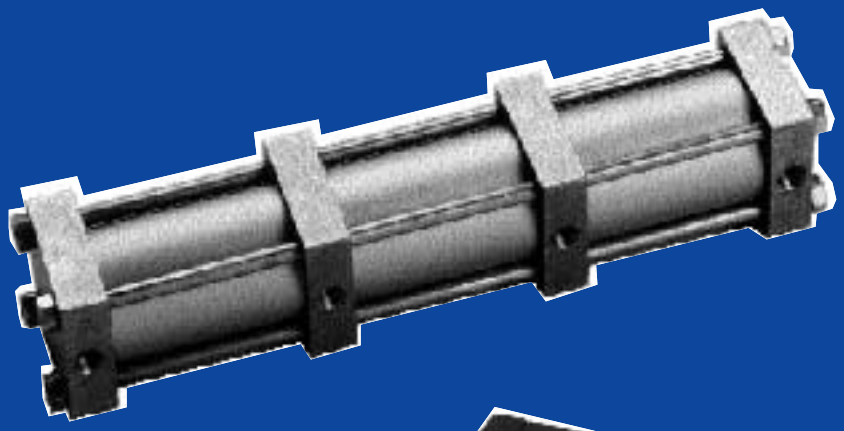
DURAMASTER CYLINDERS

D-02

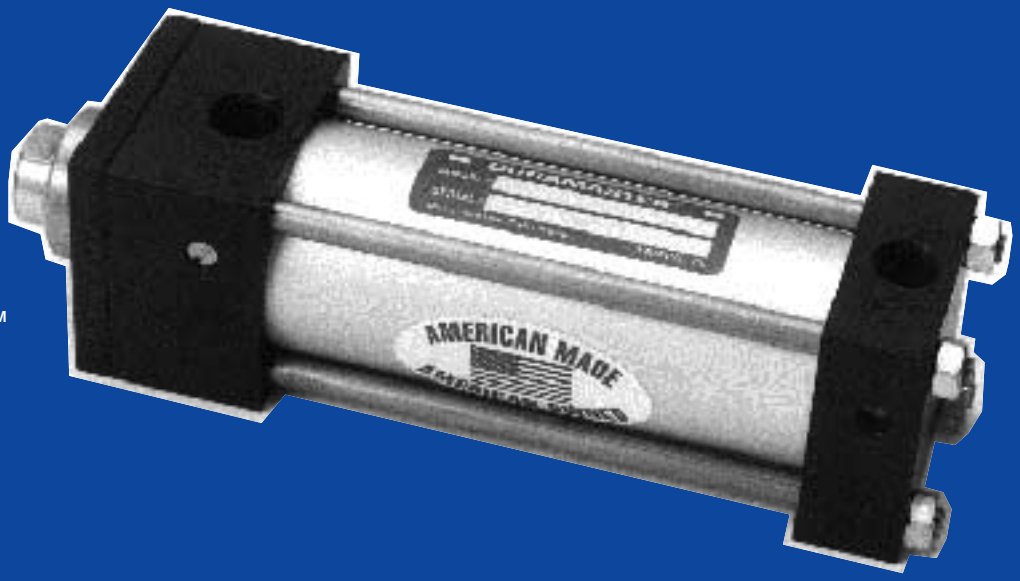
NFPA CYLINDERS

EXCLUSIVE DURA-MOUNT AVAILABLE

DURAMITE II



DURA-E MULTIPLIER



DURAMOUNT™

DURAMASTER
CYLINDERS

High Performance NFPA Interchangeable Cylinders

Standard Specifications

1. Pressure Rating -

- 250 PSI Pneumatic.
- 400 PSI Hydraulic non-shock service.

2. Bore Sizes - 1 1/2" through 8" standard.

3. Mounting Styles - 15 standard styles; specials available.

4. Rod Ends - all standard NFPA styles; other styles available upon request.

5. Piston & Rod Seals - 80 durometer nitrile, lip type standard.

6. Cylinder Tube - Thick-wall 6063-T832 aluminum alloy; Bore O.D.. & I.D. hard coated to resist scoring and corrosion. 60 RC on I.D.

7. Unitized Heavy-Duty Rod Cartridge - Precision machined and pilot fitted to assure concentricity, better sealing; reduces wear by resisting side load stress. Provides for quick change of rod seals.

Options:

- Stainless steel piston rod and tie rods.
- Electroless nickel plated cylinders for corrosive environments.
- Adjustable cushions
- Magnetic reed switches
- Self-aligning rod end couplers.
- Bumpers
- Viton Seals for ambient temperatures to 385° F
- Stop tubes
- Combination mounts
- Adjustable stroke
- Oversized rod
- Low breakaway seals
- Metallic rod scrapers
- Exposed tie rod nuts

Table Of Contents

All Cylinder Components Are Precision Machined From The Finest Materials

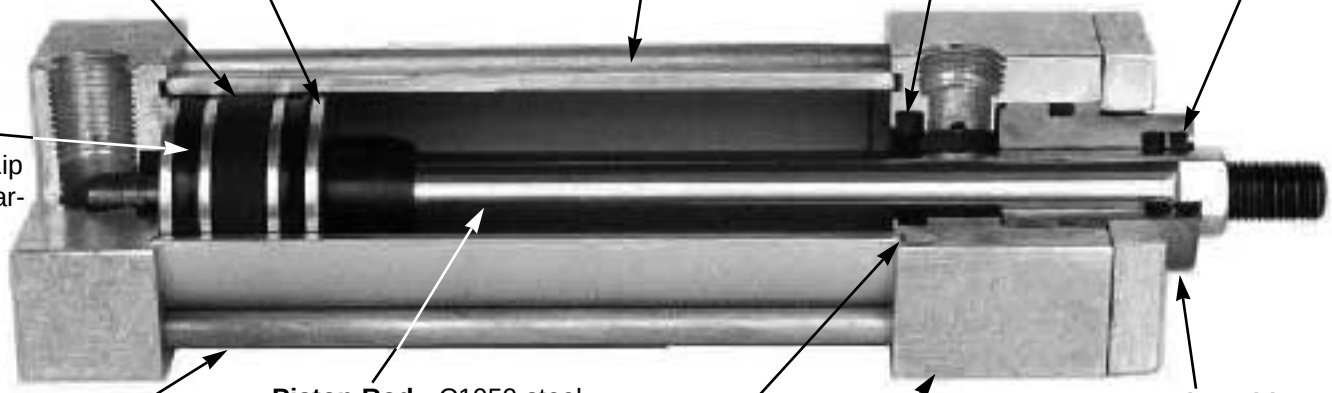
Wear Band - Specially compounded nylon with high strength reinforced materials. Impregnated with a special lubricant.

Cylinder Tube - 35,000 PSI aluminum alloy. I.D. of tube is hard anodic coated. 60 RC on I.D.

Cushion Seals - Floating nitrile-resists external misalignment.

Rod Wiper - Double lip wiper/seal ring - high quality polyurethane.

Piston - 6061-T6 aluminum alloy.



Piston Seals - Lip type, wear-resistant nitrile.

Piston Rod - C1050 steel alloy 100,000 psi minimum yield. Ground & polished with a hard chrome finish 68-70 RC. Stainless Steel Available.

Tie Rods & Nuts - Stress-proof steel. Plated. Recessed Nuts Plated. Stainless Steel Available.

Tube End Seals - Reinforced fiber material.

Head Caps & End Caps - 6061-T6 aluminum alloy extrusion and black anodized for corrosion resistance

Rod Bushing - Bronze bearing.

HOW TO ORDER

NOTE: Model 15 (1.50" Bore) Not Available With Front Cushion or Front Bumper When Ordered With 1" Rod.

NFPA FULL DURAMOUNT CYLINDERS ARE SPECIFIED AS:

D	□	□□	□□	□□□	□	□	□□
D - DURAMASTER CYLINDERS	D = Double Rod S = Single Rod	Bore Size 15 = 1.50" 20 = 2" 25 = 2 1/2" 32 = 3 1/4" 40 = 4" 50 = 5" 60 = 6" 80 = 8"	Stroke (Inches)	Mounting Style NFPA	Rod Diameter A = 5/8" B = 1" C = 1 3/8" D = 1 3/4"	Rod End Style #1 #2 #3 #4	Additional Options *M = Magnetic Piston S = Rod Scraper (Metal) C = Both Cushions R = Rear Cushions F = Front Cushion **H = Hydraulic *** B = Bumpers (both ends supplied) X = Other

EXAMPLES:

DD 20 12 MS4 A 1 C DURAMASTER Cylinder, Double Rod, 2" Bore X 12" Stroke, Basic Cylinder MS4, 5/8" Rod Dia., Male Rod End 7/16-20, Both Cushions.

DS 32 18 MF1 C1 HR DURAMASTER Cylinder, Single Rod, 3 1/4" Bore X 18" Stroke, Front Flange Mount, 1 3/8" Rod, Dia., Male Rod End 1-14, Hydraulic, Rear Cushion.

DS 60 08 MS2 C2 CS DURAMASTER Cylinder, Single Rod, 6" Bore X 8" Stroke, Side Lug Mount, 1 3/8" Rod Dia., Female Rod End 1-14, Both Cushions, Rod Scraper.

NOTES:

*Model 15 requires stainless steel tie rods when ordered with magnetic piston and reed switches

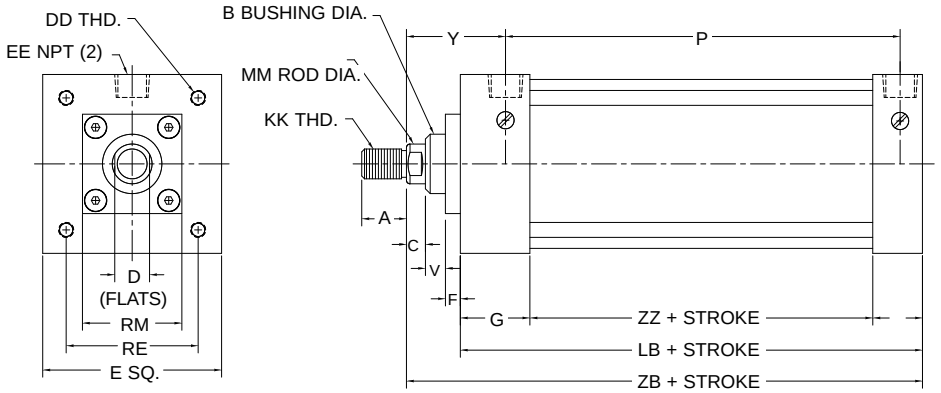
**Standard seal supplied when hydraulic, air/oil seal supplied when air over oil.

***Decreases stroke by 1/16". Model 15 with 1" rod - not available with front bumper.

DURAMASTER CYLINDERS

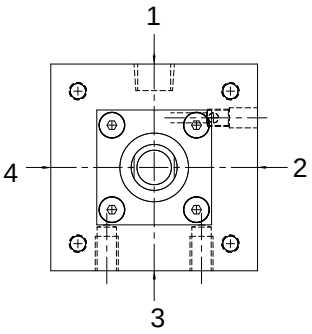
BASIC CYLINDER

MS4 Standard Mount - See Page 5 For Further Information



STANDARD POSITIONS

Port at 1
Cushion at 2
MS4 Mount at 3

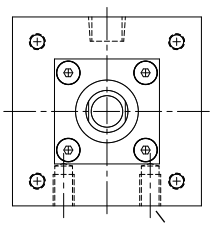


NFPA FULL DURAMOUNT CYLINDER DIMENSIONS

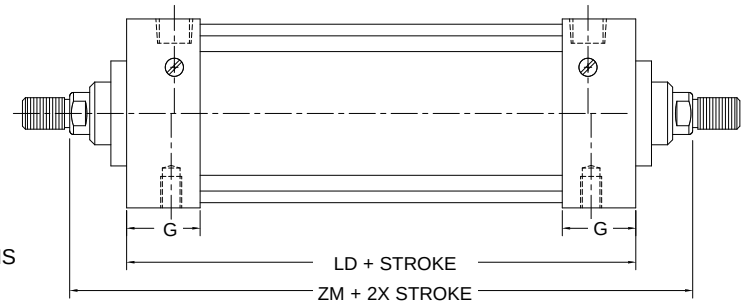
BORE	1 1/2"		2"		2 1/2"		3 1/4"		4"		5"		6"		8"	
ROD DIA.	5/8"	1"	5/8"	1"	5/8"	1"	1"	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/8""	1 3/4"	1 3/8"	1 3/4"
A	3/4"	1 1/8"	3/4"	1.125"	3/4"	1 1/8"	1 1/8"	1 5/8"	1 1/8"	1 5/8"	1 1/8"	1 5/8"	1 5/8"	2"	1 5/8"	2"
B	1 1/8"	1 1/2"	1 1/8"	1 1/2"	1 1/8"	1 1/2"	1 1/2"	2	1 1/2"	2	1 1/2"	2	2	2 3/8"	2	2 3/8"
C	3/8"	1/2"	3/8"	1/2"	3/8"	1/2"	1/2"	5/8"	.1/2"	5/8"	1/2"	5/8"	5/8"	3/4"	5/8"	3/4"
D	1/2"	7/8"	1/2"	7/8"	1/2"	7/8"	7/8"	1 1/4"	7/8"	1 1/4"	7/8"	1 1/4"	1 1/4"	1 5/8"	1 1/4"	1 5/8"
E	2"		2 1/2"		3		3 3/4"		4 1/2"		5 1/2"		6 1/2"		8 1/2"	
EE	3/8"		3/8"		3/8"		1/2"		1/2"		1/2"		3/4"		3/4"	
F	3/8"		3/8"		3/8"		5/8"		3/8"		3/8"		3/8"	5/8"	3/8"	5/8"
G	1 1/2"		1 1/2"		1 1/2"		1 3/4"		1 3/4"		1 3/4"		2"		2"	
J	1"		1"		1"		1 1/4"		1 1/4"		1 1/4"		1 1/2"		1 1/2"	
KK	7/16-20	3/4-16	7/16-20	3/4-16	7/16-20	3/4-16	3/4-16	1-14	3/4-16	1-14	3/4-16	1-14	1-14	1 1/4-12	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"	
MM	5/8"	1"	5/8"	1"	5/8"	1"	1"	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/8"	1 3/4"	1 3/8"	1 3/4"
P	2 3/16"		2 3/16"		2 5/16"		2 9/16"		2 9/16"		2 13/16"		3 1/16"		3 1/16"	
RE	1.43		1.84		2.19		2.76		3.32		4.10		4.88		6.44	
RM	2" SQ		2 1/2" SQ		3" SQ		3 3/4" SQ		2 1/2" SQ		2 1/2" SQ		2 1/2" SQ	3 3/4" SQ	2 1/2" SQ	3 3/4" SQ
V	1/4"	1/2"	1/4"	1/2"	1/4"	1/2"	1/4"	3/8"	1/2	5/8"	1/2	5/8"	5/8"	3/8"	5/8"	3/8"
Y	2"	2 3/8"	2	2 3/8"	2	2 3/8"	2 1/2"	2 3/4"	2 1/2"	2 3/4"	2 1/2"	2 3/4"	2 7/8"	3"	2 7/8"	3"
ZB	4 5/8"	5"	4 5/8"	5"	4 3/4"	5 1/8"	5 5/8"	5 7/8"	5 5/8"	5 7/8"	5 7/8"	6 1/8"	6 5/8"	6 3/4"	6 3/4"	6 7/8"
ZZ	1 1/8"		1 1/8"		1 1/4"		1 1/4"		1 1/4"		1 1/2"		1 1/2"		1 5/8"	
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	

DOUBLE ROD END

DOUBLE ROD END



SEE MS-4 FOR BOTTOM - TAP SPECIFICATIONS
SEE PAGE 5.



DOUBLE ROD END

BORE	1 1/2"		2"		2 1/2"		3 1/4"		4"		5"		6"		8"	
ROD DIA.	5/8"	1"	5/8"	1"	5/8"	1"	1"	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/8"	1 3/4"	1 3/8"	1 3/4"
G	1 1/2"		1 1/2"		1 1/2"		1 3/4"		1 3/4"		1 3/4"		2"		2"	
LD	4 1/8"		4.1/8"		4 1/4"		4 3/4"		4 3/4"		5"		5 1/2"		5 5/8"	
ZM	6 1/8"	6 7/8"	6 1/8"	6 7/8"	6 1/4"	7"	7 1/2"	8"	7 1/2"	8"	7 3/4"	8 1/4"	8 3/4"	9 1/4"	8 7/8"	9 3/8"

1-1/2" BORE WITH 1" ROD - EXPOSED NUTS REQUIRED.

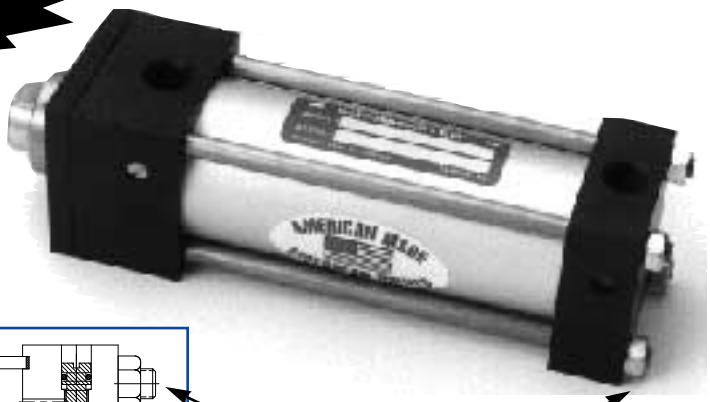
DURAMASTER CYLINDERS

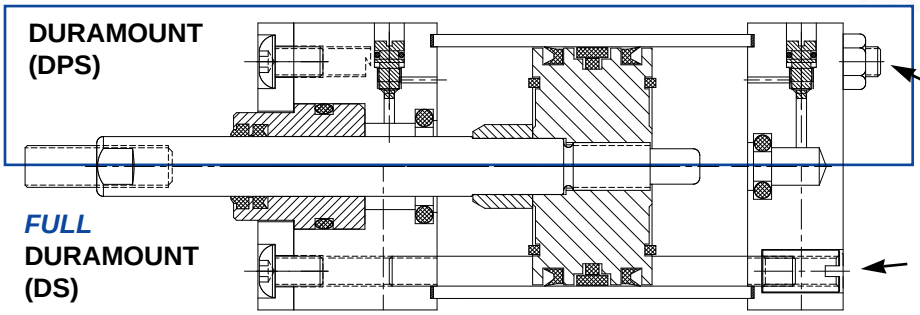
NEW STANDARD

DURAMOUNT

New STANDARD for Duramaster Cylinders,
Unless otherwise specified, ***ALL*** our cylinders will feature *EXPOSED* Nuts in Rear and Button Head Screws in the Front. Advantage: The NFPA Duramount offers a cost savings to OEM's or customers looking for High Quality at *LOWER COST.*

SAME DIMENSIONS AS FULL DURAMOUNT CYLINDERS SEE CHART ON PAGE 3.





HOW TO ORDER *NEW STANDARD*

NOTE: Model 15 (1.50" Bore) Not Available With Front Cushion or Front Bumper When Ordered With 1" Rod.

NFPA DURAMOUNT CYLINDERS ARE SPECIFIED AS:

D P	☐	☐ ☐	☐ ☐	☐ ☐ ☐	☐	☐	☐ ☐
DP DURAMOUNT CYLINDERS ***(STANDARD)***	D = Double Rod S = Single Rod	Bore Size 15 = 1 1/2" 20 = 2" 25 = 2 1/2" 32 = 3 1/4" 40 = 4" 50 = 5" 60 = 6" 80 = 8"	Stroke (Inches)	Mounting Style NFPA****	Rod Diameter A = 5/8" B = 1" C = 1 3/8" D = 1 3/4"	Rod End Style #1 #2 #3 #4	Additional Options *M = Magnetic Piston S = Rod Scraper (Metal) C = Both Cushions R = Rear Cushions F = Front Cushion **H = Hydraulic ***B = Bumpers (both ends supplied) X = Other

EXAMPLES:

DPS 60 08 MS2 C2 CS DURAMASTER Cylinder with exposed nuts, Single Rod, 6" Bore X 8" Stroke, Side Lug Mount, 1 3/8" Rod Dia., Female Rod End 1-14, Both Cushions, Rod Scraper.

