CATALOG

cylinders

C Series

Compact Cylinder Line

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EMERSON
Industrial Automation

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C Series
Rugged Compact

The **C Series** is a robust compact cylinder line that is designed to fit tight space requirements. The low profile design and variety of mounting options makes this cylinder line extremely popular. Furthermore, its unique style and diversity makes the C Series a one of a kind compact cylinder line.

Tube
The **tube** is hard coat anodized aluminum. The hard coating is an electro-chemical process, which produces a very dense surface of aluminum oxide. This surface has extreme hardness (60 RC.), excellent wear and corrosion resistance, and a low coefficient of friction. Additionally, profile tubing is standard on 3/4" through 2-1/2" bore sizes (3" and 4" bores are the tie rod configuration). The profile tubing has a custom dovetail groove on all sides for trouble-free switch and accessory mounting.

End Caps
The **end caps** are accurately machined from solid aluminum bar stock. They are anodized for corrosion resistance. Additionally, a recess on the piston-mating surface (at both ends) enables the air to work on a larger piston area for effortless breakaway.

Rod Bushing
The C Series includes a sintered bronze **rod bushing** for maximum load bearing support.

Rod Seal
The quad ring **rod seal** ensures proper sealing even at low pressures.

Piston Rod
High strength steel (100,000 psi minimum yield) **piston rod** has a ground, polished, and chrome plated surface. This surface provides maximum life for both the rod bushing and the seals.

Piston Seal
The quad ring **piston seal** ensures proper sealing even at low pressures.

Piston
The solid aluminum alloy **piston** is strong and durable.

Tie Rods
The **tie rods** (3" and 4" only) are 100,000 psi minimum yield steel for maximum holding power. The threads are roll formed for superior strength and engagement.

Tube End Seal
The **tube end seals** are compression type and reusable.

Ports
Our enhanced **port** design enables the cylinder to work more efficiently. Through the use of precise machining depths and tool shape, we are able to smooth the flow path into and out of the cylinder.

Mounting Holes
The dual purpose **mounting holes** allow use of through bolts or threaded-in attachments.

Standard Specifications:
- Variety of mounts
- Bore sizes from 3/4" through 4"
- Piston rod diameters from 1/4" to 1"
- Nominal pressure rating is 250 psi air
- Standard temperature -10°F to 165°F (-23°C to 74°C)
- All aluminum construction
- NPTF ports
- Flexible port locating

How to Order

P1 C L - 04 A 1 B - A AA 0 04 A

Leave blank unless using MU or BK option.

Mount
F1 = Front Flange
F2 = Rear Flange
P1 = Fixed Clevis
P2 = Detachable Clevis
P3 = Fixed Eye
P4 = Detachable Eye
R3 = Round Head and Cap
S2 = Foot Mount
S4 = Bottom Tapped
X0* = Basic-No Mount

*S4 mount is standard on 3/4" and 1 1/8" bore.

Type
C = Compact Cylinder Line

Bore
C = 3/4"
G = 1-1/8"
K = 1-1/2"
L = 2"
M = 2-1/2"
N = 3"
R = 4"

Full Inches Of Stroke
00 = 0" Stroke
01 = 1" Stroke
02 = 2" Stroke
03 = 3" Stroke
20 = 20" Stroke

Fractional Inches Of Stroke
A = 0" I = 1/2"
B = 1/16" J = 9/16"
C = 1/8" K = 5/8"
D = 3/16" L = 11/16"
E = 1/4" M = 3/4"
F = 5/16" N = 13/16"
G = 3/8" O = 7/8"
H = 7/16" P = 15/16"

Rod End Code
1* = #1 Standard Rod Diameter
2 = #2 Standard Rod Diameter
3 = #3 Standard Rod Diameter
4 = Special Standard Rod Diameter (must specify threads)
5 = Special Oversize Rod Diameter (must specify threads)
6 = #1 Oversized Rod Diameter
7 = #2 Oversized Rod Diameter
8 = #3 Oversized Rod Diameter

Fractional Inches of Stroke
A = 0" I = 1/2"
B = 1/16" J = 9/16"
C = 1/8" K = 5/8"
D = 3/16" L = 11/16"
E = 1/4" M = 3/4"
F = 5/16" N = 13/16"
G = 3/8" O = 7/8"
H = 7/16" P = 15/16"

Full Inches of Stroke
00 = 0" Stroke
01 = 1" Stroke
02 = 2" Stroke
03 = 3" Stroke

Magnet Piston
0 = No Magnet
2* = Reed Magnet & Wear Band
4* = Electronic Switch Magnet (Order switches separately)
*Adds to OAL of cylinder, see page 5 for details.

Options
AA = No Options
BA = Bumpers, Both Ends
KA = Stroke Adjuster (Specify Length)
DA = Double Rod End
NA = Nickel Plated
SA = Stainless Steel Rod
SE** = Spring Extend
SR** = Spring Retract
SS = Stainless Steel Rod and Tie Rods (3 and 4 Bores)
ST = Stainless Steel Tie Rods (3 and 4 Bores)
VA = Viton Seals
1A = Rod Extension (specify length)
2A = Thread Extension (specify length)
WA* = Wear Band
MU = Multiposition Cylinder
BK = Back to Back Cylinder
TD = Tandem Cylinder
* Adds to OAL of cylinder, see page 5 fore details.
** 2" Stroke Maximum

Cushions
A = No Cushions

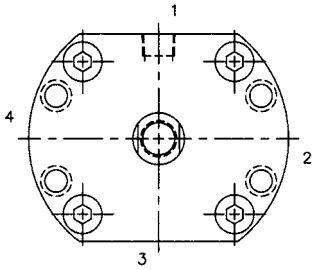
Ports

Position #	10-32	*1/8"	1/4"
1	A	B	C
2	G	H	I
3	M	N	O
4	S	T	U

* See page 5, notes on ordering for more information.

NOTE: 1/8" and 1/4" ports can affect OAL of cylinder. *See page 5* for details.

Cylinder Orientation



Ports Normally in Position 1

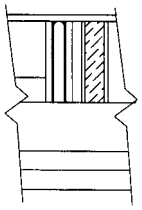
Rod End Styles, Diameters and Threads

BORE	DIAMETER	STYLE #1 STANDARD MALE	STYLE #2 OPTIONAL FEMALE	STYLE #3 STANDARD FEMALE
3/4"	.250	#8-32	N/A	#8-32
1 1/8"	.500	1/4-28	5/16-24	1/4-28
1 1/2"	.625 .750	7/16-20 1/2-20	3/8-24 N/A	7/16-20 1/2-20
2"	.625 .750	7/16-20 1/2-20	N/A N/A	7/16-20 1/2-20
2 1/2"	.625 .750	7/16-20 1/2-20	N/A N/A	7/16-20 1/2-20
3"	1.000	3/4-16	5/8-18	3/4-16
4"	1.000	3/4-16	N/A	3/4-16

*NOTE: Style #1 Male rods are studded female rods

How to Order continued

Figure 1.
Wear Band Option



Side load and misalignment are major factors that can cause premature failure of the rod bushing and piston, the two load bearing points on a cylinder.

The Wear Band option separates the load bearing points by locating the wear band at the rear of the piston assembly, to give maximum column strength even at full extension (Fig. 1).

The wear band is a stable, lubricating strip placed far back on the piston. Its width and placement serve to locate piston load at the optimum point.

Order as “WA” Option or by putting a
“2” in the magnetic piston code

Minimum Length detail for Switches

BORE	MIN. STROKE “SENSE ONE END”	MIN. STROKE “SENSE BOTH ENDS”
3/4"	1/2"	1/2"
1-1/8"	1/2"	1/2"
1-1/2"	7/16"	7/16"
2"	7/16"	7/16"
2-1/2"	1/4"	3/8"
3"	1/4"	3/8"
4"	1/8"	5/16"

C series Length Adders

Standard Adders

Cylinders	Bore	WA Option	“4” Magnet Code	“2” Magnet Code	“BA” Option Bumpers (Both Ends)	1/8” NPT Ports
C-series	0.75"	*1.05"	0.300"	*1.05"	0.125"	0.438"
C-series	1.125"	*0.925"	0.300"	*0.925"	0.125"	0.438"
C-series	1.5"	*0.937"	0.313"	*0.937"	0.125"	N/A
C-series	2"	*0.937"	0.313"	*0.937"	0.125"	N/A
C-series	2.5"	*1"	0.375"	*1"	0.125"	N/A
C-series	3"	*0.750"	0.500"	*0.750"	0.125"	N/A
C-series	4"	*0.875"	0.500"	*0.875"	0.125"	N/A

Combo Adders

WA(wearband)+ 2(Reed Magnet)	WA(wearband)+ 4(Electronic Magnet)
*1.05"	**1.05"
*0.925"	**0.925"
*0.937"	**0.937"
*0.937"	**0.937"
*1"	**1"
*0.750"	**0.750"
*0.875"	**0.875"

Special Notes:

* For cylinders that require a “2” (reed) magnet, a special piston will be used. This piston will incorporate the wearband, so when the “2” style magnet is ordered the cylinder will automatically have a wearband. For cylinders that require a “WA” option (wearband) this same special piston is used, but the magnet will not be placed into the groove unless ordered, therefore the adders will be equal for the “2” magnet and “WA” option. When ordering the combination of “2” (reed) magnet and “WA” (wearband) option you will only use the adder once.

** For cylinders that require the combination of a “4” style (Electronic) hall magnet plus a “WA” (Wearband) a special piston will be used. See table for combination length adders.

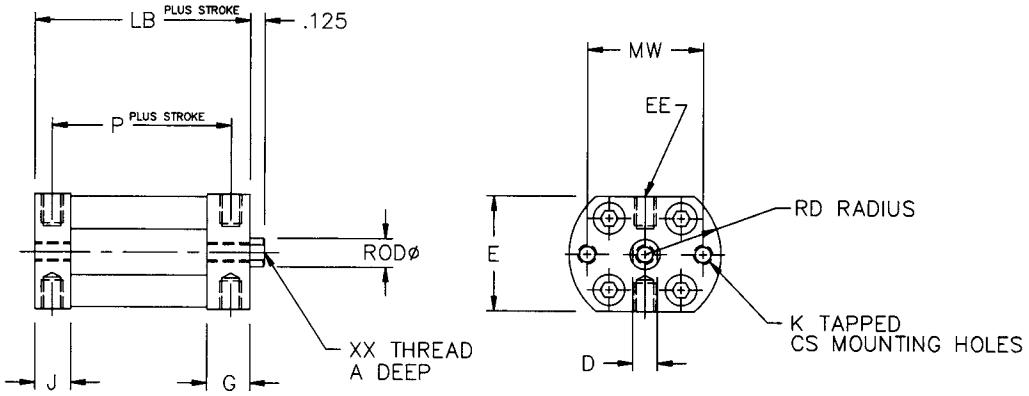
Notes on Ordering:
Ports - Full flow 10-32 ports are standard on 3/4" and 1 1/8" bore Compact Series. If you want 1/8" NPTF ports, overall lengths will increase by 7/16" on double rods and 1/2" on single rods due to a thicker head and cap. Full flow 1/8" NPTF ports are standard and 1/4" NPTF ports are not available on 1 1/2" and 2" bore sizes. Full flow 1/4" NPTF ports are standard on 2 1/2" through 4" bore sizes. Smaller ports are available.

Specials - Various special configurations are available: consult factory. Metric rod threads and “G” ports are available by special order.

Multiple Options - For multiple options, please consult the factory for "combination" option codes.

