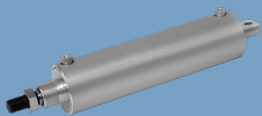
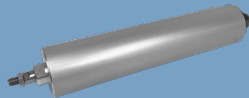


# FLAIRLINE

## PRODUCT CATALOG



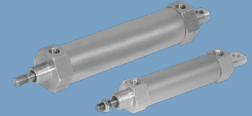
Round Body  
Repairable  
Cylinders



NFPA  
Interchangeable  
Round Body  
Cylinders



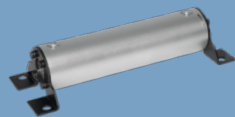
NFPA  
Tie-Rod  
Cylinders



Miniature  
(Digit)  
Cylinders



Flow Controls



Volume  
Chambers &  
Air Oil Tanks



Check Valves



Boretti Silencers



AMERICAN  
MADE



MONNIER  
COMPANIES

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# INTRODUCTION



## About Us

The durability, reliability, and unique key design of Flairline's products allow the company to exceed the needs and application requirements of its customers. This ability, paired with the cost-effectiveness of Flairline's repairable products, allows the company to provide unmatched service.

Flairline is an established, innovative manufacturer of a wide array of pneumatic and low-pressure hydraulic linear actuators, check valves and flow controls for a multitude of industries.

## Custom Solutions

Our unique ability to provide custom solutions has become a cornerstone of Flairline and has established us as a respected industry leader. This ability, combined with the cylinders' unique key design, allows Flairline to provide heavy duty, repairable, economical, and custom solutions for a variety of applications. At Flairline, custom solutions become standard.

The following list is just a few unique engineered products that we have designed and/or modified to meet customers' needs:

- Submersible low pressure hydraulic cylinders
- Puncture-Pin cylinders
- Torque Reaction actuators
- Multi-sensor cylinders
- High performance single-acting cylinders
- Low Friction actuators
- High performance tie-rod cylinders

## Markets Served

Flairline prides itself on the versatility of its products. The company successfully serves many industries including the following:

- Food Processing
- Dairy
- Fabrication
- Car Wash
- Ergonomic Assembly
- Material Handling
- Transportation
- Printing
- Medical
- Packaging
- Pharmaceutical
- Plastics
- Farming
- And More

## FLAIRLINE WARRANTY

Flairline warrants each product against defects in material and workmanship for a period of one year from the date of manufacturing providing its use was in accordance with Flairline recommendations. If the product fails to perform as warranted, Flairline will, at its option, repair or replace the product free of charge. The company will not be liable for incidental or consequential damages. We make no other warranty, expressed or implied, including warranties of merchantability or fitness for a particular purpose.

# INTRODUCTION



## Round Body Cylinders

Flairline offers a broad range of round body cylinders, including the original line, digit series, and NFPA interchangeable cylinders. Carefully constructed with components manufactured to exact tolerances, our products are thoroughly tested to provide outstanding performance and reliability. The machined aluminum components and thick wall sections of our extruded aluminum barrels make Flairline's cylinders the lightweight line with heavy-duty features.

## NFPA Tie Rod

Flairline's NFPA Tie Rod series features a machined aluminum construction, providing medium duty cylinders at a lightweight cost. Floating cushion seals with relief grooves offer fast breakaway and positive cushioning. The industry-leading low friction model (TL) operates with minimum breakaway force of 1/2 to 3 psi.

## Borrieti Silencers

Boretti Silencers maximize noise reduction of cylinders, valves, and air tools. Borrieti Silencers feature high-flow with low back pressure.

## Check Valves

Flairline's lightweight check valves feature a dilating o-ring as the only moving part. This allows quick actuation and millions of trouble-free cycles. Five standard NPT sizes from 1/8" - 3/4" are available, all of which are available with Buna or Viton Seals for high temperature applications. The O-Check design is unique within the industry, and it successfully provides high flow, requires no maintenance, and lengthens the useful life of the valve.

## Flow Controls

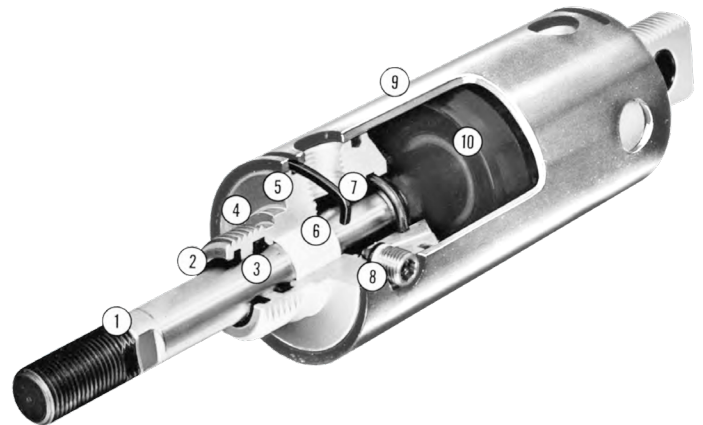
Flairline's flow control valves incorporate the unique O-Check design for rapid opening and closing without any other moving parts. This unique feature allows free flow in one direction and accurately metered flow in the opposite direction. The right-angle design eliminates additional 90-degree piping to the cylinder port. Standard metering needle design includes compound needle taper of 5 and 15 degrees and fine adjustment stem threads. Five NPT sizes between 1/8" & 3/4" are available, as are adjustment knobs and panel mounting. Optional swivel mounts allow 360 degree rotation for ease of installation.

# ROUND BODY CYLINDER CONSTRUCTION



- 1 Chrome-plated, high-strength, steel **Piston Rods** are corrosion resistant, rugged and durable. Wrench flats behind full rod diameter threads permit easy clevis mounting.
- 2 High-quality elastomer **Rod Wiper** protects rod seal by preventing contaminants from entering cylinder during retract stroke. Resilient synthetic rubber will not scratch rod.
- 3 Pressure-energized, U-cup type **Rod Seal** is wear compensating, low friction provides positive sealing.
- 4 Extra-large **Mounting Threads** and **Machined Grooves** make on-the-job mounting installation fast and secure.
- 5 Lightweight aluminum **Head** and **Caps** for long corrosion-resistant life.
- 6 Extra-long, low-friction nylon **Rod Bearing** 'gives' rather than wears under normal side loading. When necessary, service is easy; only the bearing is replaced, not the head. Permanent bronze rod bearing is featured on D and DM type cylinders for the extra side load capability.
- 7 Heads and caps are held to barrel by means of a **Circumflex Key**. The large square steel locking device requires no special installation tools. Service to head or cap can be done without disassembling the entire cylinder.

- 8 **Adjustable Cushions** available on 2" bore and larger. Under 2" bore cylinders have fixed cushions.
- 9 Precision-drawn, lightweight aluminum **Barrels** are hard-anodized inside and out for corrosion and abrasion resistance. Fine I.D. micro-finish provides long life and positive sealing.
- 10 Several **Piston** styles are offered for various application requirements.



## Durability

Flairline's repairable lightweight economical cylinders will out last and out perform competitive non-repairable cylinders.

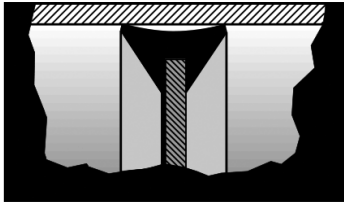
All Flairline cylinders are permanently lubricated for life.

# PISTON TYPES

FLAIRLINE

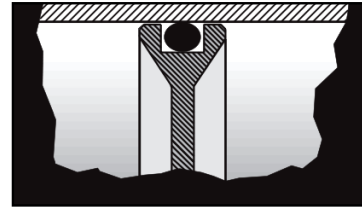
Series F, O/OLF, H, D, M & DM

## F TYPE



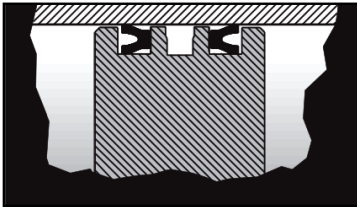
- Pressure energized, wear compensating double lip type. 'Uni-piston' seal (Buna N). Rubber bonded to a plated disc to ensure positive sealing.

## O/OLF TYPE



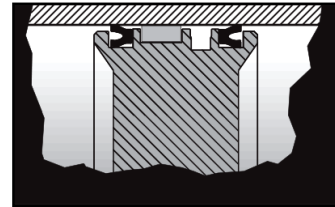
- Dynamic O-ring piston seal (Buna N standard; Viton available only on Series O.)
  - Proven to be reliable.
  - OLF is a low friction model.

## H TYPE



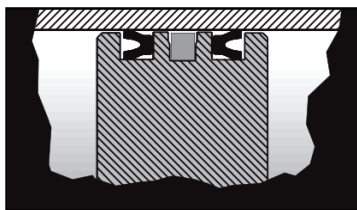
- Pressure energized, wear compensating U-cup piston seals (Buna N standard; Viton available.)

## D TYPE



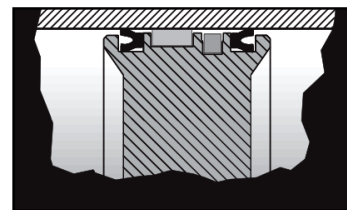
- Pressure energized, wear compensating U-cup piston seals (Buna N standard; Viton available.)
  - An acetal wear ring (bearing) prevents metal contact when side loading contact.

## M TYPE



- Pressure energized, wear compensating U-cup piston seals (Buna N standard; Viton available.)
  - Piston includes magnet.

## DM TYPE



- Pressure energized, wear compensating U-cup piston seals (Buna N standard; Viton available.)
  - Piston includes magnet.
- An acetal wear ring (bearing) prevents metal to metal contact when side loading.

**Standard Bore Sizes:** 1 $\frac{1}{8}$ ", 1 $\frac{1}{2}$ ", 2", 2 $\frac{1}{2}$ ", 3 $\frac{3}{4}$ ", 4". **Stroke Sizes:** Any stroke up to 130".  
**Cushions Available:** Either/both ends. **Pneumatic Only:** 150 psi maximum.

# MAINTENANCE

## Disassembly, Head End

Remove any fittings from the cylinder ports; wrap the **Barrel** in heavy cloth to prevent damage. Place the cap end of the cylinder **Barrel** in a vise.

As you rotate the **Head** counter-clockwise, use a screwdriver to lift the end of the **Circumflex Key** clear of the slot (**FIGURE 1**).

Continue rotation of the **Head**, and the **Circumflex Key** will feed out of the slot (**FIGURE 2**).

Gripping the rod, pull forward. The **Head**, **Rod**, and **Piston** will all come out of the **Barrel** (**FIGURE 4**).

Screw the **Head** off the **Rod Threads** for ease of clearing **Rod Packing**.

## Cap End

Slide the **Head** end back into the barrel to support the **Barrel** and follow the same procedure as above to remove the **Circumflex Key** from the cap end (**FIGURE 3**). If the cylinder has been used in wet or moist external conditions for a long period, the **Circumflex Key** may be corroded. If this is the case, apply penetrating oil into the lock slots prior to disassembly.

FIGURE 1

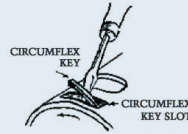


FIGURE 2

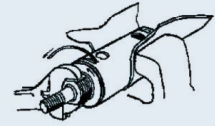


FIGURE 3

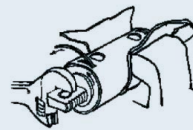


FIGURE 4



## Assembly

Replace the **Piston** (if necessary), **Rod Packings** and **Wiper** and all static seals. Clean the I.D. of the tube thoroughly. Lubricate the **Rod Packings** and the O.D. of the **Piston** prior to assembly. To reassemble the cylinder, follow the above procedure, except the heads will be turned clockwise after the **Circumflex Key** is engaged in the tang hole in the circumflex groove of the head. Turn clockwise until the **Circumflex Key** is completely into the groove and the cylinder head is aligned with the port hole in the **Barrel**. To get the head end over the **Rod Threads** without damaging the packing and wiper, wrap **Rod Threads** with tape.

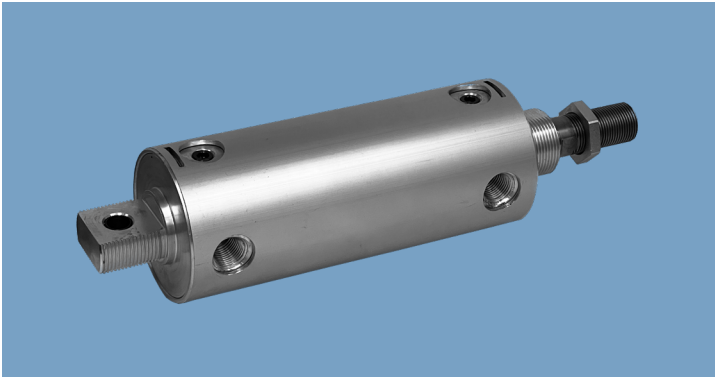
## FLAIRLINE WARRANTY

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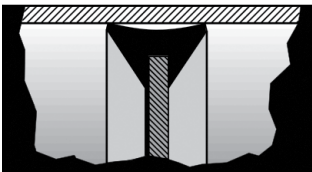
# ORIGINAL LINE

**FLAIRLINE**

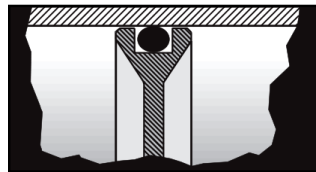
Series F, O/OLF, H & D



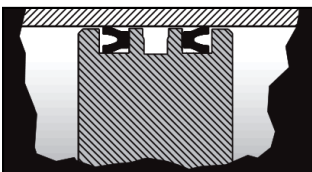
## AVAILABLE IN FOUR PISTON TYPES



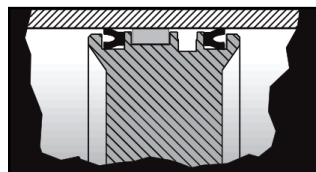
F TYPE



O/OLF TYPE



H TYPE



D TYPE

## Features

- Standard Bore Sizes: 1 1/8, 1 1/2, 2, 2 1/2, 3 1/4, 4
- Stroke Sizes: Any stroke up to 130"
- Cushions available: either/both ends

## Information

The Original Line is a family of double-acting cylinders, which can be used in nearly all types of applications where lightweight, economical, and durable actuators are required.

