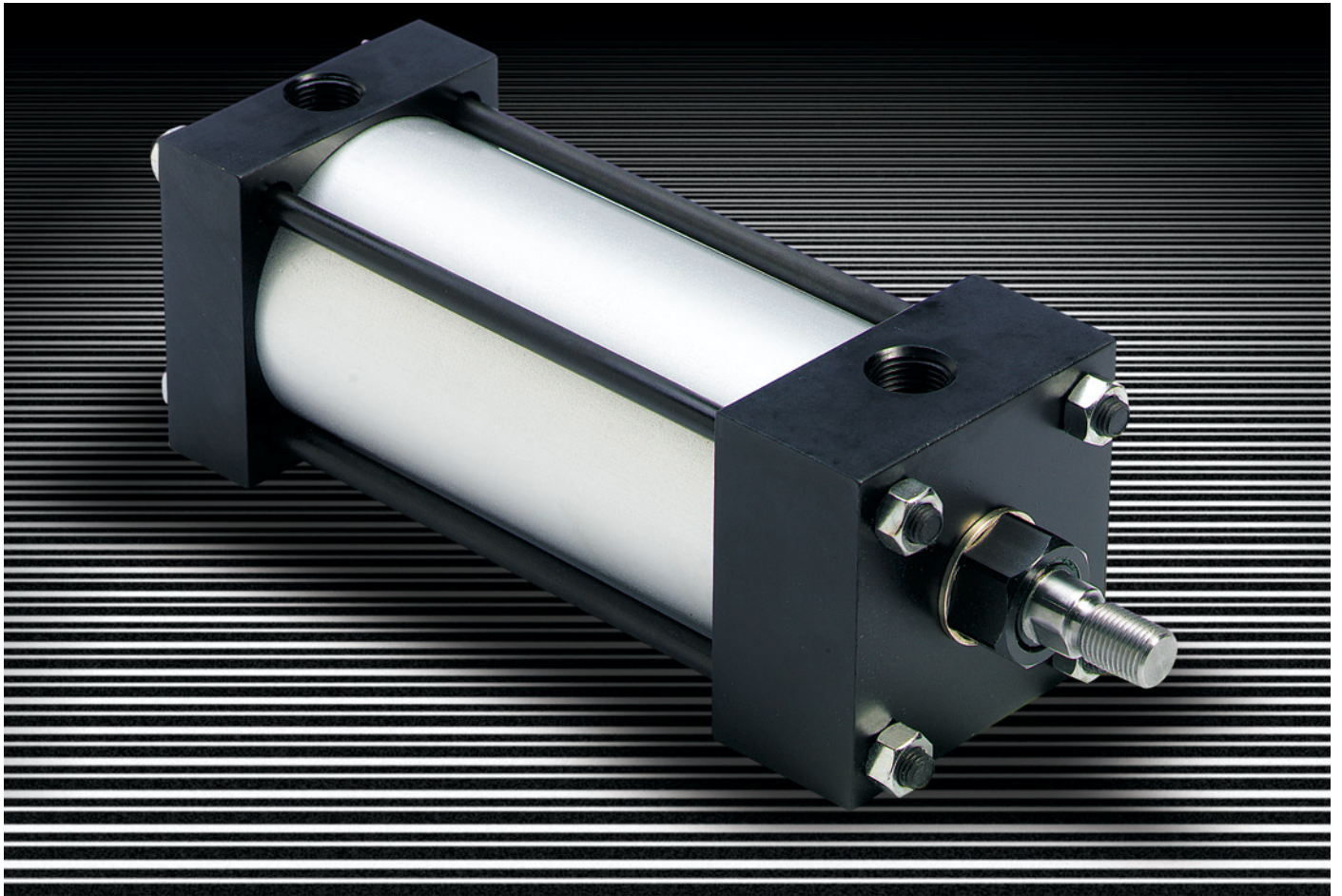


EATON

Fluid Power

Hydro-Line® Cylinders

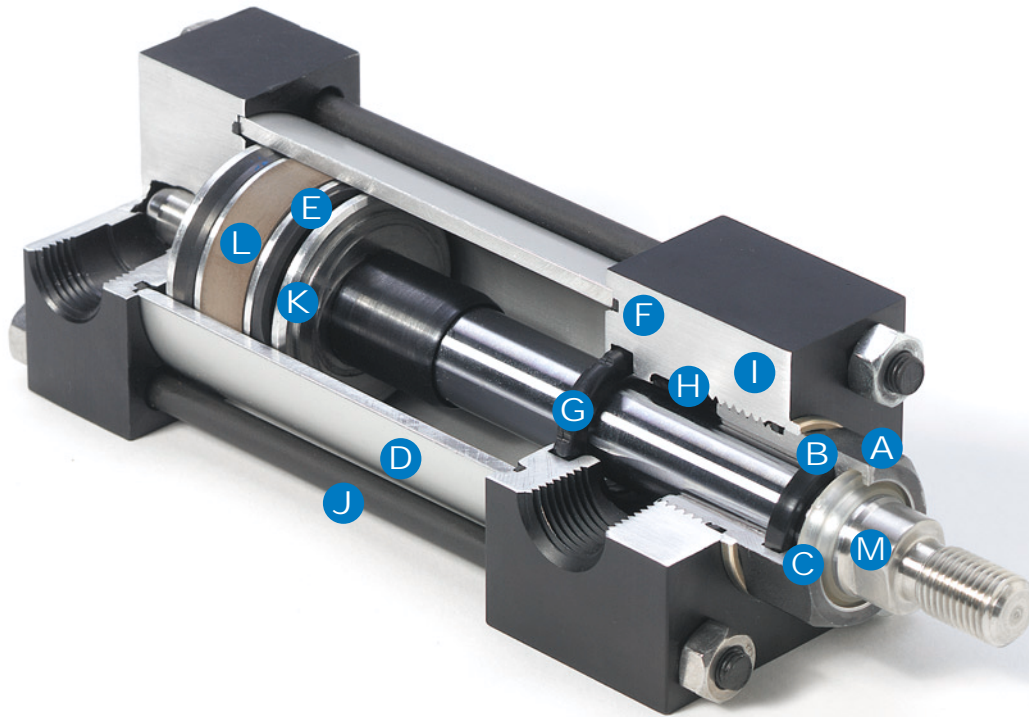
Q6/HQ6/NQ6 Series Cylinders
NFPA Interchangeable



HYDRO-LINE®



Q6 Design Features



- A Rod Bearing.**
Externally removable threaded steel bearing cartridge with black oxide finish in Series Q6/HQ6, or stainless steel for Series NQ6 option, both with an oil-impregnated sintered iron rod bearing.
- B Rod Seal.**
Nitrile lip-type seal is pressure energized and wear compensating for durability and long life.
- C Wiper Seal.**
Urethane wiper seal keeps contaminants from getting into cylinder by aggressively wiping foreign materials from the piston rod, enhancing the rod seal life.
- D Tubing.**
High-strength aluminum tubing is clear anodized on the O.D. and hard anodic coated on the I.D., resulting in a smooth, file hard (60RC), corrosion and score resistant surface finish for extended seal life in Series Q6/HQ6. Stainless steel tubing is used in Series NQ6 option.
- E Piston Seals.**
Long-wearing nitrile cup seals.
- F O-Ring Body Seal.**
Nitrile material is standard, with Viton® optional.
- G Cushion Seals.**
Advanced design features a unique, one-piece, compound seal of nitrile* captured within a precision machined groove. Linear and radial "float" of the cushion seals eliminates misalignment. Super Cushions provide exceptionally fast "out of cushion" stroke reversal. (Head and Cap Cushions are optional on 1-1/2 thru 8 inch bore cylinders.)
*Nitrile seals on the 5/8" & 1" rod diameter. For rod sizes 1-3/8" and larger, urethane seals are standard.
- H Adjustable Captive Cushion Adjusting Screw.**
One-piece stainless steel cushion screw with fine threads is held captive by a stainless steel press-in retaining washer. This allows for safe and precise adjustment of the cushion without inadvertent removal. **(Optional - Not Shown)**
- I Head/ Cap.**
Precision machined from alloy aluminum, then black anodized for corrosion resistance in Series Q6/HQ6, and electroless nickel plated for Series NQ6 option.
- J Tie Rods.**
High-strength steel in Series Q6/HQ6, and stainless steel for Series NQ6 option, maintains uniform compression on body end seals.
- K Pistons.**
Machined solid aluminum alloy, light-weight for low inertia, yet strong. (Threaded and installed with high strength threadlocker adhesive.)
- L Wear Ring.**
Reinforced Teflon® compounded with polyphenylene sulfide provides supreme wear and excellent bearing support.
- M Piston Rod.**
Hard chrome plated high-tensile carbon steel, ground and polished in Series Q6/HQ6, and stainless steel for Series NQ6 option.

Teflon® and Viton® are registered trademarks of E.I. DuPont Company.

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Q6 3/4" and 1-1/8" Mounting Dimension Drawings	page 9-10	3/4" and 1-1/8" Bore Cylinder Dimensions.....	page 21
Q6T Series Air/Oil Tanks	page 11	Cylinder Dimensions.....	page 22-23

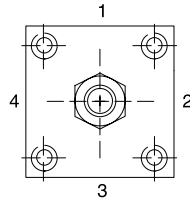
Q6 Options

- Cushions
- Oversized rod
- Oversized NPTF and SAE ports
- Stainless steel rod
- Stop tube
- Rod scraper
- Fiberglass Tube
- High temperature seals
- Air/oil piston
- Double rod end
- Rod boots
- Nonrotating rod
- Electroless nickel plated
- Spring extend/return
- Piston with magnetic ring
- Rod end couplers
- Studded rod ends
- Hardened rods
- Adjustable Stroke

Q6 Special Modifications

- Special Seals
- Nonstd. mount
- Oversize ports
- Bronze bushings
- Stainless steel rod
- Stop tube
- Nonrotating rod
- Rod boots
- Indicator switches
- Studded rod
- Port or cushion modifications
- Double-end rod with different rod ends
- Special paint/plating
- Linear displacement transducer
- Adjustable stroke
- Spring extend/return
- Hardened rod

Port and Cushion Adjustment Locations



Standard port locations are at No. 1, with optional locations at No. 2, 3 or 4. Standard cushion adjustment location is in location No. 2 (code C), with optional locations at C1, C3 or C4.

Port Sizes

Bore	Undersize	Standard	SAE
1½, 2, 2½	¼ NPTF	⅜ NPTF	#6
3¼, 4, 5	⅜ NPTF	½ NPTF	#10
6, 7, 8	½ NPTF	¾ NPTF	#12

EXCEPTIONS:

- Ports at No. 3 not available on **E** mount cap on 1½" through 3¼" bores.
- Ports at No. 3 on **B** mount head and cap not available on 1½" and 2" bores.
- Standard NPTF and SAE ports at No. 3 on **B** mount head and cap not available on 3¼" bores.
- Head cushion not available on 1½" bore with 1" diameter rod.

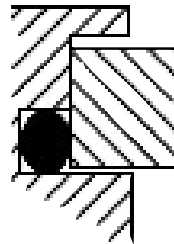
Specifications

Bore sizes: ¾" through 8"
Pressure rating: 250 PSI air, 400 PSI hydraulic
Temperature: -20°F to 400°F optional

NFPA interchangeable mountings

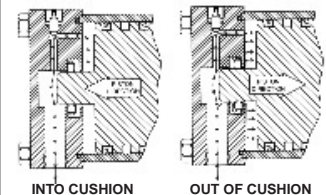
Q6: Pneumatic cylinders incorporate internally lubricated nitrile lip type piston and rod seals, which are permanently lubricated at assembly by filling the "v" groove with molybdenum disulfide grease.

O-Ring Tube End Seals



O-ring tube end seals in nitrile material are pressure compensating and reusable.

Cushion Seals



As the cylinder enters cushion, the new floating elastomeric cushion seal aligns itself on the cushion spear or collar. Sealing takes place on the spear or collar diameter and the back of the cushion seal pocket. Air trapped between the cushion and piston seal is metered out past the cushion adjustment needle to create the desired cushioning effect, dependent upon cylinder speed and load. As the cylinder comes out of cushion the cushion seal is unseated from the back of the pocket. Molded feet on the front face of the seal do not allow it to seal on the front of the pocket. Depressions molded into the outer diameter allow air to escape around the seal and work on the entire piston face for a quick break-away and stroke reversal. Due to this "self-checking" design, there is no need for ball checks.

How to Order a Q6 Cylinder

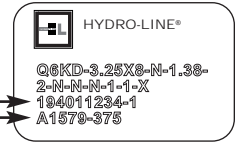
Feature	Description	Symbol
Rod Diameter	Specify in inches (2 position decimal)	—
Cushions	Noncushioned	N
	Cushioned cap end, location 1	C1
	Cushioned cap end, location 2	C
	Cushioned cap end, location 3	C3
	Cushioned cap end, location 4	C4
	Cushioned head end, location 1	H1
	Cushioned head end, location 2	H
	Cushioned head end, location 3	H3
	Cushioned head end, location 4	H4
	Cushioned both ends, location 1	B1
	Cushioned both ends, location 2	B
	Cushioned both ends, locations head 2, cap 3	H2C3
	Cushioned both ends, locations head 2, cap 4	H2C4
	Cushioned both ends, locations head 3, cap 2	H3C2
	Cushioned both ends, location 3	B3
	Cushioned both ends, locations head 3, cap 4	H3C4
Cushioned both ends, location 4	B4	
Stroke	Specify in inches (2 position decimal)	—
Bore	Specify in inches (2 position decimal)	—
Double Rod	Include ONLY for double-rod cylinder	D
Mounting Style	Side lugs, MS2	A
	Side tapped, MS4	B
	Cap fixed clevis, MP1	C
	Cap Mono clevis	CM
	Cap detachable clevis, MP2	DC
	Cap Mono detachable clevis, MP4	DCM
	End lugs, MS7	E
	Head rectangular flange, MF1	F
	Head square, ME5	G
	Head square flange, MF5	J
	No mount	K
	All tie rods extended, MX1	L
	Head end tie rods extended, MX3	M
	Cap end tie rods extended, MX2	N
	Cap square, ME6	P
	Cap rectangular flange, MF2	R
	Cap square flange, MF6	S
	Intermediate fixed trunnion, MT4	TT
	Head trunnion, MT1	U
	Cap trunnion, MT2	W
	End angles, MS1	Y
	Bolt through, MS8 (3/4" - 1 1/8" bores)	A
	Tapped Face, MR1 (3/4" - 1 1/8" bores)	FM
Sleeve nut for tapped face (1 1/2" - 8" bores)	FM	
Threaded nose, MNR1	TN	
Model/Series	Air prelubricated to 250 psi	Q6
	Hydraulic to 400 psi	HQ6
	Air/oil tank (aluminum caps/fiberglass tube)	Q6T
	Corrosion Resistant Air to 250 psi	NQ6
Rod End Style	Male, large	1
	Male, large, extended	1X
	Male, small (standard)	2
	Male, small, extended	2X
	◆ Male modified	2M
	Female	4
	◆ Female modified	4M
	Plain end	5
	Male, full rod diameter	6
Male, for rod end coupling	10	
Modified	M	
Ports	NPTF	N
	NPTF, 1st size over standard	L
	SAE	S
Rod Seals	Nitrile lip type	N
	Nitrile ELF rounded lip type	L
	Polypak	P
	Urethane Ultra Seal	H
	Viton lip type	V
	Nitrile lip type with scraper	S
Viton lip type with scraper	U	
Special	X	
Piston Seals	Nitrile lip-type & Teflon wear ring	N
	Nitrile lip type & Teflon wear ring with:	F
	- Magnetic piston (2 switches) Hall Effect	G
	- Magnetic piston (1 switch) Hall Effect	M
	- Magnetic piston (2 switches) Reed	O
	- Magnetic piston (1 switch) Reed	H
	- Magnetic piston (no switch)	V
Viton lip-type	V	
Special	X	
Port Locations	Head End	1 thru 4
	Special	X
	Cap End	1 thru 5
	Special	X
Special Modifications	Include ONLY if special modifications are required. (SEE PAGE 3 FOR LIST)	X

Hydro-Line standard cylinders can be completely and accurately identified with a model number that encodes construction specifications. To develop the model number for ordering a cylinder, see the example on this page.

