TWO-YEAR WARRANTY

NFPA STYLE MOUNT

STOKE UP TO 12"

STANDARD BORE SIZES 1.5" THROUGH 10"

NOMINAL PRESSURE -AIR 250 PSI

MULTI-STAGES NFPA STYLE MOUNT HEAVY DUTY - HIGH FLOW



MULTI-STAGES AIR CYLINDERS



M3 MULTISTAGE CYLINDERS - Design features



Solid Aluminum Head & Cap

Machined from solid aluminum bar stock (6061 T6) and black anodized for corrosion resistance. (Also available in Stainless Steel).

Piston

Machined from solid aluminum bar stock (6061-T6). Offers long bearing support.



Hard Anodized ID Aluminum Tube

(60 Rc) Provides superior wear resistance, and lower friction coefficient for maximum seal life. (Also available in Stainless Steel.)

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)



O-ring Tube End Seals

Nitrile O-ring design is pressure compensated and reusable.



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)

Piston Wear Ring

Nylon material is design for low friction, and to ensure minimum wear in the cylinder in side load application. Eliminates metal-to-metal contact.



Rod Gland

Bronze gland is externally removable without cylinder disassembly for easy maintenance. Designed to provide maximum rod bearing. (Also available in Acetal)

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)

Tie rods

Corrosion resistant (Nitro carburizing), stress proof steel maintains uniform

compression on tube end seals. (Available in Stainless steel)

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).

