
To determine the minimum recommended piston rod dia for your application, first determine the cylinder thrust using the force volume chart. (Page 2) (Thrust equals bore area multiplied by the operating pressure.) Next select from the diagram below the type of mounting you will use. Then determine the basic length by multiplied the real stroke by the stroke factor. Enter the graph along the values of "basic length" and "Thrust" the stripe within which these lines intersect represents the minimum recommended piston rod diameter.

STOP TUBE SELECTION

Stop tubes are installed between the piston and the head on long stroke cylinders to reduce the load on the bearing. That, in turn, reduce bearing wear and tendency to buckle.

To determine if a stop tube is required and, if so, its length, first determine the "Basic length from the diagrams at right. If the basic length is less than 40", no stop tube is needed. If its over than 40", a one-inch stop tube is recommended for every 10" (or fraction thereof) over 40"

Starcyl supplies two types of stop tubes for air cylinders. A cylinder with over two inches of stop tube, cushioned or not, utilizes dual piston construction for added bearing surface as well increasing distance between bearings. A cylinder requiring a stop tube under two inches uses a spacer only

MOUNTING STYLE		ROD END CONNECTION	STROKE FACTOR
Center line Mounting Centerline mounting places the mounting bolts in simple shear or simple tension so that the mechanism is protected from compound forces. Centerline mounting is a rigid mounting style and this requires accurate cylinder alignment to prevent damage to the cylinder working parts. Mountings are : MX1, MX2, MX3, MF1, MF2, ME3, ME4.		 Fixed & Rigidly Guided	0.50
		 Pivoted & Rigidly Guided	0.70
		 Supported but Not Rigidly Guided	2.00
		 Unsupported	4.00
Pivot Mounting Pivot mounting is used when the cylinder must pivot during piston motion. Clevis and Trunnion mounts are two methods used to allow this motion. The Clevis end design locates the pivot point at the cap end of the cylinder. Trunnion mounting uses the head or the cap of the cylinder to allow it to pivot at any of the two locations. The Mountings are: MP1, MP2, MP4, MT1, MT2, MT4.	MT1 TRUNNION ON HEAD	 Pivoted & Rigidly Guided	1.00
	MT4 INTERMEDIATE TRUNNION	 Pivoted & Rigidly Guided	1.50
	MT2 TRUNNION ON CAP	 Pivoted & Rigidly Guided	2.00
	MP1, MP2, MP4 CLEVIS ON CAP	 Pivoted & Rigidly Guided	2.00

STAR3 CYLINDERS - Hall Effect & Reed Switches

Reed switches are constructed of two overlapping ferromagnetic reeds which are sealed in a glass tube with the ends aligned and a small gap between them. When an external magnetic force is applied, the reed assume opposite polarity, the ends of the reeds attract each others and make contact, completing the circuit. Reed switches are no recommended in sensitive areas since they can introduce electrical noise into the circuit due to bounce and vibration from mechanical closing of the reeds.

Hall Effect switches are solid state switches with no moving parts. The solid state switches is activated when the silicon chip (Hall) senses a magnetic field. Since there are no moving parts, Hall effect switches can operate in sensitive areas without sending interference or noise into the circuit.

Switch specifications

Switch part Number	LRS-004	LHS-31	LHS-32
Spec.	Reed Switch, MOV, LED	Electronic Sensor, LED, Sourcing	Electronic Sensor, LED, Sinking
Cable length	9ft PVC Cable		
Switching Voltage	5-120 VDC/VAC 50/60 Hz	6-24 VDC	6-24 VDC
Switching Current	0.5 Amp Max 0.005 Amp Min.	0.5 Amp Max.	0.5 Amp Max.
Switching power	10 Watts Max.	12 watts Max.	12 watts Max.
Switching Speed	0.5 mS operate 0.1 mS release	1.5µs operate 0.5µs release	1.5µs operate 0.5µs release
Voltage Drop	3.5 Volts	1.0 Volts	1.0 Volts
Temperature range	-20° to 80°C		-4° to 176°F
Switch Function	SPST Normally Open	Normally open PNP output	Normally open NPN output
Shock	up to 30G (11msec.)	-	-
Vibration	up to 20G (10-55 Hz)	-	-

How To Order

Place Clamp code after switch Part Number.

Example: LRS-004-A

Reed switch for 1.5" Bore.

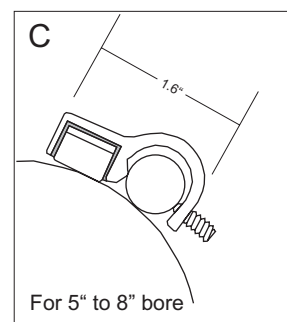
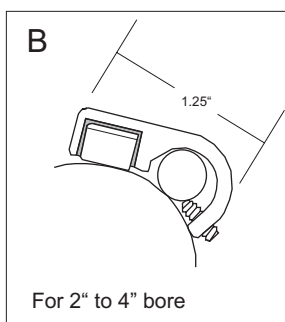
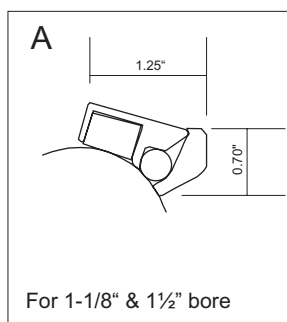
Bracket code Suffix