DPD 20 12 MS4 A 1 C DURAMASTER Cylinder with exposed nuts, Double Rod, 2" Bore X 12" Stroke, Basic Mount MS4, 5/8" Rod Dia., Male Rod End 7/16-20, Both Cushions.

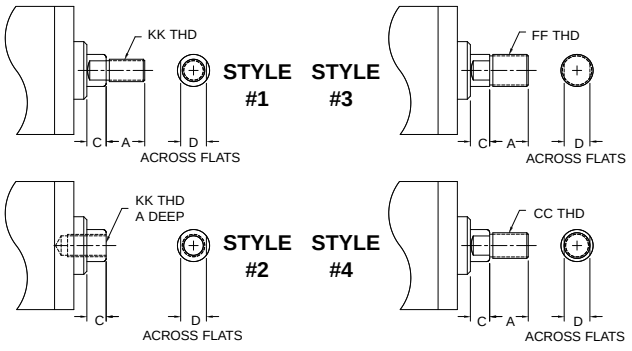
*Model 15 requires stainless steel tie rods when ordered with magnetic piston and reed switches.
** Standard seal supplied when hydraulic, air/oil seals supplied when air over oil.
*** Decreases stroke by 1/16". Model 15 with 1" rod - not available with front bumper.
**** MF-2 or MS-7 Mounts are not available with "Duramount" Design. MP-1 & MP-2 not available on Model 15 or Model 20 "Duramount" Design.

ROD END STYLES

ROD END STYLES

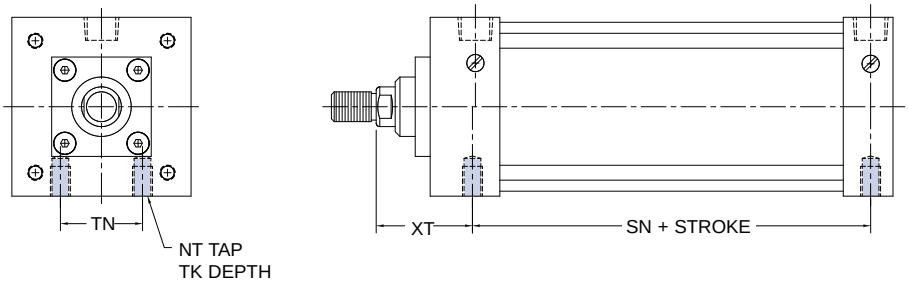
ROD DIA.	A	C	D	V	CC	FF	KK
5/8"	3/4"	3/8"	1/2"	5/8"	1/2" - 20	5/8 - 18	7/16 - 20
1"	1 1/8"	1/2"	7/8"	7/8"	7/8" -14	1 -14	3/4 - 16
1 3/8"	1 5/8"	5/8"	1 1/4"	1"	1 1/4" - 12	1 3/8 - 12	1 - 14
1 3/4"	2"	3/4"	1 1/2"	1"	1 1/2" - 12	1 3/4 -12	1 1/4 - 12

Studs for rod ends can be furnished upon request for 1 1/2" thru 5 " bores. 6" and 8" bores are one piece machined rods.



NFPA STYLE MS-4

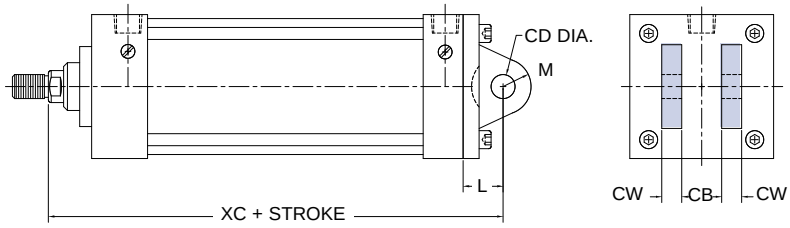
BOTTOM TAPPED MOUNT



BOTTOM TAPPED MOUNT

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

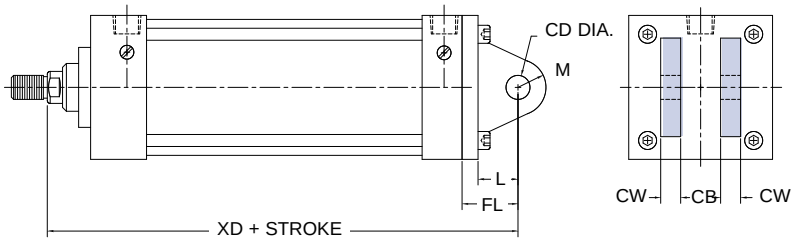
NFPA STYLE MP-1



DETACHABLE REAR CLEVIS
FIXED DIMENSIONS

MODELS 15 & 20
NOT AVAILABLE WITH
"DURAMOUNT" DESIGN

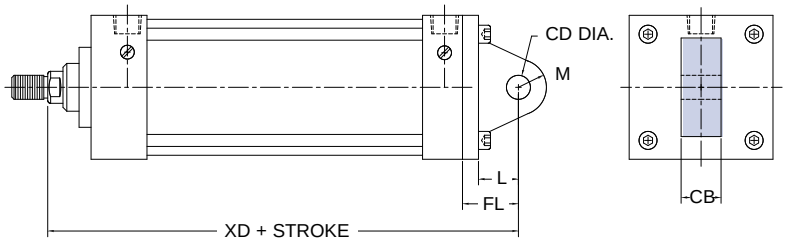
NFPA STYLE MP-2



DETACHABLE REAR CLEVIS

MODELS 15 & 20
NOT AVAILABLE WITH
"DURAMOUNT" DESIGN

NFPA STYLE MP-4



DETACHABLE EYE BRACKET

NOT AVAILABLE ON
MODELS 50, 60 & 80

CLEVIS MOUNTS

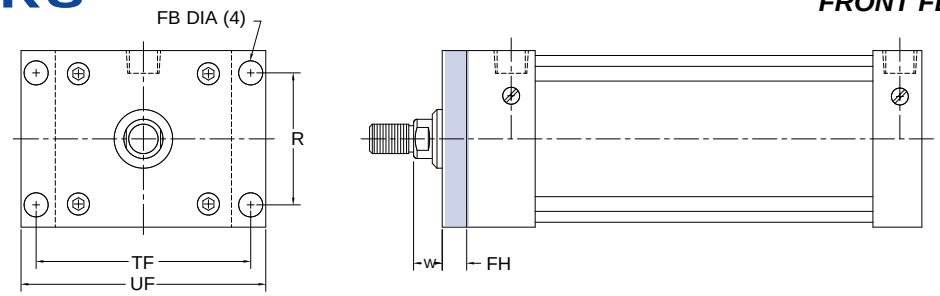
BORE	1 1/2"		2"		2 1/2"		3 1/4"		4"		5"		6"		8"	
ROD DIA.	5/8"	1"	5/8"	1"	5/8"	1"	1"	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/8"	1 3/4"	1 3/8"	1 3/4"
CB	3/4"		3/4"		3/4"		1 1/4"		1 1/4"		1 1/4"		1 1/2"		1 1/2"	
CD	1/2"		1/2"		1/2"		3/4"		3/4"		3/4"		1"		1"	
CW	1/2"		1/2"		1/2"		5/8"		5/8"		5/8"		3/4"		3/4"	
FL	1 1/8"		1 1/8"		1 1/8"		1 7/8"		1 7/8"		1 7/8"		2 1/4"		2 1/4"	
L	3/4"		3/4"		3/4"		1 1/4"		1 1/4"		1 1/4"		1 1/2"		1 1/2"	
M	5/8"		5/8"		5/8"		7/8"		7/8"		7/8"		1"		1"	
XC	5 3/8"	5 3/4"	5 3/8"	5 3/4"	5 1/2"	5 7/8"	6 7/8"	7 1/8"	6 7/8"	7 1/8"	7 1/8"	7 3/8"	8 1/8"	8 3/8"	8 1/4"	8 1/2"
XD	5 3/4"	6 1/8"	5 3/4"	6 1/8"	5 7/8"	6 1/4"	7 1/2"	7 3/4"	7 1/2"	7 3/4"	7 3/4"	8"	8 7/8"	9 1/8"	9"	9 1/4"

DURAMASTER CYLINDERS

NFPA STYLE MF-1

FRONT FLANGE MOUNT

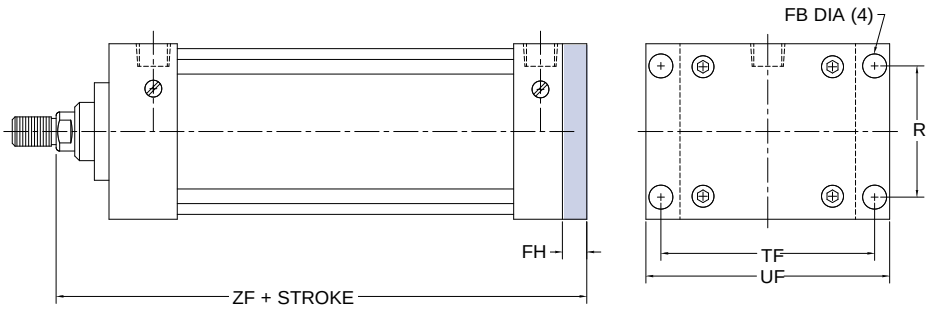
Not available on 8" Bore



NFPA STYLE MF-2

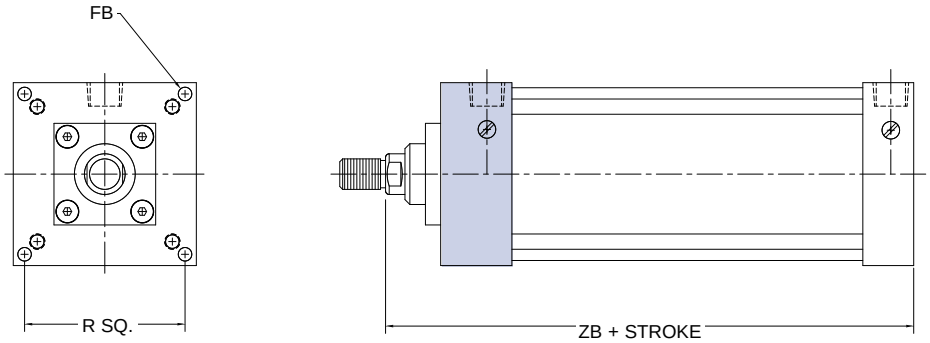
REAR FLANGE MOUNT

NOT AVAILABLE ON 8" BORE OR WITH "DURAMOUNT" DESIGN



FRONT AND REAR FLANGE MOUNT

BORE	1 1/2"		2"		2 1/2"		3 1/4"		4"		5"		6"	
ROD DIA.	5/8"	1"	5/8"	1 "	5/8"	1"	1"	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/8"	1 3/4"
FB	5/16"		3/8"		3/8"		7/16"		7/16"		9/16"		9/16"	
FH	3/8"		3/8"		3/8"		5/8"		5/8"		5/8"		.3/4"	
TF	2 3/4"		3 3/8"		3 7/8"		4 11/16"		5 7/16"		6 5/8"		7 5/8"	
UF	3 3/8"		4 1/8"		4 5/8"		5 1/2"		6 1/4"		7 5/8"		8 5/8"	
W	5/8"	1"	5/8"	1"	5/8"	1"	3/4"	1	3/4"	1"	3/4"	1"	7/8"	1 1/8"
ZF	5"	5 3/8"	5"	5 3/8"	5 1/8"	5 1/2"	6 1/4"	6 1/2"	6 1/4"	6 1/2"	6 1/4"	6 1/2"	7 3/8"	7 5/8"
R	1.43"		1.84"		2.19"		2.76"		3.32"		4.10"		4.88"	



NFPA STYLE ME-3

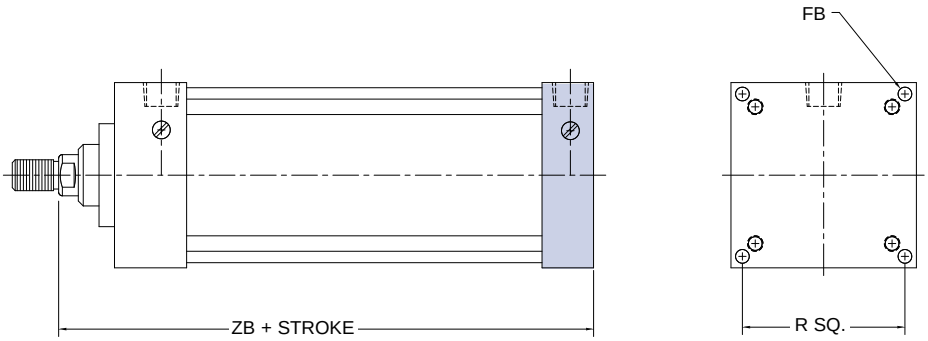
HEAD SQUARE FLANGE MOUNT

8" BORE ONLY

NFPA STYLE ME-4

REAR SQUARE FLANGE MOUNT

8" BORE ONLY
NOT AVAILABLE WITH "DURAMOUNT" DESIGN



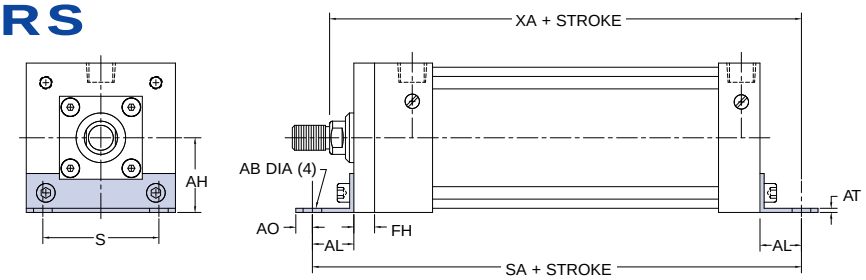
FRONT AND REAR SQUARE FLANGE MOUNT

BORE	8"	
ROD DIA.	1 3/8"	1 3/4"
FB	11/16"	
R	7.57	
ZB	6 3/4"	6 7/8"

DURAMASTER CYLINDERS

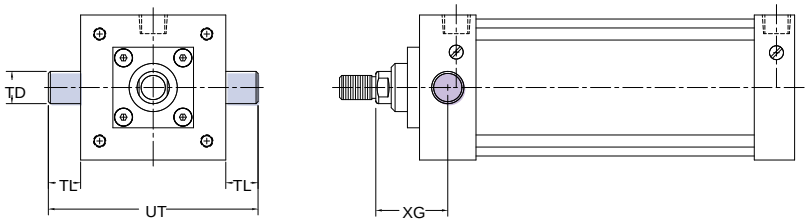
NFPA STYLE MS-1

ANGLE MOUNT



ANGLE MOUNT

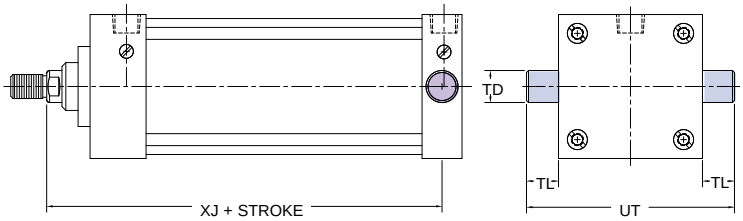
BORE	1 1/2"		2"		2 1/2"		3 1/4"		4"		5"		6"		8"	
ROD DIA.	5/8"	1"	5/8"	1"	5/8"	1"	1"	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/8"	1 3/4"	1 3/8"	1 3/4"
AB	3/8"		3/8"		3/8"		1/2"		1/2"		5/8"		5/8"		3/4"	
AH	1 3/16"		1 7/16"		1 5/8"		1 15/16"		2 1/4"		2 3/4"		3 1/4"		4 1/4"	
AL	1"		1"		1"		1 1/4"		1 1/4"		1 3/8"	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



NFPA STYLE MT-1

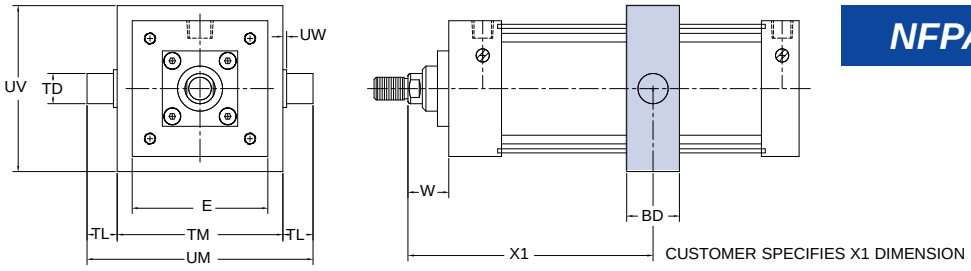
FRONT TRUNNION

MT-1 mounts for 1 1/2" and 2" bore cylinders will have steel heads.



NFPA STYLE MT-2

REAR TRUNNION



NFPA STYLE MT-4

MID TRUNNION

Placed in center unless otherwise specified.

Consult factory for availability of 6" & 8" Bore

TRUNNION MOUNTS

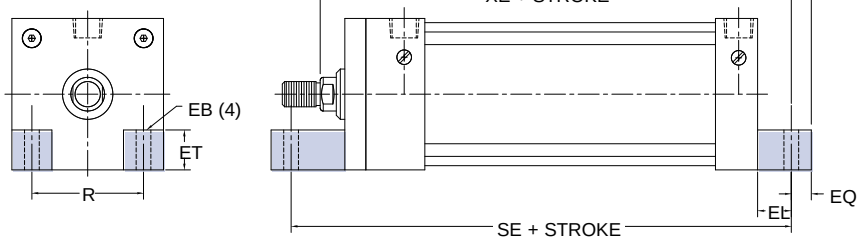
BORE	1 1/2"		2"		2 1/2"		3 1/4"		4"		5"		6"		8"	
ROD DIA.	5/8"	1"	5/8"	1"	5/8"	1"	1"	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/8"	1 3/4"	1 3/8"	1 3/4"
BD	1 1/4"		1 1/2"		1 1/2"		2"		2"		2"		2 1/2"		2 1/2"	
E	2"		2 1/2"		3"		3 3/4"		4 1/2"		5 1/2"		6 1/2"		8 1/2"	
TD	1"		1"		1"		1"		1"		1"		1 3/8"		1 3/8"	
TL	1"		1"		1"		1"		1"		1"		1 3/8"		1 3/8"	
TM	2 1/2"		3"		3 1/2"		4 1/2"		5 1/4"		6 1/4"		7 5/8"		9 3/4"	
UM	4 1/2"		5"		5 1/2"		6 1/2"		7 1/4"		8 1/4"		10 3/8"		12 1/2"	
UT	4"		4 1/2"		5"		5 3/4"		6 1/2"		7 1/2"		9 1/4"		11 1/4"	
UV	2 1/2"		3"		3 1/2"		4 1/4"		5"		6"		7"		9 1/2"	
W	1	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/8"	1 5/8"	1 3/8"	1 5/8"	1 3/8"	1 5/8"	1 5/8"	1 3/4"	1 5/8"	1 3/8"
UW	1/8"		1/8"		1/8"		1/8"		1/8"		1/8"		1/8"		1/8"	
XG	1 3/4"	2 1/8"	1 3/4"	2 1/8"	1 3/4"	2 1/8"	2 1/4"	2 1/2"	2 1/4"	2 1/2"	2 1/4"	2 1/2"	2 5/8"	2 7/8"	2 5/8"	2 7/8"
XJ	4 1/8"	4 1/2"	4 1/8"	4 1/2"	4 1/4"	4 5/8"	5"	5 1/4"	5"	5 1/4"	5"	5 1/4"	5 7/8"	6 1/8"	6"	6 1/4"

NFPA STYLE MS-7

END LUG MOUNT

On Style MS-7, Model 15 with 1" rod is not available.