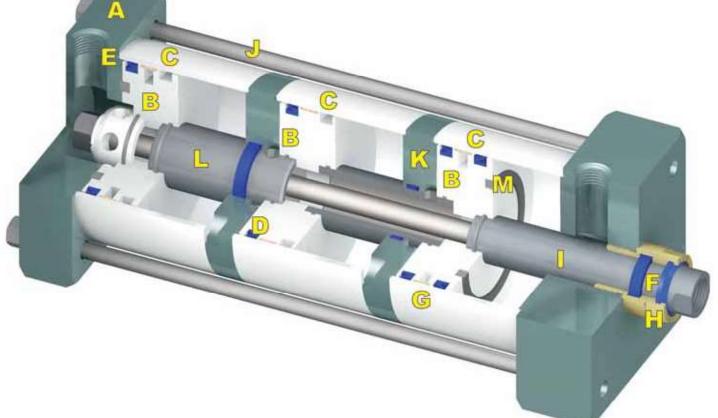
Upper Rod



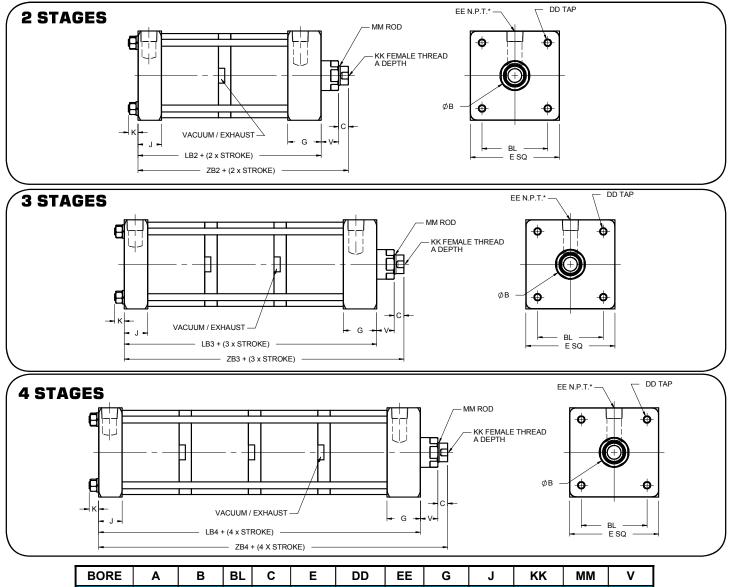
Bumper

Incorporated bumper in piston to ensure long life and noise free, design

for long life, those bumper are incorporated into the piston with enough



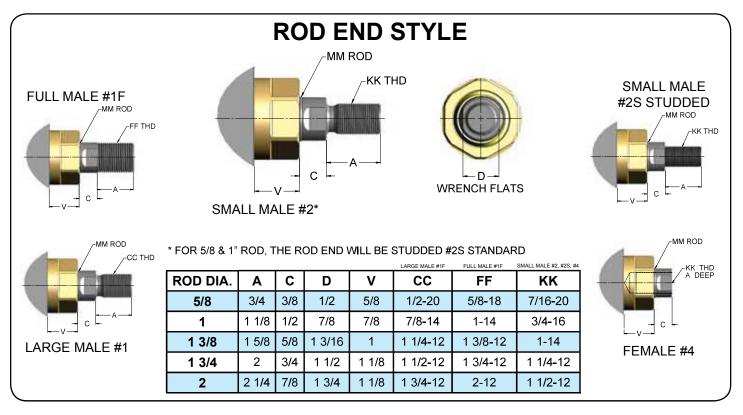
M3 MULTISTAGE CYLINDERS - Dimensions



BORE	Α	В	BL	С	E	DD	EE	G	J	КК	ММ	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

	2 ST/	AGES	3 STA	AGES	4 STAGES				
BORE	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 SERIES - Rod Thread Dimensions & Forces

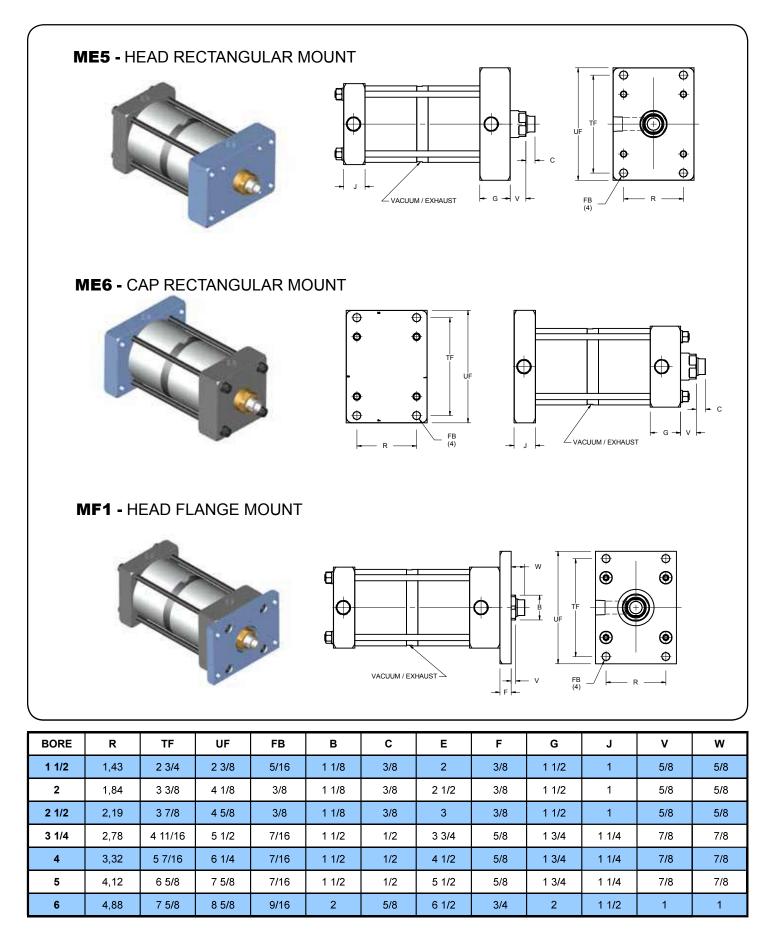


This grid is to show How much force you can get by using our M3 Multistage cylinder. All the forces are calculated with a pressure of 100 ps.i. Multistage cylinders can be use in push (extend) or Pull (retract) or Both, Stock stroke is 1, 2, 3, 4, 6", but can be ordered up to 12" stroke

		F	ORCE (in pou	inds at 100 psi	at 100 psi)							
Г	2 ST/	AGES	3 ST/	AGES	4 STAGES							
BORE	Extend	Retract	Extend	Retract	Extend	Retract						
1 1/2	275	244	373	342	471	441						
2	550	519	785	755	1021	990						
2 1/2	903	873	1316	1285	1728	1697						
3 1/4	1511	1432	2192	2113	2873	2794						
4	2365	2286	3473	3394	4581	4503						
5	3779	3700	5594	5515	7409	7330						
6	5414	5266	8001	7853	10588	10440						
8	9813	9664	14599	14450	19385	19236						