- Operating systems can be pneumatic or low pressure hydraulic
- OLF low friction series is ideal for applications where low minimum breakaway force is required
- D series is optimal for handling side load conditions
- Precision machined components and durable seals permit continuous operation in any environment

## Specifications

- **Maximum Pressure:**  
Pneumatic: 150 psi  
Hydraulic: Consult Factory
- **Operating Temperature:**  
0-200°F (Buna Seals)  
-18-93°C (Buna Seals)  
0-275°F (Viton Seals)  
-18-135°C (Viton Seals)

## FLAIRLINE WARRANTY

Flairline warrants each product against defects in material and workmanship for a period of one year from the date of manufacturing providing its use was in accordance with Flairline recommendations. If the product fails to perform as warranted, Flairline will, at its option, repair or replace the product free of charge. The company will not be liable for incidental or consequential damages. We make no other warranty, expressed or implied, including warranties of merchantability or fitness for a particular purpose.

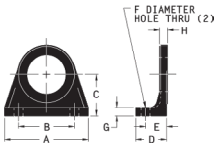


# ORIGINAL LINE

**FLAIRLINE**

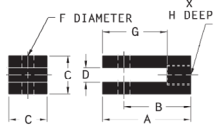
Series F, O/OLF, H & D

## Mounting Accessories



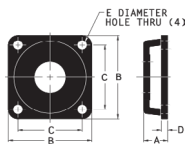
Mounting Nut included.

FOOT BRACKET									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	1-32-225	2 5/8	1 3/4	1 9/32	1	11/16	9/32	1/4	1/4
1/2	1-32-3	2 5/8	1 3/4	1 9/32	1	11/16	9/32	1/4	1/4
2, 2 1/2	1-32-4	3 1/4	2 1/4	1 15/16	1 1/32	11/16	11/32	1/4	1/4
3 1/4, 4	1-32-65	5 1/2	4	2 3/4	1 23/32	1 3/32	15/32	1/2	1/2



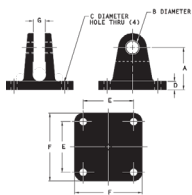
Connecting Pin included.

ROD CLEVIS									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	1-35-225	2 5/16	1 3/4	1	3/8	1/2-20	5/16	1 11/16	1 1/16
1 1/2, 2, 2 1/2	1-35-3	2 5/8	1 3/4	1	17/32	5/8-18	7/16	1 11/16	1 1/16
3 1/4, 4	1-35-65	3 3/8	2 5/8	1 1/2	2 1/32	1-14	1/2	1 9/16	1 1/4



Mounting Nut included.

FLANGE BRACKET						
Bore Size	No.	Dimensions				
		A	B	C	D	E
1/8	1-33-225	15/16	2 1/2	2	1/4	9/32
1 1/2, 2, 2 1/2	1-33-4	15/16	3 1/4	2 1/2	1/4	11/32
3 1/4, 4	1-33-65	1 19/32	5 1/4	4	1/2	15/32



Connecting Pin included.

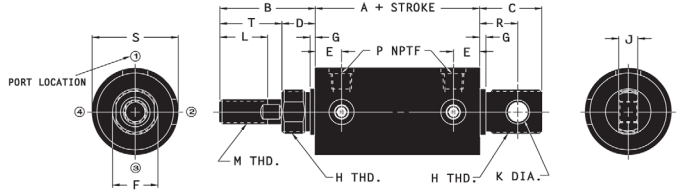
SWIVEL BRACKET								
Bore Size	No.	Dimensions						
		A	B	C	D	E	F	G
1/8, 1/2	1-34-3	1 1/4	5/16	9/32	5/16	1 3/4	2 1/4	17/32
2, 2 1/2	1-34-4	1 7/8	7/16	11/32	3/8	2 1/4	3	17/32
3 1/4, 4	1-34-65	2 7/8	1/2	15/32	1/2	3	4	25/32



Rod nut included on all F, O, H, D, M & DM type cylinders.

MOUNTING NUT			
Bore Size	No.	Dimensions	
		Height	Across Flats
1/8	1-38-16	11/32	1 3/8
1 1/2, 2, 2 1/2	1-38-20	19/32	1 5/8
3 1/4, 4	1-38-28	11/16	2 1/4

## Dimensions



Notes: AH + STROKE (Series H/D).  
For Series H/D add 1.0" to A dimension.

Dimension Reference	Cylinder Bore					
	1 1/8"	1 1/2"	2"	2 1/2"	3 1/4"	4"
A	2 25/32	3 5/16	3 5/16	3 5/16	4 11/16	4 11/16
B	2 1/8	2 1/2	2 1/2	2 1/2	3 19/32	3 19/32
C	1 1/16	1 1/4	1 5/8	1 5/8	1 11/16	1 11/16
D	5/8	7/8	7/8	7/8	1 7/32	1 7/32
E	19/32	11/16	11/16	11/16	31/32	31/32
F	1 1/16	1 3/16	1 3/16	1 3/16	1 11/16	1 11/16
G	1/8	5/32	5/32	5/32	5/32	5/32
H	1-14	1 1/8-12	1 1/8-12	1 1/8-12	1 5/8-12	1 5/8-12
J	1/2	1/2	1/2	1/2	3/4	3/4
K	5/16	5/16	7/16	7/16	1/2	1/2
L	1 1/8	1 1/4	1 1/4	1 1/4	1 7/8	1 7/8
M*	1/2-20	5/8-18	5/8-18	5/8-18	1-14	1-14
P-NPTF	1/8	1/4	1/4	1/4	1/2	1/2
R	11/16	7/8	1	1	1	1
S	1 3/8	1 3/4	2 1/4	2 3/4	3 1/2	4 1/4
T	1 1/2	1 5/8	1 5/8	1 5/8	2 3/8	2 3/8

# ORIGINAL LINE

**FLAIRLINE**

Series F, O/OLF, H & D

## Ordering Information

**F 2 X 6 T = 5 1/2 H NT**

PISTON	BORE SIZE	STROKE LENGTH	SPECIAL OPTIONS
F O OLF H D	1 1/8 1 1/2 2 2 1/2 3 1/4 4	Any length in inch increments or fraction thereof up to and including 130"	<p>CUSHIONS HEAD ONLY CAP ONLY BOTH METAL ROD SCRAPER EXTRA INLET PORT(S) <b>Indicate location(s) (PP2, PP3, PP4) in cap or head end</b> TANG AT 90° FROM STANDARD NO TANG STAINLESS STEEL CIRCUMFLEX KEYS STOP TUBES CUSTOM T DIMENSION (ROD EXTENSION) SPECIAL L DIMENSION (THREAD LENGTH) SPECIAL M DIMENSION (THREAD SIZE) SPECIAL M DIMENSION (TAPPED HOLE IN ROD END) STAINLESS STEEL RODS</p> <p>H C HC MRS TANG 90° NT SS KEYS CONSULT FACTORY T = Dimension L = Dimension M = Size or Plain Rod End M = Size and depth SS ROD</p>

## Replacement Parts

**PK KIT F 2**

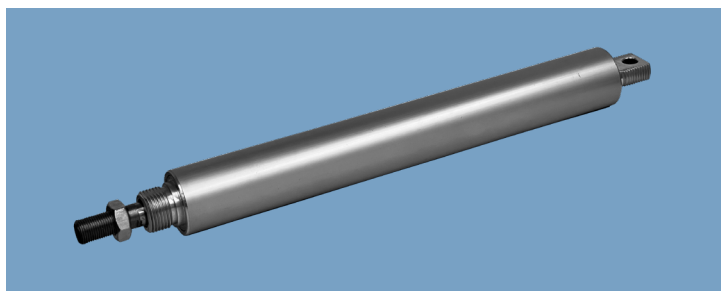
PISTON	BORE SIZE
F O OLF H D	1 1/8 1 1/2 2 2 1/2 3 1/4 4

PROUD TO BE  
**MADE IN AMERICA**

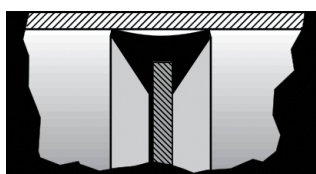
# SINGLE-ACTING CYLINDERS

**FLAIRLINE**

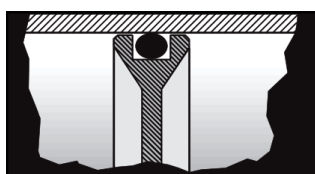
Series FSR, OSR, HSR & DSR



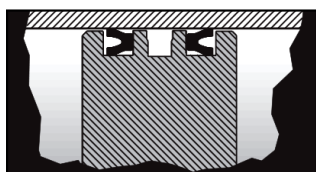
## AVAILABLE IN FOUR PISTON TYPES



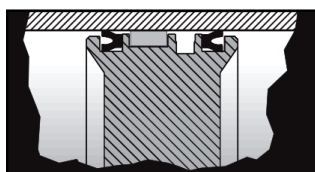
**F TYPE** For FSR



**O TYPE** For OSR



**H TYPE** For HSR



**D TYPE** For DSR

## Features

- Standard Bore Sizes: 2, 2 1/2, 3 1/4, 4
- Stroke Sizes: 1" to 6" (1" increments)  
(Consult factory for larger stroke requirements)
- Cushions available: head end when normally extended, cap end when normally retracted

## Information

The Flairline single-acting cylinder offers the same quality, performance and features as the double-acting model.

- Actuated by pressurizing only one port, a spring provides the required force to return the piston rod to its normal position
- Single actuation conserves energy and can minimize control valve expense

## Specifications

- **Maximum Pressure:**  
Pneumatic: 150 psi  
Hydraulic: Consult Factory
- **Operating Temperature:**  
0-200°F (Buna Seals)  
-18-93°C (Buna Seals)  
0-275°F (Viton Seals)  
-18-135°C (Viton Seals)

## FLAIRLINE WARRANTY

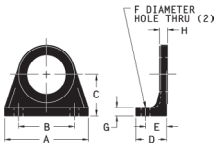
Flairline warrants each product against defects in material and workmanship for a period of one year from the date of manufacturing providing its use was in accordance with Flairline recommendations. If the product fails to perform as warranted, Flairline will, at its option, repair or replace the product free of charge. The company will not be liable for incidental or consequential damages. We make no other warranty, expressed or implied, including warranties of merchantability or fitness for a particular purpose.

# SINGLE-ACTING CYLINDERS

**FLAIRLINE**

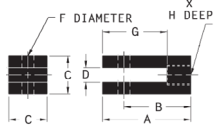
Series FSR, OSR, HSR & DSR

## Mounting Accessories



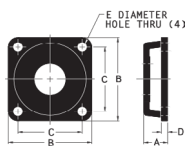
Mounting Nut included.

FOOT BRACKET									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	1-32-225	2 5/8	1 3/4	1 9/32	1	11/16	9/32	1/4	1/4
1/2	1-32-3	2 5/8	1 3/4	1 9/32	1	11/16	9/32	1/4	1/4
2, 2 1/2	1-32-4	3 1/4	2 1/4	1 15/16	1 1/32	11/16	11/32	1/4	1/4
3 1/4, 4	1-32-65	5 1/2	4	2 3/4	1 25/32	1 3/32	15/32	1/2	1/2



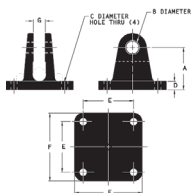
Connecting Pin included.

ROD CLEVIS									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	1-35-225	2 5/16	1 3/4	1	3/8	1/2-20	5/16	11/16	11/16
1 1/2, 2, 2 1/2	1-35-3	2 5/8	1 3/4	1	17/32	5/8-18	7/16	11/16	11/16
3 1/4, 4	1-35-65	3 3/8	2 5/8	1 1/2	2 1/32	1-14	1/2	1 9/16	1 1/4



Mounting Nut included.

FLANGE BRACKET						
Bore Size	No.	Dimensions				
		A	B	C	D	E
1/8	1-33-225	15/16	2 1/2	2	1/4	9/32
1 1/2, 2, 2 1/2	1-33-4	15/16	3 1/4	2 1/2	1/4	11/32
3 1/4, 4	1-33-65	1 19/32	5 1/4	4	1/2	15/32



Connecting Pin included.

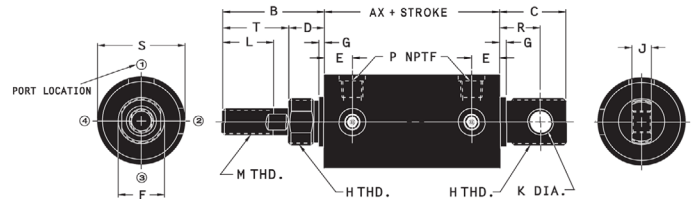
SWIVEL BRACKET								
Bore Size	No.	Dimensions						
		A	B	C	D	E	F	G
1/8, 1/2	1-34-3	1 1/4	5/16	9/32	5/16	1 3/4	2 1/4	17/32
2, 2 1/2	1-34-4	1 7/8	7/16	11/32	3/8	2 1/4	3	17/32
3 1/4, 4	1-34-65	2 7/8	1 1/2	15/32	1/2	3	4	25/32



Rod nut included on all F, O, H, D, M & DM type cylinders.

MOUNTING NUT				
Bore Size	No.	Dimensions		
		Height	Across Flats	
1/8	1-38-16	11/32	1 3/8	
1 1/2, 2, 2 1/2	1-38-20	19/32	1 5/8	
3 1/4, 4	1-38-28	11/16	2 1/4	

## Dimensions



Note: Series HSR and DSR adds 1" to all AX dimensions.