HOW TO ORDER

- Quantity
- Model Number
- Special modifications if required
- Operating temperature if below -40°F or above 200°F
- Required ship date

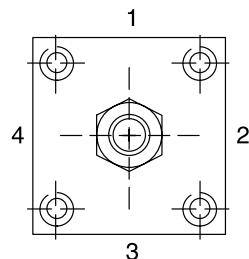
**Q6KD - 3.25 X 8 - N - 1.38
- 2 - N - N - N - 1 - 1 - X**



Customer Number (if desired)
Hydro-Line Serial Number



National
FLUID POWER
Association
MEMBER



PORT LOCATIONS

Port location 5 is on the center of the back face of the cap end.

Hydro-Line Cylinders Application Data Sheet

Company Name: _____ Contact: _____ Phone Number: _____ Fax Number: _____	Distributor Name: _____ Contact: _____ Phone Number: _____ Fax Number: _____
--	--

Model Numbering System																
QUANTITY □□□□																
MODEL/SERIES MOUNT	BORE	STROKE	CUSHION	ROD DIA	ROD STY	SEALS	PORTS	ROD	PSTN	H C	MODEL					
□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	
DOUBLE END ROD STYLE	ADDITIONAL ROD LENGTH	NEEDLE LOCATION	KEYPLATE	4-FLAT	BLEEDERS	BRONZE BUSHING	DRAIN- BACK	IND. SWITCH	MODEL PREFIX							
□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□	□□	□□	□□□□□□□□□□□□□□	□□	□□	□□□□□□□□□□□□□□	□□□□□□□□□□□□□□							
Stop Tube Length		Trunnion XI Dimension		Stainless Steel Rod Type												
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Please fill in all available information above. Refer to the Hydro-Line Model Numbering System on Pages 2.

WHAT IS THE OPERATING ENVIRONMENT?	WHAT IS THE WORK BEING PERFORMED?
Fluid Media Operating Pressure Air _____ Minimum _____ psi Oil _____ Typical _____ psi Other _____ Maximum _____ psi Fluid Type _____	Temperature at Cylinder Minimum _____ °F Typical _____ °F Maximum _____ °F
Load Push _____ lbs. Pull _____ lbs.	
Rod Speed Extend _____ in./sec. Retract _____ in./sec.	
Cycles per Minute _____ (in and out)	

WHAT IS THE MOUNTING?			
Attitude	Angle _____	Horizontal _____	Rod End Connection
Vertical _____	Degrees From Vertical _____		Firmly Guided _____
Rod Up _____	Rod Up _____		Supported _____ lbs.
Rod Down _____	Rod Down _____		Unsupported _____

WHAT ENVIRONMENTAL CONDITIONS IS THE CYLINDER SUBJECTED TO?
Standard Factory _____ Corrosive Washdown _____ Chemical? _____ Outdoors _____ Other _____

WHAT IS THE PRESENT CYLINDER TYPE AND MODEL NUMBER?

WHAT IS THE PRESENT PROBLEM?

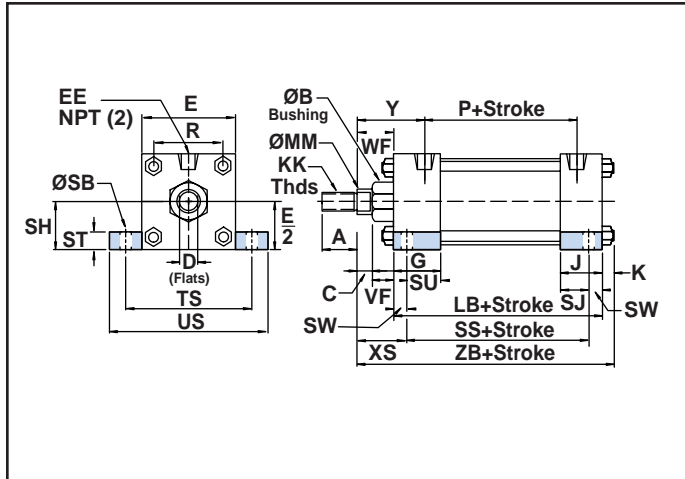
WHAT INDUSTRY IS THE CYLINDER USED IN?	WHAT TYPE OF MACHINE IS THE CYLINDER USED ON?	WHAT IS THE APPLICATION?

APPLICATION SKETCH:	DESCRIPTION OF APPLICATION OR SPECIAL REQUIREMENT:

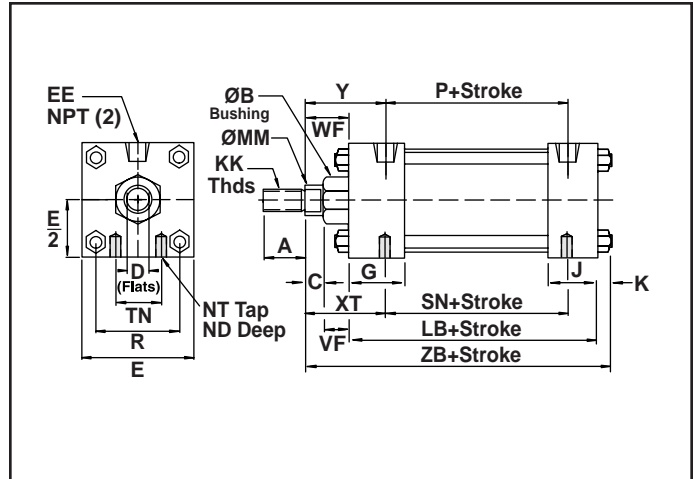
PREPARED BY:	DATE:	REVIEWED BY:	DATE:
CUSTOMER DRAWING NUMBER:	REVISION DATES:		HYDRO-LINE QUOTE NUMBER:

Q6 Mounting Dimensions

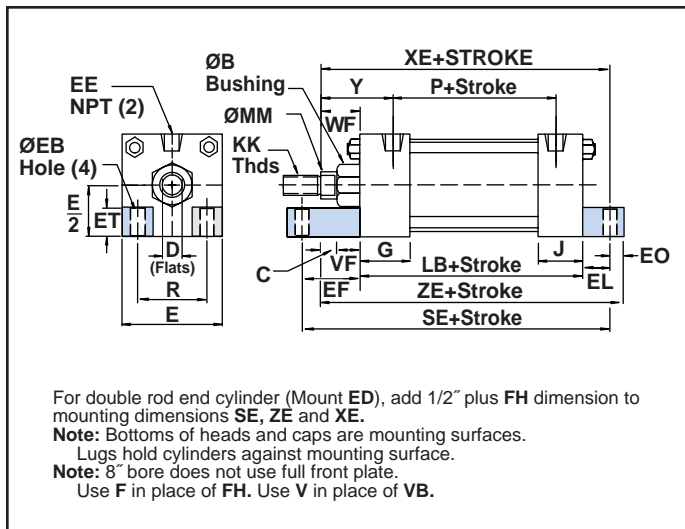
See Cylinder Dimensions on Page 22-23



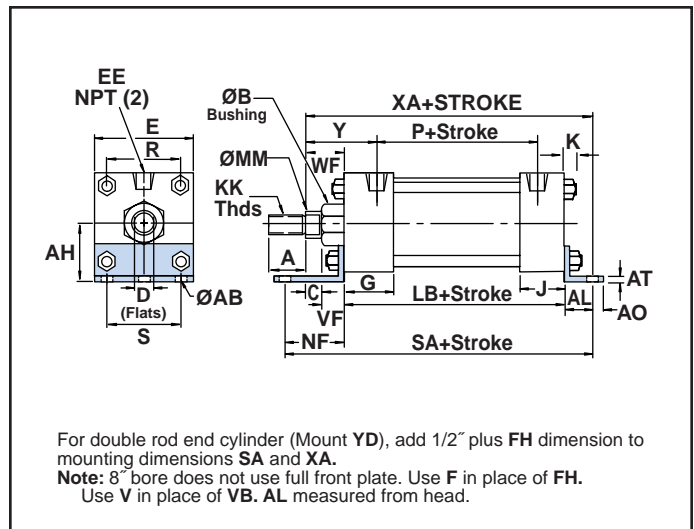
Q6A – Side Lugs Mount (NFFA Style MS2)



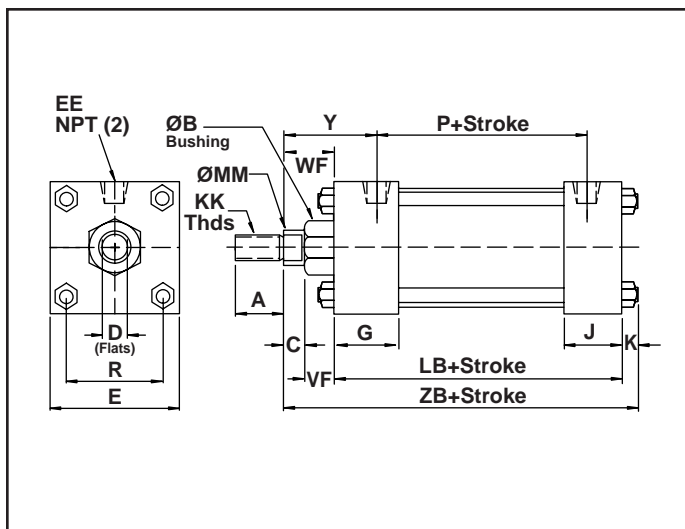
Q6B – Side Tapped Mount (NFFA Style MS4)



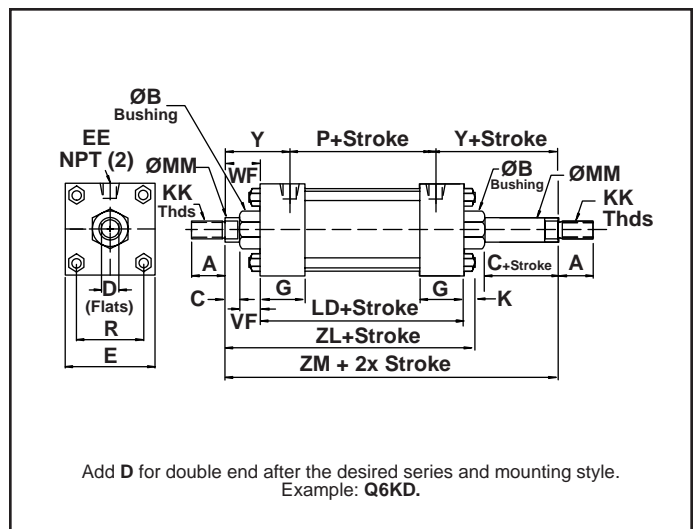
Q6E – End Lugs Mount (NFFA Style MS7)



Q6Y – End Angles Mount (NFFA Style MS1)



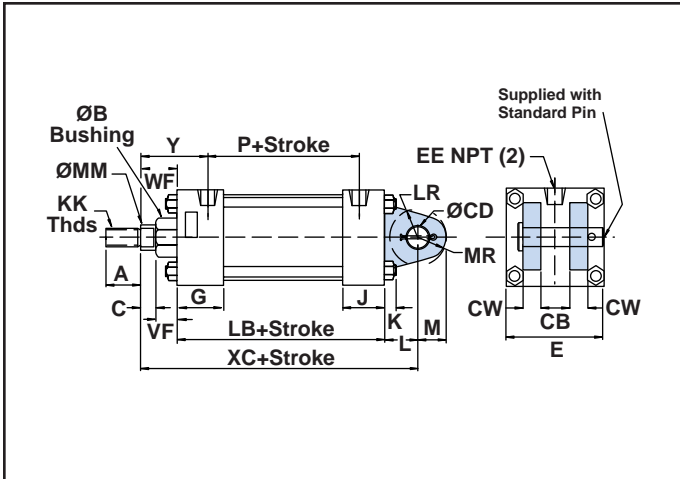
Q6K – No Mount



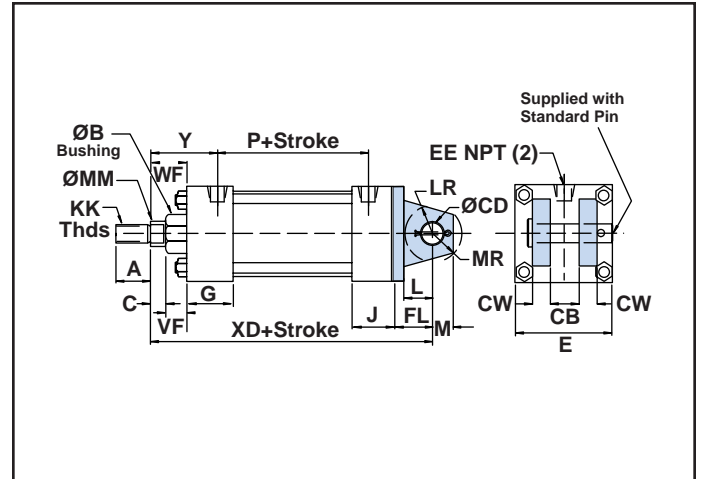
Q6D – Double Rod

Q6 Mounting Dimensions

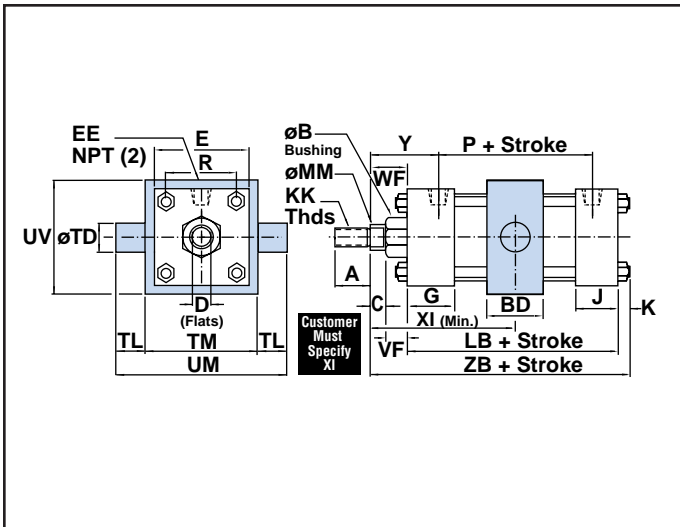
See Cylinder Dimensions on Page 22-23



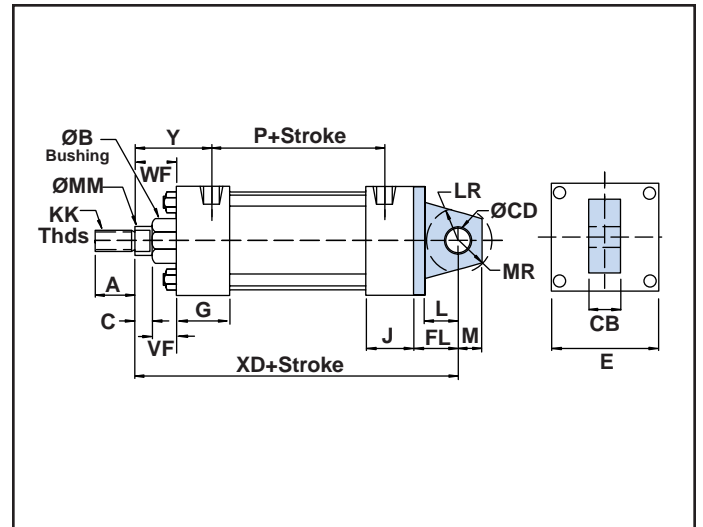
Q6C – Cap Clevis Mount (NFPA Style MP1)



