



STARCYL

AIR CYLINDERS

MULTI-STAGES

NFPA STYLE MOUNT



WWW.STARCYL.COM

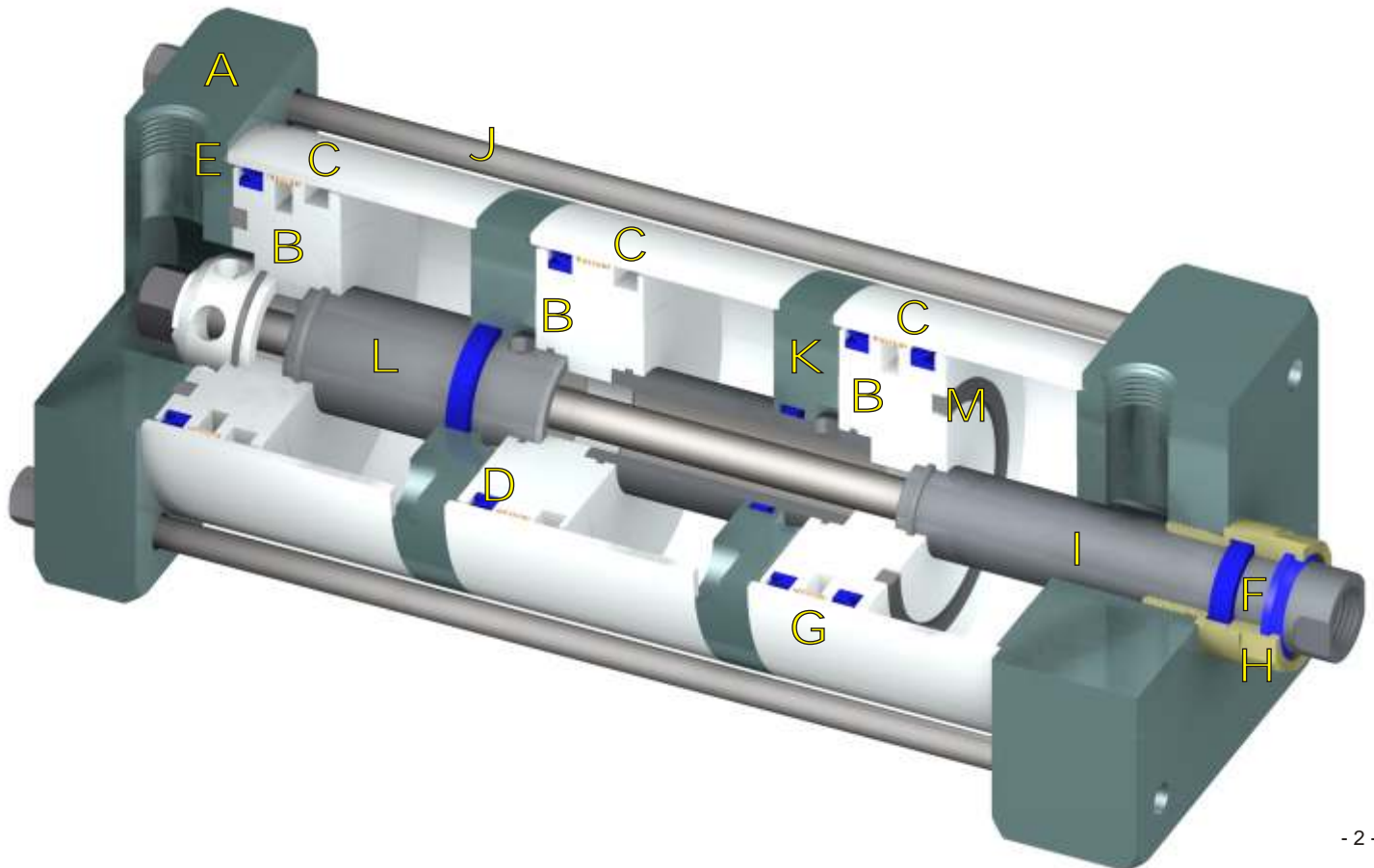
- ✓ Bore size from 1½" to 10"
- ✓ Stroke up to 12"
- ✓ High Flow Design
- ✓ 250 PSI AIR,
- ✓ Two-Year Warranty
- ✓ N.F.P.A Style Mount