On Style MS-7, Rod Clevis on Models 15, 20 & 25 is not available.



NOT AVAILABLE WITH "DURAMOUNT" DESIGN

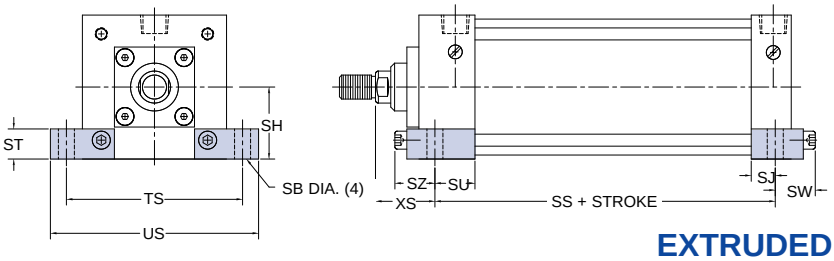
END LUG MOUNT

BORE	1 1/2"		2"		2 1/2"		3 1/4"		4"		5"		6"		8"	
ROD DIA.	5/8"	N/A	5/8"	1"	5/8"	1"	1"	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/8"	1 3/4"	1 3/8"	1 3/4"
EB	3/8"		3/8"		3/8"		1/2"		1/2"		1/2"		3/4"		3/4"	
EL	3/4"		1 5/16"		1 1/16"		7/8"		1"		1 1/16"		1"		1 1/8"	
EQ	1/4"		5/16"		5/16"		3/8"		3/8"		1/2"		1/2"		5/8"	
ET	9/16"		11/16"		13/16"		1"		1 3/16"		1 3/8"		1 9/16"		2"	
XE	5 3/8"		5 9/16"	5 15/16"	5 15/16"	6 3/16"	6 1/2"	6 3/4"	6 5/8"	6 7/8"	6 15/16"	7 3/16"	7 5/8"	7 3/4"	7 7/8"	8 1/4"
ZE	5 5/8"		5 7/8"		6 1/2"		6 7/8"		7"		7 7/16"		8 1/8"		8 1/2"	
R	1.43"		1.84"		2.19"		2.76"		3.32"		4.10"		4.88"		6.44"	
SE	5 1/2"		5 7/8"		6 1/4"		6 5/8"		6 7/8"		7 1/4"		7 3/4"		7 3/4"	

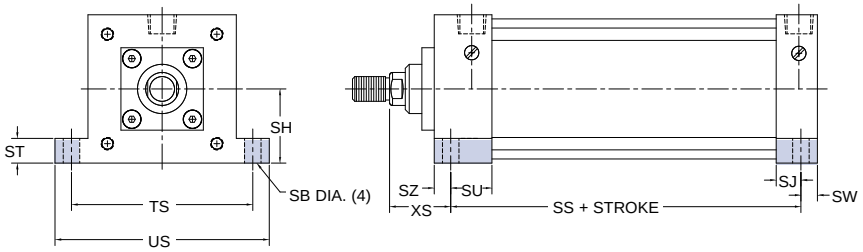
NFPA STYLE MS-2

SIDE LUG MOUNT

BOLT-ON (Available on all Models)



EXTRUDED (Standard on Models 15 thru 32)



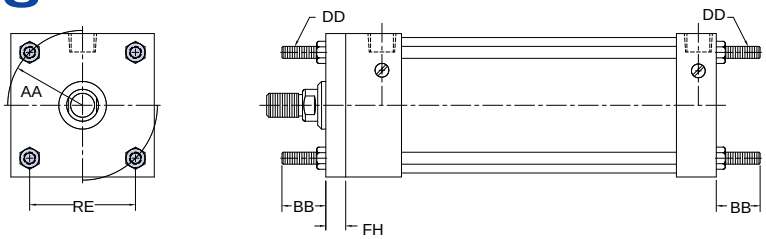
SIDE LUG MOUNT (EXTRUDED)

BORE	1 1/2"		2"		2 1/2"		3 1/4"		4"		5"		6"		8"	
ROD DIA.	5/8"	1"	5/8"	1"	5/8"	1"	1"	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/8"	1 3/4"	1 3/8"	1 3/4"
SB	7/16"		7/16"		7/16"		9/16"		9/16"		13/16"		13/16"		13/16"	
SH	1"		1 1/4"		1 1/2"		1 7/8"		2 1/4"		2 3/4"		3 3/4"		4 1/4"	
SJ	5/8"		5/8"		5/8"		3/4"		3/4"		9/16"		13/16"		13/16"	
SS	2 7/8"		2 7/8"		3"		3 1/4"		3 1/4"		3 1/8"		3 5/8"		3 3/4"	
ST	1/2"		1/2"		1/2"		3/4"		3/4"		1"		1"		1"	
SU	3/4"		3/4"		3/4"		5/8"		1 1/4"		1 1/16"		1 5/16"		1 5/16"	
SW	3/8"		3/8"		3/8"		1/2"		1/2"		11/16"		11/16"		11/16"	
SZ	3/4"		3/4"		3/4"		1 1/8"		1/2"		11/16"		11/16"		11/16"	
TS	2 3/4"		3 1/4"		3 3/4"		4 3/4"		5 1/2"		6 7/8"		7 7/8"		9 7/8"	
US	3 1/2"		4"		4 1/2"		5 3/4"		6 1/2"		8 1/4"		9 1/4"		11 1/4"	
XS	1 3/8"	1 3/4"	1 3/8"	1 3/4"	1 3/8"	1 3/4"	1 7/8"	2 1/8"	1 7/8"	2 1/8"	2 1/16"	2 5/16"	2 5/16"	2 9/16"	2 5/16"	2 9/16"
ST bolt-on	.570"		.660"		.810"		.990"		.940"		1.250"		1.375"		1.750"	
SW bolt-on	1 1/8"		1 3/16"		1 3/16"		1 3/8"		1 3/8"		1 11/16"		1 13/16"		2 1/16"	
SZ bolt-on	1 3/8"		1 7/16"		1 7/16"		1 7/8"		1 3/8"		1 11/16"		1 13/16"		2 1/16"	

DURAMASTER CYLINDERS

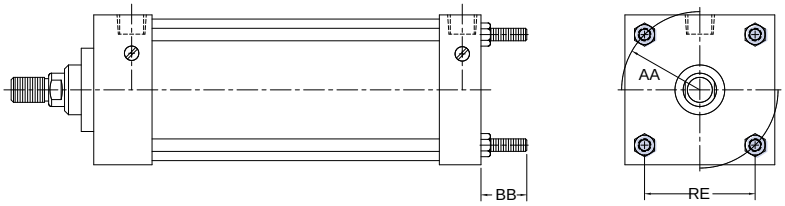
NFPA STYLE MX-1

EXTENDED TIE RODS FRONT AND REAR



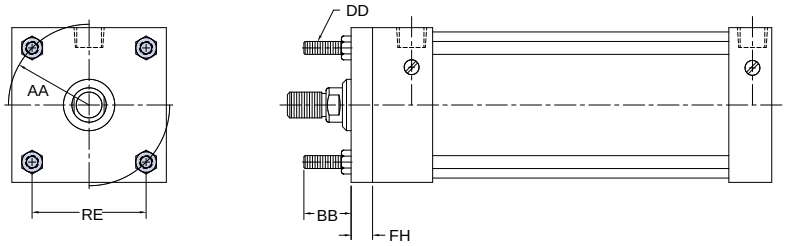
NFPA STYLE MX-2

EXTENDED TIE RODS - REAR



NFPA STYLE MX-3

EXTENDED TIE RODS -FRONT

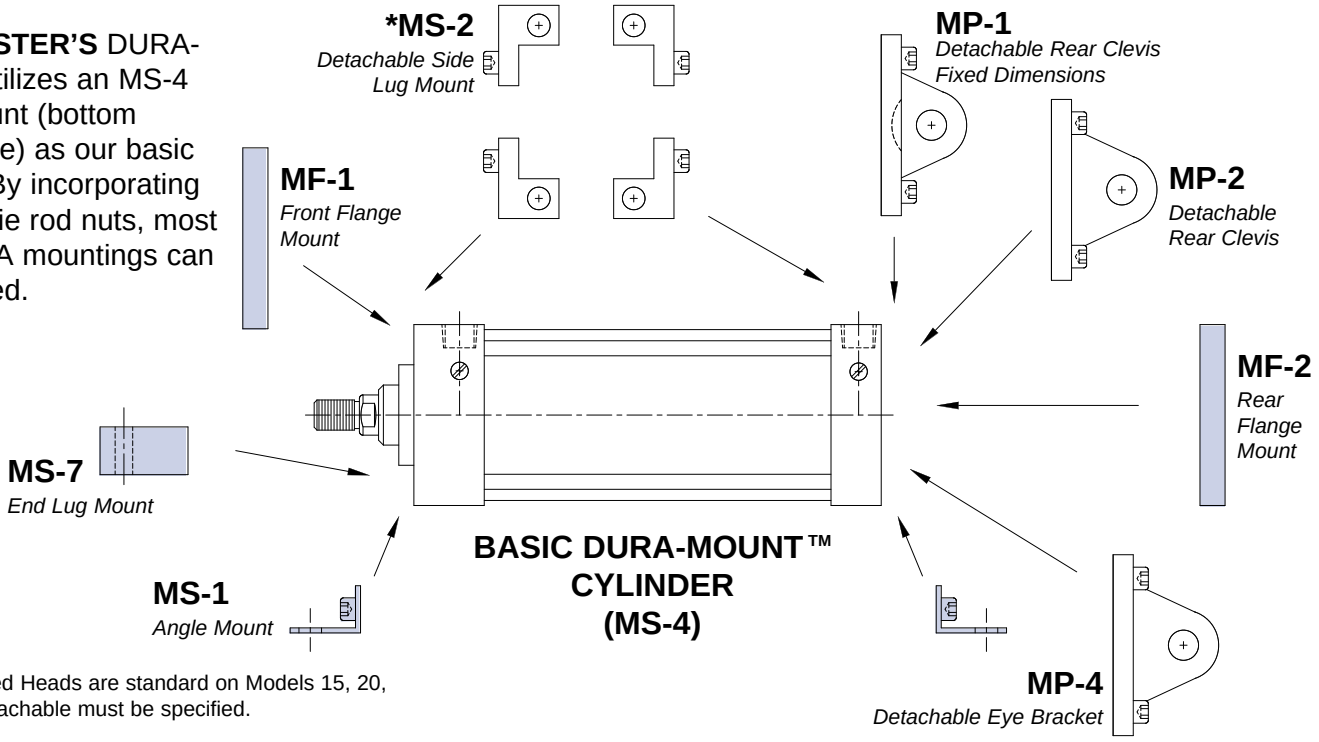


TIE ROD MOUNTS

BORE	1 1/2"		2"		2 1/2"		3 1/4"		4"		5"		6"		8"	
ROD DIA.	5/8"	1"	5/8"	1"	5/8"	1"	1"	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/4"	1 3/8"	1 3/8"	1 3/4"
AA	2.02"		2.6"		3.1"		3.9"		4.7"		5.8"		6.9"		9.1"	
BB	1"		1 1/8"		1 1/8"		1 3/8"		1 3/8"		1 13/16"		1 13/16"		2 5/16"	
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	
RE	1.43"		1.84"		2.19"		2.76"		3.32"		4.10"		4.88"		6.44"	
FH	3/8"		3/8"		3/8"		5/8"		5/8"		5/8"		3/4"		3/4"	

DURA-MOUNT™ Multiple Mountings On One Basic Cylinder

DURAMASTER'S DURA-MOUNT utilizes an MS-4 NFPA mount (bottom tapped hole) as our basic cylinder. By incorporating recessed tie rod nuts, most other NFPA mountings can be achieved.

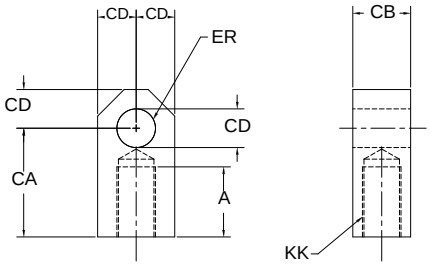


*MS-2 Extruded Heads are standard on Models 15, 20, 25, & 32 - Detachable must be specified.

CAST IRON ROD EYE

PART NO.	A	CA	CB	CD	ER	KK
DRE-97-03	3/4"	1 1/2"	3/4"	1/2"	9 /16"	1/2 - 20
DRE -97-03A	3/4"	1 1/2"	3/4"	1/2"	5/8"	7/16 - 20
DRE-97-065	1 1/8"	2 1/16"	1 1/4"	3/4"	7/8"	3/4 - 16
DRE-97-12	1 5/8"	2 13/16"	1 1/2"	1"	1 3/16"	1 - 14
DRE-97-16	2"	3 7/16"	2"	1 3/8"	1 9/16"	1 1/4 - 12

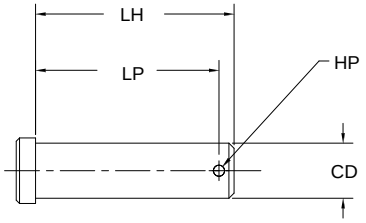
CAST IRON ROD EYE



CLEVIS PINS

PART NO.	CD	HP	LH	LP	USE WITH
DCP-96-03	1/2"	5/32"	2"	1 27/32"	DRC-92-03 or DRC-92-03A
DCP-96-065	3/4"	5/32"	2 3/4"	2 19/32"	DRC-92-065
DCP-96-12	1"	5/32"	3 1/2"	3 9/32"	DRC-92-12
DCP-96-16	1 3/8"	1/4"	5"	4 3/16"	DRC-92-16

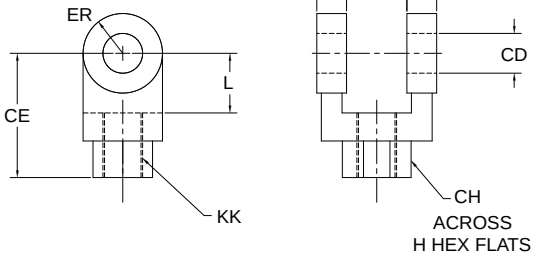
CLEVIS PIN



CAST IRON ROD CLEVIS

PART NO.	CB	CD	CE	CH	CW	ER	KK	L
DRC-92-03	3/4"	1/2"	1 1/2"	3/4"	1/2"	1/2"	1/2 - 20	3/4"
DRC -92-03A	3/4"	1/2"	1 1/2"	3/4"	1/2"	1/2"	7/16 - 20	3/4"
DRC-92-065	1 1/4"	3/4"	2 3/8"	1 1/4"	5/8"	3/4"	3/4 - 16	1 1/4"
DRC-92-12	1 1/2"	1"	3 1/8"	1 1/2"	3/4"	1"	1 - 14	1 1/2"
DRC-92-16	2"	1 3/8"	4 1/8"	2"	1"	1 3/8	1 1/4" - 12	2 1/8"

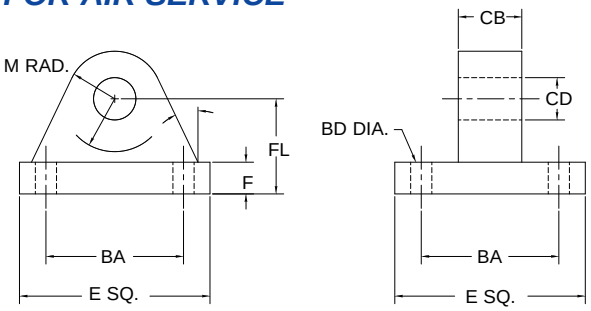
CAST IRON ROD CLEVIS



CAST IRON EYE BRACKET FITS MP-1 or MP-2

PART NO.	BA	BD	CB	CD	E	F	FL	LR	M
DEB -89-03A	1 5/8"	13/32"	3/4"	1/2"	2 1/2"	3/8"	1 1/8"	3/4"	9/16"
DEB-89-065A	2 9/16"	17/32"	1 1/4"	3/4"	3 1/2"	5/8"	1 7/8"	1 1/4"	7/8"
DEB-89-12A	3 1/4"	21/32"	1 1/2"	1"	4 1/2"	3/4"	2 1/4"	1 1/2"	1 1/4"

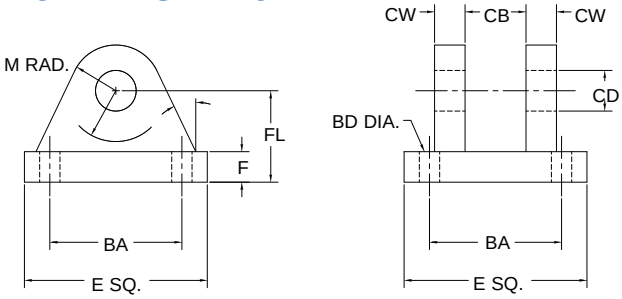
CAST IRON EYE BRACKET FOR AIR SERVICE



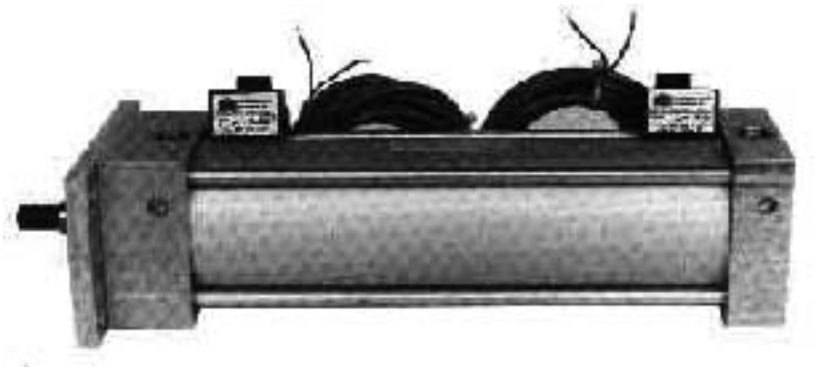
CAST IRON CLEVIS BRACKET FITS MP-4 MOUNT

PART NO.	BA	BD	CB	CD	CW	E	F	FL	LR	M
DCB -91-03A	1 5/8"	13/32"	3/4"	1/2"	1/2"	2 1/2"	3/8"	1 1/8"	1/2"	9/16"
DCB-91-065A	2 9/16"	17/32"	1 1/4"	3/4"	5/8"	3 1/2"	5/8"	1 7/8"	1"	1 1/16"
DCB-91-12A	3 1/4"	21/32"	1 1/2"	1"	3/4"	4 1/2"	3/4"	2 1/4"	1 1/4"	1 1/8"

CAST IRON CLEVIS BRACKET FOR AIR SERVICE



DURAMASTER CYLINDERS

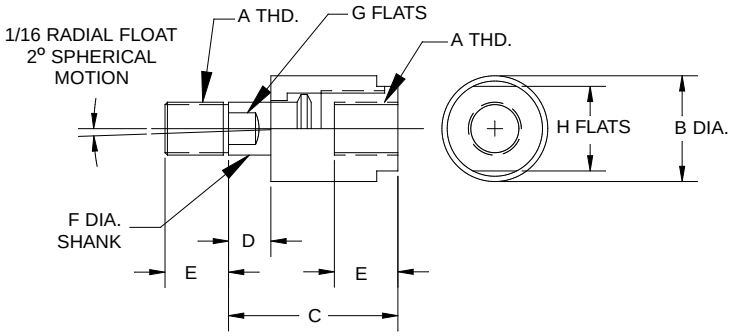


TECHNICAL INFORMATION:

Working Temperature	Min. -5ºC Max. 90ºC
Operating Time	On 2 ms Off .1 ms
Life Expectancy at full load	10^6 Cycles
Repeatability	.001 inch
Vibration Resistance	5 to 1000 Hz
Shock Resistance	30g @ 11ms
Minimum Magnetic Field to actuate	85 Gauss
Maximum Switch Current	1 AMP

VOLTAGE RATING:

Reed Switch:
240 V Max AC or DC
Hall Effect:
5-24 V DC



LINEAR ALIGNMENT COUPLERS

PART NO.	A	B	C	D	E	F	G	H	MAX. PULL AT YIELD
DAC-.250	5/16 - 24	7/8"	1 1/4"	1/4"	5/8"	5/16"	3/16"	3/4"	6,000
DAC-.312	1/4 - 28	7/8"	1 1/4"	1/4"	5/8"	5/16"	3/16"	3/4"	6,800
DAC-.375	3/8 - 24	7/8"	1 1/4"	1/4"	5/8"	5/16"	3/16"	3/4"	8,300
DAC-.437	7/16 - 20	1 1/4"	2"	1/2"	3/4"	5/8"	1/2"	1"	10,000
DAC-.500	1/2 - 20	1 1/4"	2"	1/2"	3/4"	5/8"	1/2"	1"	14,000
DAC-.625	5/8 - 18	1 1/4"	2"	1/2"	3/4"	5/8"	1/2"	1"	19,000
DAC-.750	3/4 - 16	1 3/4"	2 5/16"	1/2"	1 1/8"	31/32"	13/16"	1 1/2"	34,000
DAC-.875	7/8 - 14	1 3/4"	2 5/16"	1/2"	1 1/8"	31/32"	13/16"	1 1/2"	39,000
DAC-1.000	1 - 14	2 1/2"	2 15/16"	1/2"	1 5/8"	1 3/8"	1 5/32"	2 1/4"	64,000
DAC-1.250	1 1/4 - 12	2 1/2"	2 15/16"	1/2"	1 5/8"	1 3/8"	1 5/32"	2 1/4"	78,000

MAGNETIC REED SWITCHES

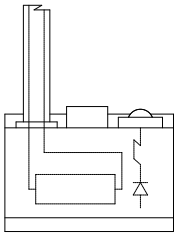
Fully Adjustable Position Sensing & Input

MAGNETIC REED SWITCHES

Duramaster's Reed and Hall Effect switches provide fully adjustable position sensing and input for many types of sequences and programmable controllers. Both Switches have a high degree of sensitivity with low EMI/RFI susceptibility and incorporate internal surge suppression for extended life expectancy.