Basic Compact Series Cylinders

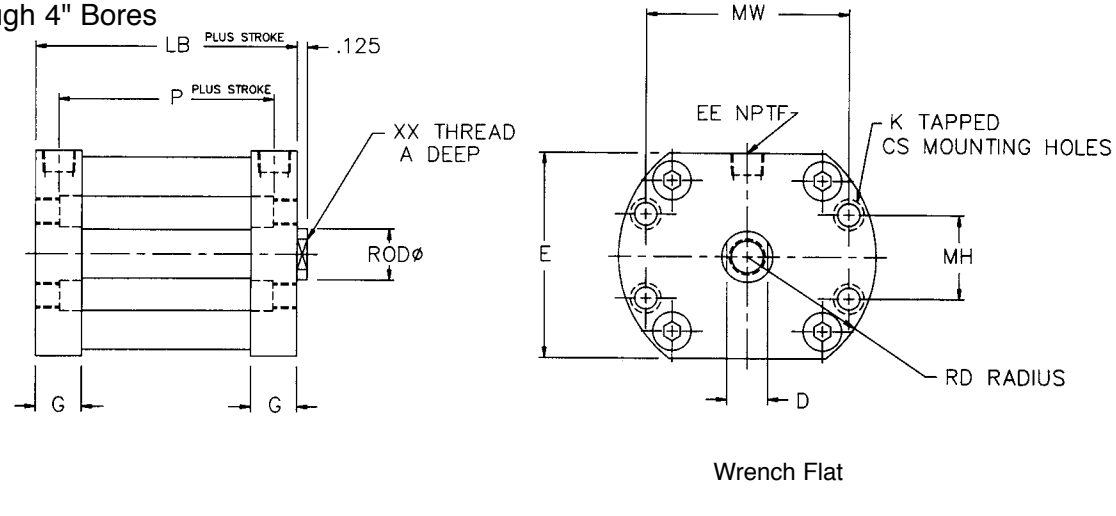
3/4" and 1 1/8" Bores



Wrench Flat

Mount Code S4 (Standard)

1 1/2" Through 4" Bores



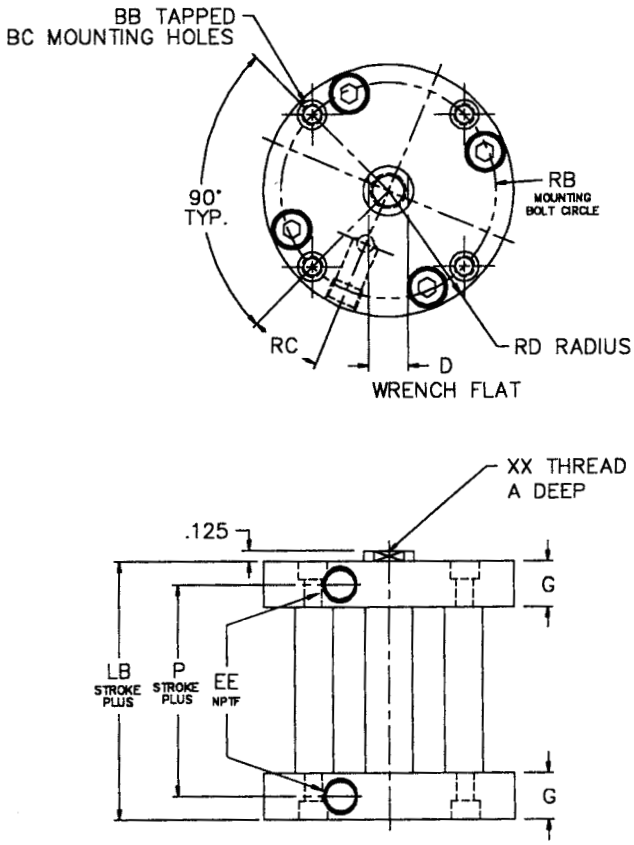
Wrench Flat

Mount Code XO

Basic Cylinder Dimensions

BORE	ROD	A	CS	D	E	EE+	G	J	K	LB	MH	MW	P	RD	XX
3/4”	0.250	0.375	#5	0.212	1.250	#10-32	0.406	0.343	#8-32	0.950	N/A	1.375	0.638	0.844	#8-32
1-1/8”	0.500	0.375	#6	0.375	1.750	#10-32	0.406	0.343	#10-32	0.950	N/A	1.793	0.638	1.125	1/4-28
1-1/2”	0.625	0.500	#10	0.500	2.000	1/8	0.625	N/A	1/4-28	1.438	.770	2.114	0.875	1.313	7/16-20
1-1/2”	0.750	0.750	#10	0.625	2.000	1/8	0.625	N/A	1/4-28	1.438	.770	2.114	0.875	1.313	1/2-20
2”	0.625	0.500	1/4	0.500	2.500	1/8	0.625	N/A	5/16-24	1.438	1.029	2.483	0.875	1.575	7/16-20
2”	0.750	0.750	1/4	0.625	2.500	1/8	0.625	N/A	5/16-24	1.438	1.029	2.483	0.875	1.575	1/2-20
2-1/2”	0.625	0.500	1/4	0.500	3.000	1/4	0.750	N/A	5/16-24	1.750	1.363	2.922	1.063	1.875	7/16-20
2-1/2”	0.750	0.750	1/4	0.625	3.000	1/4	0.750	N/A	5/16-24	1.750	1.363	2.922	1.063	1.875	1/2-20
3”	1.000	0.875	1/4	0.875	3.500	1/4	0.750	N/A	5/16-24	1.875	1.585	3.399	1.188	2.125	3/4-16
4”	1.000	0.875	5/16	0.875	4.500	1/4	0.750	N/A	3/8-24	1.875	2.060	4.418	1.188	2.750	3/4-16

Round Head and Cap Mount



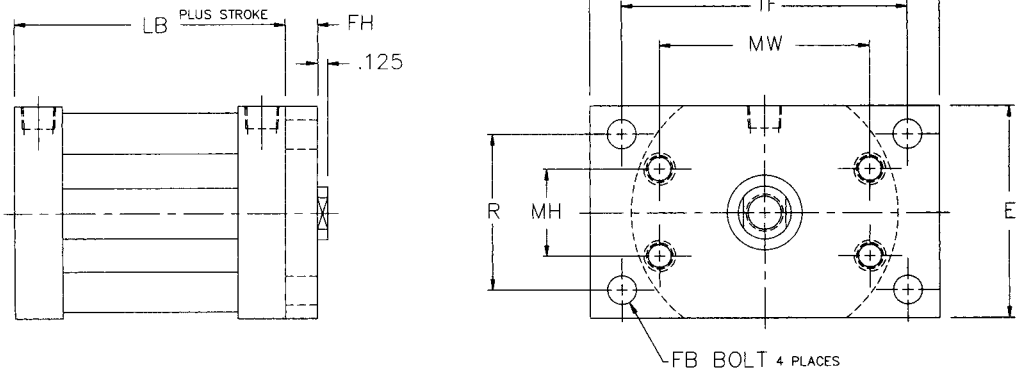
Mount Code R3

Basic Cylinder Dimensions

BORE	ROD	A	BB	BC	D	EE+	G	LB	P	RB	RC	RD	XX
3/4”	0.250	0.375	#10-32	#6	0.212	#10-32	0.406	1.013	0.638	1.219	35°	0.750	#8-32
1-1/8”	0.500	0.375	#10-32	#6	0.375	#10-32	0.406	1.013	0.638	1.688	20°	1.000	1/4-28
1-1/2”	0.625	0.500	1/4-28	#10	0.500	1/8	0.625	1.438	0.875	2.188	21°	1.313	7/16-20
1-1/2”	0.750	0.750	1/4-28	#10	0.625	1/8	0.625	1.438	0.875	2.188	21°	1.313	1/2-20
2”	0.625	0.500	1/4-28	#10	0.500	1/8	0.625	1.438	0.875	2.688	22°	1.563	7/16-20
2”	0.750	0.750	1/4-28	#10	0.625	1/8	0.625	1.438	0.875	2.688	22°	1.563	1/2-20
2-1/2”	0.625	0.500	5/16-24	1/4	0.500	1/4	0.750	1.750	1.063	3.250	25°	1.875	7/16-20
2-1/2”	0.750	0.750	5/16-24	1/4	0.625	1/4	0.750	1.750	1.063	3.250	25°	1.875	1/2-20
3”	1.000	0.875	5/16-24	1/4	0.875	1/4	0.750	1.875	1.188	3.781	21°	2.125	3/4-16
4”	1.000	0.875	3/8-24	5/16	0.875	1/4	0.750	1.875	1.188	4.938	21°	2.750	3/4-16

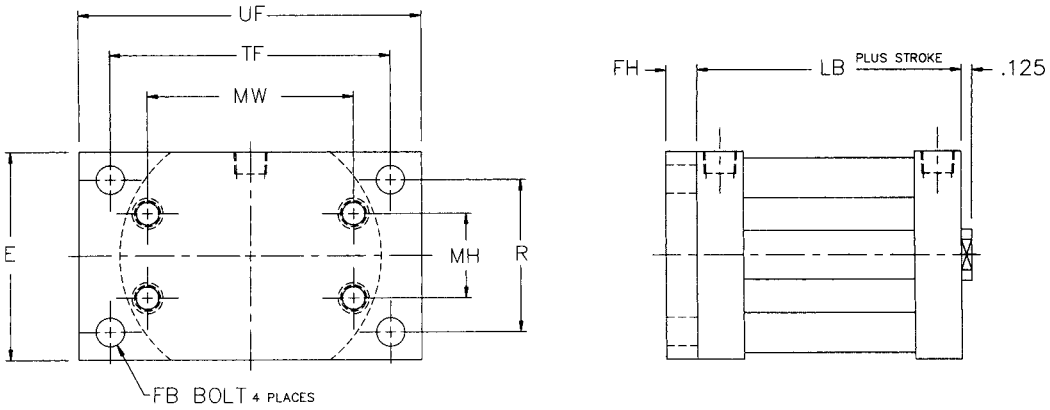
Flange Mounts

Front Flange



Mount Code F1

Rear Flange



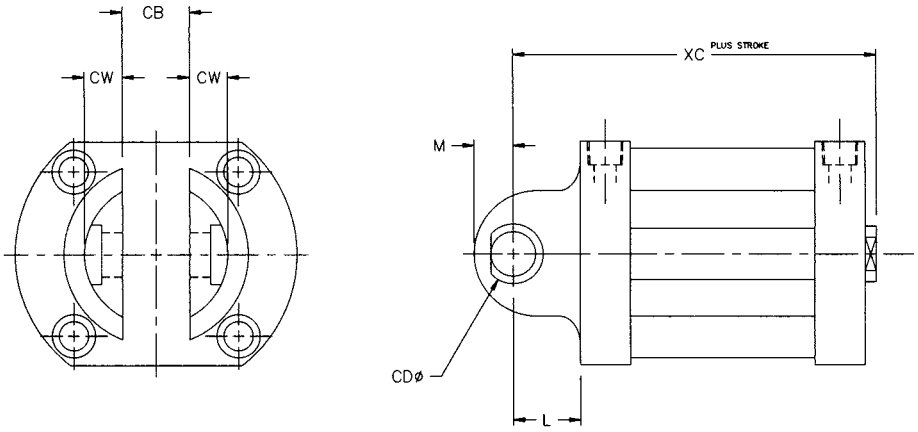
Mount Code F2

Dimensions

BORE	E	FB	FH	LB	MH	MW	R	TF	UF
3/4"	1.250	#8	.250	.950	N/A	1.375	.813	1.813	2.250
1-1/8"	1.750	#10	.250	.950	N/A	1.793	1.282	2.250	2.750
1-1/2"	2.000	5/16	.375	1.438	.770	2.114	1.430	2.750	3.375
2"	2.500	3/8	.375	1.438	1.029	2.483	1.840	3.375	4.125
2-1/2"	3.000	3/8	.375	1.750	1.363	2.922	2.190	3.875	4.625
3"	3.50	5/16	.438	1.875	1.585	3.399	2.625	4.375	5.000
4"	4.50	7/16	.625	1.875	2.060	4.418	3.320	5.438	6.250

Clevis Mounts

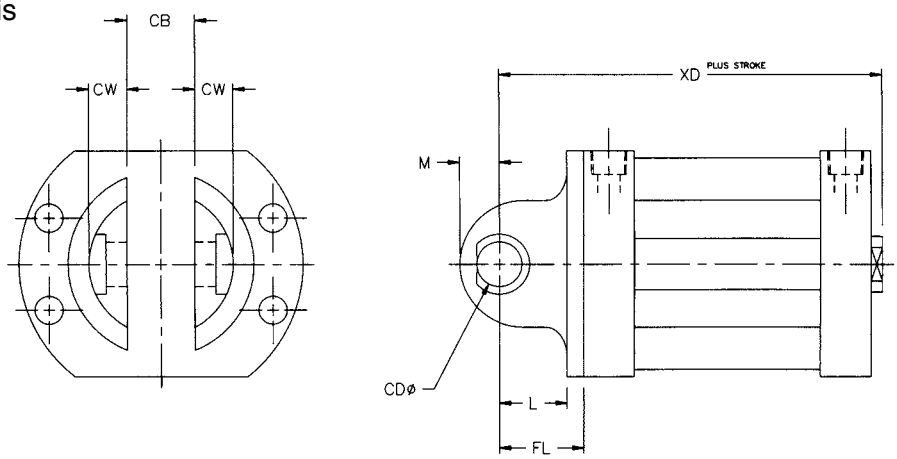
Fixed Clevis



Mount Code P1

NOTE: Includes clevis pin.

Detachable Clevis



Mount Code P2

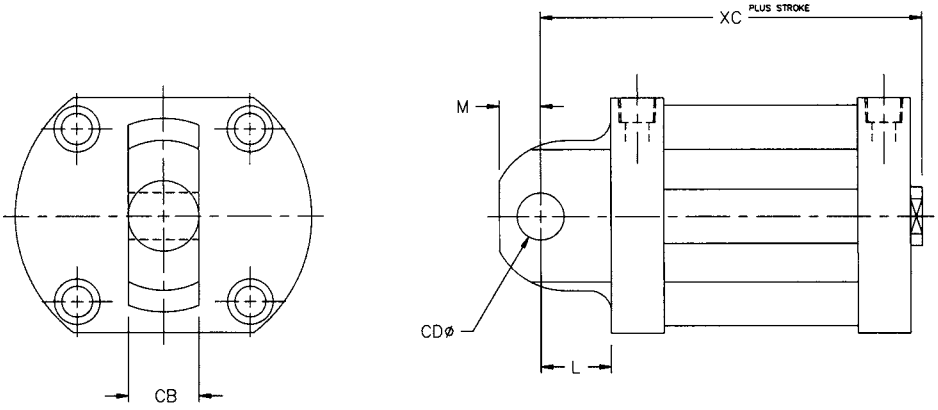
NOTE: Includes clevis pin.