M3 SERIES
MULTI-STAGES AIR
CYLINDERS

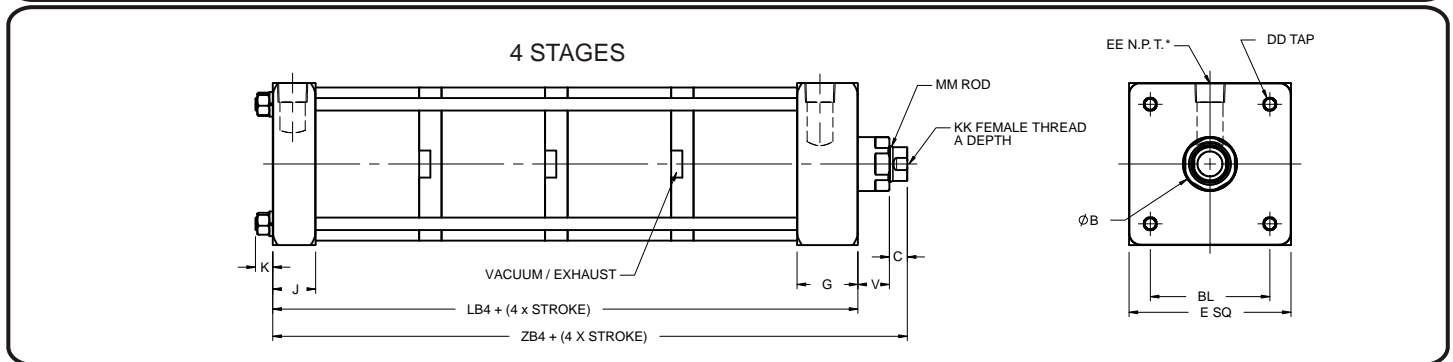
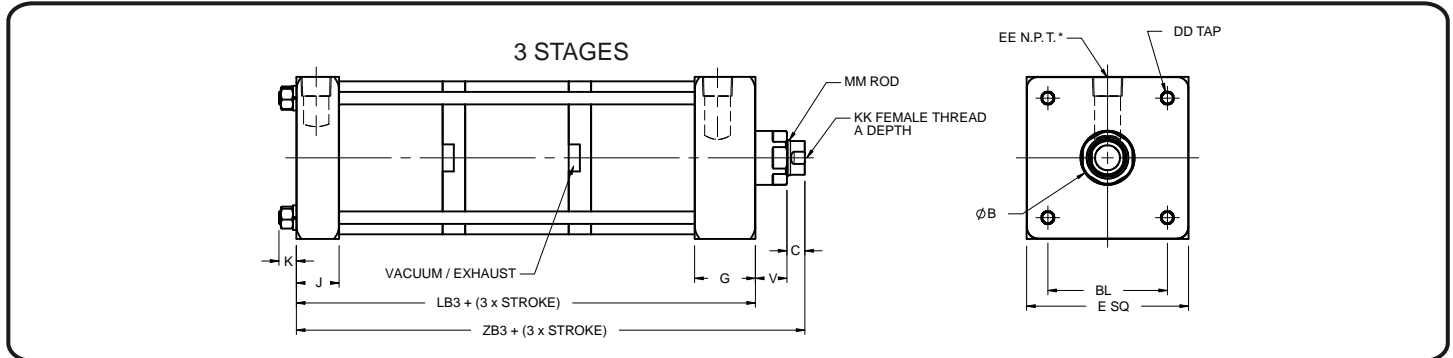
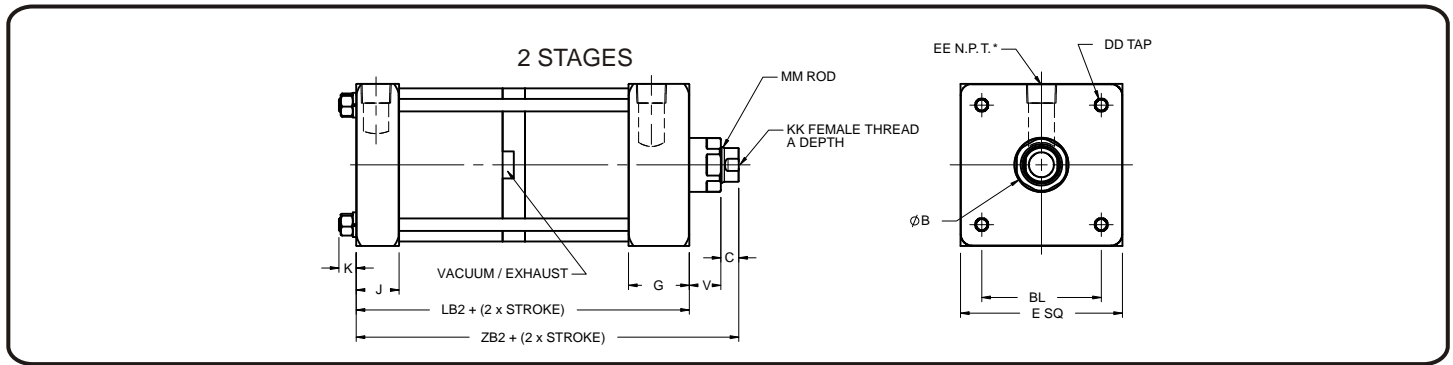
HEAVY DUTY - HIGH FLOW