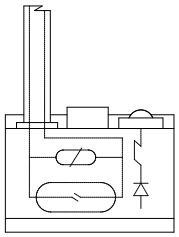
A magnetic disk coupled to the piston triggers the externally mounted switch. A built-in indicator light allows ease of testing as well as locating the switch on the cylinder. DO NOT USE an incandescent light bulb as high in-rush may damage the switch. Also, use the switch to indicate the end of the physical stroke. Do not rely on the switch alone to stop the cylinder travel.

The comprehensive design of the cylinder barrel thickness and mass of magnet, coupled with low profile switch provides sensitivity, dependability, repeatability and desired response time.



DRS-1031
Hall Effect & Light
(magnetic resonance)
5-24 VDC
Normally Open, Sourcing

DRS-1032
Sinking



DRS-1004
Reed Switch, MOV & Light.
5-240 VAC/VDC
Normally Open.
(.005 Amp Minimum)

ALIGNMENT COUPLERS

DURAMASTER CYLINDERS

FEATURES & DIMENSIONS

DURA-TANK

HOW TO ORDER

1. Refer to Table No. 1, (Force Chart Extend) on page 16 to find effective area. (square inch) of cylinder.
2. Multiple effective area by stroke of cylinder to determine volume.
3. **IMPORTANT:** Multiply area by 1.5 **safety factor.**
4. Select Air/Oil tank capacity closest to volume. See capacity chart below.

D A ☐ ☐ ☐ ☐ ☐

- **MODEL # (BORE)**
- **TANK HEIGHT (INCHES)**
- **MTG**
  - **B-BASE**
  - **F-FLANGE**
  - **T-TAPPED HOLE**

EXAMPLES:

DS2511MS4A1

(Effective area of Model 25).....4.91

(Stroke) .....x 11

.....54.01

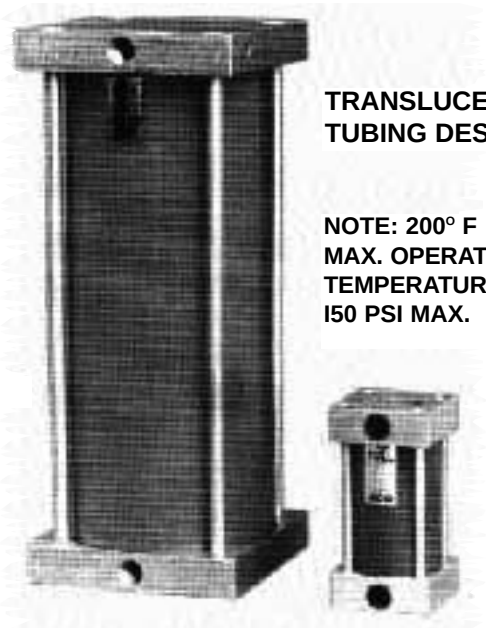
(Safety Factor .....x 1.5

.....81.015

Base your selection on a combination of space requirements, port size (for high speed) and cost.

Depending on space available, cost availability the customer could select DA2517T, DA3210T, DA4007T, DA5004T, DA6003T.

Air/Oil Tank



TRANSLUCENT TUBING DESIGN

NOTE: 200° F MAX. OPERATING TEMPERATURE I50 PSI MAX.

Duramaster's air over oil tank is the ideal answer for your power requirements where a smooth, even hydraulic action is required. This lightweight, compact unit is easily installed on any existing or new application. Years of worry-free, inexpensive operation are virtually guaranteed, because there are no moving parts.

OPTIONAL BASE & FLANGE MOUNT

BORE	C	FB	FH	J	RE	SB	THK.	TF	TS	UF	US
2 1/2"	1.250	3/8"	3/8"	1	2.190	7/16"	3/8"	3 7/8"	3 3/4"	4 5/8"	4 1/2"
3 1/4"	1.500	7/16"	5/8"	1 1/4	2.760	9/16"	1/2"	4 11/16"	4 3/4"	5 1/2"	5 3/4"
4"	2.062	7/16"	5/8"	1 1/4	3.320	9/16"	1/2"	5 7/16"	5 1/2"	6 1/4"	6 1/2"
5"	2.688	9/16"	5/8"	1 1/4	4.100	5/8"	3/4"	6 5/8"	6 7/8"	7 5/8"	8 1/4"
6"	3.250	9/16"	3/4"	1 1/2	4.880	3/4"	1"	7 5/8"	7 7/8"	8 5/8"	9 1/4"
8"	4.500	N/A	N/A	1 1/2	N/A	3/4"	1"	N/A	9 7/8"	N/A	11 1/4"

TOLERANCES: ± 1/16" ON FRACTIONS
± .010 ON 3 PLACE DECIMALS

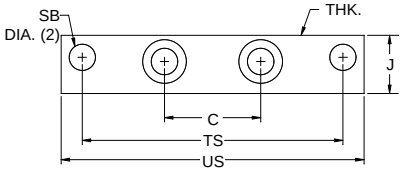
TAPPED HOLE MOUNT (STANDARD)

BORE	VOLUME (PER IN.)	A	B	C	D	E	F	G	P NPT
2 1/2"	4.91 cu. in.	3 5/32	2 9/32	1.250	3.000	1 1/8	3/8-16" x .625"	2.190	3/8
3 1/4"	8.30 cu. in.	3 17/32	2 13/32	1.500	3.750	1	1/2-13" x .750"	2.760	1/2
4"	12.57 cu. in.	3 17/32	2 13/32	2.062	4.500	1	1/2-13" x .750"	3.320	1/2
5"	19.64 cu. in.	3 17/32	2 13/32	2.688	5.500	1	5/8-11" x 1.00"	4.100	1/2
6"	28.27 cu. in.	4 1/32	2 21/32	3.250	6.500	1	3/4-10" x 1.125"	4.880	3/4
8"	50.26 cu. in.	4 1/32	2 21/32	4.500	8.500	1	3/4-10" x 1.125"	6.440	3/4

NOTE: Flange & base mounting available as extra cost.

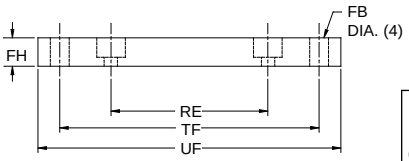
OPTIONAL BASE MOUNT

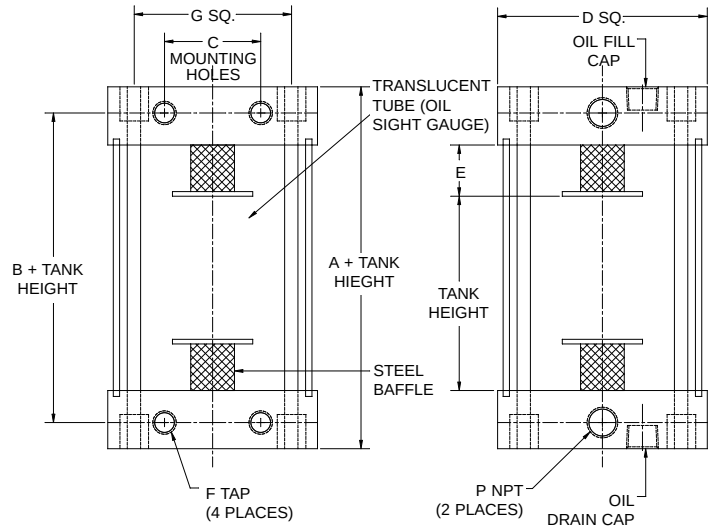
(TYP. TOP & BOTTOM)



OPTIONAL FLANGE MOUNT

(NOTE: FLANGE ADDS TO OVERALL HEIGHT)





USEABLE OIL CAPACITY CHART (cu. in.)

TANK HEIGHT WITH USEABLE OIL CAPACITY IN CUBIC INCHES	MODEL NUMBERS					
	DA-25	DA-32	DA-40	DA-50	DA-60	DA-80
	TANK BORE SIZE (INCHES)					
	2 1/2"	3 1/4"	4"	5"	6"	8"
1"	5	8	12	20	28	50
2"	10	16	25	39	56	100
3"	15	25	37	59	84	150
4"	19	33	50	78	112	199
5"	24	41	62	98	140	249
6"	29	49	75	117	168	299
7"	34	58	87	137	197	349
8"	39	66	100	156	225	399
9"	44	74	112	176	253	449
10"	48	82	125	195	281	499
11"	53	90	137	215	309	549
12"	58	99	149	234	337	598
13"	63	107	162	254	365	648
14"	68	115	174	273	393	698
15"	73	123	187	293	421	748
16"	78	132	199	312	449	798
17"	82	140	212	332	477	848

NOTE: TANK HEIGHTS ARE NOT LIMITED TO 17". TANK HEIGHTS UP TO 10 FT. ARE POSSIBLE.

DURAMASTER CYLINDERS

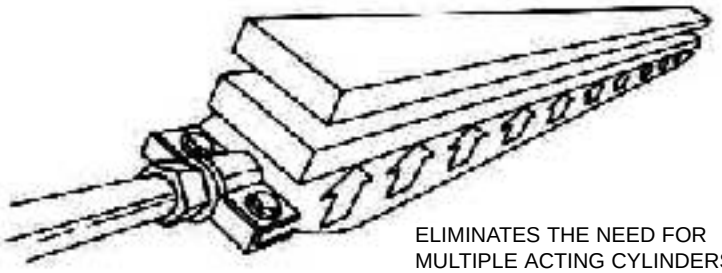
DURA-TUBE

SHORT STROKE LINEAR ACTUATOR

Short Stroke Actuator Can Replace A Series Of Short Stroke Cylinders

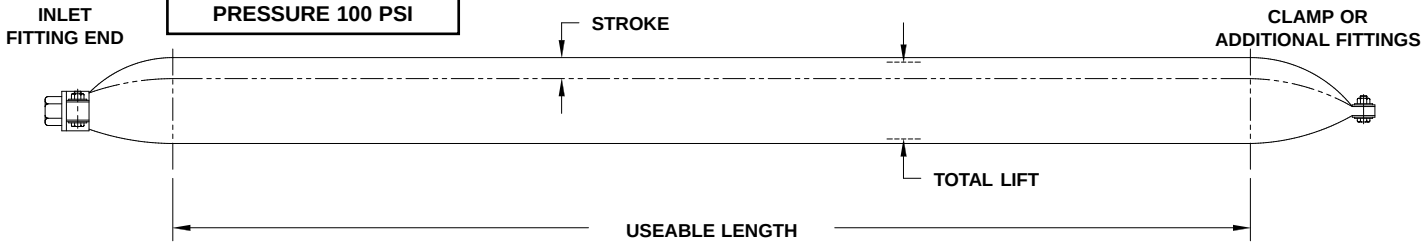
DURA-TUBE provides a unique patented construction of a non-removable end fitting bonded to a tube (up to almost 100 ft. length) to give a leak proof, long-lasting, low-cost, short-stroke linear actuator. Pneumatic or hydraulic service.

- Light Weight
- Simple Construction, Easy to Mount
- Low Cost
- **NO** Maintenance



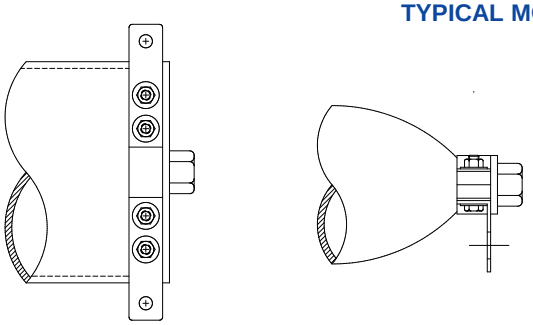
ELIMINATES THE NEED FOR MULTIPLE ACTING CYLINDERS. REPLACE WITH SINGLE DURA-TUBE PROVIDING EVEN PRESSURE OVER ENTIRE AREA.

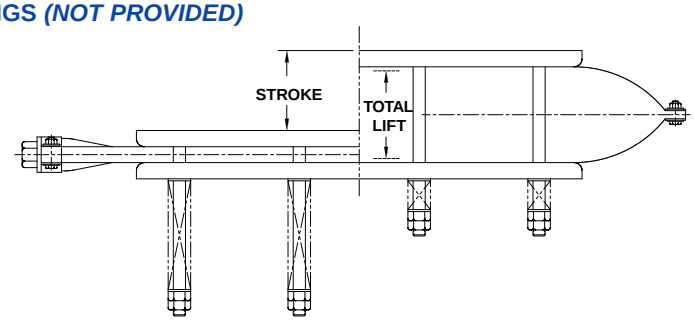
TEMP. RATING: 180° MAXIMUM OPERATING PRESSURE 100 PSI



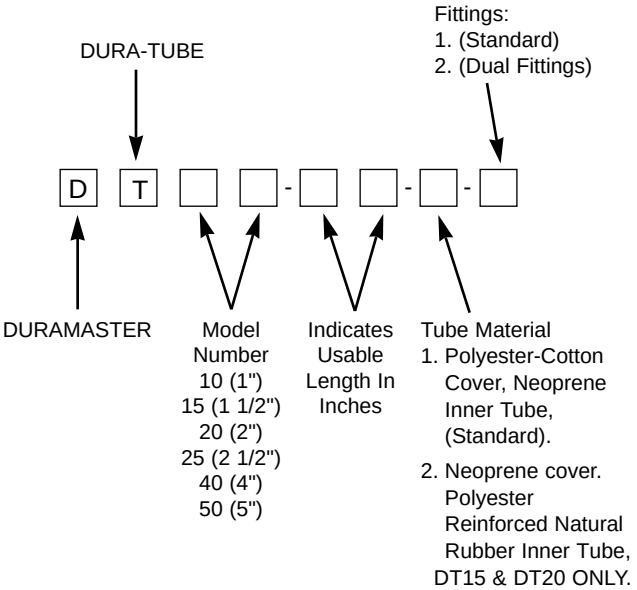
FUNCTIONS & APPLICATIONS - Lifting, Clamping, Positioning, Hold, Release and Cushioning

TYPICAL MOUNTINGS *(NOT PROVIDED)*





HOW TO ORDER



OUTPUT FORCE CALCULATION

OUTPUT FORCE TABLE IS COMPUTED FROM THE FOLLOWING FORMULA

1.57 X (BORE -- LIFT) X EFFECTIVE LENGTH X INPUT AIR PRESSURE = **OUTPUT FORCE**

where

$F\,[LB] = 1.57\,(D - l)\,LP$

d = TUBE DIA. (INCHES) (BORE SIZE)

l = LIFT (INCHES)

L = USEABLE LENGTH (INCHES)

P = INPUT PRESSURE (P.S.I.)

TYPICAL OUTPUT FORCES PER 10 INCHES OF EFFECTIVE LENGTH AT 100 PSI PRESSURE AT LIFT OF:

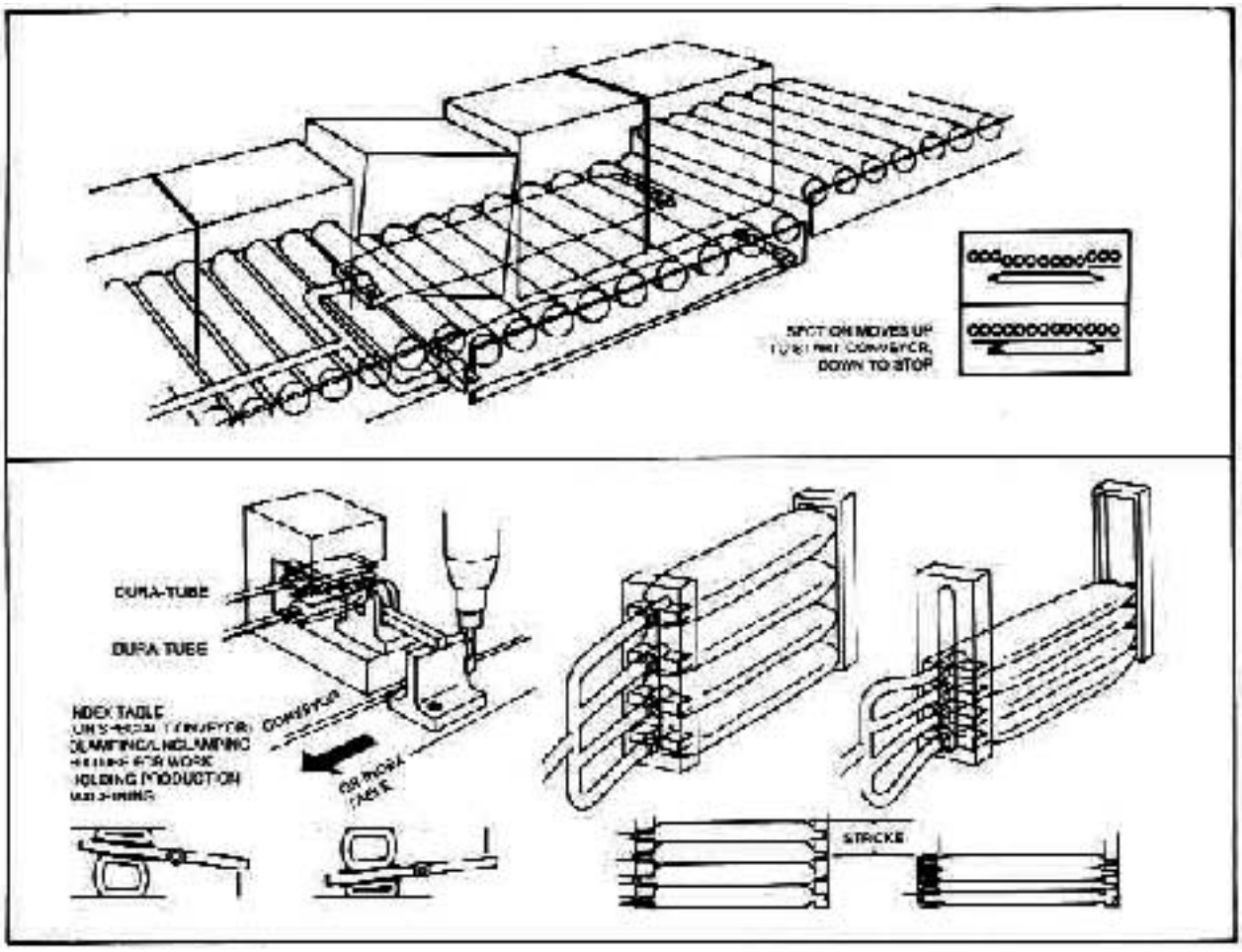
DURA-TUBE MODEL	LIFT .2"	.5"	1"	1.5"	2"	2.5"	3"	3.5"	4"	4.5"
DT10-**10** (1.0" Dia.)	1255	785								
DT15-**10** (1.5" Dia.)	2040	1570	785							
DT20-**10** (2.0" Dia.)	2825	2355	1570	785						
DT25-**10** (2.5" Dia.)	3610	3140	2355	1570	785					
DT40-**10** (4.0" Dia.)	5970	5500	4710	3925	3140	2355	1570	785		
DT50-**10** (5.0" Dia.)	7540	7070	6280	5500	4710	3925	3140	2355	1570	785

EXAMPLE:

2" DURA-TUBE with 1" total lift, 10" effective length at 100 psi

Model Number

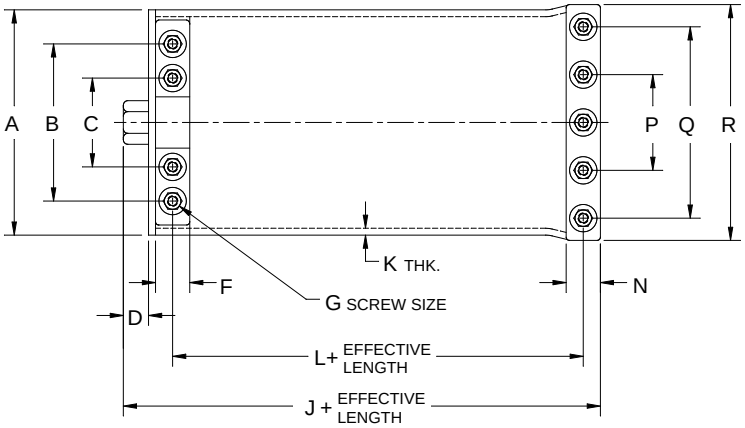
DT2010-11 1.57 X (2.0 -- 1.0) X 10 X 100 = 1570 lbs.