A = 1-1/8", 1½", 2" & 2½" bore

B = 3¼" & 4" bore

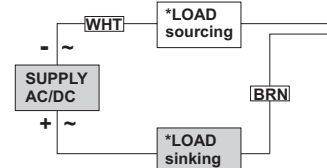
C = 5", 6" & 8" bore

Switch dimensions

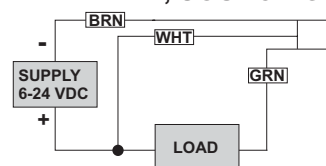


Wiring Diagrams

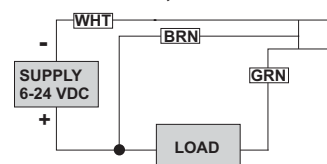
REED SWITCH LRS-004



ELECTRONIC SWITCH LHS-31 LED, SOURCING

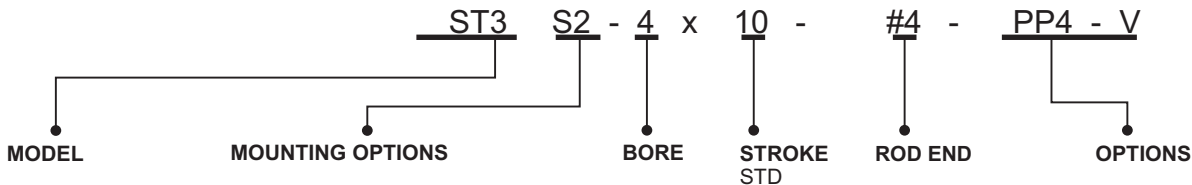


ELECTRONIC SWITCH LHS-32 LED, SINKING



STAR3 CYLINDERS - How to order

EXAMPLE ST3S2-4x10-4-PP4-V is a STAR3 series, 4" bore, 10" stroke, side lug mount, female rod thread, port position 4 with seals made of Viton™.

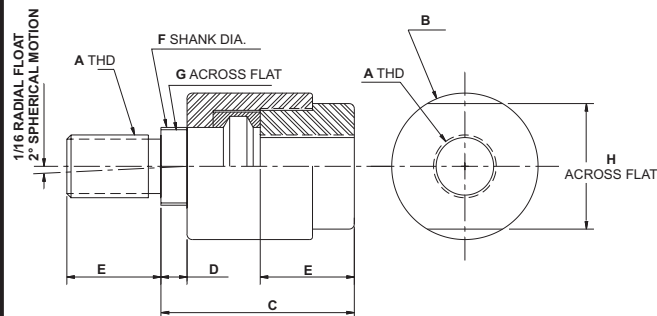


ST3 BASIC MODEL	E3 SQUARE HEAD MOUNT E4 SQUARE CAP MOUNT F1 HEAD RECT. FLANGE F2 CAP RECT. FLANGE	1 1/2 2 2 1/2 3 1/4	1 2 3 4	#1 MALE, large #1F MALE, full dia. #2 MALE, small, STD #2s MALE, studed #4 FEMALE, #X SPECIAL	B BUMPER BOTH ENDS BC BUMPER CAP END BH BUMPER HEAD END
ST3O OVERSIZE ROD	P1 DETACH. SHORT CLEVIS MOUNT P2 DETACH. CLEVIS MOUNT P4 DETACH. EYE MOUNT	4 5 6 8 10"	5 6 7 8 10 12 ask for other strokes		CB CLEVIS BRACKET CP CLEVIS PIN EB EYE BRACKET M MAGNETIC PISTON
ST3IR EXTRA IMPACT NOISE REDUCTION	S1 ANGLE MOUNT S2 SIDE LUG MOUNT S4 BOTTOM TAP MOUNT S7 SIDE END LUG MOUNT				NCU NO CUSHION HCU CUSHION HEAD END ONLY CCU CUSHION CAP END ONLY
ST3D DOUBLE ROD	T1 HEAD TRUNNION MOUNT T2 CAP TRUNNION MOUNT T4 INTERMEDIATE TRUNNION MOUNT				CPx CUSHION POS. (1,2,3,4) PPx PORT POSITION (1,2,3,4) RC ROD CLEVIS RE ROD EXTENSION RP ROD PIVOT V SEALS MADE OF Viton™
ST3H HYDRAULIC 250 PSI.	X1 BOTH TIE RODS EXTENDED X2 CAP END TIE RODS EXTENDED X3 HEAD END TIE RODS EXTENDED				AS ADJUSTABLE STROKE BB BACK TO BACK MP MULTI-POSITION MS MULTI-STAGES NR NON-ROTATING (for pick & place appl.) S/Tx STOP TUBE (x = length)

To order seal kits add the prefix **ST3SK** to the bore and rod diameter ex: **ST3SK-4000-1000** and for bronze gland kit add the prefix **ST3GK** to the rod diameter ex: **ST3SK-1375**

LINEAR ALIGNMENT COUPLERS - Choose from 19 sizes

Starcyl's linear alignment couplers extend the bearing and seal life of your cylinders. Our couplers prevent binding and Erratic movement that misalignment causes, which eventually wears down your cylinders. Not only do Starcyl couplers work equally well in "push" and "pull" applications, but they allow a greater tolerance between the cylinder centerline and the mating member.