M3 MULTISTAGE 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 an long life (temperature: -50° to 200°F) (Viton™ also Available up to 400°F) (all seals can be used in a non lube application)
- E O-ring Tube End Seals**
Nitrile O-ring design is pressure compensated and reusable.
- F Rod lips seal + wiper**
Our **New Design** with a real rod u-cup is completely self compensating for zero leakage at all pressures (all seals can be used in a non lube application)
The **New Wiper Wipes** dirt out for less maintenance and longer life of the cylinder. (Urethane) (temperature: -50° to 200°F)
- 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. Designed 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. (Available in Stainless steel)
- K Mid Plate**
High Flow Mid plate with 2 orifice (vent/vaccum)
Made of 6061-T6 Aluminum and Black anodized, design for resistance, and Flow in mind (available with 2 or 3 port for external vent/vaccum or muffler).
- L Upper Rod**
High Strength steel. NITROCARBURIZING treatment on the rod. High Flow design.
- M Bumper**
Incorporated bumper in piston to ensure long life and noise free, design for long life, those bumper are incorporated into the piston with enough space to expand without damaging the seal



M3 CYLINDERS - Dimensions

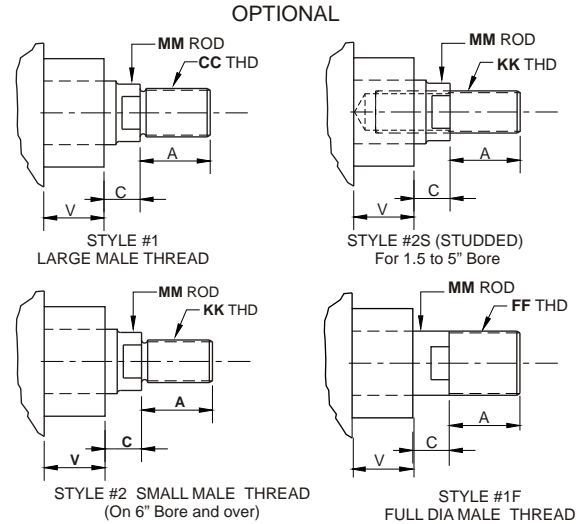
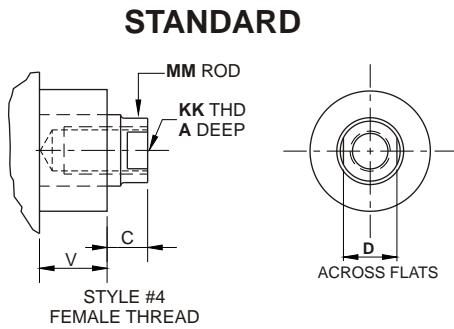


BORE	A	B	BL	C	E	DD	EE	G	J	KK	MM	V
1 1/2	3/4	1 1/8	1,43	3/8	2	1/4"-28	3/8	1 1/2	1	7/16"-20	5/8	5/8
2	3/4	1 1/8	1,84	3/8	2 1/2	5/16"-24	3/8	1 1/2	1	7/16"-20	5/8	5/8
2 1/2	3/4	1 1/8	2,19	3/8	3	5/16"-24	3/8	1 1/2	1	7/16"-20	5/8	5/8
3 1/4	1 1/8	1 1/2	2,78	1/2	3 3/4	3/8"-24	1/2	1 3/4	1 1/4	3/4"-16	1	7/8
4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