Dimensions

BORE	CB	CD	CW	FL	L	M	XC	XD
3/4”	0.375	0.188	0.302	0.688	0.500	0.474	N/A	1.763
1-1/8”	0.375	0.188	0.302	0.688	0.500	0.474	N/A	1.763
1-1/2”	0.750	0.375	0.424	0.813	0.625	0.438	2.188	2.375
2”	0.750	0.375	0.424	0.938	0.750	0.438	2.313	2.500
2-1/2”	0.750	0.375	0.424	1.000	0.750	0.500	2.625	2.875
3”	1.000	0.625	0.553	1.313	1.063	0.625	3.063	3.313
4”	1.000	0.625	0.553	1.688	1.438	0.625	3.438	3.688

Eye Mounts

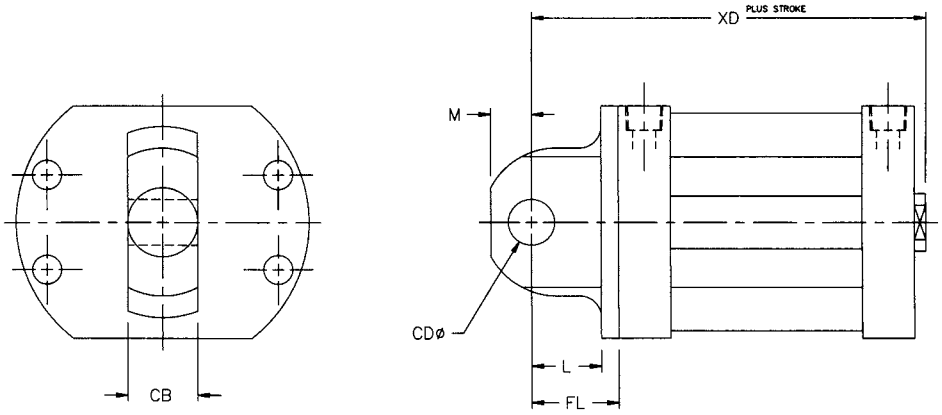
Fixed Eye



Mount Code P3

NOTE: Includes clevis pin.

Detachable Eye



Mount Code P4

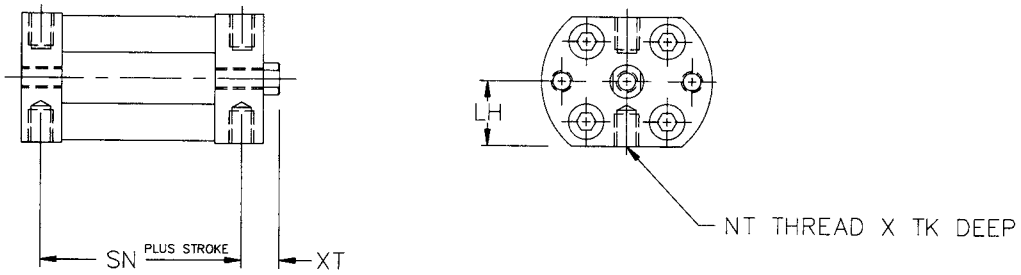
NOTE: Includes clevis pin.

Dimensions

BORE	CB	CD	FL	L	M	XC	XD
3/4”	0.375	0.188	0.688	0.500	0.490	N/A	1.763
1-1/8”	0.375	0.188	0.688	0.500	0.490	N/A	1.763
1-1/2”	0.750	0.375	0.813	0.625	0.438	2.188	2.375
2”	0.750	0.375	0.938	0.750	0.438	2.313	2.500
2-1/2”	0.750	0.375	1.000	0.750	0.500	2.625	2.875
3”	1.000	0.625	1.313	1.063	0.625	3.063	3.313
4”	1.000	0.625	1.688	1.438	0.625	3.438	3.688

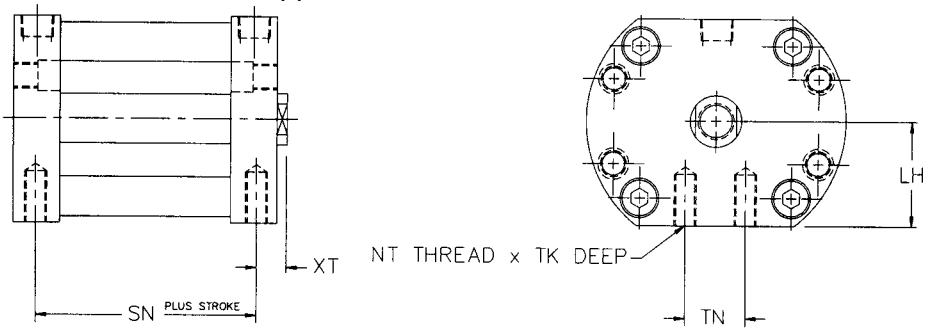
Bottom Mounts

3/4" And 1 1/8" Bores - Bottom Tapped (Standard)



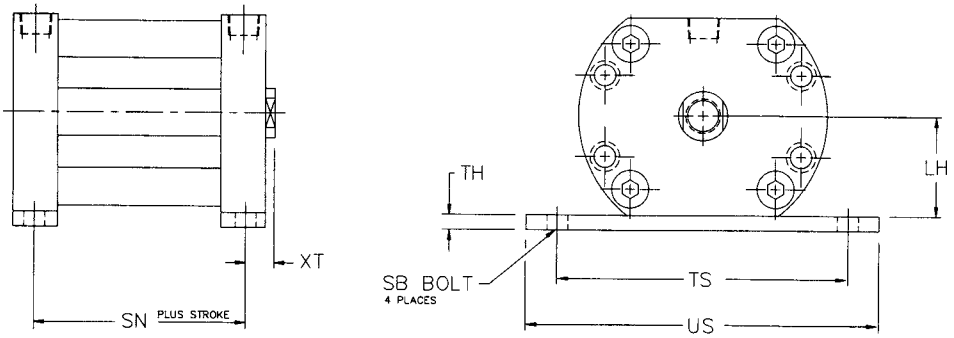
Mount Code S4 (Standard)

1 1/2" Through 4" Bores - Bottom Tapped



Mount Code S4

1 1/2" Through 4" Bores - Base Bar Mount



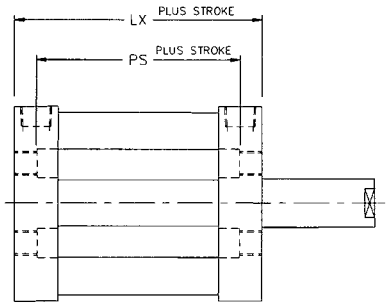
Mount Code S2

Dimensions

BORE	LH	NT	SB	SN	TH	TK	TN	TS	US	XT
3/4”	0.625	#10-32	N//A	0.638	N/A	0.250	N/A	N/A	N/A	0.293
1-1/8”	0.875	#10-32	N/A	0.638	N/A	0.250	N/A	N/A	N/A	0.293
1-1/2”	1.000	1/4-28	1/4	0.813	0.250	0.375	0.625	2.875	3.375	0.438
2”	1.250	1/4-28	1/4	0.813	0.250	0.375	0.750	3.375	3.875	0.438
2-1/2”	1.500	5/16-24	5/16	1.000	0.250	0.500	1.125	4.000	4.375	0.500
3”	1.750	5/16-24	5/16	1.125	0.375	0.500	1.625	4.500	4.875	0.500
4”	2.250	3/8-24	3/8	1.125	0.375	0.750	1.625	5.750	6.250	0.500

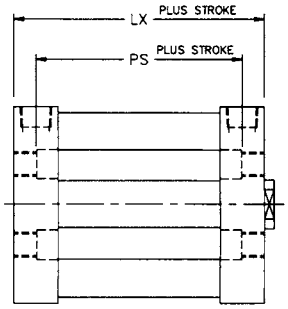
Single Acting Cylinders

Spring Extend



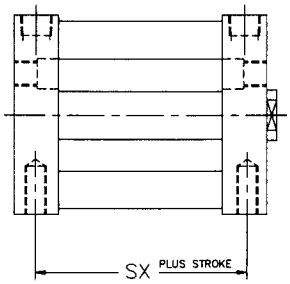
Order as "SE" option

Spring Return



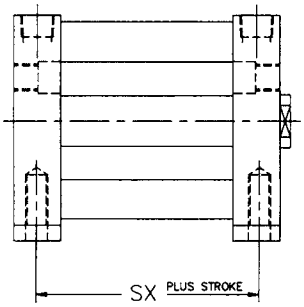
Order as "SR" option

Bottom Tapped with SE or SR option



Mount Code S4

Base Bar Mount with SE or SR option



Mount Code S2

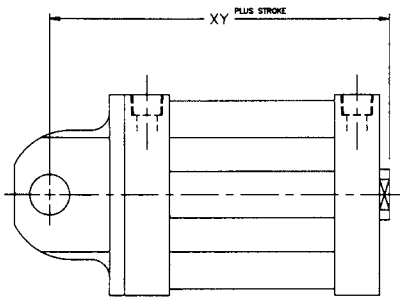
(Consult factory for strokes greater than 2")

Dimensions

BORE	"STROKES UP TO 1"					"STROKES OVER 1" UP TO 2"				
	LX	PS	SX	XV	XY	LX	PS	SX	XV	XY
3/4"	1.950	1.638	1.638	N/A	2.763	2.950	2.638	2.638	N/A	3.763
1-1/8"	1.950	1.638	1.638	N/A	2.763	2.950	2.638	2.638	N/A	3.763
1-1/2"	2.688	2.125	2.063	3.438	3.625	3.938	3.375	3.313	4.688	4.875
2"	2.813	2.250	2.188	3.688	3.875	4.188	3.625	3.563	5.063	5.250
2-1/2"	3.125	2.438	2.375	4.000	4.250	4.500	3.813	3.750	5.375	5.625
3"	3.375	2.688	2.625	4.563	4.813	4.875	4.188	4.125	6.063	6.313
4"	3.375	2.688	2.625	4.938	5.188	4.875	4.188	4.125	6.438	6.688

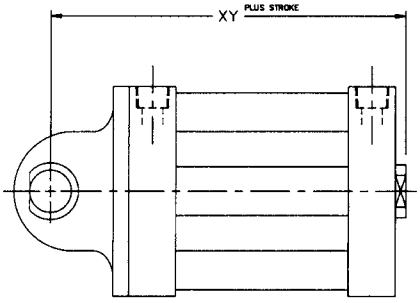
Single Acting Cylinders continued

Detachable Eye with SE or SR option



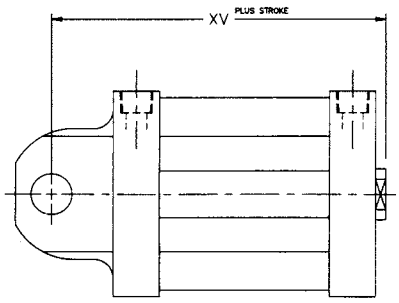
Mount Code P4

Detachable Clevis with SE or SR option



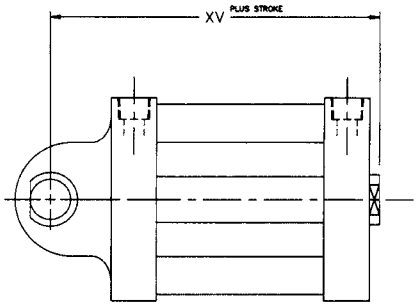
Mount Code P2

Fixed Eye with SE or SR option



Mount Code P3

Fixed Clevis with SE or SR option



Mount Code P1

(Consult factory for strokes greater than 2")