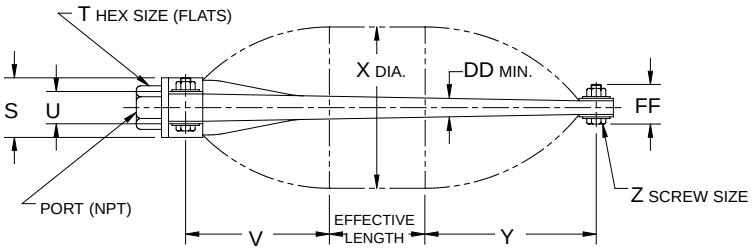


MODEL	A	B	C	D	F	G	J	K
DT10	1.67	-	1.06	.64	.88	#8-32 X .75	4 1/2	.10
DT15	2.30	-	1.50	.75	1.25	1/4-20 X 1.00	6 1/8 / 6 1/2	.11
DT20	3.20	-	2.25	.72	1.25	3/8-16 X 1.25	7 5/16 / 8 5/8	.11
DT25	3.86	-	2.50	.72	1.25	3/8-16 X 1.25	8	.12
DT40	6.75	5.00	2.50	1.00	1.25	3/8-24 X 1.75	12	.16
DT50	8.25	6.75	4.25	1.00	1.25	3/8-24 X 1.75	15	.25

MODEL	L	N	P	Q	R	S	T	U	V
DT10	2 5/8	.88	1.25	-	2.00	.89	.75	.52	1 1/4
DT15	4 / 4 3/8	1.25	1.75	-	2.75	1.14	.88	.64	1 7/8 / 2
DT20	5 1/8 / 6 3/8	1.25	2.25	-	3.63	1.40	1.12	.66	2 1/8 / 2 3/4
DT25	5 7/8	1.25	3.00	-	4.38	1.67	1.12	.71	2 5/8
DT40	9 1/2	1.25	2.50	5.00	6.50	2.13	1.38	2.13	4 1/2
DT50	12 1/2	1.25	3.50	7.00	8.63	2.13	1.38	2.13	6

MODEL	X	Y	Z	DD	FF	PORT (NPT)	ORIFICE
DT10	1.25	1 3/8	#8-32 X .38	.33	.78	1/4-18 FEMALE	.24
DT15	1.75/1.82	2 1/8/2 3/8	1/4-20 X .75	.39	1.14	3/8-18 FEMALE	.37
DT20	2.33	3 / 3 5/8	3/8-16 X 1.00	.40	1.32	1/2-14 FEMALE	.47
DT25	2.88	3 1/4	3/8-16 X 1.00	.41	1.33	1/2-14 FEMALE	.47
DT40	4.48	5	3/8-24 X 1.00	.49	1.41	3/4-14 MALE	.65
DT50	5.90	6 1/2	3/8-24 X 1.25	.68	1.60	3/4-14 MALE	.65





TOLERANCES: ± 1/4" ON FRACTIONS
± .03 ON 2-PLACE DECIMALS

NOTES: DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE
J, L, V, X & Y DIMENSIONS: STANDARD TUBE / NEOPRENE TUBE

STOP-TUBE CYLINDER SELECTION

Rod Selection

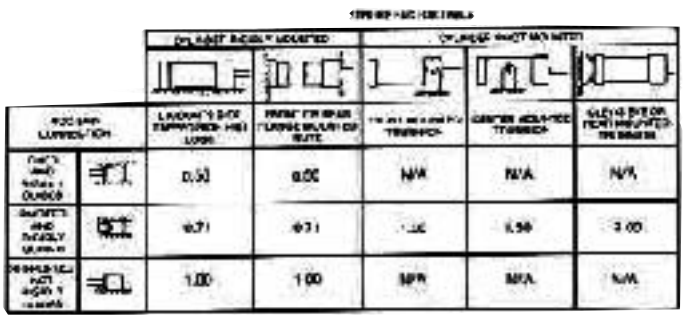
The stroke length is determined by what distance the cylinder must move a load. However, a cylinder of a particular bore size may not have a piston rod with adequate strength for the application. The two variables which determine if a piston rod has adequate strength are (1) the stroke length and (2) the mounting style used.

If it is determined that a particular bore size will not provide adequate piston strength for the stroke length and mounting style used, there are two methods that can be used to ensure adequate piston rod strength.

1. Specify a cylinder of a larger bore size which has a larger piston rod.
2. Specify an oversize piston rod for the bore size cylinder already selected.

To determine if the piston rod of a cylinder with a particular bore size has adequate strength for the application, follow the procedures below:

1. From the STROKE FACTOR CHART determine the necessary “stroke factor”, based upon mounting configuration and rod end connection.
2. Using the “stroke factor” calculate the value of “L”. L = Actual Stroke length (inches) x stroke factor.



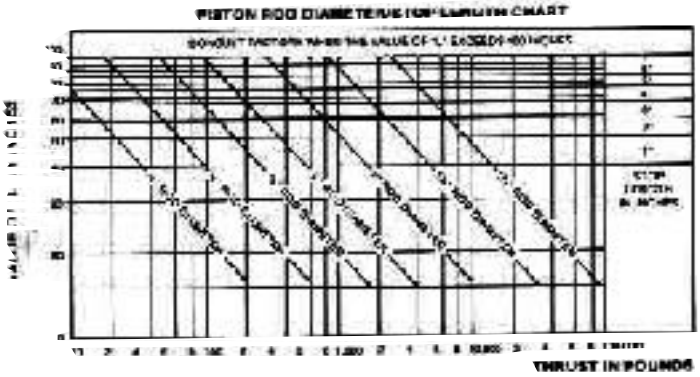
3. If the cylinder being calculated will be ordered with longer than standard rod extension (see rod options), this extra length, in inches, must be added on to “L”. L + rod extension.
4. Using the “thrust” value for the cylinder being calculate, from chart on page 3 and the value of “L”, note the point of intersection of the lines projected from these two values. If the cylinder of a specific bore size has already been selected and the piston rod diameter is smaller than that indicated on the diagonal line, a cylinder with a large piston rod will be required. To get a large piston rod there are two choices:

   (A) Select the next bore size cylinder which has the proper piston rod diameter.

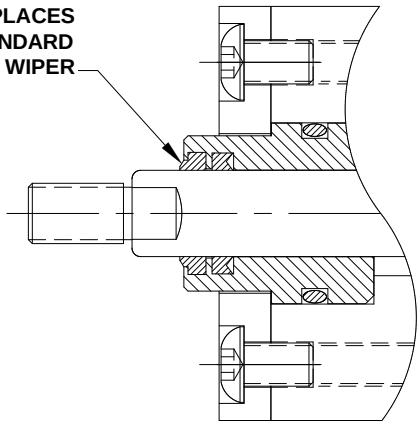
   (B) Order the selected cylinder with “oversize” rod.
5. If the value of “L” is 40 or above, then a stop tube is required, regardless of the piston rod diameter. For the cylinder to dimensionally accept the stop tube assembly, extra length (stop length) must be added to the cylinder. The proper stop length is determined from the dimension in the column on the right of the chart that corresponds to the “value of L”. To order a cylinder with a stop tube, add this stop length to the stroke length in the model number.

   NOTE: STANDARD STOP TUBE IS A DUAL PISTON DESIGN. MINIMUM STOP TUBE IS 3". CONSULT FACTORY FOR SHORTER STOP TUBE OPTIONS.

   NOTE: STOP TUBES ARE AVAILABLE WITH CUSHIONS.

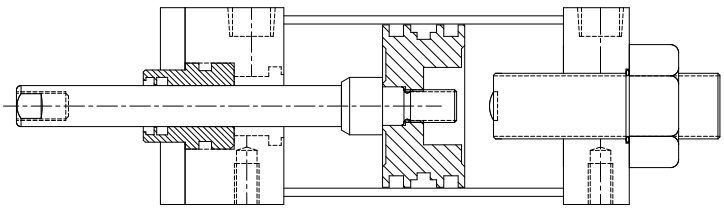


METALLIC ROD SCRAPER REPLACES STANDARD ROD WIPER



METALLIC ROD SCRAPER

When the cylinder must endure paint overspray, weld splatter or flyash, a scraper may be necessary.



ADJUSTABLE STROKE

Adjustable stroke cylinders allow one cylinder to be used in varying applications.

To order: Place XX in stroke designator and specify cylinder stroke, adjustable stroke and inches of adjustment.

FORCE CHART EXTEND

BORE	EFFECTIVE PISTON AREA	PRESSURE 40	50	60	80	90	100	125	150	175	200	400	CUBIC FEET DISPLACEMENT PER IN. OF EXTEND STROKE
1 1/2	1.77	71	88	106	142	160	177	221	266	310	353	708	.00102
2	3.14	126	157	189	251	283	314	392	471	549	628	1256	.00182
2 1/2	4.91	196	246	295	393	442	491	614	737	859	982	1964	.00284
3 1/4	8.30	332	415	498	664	747	830	1037	1245	1452	1659	3320	.00480
4	12.57	503	629	754	1005	1131	1257	1571	1886	2200	2513	5028	.00727
5	19.64	785	982	1178	1571	1768	1964	2455	2946	3437	3928	7856	.01136
6	28.27	1130	1414	1696	2262	2544	2827	3534	4240	4947	5654	11308	.01636
8	50.26	2010	2513	3015	4020	4523	5026	6280	7539	8795	10052	20104	.02909

FORCE CHART RETRACT

BORE	ROD	EFFECTIVE PISTON AREA	PRESSURE 40	50	60	80	90	100	125	150	175	200	400	CUBIC FEET DISPLACEMENT PER IN OF RETRACT STROKE
1 1/2	5/8"	1.46	58	73	87	116	131	146	182	219	255	292	584	.0008449
1 1/2	1"	.98	39	49	59	78	88	98	123	147	172	196	392	.0005671
2	5/8"	2.83	113	141	169	226	254	283	353	424	495	566	1132	.0016377
2	1"	2.35	94	118	141	188	212	235	294	353	411	470	940	.0013599
2 1/2	5/8"	4.60	184	230	276	368	414	460	575	690	805	920	1840	.0026620
2-1/2	1"	4.12	165	206	247	330	371	412	515	618	721	824	1648	.0023842
3 1/4	1"	7.51	300	375	450	600	675	751	938	1126	1314	1502	3004	.0043460
3 1/4	1 3/8"	6.81	272	341	409	545	613	681	851	1022	1192	1362	2724	.0039409
4	1"	11.78	471	589	706	942	1060	1178	1472	1767	2061	2356	4712	.0068171
4	1 3/8"	11.08	443	554	665	886	997	1108	1385	1662	1939	2216	4432	.0064120
5	1"	18.85	754	942	1131	1508	1696	1885	2356	2827	3298	3770	7540	.0109085
5	1 3/8"	18.15	726	908	1089	1452	1634	1815	2269	2723	3176	3630	7260	.0105034
6	1 3/8"	26.78	1071	1339	1606	2142	2410	2678	3347	4017	4686	5356	10712	.0154976
6	1 3/4"	25.86	1034	1293	1552	2069	2327	2586	3233	3879	4526	5172	10344	.0149652
8	1 3/8"	48.77	1951	2439	2936	3902	4389	4877	6096	7316	8535	9754	19508	.0282233
8	1 3/4"	47.85	1914	2392	2871	3828	4307	4785	5982	7178	8374	9571	19142	.0276909

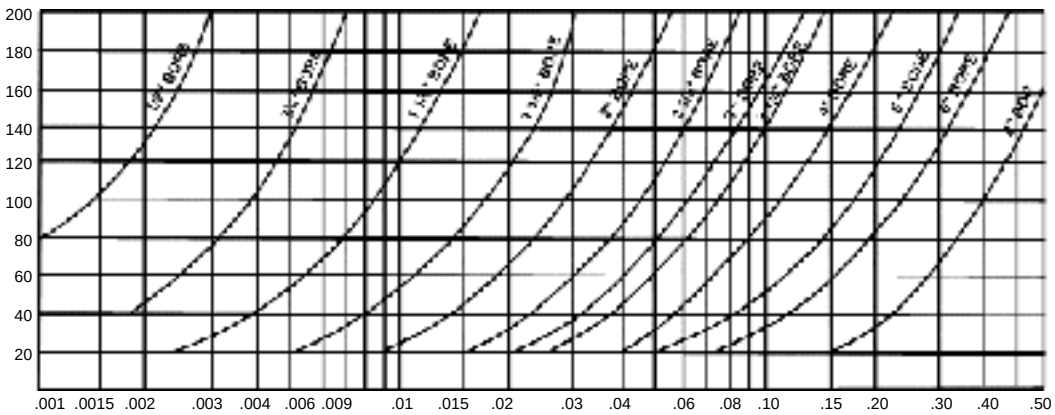
APPROXIMATE CYLINDER WEIGHT IN POUNDS

BORE	1 1/2"		2"		2 1/2"		3 1/4"		4"		5"		6"		8"	
PISTON ROD DIA.	5/8"	1"	5/8"	1"	5/8"	1"	1"	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/8"	1 3/4"	1 3/8"	1 3/4"
MS-4	2.1	2.8	2.7	3.4	3.6	4.3	7.1	8.4	9.3	10.8	13.0	14.0	22.0	22.5	35.2	37.0
MF-1, MF-2, ME-3, ME-4, MS-2	2.7	3.5	3.7	4.4	5.0	5.7	10.3	12.0	14.0	15.4	20.0	21.0	32.0	34.0	35.0	37.0
MP-1, MP-4	3.2	4.0	4.1	5.0	5.5	6.4	11.5	13.1	15.5	16.4	20.1	21.8	35.1	36.0	38.1	37.0
MT-1, MT-2	2.6	3.3	3.1	3.9	4.0	4.8	7.5	8.9	9.9	11.3	13.7	15.0	23.0	25.0	36.5	38.0
MP-1, MP-2, MX-2, MX-3, MS-1	2.3	3.0	2.8	3.5	3.7	4.5	7.5	9.0	9.9	11.3	13.3	15.0	23.0	25.0	36.4	38.0
PER INCH OF STROKE	.24	.40	.30	.40	.30	.44	.50	.70	.60	.80	.60	.80	.90	1.14	1.30	1.50

AIR CONSUMPTION CHART

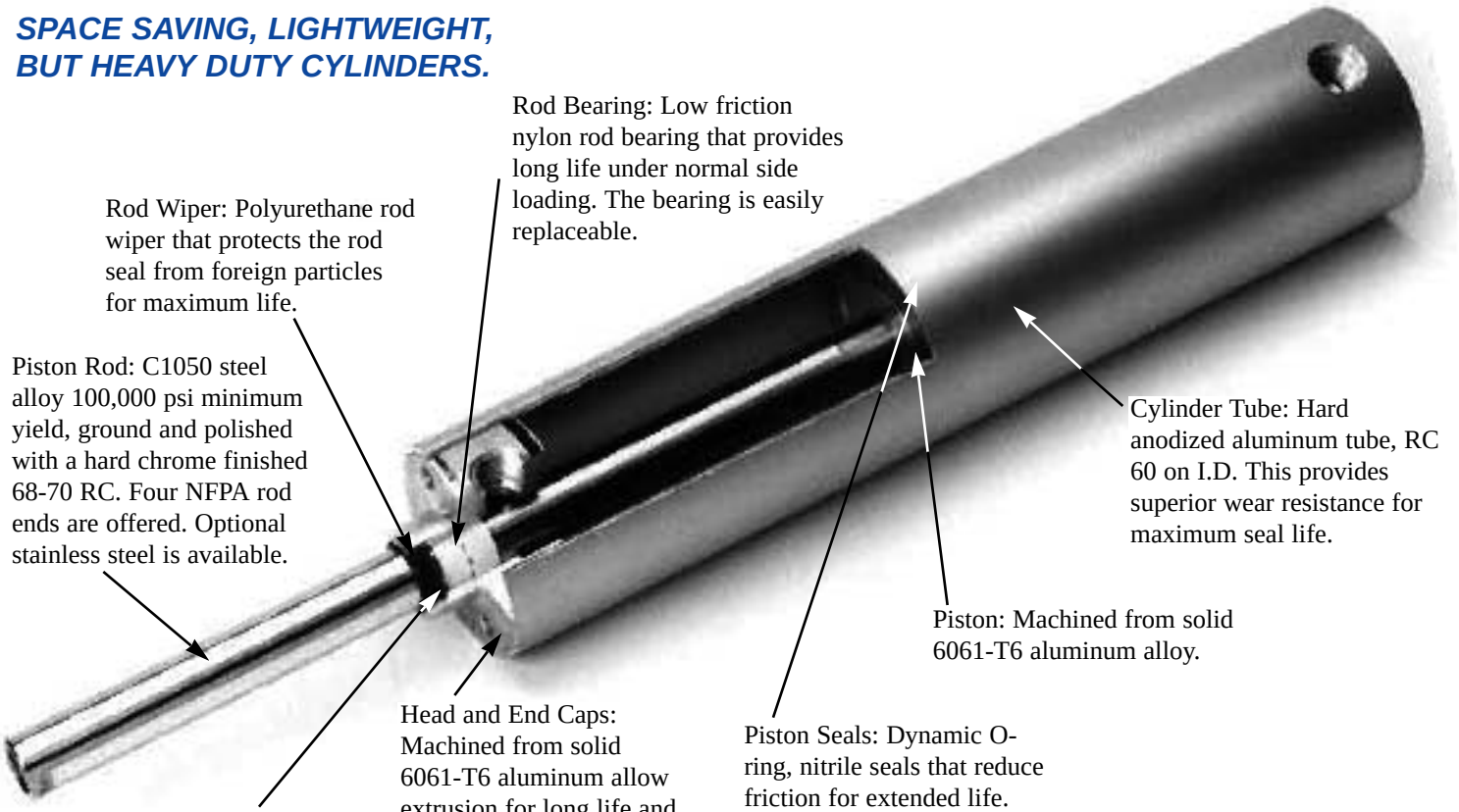
TO CALCULATE THE AIR CONSUMPTION FOR A COMPLETE CYCLE OF A DOUBLE ACTING CYLINDER, READ CUBIC FEET FROM THE CHART BASED UPON PRESSURE AND BORE SIZE AND USE THE FOLLOWING FORMULA.