BORE	2 STAGES		3 STAGES		4 STAGES	
	LB2	ZB2	LB3	ZB3	LB4	ZB4
1 1/2	5 3/8	6 3/8	7 1/8	8 1/8	8 7/8	9 7/8
2	5 3/8	6 3/8	7 1/8	8 1/8	8 7/8	9 7/8
2 1/2	5 5/8	6 5/8	7 1/2	8 1/2	9 3/8	10 3/8
3 1/4	6 1/4	7 5/8	8 1/4	9 5/8	10 1/4	11 5/8
4	6 1/4	7 5/8	8 1/4	9 5/8	10 1/4	11 5/8
5	6 3/4	8 1/8	9	10 3/8	11 1/4	12 5/8
6	7 1/2	9 1/8	10	11 5/8	12 1/2	14 1/8
8	7 3/4	9 3/8	10 3/8	12	13	14 5/8

M3 - Rod Thread Dimensions & multi stage force

Rod end style



NOTE: STYLE #4 FURNISHED AS STANDARD UNLESS OTHERWISE SPECIFIED.

	#1	#1F	#2 & #4				
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

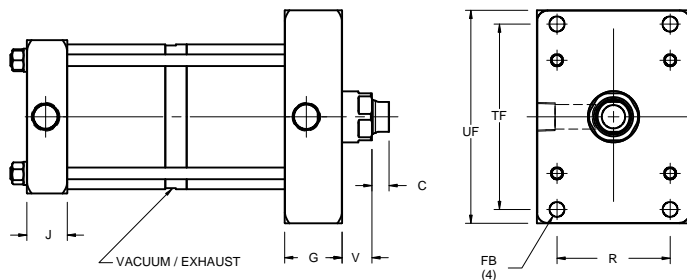
This grid is to show How much force you can get by using our M3 Multistage cylinder. All the forces are calculated with a pressure of 100 ps.i. Multistage cylinders can be use in push (extend) or Pull (retract) or Both, Stock stroke is 1, 2, 3, 4, 6", but can be ordered up to 12" stroke

BORE	FORCE (in pounds at 100 psi)					
	2 STAGES		3 STAGES		4 STAGES	
	Extend	Retract	Extend	Retract	Extend	Retract
1 1/2	275	244	452	421	628	598
2	550	519	864	833	1178	1147
2 1/2	903	873	1394	1363	1885	1854
3 1/4	1511	1432	2340	2262	3170	3091
4	2365	2286	3621	3543	4878	4800
5	3779	3700	5742	5663	7705	7627
6	5414	5266	8242	8093	11069	10921
8	9813	9664	14839	14691	19866	19717

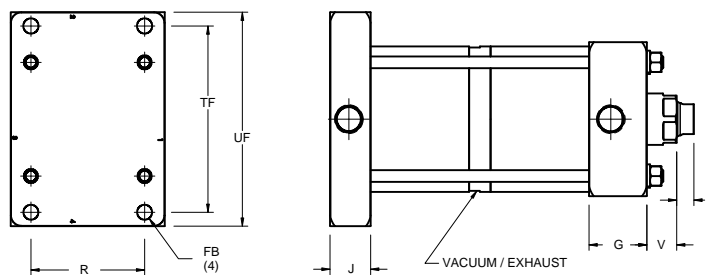
More Stage than 4 can be ordered ask your sales representative for a special quote. 10" bore also available on special request.