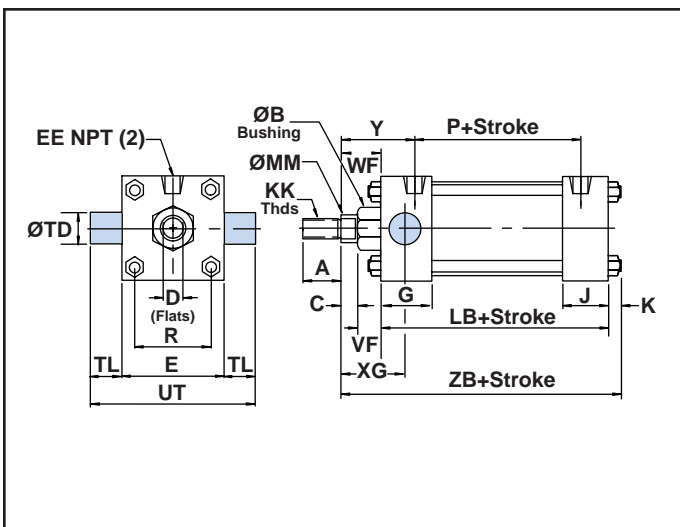
Q6DC – Cap Detachable Clevis Mount (NFPA Style MP2)



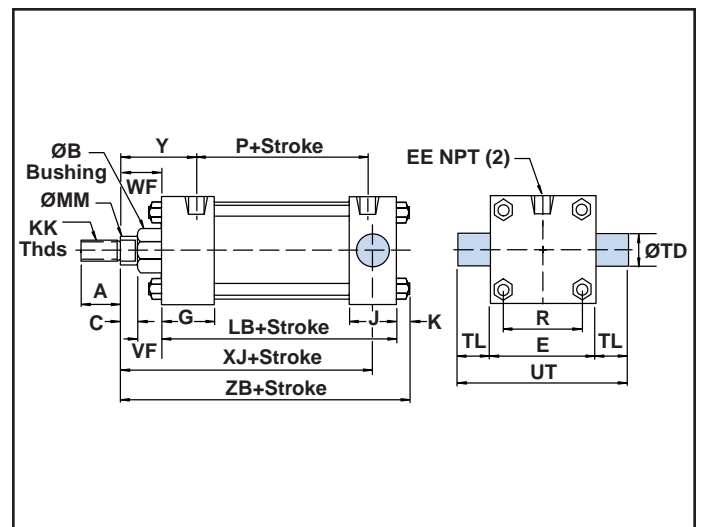
Q6TT – Intermediate Fixed Trunnion Mount (NFPA Style MT4)



Q6DCM – Cap Detachable Mono Clevis Mount (NFPA Style MP4)



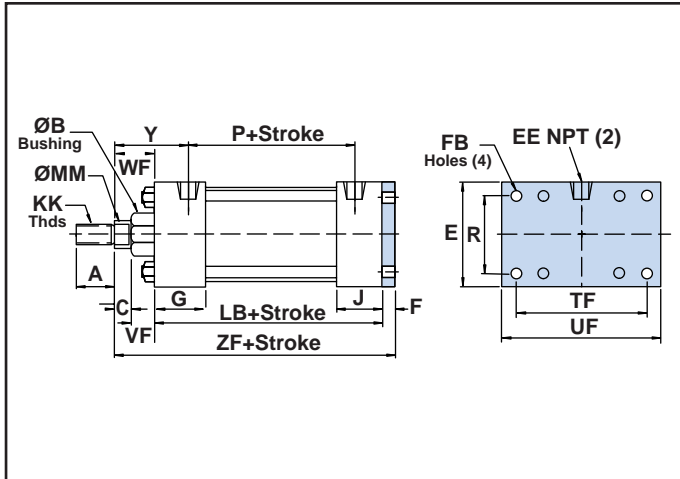
Q6U – Head Trunnion Mount (NFPA Style MT1)



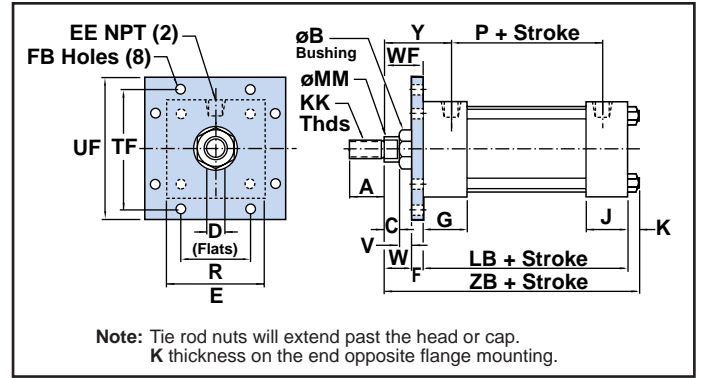
Q6W – Cap Trunnion Mount (NFPA Style MT2)

Q6 Mounting Dimensions

See Cylinder Dimensions on Page 22-23

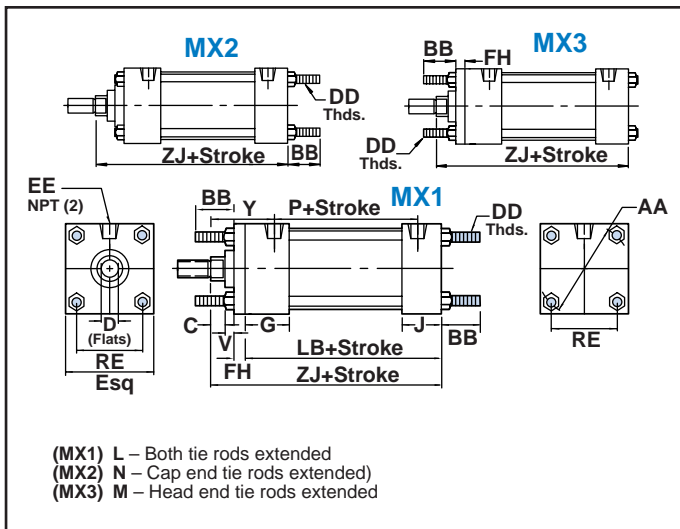


Q6R – Cap Rectangular Flange Mount (NFPA Style MF2) (½”-6” Bores)



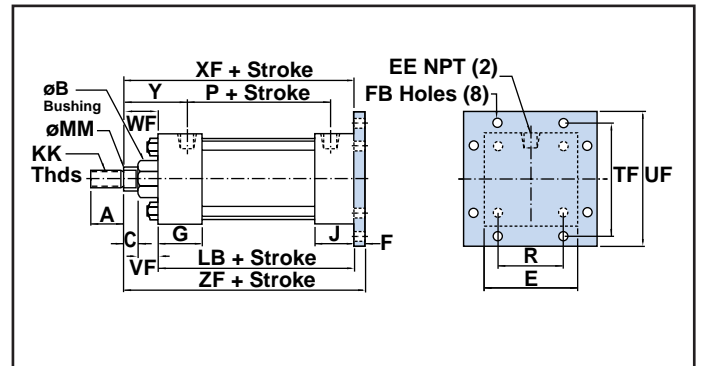
Note: Tie rod nuts will extend past the head or cap.
K thickness on the end opposite flange mounting.

Q6J – Head Square Flange Mount (NFPA Style MF5) (1½”-6” Bores)

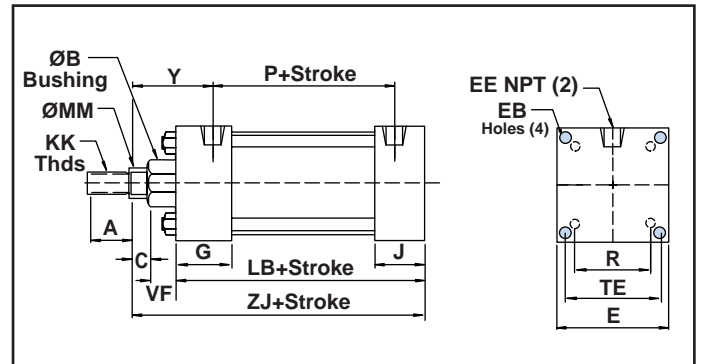


(MX1) L – Both tie rods extended
(MX2) N – Cap end tie rods extended
(MX3) M – Head end tie rods extended

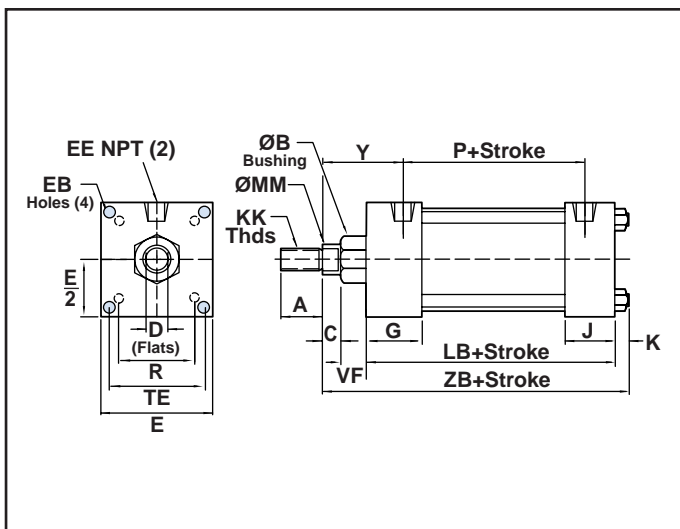
Q6L, M, N – Tie Rods Extended Mount (NFPA Style MX1, MX2, MX3)



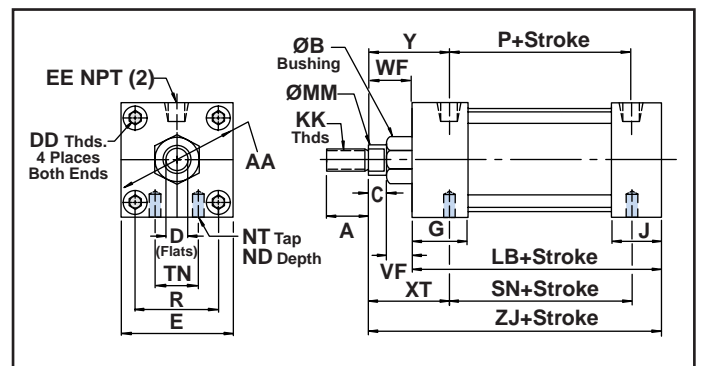
Q6S – Cap Square Flange Mount (NFPA Style MF6) (1½”-6” Bores)



Q6P – Cap Square Mount (NFPA Style ME4) (7” & 8” Bores only)



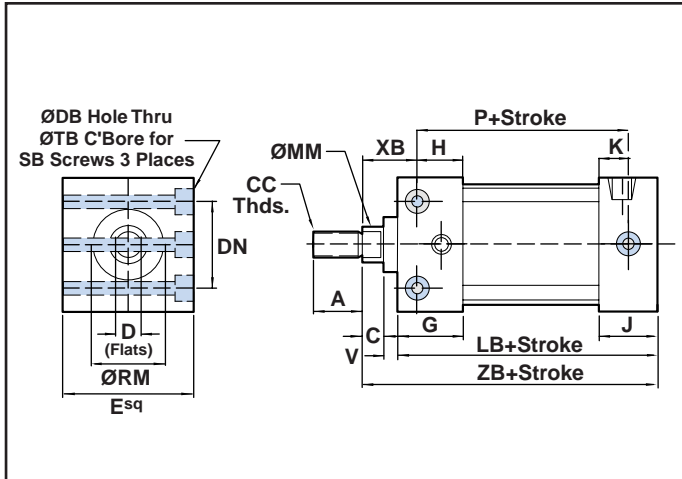
Q6G – Head Square Mount (NFPA Style ME3) (7” & 8” Bores only)



Q6FM – Sleeve Nut for Tapped Face Mounts (1½”-6” Bores)

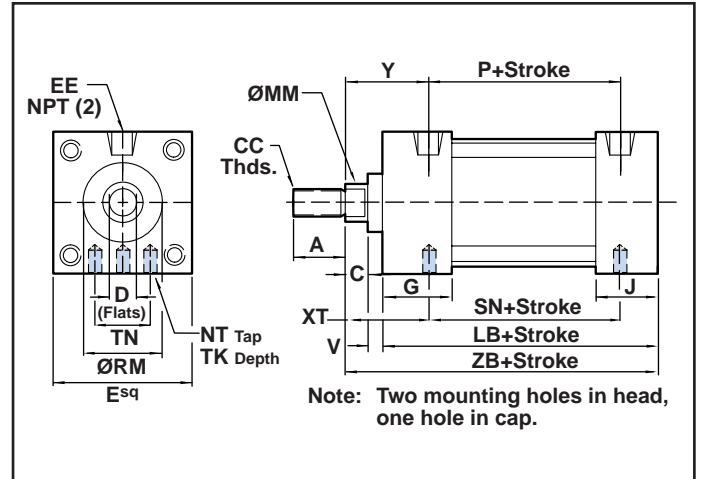
Q6 3/4" - 1 1/8" Mounting Dimensions

See Cylinder Dimensions on Page 21



Q6A – Bolt Through Mounts

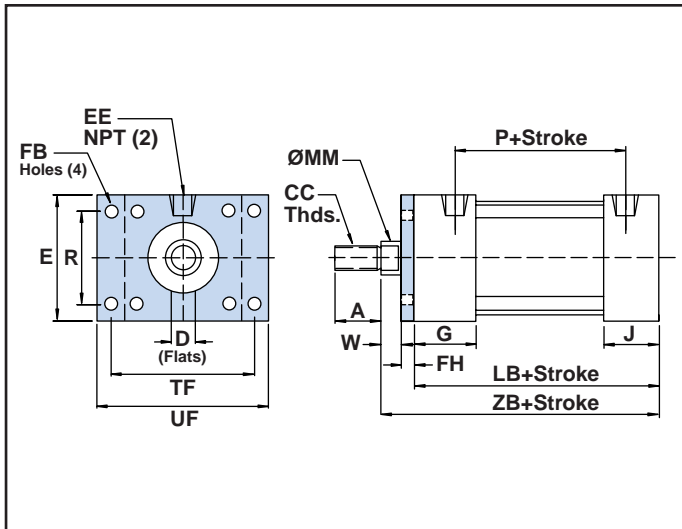
(ANSI MS8)



Q6B – Tapped Mounts

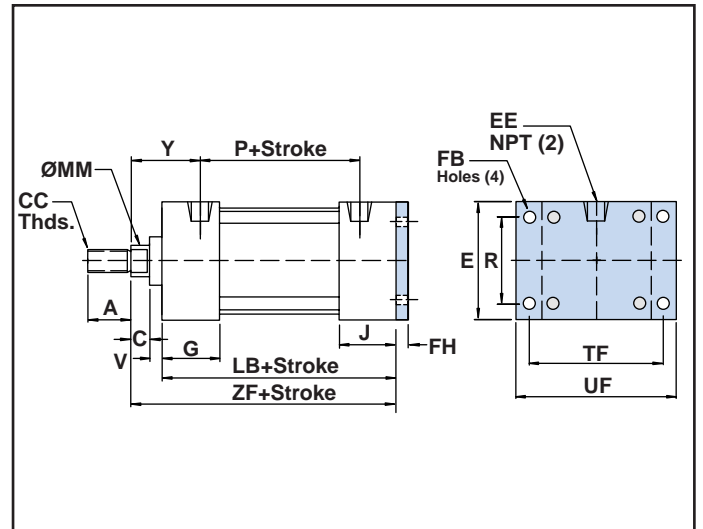
(ANSI MS9)

Note: Two mounting holes in head, one hole in cap.