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

M3 SERIES - Mounting Dimensions



M3 SERIES- Mounting Dimensions

2 1/2

3 1/4

4

5

6

8

4 1/4

4 5/8

4 5/8

5 1/8

5 5/8

5 7/8

6 1/8

6 5/8

6 5/8

7 3/8

8 1/8

8 1/2

8

8 5/8

8 5/8

9 5/8

10 5/8

11 1/8

3/8-16

1/2-13

1/2-13

5/8-18

3/4-10

3/4-10

1 1/4

1 1/2

2 1/16

2 11/16

3 1/4

4 1/2

5/8

3/4

3/4

1

1 1/8

1 1/8

1 15/16

2 7/16

2 7/16

2 7/16

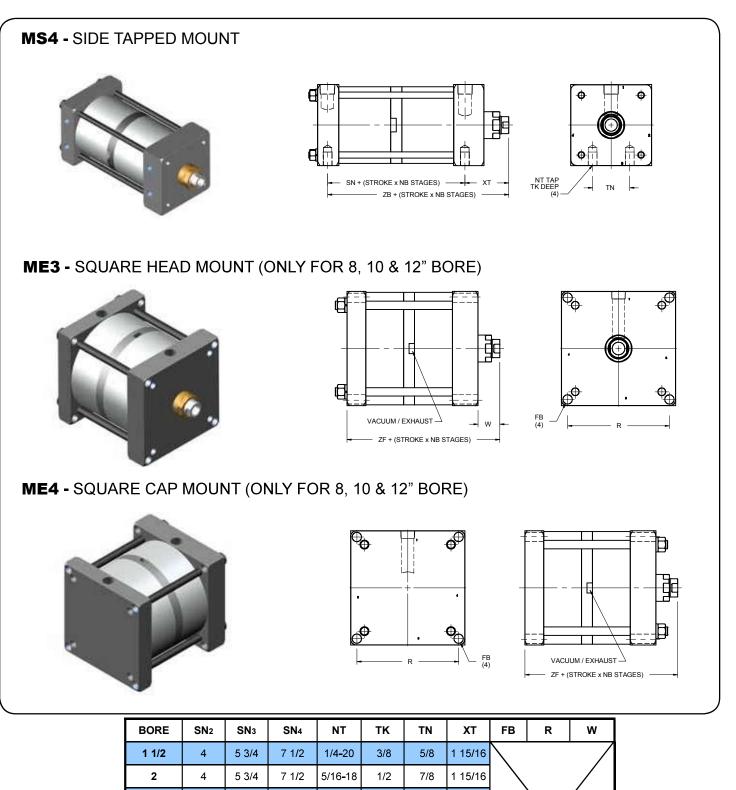
2 13/16

2 13/16

11/16

7.57

1 5/8



M3 SERIES - Mounting Dimensions

MP1 - SHORT CLEVIS MOUNT CD dia je L Clearance Radius CW CW XC + (STROKE x NB STAGES) СВ MP1 MP2 - LONG CLEVIS MOUNT 0 œ CD dia _ 0 CW CW FL + XD + (STROKE x NB STAGES) СВ MP2 **MP4 - EYE PIVOT MOUNT** CD dia 眉 ۲ -FL --- СВ XD + (STROKE x NB STAGES) MP4 1

							2 STAGES		3 ST/	AGES	4 STAGES		
BORE	СВ	CD	cw	FL	L	М	XC2	XD2	XC3	XD3	XC4	XD4	
1 1/2	3/4	1/2	1/2	1 1/8	3/4	5/8	7 1/8	7 1/2	8 7/8	9 1/4	10 5/8	11	
2	3/4	1/2	1/2	1 1/8	3/4	5/8	7 1/8	7 1/2	8 7/8	9 1/4	10 5/8	11	
2 1/2	3/4	1/2	1/2	1 1/8	3/4	5/8	7 3/8	7 3/4	9 1/4	9 5/8	11 1/8	11 1/2	
3 1/4	1 1/4	3/4	5/8	1 7/8	1 1/4	7/8	8 7/8	9 1/2	10 7/8	11 1/2	12 7/8	13 1/2	
4	1 1/4	3/4	5/8	1 7/8	1 1/4	7/8	8 7/8	9 1/2	10 7/8	11 1/2	12 7/8	13 1/2	
5	1 1/4	3/4	5/8	1 7/8	1 1/4	7/8	9 3/8	10	11 5/8	12 1/4	13 7/8	14 1/2	
6	1 1/2	1	3/4	2 1/4	1 1/2	1 1/4	10 5/8	11 3/8	13 1/8	13 7/8	15 5/8	16 3/8	
8	2	1	3/4	2 1/4	1 1/2	1 1/4	10 7/8		13 1/2		16 1/8		