M3 CYLINDERS - Mounting Dimensions

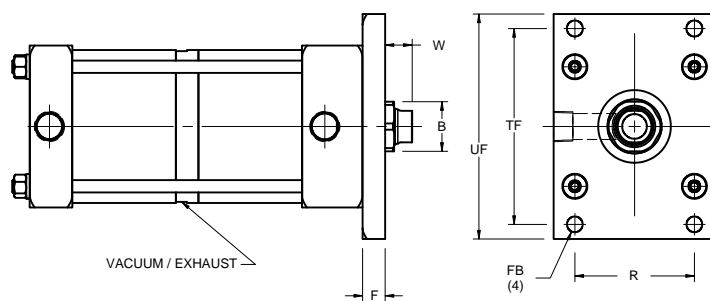
ME5 - HEAD RECTANGULAR MOUNT



ME6 - CAP RECTANGULAR MOUNT



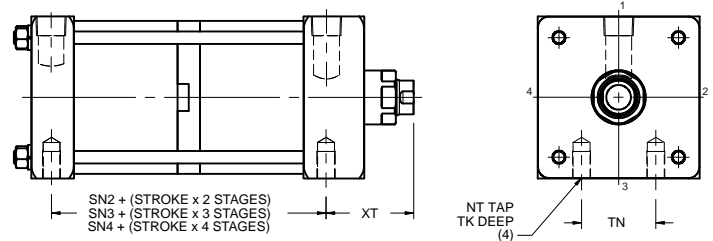
MF1 - HEAD FLANGE MOUNT



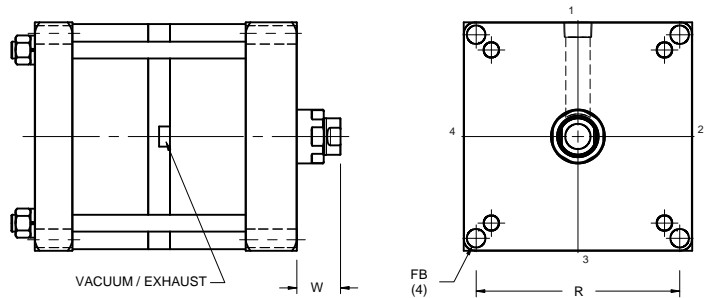
BORE	R	TF	UF	FB	B	C	E	F	G	J	V	W
1 1/2	1,43	2 3/4	2 3/8	5/16	1 1/8	3/8	2	3/8	1 1/2	1	5/8	5/8
2	1,84	3 3/8	4 1/8	3/8	1 1/8	3/8	2 1/2	3/8	1 1/2	1	5/8	5/8
2 1/2	2,19	3 7/8	4 5/8	3/8	1 1/8	3/8	3	3/8	1 1/2	1	5/8	5/8
3 1/4	2,78	4 11/16	5 1/2	7/16	1 1/2	1/2	3 3/4	5/8	1 3/4	1 1/4	7/8	7/8
4	3,32	5 7/16	6 1/4	7/16	1 1/2	1/2	4 1/2	5/8	1 3/4	1 1/4	7/8	7/8
5	4,12	6 5/8	7 5/8	7/16	1 1/2	1/2	5 1/2	5/8	1 3/4	1 1/4	7/8	7/8
6	4,88	7 5/8	8 5/8	9/16	2	5/8	6 1/2	3/4	2	1 1/2	1	1

M3 CYLINDERS - Mounting Dimensions

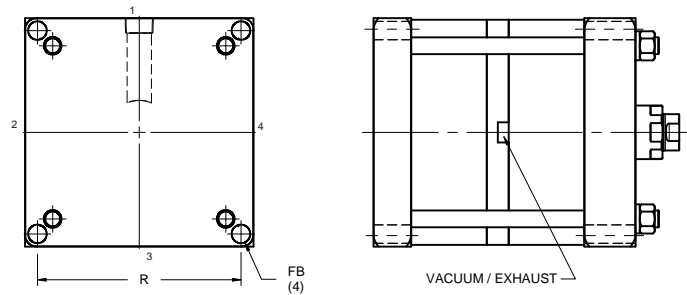
MS4 - SIDE TAPPED MOUNT



ME3 - SQUARE HEAD MOUNT



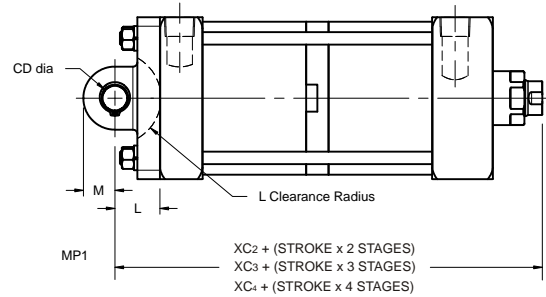
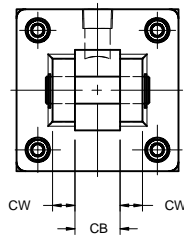
ME4 - SQUARE CAP MOUNT