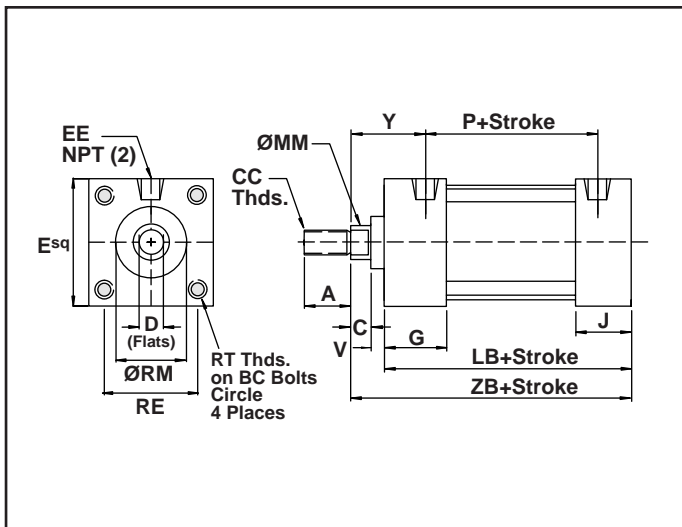
Q6F – Head Rectangular Flange Mounts

(ANSI MF1)



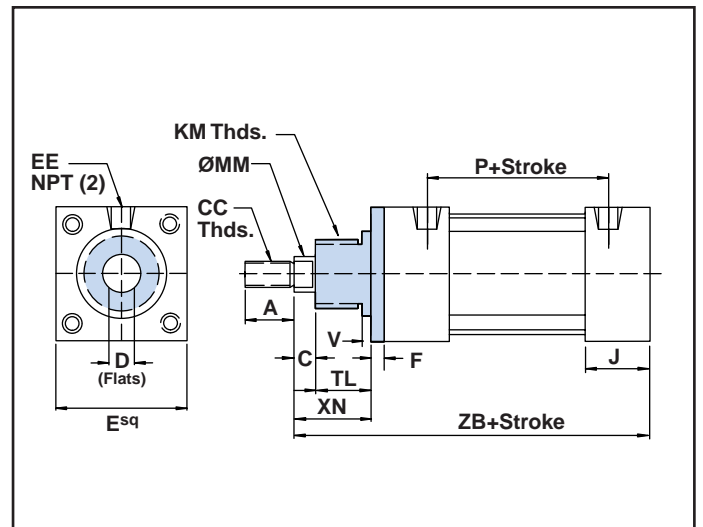
Q6R – Cap Rectangular Flange Mounts

(ANSI MF2)



Q6FM – Head Tapped Face Mounts

(ANSI MR1)

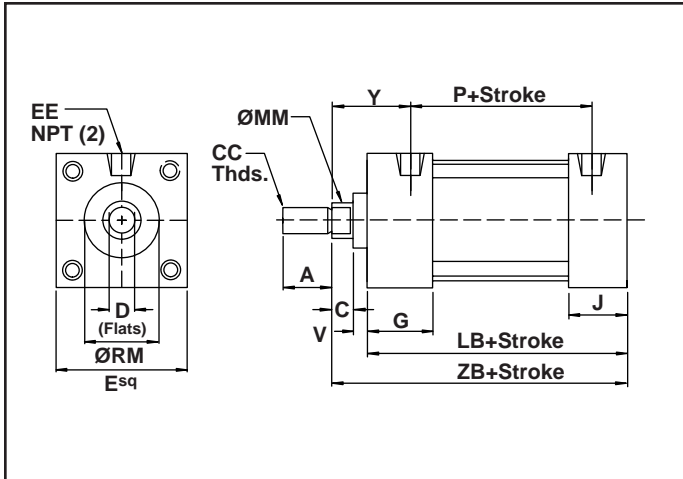


Q6TN – Threaded Nose Mounts

(ANSI MNR1)

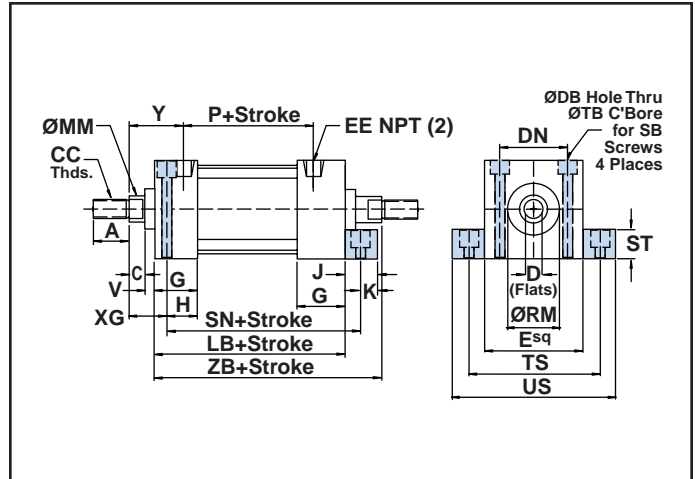
Q6 3/4" - 1 1/8" Mounting Dimensions

See Cylinder Dimensions on Page 21

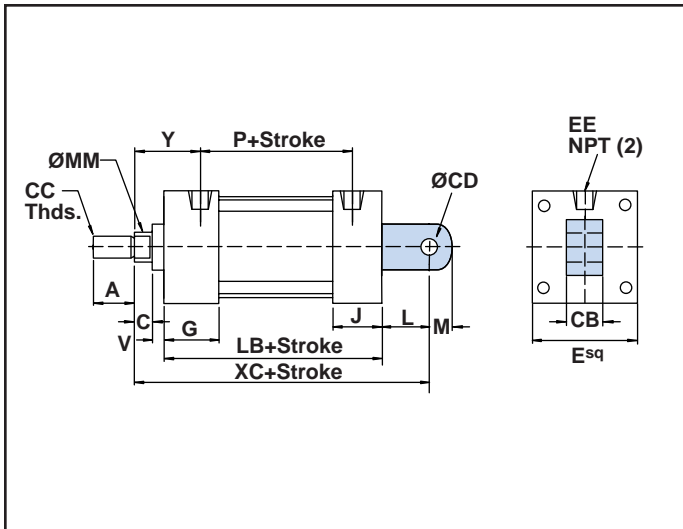


Q6K - No Mounts

(ANSI MX6)

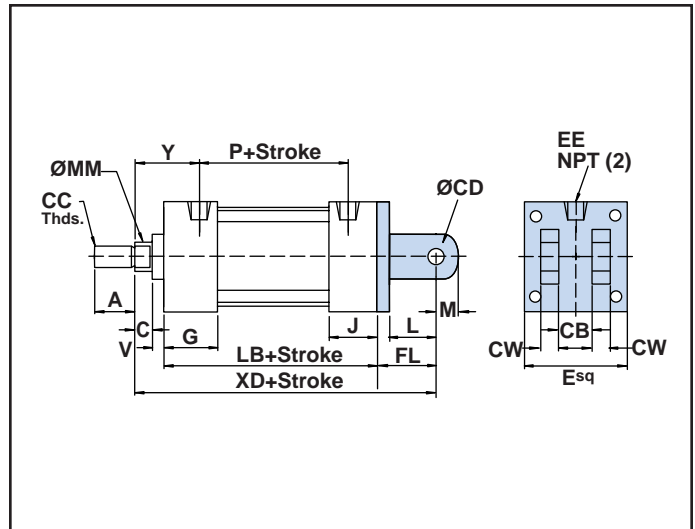


Q6AD - Double Rod Bolt Through Mounts



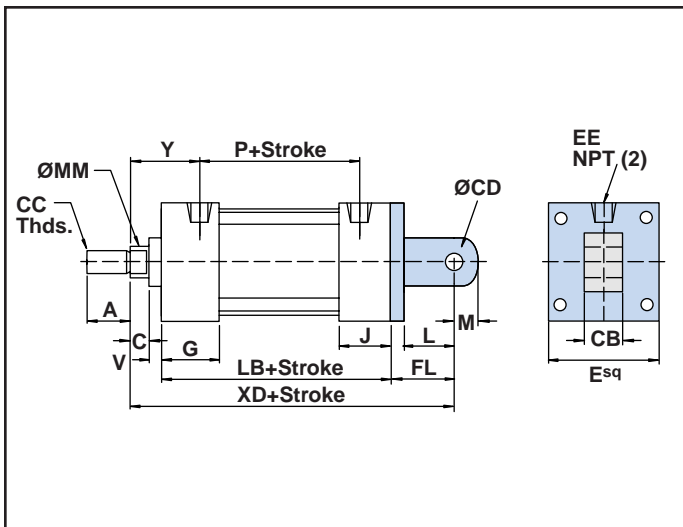
Q6CM - Fixed Eye Mounts

(ANSI MP3)



Q6DC - Detachable Clevis Mounts

(ANSI MP2)



Q6DCM - Detachable Eye Mounts

(ANSI MP4)

Q6T Series Air/Oil Tanks

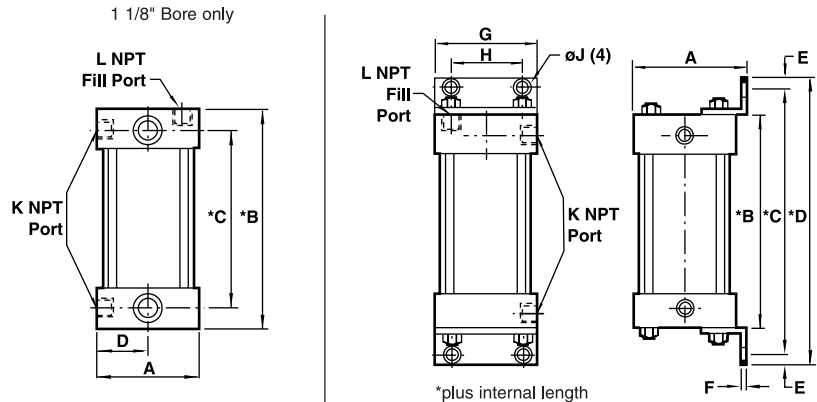
Pressures to 200 psi maximum

Air/oil systems combine the speed and low cost of air operation with the smooth, even actuator control of oil from a standard air line source.



- Anodized aluminum caps are lightweight and corrosion resistant.
- O-ring tube-end seals provide positive sealing.
- Translucent filament-wound fiberglass tubing has a high strength-to-weight ratio and a dent resistance much higher than brass or aluminum.
- Translucent tube property also provides visual oil-level indication without the need for separate costly, easily damaged sight glasses.
- Unique Hydro-Line designed oil baffle system eliminates whirlpooling and oil foaming.
- End angles provide mounting flexibility.

Work Cylinder Piston Area	
Cyl. Bore (inch)	Piston Area (sq. inch)
1½	1.77
2	3.14
2½	4.91
3¼	8.30
4	12.57
5	19.64
6	28.27
8	50.27



How to Figure Length of Volume

The following equations are given to help you in selecting the right air/oil tank volume for your particular application.

- Volume of Cylinder**
- Cap End Cylinder Bore Area x Stroke = Volume
 - Head End Cylinder Bore Area – (Piston Rod Area) x Stroke = Volume

Length of Tank = $\frac{\text{Volume of Cylinder} \times 1.3^{**}}{\text{Tank Bore Area}}$ (See chart below.) **30% minimum recommended reserve working volume.

Final Length of Volume of Tank = Working length of tank + 2" minimum safety factor to prevent aeration of oil.

Note: Length must be at least 3"

Air-Oil Tank Dimensions

Bore	1-1/8"	2"	3-1/4"	5"	8"
	Q6T-112	Q6T-2	Q6T-325	Q6T-5	Q6T-8
A	1.500 (38.10)	2.687 (68.25)	4.000(101.60)	5.625(142.88)	8.625 (219.08)
B	1.250 (31.75)	2.000 (50.80)	2.500 (63.50)	2.500 (63.50)	3.000 (76.20)
C	.750 (19.05)	4.000(101.60)	5.000 (127.00)	5.000 (127.00)	6.625 (168.28)
D	.750 (19.05)	4.750(120.65)	6.000 (152.40)	6.000 (152.40)	8.000 (203.20)
E	–	.375 (9.53)	.500 (12.70)	.500 (12.70)	.687 (17.45)
F	–	.125 (3.18)	.187 (4.75)	.187 (4.75)	.250 (6.35)
G	–	2.500 (63.50)	3.750 (95.25)	5.500(139.70)	8.500 (215.90)
H	–	1.750 (44.45)	2.750 (69.85)	4.250(107.95)	7.125 (180.98)
øJ	–	.437 (11.10)	.562 (14.27)	.562 (14.27)	.812 (20.62)
K	.125 (3.18)	.375 (9.53)	.500 (12.70)	.500 (12.70)	.750 (19.05)
L	.125 (3.18)	.250 (6.35)	.375 (9.53)	.375 (9.53)	.500 (12.70)

Note: Maximum operating pressure 250 PSI.

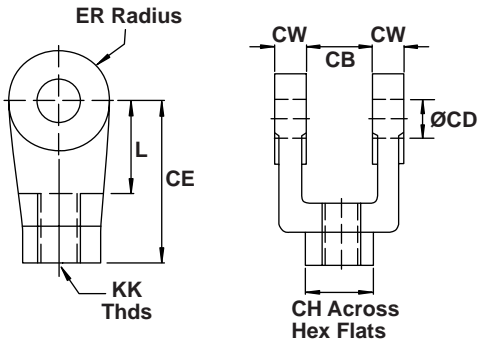
Air-Oil Tank Volumes (cubic inches)

Bore	1-1/8"	2"	3-1/4"	5"	8"
Area	.995 sq."	3.14 sq."	8.30 sq."	19.64 sq."	50.26 sq."
6"	5.9	18.6	49.8	117.8	301.5
8"	7.9	25.1	66.4	157.1	402.0
10"	9.9	31.4	83.0	196.4	502.6
12"	11.9	37.6	99.6	235.6	603.1
14"	13.9	43.9	116.2	274.9	703.6
16"	15.9	50.2	132.8	314.2	804.1
18"	17.9	56.5	149.4	353.5	904.5
20"	19.9	62.8	166.0	392.8	1005.2

How to Order: Specify air-oil tank part number and internal length.
Example: 2" bore with 6" internal length = Q6T-2x6

Cylinder Mounting Accessories

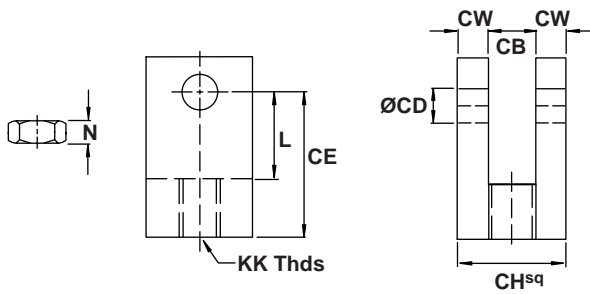
NFPA Rod Clevis



	C-700-13	C-700-16	C-700-18	C-700-19	C-700-20
CB	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.000 (50.80)
CD	.500 (12.70)	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (60.33)
CE	1.500 (38.10)	1.500 (38.10)	2.375 (60.33)	3.125 (79.38)	4.125 (104.78)
CH	1.000 (25.40)	1.000 (25.40)	1.250 (31.75)	1.500 (38.10)	2.000 (50.80)
CW	.500 (12.70)	.500 (12.70)	.625 (15.88)	.750 (19.05)	1.000 (25.40)
ER	.500 (12.70)	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (60.33)
KK	7/16-20	1/2-20	3/4-16	1-14	1-1/4-12
L	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.125 (53.98)

All dimensions in inches (mm)

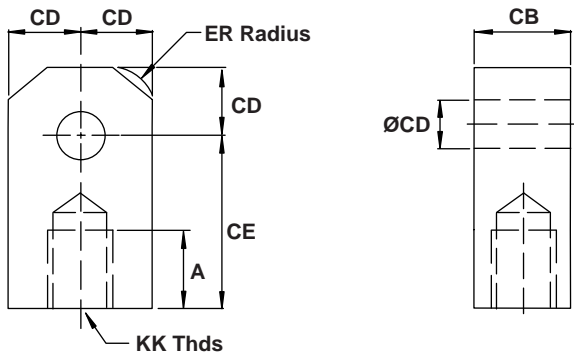
Small Rod Clevis & Jam Nut



	C-700-15	C-700-17
CB	.500 (12.70)	.750 (19.05)
CD	.500 (12.70)	.750 (19.05)
CE	1.375 (34.93)	1.750 (44.45)
CH	1.000 (25.40)	1.500 (38.10)
CW	.250 (6.35)	.375 (9.53)
KK	1/2-20	3/4-16
L	.750 (19.05)	1.000 (25.40)
N	.375 (9.53)	.500 (12.70)

All dimensions in inches (mm)