Dimension Reference	Cylinder Bore					
	1 1/8"	1 1/2"	2"	2 1/2"	3 1/4"	4"
AX	2 25/32	3 5/16	3 5/16	3 5/16	4 11/16	4 11/16
B	2 1/8	2 1/2	2 1/2	2 1/2	3 19/32	3 19/32
C	1 1/16	1 1/4	1 5/8	1 5/8	1 11/16	1 11/16
D	5/8	7/8	7/8	7/8	1 7/32	1 7/32
E	19/32	11/16	11/16	11/16	31/32	31/32
F	1 1/16	1 3/16	1 3/16	1 3/16	1 11/16	1 11/16
G	1/8	5/32	5/32	5/32	5/32	5/32
H	1-14	1 1/8-12	1 1/8-12	1 1/8-12	1 5/8-12	1 5/8-12
J	1/2	1/2	1/2	1/2	3/4	3/4
K	5/16	5/16	7/16	7/16	1/2	1/2
L	1 1/8	1 1/4	1 1/4	1 1/4	1 7/8	1 7/8
M*	1/2-20	5/8-18	5/8-18	5/8-18	1-14	1-14
P-NPTF	1/8	1/4	1/4	1/4	1/2	1/2
R	11/16	7/8	1	1	1	1
S	1 3/8	1 3/4	2 1/4	2 3/4	3 1/2	4 1/4
T	1 1/2	1 5/8	1 5/8	1 5/8	2 3/8	2 3/8

### AX Dimension Chart Including Stroke Lengths

1" or Less	6 25/32	7 5/16	7 5/16	7 5/16	8 11/16	8 11/16
Over 1" to 1 1/2"	7 25/32	8 5/16	8 5/16	8 5/16	9 11/16	9 11/16
Over 1 1/2" to 2 1/2"	8 25/32	9 5/16	9 5/16	9 5/16	10 11/16	10 11/16
Over 2 1/2" to 3"	9 25/32	10 5/16	10 5/16	10 5/16	11 11/16	11 11/16
Over 3" to 3 1/2"	10 25/32	11 5/16	11 5/16	11 5/16	12 11/16	12 11/16
Over 3 1/2" to 4"	11 25/32	12 5/16	12 5/16	12 5/16	13 11/16	13 11/16
Over 4 1/2" to 5 1/2"	11 25/32	14 5/16	14 5/16	14 5/16	15 11/16	15 11/16
Over 5 1/2" to 6"	11 25/32	16 5/16	16 5/16	16 5/16	17 11/16	17 11/16

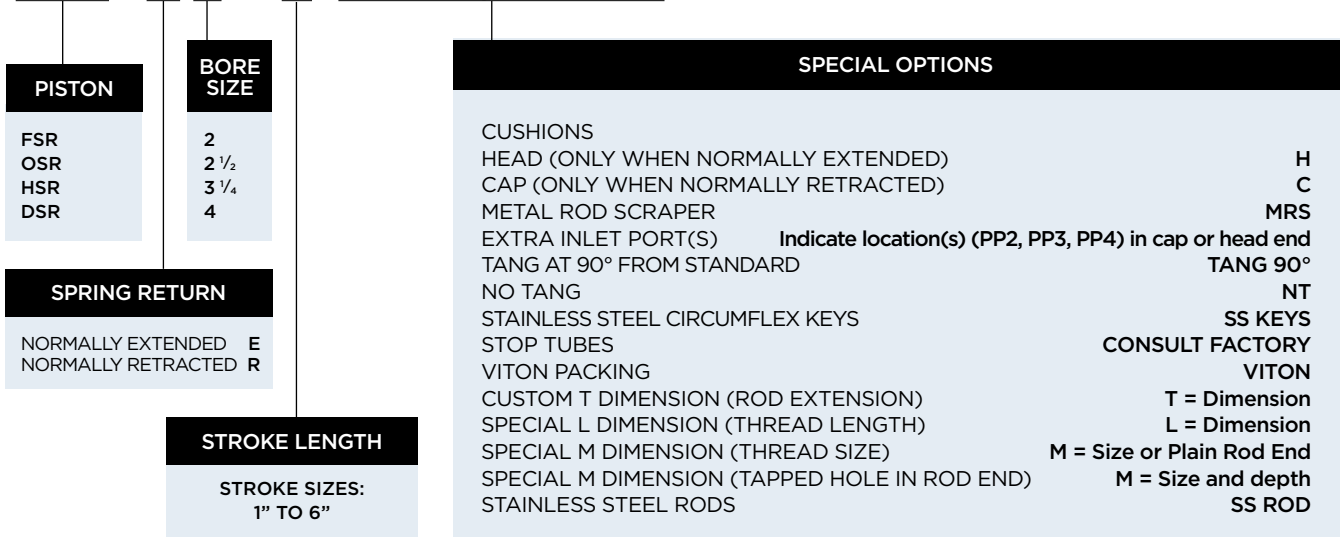
# SINGLE-ACTING CYLINDERS

**FLAIRLINE**

Series FSR, OSR, HSR & DSR

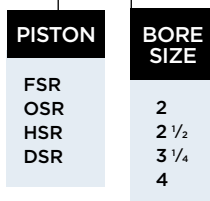
## Ordering Information

**FSR - R 2 X 6 T = 5 1/2 H NT**



## Replacement Parts

**PK KIT FSR 2**

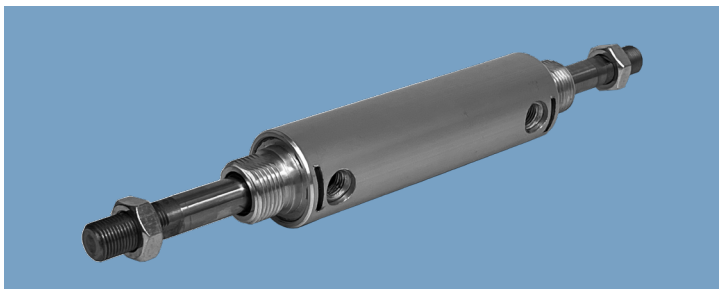


PROUD TO BE  
**MADE IN AMERICA**

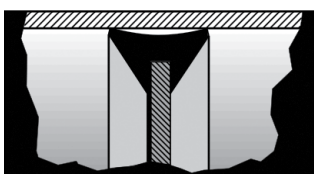
# DOUBLE-ACTING DOUBLE-ENDED CYLINDERS

**FLAIRLINE**

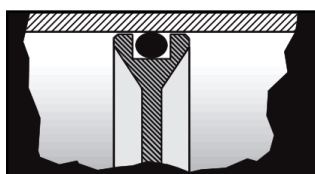
Series FDE, ODE, HDE & DDE



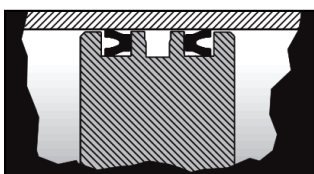
## AVAILABLE IN FOUR PISTON TYPES



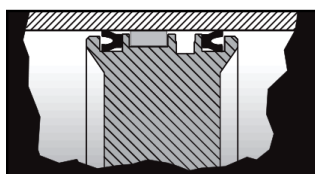
**F TYPE** For FDE



**O TYPE** For ODE



**H TYPE** For HDE



**D TYPE** For DDE

## Features

- Standard Bore Sizes: 1 1/8, 1 1/2, 2, 2 1/2, 3 1/4 & 4 (FDE only available up to 2 1/2 bore size)
- Stroke Sizes: Any stroke up to 130"
- Cushions available: either/both ends

## Information

The double-acting double-ended cylinders can be used in nearly all types of applications where lightweight, economical, and durable actuators are required.

- Double-ended cylinders allow equal force and speed in either direction
- A large selection of rod mounting attachments permit work at both ends
- Customizable attachments are available

## Specifications

- **Maximum Pressure:**  
Pneumatic: 150 psi  
Hydraulic: Consult Factory
- **Operating Temperature:**  
0-200°F (Buna Seals)  
-18-93°C (Buna Seals)  
0-275°F (Viton Seals)  
-18-135°C (Viton Seals)

## FLAIRLINE WARRANTY

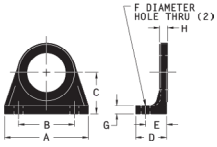
Flairline warrants each product against defects in material and workmanship for a period of one year from the date of manufacturing providing its use was in accordance with Flairline recommendations. If the product fails to perform as warranted, Flairline will, at its option, repair or replace the product free of charge. The company will not be liable for incidental or consequential damages. We make no other warranty, expressed or implied, including warranties of merchantability or fitness for a particular purpose.

# DOUBLE-ACTING DOUBLE-ENDED CYLINDERS

**FLAIRLINE**

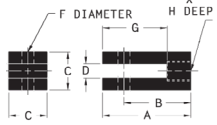
Series FDE, ODE, HDE & DDE

## Mounting Accessories



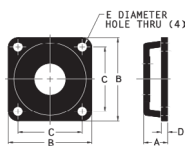
Mounting Nut included.

FOOT BRACKET									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	1-32-225	2 5/8	1 3/4	1 9/32	1	11/16	9/32	1/4	1/4
1/2	1-32-3	2 5/8	1 3/4	1 9/32	1	11/16	9/32	1/4	1/4
2, 2 1/2	1-32-4	3 1/4	2 1/4	1 15/16	1 1/32	11/16	11/32	1/4	1/4
3 1/4, 4	1-32-65	5 1/2	4	2 3/4	1 23/32	1 3/32	15/32	1/2	1/2



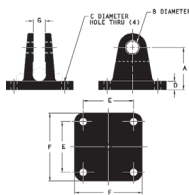
Connecting Pin included.

ROD CLEVIS									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	1-35-225	2 5/16	1 3/4	1	3/8	1/2-20	5/16	1 11/16	1 1/16
1 1/2, 2, 2 1/2	1-35-3	2 3/8	1 3/4	1	17/32	5/8-18	7/16	1 11/16	1 1/16
3 1/4, 4	1-35-65	3 3/8	2 5/8	1 1/2	2 1/32	1-14	1/2	1 9/16	1 1/4



Mounting Nut included.

FLANGE BRACKET						
Bore Size	No.	Dimensions				
		A	B	C	D	E
1/8	1-33-225	15/16	2 1/2	2	1/4	9/32
1 1/2, 2, 2 1/2	1-33-4	15/16	3 1/4	2 1/2	1/4	11/32
3 1/4, 4	1-33-65	1 19/32	5 1/4	4	1/2	15/32



Connecting Pin included.

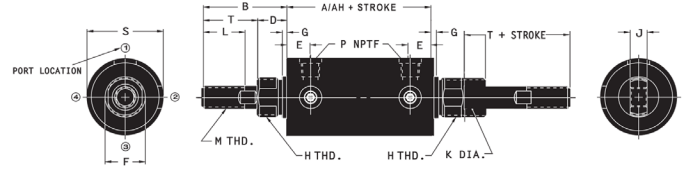
SWIVEL BRACKET								
Bore Size	No.	Dimensions						
		A	B	C	D	E	F	G
1/8, 1 1/2	1-34-3	1 1/4	5/16	9/32	5/16	1 3/4	2 1/4	17/32
2, 2 1/2	1-34-4	1 7/8	7/16	11/32	3/8	2 1/4	3	17/32
3 1/4, 4	1-34-65	2 7/8	1/2	15/32	1/2	3	4	25/32



Rod nut included on all F, O, H, D, M & DM type cylinders.

MOUNTING NUT			
Bore Size	No.	Dimensions	
		Height	Across Flats
1/8	1-38-16	11/32	1 3/8
1 1/2, 2, 2 1/2	1-38-20	19/32	1 5/8
3 1/4, 4	1-38-28	11/16	2 1/4

## Dimensions



Note: For HDE/DDE use AH Dimension in place of A dimension.

Dimension Reference	Cylinder Bore					
	1 1/8"	1 1/2"	2"	2 1/2"	3 1/4"	4"
<b>A</b>	2 25/32	3 5/16	3 5/16	3 5/16	4 11/16	4 11/16
<b>B</b>	2 1/8	2 1/2	2 1/2	2 1/2	3 19/32	3 19/32
<b>D</b>	5/8	7/8	7/8	7/8	1 7/32	1 7/32
<b>E</b>	19/32	11/16	11/16	11/16	31/32	31/32
<b>F</b>	1 1/16	1 3/16	1 3/16	1 3/16	1 11/16	1 11/16
<b>G</b>	1/8	5/32	5/32	5/32	5/32	5/32
<b>H</b>	1-14	1 1/8-12	1 1/8-12	1 1/8-12	1 5/8-12	1 5/8-12
<b>J</b>	1/2	1/2	1/2	1/2	3/4	3/4
<b>K</b>	5/16	5/16	7/16	7/16	1/2	1/2
<b>L</b>	1 1/8	1 1/4	1 1/4	1 1/4	1 7/8	1 7/8
<b>M</b>	1/2-20	5/8-18	5/8-18	5/8-18	1-14	1-14
<b>P-NPTF</b>	1/8	1/4	1/4	1/4	1/2	1/2
<b>S</b>	1 3/8	1 3/4	2 1/4	2 3/4	3 1/2	4 1/4
<b>T</b>	1 1/2	1 5/8	1 5/8	1 5/8	2 3/8	2 3/8
<b>AH</b>	3 25/32	4 5/16	4 5/16	4 5/16	5 11/16	5 11/16

# DOUBLE-ACTING DOUBLE-ENDED CYLINDERS



## Series FDE, ODE, HDE & DDE

### Ordering Information

**FDE 2 X 6 T = 5 1/2 H NT**

PISTON		STROKE LENGTH				SPECIAL OPTIONS	
FDE		Any length in inch increments or fraction thereof up to and including 130"				CUSHIONS	
ODE						HEAD (ONE END ONLY)	H
HDE						BOTH	HH
DDE						METAL ROD SCRAPER	MRS
		BORE SIZE				EXTRA INLET PORT(S)	Indicate location(s) (PP2, PP3, PP4) in cap or head end
FDE	ODE	HDE	DDE		TANG AT 90° FROM STANDARD	TANG 90°	
1/8	1/8	1/8	1/8		NO TANG	NT	
1/2	1/2	1/2	1/2		STAINLESS STEEL CIRCUMFLEX KEYS	SS KEYS	
2	2	2	2		STOP TUBES	CONSULT FACTORY	
2 1/2	2 1/2	2 1/2	2 1/2		VITON PACKING	VITON	
	3/4	3/4	3/4		CUSTOM T DIMENSION (ROD EXTENSION)	T = Dimension	
	4	4	4		SPECIAL L DIMENSION (THREAD LENGTH)	L = Dimension	
						SPECIAL M DIMENSION (THREAD SIZE)	M = Size or Plain Rod End
						SPECIAL M DIMENSION (TAPPED HOLE IN ROD END)	M = Size and depth
						STAINLESS STEEL RODS	SS ROD

### Replacement Parts

**PK KIT FDE 2**

PISTON	BORE SIZE
FDE	1/8
ODE	1/2
HDE	2
DDE	2 1/2
	3 1/4
	4

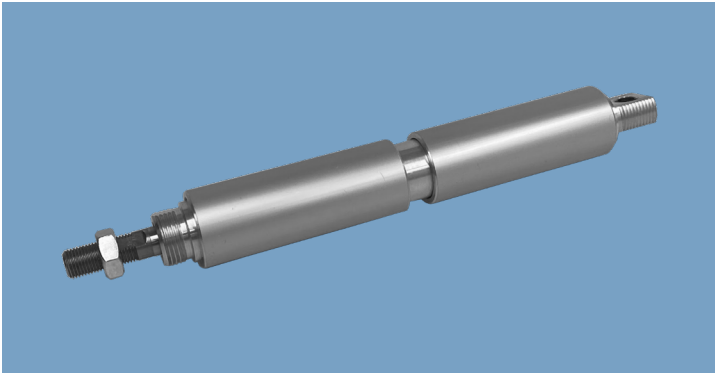
PROUD TO BE  
**MADE IN AMERICA**



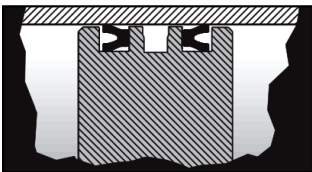
# TANDEM CYLINDERS

**FLAIRLINE**

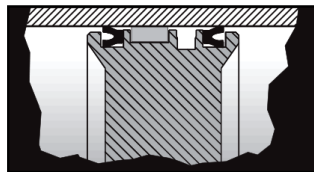
Series FT & DT



## AVAILABLE IN TWO PISTON TYPES



**H TYPE** For FT



**D TYPE** For DT

## Features

- Standard Bore Sizes: 1 1/2, 2, 2 1/2, 3 1/4, 4
- Stroke Sizes: Any stroke up to 130"
- Cushions available: either/both ends (not standard on center head)
- Used to multiply force without increasing pressure or bore size

## Information

Tandem models consist of two double acting cylinders mounted in line with the pistons connected to a common piston rod. Perfect when a large amount of force is required in a small-diameter cylinder.