CFM = CUBIC FT. X CYCLES PER MINUTE X STROKE IN INCHES.



HIGH PERFORMANCE NFPA INTERCHANGEABLE CYLINDERS

SPACE SAVING, LIGHTWEIGHT, BUT HEAVY DUTY CYLINDERS.

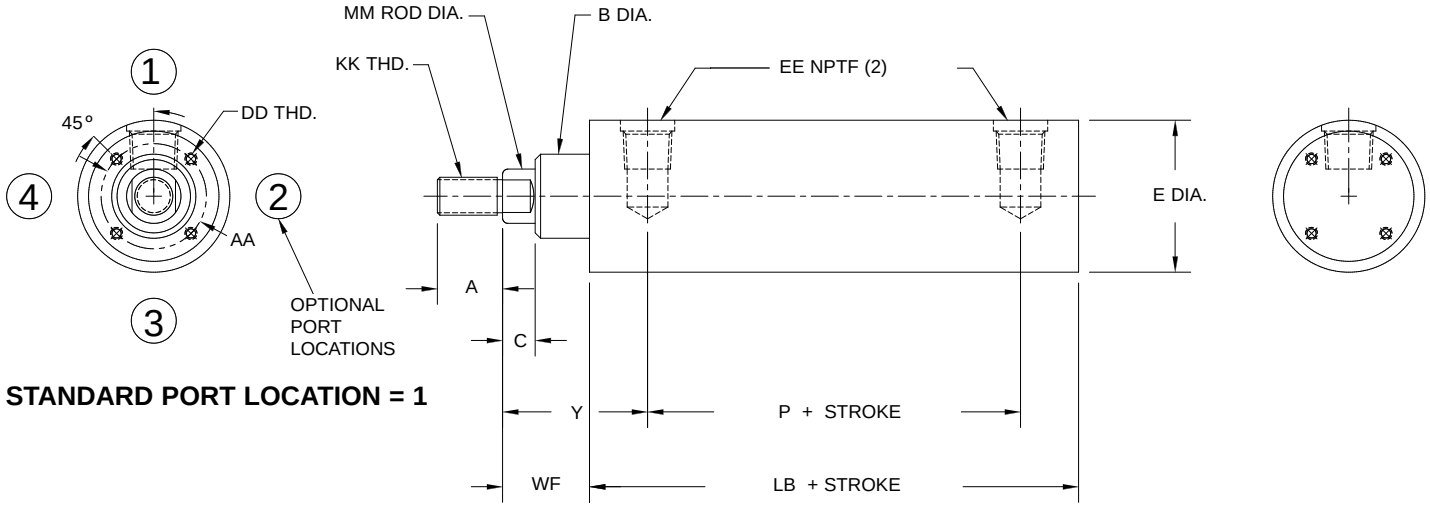


HIGH PERFORMANCE NFPA INTERCHANGEABLE CYLINDERS

Standard Specifications:

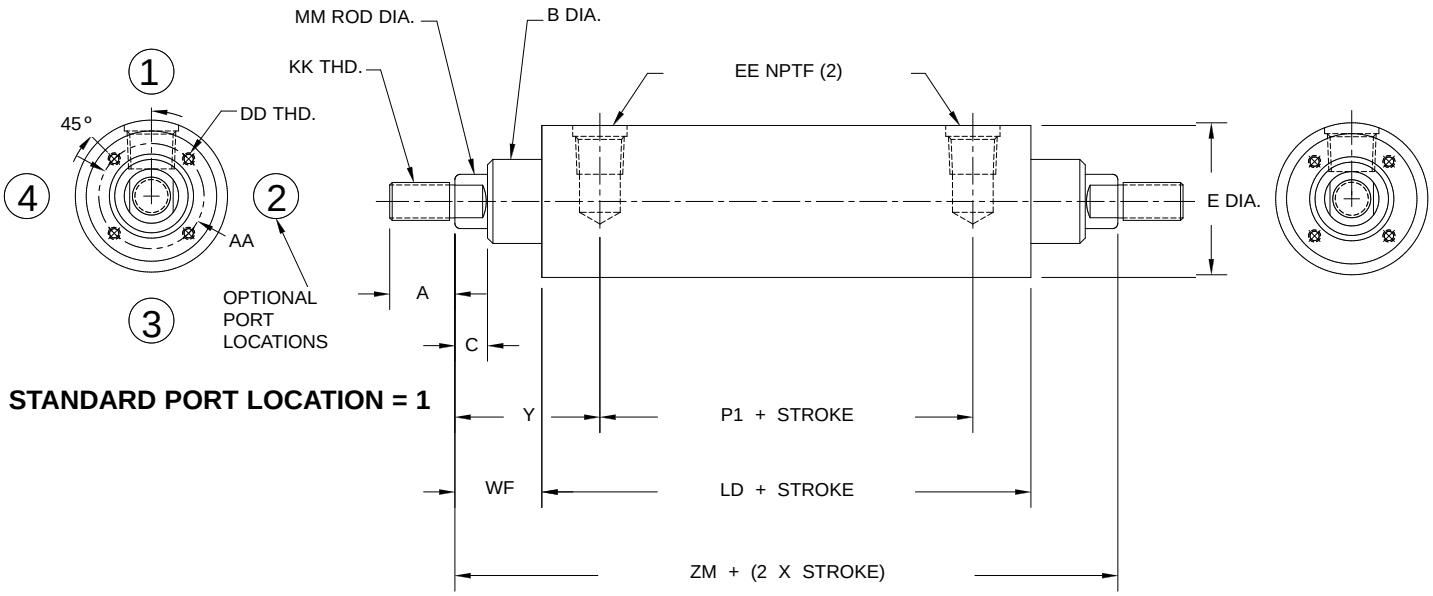
1. Pressure Rating: 250 PSI Pneumatic.
   350 PSI Hydraulic (Non-shock)
2. Bore Sizes: 1 1/2" through 4"
3. Mounting Styles: Front Flange, Rear Flange, Side Lug, End Lug, Clevis, and Eye Bracket.
4. Rod Ends: All Standard NFPA Styles
5. Head and End Caps: Machined from solid 6061-T6 aluminum allow extrusion for long life and corrosion resistance.
6. Piston: Machined from solid 6061-T6 aluminum alloy.
7. Piston Rod: C1050 steel alloy 100,000 psi minimum yield, ground and polished with a hard chrome finished 68-70 RC. Four NFPA rod ends are offered. Optional stainless steel is available.
8. Rod Bearing: Low friction nylon rod bearing that provides long life under normal side loading. The bearing is easily replaceable.
9. Cylinder Tube: Hard anodized aluminum tube, RC 60 on I.D. This provides superior wear resistance for maximum seal life.
10. Piston Seals: Dynamic O-ring, nitrile seals that reduce friction for extended life. Optional seals include Viton, Low friction and ELF (extra low friction).
11. Rod Seal: Pressure energized, high quality nitrile lip-type rod seal.
12. Rod Wiper: Polyurethane rod wiper that protects the rod seal from foreign particles for maximum life.
13. Snap Ring: Retains Head & Cap Ends to cylinder tube with ease of removal for repairing of cylinder.
14. Cushions available on all sizes, except Model 15 (1 1/2" bore).

BASIC CYLINDER



STANDARD PORT LOCATION = 1

DOUBLE END ROD CYLINDER



STANDARD PORT LOCATION = 1

DURAMITE II ROUND NFPA (SERIES DRN)

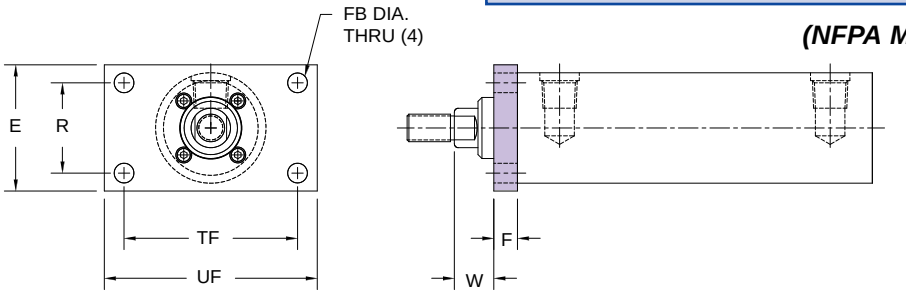
MODEL NUMBER	BORE SIZE	A	AA	B	C	DD	E	EE NPTF	KK	LB	LD	MM	P	P1	WF	Y	ZM
DRN15	1 1/2	3/4	1.21	31/32	3/8	6-32	1 3/4	1/4-18	7/16-20	3 5/8	4 1/8	5/8	2.29	2.79	1	1.67	6 1/8
DRN20	2	3/4	1.60	1 1/8	3/8	10-32	2 1/4	1/4-18	7/16-20	3 5/8	4 1/8	5/8	2.29	2.79	1	1.67	6 1/8
DRN25	2 1/2	3/4	2.00	1 1/8	3/8	1/4-28	2 3/4	1/4-18	7/16-20	3 3/4	4 1/4	5/8	2.42	2.92	1	1.67	6 1/4
DRN32	3 1/4	1 1/8	2.62	1 1/2	1/2	3/8-24	3 1/2	1/2-14	3/4-16	4 1/4	4 3/4	1	2.44	2.94	1 3/8	2.11	7 1/2
DRN40	4	1 1/8	2.62	1 1/2	1/2	3/8-24	4 1/4	1/2-14	3/4-16	4 1/4	4 3/4	1	2.44	2.94	1 3/8	2.11	7 1/2

DURAMITE
CYLINDERS

DURAMITE II ROUND NFPA Series DRN Cylinders

FRONT FLANGE MOUNT

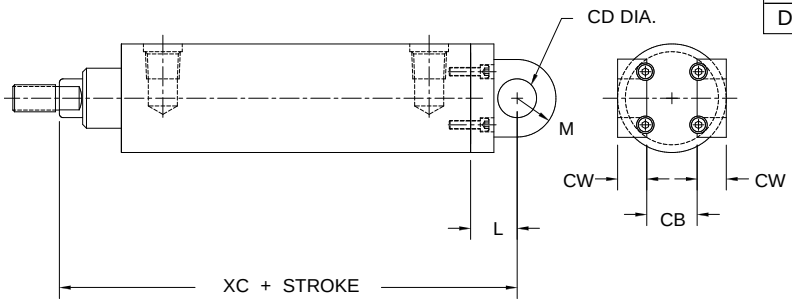
(NFPA MF-1)



MODEL NUMBER	BORE SIZE	E	F	FB	R	TF	UF	W
DRN15	1 1/2	2	3/8	9/32	1.43	2.75	3 3/8	5/8
DRN20	2	2 1/2	3/8	11/32	1.84	3.38	4 1/8	5/8
DRN25	2 1/2	3	3/8	11/32	2.19	3.88	4 5/8	5/8
DRN32	3 1/4	3 3/4	5/8	13/32	2.76	4.69	5 1/2	3/4
DRN40	4	4 1/2	5/8	13/32	3.32	5.44	6 1/4	3/4

CLEVIS MOUNT

(NFPA MP-1)

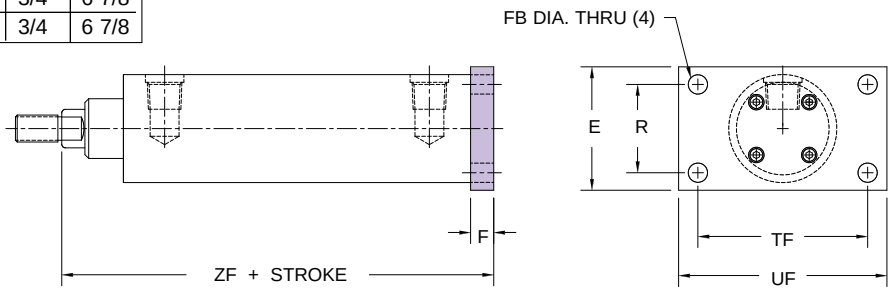


MODEL NUMBER	BORE SIZE	CB	CD	CW	L	LR	M	XC
DRN15	1 1/2	3/4	1/2	1/2	3/4	9/16	1/2	5 3/8
DRN20	2	3/4	1/2	1/2	3/4	3/4	1/2	5 3/8
DRN25	2 1/2	3/4	1/2	1/2	3/4	3/4	1/2	5 1/2
DRN32	3 1/4	1 1/4	3/4	5/8	1 1/4	1 1/8	3/4	6 7/8
DRN40	4	1 1/4	3/4	5/8	1 1/4	1 1/8	3/4	6 7/8

PIVOT PIN INCLUDED

REAR FLANGE MOUNT

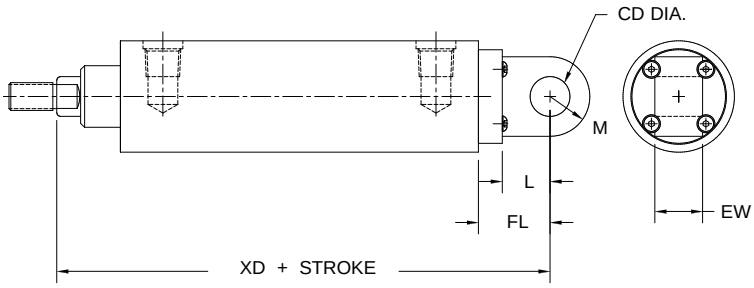
(NFPA MF-2)



MODEL NUMBER	BORE SIZE	E	F	FB	R	TF	UF	ZF
DRN15	1 1/2	2	3/8	9/32	1.43	2.75	3 3/8	5
DRN20	2	2 1/2	3/8	11/32	1.84	3.38	4 1/8	5
DRN25	2 1/2	3	3/8	11/32	2.19	3.88	4 5/8	5 1/8
DRN32	3 1/4	3 3/4	5/8	13/32	2.76	4.69	5 1/2	6 1/4
DRN40	4	4 1/2	5/8	13/32	3.32	5.44	6 1/4	6 1/4

PIVOT MOUNT

(NFPA MP-4)



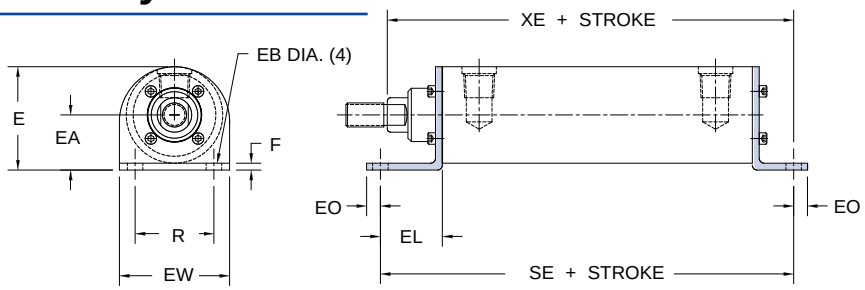
MODEL NUMBER	BORE SIZE	CD	EW	FL	L	M	XD
DRN15	1 1/2	1/2	3/4	1 1/8	3/4	1/2	5 3/4
DRN20	2	1/2	3/4	1 1/8	3/4	1/2	5 3/4
DRN25	2 1/2	1/2	3/4	1 1/8	3/4	1/2	5 7/8
DRN32	3 1/4	3/4	1 1/4	1 7/8	1 1/4	3/4	7 1/2
DRN40	4	3/4	1 1/4	1 7/8	1 1/4	3/4	7 1/2

PIVOT PIN NOT INCLUDED, SEE PAGE 10

DURAMITE II ROUND NFPA Series DRN Cylinders

END LUG MOUNT

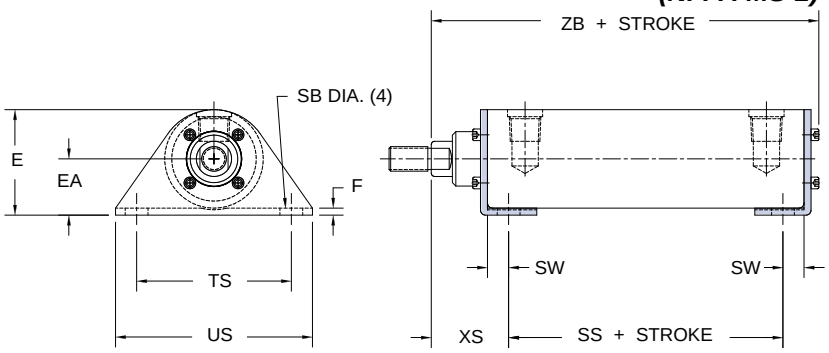
(NFPA MS-7)



MODEL NUMBER	BORE SIZE	E	EA	EB	EL	EQ	EW	F	R	SE	XE
DRN15	1 1/2	1 7/8	1	9/32	1 1/8	1/4	2	1/8	1.43	5 1/2	5 3/8
DRN20	2	2 3/8	1 1/4	11/32	1 5/16	5/16	2 7/16	1/8	1.84	5 7/8	5 9/16
DRN25	2 1/2	2 7/8	1 1/2	11/32	1 7/16	7/16	3	3/16	2.19	6 1/4	5 13/16
DRN32	3 1/4	3 5/8	1 7/8	13/32	1 1/2	3/8	3 1/2	1/4	2.76	6 5/8	6 1/2
DRN40	4	4 3/8	2 1/4	13/32	1 5/8	3/8	4 1/4	5/16	3.32	6 7/8	6 5/8

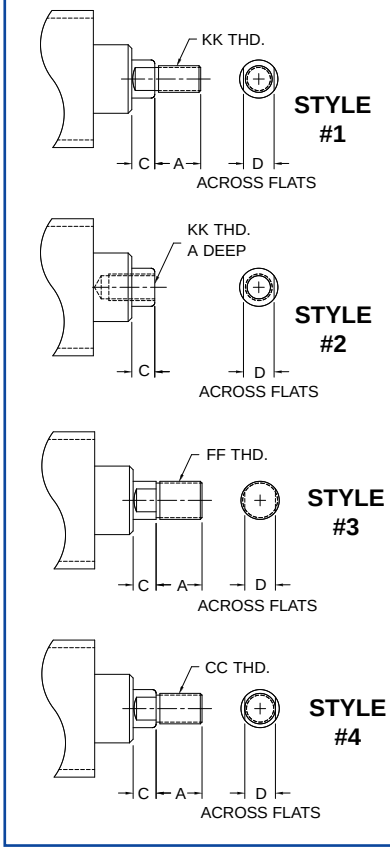
SIDE LUG MOUNT

(NFPA MS-2)



MODEL NUMBER	BORE SIZE	E	EA	F	SB	SS	SW	TS	US	XS	ZB
DRN15	1 1/2	1 7/8	1	1/8	13/32	2 7/8	3/8	2 3/4	3 1/2	1 3/8	4.92
DRN20	2	2 3/8	1 1/4	1/8	13/32	2 7/8	3/8	3 1/4	4	1 3/8	4.95
DRN25	2 1/2	2 7/8	1 1/2	3/16	13/32	3	3/8	3 3/4	4 1/2	1 3/8	5.19
DRN32	3 1/4	3 5/8	1 7/8	1/4	17/32	3 1/4	1/2	4 3/4	5 3/4	1 7/8	6.19
DRN40	4	4 3/8	2 1/4	5/16	17/32	3 1/4	1/2	5 1/2	6 1/2	1 7/8	6.25

ROD END STYLES



ROD END STYLES

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

HOW TO ORDER (DURAMITE II ROUND SERIES)

D	R	N												

- D=Duramite **II**
  RN=ROUND NFPA
- S=Single Rod
  D=Double Rod
- Bore Size:
  15=1-1/2"
  20=2"
  25=2-1/2"
  32=3-1/4"
  40=4"
- Stroke (inches)
- Mounting Style: (NFPA)
- Rod Size:
  A=5/8" models 15-25
  B=1" models 32-40
- Rod End Style
  1=Small Size Male
  2=Small Size Female
  3=Full Size Male
  4=Medium Size Male
  (2=Standard, see chart)
- Options:
  M=Magnetic piston
  S=Rod Scraper, Metal
  C=Both Cushions
  R=Rear Cushions
  F=Front Cushions
  H=Hydraulic
  B=Bumpers, both ends
  L=Low Friction Seals
  X=Other, specify in text

Examples:

1-1/2" bore Single Rod with 12" stroke with MP-4 mounting and Low Friction: DRNS1512MP4A1L.