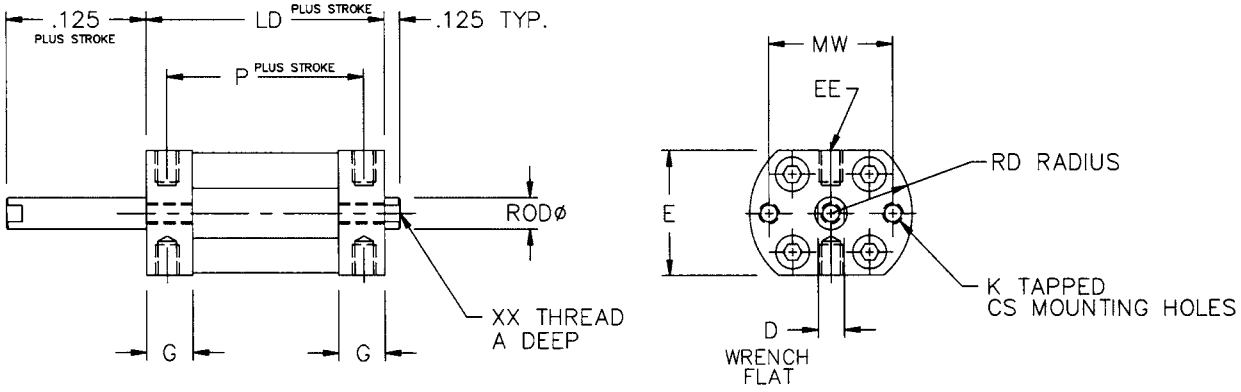
Dimensions

BORE	"STROKES UP TO 1"					"STROKES OVER 1" UP TO 2"				
	LX	PS	SX	XV	XY	LX	PS	SX	XV	XY
3/4"	1.950	1.638	1.638	N/A	2.763	2.950	2.638	2.638	N/A	3.763
1-1/8"	1.950	1.638	1.638	N/A	2.763	2.950	2.638	2.638	N/A	3.763
1-1/2"	2.688	2.125	2.063	3.438	3.625	3.938	3.375	3.313	4.688	4.875
2"	2.813	2.250	2.188	3.688	3.875	4.188	3.625	3.563	5.063	5.250
2-1/2"	3.125	2.438	2.375	4.000	4.250	4.500	3.813	3.750	5.375	5.625
3"	3.375	2.688	2.625	4.563	4.813	4.875	4.188	4.125	6.063	6.313
4"	3.375	2.688	2.625	4.938	5.188	4.875	4.188	4.125	6.438	6.688

Double Rod Cylinders

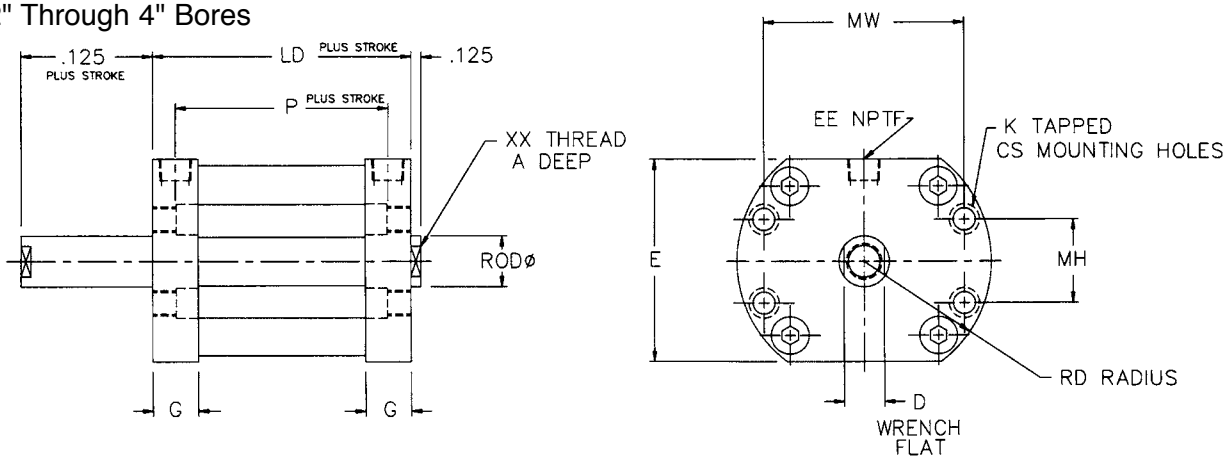
This configuration has a piston rod which extends out both ends of the cylinder. It is also called a through rod cylinder.

3/4" and 1 1/8" Bores



Order as "DA" Option

1 1/2" Through 4" Bores



Order as "DA" Option

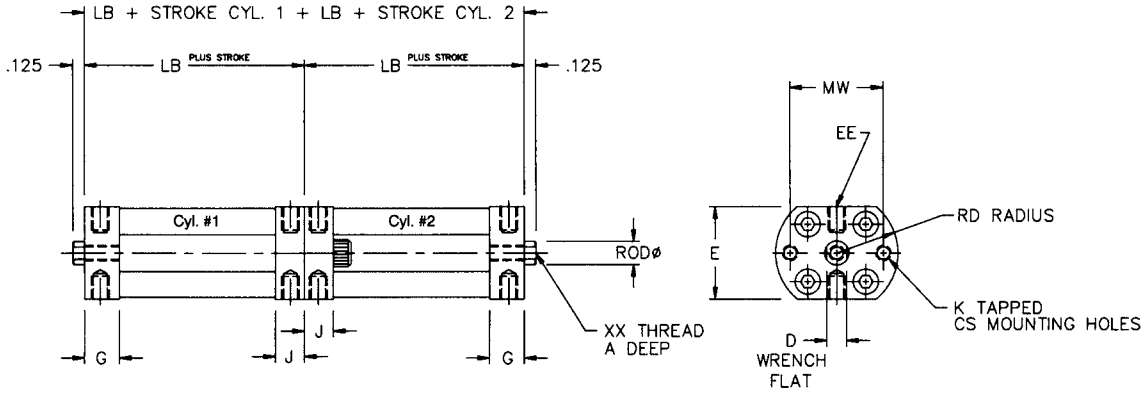
Basic Cylinder Dimensions

BORE	ROD	A	CS	D	E	EE+	G	K	LD	MH	MW	P	RD	XX
3/4”	0.250	0.375	#5	0.212	1.250	#10-32	0.406	#8-32	1.013	N/A	1.375	0.678	0.844	#8-32
1-1/8”	0.500	0.375	#6	0.375	1.750	#10-32	0.406	#10-32	1.013	N/A	1.793	0.678	1.125	1/4-28
1-1/2”	0.625	0.500	#10	0.500	2.000	1/8	0.625	1/4-28	1.438	0.770	2.114	0.875	1.313	7/16-20
1-1/2”	0.750	0.750	#10	0.625	2.000	1/8	0.625	1/4-28	1.438	0.770	2.114	0.875	1.313	1/2-20
2”	0.625	0.500	1/4	0.500	2.500	1/8	0.625	5/16-24	1.438	1.029	2.483	0.875	1.575	7/16-20
2”	0.750	0.750	1/4	0.625	2.500	1/8	0.625	5/16-24	1.438	1.029	2.483	0.875	1.575	1/2-20
2-1/2”	0.625	0.500	1/4	0.500	3.000	1/4	0.750	5/16-24	1.750	1.363	2.922	1.063	1.875	7/16-20
2-1/2”	0.750	0.750	1/4	0.625	3.000	1/4	0.750	5/16-24	1.750	1.363	2.922	1.063	1.875	1/2-20
3”	1.000	0.875	1/4	0.875	3.500	1/4	0.750	5/16-24	1.875	1.585	3.399	1.188	2.125	3/4-16
4”	1.000	0.875	5/16	0.875	4.500	1/4	0.750	3/8-24	1.875	2.060	4.418	1.188	2.750	3/4-16

Back to Back Cylinders

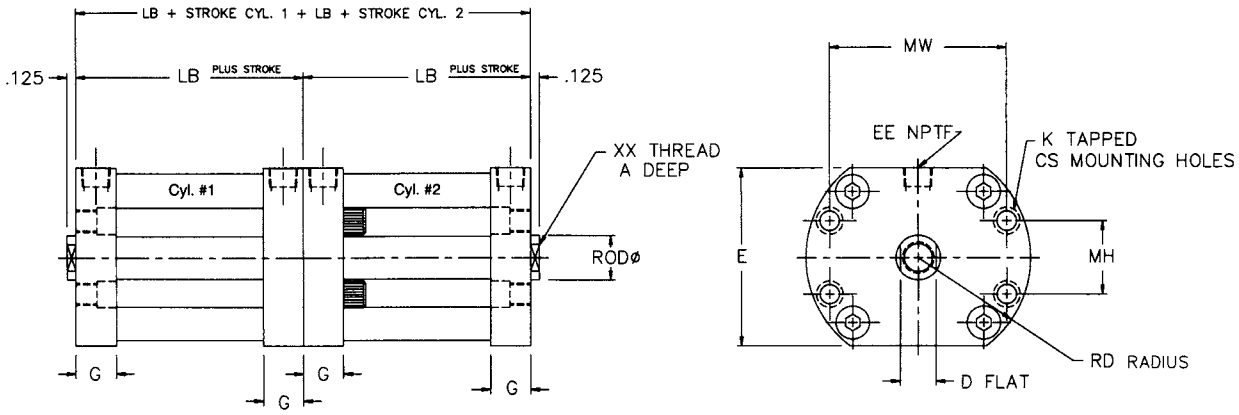
This configuration is two cylinders mounted back to back. Each cylinder can be operated independently. The cylinders can have the same stroke or different strokes. This configuration enables you to have four combinations of rods extended or retracted.

3/4" and 1 1/8" Bores



Consult factory for ordering.

1 1/2" Through 4" Bores

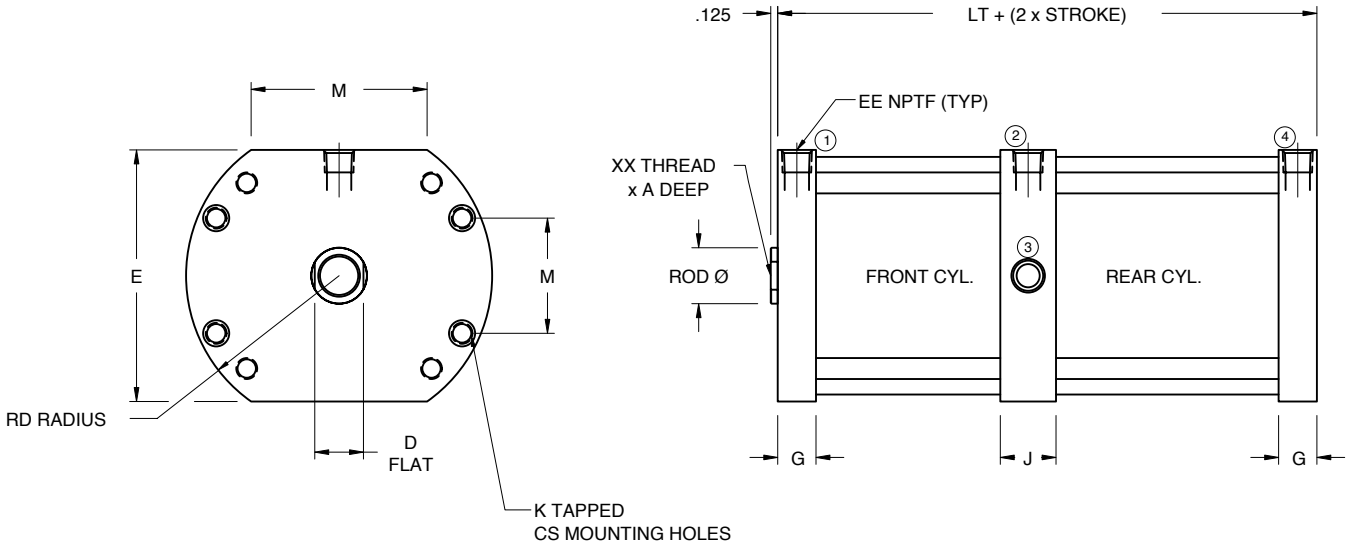


Basic Cylinder Dimensions

BORE	ROD	A	CS	D	E	EE	G	J	K	LB	MH	MW	RD	XX
1-1/8”	0.500	0.375	#6	0.375	1.750	#10-32	0.406	0.343	#10-32	0.950	N/A	1.793	1.125	1/4-28
1-1/2”	0.625	0.500	#10	0.500	2.000	1/8	0.625	N/A	1/4-28	1.438	0.770	2.114	1.313	7/16-20
1-1/2”	0.750	0.750	#10	0.625	2.000	1/8	0.625	N/A	1/4-28	1.438	0.770	2.114	1.313	1/2-20
2”	0.625	0.500	1/4	0.500	2.500	1/8	0.625	N/A	5/16-24	1.438	1.029	2.483	1.575	7/16-20
2”	0.750	0.750	1/4	0.625	2.500	1/8	0.625	N/A	5/16-24	1.438	1.029	2.483	1.575	1/2-20
2-1/2”	0.625	0.500	1/4	0.500	3.000	1/4	0.750	N/A	5/16-24	1.750	1.363	2.922	1.875	7/16-20
2-1/2”	0.750	0.750	1/4	0.625	3.000	1/4	0.750	N/A	5/16-24	1.750	1.363	2.922	1.875	1/2-20
3”	1.000	0.875	1/4	0.875	3.500	1/4	0.750	N/A	5/16-24	1.875	1.585	3.399	2.125	3/4-16
4”	1.000	0.875	5/16	0.875	4.500	1/4	0.750	N/A	3/8-24	1.875	2.060	4.418	2.750	3/4-16

Tandem Cylinders

This configuration provides nearly twice the force of an equivalent basic double acting cylinder. Two pistons are attached to a common piston rod. Ports 2 and 4 are pressurized to nearly double the extend force. Ports 1 and 3 are pressurized to double the retract force.