- Double-ended models available

## Specifications

- **Maximum Pressure:**
  - Pneumatic: 150 psi
  - Hydraulic: Consult Factory
- **Operating Temperature:**
  - 0-200°F (Buna Seals)
  - 18-93°C (Buna Seals)
  - 0-275°F (Viton Seals)
  - 18-135°C (Viton Seals)

## FLAIRLINE WARRANTY

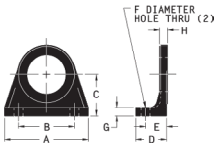
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# TANDEM CYLINDERS

FLAIRLINE

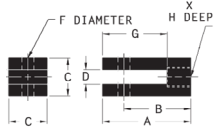
Series FT & DT

## Mounting Accessories



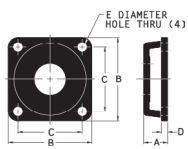
Mounting Nut included.

FOOT BRACKET									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	1-32-225	2 5/8	1 3/4	1 9/32	1	11/16	9/32	1/4	1/4
1/2	1-32-3	2 5/8	1 3/4	1 9/32	1	11/16	9/32	1/4	1/4
2, 2 1/2	1-32-4	3 1/4	2 1/4	1 15/16	1 1/32	11/16	11/32	1/4	1/4
3 1/4, 4	1-32-65	5 1/2	4	2 3/4	1 23/32	1 3/32	15/32	1/2	1/2



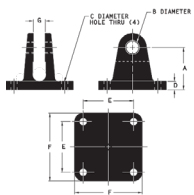
Connecting Pin included.

ROD CLEVIS									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	1-35-225	2 5/16	1 3/4	1	3/8	1/2-20	5/16	1 11/16	1 1/16
1 1/2, 2, 2 1/2	1-35-3	2 5/8	1 3/4	1	17/32	5/8-18	7/16	1 11/16	1 1/16
3 1/4, 4	1-35-65	3 3/8	2 5/8	1 1/2	2 1/32	1-14	1/2	1 9/16	1 1/4



Mounting Nut included.

FLANGE BRACKET						
Bore Size	No.	Dimensions				
		A	B	C	D	E
1/8	1-33-225	15/16	2 1/2	2	1/4	9/32
1 1/2, 2, 2 1/2	1-33-4	15/16	3 1/4	2 1/2	1/4	11/32
3 1/4, 4	1-33-65	1 19/32	5 1/4	4	1/2	15/32



Connecting Pin included.

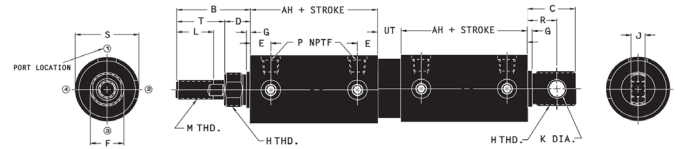
SWIVEL BRACKET								
Bore Size	No.	Dimensions						
		A	B	C	D	E	F	G
1/8, 1 1/2	1-34-3	1 1/4	5/16	9/32	5/16	1 3/4	2 1/4	17/32
2, 2 1/2	1-34-4	1 7/8	7/16	11/32	3/8	2 1/4	3	17/32
3 1/4, 4	1-34-65	2 7/8	1 1/2	15/32	1/2	3	4	25/32



Rod nut included on all F, O, H, D, M & DM type cylinders.

MOUNTING NUT				
Bore Size	No.	Dimensions		
		Height	Across Flats	
1/8	1-38-16	11/32	1 3/8	
1 1/2, 2, 2 1/2	1-38-20	19/32	1 5/8	
3 1/4, 4	1-38-28	11/16	2 1/4	

## Dimensions



Dimension Reference	Cylinder Bore					
	1 1/8"	1 1/2"	2"	2 1/2"	3 1/4"	4"
B	2 1/8	2 1/2	2 1/2	2 1/2	3 19/32	3 19/32
C	1 1/16	1 1/4	1 5/8	1 5/8	1 11/16	1 11/16
D	5/8	7/8	7/8	7/8	1 7/32	1 7/32
E	19/32	11/16	11/16	11/16	31/32	31/32
F	1 1/16	1 3/16	1 3/16	1 3/16	1 11/16	1 11/16
G	1/8	5/32	5/32	5/32	5/32	5/32
H	1-14	1 1/8-12	1 1/8-12	1 1/8-12	1 5/8-12	1 5/8-12
J	1/2	1/2	1/2	1/2	3/4	3/4
K	5/16	5/16	7/16	7/16	1/2	1/2
L	1 1/8	1 1/4	1 1/4	1 1/4	1 7/8	1 7/8
M	1/2-20	5/8-18	5/8-18	5/8-18	1-14	1-14
P-NPTF	1/8	1/4	1/4	1/4	1/2	1/2
R	11/16	7/8	1	1	1	1
S	1 3/8	1 3/4	2 1/4	2 3/4	3 1/2	4 1/4
T	1 1/2	1 5/8	1 5/8	1 5/8	2 3/8	2 3/8
AH	3 25/32	4 5/16	4 5/16	4 5/16	5 11/16	5 11/16
UT	—	3/4	3/4	3/4	1 1/8	1 1/8

# TANDEM CYLINDERS

**FLAIRLINE**

Series FT & DT

## Ordering Information

**FT 2 X 6 T = 5 1/2 H NT**

PISTON	BORE SIZE	STROKE LENGTH	SPECIAL OPTIONS
FT DT	1 1/2 2 2 1/2 3 1/4 4	Any length in inch increments or fraction thereof up to and including 130"	<p>CUSHIONS (ROD END ONLY)</p> <p>HEAD H</p> <p>CAP C</p> <p>BOTH HC</p> <p>METAL ROD SCRAPER MRS</p> <p>EXTRA INLET PORT(S) Indicate location(s) (PP2, PP3, PP4) in cap or head end</p> <p>TANG AT 90° FROM STANDARD TANG 90°</p> <p>NO TANG NT</p> <p>STAINLESS STEEL CIRCUMFLEX KEYS SS KEYS</p> <p>STOP TUBES CONSULT FACTORY</p> <p>VITON PACKING VITON</p> <p>CUSTOM T DIMENSION (ROD EXTENSION) T = Dimension</p> <p>SPECIAL L DIMENSION (THREAD LENGTH) L = Dimension</p> <p>SPECIAL M DIMENSION (THREAD SIZE) M = Size or Plain Rod End</p> <p>SPECIAL M DIMENSION (TAPPED HOLE IN ROD END) M = Size and depth</p> <p>STAINLESS STEEL RODS SS ROD</p>

## Replacement Parts

**PK KIT FT 2**

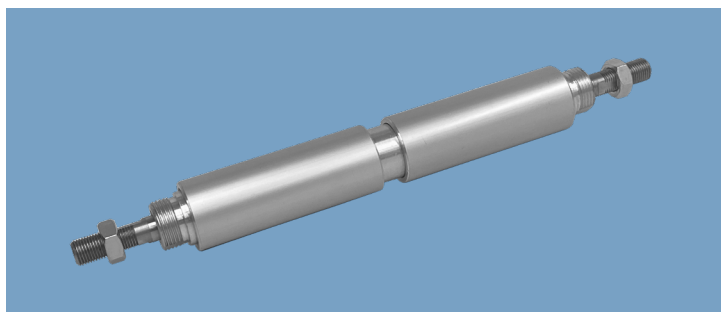
PISTON	BORE SIZE
FT DT	1 1/2 2 2 1/2 3 1/4 4

PROUD TO BE  
**MADE IN AMERICA**

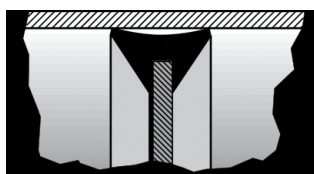
# CAP-TO-CAP CYLINDERS

**FLAIRLINE**

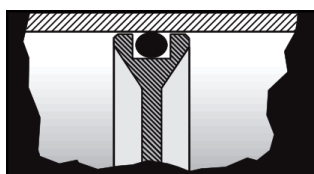
Series FCC, OCC, HCC & DCC



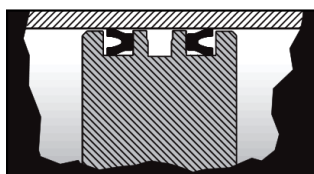
## AVAILABLE IN FOUR PISTON TYPES



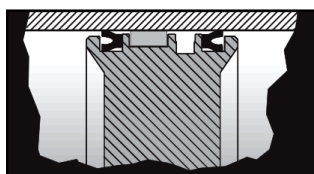
**F TYPE** For FCC



**O TYPE** For OCC



**H TYPE** For HCC



**D TYPE** For DCC

## Features

- Standard Bore Sizes:  
1 1/8, 1 1/2, 2, 2 1/2, 3 1/4, 4
- Stroke Sizes: Any combined stroke up to 130"
- Cushions available: either/both ends

## Information

Cap-to-cap models incorporate two F, O, H, or D type cylinders joined at the cap end by a common center section. This is a very flexible product to accurately achieve three positions with the same stroke, or four positions with a different stroke, depending on application.

## Specifications

- **Maximum Pressure:**  
Pneumatic: 150 psi  
Hydraulic: Consult Factory
- **Operating Temperature:**  
0-200°F (Buna Seals)  
-18-93°C (Buna Seals)  
0-275°F (Viton Seals)  
-18-135°C (Viton Seals)

## FLAIRLINE WARRANTY

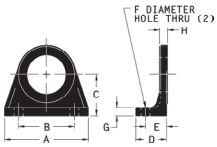
Flairline warrants each product against defects in material and workmanship for a period of one year from the date of manufacturing providing its use was in accordance with Flairline recommendations. If the product fails to perform as warranted, Flairline will, at its option, repair or replace the product free of charge. The company will not be liable for incidental or consequential damages. We make no other warranty, expressed or implied, including warranties of merchantability or fitness for a particular purpose.

# CAP-TO-CAP CYLINDERS

**FLAIRLINE**

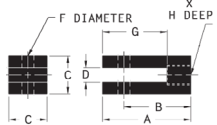
Series FCC, OCC, HCC & DCC

## Mounting Accessories



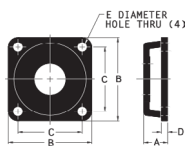
Mounting Nut included.

FOOT BRACKET									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	1-32-225	2 5/8	1 3/4	1 9/32	1	11/16	9/32	1/4	1/4
1/2	1-32-3	2 5/8	1 3/4	1 9/32	1	11/16	9/32	1/4	1/4
2, 2 1/2	1-32-4	3 1/4	2 1/4	1 15/16	1 1/32	11/16	11/32	1/4	1/4
3 1/4, 4	1-32-65	5 1/2	4	2 3/4	1 23/32	1 3/32	15/32	1/2	1/2



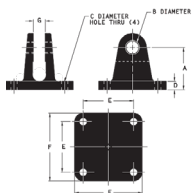
Connecting Pin included.

ROD CLEVIS									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	1-35-225	2 5/16	1 3/4	1	3/8	1/2-20	5/16	1 11/16	1 1/16
1 1/2, 2, 2 1/2	1-35-3	2 5/8	1 3/4	1	17/32	5/8-18	7/16	1 11/16	1 1/16
3 1/4, 4	1-35-65	3 3/8	2 5/8	1 1/2	2 1/32	1-14	1/2	1 9/16	1 1/4



Mounting Nut included.

FLANGE BRACKET						
Bore Size	No.	Dimensions				
		A	B	C	D	E
1/8	1-33-225	15/16	2 1/2	2	1/4	9/32
1 1/2, 2, 2 1/2	1-33-4	15/16	3 1/4	2 1/2	1/4	11/32
3 1/4, 4	1-33-65	1 19/32	5 1/4	4	1/2	15/32



Connecting Pin included.

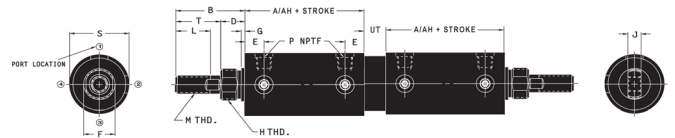
SWIVEL BRACKET								
Bore Size	No.	Dimensions						
		A	B	C	D	E	F	G
1/8, 1 1/2	1-34-3	1 1/4	5/16	9/32	5/16	1 3/4	2 1/4	17/32
2, 2 1/2	1-34-4	1 7/8	7/16	11/32	3/8	2 1/4	3	17/32
3 1/4, 4	1-34-65	2 7/8	1 1/2	15/32	1/2	3	4	25/32



Rod nut included on all F, O, H, D, M & DM type cylinders.