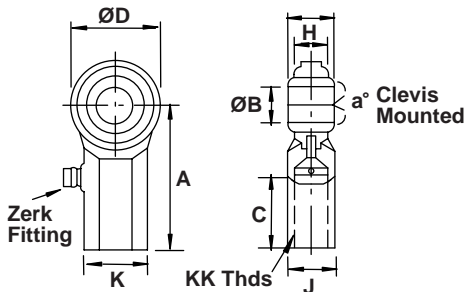
NFPA Rod Eye



	C-700-03	C-700-06	C-700-07	C-700-08	C-700-09
CB	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.000 (50.80)
CD	.500 (12.70)	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (34.93)
CE	1.500 (38.10)	1.500 (38.10)	2.062 (52.37)	2.812 (71.42)	3.437 (87.30)
ER	.562 (14.27)	.562 (14.27)	.937 (23.80)	1.125 (28.58)	1.562 (39.67)
KK	7/16 - 20	1/2 - 20	3/4 - 16	1 - 14	1 1/4 - 12

All dimensions in inches (mm)

Spherical Rod Eye

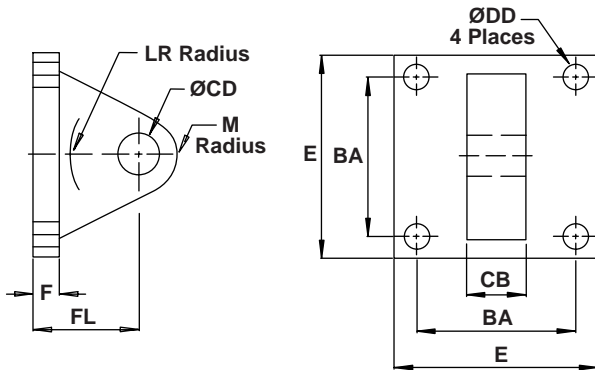


	C-700-36	C-700-38	C-700-39
Bore	1-1/2 & 2-1/2	3-1/4, 4 & 5	6 & 8
a°	Misalign. Angle	12	14
A	± .015	2.125 (53.98)	2.875 (73.03)
B	+0.025 / -0.005	.500 (12.70)	.750 (19.05)
C	+0.062 / -0.031	1.062 (26.97)	1.562 (39.67)
D	± .010	1.312 (33.32)	1.750 (44.45)
H	REF.	.453 (11.51)	.593 (15.06)
J	± .010	.750 (19.05)	1.000 (25.40)
K	± .010	.875 (22.23)	1.125 (28.58)
KK	UNF-2B	1/2-20	3/4-16
W	+0.000 / -0.005	.625 (15.88)	.875 (22.23)

All dimensions in inches (mm)

Cylinder Mounting Accessories

NFPA Eye Bracket

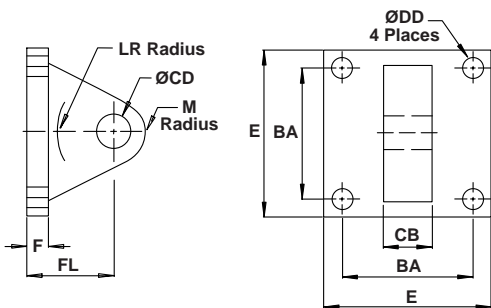


	C-700-82	C-700-86	C-700-90	C-700-91
BA	1.625 (41.28)	2.562 (65.07)	3.250 (82.55)	3.812 (96.82)
CB	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.000 (50.80)
CD	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (60.33)
DD	.406 (10.31)	.531 (13.49)	.656 (16.66)	.656 (16.66)
E	2.500 (63.50)	3.500 (88.90)	4.500 (114.30)	5.000 (127.00)
F	.375 (9.53)	.625 (15.88)	.750 (19.05)	.875 (22.23)
FL	1.125 (28.58)	1.875 (47.63)	2.250 (57.15)	3.000 (76.20)
LR	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.125 (53.98)

All dimensions in inches (mm)

*Dimensions F and FL reflect revised NFPA standards.

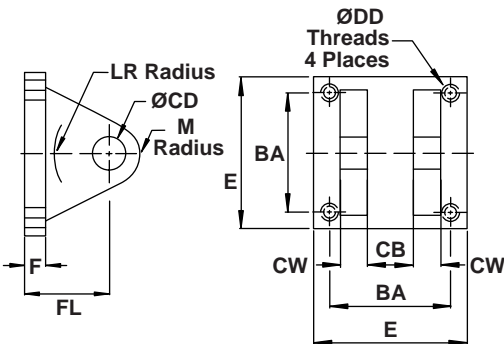
Alternate Eye Bracket



	C-700-83	C-700-84	C-700-92	C-700-87	C-700-88
BA	1.437 (36.50)	1.844 (46.84)	2.187 (55.55)	2.937 (74.60)	3.562 (90.47)
CB	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.250 (31.75)
CD	.500 (12.70)	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)
DD	.281 (7.14)	.343 (8.71)	.343 (8.71)	.469 (11.91)	.469 (11.91)
E	2.000 (50.80)	2.500 (63.50)	3.000 (76.20)	3.750 (95.25)	4.500 (114.30)
F	.375 (9.53)	.375 (9.53)	.375 (9.53)	.500 (12.70)	.500 (12.70)
FL	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)	1.750 (44.45)	1.750 (44.45)
LR	.562 (14.27)	.562 (14.27)	.562 (14.27)	1.000 (25.40)	1.000 (25.40)
M	.625 (15.88)	.625 (15.88)	.625 (15.88)	.875 (22.23)	.875 (22.23)

All dimensions in inches (mm)

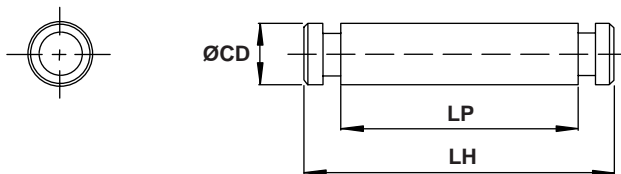
NFPA Clevis Bracket



	C-700-81	C-700-85	C-700-89
BA	1.625 (41.28)	2.562 (65.07)	3.250 (82.55)
CB	.750 (19.05)	1.250 (31.75)	1.500 (38.10)
CD	.500 (12.70)	.750 (19.05)	1.000 (25.40)
CW	.500 (12.70)	.625 (15.88)	.750 (19.05)
DD	3/8 - 24	1/2 - 20	5/8 - 18
E	2.500 (63.50)	3.500 (88.90)	4.500 (114.30)
F	.375 (9.53)	.625 (15.88)	.750 (19.05)
FL	1.125 (28.58)	1.875 (47.63)	2.250 (57.15)
LR	.750 (19.05)	1.250 (31.75)	1.500 (38.10)
M	.500 (12.70)	.812 (20.62)	1.000 (25.40)

All dimensions in inches (mm)

NFPA Pin



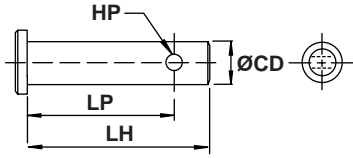
	C-700-66	C-700-85	C-700-74
CD	.500 (12.70)	.750 (19.05)	1.000 (25.40)
LH	2.219 (56.36)	3.125 (79.38)	3.750 (95.25)
LP	1.875 (47.63)	2.750 (69.85)	3.250 (82.55)

All dimensions in inches (mm)

1. Pivot pins are furnished with clevis mounted cylinders.
2. Pivot pins must be ordered as a separate item if to be used with female eye, female clevis, NFPA eye bracket and NFPA clevis bracket.

Cylinder Mounting Accessories

Standard Pin

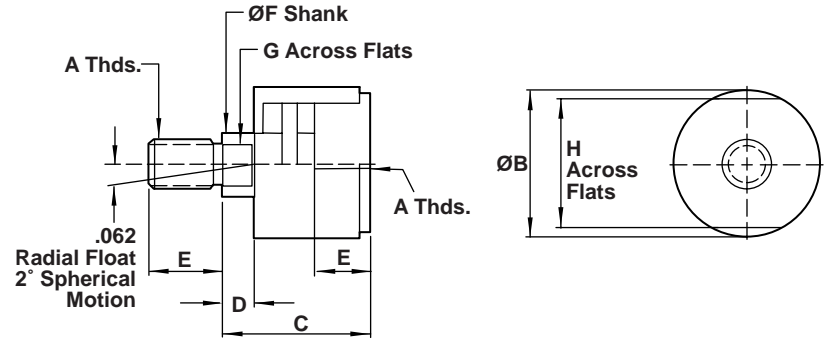


	C-700-63	C-700-68	C-700-71	C-700-72	C-700-75	C-700-76
CD	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)	1.000 (25.40)	1.375 (34.93)
HP	.156 (3.96)	.156 (3.96)	.156 (3.96)	.156 (3.96)	.203 (5.16)	.250 (6.35)
LH	1.421 (36.09)	2.250 (57.15)	2.000 (50.80)	3.000 (76.20)	3.500 (88.90)	5.000 (127.00)
LP	1.266 (32.16)	2.093 (53.16)	1.843 (46.81)	2.843 (72.21)	3.297 (83.74)	4.500 (114.30)

All dimensions in inches (mm)

Self-Aligning Coupler

- Increases cylinder life by reducing component wear caused by misalignment.
- Allows greater tolerance between cylinder centerline and mating component
- Prevents binding and erratic movement produced by misalignment.
- Allows $1/16''$ of radial float and 2° of spherical movement

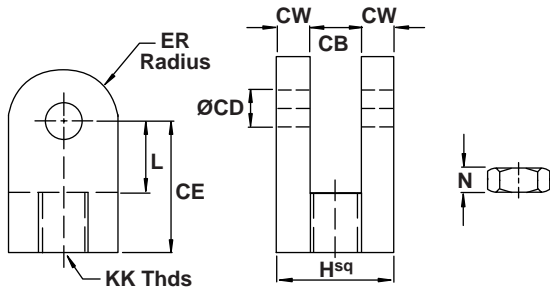


	C-700-50	C-700-51	C-700-52	C-700-53	C-700-54	C-700-55	C-700-56	C-700-57	C-700-58	C-700-59	C-700-60	C-700-61
A	1/4 – 28	5/16 – 24	3/8 – 24	7/16 – 20	1/2 – 20	5/8 – 18	3/4 – 16	7/8 – 14	1 – 14	1-1/4 – 12	1-1/2 – 12	1-3/4 – 12
B	.875 (22.23)	.875 (22.23)	.875 (22.23)	1.250 (31.75)	1.250 (31.75)	1.250 (31.75)	1.750 (44.45)	1.750 (44.45)	2.500 (63.50)	2.500 (63.50)	3.250 (82.50)	3.250 (82.50)
C	1.250 (31.75)	1.250 (31.75)	1.250 (31.75)	2.000 (50.80)	2.000 (50.80)	2.000 (50.80)	2.312 (58.72)	2.312 (58.72)	2.937 (74.60)	2.937 (74.60)	4.375 (111.13)	4.375 (111.13)
D	.250 (6.35)	.250 (6.35)	.250 (6.35)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.812 (20.62)	.812 (20.62)
E	.625 (15.88)	.625 (15.88)	.625 (15.88)	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.125 (28.58)	1.125 (28.58)	1.625 (41.28)	1.625 (41.28)	2.250 (57.15)	2.250 (57.15)
F	.312 (7.92)	.312 (7.92)	.375 (9.53)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.969 (24.61)	.969 (24.61)	1.375 (34.93)	1.375 (34.93)	1.750 (44.45)	1.750 (44.45)
G	.187 (4.75)	.250 (6.35)	.312 (7.92)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.812 (20.62)	.812 (20.62)	1.156 (29.36)	1.156 (29.36)	1.500 (38.10)	1.500 (38.10)
H	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)	1.500 (38.10)	1.500 (38.10)	2.250 (57.15)	2.250 (57.15)	3.000 (76.20)	3.000 (76.20)
Max Pull lbs. (kg)	1,500 (680)	2,075 (941)	2,075 (941)	2,500 (1134)	3,500 (1588)	4,750 (2155)	8,500 (3856)	9,750 (4423)	16,000 (7258)	19,500 (8845)	33,500 (15196)	33,500 (15196)

All dimensions in inches (mm)

Accessories for 3/4" and 1-1/8" Bore Cylinders

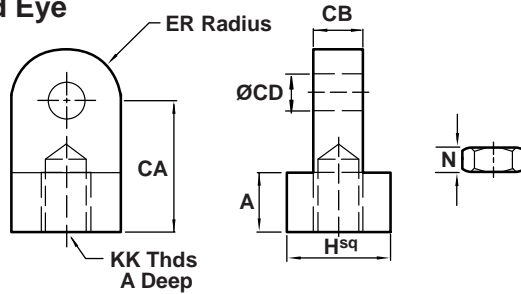
Rod Clevis



	3/4		1-1/8	
	C-700-10	C-700-11	C-700-12	C-700-14
CB	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
CD	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
CE	.812 (20.60)	.812 (20.60)	.875 (22.23)	.875 (22.23)
CW	.125 (3.18)	.125 (3.18)	.187 (4.75)	.187 (4.75)
ER	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
H	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)
KK	1/4 - 28	5/16 - 24	3/8 - 24	1/2 - 20
L	.500 (12.70)	.500 (12.70)	.500 (12.70)	.500 (12.70)
N	.156 (3.96)	.187 (4.75)	.219 (5.56)	.312 (7.92)

All dimensions in inches (mm)

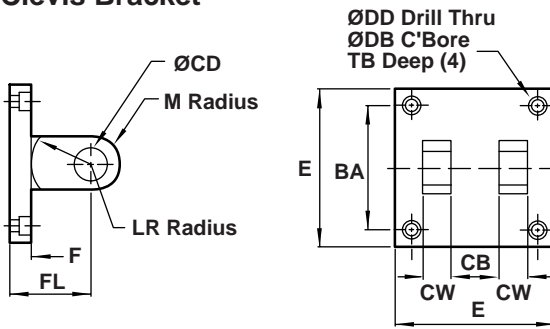
Rod Eye



	3/4		1-1/8	
	C-700-00	C-700-01	C-700-02	C-700-04
A	.312 (7.92)	.312 (7.92)	.437 (11.10)	.437 (11.10)
CA	.750 (19.05)	.750 (19.05)	.875 (22.23)	.875 (22.23)
CB	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
CD	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
ER	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
H	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)
KK	1/4 - 28	5/16 - 24	3/8 - 24	1/2 - 20
N	.156 (3.96)	.187 (4.75)	.219 (5.56)	.312 (7.92)

All dimensions in inches (mm)

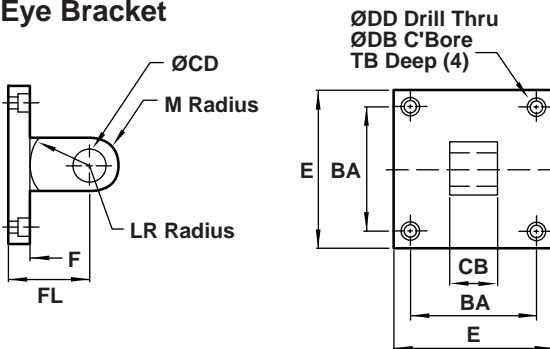
Clevis Bracket



	3/4	1-1/8
	C-700-77	C-700-79
BA	.750 (19.05)	1.125 (28.58)
CB	.250 (6.35)	.375 (9.53)
CD	.250 (6.35)	.375 (9.53)
CW	.250 (6.35)	.250 (6.35)
DB	.250 (6.35)	.328 (8.33)
DD	.156 (3.96)	.203 (5.16)
E	1.000 (25.40)	1.500 (38.10)
F	.500 (12.70)	.500 (12.70)
FL	1.125 (28.58)	1.125 (28.58)
LR	.437 (11.10)	.625 (15.88)
M	.250 (6.35)	.375 (9.53)
TB	.125 (3.18)	.250 (6.53)

All dimensions in inches (mm)