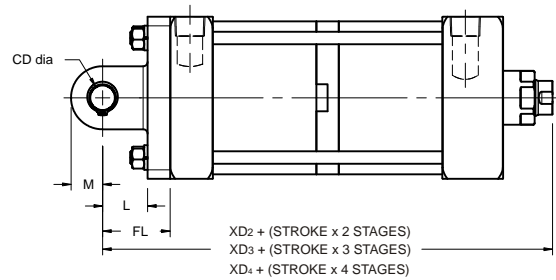
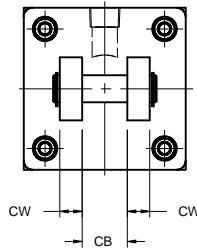
BORE	SN ₁	SN ₂	SN ₃	NT	TK	TN	FB	R	W
1 1/2	4	5 3/4	7 1/2	1/4-20	3/8	5/8	X		
2	4	5 3/4	7 1/2	5/16-18	1/2	7/8			
2 1/2	4 1/4	6 1/8	8	3/8-16	5/8	1 1/4			
3 1/4	4 5/8	6 5/8	8 5/8	1/2-13	3/4	1 1/2			
4	4 5/8	6 5/8	8 5/8	1/2-13	3/4	2 1/16			
5	5 1/8	7 3/8	9 5/8	5/8-18	1	2 11/16			
6	5 5/8	8 1/8	10 5/8	3/4-10	1 1/8	3 1/4			
8	5 7/8	8 1/2	11 1/8	3/4-10	1 1/8	4 1/2	11/16	7.57	1 5/8

M3 CYLINDERS - Mounting Dimensions

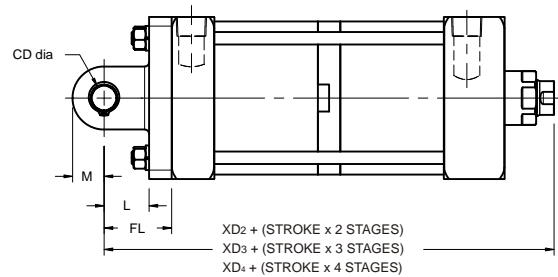
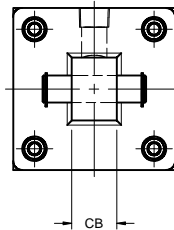
MP1 - SHORT CLEVIS MOUNT



MP2 - LONG CLEVIS MOUNT



MP4 - EYE PIVOT MOUNT



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

BORE	2 STAGES		3 STAGES		4 STAGES	
	XC2	XD2	XC3	XD3	XC4	XD4
1 1/2	7 1/8	7 1/2	8 7/8	9 1/4	10 5/8	11
2	7 1/8	7 1/2	8 7/8	9 1/4	10 5/8	11
2 1/2	7 3/8	7 3/4	9 1/4	9 5/8	11 1/8	11 1/2
3 1/4	8 7/8	9 1/2	10 7/8	11 1/2	12 7/8	13 1/2
4	8 7/8	9 1/2	10 7/8	11 1/2	12 7/8	13 1/2
5	9 3/8	10	11 5/8	12 1/4	13 7/8	14 1/2
6	10 5/8	11 3/8	13 1/8	13 7/8	15 5/8	16 3/8
8	10 7/8		13 1/2		16 1/8	

M3 CYLINDERS - Hall Effect & Reed Switches

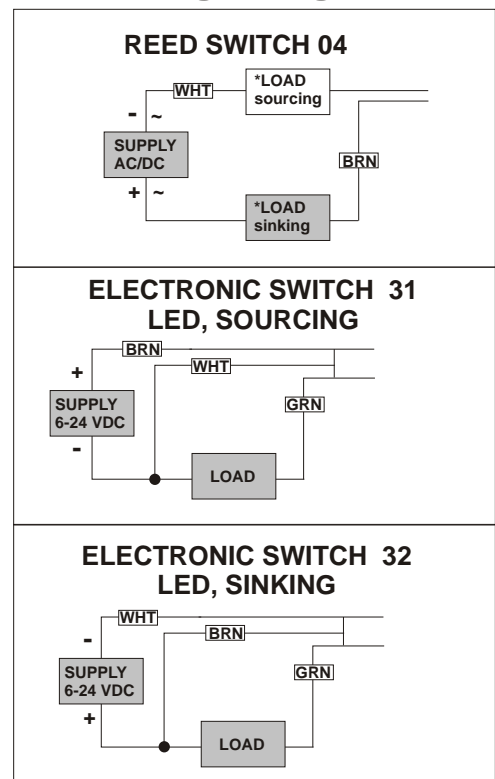
Reed switches are constructed of two overlapping ferromagnetic reeds which are sealed in a glass tube with the ends aligned and a small gap between them. When an external magnetic force is applied, the reed assumes opposite polarity, the ends of the reeds attract each other and make contact, completing the circuit. Reed switches are not 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	862-200-004	862-200-031	862-200-032
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)	-	-