M3 SERIES- 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

How To Order

Series

A clamp = 800-A00-000

1.25

For 1-1/8" to 2" bore

.70"

Clamp dimensions

862

762

А

<u>862</u> - 100 - <u>x</u> <u>xx</u>

1 - 8 mm Quick Connect

with Pigtail (std)

3 -8 mm Quick Connect

В

To Order Switch Clamp Use: (no charge when ordered with switches)

B clamp = 800-B00-000

For 2-1/2" to 4" bore

1 25

Connections

0 -9ft PCV wire

Switch part Number	862-100-004	862-100-031	862-100-032
Spec	Reed switch, MOV, LED	Electronic Sensor, LED, Sourcing	Electronic Sensor, LED, Sinking
Cable Length			
Switching Voltage	5-120 VDC/VAC 50/60 Hz	6-24 VDC	6-24 VDC
Switching Current	0.5 Amp Max .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 µs operate 0.1 µs release	1.5 μs operate 0.5 μs release	0.5 µs operate 0.1 µs 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 (11 msec.)	-	-
Vibration	Up to 20G (10-55 Hz)	-	-

Type Code

02 - Reed switches

04 - Reed switches

31 - Hall Effect PNP

32 - Hall Effect NPN

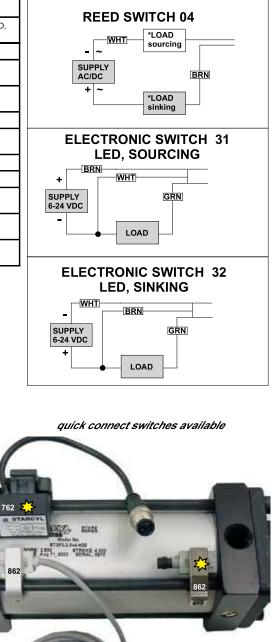
С

Order Clamp Separatly see below

C clamp = 800-C00-000

For 5" to 8" bore

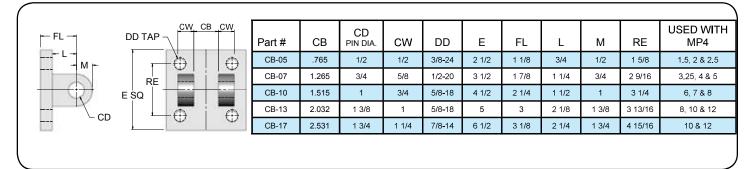
Wiring Diagrams



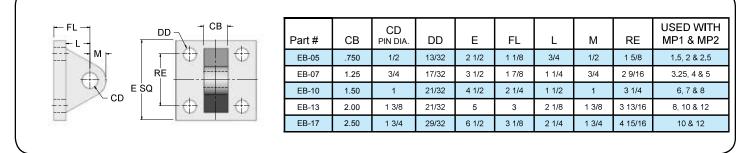
M3 SERIES - Accessories



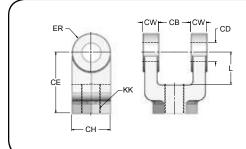
NFPA CLEVIS BRACKET



NFPA EYE BRACKET

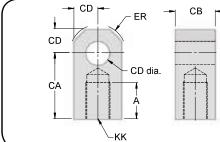


NFPA ROD CLEVIS



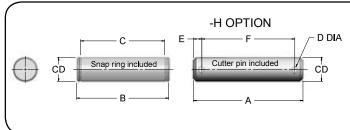
Part #	СВ	CD PIN DIA.	CE	CH HEX.	cw	ER	КК	L
RC-05	.765	1/2	1 1/2	1	1/2	1/2	7/16-20	3/4
RC-07	1.265	3/4	2 3/8	1 1/4	5/8	3/4	3/4-16	1 1/4
RC-10	1.515	1	3 1/8	1 1/2	3/4	1	1-14	1 1/2
RC-13	2.032	1 3/8	4 1/8	2	1	1 3/8	1 1/4-12	2 1/8
RC-17	2.531	1 3/4	4 1/2	2 3/8	1 1/4	1 3/4	1 1/2-12	2 1/4
RC-20	2.531	2	5 1/2	2 15/16	1 1/4	2	1 7/8-12	2 1/2