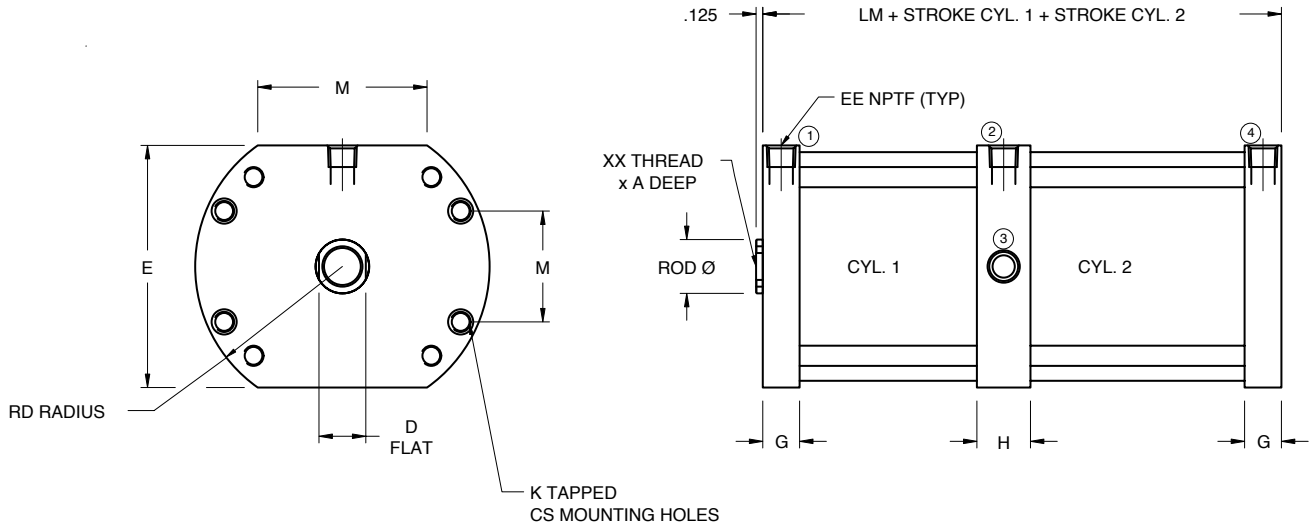


Basic Cylinder Dimensions

BORE	ROD	A	CS	D	E	EE	G	J	K	LT	MH	MW	RD	XX
1-1/2”	0.625	0.500	#10	0.500	2.000	1/8	0.625	0.688	1/4-28	2.313	0.770	2.114	1.313	7/16-20
1-1/2”	0.750	0.750	#10	0.625	2.000	1/8	0.625	0.688	1/4-28	2.313	0.770	2.114	1.313	1/2-20
2”	0.625	0.500	1/4	0.500	2.500	1/8	0.625	0.688	5/16-24	2.313	1.029	2.483	1.575	7/16-20
2”	0.750	0.750	1/4	0.625	2.500	1/8	0.625	0.688	5/16-24	2.313	1.029	2.483	1.575	1/2-20
2-1/2”	0.625	0.500	1/4	0.500	3.000	1/4	0.750	0.813	5/16-24	2.313	1.363	2.922	1.875	7/16-20
2-1/2”	0.750	0.750	1/4	0.625	3.000	1/4	0.750	0.813	5/16-24	2.313	1.363	2.922	1.875	1/2-20
3”	1.000	0.875	1/4	0.875	3.500	1/4	0.750	0.813	5/16-24	3.063	1.585	3.399	2.125	3/4-16
4”	1.000	0.875	5/16	0.875	4.500	1/4	0.750	0.813	3/8-24	3.063	2.060	4.418	2.750	3/4-16

Multi-Position Cylinders

Multi-position cylinders look similar to tandem cylinders. However, in this cylinder the rear and front piston rods are separate. The stroke from full retract to the intermediate extend point is set by the stroke of cylinder #2. The total stroke for full retract to full extend is set by the stroke of cylinder #1. Full extend or retract is achieved by pressurizing ports 1 and 2 respectively with ports 3 and 4 vented. An intermediate position is achieved by pressurizing port 4 with the other ports vented or by pressurizing both ports 1 and 4. With 1 and 4 pressurized, the rod is more positively held in the intermediate position.

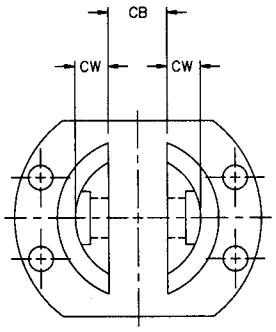


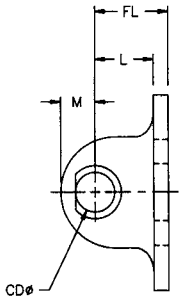
Basic Cylinder Dimensions

BORE	ROD	A	CS	D	E	EE	G	H	K	LM	MH	MW	RD	XX
1-1/2”	0.625	0.500	#10	0.500	2.000	1/8	0.625	0.875	1/4-28	2.500	0.770	2.114	1.313	7/16-20
1-1/2”	0.750	0.750	#10	0.625	2.000	1/8	0.625	0.875	1/4-28	2.500	0.770	2.114	1.313	1/2-20
2”	0.625	0.500	1/4	0.500	2.500	1/8	0.625	0.875	5/16-24	2.500	1.029	2.483	1.575	7/16-20
2”	0.750	0.750	1/4	0.625	2.500	1/8	0.625	0.875	5/16-24	2.500	1.029	2.483	1.575	1/2-20
2-1/2”	0.625	0.500	1/4	0.500	3.000	1/4	0.750	1.000	5/16-24	3.000	1.363	2.922	1.875	7/16-20
2-1/2”	0.750	0.750	1/4	0.625	3.000	1/4	0.750	1.000	5/16-24	3.000	1.363	2.922	1.875	1/2-20
3”	1.000	0.875	1/4	0.875	3.500	1/4	0.750	1.125	5/16-24	3.375	1.585	3.399	2.125	3/4-16
4”	1.000	0.875	5/16	0.875	4.500	1/4	0.750	1.125	3/8-24	3.375	2.060	4.418	2.750	3/4-16

Accessories

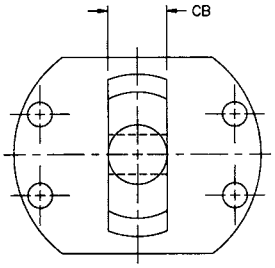
Clevis Bracket

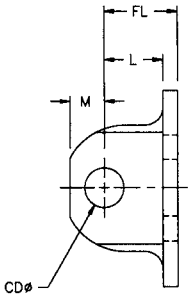




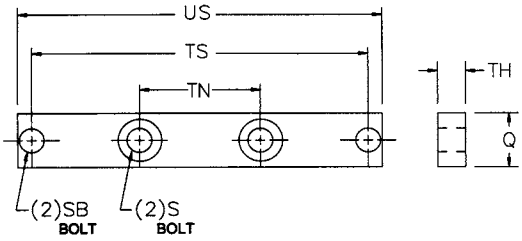
Note: Only two mounting holes on the 3/4" and 1-1/8" bore sizes.

Eye Bracket

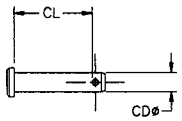




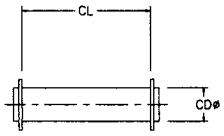
Base Bar



Clevis Pins - 3/4" and 1 1/8" Bores *



Clevis Pins - 1 1/2" Through 4" Bores *



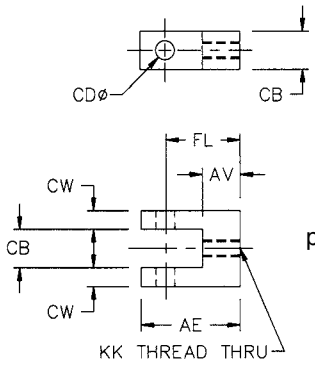
* Included with P1, P2, P3 and P4 mounts

Dimensions

BORE	CLEVIS KIT	EYE KIT	PIVOT PIN	CB	CD	CL	CW	FL	L	M CLEVIS	M EYE	Q	S	SB	TH	TN	TS	US
3/4”	C600-C05	C600-C06	N131-1014	0.375	0.188	1.100	0.302	0.688	0.500	0.474	0.490	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1-1/8”	C600-G05	C600-G06	N131-1014	0.375	0.188	1.100	0.302	0.688	0.500	0.474	0.490	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1-1/2”	C600-K05	C600-K06	N131-1000	0.750	0.375	1.500	0.424	0.813	0.625	0.438	0.438	0.625	1/4	1/4	0.250	0.625	2.875	3.375
2”	C600-L05	C600-L06	N131-1000	0.750	0.375	1.500	0.424	0.938	0.750	0.438	0.438	0.625	1/4	1/4	0.250	0.750	3.375	3.875
2-1/2”	C600-M05	C600-M06	N131-1000	0.750	0.375	1.500	0.424	1.000	0.750	0.500	0.500	0.750	5/16	5/16	0.250	1.125	4.000	4.375
3”	C600-N05	C600-N06	N131-1001	1.000	0.625	2.125	0.553	1.313	1.063	0.625	0.625	0.750	5/16	5/16	0.375	1.625	4.500	4.875
4”	C600-R05	C600-R06	N131-1001	1.000	0.625	2.125	0.553	1.688	1.438	0.625	0.625	0.750	3/8	3/8	0.375	1.625	5.750	6.250

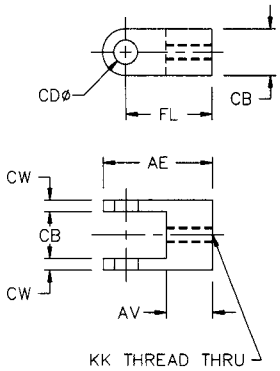
Accessories (continued)

Rod Clevis - 3/4" and 1 1/8" Bores



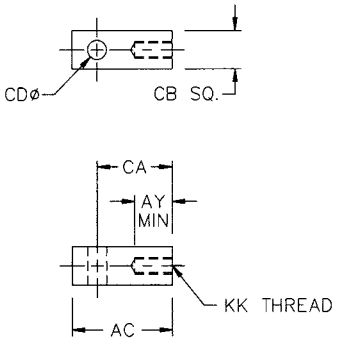
Order rod stud and pivot pin separately.

Rod Clevis - 1 1/2" Through 4" Bores

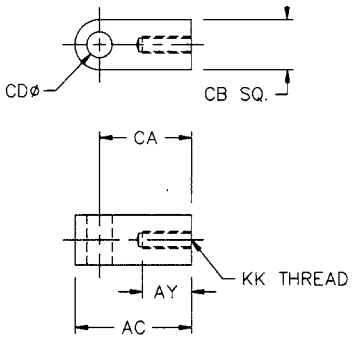


Order rod stud and pivot pin separately.