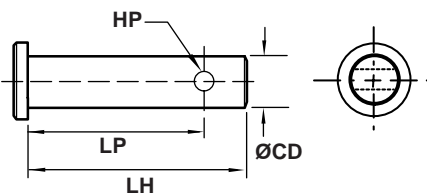
Eye Bracket



	3/4	1-1/8
	C-700-78	C-700-80
BA	.750 (19.05)	1.125 (28.58)
CB	.250 (6.35)	.375 (9.53)
CD	.250 (6.35)	.375 (9.53)
DB	.250 (6.35)	.328 (8.33)
DD	.156 (3.96)	.203 (5.16)
E	1.000 (25.40)	1.500 (38.10)
F	.500 (12.70)	.500 (12.70)
FL	.937 (23.80)	1.125 (28.58)
LR	.437 (11.10)	.625 (15.88)
M	.250 (6.35)	.375 (9.53)
TB	.125 (3.18)	.250 (6.53)

All dimensions in inches (mm)

Clevis Pin

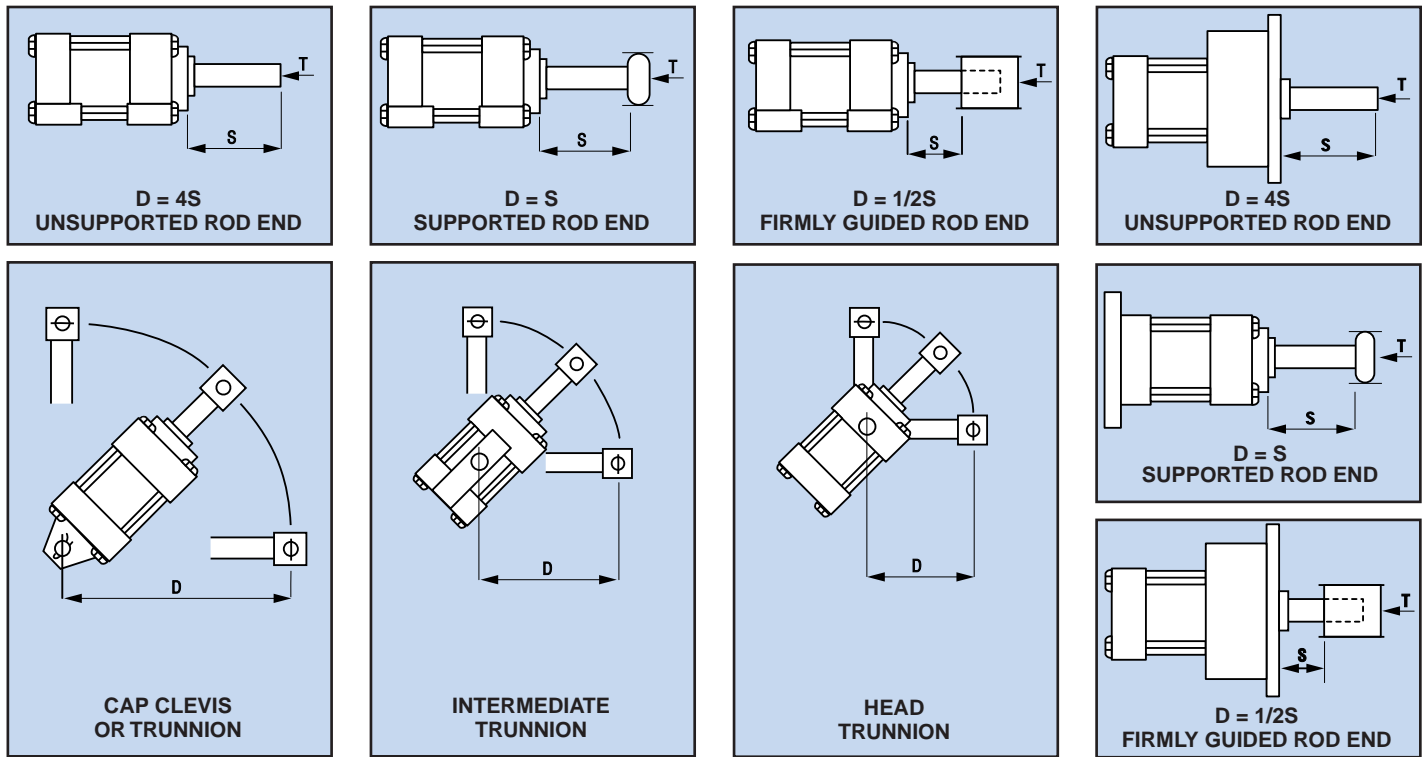


	3/4		1-1/8	
	C-700-62	C-700-63	C-700-64	C-700-65
CD	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)
HP	.094 (2.39)	.094 (2.39)	.156 (3.96)	.156 (3.96)
LH	.750 (19.05)	1.000 (25.40)	1.094 (27.79)	1.250 (31.75)
LP	.656 (16.66)	.906 (23.01)	.937 (23.80)	1.032 (26.21)
Use w/	VP62004A	VP78004A	VP62006A	VP78006A
	VP620048	VP61004A	VP62006B	VP61006A
	-	VP60004A	-	VP60006A

All dimensions in inches (mm)

Hydro-Line Technical Data

Rod Size and Stop Tube Selection

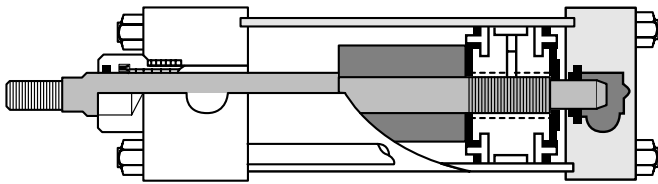


Rod Size Selection

Standard rod sizes are normally suitable for all applications except for long stroke or high thrust applications. Proper selection of minimum rod size may be determined by the following steps:

1. With knowledge of bore size and stroke, thrust may be determined. Refer to graph in next column.
2. Select from illustrations above the type of mounting to be used and determine the length of **D** with the piston rod in the fully extended position.
3. Find the value of **D** at the bottom of the graph and follow its line vertically until it intercepts the horizontal line representing the maximum push thrust that will be applied to your cylinder. The intersection of these two lines will fall within a stripe representing the minimum recommended piston rod diameter for your application.

Stop Tubes

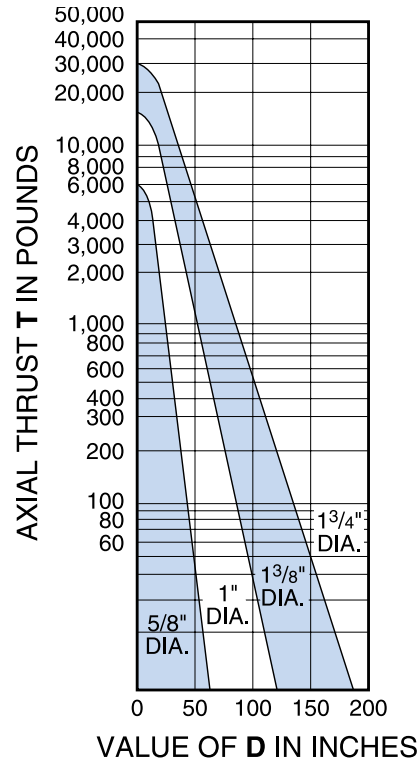


Stop tubes are located between the piston and the rod shoulder on the head end of the cylinder. Bearing loading is reduced by separating the piston and the rod bushing. Bearing wear and tendency to buckle is reduced.

To determine if a stop tube is required and the length of stop tube needed, use the following procedure:

Determine the value of **D** with the piston rod in the fully extended position. If the value of **D** is under 40", no stop tube is needed. If **D** is greater than 40", one inch of stop tube is recommended for each 10" or fraction thereof beyond 40".

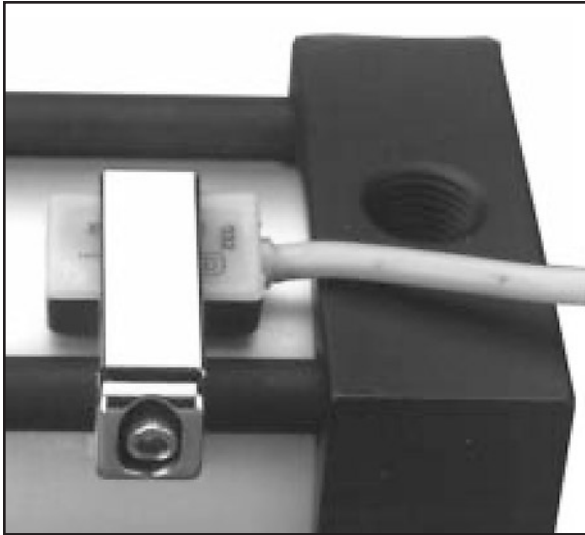
Special note: When specifying stroke and stop tube lengths, please include net working stroke plus stop tube length.



Cushions

Cushions are recommended when piston speed is in excess of 20-25 feet per minute. Cushions decelerate the piston and rod assembly at the end of the stroke, lessening the noise and shock and increasing cylinder life. Heavy loads that are attached to piston and rod assembly should be stopped by external means such as shock absorbers, springs, decelerating valves, etc. **Note: 250 PSI maximum for cushioned HQ6 cylinders.**

Low Profile Reed and Hall Effect Switches



Benefits

- Low profile design is considerably smaller than conventional switches, saving space and providing additional mounting flexibility. (See mounting dimensions.)
- Low profile bracket attaches securely to one tie rod and is easily adjusted over the entire piston travel.
- Several switches may be mounted to control or initiate any sequence or function.
- LED indicator provides convenient means for positioning and troubleshooting circuits.
- Optional quick-connect versions allow electrical disconnection without changing the adjustment of the switch on the cylinder.

Hydro-Line Low Profile Reed and Hall effect switches are available for all bore size Q6, A5 and E-Line Series cylinders. These switches are activated by a magnetic band fitted around the cylinder piston. Signals from these switches are used as input to programmable controllers, sequencers, relays, and in some cases, to drive valve solenoids.

Low Profile Switch Selection

Use the requirements in the chart at the right to determine which switch fits the application. By using the process of elimination, you should be able to choose the proper switch. See the specifications for each switch to confirm your choice.

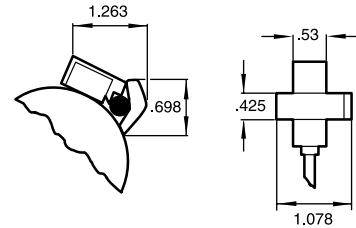
Requirements	Part No.			
	PS8-2-32 & PS7-32	PS8-2-31 & PS7-31	PS8-2-04 & PS7-04	PS7-24
	Hall (Sink)	Hall (Source)	DC Reed	AC Reed
AC				X
DC	X	X	X	
Mechanical Switch			X	X
Solid State Switch (zero bounce)	X	X		
Input for Programmable Controller	X	X	X	X
Longest Life	X	X		

Low Profile Hall Effect Switches

Hydro-Line Low Profile Hall Effect Switches are solid-state devices designed specifically to provide an input signal to various types of programmable controllers or logic systems. Since Hall Effect Switches are solid-state, there are no moving parts to wear out. Due to this, the switches offer an infinite number of trouble-free operations. Hall Effect Switches operate on DC current only.

Switch and Mounting Bracket Dimensions

PS8-2 Series



Hall Effect Working Principle

Hydro-Line Low Profile Hall Effect Switches contain a Hall generator (or semi-conductor) which has a current flowing through it (**Fig. 18-1**). Voltage at the edges of the Hall generator equals 0. When influenced by a magnet, negatively charged electrons “pile up” on one edge of the Hall generator and positive charges on the other, creating a Hall Voltage ($V \neq 0$, **Fig. 18-2**). This voltage provides the input to the controlling system.

Fig. 18-1

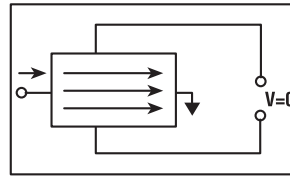
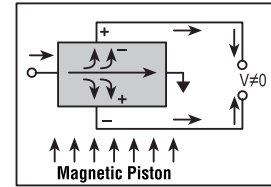


Fig. 18-2



Sink vs. Source

Hall Effect Switches are available in either a Sink or Source model. The Sink Output connects the load (controller or logic system) to ground (**Fig. 18-3**). The Source Output connects the load (controller or logic system) to positive (**Fig. 18-4**). These two outputs are supplied because different logic systems require either current sinking or current sourcing inputs.

Fig. 18-3

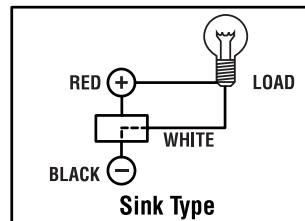
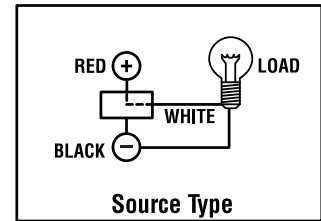


Fig. 18-4



Low Profile Reed Switches

Hydro-Line Low Profile Reed Switches are available in either an AC or DC model. They are ideal for use as inputs for many types of sequencers and programmable controllers. In some cases they can be used to drive relays or valve solenoids. However, electrical transients (inrush currents or line spikes) associated with inductive or capacitive loads can cause damage and shorten the life of the switch.

Reed Working Principle

Hydro-Line Low Profile Reed Switches contain hermetically sealed reeds (mechanical contacts) which are open in their normal state (**Fig. 18-5**). When the piston with an axial magnetic band moves within proximity of the switch, magnetism is induced into the reeds. Since magnetic poles attract each other, the ends of the reeds are drawn together making electrical contact (**Fig. 18-6**). As the piston (with the magnet) moves away, the reeds assume their original open position.

Fig. 18-5

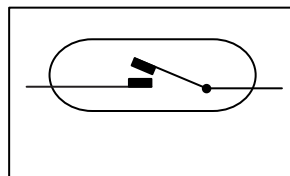
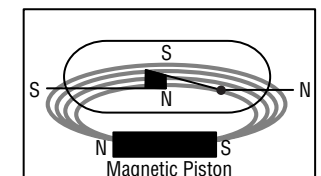


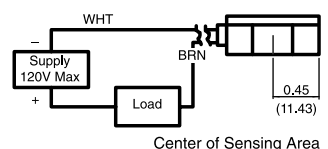
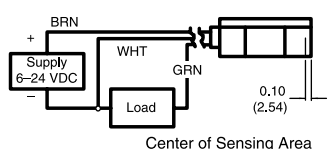
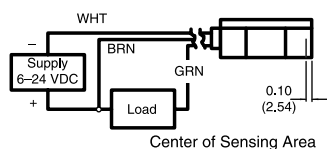
Fig. 18-6



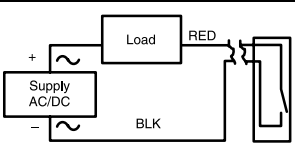
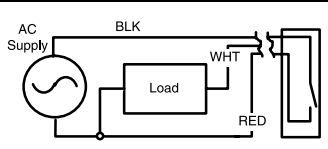
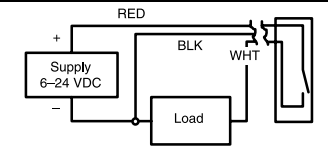
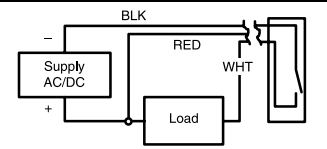
Switch Specifications

3/4" thru 2-1/2" Bores

*Metal Oxide Varistor Surge Suppression. **Note:** All PS7 and PS* Series Switches are supplied with 9 foot leads.