NFPA ROD EYE



Part #	А	CA	СВ	CD PIN DIA.	ER	КК
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
RE-17	2 1/4	4	2 1/2	1 3/4	2	1 1/2-12
RE-20	3	5	2 1/2	2	2 1/2	1 7/8-12

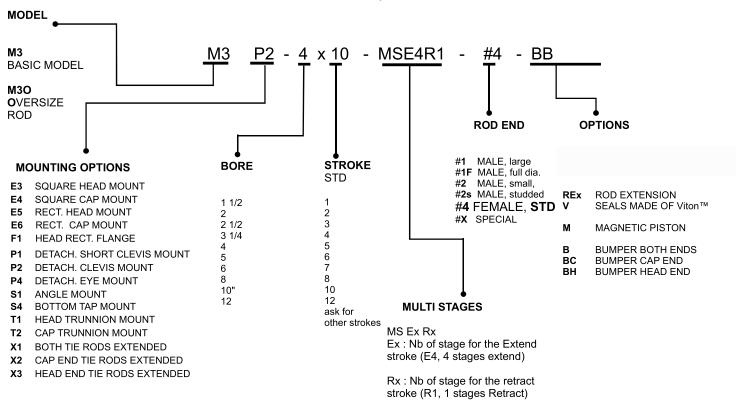
NFPA PIN



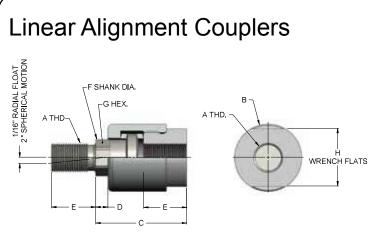
Part #	CD	А	В	С	D	E	F
P-05	1/2	2,281	2.094	1.875	0.106	0.172	1.938
P-07	3/4	3.094	2.875	2.625	0.140	0.188	2.719
P-10	1	3.594	3.375	3.125	0.140	0.188	3.219
P-13	1 3/8	4.656	4.485	4.187	0.173	0.203	4.25
P-17	1 3/4	5.656	5.547	5.188	0.173	0.219	5.250
P-20	2	5.719	5.547	5.188	0.204	0.234	5.281

M3 CYLINDERS - How to Order

EXAMPLE M3P2-4x10-MSE4R1-B is a M3 series, 4" bore, 10" stroke, 4 stages in extend Stroke, 1 in retract ,clevis mount, female rod thread, with Bumpers



To order seal kits add the prefix M3SK to the bore and rod diameter ex: M3SK-4000-1000-ExRx and for gland kit add the prefix M3BK to the rod diameter ex: M3BK-1375



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 center line and the mating member.

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

	Part #	A	в	с	D	E	F	G	н	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
5	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-1000C	1-8	2 1/2	2 15/16	1/2	1 5/8	1 3/8	1 1/4	2 1/4	64000
t I	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
t	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

M3 CYLINDERS - NOTES

PNEUMATIC & HYDRAULIC **STARCYL STARCYL CYLINDERS** -1994-WWW.starcyl.com - 1 877 782-7295



STAR1 - Multistage Upgradable air cylinders



SO - Space One, Spacesaver Air Cylinder



STAR2 - NFPA style Mount spacesaver air cylinders



MEDIUM DUTY SERVICES INDUSTRIAL TIE ROD CONSTRUCTION STANDARD BORE SIZES 1:5" THROUGH S" PISTON ROD DIAMETERS 5:5" THROUGH 5-12"

STAR4 - Heavy Duty NFPA interchangeable air cylinders Steel Construction STAR5 - Medium Duty NFPA interchangeable Hydraulic cylinders Steel Construction

WWW.STARCYL.COM







 AFFA Interchangelit Inter Day Ar Synder
The Second Second

STAR3 - Heavy Duty NFPA interchangeable air cylinders Aluminum construction



STAR6 - Heavy Duty NFPA interchangeable Hydraulic cylinders, 3000 psi

YOUR STARCYL DISTRIBUTOR:



ST3RL - NFPA Rod Lock for STAR3 air cylinders



STMM - Isometric series ISO 6432 & 15552 Air Cylinder

STARCYL CYLINDERS 877-STARCYL FAX: (630) 282-7142

IN CANADA: PH: 450-688-0505 - FAX 514-221-3798

M3-SE2012