Rod Eye - 3/4" and 1 1/8" Bores



Rod Eye - 1 1/2" Through 4" Bores

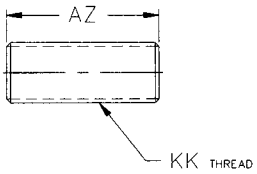


Dimensions

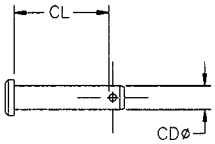
BORE	EYE	CLEVIS	AC	AE	AV	AY	AZ	CA	CB	CD	CL	CW	FL	KK
3/4”	C500-706	C500-606	0.938	0.938	0.375	0.375	0.750	0.750	0.375	0.188	0.750	0.188	0.750	#8-32
1-1/8”	B500-708	B500-608	0.938	0.938	0.375	0.375	0.750	0.750	0.375	0.188	0.750	0.188	0.750	1/4-28
1-1/2”	C500-701	C500-601	1.093	1.375	0.600	0.375	0.875	0.718	0.750	0.375	1.125	0.188	1.000	7/16-20
1-1/2”	C500-702	C500-602	1.093	1.375	0.600	0.375	1.125	0.718	0.750	0.375	1.125	0.188	1.000	1/2-20
2”	C500-701	C500-601	1.093	1.375	0.600	0.375	0.875	0.718	0.750	0.375	1.125	0.188	1.000	7/16-20
2”	C500-702	C500-602	1.093	1.375	0.600	0.375	1.125	0.718	0.750	0.375	1.125	0.188	1.000	1/2-20
2-1/2”	C500-701	C500-601	1.093	1.375	0.600	0.375	0.875	0.718	0.750	0.375	1.125	0.188	1.000	7/16-20
2-1/2”	C500-702	C500-602	1.093	1.375	0.600	0.375	1.125	0.718	0.750	0.375	1.125	0.188	1.000	1/2-20
3”	C500-703	C500-603	1.500	2.188	0.750	0.500	1.375	1.000	1.000	0.625	1.500	0.250	1.688	3/4-16
4”	C500-703	C500-603	1.500	2.188	0.750	0.500	1.375	1.000	1.000	0.625	1.500	0.250	1.688	3/4-16

Accessories (continued)

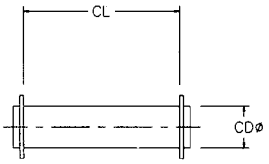
Rod Stud



Clevis Pins - 3/4" and 1 1/8" Bores



Clevis Pins - 1 1/2" Through 4" Bores



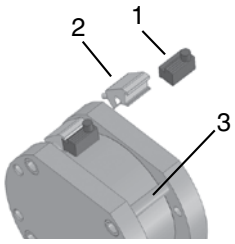
Dimensions

BORE	ROD STUD	PIVOT PIN	AC	AE	AV	AY	AZ	CA	CB	CD	CL	CW	FL	KK
3/4”	C500-506	C500-406	0.938	0.938	0.375	0.375	0.750	0.750	0.375	0.188	0.750	0.188	0.750	#8-32
1-1/8”	C500-508	C500-406	0.938	0.938	0.375	0.375	0.750	0.750	0.375	0.188	0.750	0.188	0.750	1/4-28
1-1/2”	C500-502	C500-403	1.093	1.375	0.600	0.375	0.875	0.718	0.750	0.375	1.125	0.188	1.000	7/16-20
1-1/2”	C500-503	C500-403	1.093	1.375	0.600	0.375	1.125	0.718	0.750	0.375	1.125	0.188	1.000	1/2-20
2”	C500-502	C500-403	1.093	1.375	0.600	0.375	0.875	0.718	0.750	0.375	1.125	0.188	1.000	7/16-20
2”	C500-503	C500-403	1.093	1.375	0.600	0.375	1.125	0.718	0.750	0.375	1.125	0.188	1.000	1/2-20
2-1/2”	C500-502	C500-403	1.093	1.375	0.600	0.375	0.875	0.718	0.750	0.375	1.125	0.188	1.000	7/16-20
2-1/2”	C500-503	C500-403	1.093	1.375	0.600	0.375	1.125	0.718	0.750	0.375	1.125	0.188	1.000	1/2-20
3”	C500-505	C500-404	1.500	2.188	0.750	0.500	1.375	1.000	1.000	0.625	1.500	0.250	1.688	3/4-16
4”	C500-505	C500-404	1.500	2.188	0.750	0.500	1.375	1.000	1.000	0.625	1.500	0.250	1.688	3/4-16

C series World application Detail

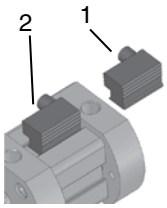
Round Tube and Tie Rod Detail

1. World Switch
2. Tie Rod Bracket
3. Cylinder Tie Rod



Profile Tube Detail

1. World Switch
2. Dove Tail extrusion



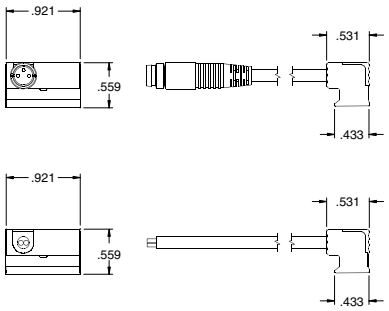
C series World Switch Bracket

Cylinders	Bore	Part Number
C series Profile	3/4"-2 1/2"	Direct Fit
C series Tie Rod	3" Bore	SB6-L01
C series Tie Rod	4" Bore	SB6-P01

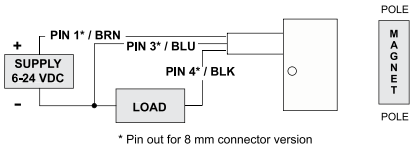
C series World Switch Hall Effect Part Numbers

P/N	Switch Style	Switch Type	Function	Switching Voltage	Switching Current	Switching Power	Voltage Drop
SH6-031	3m Wire Version	Hall Effect for Reed Magnet & Light Sourcing	Normally Open Sourcing (PNP)	6 -24 VDC	0.3 Amps Max.	7.2 Watts Max.	0.5 Volts
SH6-021	8m Connector Pigtail	Hall Effect for Reed Magnet & Light Sourcing	Normally Open Sourcing (PNP)	6 -24 VDC	0.3 Amps Max.	7.2 Watts Max.	0.5 Volts
SH6-032	3m Wire Version	Hall Effect for Reed Magnet & Light Sourcing	Normally Open Sourcing (NPN)	6 -24 VDC	0.3 Amps Max.	7.2 Watts Max.	0.5 Volts
SH6-022	8m Connector Pigtail	Hall Effect for Reed Magnet & Light Sourcing	Normally Open Sourcing (NPN)	6 -24 VDC	0.3 Amps Max.	7.2 Watts Max.	0.5 Volts

Hall Effect Switch

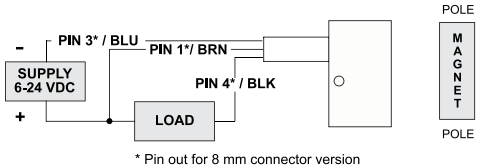


PNP Sourcing



* Pin out for 8 mm connector version

NPN Sinking

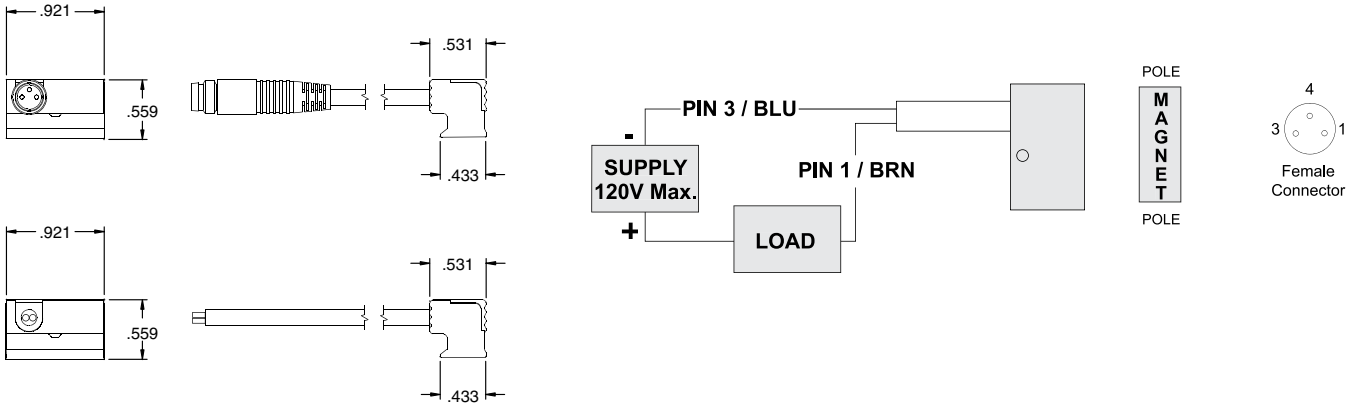


* Pin out for 8 mm connector version

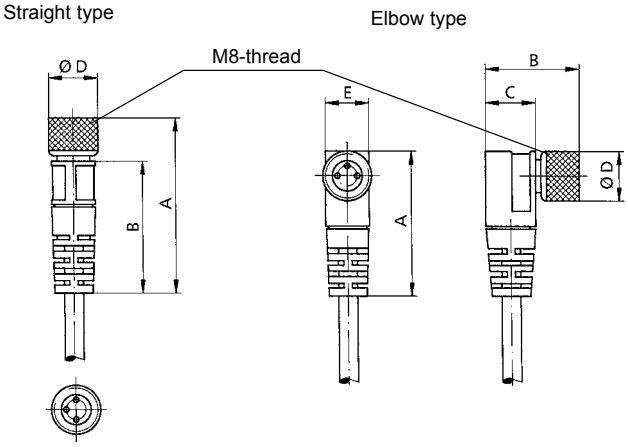
C Series World Switch Reed Switch Part Numbers

P/N	Switch Style	Switch Type	Function	Switching Voltage	Switching Current	Switching Power	Voltage Drop
SR6-002	3m Wire Version	Reed Switch, LED	SPST Normally Open	5 -120V AC/DC	0.025 Amps Max. 0.001 Amps Min.	3 Watts Max.	3.5 Volts
SR6-004	3m Wire Version	Reed Switch, LED & MOV	SPST Normally Open	5 -120V AC/DC	0.5 Amps Max. 0.005 Amps Min.	10 Watts Max.	3.0 Volts
SR6-021	8mm Pigtail	Reed Switch	SPST Normally Open	0 -120V AC/DC	0.5 Amps Max.	10 Watts Max.	0 Volts
SR6-022	8mm Pigtail	Reed Switch, LED	SPST Normally Open	5 -120V AC/DC	0.025 Amps Max. 0.001 Amps Min.	3 Watts Max.	3.5 Volts
SR6-024	8mm Pigtail	Reed Switch, LED & MOV	SPST Normally Open	5 -120V AC/DC	0.5 Amps Max. 0.005 Amps Min.	10 Watts Max.	3.0 Volts

Reed Switch - Normally Open Type SR6



Cords M8-thread for Switches and Sensors with Connector



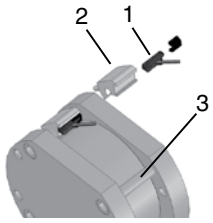
Dimensions (mm)

Type		A	B	C	D	E	Weight (approx. kg)	Order Code
Straight with 5m-cable	(3x0.25 mm^2)	32.3	24.4	–	9.0	–	0.143	SC6-001
Elbow with 5m-cable	(3x0.25 mm^2)	26.3	17.1	9.2	9.0	8.0	0.145	SC6-002

C Series Global application Detail

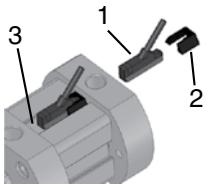
Round Tube and Tie Rod Detail

1. Global Switch
2. Tie Rod Bracket
3. Cylinder Tie Rod



Profile Tube Detail

1. Global Switch
2. Included Dovetail adapter
3. Dove Tail extrusion

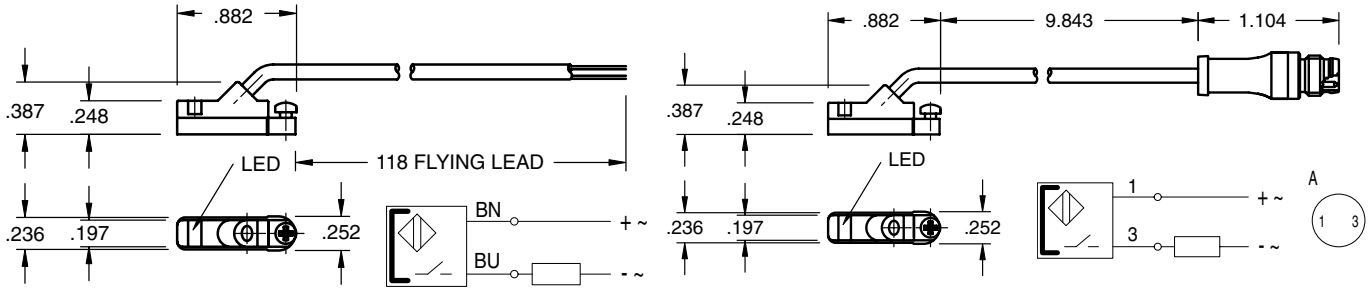


C Series Global Switch Bracket

Cylinders	Bore	Part Number
C series Profile	3/4"-2 1/2" Bore	Direct Fit w/included adapter
C series Tie Rod	3" Bore	N199-1017
C series Tie Rod	4" Bore	N199-1018

C Series Global Switches

Reed Switch (AC/DC NO), flying lead - RSS02, 8mm connector - RSQ02



Sensing Data

Ambient temperature range T_a	(°F/°C)	-4 to 176 (-20 to 80)
Frequency of operating cycles f at U_e	(kHz)	0.5
Turn on time t	(ms)	<= 0.25
turn off time t	(ms)	0.03
LED function indication		yes