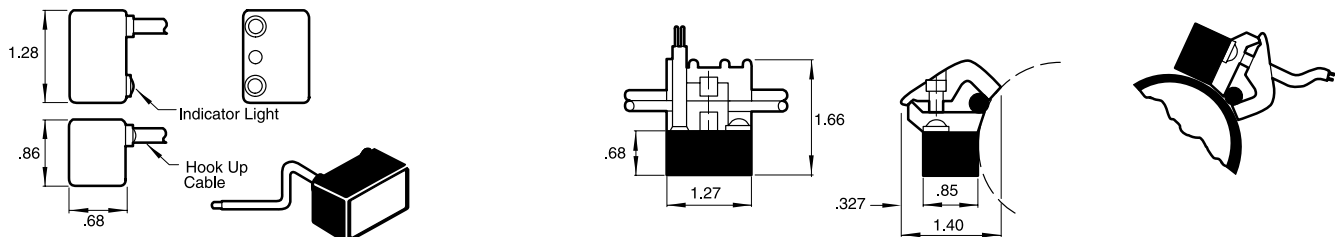
Switch Model	PS8-2-04 Reed	PS8-2-31 Hall	PS8-2-32 Hall
Bore Sizes	3/4" thru 2-1/2"	3/4" thru 2-1/2"	3/4" thru 2-1/2"
Switch Type	Reed Switch *MOV & Light	Hall Effect & Light, Sourcing PNP	Hall Effect & Light, Sinking PNP
Function	SPST Normally Open	Normally Open	Normally Open
Switching Voltage	5-120 VDC/VAC 50/60 Hz	6-24 VDC	6-24 VDC
Switching Current	.5 Amp Max .005 Amp Min	.5 Amp Max	.5 Amp Max
Switching Power	10 VA	12 Watts Max	12 Watts Max
Max Voltage Drop	3.5 Volts	.5 Volts	.5 Volts
Magnetic Sensitivity	85 Gauss	85 Gauss	85 Gauss
Enclosure Classification	NEMA 6 & CSA Approved	NEMA 6 & CSA Approved	NEMA 6 & CSA Approved
Temperature Range	-22° F to +176° F	-22° F to +176° F	-22° F to +176° F
Wiring Diagrams			

2" thru 8" Bores

PS7-04 Reed	PS7-24 Reed	PS7-31 Hall	PS7-32 Hall
2" thru 8"	2" thru 8"	2" thru 8"	2" thru 8"
Reed Switch *MOV & Light	Reed Switch *MOV & Light, 3 Wire	Hall Effect & Light, Sourcing PNP	Hall Effect & Light, Sinking PNP
Normally Open	Normally Open	Normally Open	Normally Open
5-240 VDC/VAC 50/60 Hz	24-240 VAC 50/60 Hz	6-24 VAC	6-24 VAC
1 Amp Max	4 Amp Max 50 Amp Inrush	1 Amp Max	1 Amp Max
30 Watts Max	100 Watts Max	24 Watts Max	24 Watts Max
3 Volts	N/A	.5 Volts	.5 Volts
85 Gauss Parallel	85 Gauss Parallel	85 Gauss Parallel	85 Gauss Parallel
NEMA 6 & CSA Approved	NEMA 6 & CSA Approved	NEMA 6 & CSA Approved	NEMA 6 & CSA Approved
-22° F to +176° F	-22° F to +176° F	-22° F to +176° F	-22° F to +176° F
			

Note: For 8" bore add 9 to part number. Example: PS7-9-04

PS7 Series



Rod End Styles

Choose from eight

Rod End Style No.	Dimensions
2 ^{STD} ★	
2X	
1	
1X	
4	
5	
6	
10	

★ Male Rod End Style No.2 is standard and will be furnished unless otherwise specified.

Eaton Fluid Power Limited Warranty

Eaton Fluid Power ("Eaton") warrants to the original purchaser that products sold shall be free from defects in material and workmanship on the date of manufacture by Eaton.

This Limited Warranty shall remain in effect for thirty-six (36) months from the date of manufacture by Eaton; with the exception of electric or electronic components where the warranty shall remain in effect for twelve (12) months from the date of shipment.

If buyer claims that a product violates such warranty, Eaton, upon notice promptly given, will either examine the product at buyer's site, or issue shipping instructions for return to Eaton at buyer's expense, transportation charges prepaid.

Eaton's sole obligation under its warranty shall be, at its option, to repair, replace or refund the price of any product thereof which is proved to violate such warranty.

In no event, whether based on contract, indemnity, warranty, tort (including negligence), strict liability or otherwise, shall Eaton be liable to the Buyer for special, indirect, incidental or consequential damages whatsoever including, without limitation, loss of profit or revenue. The above warranty is Buyer's exclusive remedy and Eaton hereby expressly disclaims all other warranties, express or implied, including the implied warranty of merchantability or implied warranty of fitness for a particular purpose.

The foregoing shall constitute the sole remedy of the buyer and the sole liability of Eaton.

This Limited Warranty shall not apply to any product that has been subject to alteration, accident, misuse, abuse, neglect, or failure to follow Eaton's instructions for operation and maintenance.

Any technical assistance provided by Eaton's personnel, or representatives, in system design is construed to be a proposal and not a recommendation. The responsibility for determining feasibility rests with the user and should be subject to test.

Only the terms expressed in this Limited Warranty shall apply and no distributor, corporation, or individual is authorized to amend, modify or extend this warranty in any way on resale.

For additional information contact:

Eaton Fluid Power
Warranty Department
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Telephone 952/937-7168
Fax 952/294-2020

11-02-0001
EN 1000
(Replaces 132-1056)

Oversize Rod Information

The dimensions listed are those which change when oversize rods are used.

BORE	1 1/2" (38.10)	2" (50.80)	2 1/2" (63.50)	3 1/4" (82.55)	4" (101.60)	5" (127.00)	6" (152.40)	7" (177.80)	8" (203.20)
Ø Rod	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.750 (44.45)	1.750 (44.45)	1.750 (44.45)
A	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)	1.625 (41.28)	1.625 (41.28)	1.625 (41.28)	2.000 (50.80)	2.000 (50.80)	2.000 (50.80)
B ^{+0.000} / _{-0.002}	1.499 (38.08)	1.499 (38.08)	1.499 (38.08)	1.999 (50.78)	1.999 (50.78)	1.999 (50.78)	2.374 (60.30)	2.374 (60.30)	2.374 (60.30)
C	.500 (12.70)	.500 (12.70)	.500 (12.70)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.750 (19.05)	.750 (19.05)	.750 (19.05)
CC	7/8-14	7/8-14	7/8-14	1 1/4-12	1 1/4-12	1 1/4-12	1 1/2-12	1 1/2-12	1 1/2-12
D	.813 (20.64)	.813 (20.64)	.813 (20.64)	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)	1.500 (38.10)	1.500 (38.10)	1.500 (38.10)
FF	1-14	1-14	1-14	1 3/8-12	1 3/8-12	1 3/8-12	1 3/4-12	1 3/4-12	1 3/4-12
KK	3/4-16	3/4-16	3/4-16	1-14	1-14	1-14	1 1/4-12	1 1/4-12	1 1/4-12
MM	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.750 (44.45)	1.750 (44.45)	1.750 (44.45)
V	.500 (12.70)	.500 (12.70)	.500 (12.70)	.375 (9.53)	.375 (9.53)	.375 (9.53)	.375 (9.53)	-	-
VF	.875 (22.23)	.875 (22.23)	.875 (22.23)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)
W	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.125 (28.58)	-	-
WF	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.625 (41.28)	1.625 (41.28)	1.625 (41.28)	1.875 (47.63)	1.875 (47.63)	1.875 (47.63)
XA	6.000 (152.40)	6.000 (152.40)	6.125 (155.58)	7.125 (180.98)	7.125 (180.98)	7.500 (190.50)	8.250 (209.55)	8.813 (223.84)	8.813 (223.84)
XC	5.750 (146.05)	5.750 (146.05)	5.875 (149.23)	7.125 (180.98)	7.125 (180.98)	7.375 (187.33)	8.375 (212.73)	8.500 (215.90)	8.500 (215.90)
XD	6.125 (155.58)	6.125 (155.58)	6.250 (158.75)	7.750 (196.85)	7.750 (196.85)	8.000 (203.20)	9.125 (231.78)	9.250 (234.95)	9.250 (234.95)
XE	5.750 (146.05)	5.938 (150.81)	6.188 (157.16)	6.750 (171.45)	6.875 (174.63)	7.188 (182.56)	7.875 (200.03)	8.125 (206.38)	8.125 (206.38)
XG	2.125 (53.98)	2.125 (53.98)	2.125 (53.98)	2.500 (63.50)	2.500 (63.50)	2.500 (63.50)	2.875 (73.03)	2.875 (73.03)	2.875 (73.03)
XI	3.500 (88.90)	3.625 (92.08)	3.625 (92.08)	4.375 (111.13)	4.375 (111.13)	4.375 (111.13)	4.875 (123.83)	5.125 (130.18)	5.125 (130.18)
XJ	4.500 (114.30)	4.500 (114.30)	4.625 (117.48)	5.250 (133.35)	5.250 (133.35)	5.500 (139.70)	6.125 (155.58)	6.250 (158.75)	6.250 (158.75)
XS	1.750 (44.45)	1.750 (44.45)	1.750 (44.45)	2.125 (53.98)	2.125 (53.98)	2.313 (58.74)	2.562 (65.07)	2.562 (65.07)	2.562 (65.07)
XT	2.313 (58.74)	2.313 (58.74)	2.313 (58.74)	2.688 (68.26)	2.688 (68.26)	2.688 (68.26)	3.063 (77.79)	3.063 (77.79)	3.063 (77.79)
Y	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)	2.688 (68.26)	2.688 (68.26)	2.688 (68.26)	3.063 (77.79)	3.063 (77.79)	3.063 (77.79)
ZB	5.250 (133.35)	5.313 (134.94)	5.438 (138.11)	6.250 (158.75)	6.250 (158.75)	6.563 (166.69)	7.313 (185.74)	7.563 (192.09)	7.563 (192.09)
ZE	6.000 (152.40)	6.250 (158.75)	6.500 (165.10)	7.125 (180.98)	7.250 (184.15)	7.688 (195.26)	8.375 (212.73)	8.750 (222.25)	8.750 (222.25)
ZF	5.375 (136.53)	5.375 (136.53)	5.500 (139.70)	6.500 (165.10)	6.500 (165.10)	6.750 (171.45)	7.625 (193.68)	-	-
ZJ	5.000 (127.00)	5.000 (127.00)	5.125 (130.18)	5.875 (149.23)	5.875 (149.23)	5.875 (149.23)	6.875 (174.63)	-	-
ZL	5.750 (146.05)	5.813 (147.64)	5.938 (150.81)	6.750 (171.45)	6.750 (171.45)	7.063 (178.47)	7.813 (198.44)	8.125 (206.38)	8.125 (206.38)
ZM	6.875 (174.63)	6.875 (174.63)	7.000 (177.80)	8.000 (203.20)	8.000 (203.20)	8.000 (203.20)	9.250 (234.95)	9.375 (238.13)	9.375 (238.13)

3/4" and 1-1/8" Bore Cylinder Dimensions

All dimensions in inches (mm)

BORE	3/4" (19.05)	1 1/8" (28.58)	BORE	3/4" (19.05)	1 1/8" (28.58)	BORE	3/4" (19.05)	1 1/8" (28.58)
Ø Rod	.312 (7.92)	.375 (9.53)	K	.375 (9.53)	.375 (9.53)	TK	.187 (4.87)	.250 (6.35)
A	.625 (15.88)	.625 (15.88)	KM	5/8 - 18	1-14	TL	.625 (15.88)	.875 (22.23)
C	.250 (6.35)	.250 (6.35)	L	.437 (11.10)	.437 (11.10)	TN	.625 (15.88)	1.000 (25.40)
CB	.250 (6.35)	.375 (9.53)	LB	2.250 (57.15)	2.250 (57.15)	TS	1.375 (34.93)	1.875 (47.63)
CC	3/4 - 28	3/8 - 24	M	.250 (6.35)	.375 (9.53)	UF	2.000 (56.80)	2.500 (63.50)
CD	.250 (6.35)	.375 (9.53)	MM	.307 (7.80)	.370 (9.40)	US	1.750 (44.45)	2.250 (57.15)
D	.250 (6.35)	.312 (7.92)	NT	8 - 32	10 - 32	V	.125 (3.18)	.125 (3.18)
DB	.172 (4.37)	.203 (5.16)	P	1.375 (34.93)	1.375 (34.93)	W	.125 (3.18)	.125 (3.18)
DN	.625 (15.88)	1.000 (25.40)	R	.500 (12.70)	1.000 (25.40)	XB	.562 (14.27)	.625 (15.88)
E	1.000 (25.40)	1.500 (38.10)	RE	.750 (19.05)	1.125 (28.58)	XC	3.062 (77.77)	3.062 (77.77)
EE	.125 (3.18)	.125 (3.18)	RM	.625 (15.88)	.750 (19.05)	XD	3.562 (90.47)	3.750 (95.25)
F	.250 (6.35)	.250 (6.35)	RT	8 - 32	10 - 32	XG	.562 (14.27)	.625 (15.88)
FB	.219 (5.56)	.219 (5.56)	SB	#8	#10	XN	.875 (22.23)	1.125 (28.58)
FH	.250 (6.35)	.250 (6.35)	SD	2.562 (65.07)	2.500 (63.50)	XT	.562 (14.27)	.625 (15.88)
FL	.937 (23.80)	1.125 (28.58)	SN	1.812 (46.02)	1.750 (44.45)	Y	.938 (23.83)	.938 (23.83)
G	.875 (22.23)	.875 (22.23)	ST	.375 (9.53)	.375 (9.53)	ZB	2.625 (66.68)	2.625 (66.68)
H	.687 (17.45)	.625 (15.88)	TB	.281 (7.14)	.328 (8.33)	ZF	2.875 (73.03)	2.875 (73.03)
J	.625 (15.88)	.625 (15.88)	TF	1.500 (38.10)	2.000 (56.80)			

Oversize Rod Information for 1 1/8" Bore Cylinders

(None available for 3/4" bore cylinders)

BORE	1 1/8" (28.58)
Ø Rod	.500 (12.70)
A	.750 (19.05)
CC	1/2 - 20
D	.437 (11.10)
KK	7/16 - 20
XX	3/8 - 24

All dimensions in inches (mm)