MOUNTING NUT				
Bore Size	No.	Dimensions		
		Height	Across Flats	
1/8	1-38-16	11/32	1 3/8	
1 1/2, 2, 2 1/2	1-38-20	19/32	1 5/8	
3 1/4, 4	1-38-28	11/16	2 1/4	

## Dimensions



**Notes:** Series FCC and OCC correspond to A dimensions. For HCC/DCC use AH Dimension in place of A dimension.

Dimension Reference	Cylinder Bore					
	1 1/8"	1 1/2"	2"	2 1/2"	3 1/4"	4"
<b>A</b>	2 25/32	3 5/16	2 1/2	3 5/16	3 5/16	4 11/36
<b>B</b>	2 1/8	2 1/2	2 1/2	2 1/2	3 19/32	3 19/32
<b>C</b>	1 1/16	1 1/4	1 5/8	1 5/8	1 11/16	1 11/16
<b>D</b>	5/8	7/8	7/8	7/8	1 7/32	1 7/32
<b>E</b>	19/32	11/16	11/16	11/16	31/32	31/32
<b>F</b>	1 1/16	1 3/16	1 3/16	1 3/16	1 11/16	1 11/16
<b>G</b>	1/8	5/32	5/32	5/32	5/32	5/32
<b>H</b>	1-14	1 1/8-12	1 1/8-12	1 1/8-12	1 5/8-12	1 5/8-12
<b>J</b>	1/2	1/2	1/2	1/2	3/4	3/4
<b>K</b>	5/16	5/16	7/16	7/16	1/2	1/2
<b>L</b>	1 1/8	1 1/4	1 1/4	1 1/4	1 7/8	1 7/8
<b>M*</b>	1/2-20	5/8-18	5/8-18	5/8-18	1-14	1-14
<b>P-NPTF</b>	1/8	1/4	1/4	1/4	1/2	1/2
<b>R</b>	11/16	7/8	1	1	1	1
<b>S</b>	1 3/8	1 3/4	2 1/4	2 3/4	3 1/2	4 1/4
<b>T</b>	1 1/2	1 5/8	1 5/8	1 5/8	2 3/8	2 3/8
<b>AH</b>	3 25/32	4 5/16	4 5/16	4 5/16	5 11/16	5 11/16
<b>UC</b>	1/2	1/2	1/2	1/2	15/16	15/16

# CAP-TO-CAP CYLINDERS

**FLAIRLINE**

Series FCC, OCC, HCC & DCC

## Ordering Information

**FCC 2 X 6 T = 5 1/2 H NT**

PISTON	BORE SIZE	STROKE LENGTH	SPECIAL OPTIONS
FCC OCC HCC DCC	1/8 1/2 2 2 1/2 3 1/4 4	Any length in inch increments or fraction thereof up to and including 130"	CUSHIONS HEAD ONLY CAP ONLY BOTH METAL ROD SCRAPER EXTRA INLET PORT(S) <small>Indicate location(s) (PP2, PP3, PP4) in cap or head end</small> TANG AT 90° FROM STANDARD STAINLESS STEEL CIRCUMFLEX KEYS STOP TUBES VITON PACKING CUSTOM T DIMENSION (ROD EXTENSION) SPECIAL L DIMENSION (THREAD LENGTH) SPECIAL M DIMENSION (THREAD SIZE) SPECIAL M DIMENSION (TAPPED HOLE IN ROD END) STAINLESS STEEL RODS
			H C HC MRS TANG 90° SS KEYS CONSULT FACTORY VITON T = Dimension L = Dimension M = Size or Plain Rod End M = Size and depth SS ROD

## Replacement Parts

**PK KIT FCC 2**

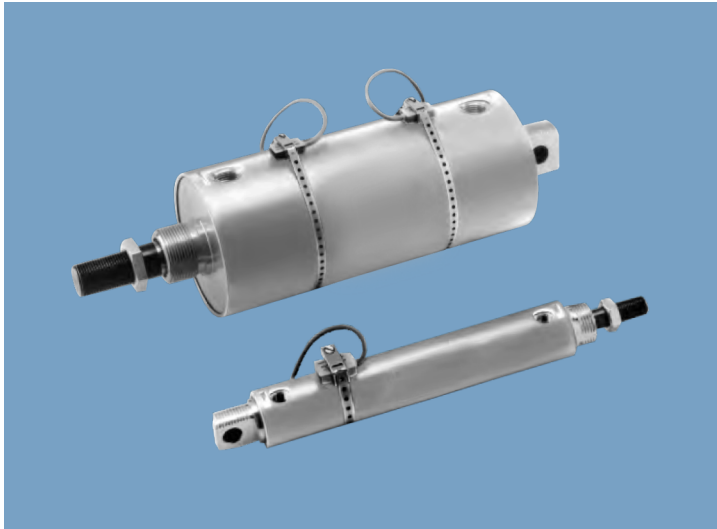
PISTON	BORE SIZE
FCC OCC HCC DCC	1/8 1/2 2 2 1/2 3 1/4 4

PROUD TO BE  
**MADE IN AMERICA**

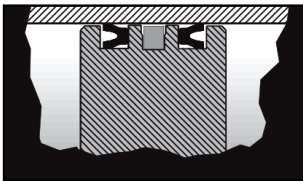
# MAGNETIC PISTON CYLINDERS

**FLAIRLINE**

Series M, DM, MSR & DMSR, MDE & DMDE, MT & DMT, MCC & DMCC

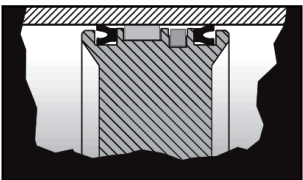


## AVAILABLE IN TWO PISTON TYPES



### **M TYPE**

For M, MSR, MDE,  
MT & MCC



### **DM TYPE**

For DM, DMSR, DMDE,  
DMT & DMCC

## Information

Flairline's magnetic piston cylinders allow for automated stroke sequencing with the same quality features common to other Flairline cylinder products.

- Standard Construction: hard anodized aluminum barrels, aluminum heads and end caps, chrome-plated rods, nylon rod bearings (bronze rod bearings on DM series Cylinders)
- A complete line of universal mounting accessories
- Magnetic switch options include Reed and Hall effect types
- Stainless steel mounting bands allow for switch mounting customization

## FLAIRLINE WARRANTY

Flairline warrants each product against defects in material and workmanship for a period of one year from the date of manufacturing providing its use was in accordance with Flairline recommendations. If the product fails to perform as warranted, Flairline will, at its option, repair or replace the product free of charge. The company will not be liable for incidental or consequential damages. We make no other warranty, expressed or implied, including warranties of merchantability or fitness for a particular purpose.

# MAGNETIC PISTON CYLINDERS

**FLAIRLINE**

Series M, DM, MSR & DMSR, MDE & DMDE, MT & DMT, MCC & DMCC

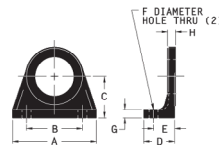
## Features

- Standard Bore Sizes: 1 1/8, 1 1/2, 2, 2 1/2, 3 1/4, 4
- MSR/DMSR - Spring Returned  
MDE/DMDE - Double Ended  
MT/DMT - Tandem
- Stroke Sizes: Any stroke up to 130"
- Cushions available: either/both ends

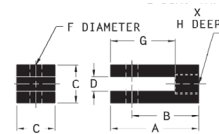
## Specifications

- Maximum Pressure:  
Pneumatic: 150 psi  
Hydraulic: Consult Factory
- Operating Temperature:  
0-200°F (Buna Seals)  
-18-93°C (Buna Seals)  
0-275°F (Viton Seals)  
-18-135°C (Viton Seals)
- Pistons complete with a factory installed magnet

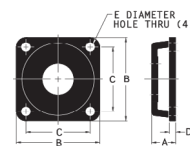
## Mounting Accessories



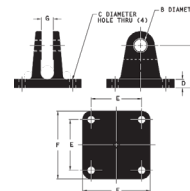
Mounting Nut included.



Connecting Pin included.



Mounting Nut included.



Connecting Pin included.



Rod nut included on all F, O, H, D, M & DM type cylinders.

### FOOT BRACKET

Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	1-32-225	2 5/8	1 3/4	1 9/32	1	11/16	9/32	1/4	1/4
1/2	1-32-3	2 5/8	1 3/4	1 9/32	1	11/16	9/32	1/4	1/4
2, 2 1/2	1-32-4	3 1/4	2 1/4	1 15/16	1 1/32	11/16	11/32	1/4	1/4
3 1/4, 4	1-32-65	5 1/2	4	2 3/4	1 23/32	1 3/32	15/32	1/2	1/2

### ROD CLEVIS

Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	1-35-225	2 5/8	1 3/4	1	3/8	1/2-20	5/16	1 11/16	11/16
1/2, 2, 2 1/2	1-35-3	2 5/8	1 3/4	1	17/32	5/8-18	7/16	1 11/16	11/16
3 1/4, 4	1-35-65	3 3/8	2 5/8	1 1/2	2 1/32	1-14	1/2	1 9/16	1 1/4

### FLANGE BRACKET

Bore Size	No.	Dimensions				
		A	B	C	D	E
1/8	1-33-225	15/16	2 1/2	2	1/4	9/32
1 1/2, 2, 2 1/2	1-33-4	15/16	3 1/4	2 1/2	1/4	11/32
3 1/4, 4	1-33-65	1 19/32	5 1/4	4	1/2	15/32

### SWIVEL BRACKET

Bore Size	No.	Dimensions						
		A	B	C	D	E	F	G
1/8, 1 1/2	1-34-3	1/4	5/16	9/32	5/16	1 3/4	2 1/4	17/32
2, 2 1/2	1-34-4	1/8	7/16	11/32	3/8	2 1/4	3	17/32
3 1/4, 4	1-34-65	2 7/8	1/2	15/32	1/2	3	4	25/32

### MOUNTING NUT

Bore Size	No.	Dimensions	
		Height	Across Flats
1/8	1-38-16	11/32	1 3/8
1 1/2, 2, 2 1/2	1-38-20	19/32	1 5/8
3 1/4, 4	1-38-28	11/16	2 1/4



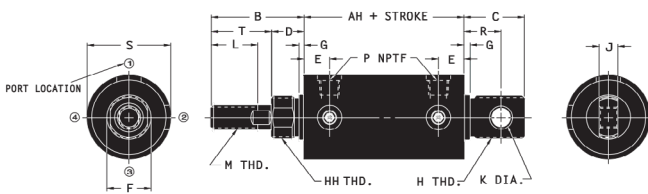
# MAGNETIC PISTON CYLINDERS

**FLAIRLINE**

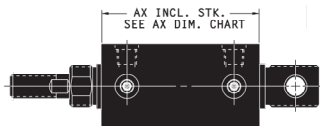
Series M, DM, MSR & DMSR, MDE & DMDE, MT & DMT, MCC & DMCC

## Dimensions

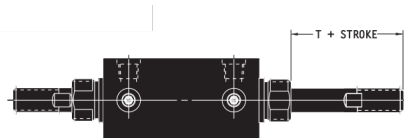
### SERIES M/DM



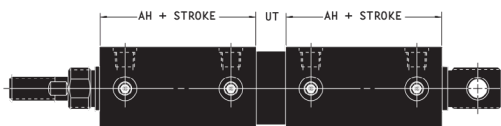
### SERIES MSR/DMSR



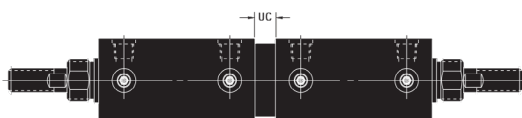
### SERIES MDE/DMDE



### SERIES MT/DMT



### SERIES MCC/DMCC



Dimension Reference	Cylinder Bore					
	1 1/8"	1 1/2"	2"	2 1/2"	3 1/4"	4"
<b>A</b>	2 25/32	3 5/16	3 5/16	3 5/16	4 11/16	4 11/16
<b>B</b>	2 1/8	2 1/2	2 1/2	2 1/2	3 19/32	3 19/32
<b>C</b>	1 1/16	1 1/4	1 5/8	1 5/8	1 11/16	1 11/16
<b>D</b>	5/8	7/8	7/8	7/8	1 7/32	1 7/32
<b>E</b>	19/32	11/16	11/16	11/16	31/32	31/32
<b>F</b>	1 1/16	1 3/16	1 3/16	1 3/16	1 11/16	1 11/16
<b>G</b>	1/8	5/32	5/32	5/32	5/32	5/32
<b>H</b>	1-14	1 1/8-12	1 1/8-12	1 1/8-12	1 5/8-12	1 5/8-12
<b>J</b>	1/2	1/2	1/2	1/2	3/4	3/4
<b>K</b>	5/16	5/16	7/16	7/16	1/2	1/2
<b>L</b>	1 1/8	1 1/4	1 1/4	1 1/4	1 7/8	1 7/8
<b>M'</b>	1/2-20	5/8-18	5/8-18	5/8-18	1-14	1-14
<b>P-NPTF</b>	1/8	1/4	1/4	1/4	1/2	1/2
<b>R</b>	11/16	7/8	1	1	1	1
<b>S</b>	1 3/8	1 3/4	2 1/4	2 3/4	3 1/2	4 1/4
<b>T</b>	1 1/2	1 5/8	1 5/8	1 5/8	2 3/8	2 3/8
<b>AH</b>	3 25/32	4 5/16	4 5/16	4 5/16	5 11/16	5 11/16
<b>UC</b>	1/2	1/2	1/2	1/2	15/16	15/16
<b>UT</b>	—	3/4	3/4	3/4	1 1/8	1 1/8
<b>AX Dimension Chart Including Stroke Lengths</b>						
ME Stroke Lengths	Cylinder Bore					
	1 1/8"	1 1/2"	2"	2 1/2"	3 1/4"	4"
1" or Less	6 25/32	7 5/16	7 5/16	7 5/16	8 11/16	8 11/16
Over 1" to 1 1/2"	7 25/32	8 5/16	8 5/16	8 5/16	9 11/16	9 11/16
Over 1 1/2" to 2 1/2"	8 25/32	9 5/16	9 5/16	9 5/16	10 11/16	10 11/16
Over 2 1/2" to 3"	9 25/32	10 5/16	10 5/16	10 5/16	11 11/16	11 11/16
Over 3" to 3 1/2"	10 25/32	11 5/16	11 5/16	11 5/16	12 11/16	12 11/16
Over 3 1/2" to 4"	11 25/32	12 5/16	12 5/16	12 5/16	13 11/16	13 11/16
Over 4 1/2" to 5 1/2"	11 25/32	14 5/16	14 5/16	14 5/16	15 11/16	15 11/16
Over 5 1/2" to 6"	11 25/32	16 5/16	16 5/16	16 5/16	17 11/16	17 11/16