4" bore Double Rod with 6" stroke with MF-1 mounting, and Bumpers: DRND4006MF1B1B.

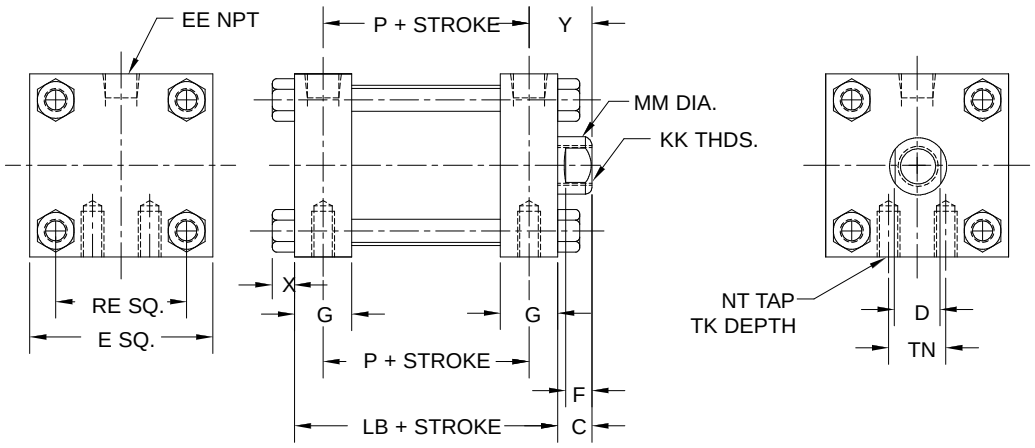
3-1/4" bore Single Rod with 4.25" stroke with MS-2 mounting, Female Rod End and Hydraulic: DRNS324.25MS2B2H.

DURA-E BASIC CYLINDER

DURA-E was designed for the purpose of furnishing OEM's with a tough medium duty cylinder for powering their machines when fewer cycle times are required. Lower in cost than NFPA Dura-Mount with an emphasis on quality and delivery. Sizes 1-1/2" thru 6" bore are offered on all DURA-E, DURA-DOUBLE, DURA-POWER, DURA-BACK-TO-BACK and DURA-MULTI-POSITION. Pressure Rating: 200 PSI Air and 300 PSI Hydraulic Non-Shock Service.

NOTE: Magnetic Piston option adds 1/2" to overall length on ALL bores regardless of mounting style. Bumpers add 1/8" on all models.
MS4 Mount (shown here) is standard on all cylinders. Ports at position 1 is standard.

DURA-E BASIC CYLINDER

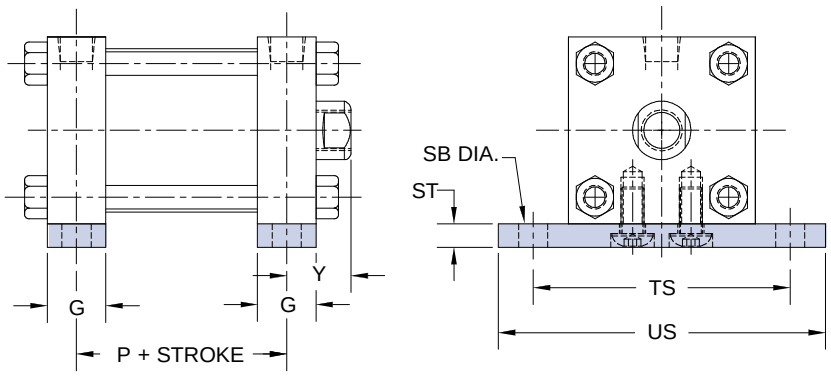


DURA-E BASIC CYLINDER EXAMPLE: **DES1512MS4A2**

BORE	C	D	E SQ.	EE NPT	F	G	KK THD.	LB	MM DIA.	NT	P	RE SQ.	TK	TN	X	Y
1-1/2	3/8	1/2	2	1/8-27	5/16	5/8	3/8-24	1 3/4	5/8	1/4-20	1 1/8	1.43	3/8	5/8	1/4	11/16
2	3/8	1/2	2 1/2	1/8-27	5/16	5/8	3/8-24	1 3/4	5/8	1/4-20	1 1/8	1.84	3/8	7/8	5/16	11/16
2-1/2	3/8	1/2	3	1/8-27	5/16	5/8	3/8-24	1 3/4	5/8	5/16-18	1 1/8	2.19	5/8	1 1/4	5/16	11/16
3-1/4	1/2	13/16	3 3/4	1/4-18	7/16	7/8	5/8-18	2 1/2	1	3/8-16	1 5/8	2.94	7/8	1 1/2	3/8	15/16
4	1/2	13/16	4 1/2	1/4-18	7/16	7/8	5/8-18	2 1/2	1	3/8-16	1 5/8	3.56	7/8	2 1/16	3/8	15/16
5	1/2	13/16	5 1/2	3/8-18	7/16	1	5/8-18	2 3/4	1	1/2-13	1 3/4	4.10	1	2 11/16	1/2	1
6	5/16	1 1/4	6 1/2	1/2-14	7/32	1 1/2	3/4-16	3 3/4	1 3/8	3/4-10	2 1/4	4.88	1 1/8	3 1/4	1/2	1 1/16

OPTIONAL MOUNTINGS (Dimensions not specified are the same as on the Basic Cylinder)

DURA-E BASE BAR MOUNT (BB-M)



BORE	G	P	SB DIA.	ST	TS	US	Y
1-1/2	5/8	1 1/8	5/16	1/4	2 3/4	3 1/2	11/16
2	5/8	1 1/8	5/16	1/4	3 1/4	4	11/16
2-1/2	5/8	1 1/8	3/8	5/16	3 3/4	4 1/2	11/16
3-1/4	7/8	1 1/2	1/2	1/2	4 3/4	5 3/4	15/16
4	7/8	1 1/2	1/2	1/2	5 1/2	6 1/2	15/16
5	1	1 3/4	1/2	1/2	6 1/2	7 1/2	1
6	1 1/2	2 1/4	3/4	1	7 7/8	9 1/4	1 1/16

DURA-E BASIC CYLINDER WITH A BASE BAR MOUNT EXAMPLE: **DES1512BB-MA2**

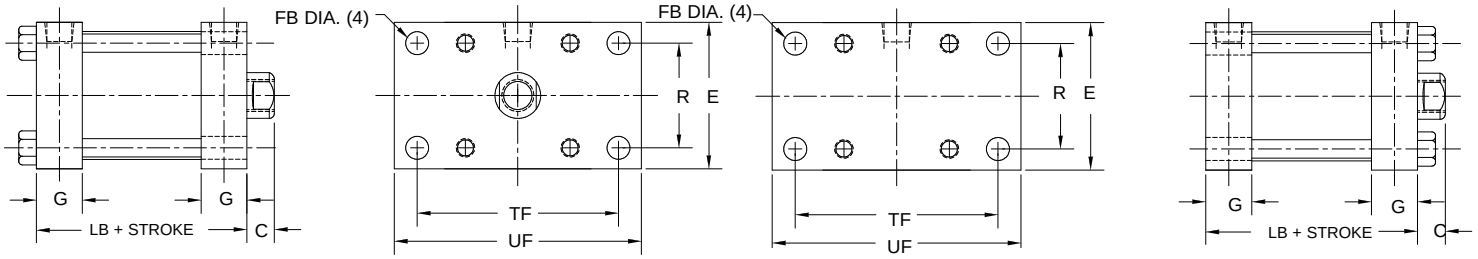
Minimum order of BB-M mounts is 25

DURAMASTER CYLINDERS

DURA-E OPTIONAL MOUNTINGS

DURA-E FLANGE MOUNT

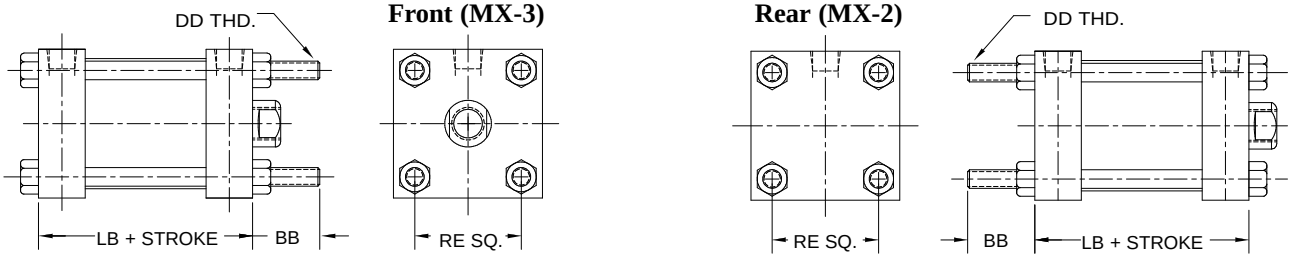
Front (MF-1) **Rear (MF-2)**



BORE	C	E	FB	G	LB	R	TF	UF
1-1/2	3/8	2	5/16	5/8	1 3/4	1.43	2 3/4	3 38
2	3/8	2 1/2	3/8	5/8	1 3/4	1.84	3 3/8	4 1/8
2-1/2	3/8	3	3/8	5/8	1 3/4	2.19	3 7/8	4 5/8
3-1/4	1/2	3 3/4	7/16	7/8	2 1/2	2.76	4 11/16	5 1/2
4	1/2	4 1/2	7/16	7/8	2 1/2	3.32	5 7/16	6 1/4
5	1/2	5 1/2	9/16	1	2 3/4	4.10	6 5/8	7 5/8
6	5/16	6 1/2	17/32	1 1/2	3 3/4	5.25	7	8 5/8

DURA-E TIE ROD MOUNT

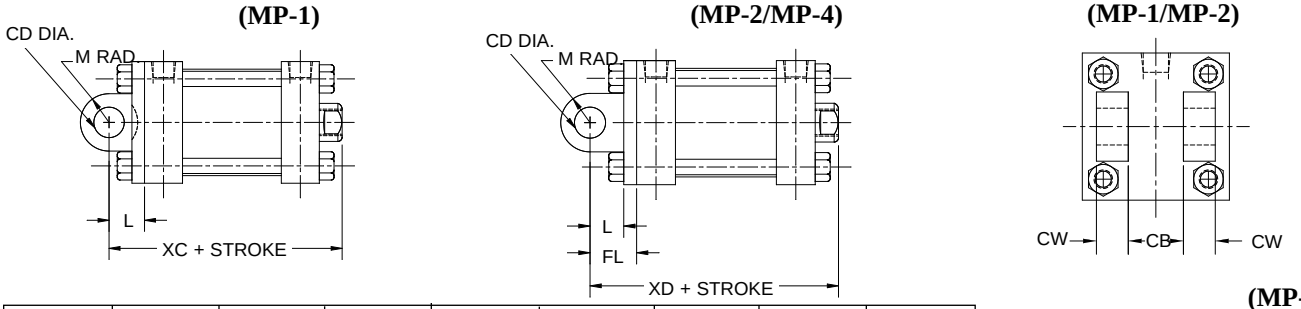
Front (MX-3) **Rear (MX-2)**



BORE	BB	DD THD.	LB	RE SQ.
1-1/2	7/8	1/4-28	1 3/4	1.43
2	1	5/16-24	1 3/4	1.84
2-1/2	1	5/16-24	1 3/4	2.19
3-1/4	1 1/4	7/16-20	2 1/2	2.94
4	1 1/4	7/16-20	2 1/2	3.56
5	1 1/2	1/2-20	2 3/4	4.10
6	1 1/2	1/2-20	3 3/4	4.88

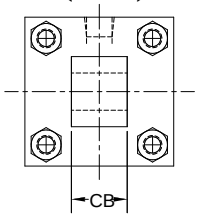
DURA-E CLEVIS MOUNT

(MP-1) **(MP-2/MP-4)** **(MP-1/MP-2)**



BORE	CB	CD	CW	FL	L	M	XC	XD
1-1/2	3/4	1/2	1/2	1 1/8	3/4	5/8	2 7/8	3 1/4
2	3/4	1/2	1/2	1 1/8	3/4	5/8	2 7/8	3 1/4
2-1/2	3/4	1/2	1/2	1 1/8	3/4	5/8	2 7/8	3 1/4
3-1/4	1 1/4	3/4	5/8	1 3/4	1 1/4	7/8	4 1/4	4 3/4
4	1 1/4	3/4	5/8	1 3/4	1 1/4	7/8	4 1/4	4 3/4
5	1 1/4	3/4	5/8	1 3/4	1 1/4	7/8	4 1/2	5
6	1 1/2	1	3/4	2 1/4	1 1/2	1	5 9/16	6 5/16

(MP-4)



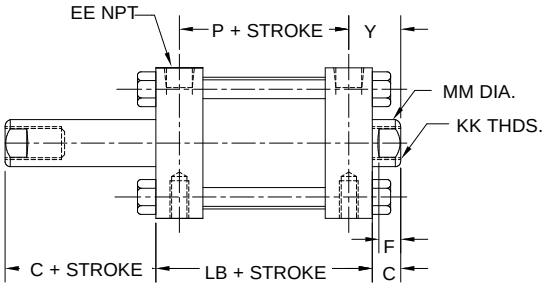
MP-4 Mount not available on Models 50 & 60..

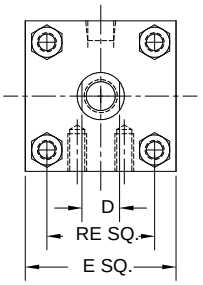
DURAMASTER CYLINDERS

DURA-E CYLINDER VARIATIONS

DURA-DOUBLE ROD

Double rod end cylinders operate with a single piston and two opposing rods. As one extends, the other retracts. As a result, the two ends can do reciprocal work in positioning or in moving a work piece with equal force, equal stroke length and equal speed.



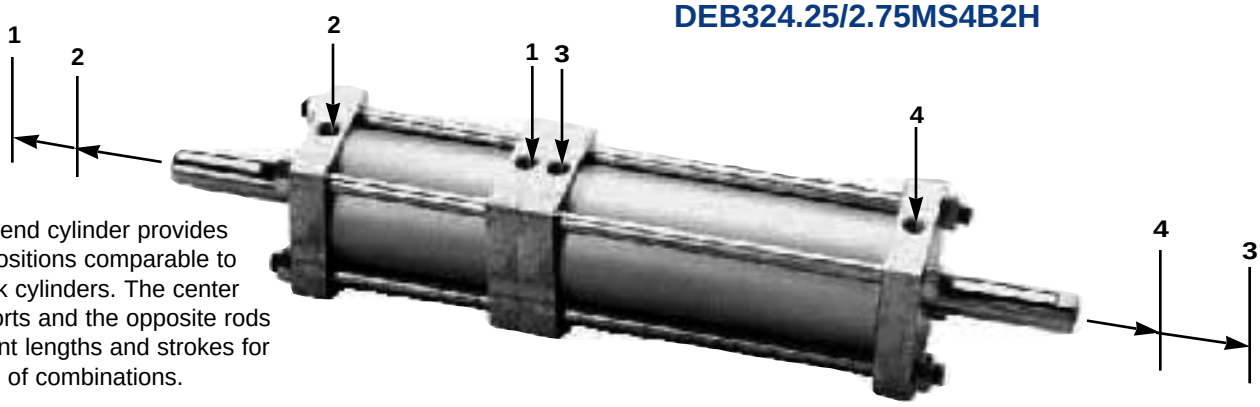


DURA-DOUBLE ROD EXAMPLE:
DED4006MS4B2B

BORE	C	D	E SQ.	EE NPT	F	G	KK THD.	LB	MM DIA.	NT	P	RE SQ.	TK	TN	X	Y
1-1/2	3/8	1/2	2	1/8-27	5/16	5/8	3/8-24	1 3/4	5/8	1/4-20	1 1/8	1.43	3/8	5/8	1/4	11/16
2	3/8	1/2	2 1/2	1/8-27	5/16	5/8	3/8-24	1 3/4	5/8	1/4-20	1 1/8	1.84	3/8	7/8	5/16	11/16
2-1/2	3/8	1/2	3	1/8-27	5/16	5/8	3/8-24	1 3/4	5/8	5/16-18	1 1/8	2.19	5/8	1 1/4	5/16	11/16
3-1/4	1/2	13/16	3 3/4	1/4-18	7/16	7/8	5/8-18	2 1/2	1	3/8-16	1 5/8	2.94	7/8	1 1/2	3/8	15/16
4	1/2	13/16	4 1/2	1/4-18	7/16	7/8	5/8-18	2 1/2	1	3/8-16	1 5/8	3.56	7/8	2 1/16	3/8	15/16
5	1/2	13/16	5 1/2	3/8-18	7/16	1	5/8-18	2 3/4	1	1/2-13	1 3/4	4.10	1	2 11/16	1/2	1
6	5/16	1 1/4	6 1/2	1/2-14	7/32	1 1/2	3/4-16	3 3/4	1 3/8	3/4-10	2 1/4	4.88	1 1/8	3 1/4	1/2	1 1/16

DURA BACK-TO-BACK

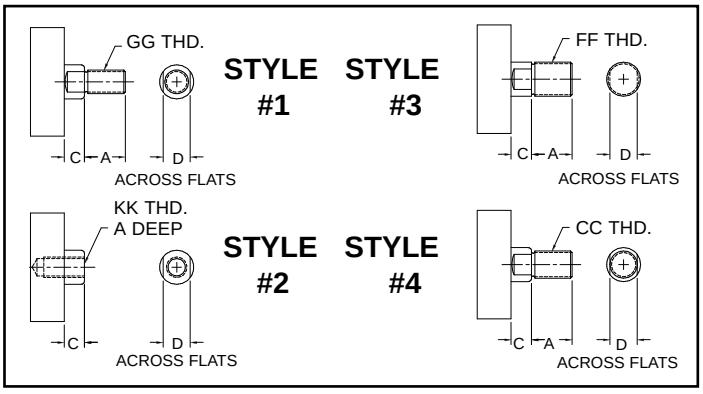
DURA BACK-TO-BACK EXAMPLE:
DEB324.25/2.75MS4B2H



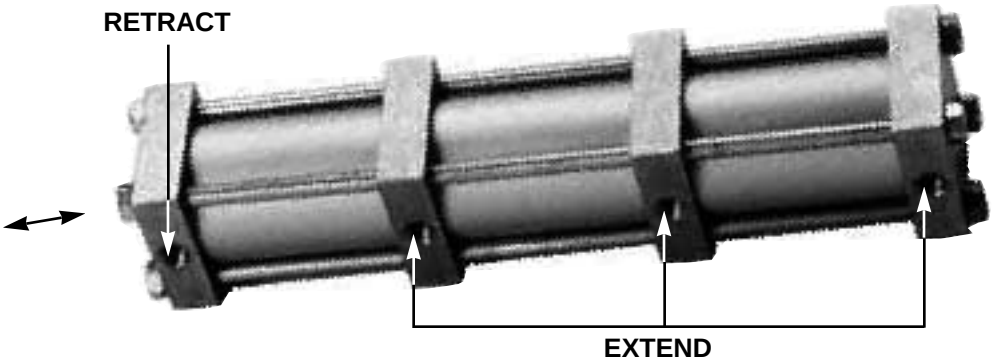
This double rod end cylinder provides four operating positions comparable to two back-to-back cylinders. The center head has two ports and the opposite rods can have different lengths and strokes for an infinite series of combinations.