Cylinder Dimensions

BORE	1½" (38.10)	2" (50.80)	2½" (63.50)	3¼" (82.55)	4" (101.60)	5" (127.00)	6" (152.40)	7" (177.80)	8" (203.20)
ø Rod	.625 (15.88)	.625 (15.88)	.625 (15.88)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)
A	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)	1.625 (41.28)	1.625 (41.28)	1.625 (41.28)
AA	2.020 (51.31)	2.600 (66.04)	3.100 (78.74)	3.900 (99.06)	4.700 (119.38)	5.800 (147.32)	6.900 (175.26)	-	-
AB	.438 (11.11)	.438 (11.11)	.438 (11.11)	.563 (14.29)	.563 (14.29)	.688 (17.46)	.813 (20.64)	.813 (20.64)	.813 (20.64)
AH	1.188 (30.16)	1.438 (36.51)	1.625 (41.28)	1.938 (49.21)	2.250 (57.15)	2.750 (69.85)	3.250 (82.55)	3.750 (95.25)	4.250 (107.95)
AL	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.250 (31.75)	1.250 (31.75)	1.375 (34.93)	1.375 (34.93)	1.813 (46.04)	1.813 (46.04)
AO	.375 (9.53)	.375 (9.53)	.375 (9.53)	.500 (12.70)	.500 (12.70)	.625 (15.88)	.625 (15.88)	.688 (17.46)	.688 (17.46)
AT	.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	.125 (3.18)	.187 (4.75)	.187 (4.75)	.250 (6.35)	.250 (6.35)
B ^{+0.000} _{-.002}	1.124 (28.55)	1.124 (28.55)	1.124 (28.55)	1.499 (38.08)	1.499 (38.08)	1.499 (38.08)	1.999 (50.78)	1.999 (50.78)	1.999 (50.78)
BB	1.000 (25.40)	1.125 (28.58)	1.125 (28.58)	1.375 (34.93)	1.375 (34.93)	1.813 (46.04)	1.813 (46.04)	2.313 (58.74)	2.313 (58.74)
BD	1.250 (31.75)	1.500 (38.10)	1.500 (38.10)	2.000 (50.80)	2.000 (50.80)	2.000 (50.80)	2.500 (63.50)	2.500 (63.50)	2.500 (63.50)
C	.375 (9.53)	.375 (9.53)	.375 (9.53)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.625 (15.88)	.625 (15.88)	.625 (15.88)
CB	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.250 (31.75)	1.250 (31.75)	1.500 (38.10)	1.500 (38.10)	1.500 (38.10)
CC	½-20	½-20	½-20	⅞-14	⅞-14	⅞-14	1¼-12	1¼-12	1¼-12
CD	.500 (12.70)	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)
CW	.500 (12.70)	.500 (12.70)	.500 (12.70)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.750 (19.05)	.750 (19.05)	.750 (19.05)
D	.500 (12.70)	.500 (12.70)	.500 (12.70)	.813 (20.65)	.813 (20.65)	.813 (20.65)	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)
DD	¼-28	⅝-24	⅝-24	⅜-24	⅜-24	½-20	½-20	⅝-18	⅝-18
E	2.000 (50.80)	2.500 (63.50)	3.000 (76.20)	3.750 (95.25)	4.500 (114.30)	5.500 (139.70)	6.500 (165.10)	7.500 (190.50)	8.500 (215.90)
EB	.313 (7.94)	.375 (9.53)	.375 (9.53)	.438 (11.11)	.438 (11.11)	.563 (14.29)	.563 (14.29)	.563 (14.30)	.688 (17.46)
EE (N)	.250 (6.35)	.250 (6.35)	.250 (6.35)	.375 (9.53)	.375 (9.53)	.375 (9.53)	.500 (12.70)	.500 (12.70)	.500 (12.70)
EE (L)	.375 (9.53)	.375 (9.53)	.375 (9.53)	.500 (12.70)	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)	.750 (19.05)
EE (S)	6.000 (152.40)	6.000 (152.40)	6.000 (152.40)	10.000 (254.00)	10.000 (254.00)	10.000 (254.00)	12.000 (304.80)	12.000 (304.80)	12.000 (304.80)
EF	1.125 (28.58)	1.313 (33.34)	1.438 (36.51)	1.500 (38.10)	1.625 (41.28)	1.688 (42.88)	1.750 (44.45)	1.750 (44.45)	1.750 (44.45)
EL	.750 (19.05)	.938 (23.81)	1.063 (26.99)	.875 (22.23)	1.000 (25.40)	1.063 (26.99)	1.000 (25.40)	1.125 (28.58)	1.125 (28.58)
EO	.250 (6.35)	.313 (7.94)	.313 (7.94)	.375 (9.53)	.375 (9.53)	.500 (12.70)	.500 (12.70)	.625 (15.88)	.625 (15.88)
ET	.500 (12.70)	.750 (19.05)	.750 (19.05)	1.000 (25.40)	1.250 (31.75)	1.500 (38.10)	1.500 (38.10)	1.750 (44.45)	2.063 (52.39)
F	.375 (9.53)	.375 (9.53)	.375 (9.53)	.625 (15.88)	.625 (15.88)	.625 (15.88)	.750 (19.05)	.750 (19.05)	.750 (19.05)
FB	.313 (7.94)	.375 (9.53)	.375 (9.53)	.438 (11.11)	.438 (11.11)	.563 (14.29)	.563 (14.29)	-	-
FF	⅝-18	⅝-18	⅝-18	1-14	1-14	1-14	1⅜-12	1⅜-12	1⅜-12
FL	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)	1.875 (47.63)	1.875 (47.63)	1.875 (47.63)	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)
G	1.500 (38.10)	1.500 (38.10)	1.500 (38.10)	1.750 (44.45)	1.750 (44.45)	1.750 (44.45)	2.000 (50.80)	2.000 (50.80)	2.000 (50.80)
J	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.250 (31.75)	1.250 (31.75)	1.250 (31.75)	1.500 (38.10)	1.500 (38.10)	1.500 (38.10)
K	.250 (6.35)	.313 (7.94)	.313 (7.94)	.375 (9.53)	.375 (9.53)	.438 (11.11)	.438 (11.11)	.563 (14.29)	.563 (14.29)
KK	⅞-20	⅞-20	⅞-20	¾-16	¾-16	¾-16	1-14	1-14	1-14
L	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.250 (31.75)	1.250 (31.75)	1.500 (38.10)	1.500 (38.10)	1.500 (38.10)
LB	3.625 (92.08)	3.625 (92.08)	3.750 (95.25)	4.250 (107.95)	4.250 (107.95)	4.500 (114.30)	5.000 (127.00)	5.125 (130.18)	5.125 (130.18)
LR	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.250 (31.75)	1.250 (31.75)	1.250 (31.75)	1.500 (38.10)	1.500 (38.10)	1.500 (38.10)
M	.500 (12.70)	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)	.750 (19.05)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)
MM	.625 (15.88)	.625 (15.88)	.625 (15.88)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)
MR	.625 (15.88)	.625 (15.88)	.625 (15.88)	.938 (23.81)	.938 (23.81)	.938 (23.81)	1.188 (30.16)	1.188 (30.16)	1.188 (30.16)
ND	.375 (9.53)	.375 (9.53)	.500 (12.70)	.750 (19.05)	.750 (19.05)	.938 (23.81)	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)
NF	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.875 (47.63)	1.875 (47.63)	2.000 (50.80)	2.125 (53.98)	1.813 (46.06)	1.813 (46.04)

All dimensions in inches (mm)

BORE	1½" (38.10)	2" (50.80)	2½" (63.50)	3¼" (82.55)	4" (101.60)	5" (127.00)	6" (152.40)	7" (177.80)	8" (203.20)
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	3/4-10
P	2.313 (58.74)	2.313 (58.74)	2.438 (61.91)	2.625 (66.68)	2.625 (66.68)	2.875 (73.03)	3.125 (79.38)	3.250 (82.55)	3.250 (82.55)
R	1.428 (36.27)	1.838 (46.68)	2.192 (55.67)	2.758 (70.05)	3.323 (84.40)	4.101 (104.16)	4.879 (123.92)	5.730 (145.54)	6.442 (163.63)
SB	.438 (11.11)	.438 (11.11)	.438 (11.11)	.563 (14.29)	.563 (14.29)	.813 (20.64)	.813 (20.64)	.813 (20.64)	.813 (20.64)
SE	5.500 (139.70)	5.875 (149.23)	6.250 (158.75)	6.625 (168.28)	6.875 (174.63)	7.250 (184.15)	7.750 (196.85)	8.000 (203.20)	8.000 (203.20)
SH	1.000 (25.40)	1.250 (31.75)	1.500 (38.10)	1.875 (47.63)	2.250 (57.15)	2.750 (69.85)	3.250 (82.55)	3.750 (95.25)	4.250 (107.95)
SJ	.625 (15.88)	.625 (15.88)	.625 (15.88)	.750 (19.05)	.750 (19.05)	.813 (20.64)	.813 (20.64)	.813 (20.64)	.813 (20.64)
SN	2.250 (57.15)	2.250 (57.15)	2.375 (60.33)	2.625 (66.68)	2.625 (66.68)	2.875 (73.03)	3.125 (79.38)	3.250 (82.55)	3.250 (82.55)
ST	.500 (12.70)	.500 (12.70)	.500 (12.70)	.750 (19.05)	.750 (19.05)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)
SU ^{+.000} _{-.001}	1.125 (28.58)	1.125 (28.58)	1.125 (28.58)	1.250 (31.75)	1.250 (31.75)	1.063 (26.99)	1.313 (33.34)	1.313 (33.34)	1.313 (33.34)
SW	.375 (9.53)	.375 (9.53)	.375 (9.53)	.500 (12.70)	.500 (12.70)	.688 (17.46)	.688 (17.46)	.688 (17.46)	.688 (17.46)
TD	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)
TE	-	-	-	-	-	-	-	6.75 (171.45)	7.570 (192.27)
TF	2.750 (69.85)	3.375 (85.73)	3.875 (98.43)	4.688 (119.06)	5.438 (138.11)	6.625 (168.28)	7.625 (193.68)	-	-
TL	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)
TM	2.500 (63.50)	3.000 (76.20)	3.500 (88.90)	4.500 (114.30)	5.250 (133.35)	6.250 (158.75)	7.625 (193.68)	8.750 (222.25)	9.750 (247.65)
TN	.625 (15.88)	.875 (22.23)	1.250 (31.75)	1.500 (38.10)	2.063 (52.37)	2.688 (68.28)	3.250 (82.55)	3.500 (88.90)	4.500 (114.30)
TS	2.750 (69.85)	3.25 (82.55)	3.750 (95.25)	4.750 (120.65)	5.500 (139.70)	6.875 (174.63)	7.875 (200.03)	8.875 (225.43)	9.875 (250.83)
UF	3.375 (85.73)	4.125 (104.78)	4.625 (117.48)	5.500 (139.70)	6.250 (158.75)	7.625 (193.68)	8.625 (219.08)	-	-
UM	4.500 (114.3)	5.000 (127.00)	5.500 (139.70)	6.500 (165.10)	7.250 (184.15)	8.250 (209.55)	10.375 (263.53)	11.500 (292.10)	12.500 (317.50)
US	3.500 (88.90)	4.000 (101.60)	4.500 (114.30)	5.750 (146.05)	6.500 (165.10)	8.250 (209.55)	9.250 (234.95)	10.250 (260.35)	11.250 (285.75)
UT	4.000 (101.60)	4.500 (114.30)	5.000 (127.00)	5.750 (146.05)	6.500 (165.10)	7.500 (190.50)	9.250 (234.95)	10.250 (260.35)	11.250 (285.75)
UV	2.500 (63.50)	3.000 (76.20)	3.500 (88.90)	4.250 (107.95)	5.000 (127.00)	6.000 (152.40)	7.000 (177.80)	8.500 (215.90)	9.500 (241.30)
V	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)	.250 (6.35)	-	-
VF	.625 (15.88)	.625 (15.88)	.625 (15.88)	.875 (22.23)	.875 (22.23)	.875 (22.23)	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)
W	.625 (15.88)	.625 (15.88)	.625 (15.88)	.750 (19.05)	.750 (19.05)	.750 (19.05)	.875 (22.23)	-	-
WF	1.000 (25.40)	1.000 (25.40)	1.000 (25.40)	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.625 (41.28)	1.625 (41.28)	1.625 (41.28)
XA	5.625 (142.88)	5.625 (142.88)	5.750 (146.05)	6.875 (174.63)	6.875 (174.63)	7.250 (184.15)	8.000 (203.20)	8.562 (217.47)	8.562 (217.47)
XC	5.375 (136.53)	5.375 (136.53)	5.500 (139.70)	6.875 (174.63)	6.875 (174.63)	7.125 (180.98)	8.125 (206.38)	8.250 (209.55)	8.250 (209.55)
XD	5.750 (146.05)	5.750 (146.05)	5.875 (149.23)	7.500 (190.50)	7.500 (190.50)	7.750 (196.85)	8.875 (225.43)	9.000 (228.60)	9.000 (228.60)
XE	5.375 (136.53)	5.563 (141.29)	5.813 (147.64)	6.500 (165.10)	6.625 (168.28)	6.938 (176.21)	7.625 (193.68)	7.875 (200.03)	7.875 (200.03)
XG	1.750 (44.45)	1.750 (44.45)	1.750 (44.45)	2.250 (57.15)	2.250 (57.15)	2.250 (57.15)	2.625 (66.68)	2.625 (66.68)	2.625 (66.68)
XI min.	3.125 (79.38)	3.250 (82.55)	3.250 (82.55)	4.125 (104.78)	4.125 (104.78)	4.125 (104.78)	4.625 (117.48)	4.875 (123.83)	4.875 (123.83)
XJ	4.125 (104.78)	4.125 (104.78)	4.250 (107.95)	5.000 (127.00)	5.000 (127.00)	5.250 (133.35)	5.875 (149.23)	6.000 (152.40)	6.000 (152.40)
XS	1.375 (34.93)	1.375 (34.93)	1.375 (34.93)	1.875 (47.63)	1.875 (47.63)	2.062 (52.37)	2.313 (58.74)	2.313 (58.74)	2.313 (58.74)
XT	1.938 (49.21)	1.938 (49.21)	1.938 (49.21)	2.438 (61.91)	2.438 (61.91)	2.438 (61.91)	2.813 (71.44)	2.813 (71.44)	2.813 (71.44)
Y	1.875 (47.63)	1.875 (47.63)	1.875 (47.63)	2.438 (61.91)	2.438 (61.91)	2.438 (61.91)	2.813 (71.44)	2.813 (71.44)	2.813 (71.44)
ZB	4.875 (123.83)	4.938 (125.41)	5.063 (128.59)	6.000 (152.40)	6.000 (152.40)	6.313 (160.34)	7.063 (179.39)	7.313 (185.74)	7.313 (185.74)
ZE	5.625 (142.88)	5.875 (149.23)	6.125 (155.58)	6.875 (174.63)	7.000 (177.80)	7.438 (188.91)	8.125 (206.38)	8.500 (215.90)	8.500 (215.90)
ZF	5.000 (127.00)	5.000 (127.00)	5.125 (130.18)	6.250 (158.75)	6.250 (158.75)	6.500 (165.10)	7.375 (187.33)	-	-
ZJ	4.625 (117.48)	4.625 (117.48)	4.750 (120.65)	5.625 (142.88)	5.625 (142.88)	5.625 (142.88)	6.625 (168.28)	6.750 (185.74)	6.750 (185.74)
ZL	5.375 (136.53)	5.438 (138.11)	5.563 (141.29)	6.500 (165.10)	6.500 (165.10)	6.813 (174.04)	7.563 (192.09)	7.813 (198.44)	7.813 (198.44)
ZM	6.125 (155.58)	6.125 (155.58)	6.250 (158.75)	7.500 (190.50)	7.500 (190.50)	7.500 (190.50)	8.750 (222.25)	8.875 (225.43)	8.875 (225.43)

All dimensions in inches (mm)

HYDRO-LINE® Actuation Products



N5 SERIES CYLINDERS

- NFPA interchangeable
- N5–3000 psi nominal hydraulic
- AN5 – to 250 psi very heavy-duty pneumatic
- LAN5 – to 250 psi very heavy-duty pneumatic – permanently lubricated
- All steel construction



R5 SERIES CYLINDERS

- NFPA interchangeable
- A5/R5 – to 250 psi pneumatic
- LA5/LR5 – to 250 psi pneumatic – permanently lubricated
- HA5 – to 400 psi hydraulic
- HR5 – 1500 psi nominal hydraulic



HM SERIES CYLINDERS

- Conform to international metric specifications ISO 6020/2 and DIN 24 554
- 25 mm to 200 mm bore sizes
- 210 BAR nominal hydraulic
- All steel construction



FIELDMATE SERIES CYLINDERS

- ASAE interchangeable agricultural cylinders
- Rockford 2500–2500 psi hydraulic
- Rockford 3000–3000 psi hydraulic



SERIES 20/30 BOOSTERS

- Standard series to 5000 psi output
- Custom designs to 20,000 psi

T SERIES AIR/OIL TANKS

All steel construction

Q6T SERIES AIR/OIL TANKS

Aluminum end caps and translucent tubing



ELECTRONIC FEEDBACK CYLINDERS

Hydraulic or pneumatic cylinders which incorporate cylinder position sensing and feedback throughout the stroke. Available in N5, R5, A5, Q6, HM, HW, SM or special cylinders.



HW SERIES CYLINDERS

- Welded construction
- Heavy duty industrial grade
- 3000 psi nominal hydraulic



TSAVER CYLINDERS

- Threaded body construction
- To 250 psi pneumatic
- To 1000 psi nominal hydraulic



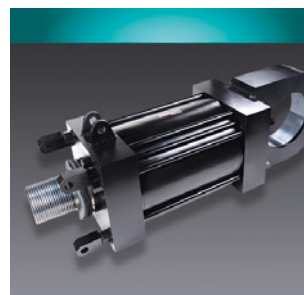
SM SERIES CYLINDERS

- Steel mill type construction
- MSM–2000 psi nominal hydraulic
- HSM–3000 psi nominal hydraulic
- ASM–Pneumatic



Q6 SERIES CYLINDERS

- NFPA Interchangeable
- Q6–250 psi pneumatic - permanently lubricated
- HQ6–400 psi hydraulic
- 3/4" to 8" Bores



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Custom cylinders to meet special requirements

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