Wiring Diagrams



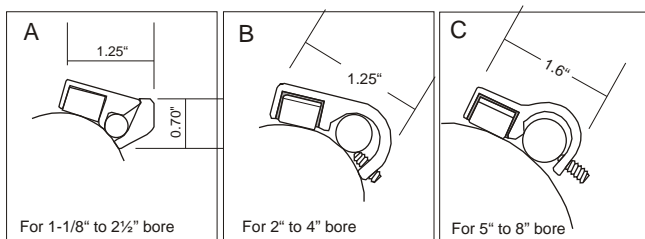
How To Order

★ ALSO AVAILABLE 8 MM QUICK CONNECT

862 - x00 - x XX

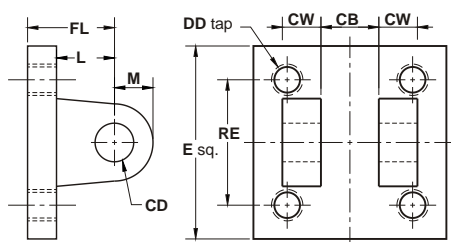
Series	Bracket code	Suffix	Connections	Type Code
862	2	= 1-1/8", 1½", 2" & 2½" bore	0 -9ft PCV wire	04 - Reed switches
762	B	= 3¼" & 4" bore	3 -8 mm Quick Connect	31 - Hall Effect PNP
	C	= 5", 6" & 8" bore		32 - Hall Effect NPN

Switch dimensions



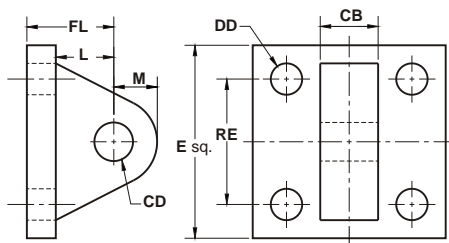
M3 CYLINDERS - Mounting options & NFPA accessories

NFPA Clevis Bracket



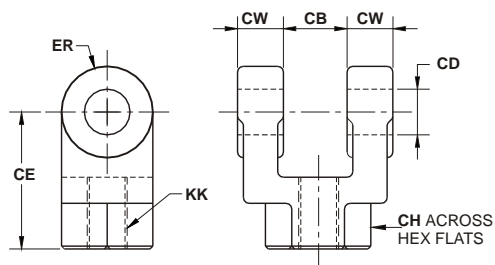
PART #	CB	CD	CW	DD	E	FL	L	M	RE	USED ON BORES
CB-05	.765	1/2	1/2	3/8-24	2 1/2	1 1/8	3/4	1/2	1 5/8	1 1/2 - 2 - 2 1/2"
CB-07	1.265	3/4	5/8	1/2-20	3 1/2	1 7/8	1 1/4	3/4	2 9/16	3 1/4 - 4 - 5"
CB-10	1.515	1	3/4	5/8-18	4 1/2	2 1/4	1 1/2	1	3 1/4	6 - 8"
CB-13	2.032	1 3/8	1	5/8-18	5	3	2 1/8	1 3/8	3 13/16	8 - 10"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

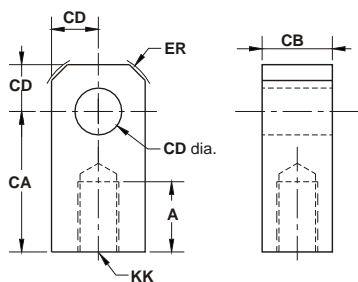
NFPA rod clevis



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)