# MAGNETIC PISTON CYLINDERS

**FLAIRLINE**

Series M, DM, MSR & DMSR, MDE & DMDE, MT & DMT, MCC & DMCC

## Ordering Information

**M 2-CR 2 X 6 T = 5 1/2 H NT**

PISTON	BORE SIZE	STROKE LENGTH	SPECIAL OPTIONS	
M DM MDE DMDE MT DMT MCC DMCC	1 1/8 1 1/2 2 2 1/2 3 1/4 4	Any length in inch increments or fraction thereof up to and including 130"	<p>CUSHIONS MT/MCC &amp; DMT/DMCC (ROD END ONLY) HEAD CAP BOTH METAL ROD SCRAPER EXTRA INLET PORT(S) Indicate location(s) (PP2, PP3, PP4) in cap or head end TANG AT 90° FROM STANDARD NO TANG STAINLESS STEEL CIRCUMFLEX KEYS STOP TUBES VITON PACKING CUSTOM T DIMENSION (ROD EXTENSION) SPECIAL L DIMENSION (THREAD LENGTH) SPECIAL M DIMENSION (THREAD SIZE) SPECIAL M DIMENSION (TAPPED HOLE IN ROD END)</p>	
<p><b>SWITCHES</b></p> <p>REED SWITCH Indicate Quantity - CR HALL EFFECT SWITCH (SOURCING) Indicate Quantity - HP HALL EFFECT SWITCH (SINKING) Indicate Quantity - HN</p>			<p>H C HC MRS TANG 90° NT SS KEYS CONSULT FACTORY VITON</p>	<p>T = Dimension L = Dimension M = Size or Plain Rod End M = Size and depth</p>

**Note:** Reference switch options on the last page of the section.

**Note:** MSR/DMSR ordering information on the next page.

## Replacement Parts

**PK KIT M 2**

PISTON	BORE SIZE
M DM MDE DMDE MT DMT MCC DMCC	1 1/8 1 1/2 2 2 1/2 3 1/4 4

PROUD TO BE  
**MADE IN AMERICA**

# MAGNETIC PISTON CYLINDERS



Series M, DM, MSR & DMSR, MDE & DMDE, MT & DMT, MCC & DMCC

## Ordering Information

**MSR-E 2-CR 2 X 6 T = 5 1/2**

<p><b>PISTON</b></p> <p>MSR DMSR</p>	<p><b>BORE SIZE</b></p> <p>1 1/8 1 1/2 2 2 1/2 3 1/4 4</p>	<p><b>STROKE LENGTH</b></p> <p>Any length in inch increments or fraction thereof <b>up to and including 130"</b></p>	<p><b>SPECIAL OPTIONS</b></p> <p>CUSHIONS HEAD (ONLY WHEN NORMALLY EXTENDED) <b>H</b> CAP (ONLY WHEN NORMALLY RETRACTED) <b>C</b> METAL ROD SCRAPER <b>MRS</b> EXTRA INLET PORT(S) <b>Indicate location(s) (PP2, PP3, PP4) in cap or head end</b> TANG AT 90° FROM STANDARD <b>TANG 90°</b> NO TANG <b>NT</b> STAINLESS STEEL CIRCUMFLEX KEYS <b>SS KEYS</b> STOP TUBES <b>CONSULT FACTORY</b> VITON PACKING <b>VITON</b> CUSTOM T DIMENSION (ROD EXTENSION) <b>T = Dimension</b> SPECIAL L DIMENSION (THREAD LENGTH) <b>L = Dimension</b> SPECIAL M DIMENSION (THREAD SIZE) <b>M = Size or Plain Rod End</b> SPECIAL M DIMENSION (TAPPED HOLE IN ROD END) <b>M = Size and depth</b> STAINLESS STEEL RODS <b>SS ROD</b></p>
<p><b>SPRING RETURN</b></p> <p>NORMALLY EXTENDED <b>-E</b> NORMALLY RETRACTED <b>-R</b></p>			
<p><b>SWITCHES</b></p> <p>REED SWITCH <b>Indicate Quantity - CR</b> HALL EFFECT SWITCH (SOURCING) <b>Indicate Quantity - HP</b> HALL EFFECT SWITCH (SINKING) <b>Indicate Quantity - HN</b></p>			

**NOTE:** Reference switch options on the last page of the section.

## Replacement Parts

**PK KIT MSR 2**

<p><b>PISTON</b></p> <p>MSR DMSR</p>	<p><b>BORE SIZE</b></p> <p>1 1/8 1 1/2 2 2 1/2 3 1/4 4</p>
--	--

PROUD TO BE  
**MADE IN AMERICA**

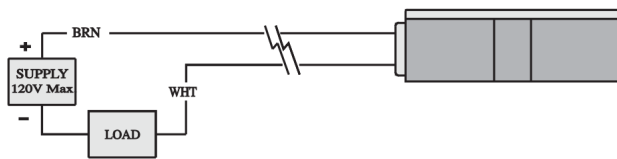
# MAGNETIC PISTON CYLINDERS

**FLAIRLINE**

Series M, DM, MSR & DMSR, MDE & DMDE, MT & DMT, MCC & DMCC

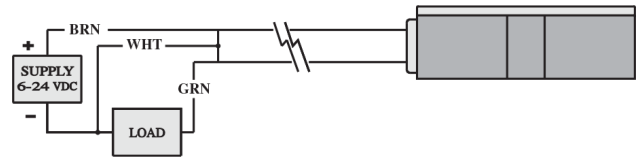
## Switch Options

**Reed Switch - Part No. 43-CR**



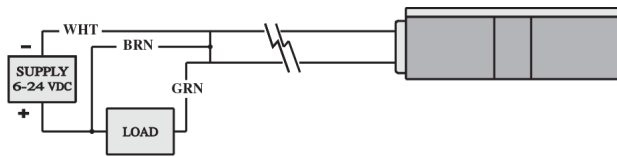
**Warning:** Do not exceed 24 VDC.  
Permanent damage to sensor may occur.

**Hall Effect Switch - Sourcing - Part No. 43-HP**



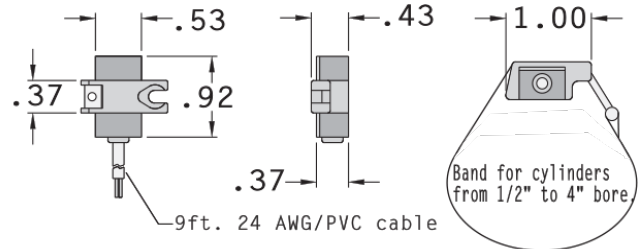
**Warning:** Do not exceed 24 VDC.  
Permanent damage to sensor may occur.

**Hall Effect Switch - Sinking - Part No. 43-HN**



**Warning:** Do not exceed 24 VDC.  
Permanent damage to sensor may occur.

**Mounting Band - Included with Switches**



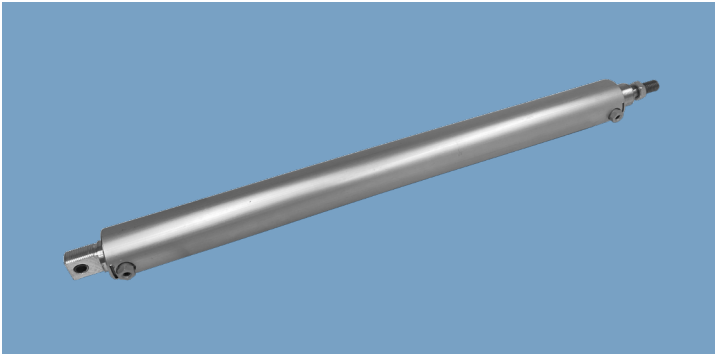
## Sensor Types and Technical Data

Part No.	Description	Function	Switching Voltage	Switching Current	Switching Power	Switching Speed	Max Volt. Drop	Sensitivity
43CR	Reed Switch MOV, LED	SPST Normally Open	5-120 VDC/VAC 50/60 Hz	0.5 Amp Max. 0.005 Amp Min.	12 Watts Max	0.5ms Operate	3.5 Volts	85 Gauss
43HP	Half Effect Sourcing	Normally Open PNP Output	6-24 VDC	0.5 Amp Max	12 Watts Max	1.5ms Operate 0.5ms Operate	0.5 Volts	85 Gauss
43HN	Half Effect LED Sinking	Normally Open NPN Output	6-24 VDC	0.5 Amp Max	12 Watts Max	1.5ms Operate 0.5ms Operate	0.5 Volts	85 Gauss

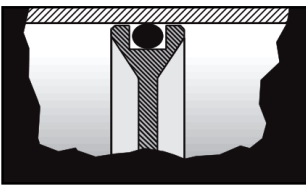
# COMPETITIVE INTERCHANGE CYLINDERS

**FLAIRLINE**

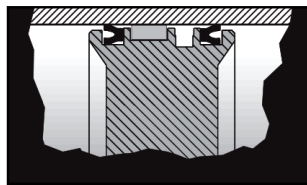
Series I & IDE, DI & DIDE, DIM & DIMDE, SI & SIDE, DSI & DSIDE, DSIM & DSIMDE  
CSI, CDSI, CDSI & CDSIM, CDSIDE & CDSIMDE



## AVAILABLE IN TWO PISTON TYPES



**O TYPE**  
For I, S I & CSI



**D TYPE**  
For DI, DSI, IDE,  
CDSI & CDSIDE

## Specifications

- Maximum Pressure:  
Pneumatic: 150 psi  
Hydraulic: Consult Factory
- Operating Temperature:  
0-200°F (Buna Seals)  
-18-93°C (Buna Seals)  
0-275°F (Viton Seals)  
-18-135°C (Viton Seals)

## Information

Flairline's interchange series includes pneumatic and hydraulic cylinders that are dimensionally interchangeable with several competitive cylinders. The Interchange series can be installed into many existing applications without any rework or engineering revisions.

- Double-acting and double-acting double-ended models are available

## Features

- Standard Bore Sizes: 1 1/8, 1 1/2, 2, 2 1/2, 3  
CSI Series also available with 4" bore
- Stroke Sizes: Any stroke up to 130"
- Cushions are available for all Interchange cylinders
- External dimensions may be identical with several competitors
- Available for use in pneumatic or hydraulic applications
- Suitable for wherever lightweight, economical and durable actuators are required
- DIM, DSIM & CDSIM available with magnetic switches.

FULL DIMENSIONS FOR DOUBLE ACTING AND DOUBLE ENDED CYLINDERS ARE LISTED ON THE NEXT PAGE.

## FLAIRLINE WARRANTY

Flairline warrants each product against defects in material and workmanship for a period of one year from the date of manufacturing providing its use was in accordance with Flairline recommendations. If the product fails to perform as warranted, Flairline will, at its option, repair or replace the product free of charge. The company will not be liable for incidental or consequential damages. We make no other warranty, expressed or implied, including warranties of merchantability or fitness for a particular purpose.

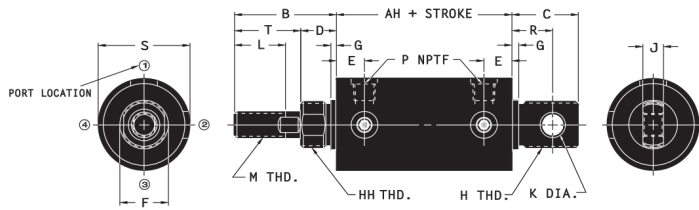
# COMPETITIVE INTERCHANGE CYLINDERS



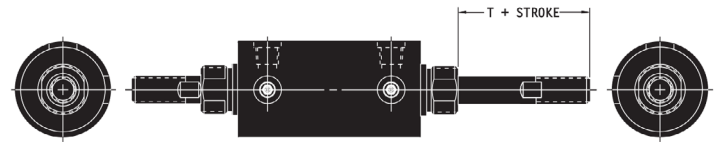
Series I & IDE, DI & DIDE, DIM & DIMDE, SI & SIDE, DSI & DSIDE, DSIM & DSIMDE  
CSI, CDSI, CDSI & CDSIM, CDSIDE & CDSIMDE

## Dimensions

### DOUBLE ACTING CYLINDERS



### DOUBLE ENDED CYLINDERS



“G” through “T” Same data for all series listed

G	H	HH	J	K	L	M*	P	R	S	T
1/8	3/4-16	3/4-16	3/8	1/4	7/8	3/8-16	1/8	11/16	1 3/8	1
7/32	1 1/16-18	1 1/16-18	1/2	5/16	1 1/4	1/2-13	1/4	7/8	1 3/4	1 7/16
7/32	1 1/16-18	1 1/16-18	1/2	5/16	1 1/4	5/8-11	1/4	7/8	2 1/4	1 7/16
11/32	1 3/8-12	1 3/8-12	5/8	7/16	1 1/2	3/4-10	3/8	1 3/8	2 3/4	1 11/16
11/32	1 3/8-12	1 3/8-12	5/8	7/16	1 1/2	3/4-10	3/8	1 3/8	3 1/4	1 11/16

### Series I & IDE

Bore	A	B	C	D	E	F
1/8	2 1/32	1 3/4	31/32	3/4	27/64	3/4
1 1/2	2 5/8	2 7/16	1 1/4	1	33/64	1 1/16
2	2 5/8	2 7/16	1 1/4	1	33/64	1 1/16
2 1/2	2 7/8	2 15/16	2	1 1/4	9/16	1 7/16
3	2 7/8	2 15/16	2	1 1/4	9/16	1 7/16

### Series DI, DIM, DIDE & DIMDE

Bore Size	A	B	C	D	E	F
1/8	3 1/32	1 3/4	31/32	3/4	27/64	3/4
1 1/2	3 5/8	2 7/16	1 1/4	1	33/64	1 1/16
2	3 5/8	2 7/16	1 1/4	1	33/64	1 1/16
2 1/2	3 7/8	2 15/16	2	1 1/4	9/16	1 7/16
3	3 7/8	2 15/16	2	1 1/4	9/16	1 7/16

### Series SI & SIDE

Bore Size	A	B	C	D	E	F
1/8	2 1/16	1 5/8	1	5/8	27/64	3/4
1 1/2	2 5/8	2 5/16	1 1/4	7/8	33/64	1 1/16
2	2 5/8	2 5/16	1 1/4	7/8	33/64	1 1/16
2 1/2	2 7/8	2 11/16	2	1	9/16	1 3/8
3	2 7/8	2 11/16	2	1	9/16	1 3/8