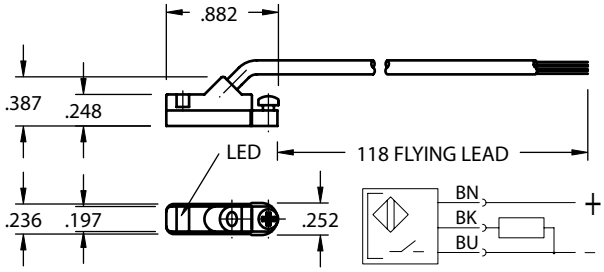
Electrical Data

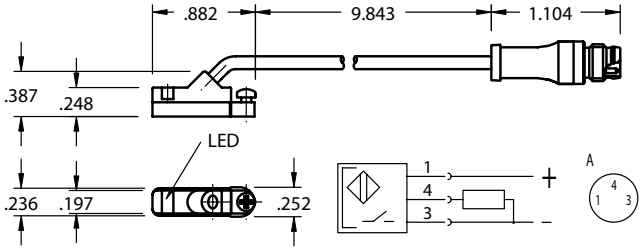
Rated operational voltage U_e	(V)	3...130 AC/DC
Supply voltage U_B	(V)	3...130 AC/DC
Voltage drop U_d at I_e Stat./dyn.	(V)	3.5
Rated insulation volatage U_i	(V)	2750 DC (EN 60335-1)
Rated supply frequency	(Hz)	AC/DC
Rated operational current I_e	(mA)	50 (10W max.)
No-load supply current I_o at U_e d./und.	(mA)	0
Observe polarity for correct LED function		

Mechanical Data

Housing material		Polyamide
Material of sensing face		Polyamide
Connection		PVC cable
Degree of Protection	IP	67
Rated shock: half-sinus, 50g, 11 ms		
Rated vibration environment: 10g, 10...2000 Hz. 90 min		

Electronic Switch (PNP NO), flying lead - HPNPS31, 8mm connector - HPNPQ31





Sensing Data

Ambient temperature range $_d$	(°F/°C)	-13 to +158 (-25 to +70)
Temperature drift	(% of)	<= 0.3%/°C
Frequency of operating cycles f at U_e	(kHz)	10
Turn on time t	(ms)	.05
turn off time t	(ms)	.05
Utilization categories		DC13
Function–/supply voltage indication		YES

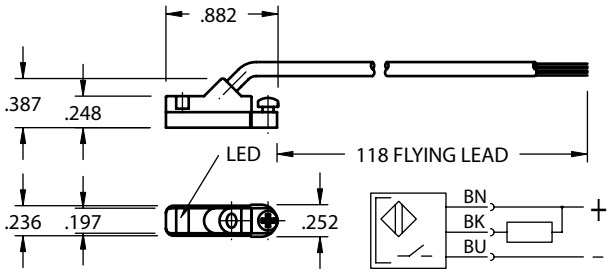
Mechanical Data

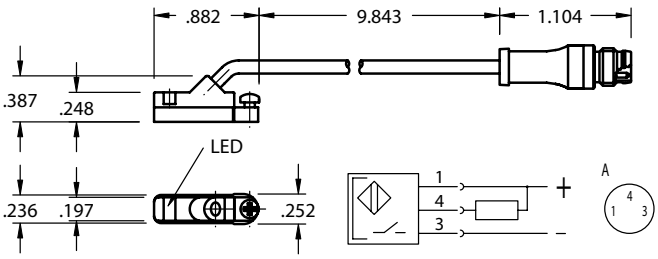
Housing material		Polyamide
Material of sensing face		Polyamide
Connection		PVC cable
Degree of Protection	IP	67
Rated shock: half-sinus, 30 g, 11 ms		
Rated vibration environment: 55 Hz, 1mm amplitude, 3 x 30		

Electrical Data

Rated operational voltage U_e	(V)	24 DC
Supply voltage U_B	(V)	10...30 DC
incl. ripple	(% of U_e)	15
Voltage drop U_d at I_e Stat./dyn.	(V)	1/–
Rated insulation volatage U_i	(V)	75 AC
Rated supply frequency	(Hz)	DC
Rated operational current I_e	(mA)	200
No-load supply current I_o at U_e d./und.	(mA)	25/13
Protected against polarity reversal		YES

Electronic Switch (NPN NO), flying lead - HNPNS32, 8mm connector - HNPNQ32





Sensing Data

Ambient temperature range $_d$	(°F/°C)	-13 to +158 (-25 to +70)
Temperature drift	(% of S_r)	<= 0.3%/°C
Frequency of operating cycles f at U_e	(kHz)	10
Turn on time t	(ms)	.05
turn off time t	(ms)	.05
Utilization categories		DC13
Function–/supply voltage indication		YES

Mechanical Data

Housing material		Polyamide
Material of sensing face		Polyamide
Connection		PVC cable
Degree of Protection	IP	67
Rated shock: half-sinus, 30 g, 11 ms		
Rated vibration environment: 55 Hz, 1mm amplitude, 3 x 30		

Electrical Data

Rated operational voltage U_e	(V)	24 DC
Supply voltage U_B	(V)	10...30 DC
incl. ripple	(% of U_e)	15
Voltage drop U_d at I_e Stat./dyn.	(V)	1/–
Rated insulation volatage U_i	(V)	75 AC
Rated supply frequency	(Hz)	DC
Rated operational current I_e	(mA)	200
No-load supply current I_o at U_e d./und.	(mA)	25/13
Protected against polarity reversal		YES

How to Order - C Series **Piston Rod Assembly**

C92 - K 3 1 A 0 - 01 A - AA

Type
C92 = C Series Piston Rod Assembly

Bore
C = 3/4"
G = 1-1/8"
K = 1-1/2"
L = 2"
M = 2-1/2"
N = 3"
R = 4"

Rod Code
1 = Style #1 Standard Rod Diameter
2 = Style #2 Standard Rod Diameter
3 = Style #3 Standard Rod Diameter
4* = Special Rod End Standard Rod Diameter (must specify threads)
5* = Special Rod End Oversize Rod Diameter (must specify threads)
6 = Style #1 Oversize Rod Diameter
8 = Style #3 Oversize Rod Diameter

Mount
1 = All Mounts Except F1 & R1
2 = F1 Mount
3 = R1 Mount

Port
A = All Port Sizes Other Than 1/8"
B = 1/8" Ports

Magnet
0 = No Magnet
2 = Reed Magnet and Wear Band
4 = Electronic Switch Magnet

Option
AA = No Option
BC = Bumpered Cap End
BH = Bumped Head End
DA = Double Rod
NA = Nickel Plated
SA = Stainless Rod
VA = Viton Seals
WA = Wearband
1A* = Rod Extension
1B* = Rear Rod Extension
2A* = Thread Extension
2B* = Rear Thread Extension
3A = Rod Stud
3B = Rear Rod Stud
4A* = Stop Tube
* Must specify length

Fractional Inches of Stroke
A = 0" I = 1/2"
B = 1/16" J = 9/16"
C = 1/8" K = 5/8"
D = 3/16" L = 11/16"
E = 1/4" M = 3/4"
F = 5/16" N = 13/16"
G = 3/8" O = 7/8"
H = 7/16" P = 15/16"
Note: 1/8" minimum stroke.

Full Inch of Stroke
00 = 0" Stroke
01 = 1" Stroke
02 = 2" Stroke
03 = 3" Stroke
04 = 4" Stroke
20 = 20" Stroke (Maximum)

Note: Options listed are ones that apply to a piston rod assembly only.
Model number is set up to use option code supplied with original cylinder or with any above.

Rod End Styles, Diameters and Threads

Bore	Diameter	Style #1 Optional Male	Style #2 Optional Female	Style #3 Standard Female
3/4"	0.250	#8-32	N/A	#8-32
1 1/8"	0.500	1/4-28	5/16-24	1/4-28
1 1/2"	0.625 0.750	7/16-20 1/2-20	3/8-24 N/A	7/16-20 1/2-20
2"	0.625 0.750	7/16-20 1/2-20	N/A N/A	7/16-20 1/2-20
2 1/2"	0.625 0.750	7/16-20 1/2-20	N/A N/A	7/16-20 1/2-20
3"	1.000	3/4-16	5/8-18	3/4-16
4"	1.000	3/4-16	N/A	3/4-16

How to Order - C Series **Repair Kit**

C98 - K 0 1 B 0 - 01 A - AA

Type
C98 = C Series Repair Kit

Bore
C = 3/4"
G = 1 1/8"
K = 1 1/2"
L = 2"
M = 2 1/2"
N = 3"
R = 4"

Rod Size
0 = Standard Rod
1 = Oversize Rod

Mount
1 = S4 and S2 Mount
2 = R3 Mount
3 = Other Mounts
(F1, F2, R1, R2,P1, P2, P3, P4, X0)

Port
A = #10-32 Port Position 1
G = #10-32 Port Position 2
M = #10-32 Port Position 3
S = #10-32 Port Position 4
B = 1/8" Port Position 1
H = 1/8" Port Position 2
N = 1/8" Port Position 3
T = 1/8" Port Position 4
C = 1/4" Port Position 1
I = 1/4" Port Position 2
O = 1/4" Port Position 3
U = 1/4" Port Position 4

Option
AA = No Option
BC = Bumpered Cap End
BH = Bumpered Head End
DA = Double Rod
NA = Nickel Plated
VA = Viton Seals
WA = Wearband

Fractional Inches of Stroke
A = 0" I = 1/2"
B = 1/16" J = 9/16"
C = 1/8" K = 5/8"
D = 3/16" L = 11/16"
E = 1/4" M = 3/4"
F = 5/16" N = 13/16"
G = 3/8" O = 7/8"
H = 7/16" P = 15/16"
Note: 1/8" minimum stroke.

Full Inch of Stroke
00 = 0" Stroke
01 = 1" Stroke
02 = 2" Stroke
03 = 3" Stroke
04 = 4" Stroke
20 = 20" Stroke (Maximum)

Magnet
0 = No Magnet
2 = Reed Magnet and Wear Band
4 = Electronic Switch Magnet

Note: Options listed are ones that apply to a repair kit only.
Model number is set up to use option code supplied with original cylinder or with any above.

How to Order - C Series **Seal Kit**

C97 - K 0 2 - AA

Type
C97 = C Series Seal Kit

Bore
C = 3/4"
G = 1 1/8"
K = 1 1/2"
L = 2"
M = 2 1/2"
N = 3"
R = 4"

Rod Size
0 = Standard Rod
1 = Oversize Rod

Option
AA = No Option
DA = Double Rod
VA = Viton Seals
WA = Wearband

Magnet
0 = No Magnet
2 = Reed Magnet
4 = Electronic Switch Magnet

Note: Options listed are ones that apply to a seal kit only.
Model number is set up to use option code supplied with original cylinder or with any above.

Note:
Tie Rod and Sleeve Nuts are Standard on 3" and 4" bore sizes.

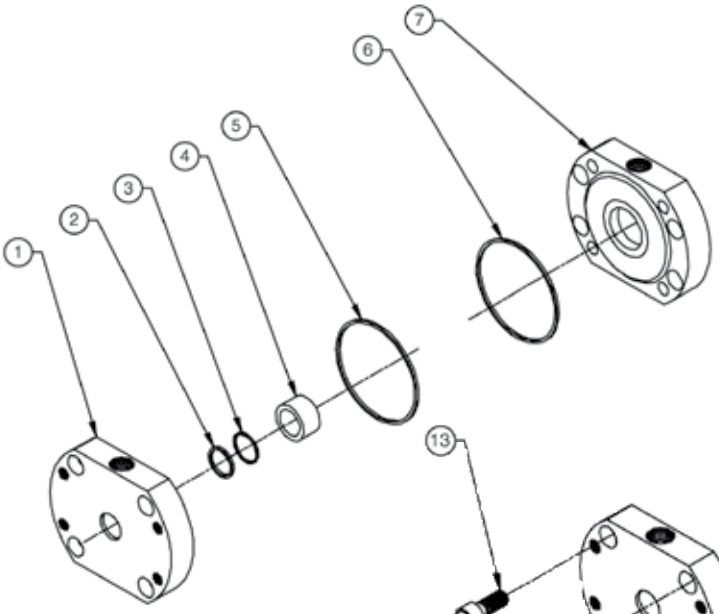
Piston Rod Assembly Kit Removal/Installation Instructions

1. Loosen 4 Socket Head Cap Screws or 4 Sleeve Nuts (Part #13) to remove Head (Part #1) or Cap (Part #7).
2. Remove Head and Cap to access Piston/Rod Assembly (Part #8 & #9)
3. Carefully remove seal. (Part #10) Any damage to the seal grooves may result in leakage.
4. Lubricate piston seal with supplied Numatics' Lube. Examine seals before installing for any contamination. Contamination may cause leakage.
5. Install Quad Piston Seal (Part #10). Make sure the piston seal is not twisted inside groove.
6. Sink piston/rod assembly into sinker tube.
7. Apply lube inside the cylinder tube (Part #11).
8. Sink piston/rod assembly into cylinder tube.
9. Press piston/rod assembly flush with the cylinder tube. Wipe off any lube from the face of the piston.
10. Examine all seals before reassembling cylinder for any contamination. Contamination may cause leakage.
11. Lightly grease Rod Seal (Part #3). This will ease the installation of the loaded head over the rod.
12. Reassembly cylinder. Loosely torque 4 Socket Head Cap Screws or 4 Sleeve Nuts to allow head and cap to rotate slightly.
13. Before final torque, place cylinder on level surface. This will ensure that the cylinder head and cap are square. Torque Socket Head Cap Screws or Sleeve Nuts in a crisscross pattern. Use the following charts for torque tolerances for Socket Head Cap Screws or Sleeve Nuts.
14. Stroke cylinder by hand. This will enable detection of any binding. If binding does occur, repeat steps 12-14.