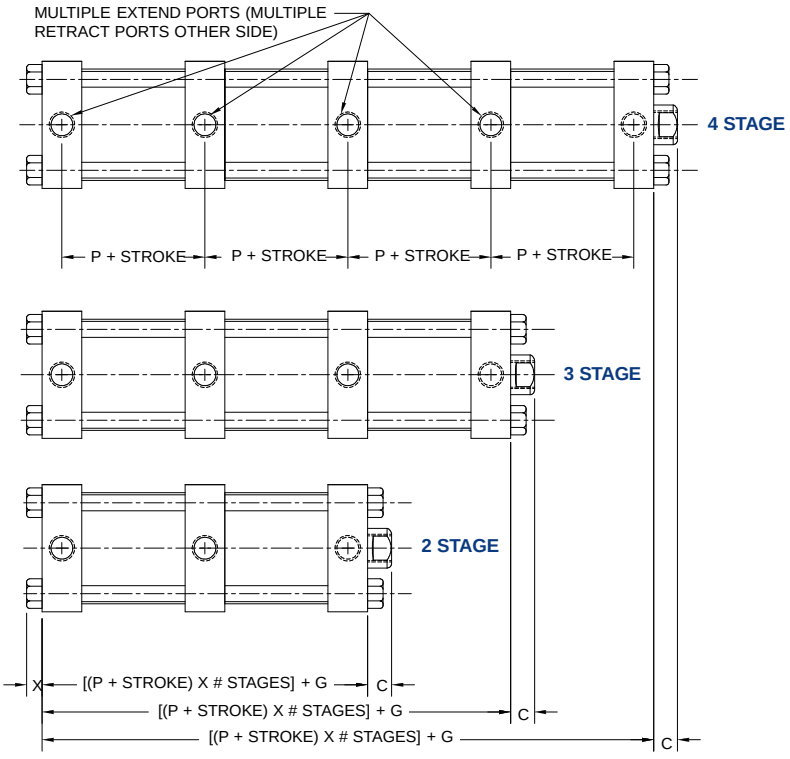
DURA-E ROD END STYLES

ROD DIA.	A	C	D	CC	FF	GG	KK
5/8	3/4	3/8	1/2	1/2-20	5/8-18	7/16-20	3/8-24
1	1 1/8	1/2	13/16	7/8-14	1-14	3/4-16	5/8-18
1 3/8	1 5/8	5/16	1 1/4	1 1/4-12	1 3/8-12	1-14	3/4-16



DURA-POWER MULTIPLIER

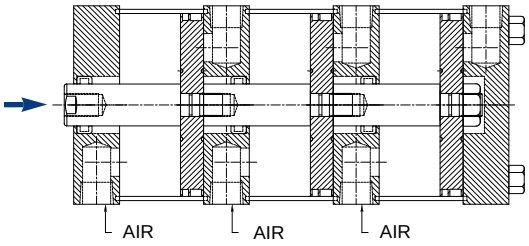




EXAMPLE DURA-POWER

Model No. DE3P60 02 MF1C2 Shown

POSITION 1:
(RETRACTED)



POSITION 2:
2" STROKE

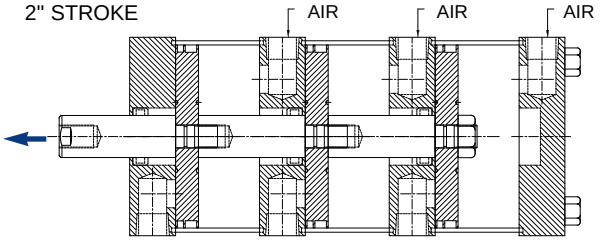
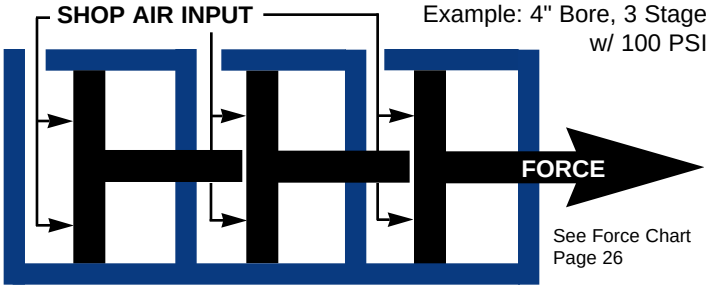


ILLUSTRATION SHOWS A 3 STAGE DURA-POWER, FORCES ARE NEARLY 3 TIMES THE FORCES OF A SINGLE STAGE CYLINDER (SEE FORCE CHART PG. 26).



Example: 4" Bore, 3 Stage w/ 100 PSI

See Force Chart Page 26

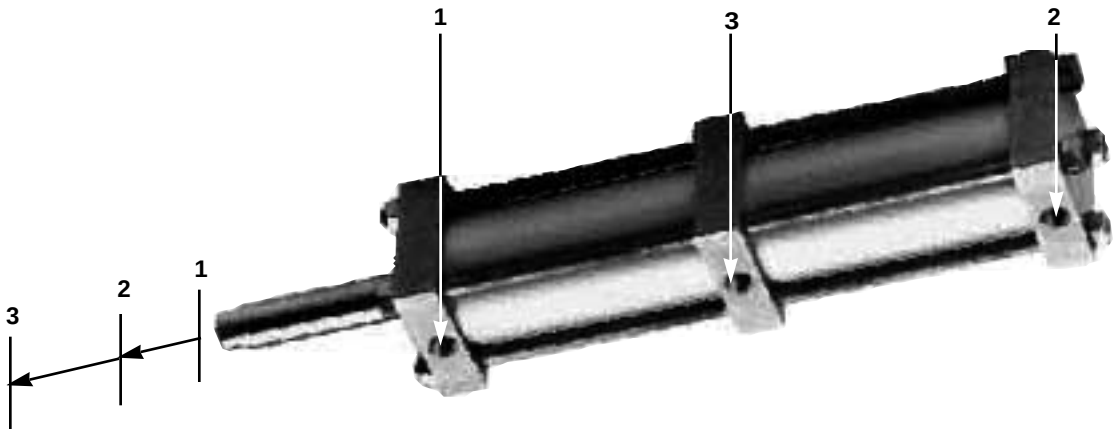
4" Dia. Piston	+	4" Dia. Piston	+	4" Dia Piston	=	3 Stage
12.6 Sq. In. X 100 PSI 1260 Lbs.		11.8 Sq. In. X 100 PSI + 1180 Lbs.		11.8 Sq. In. X 100 PSI + 1180 Lbs.	=	EQUALS 3620 LBS. OUTPUT FORCE (EXTEND)
11.8 Sq. In. X 100 PSI 1180 Lbs.		11.8 Sq. In. X 100 PSI + 1180 Lbs.		11.8 Sq. In. X 100 PSI + 1180 Lbs.	=	EQUALS 3540 LBS. (RETRACT)

This cylinder is for applications requiring higher forces with restricted mounting space. Each stage is an individually ported chamber with its own piston. The combined effect of the multiple ports acting on multiple pistons greatly increases the effective piston area thereby increasing the cylinder's force. These cylinders can be configured to multiply both the extend force and the retract force.

BORE	C	G	P	X
1-1/2	3/8	5/8	1 1/8	1/4
2	3/8	5/8	1 1/8	5/16
2-1/2	3/8	5/8	1 1/8	5/16
3-1/4	1/2	7/8	1 1/2	3/8
4	1/2	7/8	1 1/2	3/8
5	1/2	1	1 3/4	1/2
6	5/16	1 1/2	2 1/4	1/2

NOTE: Add 1/8" to overall length of each stage for magnetic piston on bores 1-1/2", 2" and 2-1/2".

DURA-E CYLINDER VARIATIONS

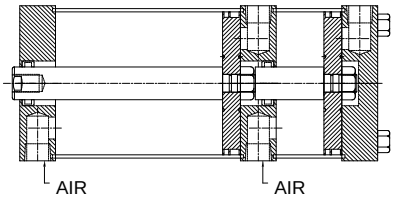


DURA MULTI-POSITION
(TANDEM)

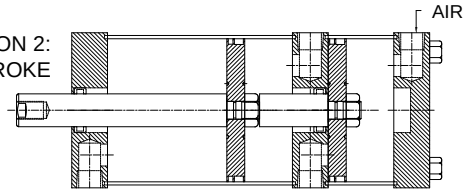
Rod cylinders need not be limited to only two positions. With multiple rods & pistons "chained" together, a single rod end can have multiple stopping points or 'stages'. Dura-Multi-Position cylinders have been built with as many as 9 stages and varying strokes at each stage. Consult the factory for help with your own custom application.

EXAMPLE MULTI-POSITION:
Specify each incremental stroke, in order, starting from retracted.
Example Model No. DE2M32 **01/04** MF1B2

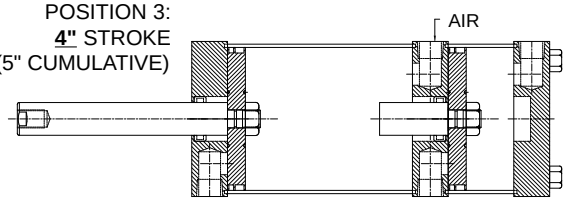
POSITION 1: (RETRACTED)



POSITION 2: **1"** STROKE

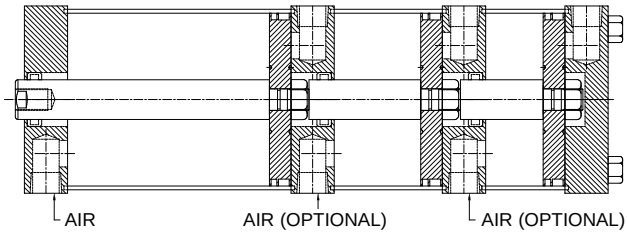


POSITION 3: **4"** STROKE (5" CUMULATIVE)

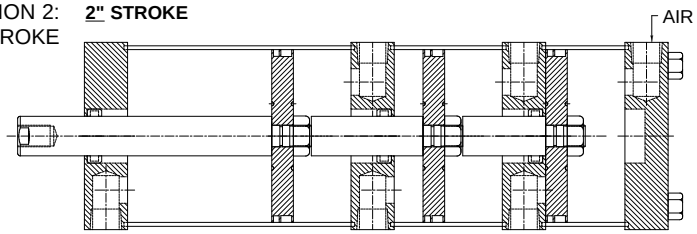


EXAMPLE MULTI-POSITION:
Specify each incremental stroke, in order, starting from retracted.
Example Model No. DE3M60 **02/01/04** MS4C2

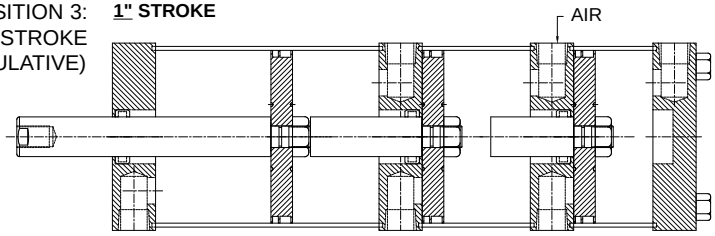
POSITION 1: (RETRACTED)



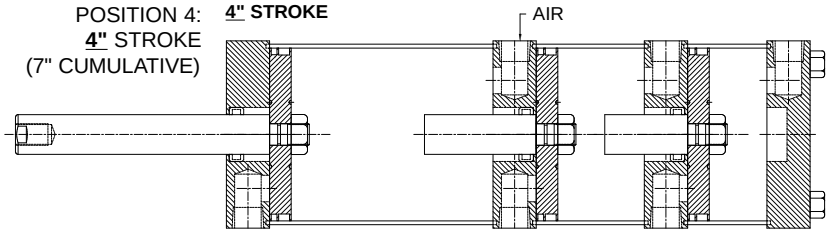
POSITION 2: **2"** STROKE — **2" STROKE**



POSITION 3: **1"** STROKE (3" CUMULATIVE) — **1" STROKE**



POSITION 4: **4"** STROKE (7" CUMULATIVE) — **4" STROKE**



Multi-Position cylinders extend and retract in multi-stages, or in a single stroke. Consult factory for custom application.

DURA-E FORCE & AIR CONSUMPTION TABLES

FORCE CHART EXTEND

BORE	EFFECTIVE PISTON AREA	PRESSURE											CUBIC FEET DISPLACEMENT PER IN. OF EXTEND STROKE
		40	50	60	80	90	100	125	150	175	200	400	
1 1/2	1.77	71	88	106	142	160	177	221	266	310	353	708	.00102
2	3.14	126	157	189	251	283	314	392	471	549	628	1256	.00182
2 1/2	4.91	196	246	295	393	442	491	614	737	859	982	1964	.00284
3 1/4	8.30	332	415	498	664	747	830	1037	1245	1452	1659	3320	.00480
4	12.57	503	629	754	1005	1131	1257	1571	1886	2200	2513	5028	.00727
5	19.64	785	982	1178	1571	1768	1964	2455	2946	3437	3928	7856	.01136
6	28.27	1130	1414	1696	2262	2544	2827	3534	4240	4947	5654	11308	.01636

NOTE: For the Dura-Power Model, the extend force must be calculated by adding up the forces contributed by each stage of the Dura-power unit. Only one of the stages contributes the amount of force shown in the above chart. The amount of force contributed by the each of the other stages must be obtained from the chart below. For example, at 80 PSI, a three stage Dura-Power with a 5" bore would extend with 1571 + 1508 + 1508 = 4587 Lbs. (see page 24 for more information.)

1 2 3 (Stage 1) 1 2 3 (Stage 2) 1 2 3 (Stage 3)

FORCE CHART RETRACT

BORE	EFFECTIVE PISTON AREA	PRESSURE											CUBIC FEET DISPLACEMENT PER IN OF RETRACT STROKE
		40	50	60	80	90	100	125	150	175	200	400	
1 1/2	1.46	58	73	87	116	131	146	182	219	255	292	584	.0008449
2	2.83	113	141	169	226	254	283	353	424	495	566	1132	.0016377
2 1/2	4.60	184	230	276	368	414	460	575	690	805	920	1840	.0026620
3 1/4	7.51	300	375	450	600	675	751	938	1126	1314	1502	3004	.0043460
4	11.78	471	589	706	942	1060	1178	1472	1767	2061	2356	4712	.0068171
5	18.85	754	942	1131	1508	1696	1885	2356	2827	3298	3770	7540	.0109085
6	26.78	1071	1339	1606	2142	2410	2678	3347	4017	4686	5356	10712	.0154976

NOTE: For the Dura-Power Model, the retract force obtained from the above chart is multiplied by the number of stages of the Dura-Power unit. For example, at 80 PSI, a three stage Dura-Power with a 5" bore would retract with 3 X 1508 = 4524 Lbs. (See page 24 for more information.)

1 2 3 (3 Stage)

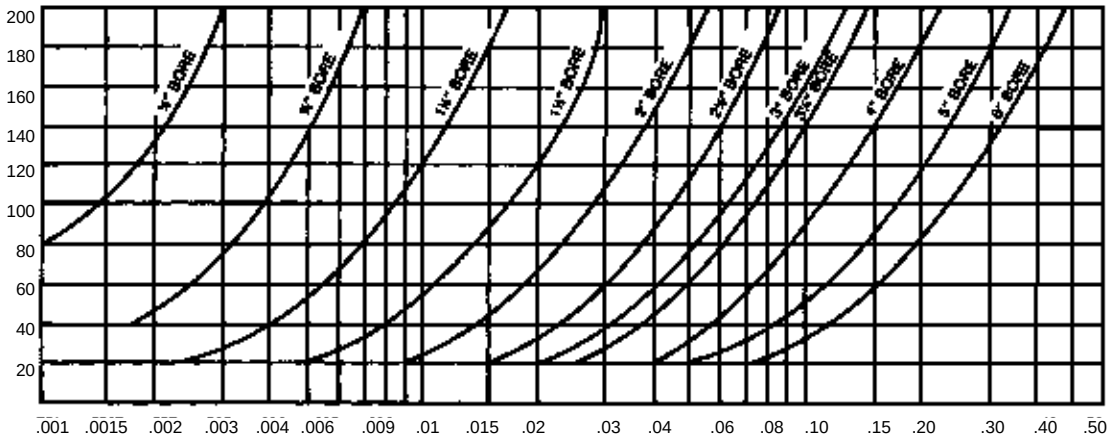
AIR CONSUMPTION CHART

TO CALCULATE THE AIR CONSUMPTION FOR A COMPLETE CYCLE OF A DOUBLE ACTING CYLINDER, READ CUBIC FEET FROM THE CHART BASED UPON PRESSURE AND BORE SIZE AND USE THE FOLLOWING FORMULA.

CFM = CUBIC FT. X CYCLES PER MINUTE X STROKE IN INCHES.

NOTE: FOR DURA-POWER, AIR CONSUMPTION IS MULTIPLIED BY THE NUMBER OF STAGES.

NOTE: FOR DURA MULTI-POSITION, AIR CONSUMPTION IS BASED ON THE SUM OF ALL OF THE CUMULATIVE STROKES.
EXAMPLE: 2" + 3" + 7" = 12" STROKE (DE3M60 O2/01/04 MS4C2) FOR THE EXAMPLE CYLINDER SHOWN ON PAGE 25.
EXAMPLE: 1" + 5" = 6" STROKE (DE2M32 01/04 MF1B2) FOR THE OTHER EXAMPLE CYLINDER SHOWN ON PAGE 25.



HOW TO ORDER (DURA-E SERIES)

D E ☐☐ ☐☐ ☐☐ ☐☐ ☐☐ ☐☐ ☐☐ ☐☐ ☐☐ ☐☐☐ ☐ ☐ ☐☐

D=Duramaster
E=E-Series

Bore Size:
15=1-1/2"
20=2"
25=2-1/2"
32=3-1/4"
40=4"
50=5"
60=6"

Stroke / Strokes:
(inches)
(Two strokes For Dura-Back-to-Back)
(Up to nine strokes for Multi-Position)

Mounting Style:
(MS4 standard)

Rod End Style
#2=Female standard, see basic cylinder. (Customer may specify other than standard). See below for other rod end styles.

Options:
M=Magnetic piston
B=Bumpers
(Bumpers not available on 1-1/2" Bore)
H=Hydraulic
V= Viton Seals

Rod Size:
A=5/8" models 15-25
B=1" models 32-50
C=1 3/8" model 60

S=Single Rod
D=Double Rod
B=Back-to-Back
2P=2 Stage Power Multiplier (Dura-Power)
3P=3 Stage Power Multiplier (Dura-Power)
4P=4 Stage Power Multiplier (Dura-Power)
2M= 2 Stage Multi-Position
3M= 3 Stage Multi-Position
4M= 4 Stage Multi-Position
5M= 5 Stage Multi-Position
6M= 6 Stage Multi-Position
7M= 7 Stage Multi-Position
8M= 8 Stage Multi-Position
9M= 9 Stage Multi-Position

EXAMPLES:

1-1/2" bore, Single Rod with 12" stroke with MX-3 mounting: DES1512MX3A2.

4" bore Double Rod with 6" stroke with MF-1 mounting and Bumpers: DED4006MF1B2B.

3-1/4" bore Dura-Back-to-Back with 4.25" stroke on one end, and 2.75" stroke on other end with MS2 mounting and hydraulic: DEB324.25/2.75MS2B2H.

5" bore Dura-Power with 3 stages and 1" stroke with MX-2 mounting and magnetic piston: DE3P5001MX2B2M

2" bore Multi-Position with strokes in this order (starting with the rod retracted): 3.50", 6.25", 3.00" with MP-1 mounting: DE3M203.5/6.25/3.MP1A2.

DURA-E ROD END STYLES

ROD DIA.	A	C	D	CC	FF	GG	KK
5/8	3/4	3/8	1/2	1/2-20	5/8-18	7/16-20	3/8-24
1	1 1/8	1/2	13/16	7/8-14	1-14	3/4-16	5/8-18
1 3/8	1 5/8	5/16	1 1/4	1 1/4-12	1 3/8-12	1-14	3/4-16

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