### Series DSI, DSIM, DSIDE & DSIMDE

Bore Size	A	B	C	D	E	F
1/8	3 1/16	1 5/8	1	5/8	27/64	3/4
1 1/2	3 5/8	2 5/16	1 1/4	7/8	33/64	1 1/16
2	3 5/8	2 5/16	1 1/4	7/8	33/64	1 1/16
2 1/2	3 7/8	2 11/16	2	1	9/16	1 3/8
3	3 7/8	2 11/16	2	1	9/16	1 3/8

### Series CSI & CDSI

Bore Size	A	B	C	D	E	F
1/8	2 1/16	1 5/8	1	5/8	27/64	3/4
1 1/2	2 5/8	2 5/16	1 1/4	7/8	33/64	1 1/16
2	2 5/8	2 5/16	1 1/4	7/8	33/64	1 1/16
2 1/2	2 7/8	2 11/16	2	1	9/16	1 3/8
3	2 7/8	2 11/16	2	1	9/16	1 3/8
4	5		2 3/16	1 1/8	9/16	1 3/4

### Series CDSI, CDSIM, CDSIDE & CDSIMDE

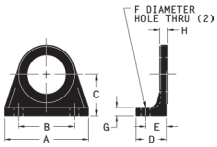
Bore Size	A	B	C	D	E	F
1/8	3 1/16	1 5/8	1	5/8	27/64	3/4
1 1/2	3 5/8	2 5/16	1 1/4	7/8	33/64	1 1/16
2	3 5/8	2 5/16	1 1/4	7/8	33/64	1 1/16
2 1/2	3 7/8	2 11/16	2	1	9/16	1 3/8
3	3 7/8	2 11/16	2	1	9/16	1 3/8
4	5		2 3/16	1 1/8	9/16	1 3/4

# COMPETITIVE INTERCHANGE CYLINDERS



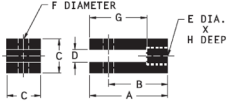
Series I & IDE, DI & DIDE, DIM & DIMDE, SI & SIDE, DSI & DSIDE, DSIM & DSIMDE  
CSI, CDSI, CDSI & CDSIM, CDSIDE & CDSIMDE

## Mounting Accessories



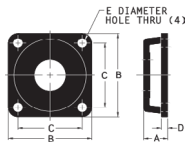
Mounting Nut included.

FOOT BRACKET									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	2-32-225	1 3/8	1	1 9/32	1	5/8	17/64	1/4	1/4
1 1/2, 2 CAP END	2-32-4	3	1 1/16	1 1/2	1 17/32	57/64	9/32	5/16	5/16
1 1/2, 2 HEAD END	2-32-4A	3	1 1/16	1 1/2	1 17/32	57/64	9/32	5/16	5/16
2 1/2, 3	2-32-6	4	2 1/4	2	2 3/32	1 17/32	13/32	3/8	3/8



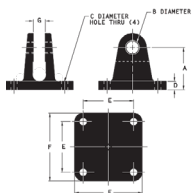
Connecting Pin included.

ROD CLEVIS									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	2-35-225	1 3/4	1 13/32	3/4	5/16	3/8-16	1/4	1	3/4
1 1/2	2-35-3	2 1/4	1 3/4	1	3/8	1/2-13	5/16	1 3/16	1 1/16
2	2-35-4	2 1/4	1 3/4	1	3/8	5/8-11	5/16	1 3/16	1 1/16
2 1/2, 3	2-35-6	2 11/16	2 1/16	1 1/8	1/2	3/4-10	7/16	1 3/4	1 3/16



Mounting Nut included.

FLANGE BRACKET						
Bore Size	No.	Dimensions				
		A	B	C	D	E
1/8	2-33-225	11/16	2 1/2	2	1/4	9/32
1 1/2, 2 CAP END	2-33-4	19/32	3 1/4	2 1/2	5/16	9/32
1 1/2, 2 HEAD END	2-33-4A	19/32	3 1/4	2 1/2	5/16	9/32
2 1/2, 3	2-33-6	25/32	4 1/2	3 3/8	3/8	15/32



Connecting Pin included.

SWIVEL BRACKET								
Bore Size	No.	Dimensions						
		A	B	C	D	E	F	G
1/8	2-34-225	1 7/32	1/4	9/32	5/16	1 3/4	2 1/4	3/8
1 1/2, 2	2-34-4	1 3/4	5/16	9/32	5/16	2 1/4	3	1/2
2 1/2, 3	2-34-6	2 3/8	7/16	3/32	3/8	3	4	5/8



Rod nut included on all F, O, H, D, M & DM type cylinders.

MOUNTING NUT				
Bore Size	No.	Dimensions		
		Height	Across Flats	
1/8	2-38-12	3/8	1 1/16	
1 1/2, 2 CAP (H Dimension)	2-38-18	15/16	1 1/16	
1 1/2, 2 HEAD (H Dimension)	1-38-16	11/32	1 3/8	
2 1/2, 3	2-38-24	25/32	2 1/16	

## Ordering Information

I 2 X 6 T = 5 1/2 H NT

PISTON	BORE SIZE	STROKE LENGTH
I		Any length in inch increments or fraction thereof up to and including 130"
IDE	1 1/8	
DI	1 1/2	
DIDE	2	
SI	2 1/2	
SIDE	3 1/4	
DSI		
CSI	4	
CDSI		
CDSIDE		

SPECIAL OPTIONS	
CUSHIONS: HEAD, CAP, BOTH	H, C, HC
CUSHIONS: (DOUBLE-ENDED CYLINDERS) ONE END, BOTH	H, HH
METAL ROD SCRAPER (not available for 1-18" bore)	MRS
EXTRA INLET PORT(S)	Indicate location(s) (PP2, PP3, PP4) in cap or head end
TANG AT 90° FROM STANDARD	TANG 90°
NO TANG	NT
STAINLESS STEEL CIRCUMFLEX KEYS	SS KEYS
STOP TUBES	CONSULT FACTORY
VITON PACKING	VITON
CUSTOM T DIMENSION (ROD EXTENSION)	T = Dimension
SPECIAL L DIMENSION (THREAD LENGTH)	L = Dimension
SPECIAL M DIMENSION (THREAD SIZE)	M = Size or Plain Rod End
SPECIAL M DIMENSION (TAPPED HOLE IN ROD END)	M = Size and depth
STAINLESS STEEL RODS	SS ROD

Note: Magnetic Interchange cylinder's ordering information on the next page.

## Replacement Parts

PK KIT I 2

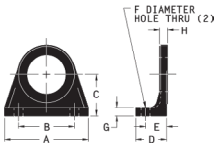
PISTON	BORE SIZE
I	
IDE	1 1/8
DI	1 1/2
DIDE	2
SI	2 1/2
SIDE	3 1/4
DSI	
CSI	4
CDSI	
CDSIDE	

# COMPETITIVE INTERCHANGE CYLINDERS



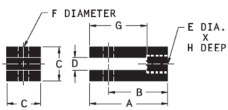
Series I & IDE, DI & DIDE, DIM & DIMDE, SI & SIDE, DSI & DSIDE, DSIM & DSIMDE  
CSI, CDSI, CDSI & CDSIM, CDSIDE & CDSIMDE

## Mounting Accessories



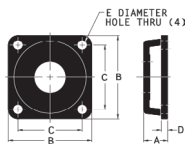
Mounting Nut included.

FOOT BRACKET									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	2-32-225	1 3/8	1	1 9/32	1	5/8	17/64	1/4	1/4
1 1/2, 2 CAP END	2-32-4	3	1 11/16	1 1/2	1 17/32	57/64	9/32	5/16	5/16
1 1/2, 2 HEAD END	2-32-4A	3	1 11/16	1 1/2	1 17/32	57/64	9/32	5/16	5/16
2 1/2, 3	2-32-6	4	2 1/4	2	2 3/32	1 17/32	13/32	3/8	3/8



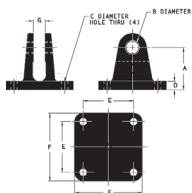
Connecting Pin included.

ROD CLEVIS									
Bore Size	No.	Dimensions							
		A	B	C	D	E	F	G	H
1/8	2-35-225	1 3/4	1 13/32	3/4	5/16	3/8-16	1/4	1	3/4
1 1/2	2-35-3	2 1/4	1 3/4	1	3/8	1/2-13	5/16	1 3/16	1 1/16
2	2-35-4	2 1/4	1 3/4	1	3/8	5/8-11	5/16	1 3/16	1 1/16
2 1/2, 3	2-35-6	2 11/16	2 1/16	1 1/8	1/2	3/4-10	7/16	1 3/4	1 3/16



Mounting Nut included.

FLANGE BRACKET						
Bore Size	No.	Dimensions				
		A	B	C	D	E
1/8	2-33-225	11/16	2 1/2	2	1/4	9/32
1 1/2, 2 CAP END	2-33-4	19/32	3 1/4	2 1/2	5/16	9/32
1 1/2, 2 HEAD END	2-33-4A	19/32	3 1/4	2 1/2	5/16	9/32
2 1/2, 3	2-33-6	25/32	4 1/2	3 3/8	3/8	15/32



Connecting Pin included.

SWIVEL BRACKET								
Bore Size	No.	Dimensions						
		A	B	C	D	E	F	G
1/8	2-34-225	1 7/32	1/4	9/32	5/16	1 3/4	2 1/4	3/8
1 1/2, 2	2-34-4	1 3/4	5/16	9/32	5/16	2 1/4	3	1/2
2 1/2, 3	2-34-6	2 3/8	7/16	3/32	3/8	3	4	5/8



Rod nut included on all F, O, H, D, M & DM type cylinders.

MOUNTING NUT				
Bore Size	No.	Dimensions		
		Height	Across Flats	
1/8	2-38-12	3/8	1 1/16	
1 1/2, 2 CAP (H Dimension)	2-38-18	15/16	1 1/16	
1 1/2, 2 HEAD (H Dimension)	1-38-16	11/32	1 3/8	
2 1/2, 3	2-38-24	25/32	2 1/16	

## Ordering Information

**DIM 2-CR 2 X 6 T = 5 1/2 H NT**

PISTON	BORE SIZE	STROKE LENGTH
DIM	1 1/8	Any length in inch increments or fraction thereof up to and including 130"
DIMDE	1 1/2	
DSIM	2	
DSIMDE	2 1/2	
CDSIM	3 1/4	
CDSIMDE	4	

SWITCHES		
REED SWITCH	Indicate Quantity - CR	
HALL EFFECT SWITCH (SOURCING)	Indicate Quantity - HP	
HALL EFFECT SWITCH (SINKING)	Indicate Quantity - HN	

**NOTE:** Reference switch options on the following page.

SPECIAL OPTIONS	
CUSHIONS: HEAD, CAP, BOTH	H, C, HC
CUSHIONS: (DOUBLE-ENDED CYLINDERS) ONE END, BOTH	H, HH
METAL ROD SCRAPER	MRS
(not available for 1-18" bore)	
EXTRA INLET PORT(S)	Indicate location(s) (PP2, PP3, PP4) in cap or head end
TANG AT 90° FROM STANDARD	TANG 90°
NO TANG	NT
STAINLESS STEEL CIRCUMFLEX KEYS	SS KEYS
STOP TUBES	CONSULT FACTORY
VITON PACKING	VITON
CUSTOM T DIMENSION (ROD EXTENSION)	T = Dimension
SPECIAL L DIMENSION (THREAD LENGTH)	L = Dimension
SPECIAL M DIMENSION (THREAD SIZE)	M = Size or Plain Rod End
SPECIAL M DIMENSION (TAPPED HOLE IN ROD END)	M = Size and depth
STAINLESS STEEL RODS	SS ROD

## Replacement Parts

**PK KIT DIM 2**

PISTON	BORE SIZE
DIM	1 1/8
DIMDE	1 1/2
DSIM	2
DSIMDE	2 1/2
CDSIM	3 1/4
CDSIMDE	4



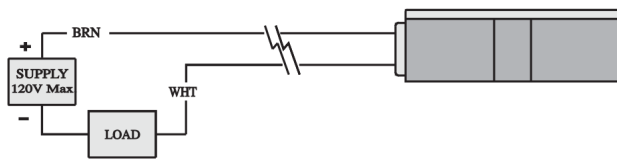
# COMPETITIVE INTERCHANGE CYLINDERS



Series I & IDE, DI & DIDE, DIM & DIMDE, SI & SIDE, DSI & DSIDE, DSIM & DSIMDE  
CSI, CDSI, CDSI & CDSIM, CDSIDE & CDSIMDE

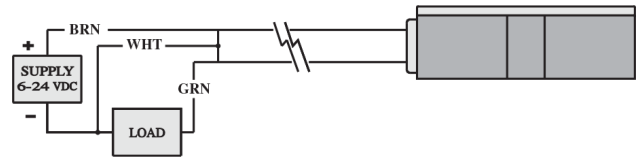
## Switch Options

**Reed Switch - Part No. 43-CR**



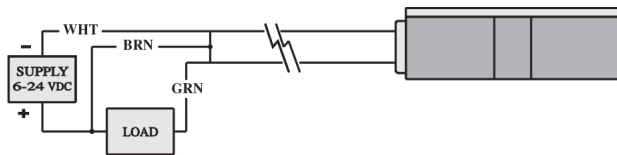
**Warning:** Do not exceed 24 VDC.  
Permanent damage to sensor may occur.

**Hall Effect Switch - Sourcing - Part No. 43-HP**



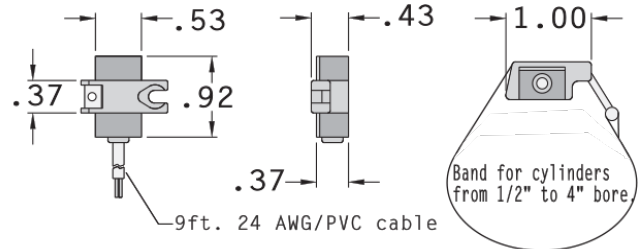
**Warning:** Do not exceed 24 VDC.  
Permanent damage to sensor may occur.