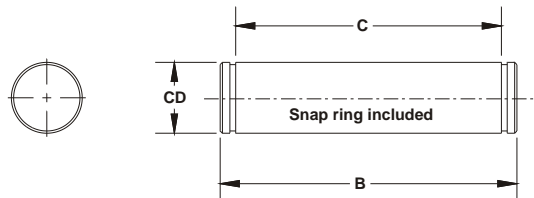
NFPA rod eye



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

M3 CYLINDERS - Dimensions

EXAMPLE M3S2-4x10-MES4R1-BB is a M3 series, 4" bore, 10" stroke, 4 stages in extend Stroke, 1 in retract side lug mount, female rod thread, with Bumpers

MODEL

M3
BASIC MODEL

M3O
OVERSIZE
ROD

M3 S2 - 4 x 10 - MSE4R1 - #4 - BB

ROD END

OPTIONS

MOUNTING OPTIONS

- E3 SQUARE HEAD MOUNT
- E4 SQUARE CAP MOUNT
- E5 RECT. HEAD MOUNT
- E6 RECT. CAP MOUNT
- F1 HEAD RECT. FLANGE
- P1 DETACH. SHORT CLEVIS MOUNT
- P2 DETACH. CLEVIS MOUNT
- P4 DETACH. EYE MOUNT
- S1 ANGLE MOUNT
- S4 BOTTOM TAP MOUNT
- T1 HEAD TRUNNION MOUNT
- T2 CAP TRUNNION MOUNT
- T4 INTERMEDIATE TRUNNION MOUNT
- X1 BOTH TIE RODS EXTENDED
- X2 CAP END TIE RODS EXTENDED
- X3 HEAD END TIE RODS EXTENDED

BORE

- 1 1/2
- 2
- 2 1/2
- 3 1/4
- 4
- 5
- 6
- 8
- 10"

STROKE STD

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 10
- 12
- ask for
other strokes

MULTI STAGES

MS Ex Rx
Ex : Nb of stage for the Extend
stroke (E4, 4 stages extend)

Rx : Nb of stage for the retract
stroke (R1, 1 stages Retract)

- #1 MALE, large
- #1F MALE, full dia.
- #2 MALE, small,
- #2s MALE, studded
- #4 FEMALE, STD
- #X SPECIAL

PxCx PORT POSITION (1,2,3,4)
CUSHION POS. (1,2,3,4)

REx ROD EXTENSION
V SEALS MADE OF Viton™

NR NON-ROTATING
(for pick & place appl.)

M MAGNETIC PISTON

BB BUMPER BOTH ENDS

BC BUMPER CAP END

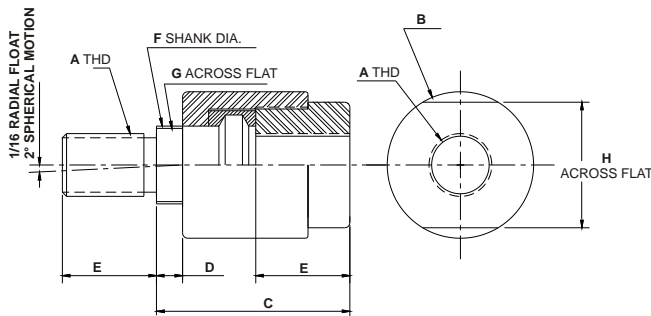
BH BUMPER HEAD END

To order seal kits add the prefix **M3SK** to the bore and rod diameter ex: **M3SK-4000-1000**
and for bronze gland kit add the prefix **M3GK** to the rod diameter ex: **M3SK-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.

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

Viton™ are registered trademarks of DuPont Dow Elastomers.

M3 CYLINDERS - NOTES



STARCYL AIR CYLINDERS

OTHER PRODUCTS:



STAR3 SERIES - N.F.P.A. INTERCHANGEABLE CYLINDERS
BORE SIZES 1 1/2" - 10"



STAR1 - UPGRADABLE SPACE SAVER CYLINDERS



ROUND LINE SPACESAVER CYLINDERS

FIND US ON THE INTERNET

WWW.STARCYL.COM

EMAIL : STARCYL@STARCYL.COM

YOUR STARCYL DISTRIBUTOR:

STARCYL CYLINDER INC.

IN USA : 1-877-STARCYL (782-7295)
fax: 425-920-0504

IN CAN : 1-888-332-1711
fax (450) 967-9029