Use jam nut to lock coupler to rod when used with full diameter threads.

Viton™ are registered trademarks of DuPont Dow Elastomers.

PART #	A	B	C	D	E	F	G	H	MAX PULL AT YIELD
AC-250F	1/4-28	7/8	1 1/4	1/4	5/8	0.245	3/16	13/16	6000
AC-312F	5/16-24	7/8	1 1/4	1/4	5/8	0.308	1/4	13/16	8300
AC-375C	3/8-16	7/8	1 1/4	1/4	5/8	0.369	5/16	13/16	5000
AC-375F	3/8-24	7/8	1 1/4	1/4	5/8	0.370	5/16	13/16	8300
AC-437F	7/16-20	1 1/4	2	1/2	3/4	5/8	9/16	1 1/8	10000
AC-500C	1/2-13	1 1/4	2	1/2	3/4	5/8	9/16	1 1/8	14000
AC-500F	1/2-20	1 1/4	2	1/2	3/4	5/8	9/16	1 1/8	14000
AC-625F	5/8-18	1 1/4	2	1/2	3/4	5/8	1/2	1 1/8	14000
AC-750C	3/4-10	1 3/4	2 5/16	5/16	1 1/8	31/32	7/8	1 1/2	34000
AC-750F	3/4-16	1 3/4	2 5/16	5/16	1 1/8	31/32	7/8	1 1/2	34000
AC-875F	7/8-14	1 3/4	2 5/16	5/16	1 1/8	31/32	7/8	1 1/2	34000
AC-1000F	1-14	2 1/2	2 15/16	1/2	1 5/8	1 3/8	1 1/4	2 1/4	64000
AC-1000C	1-8	2 1/2	2 15/16	1/2	1 5/8	1 3/8	1 1/4	2 1/4	64000
AC-1250F	1-1/4-12	2 1/2	2 15/16	1/2	1 5/8	1 3/8	1 1/4	2 1/4	64000
AC-1375F	1-3/8-12	2 1/2	2 15/16	1/2	1 5/8	1 3/8	1 1/4	2 1/4	64000
AC-1500F	1-1/2-12	3 1/4	4 3/8	13/16	2 1/4	1 3/4	1 1/2	3	134000
AC-1750F	1-3/4-12	3 1/4	4 3/8	13/16	2 1/4	1 3/4	1 1/2	3	134000
AC-1875F	1-7/8-12	3 3/4	5 7/16	11/16	3	2 1/4	1 7/8	3 1/2	240000
AC-2000F	2-12	3 3/4	5 7/16	11/16	3	2 1/4	1 7/8	3 1/2	240000

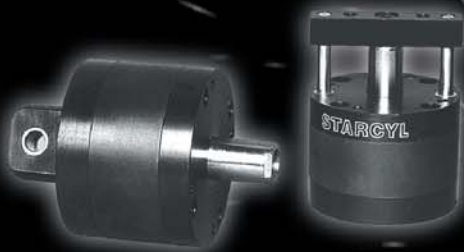
Part numbers AC-250F through AC-1250F in UNF are stock items

**4:1 safety factor included



STARCYL

AIR CYLINDERS



PIVOT MOUNT

NON-ROTATING

ROUND SPACE SAVER 9/16 TO 4" BORE
CATALOG # RL-1095



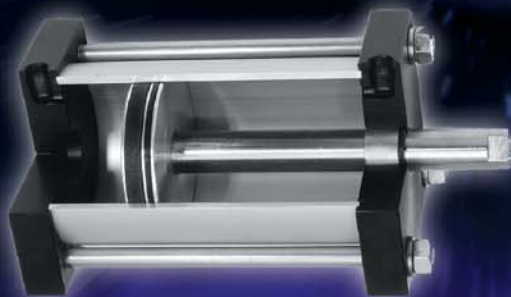
SQUARE MULTI-STAGE SPACE SAVER
UP TO 4 TONS WITH 100 PSI AIR
CATALOG # MA-1095



SQUARE SPACE SAVER 9/16 TO 4" BORE
CATALOG # MA-1095



AIR PRESSES 1/2 TO 8 TONS



STAR2 SPACE SAVER NFPA STYLE MOUNTING
1 1/2 TO 10" BORE, STROKE UP TO 40"
CATALOG # STAR2-1097

YOUR STARCYL DISTRIBUTOR:

STARCYL CYLINDER INC.

IN US : 1-877-STARCYL (782-7295)

IN CDN : 1-888-332-1711

WWW.STARCYL.COM

EMAIL : STARCYL@STARCYL.COM

TEL: (450) 661-1212 FAX (450) 661-0094

CATALOG # STAR3-1099