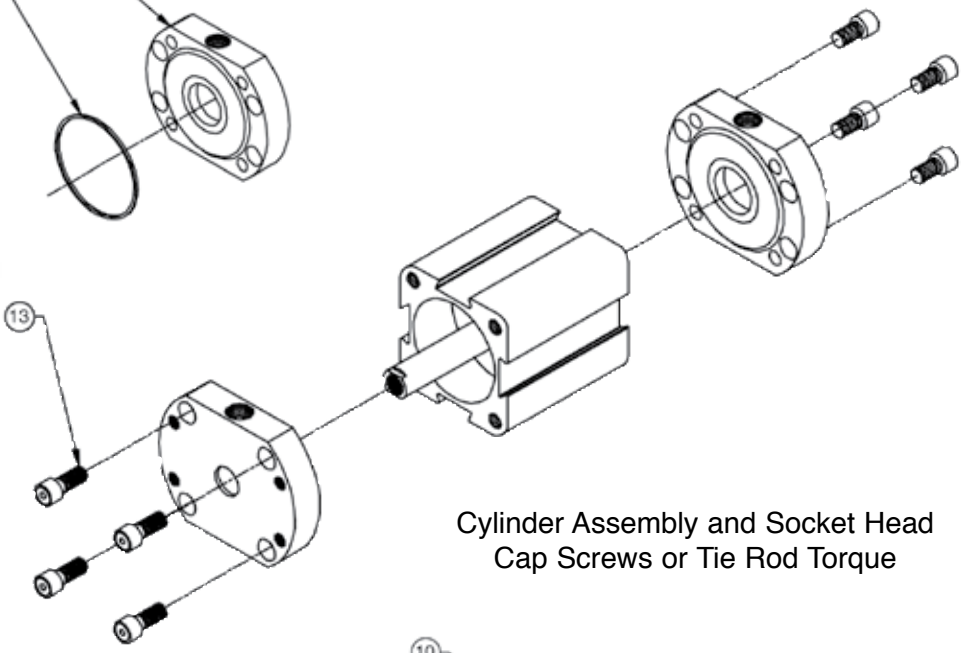
See Seal Installation Guide on page 30 for additional (visual) instructions.

Diagrams

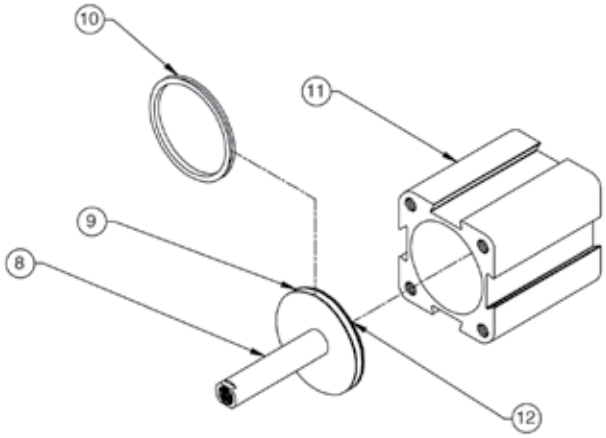
Pneumatic Service Temperatures:
Nitrile Seals: -10˚F (-23˚C) to 165˚F (74˚C)
Viton® Seals: 0˚F (-17˚C) to 400˚F (204˚C)



Loaded Head, Cap, and Seals Assembly



Cylinder Assembly and Socket Head Cap Screws or Tie Rod Torque



Piston/Rod Assembly

C Series

Part #	Description	Parts included in: Seal Kit	Repair Kit	Piston/Rod Assembly
1	Head		X	
2	Back-up Ring	X	X	
3	Rod Seal	X	X	
4	Bushing		X	
5	Head Tube End Seal	X	X	
6	Cap Tube End Seal	X	X	
7	Cap			
8	Rod			X
9	Piston			X
10	Piston Seal	X	X	
11	Tube			
12	Piston/Rod Assembly Locking Nut			X
13	Socket Head Cap Screws (SHCS)			

Repair Kit Installation Instructions

1. Loosen 4 Socket Head Cap Screws or 4 Sleeve Nuts (Part #13) to remove Head (Part #1) or Cap (Part #7).
2. Remove Head and Cap to access Piston/Rod Assembly (Part #8 & #9)
3. Carefully remove seals. (Part #5, #6, and #10) Any damage to the seal grooves may result in leakage.
4. Lubricate all seals with supplied Numatics' Lube. Examine seals before installing for any contamination. Contamination may cause leakage.
5. Install Quad Piston Seal (Part #10). Make sure the piston seal is not twisted inside groove.
6. Sink piston/rod assembly into sinker tube.
7. Apply lube inside the cylinder tube (Part #11).
8. Sink piston/rod assembly into cylinder tube.
9. Press piston/rod assembly flush with the cylinder tube. Wipe off any lube from the face of the piston.
10. Place Tube End Seals (Part #6) into head and cap seal grooves. Examine seals after installing for any contamination. Contamination may cause leakage.
11. Lightly grease Rod Seal (Part #3) in supplied loaded head assembly. This will ease the installation of the loaded head over the rod.
12. Reassembly cylinder. Loosely torque 4 Socket Head Cap Screws or 4 Sleeve Nuts to allow head and cap to rotate slightly.
13. Before final torque, place cylinder on level surface. This will ensure that the cylinder head and cap are square. Torque Socket Head Cap Screws or Sleeve Nuts in a crisscross pattern. Use the following charts for torque tolerances for Socket Head Cap Screws or Sleeve Nuts.
14. Stroke cylinder by hand. This will enable detection of any binding. If binding does occur, repeat steps 12-14.

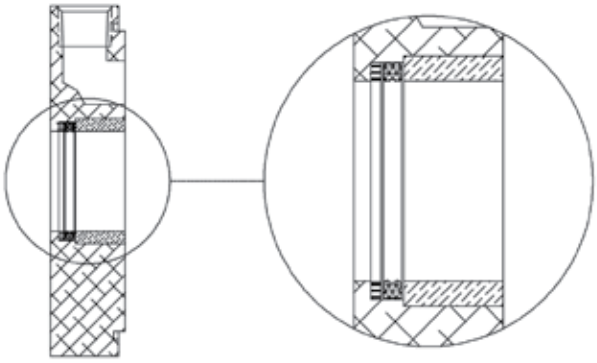
See Seal Installation Guide on page 30 for additional (visual) instructions.

Seal Kit Installation Instructions

1. Loosen 4 Socket Head Cap Screws or 4 Sleeve Nuts (Part #13) to remove Head (Part #1) or Cap (Part #7).
2. Remove Head and Cap to access Piston/Rod Assembly (Part #8 & #9)
3. Carefully remove seals. (Part #2, #3, #5, #6, and #10) Any damage to the seal grooves may result in leakage.
4. Lubricate all seals with supplied Numatics' Lube. Examine seals before installing for any contamination. Contamination may cause leakage.
5. Install Quad Piston Seal (Part #10). Make sure the piston seal is not twisted inside groove.
6. Sink piston/rod assembly into sinker tube.
7. Apply lube inside the cylinder tube (Part #11).
8. Sink piston/rod assembly into cylinder tube.
9. Press piston/rod assembly flush with the cylinder tube. Wipe off any lube from the face of the piston.
10. Place Tube End Seals (Part #6) into head and cap seal grooves. Examine seals after installing for any contamination. Contamination may cause leakage.
11. Install Backup Ring (Part #2) and Rod Seal (Part #3) into head. After installation, lightly grease Rod Seal. This will ease the installation of the loaded head over the rod.
12. Reassembly cylinder. Loosely torque 4 Socket Head Cap Screws or 4 Sleeve Nuts to allow head and cap to rotate slightly.
13. Before final torque, place cylinder on level surface. This will ensure that the cylinder head and cap are square. Torque Socket Head Cap Screws or Sleeve Nuts in a crisscross pattern. Use the following charts for torque tolerances for Socket Head Cap Screws or Sleeve Nuts.
14. Stroke cylinder by hand. This will enable detection of any binding. If binding does occur, repeat steps 12-14.

See Seal Installation Guide on page 30 for additional (visual) instructions.

Seal Installation Guide



Loaded Head

Piston

Screw/Sleeve Nut Torque Tolerances (lbs-ft) Part #13

Bore	Min.	Max.
3/4"	1	1.5
1-1/8"	5	6
1-1/2"	15	20
2"	15	20
2 -1/2"	15	20
3"	25	30
4"	45	50

Sinker Tube Part Numbers

Bore	Part #
3/4"	C06-C91
1-1/8"	C06-G91
1-1/2"	A06-K91
2"	A06-L91
2-1/2"	A06-M91
3"	C06-N91
4"	A06-R91

Note: Sinker Tubes are not included in kits. They can be ordered using the part numbers from the provided chart.

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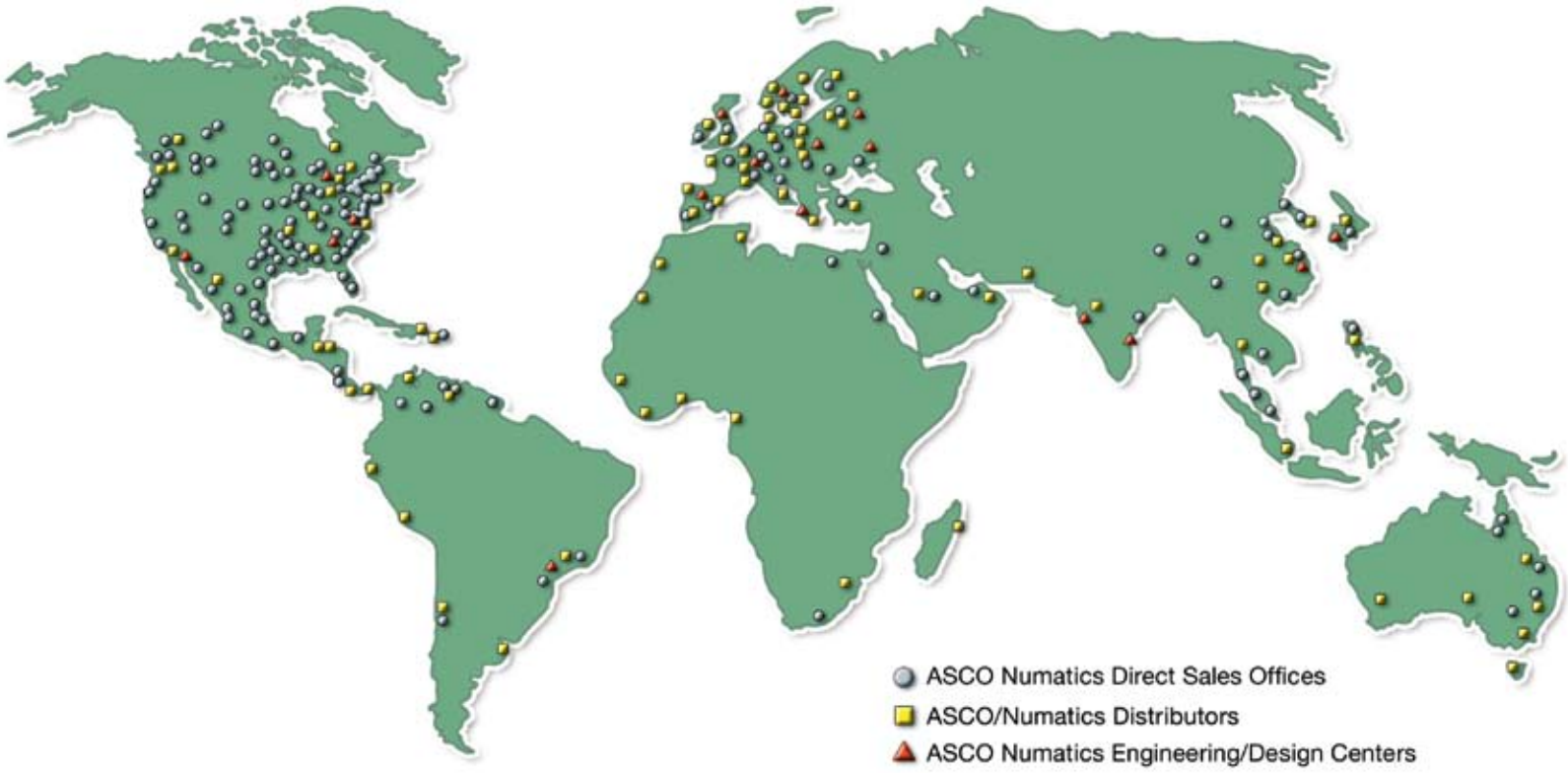

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