**Hall Effect Switch - Sinking - Part No. 43-HN**



**Warning:** Do not exceed 24 VDC.  
Permanent damage to sensor may occur.

**Mounting Band - Included with Switches**



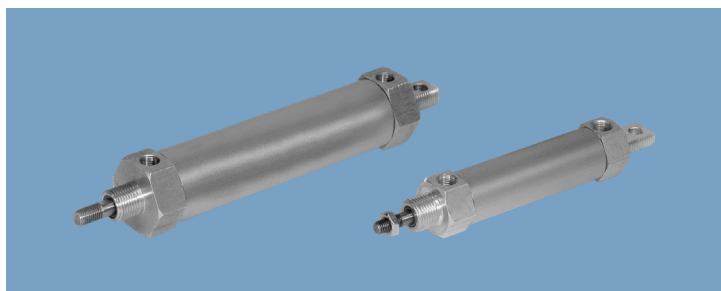
## Sensor Types and Technical Data

Part No.	Description	Function	Switching Voltage	Switching Current	Switching Power	Switching Speed	Max Volt. Drop	Sensitivity
43CR	Reed Switch MOV, LED	SPST Normally Open	5-120 VDC/VAC 50/60 Hz	0.5 Amp Max. 0.005 Amp Min.	12 Watts Max	0.5ms Operate	3.5 Volts	85 Gauss
43HP	Half Effect Sourcing	Normally Open PNP Output	6-24 VDC	0.5 Amp Max	12 Watts Max	1.5ms Operate 0.5ms Operate	0.5 Volts	85 Gauss
43HN	Half Effect LED Sinking	Normally Open NPN Output	6-24 VDC	0.5 Amp Max	12 Watts Max	1.5ms Operate 0.5ms Operate	0.5 Volts	85 Gauss

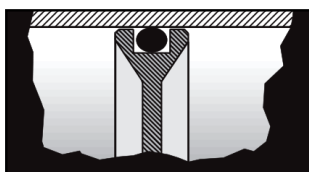
# MINIATURE (DIGIT-AIR) CYLINDERS

**FLAIRLINE**

Series MTM, MSM, MTMR, MSMR, FTM, FSM, FTMR & FSMR

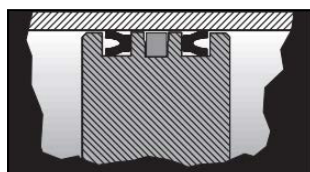


## AVAILABLE IN TWO PISTON TYPES



### O TYPE

For FTM, FSM, FTMR & FSMR



### M TYPE

For MTM, MSM, MTMR & MSMR

## Information

Flairline's Digit-Air models are small bore cylinders that reduce replacement costs, maintenance labor, and machine downtime.

- Standard Construction: anodized aluminum barrels, aluminum heads and caps, O type piston, bronze rod bearings, and stainless steel rods
- FSM/MSM models for head to nose mounting
- FTM/MTM models for cap end universal swivel mounting
- FTMR/MTMR and FSMR/MSMR models for harsh working conditions
- MSM/MTM/MTMR feature magnetic piston cylinders with hall/reed effect switches.

## Specifications

- Maximum Pressure:  
Pneumatic: 200 psi  
Hydraulic: 200 psi
- Operating Temperature:  
0-200°F (Buna Seals)  
-18-93°C (Buna Seals)
- Hard anodized aluminum barrels
- Aluminum heads and end caps
- Stainless steel rods
- Bronze rod bearings

## Features

- Standard Bore Sizes:  $\frac{1}{2}$ ,  $\frac{3}{4}$ ,  $1\frac{1}{8}$
- Stroke Sizes:  $\frac{1}{2}$ " to 36"
- Cushions available:  
MTM/MSM: Either/both ends  
MTMR/MSMR: Either/both ends  
FTM/FSM: Either/both ends  
FTMR/FSMR: Normally extended:  
head end only. Normally retracted:  
cap end only

## FLAIRLINE WARRANTY

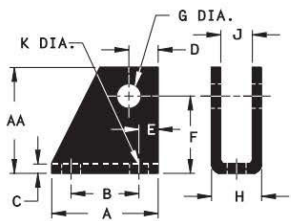
Flairline warrants each product against defects in material and workmanship for a period of one year from the date of manufacturing providing its use was in accordance with Flairline recommendations. If the product fails to perform as warranted, Flairline will, at its option, repair or replace the product free of charge. The company will not be liable for incidental or consequential damages. We make no other warranty, expressed or implied, including warranties of merchantability or fitness for a particular purpose.

# MINIATURE (DIGIT-AIR) CYLINDERS

**FLAIRLINE**

Series MTM, MSM, MTMR, MSMR, FTM, FSM, FTMR & FSMR

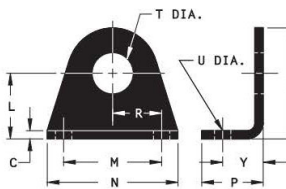
## Series FTM, FSM, MTM, MSM, FTMR, FSMR, MTMR & MSMR Mounting:



### SWIVEL BRACKET

BORE SIZE	NUMBER
1/2, 3/4	6/4 - 34
1 1/8	9 - 34

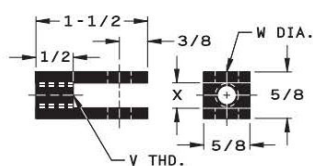
Connecting Pin Included.



### FOOT BRACKET

BORE SIZE	NUMBER
1/2, 3/4	6/4 - 32
1 1/8	9 - 32

Mounting Nut Included.



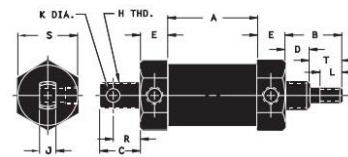
### ROD CLEVIS

BORE SIZE	NUMBER
1/2, 3/4	6/4 - 35
1 1/8	9 - 35

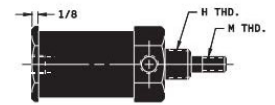
Connecting Pin Included.

BORE SIZE	1/2, 3/4	1 1/8
A	1 3/8	1 3/8
AA	1 1/8	1 3/8
B	7/8	7/8
C	1/8	1/8
D	3/8	3/8
E	1/4	1/4
F	3/4	1
G	1/4	5/16
H	21/32	21/32
J	13/32	13/32
K	1/4	1/4
L	3/4	1
M	1	1 1/2
N	1 3/8	2
P	3/4	15/16
R	1/2	3/4
S	1 1/4	1 11/16
T	5/8	5/8
U	3/16	1/4
V	1/4 - 28	5/16 - 24
W	1/4	5/16
X	11/32	11/32
Y	1/2	5/8

## Dimensions



SERIES MTM/MTMR SWIVEL MOUNT CYLINDERS



SERIES MSM/MSMR NOSE MOUNT CYLINDERS

BORE SIZE	1/2	3/4	1 1/8
A	2 1/16	1 9/16	1 9/16
B	1 1/4	1 1/4	1 5/16
C	13/16	13/16	15/16
D	1/2	1/2	9/16
E	9/16	9/16	5/8
H	1/2 - 20	5/8 - 18	5/8 - 18
J	1/4	1/4	3/8
K	1/4	1/4	5/16
L	1/2	1/2	1/2
M	1/4 - 28	1/4 - 28	5/16 - 24
R	9/16	9/16	5/8
S	3/4	1	1 3/8
T	3/4	3/4	3/4

**Note:**

FOR SERIES MTM & MSM DOUBLE-ACTING: A + STROKE  
 FOR SERIES MTMR & MSMR SPRING RETURN: A + (STROKE X 2)  
 FOR SERIES MTMR & MSMR UP TO 1/2" STROKE SPRING RETURN: A + (STROKE + 1")

For cylinders with bumpers, contact factory for stock stroke sizes and add 1/2" to Dimension "A" for each bumper. For cylinders with switches, contact factory for number of switches each stock stroke size can accommodate.

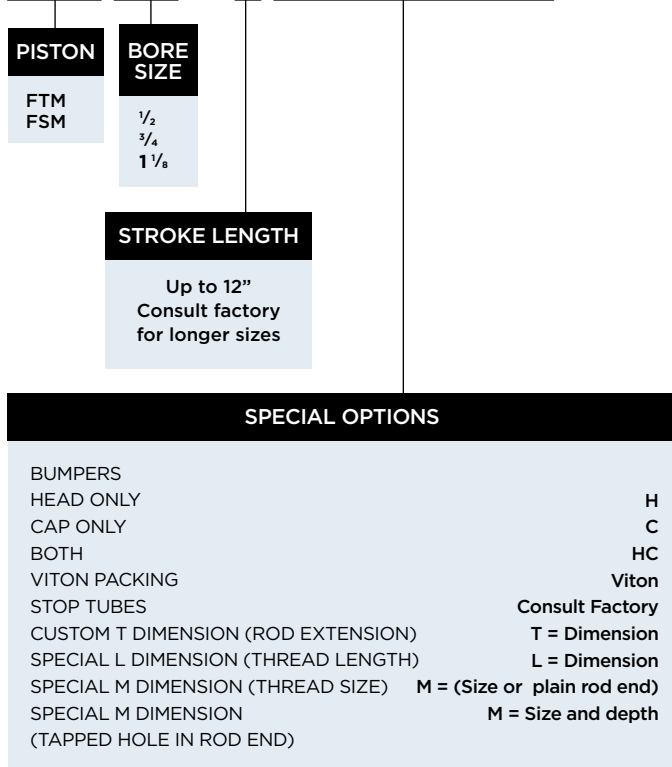
# MINIATURE (DIGIT-AIR) CYLINDERS



Series MTM, MSM, MTMR, MSMR, FTM, FSM, FTMR & FSMR

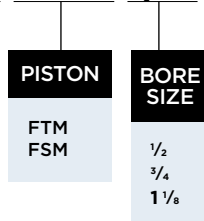
## Ordering Information

### FTM 1/2 X 3 T=5 1/2 H NT



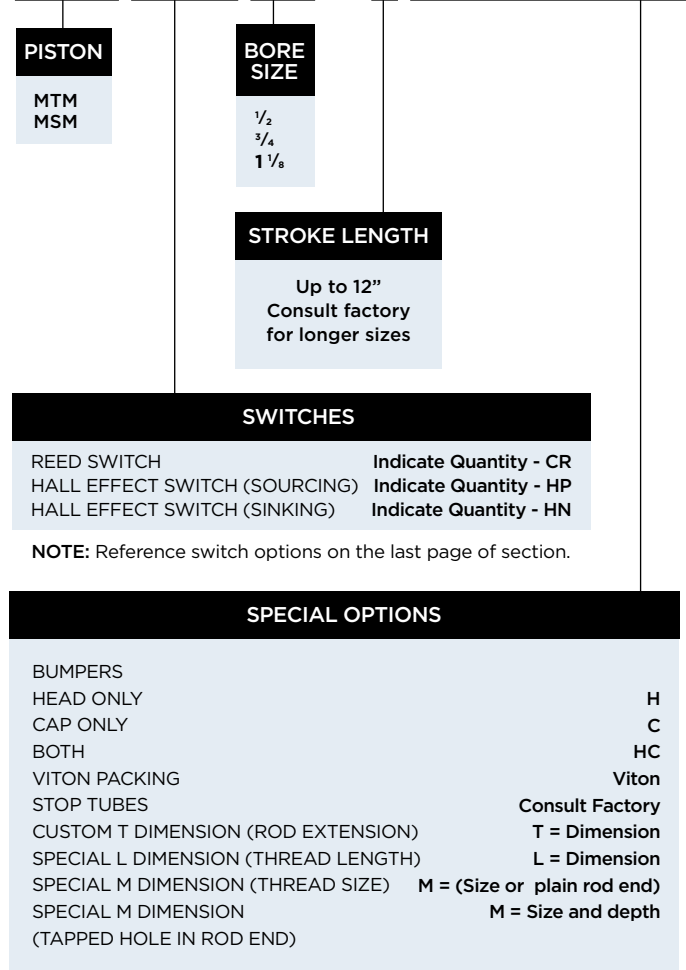
## Replacement Parts

### PK KIT FTM 1/2



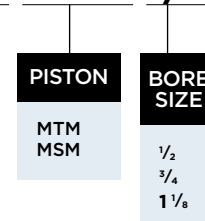
## Ordering Information

### MTM 2-CR 1/2 X 3 T=5 1/2 H NT



## Replacement Parts

### PK KIT MTM 1/2



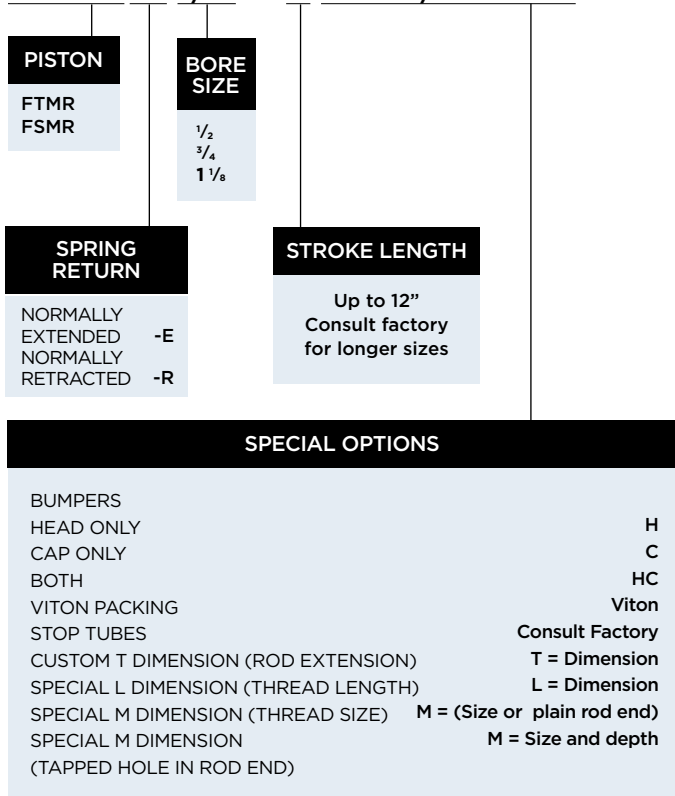
# MINIATURE (DIGIT-AIR) CYLINDERS



Series MTM, MSM, MTMR, MSMR, FTM, FSM, FTMR & FSMR

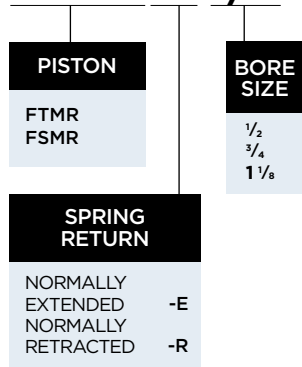
## Ordering Information

### FTMR-E 1/2 X 3 T=5 1/2 H NT



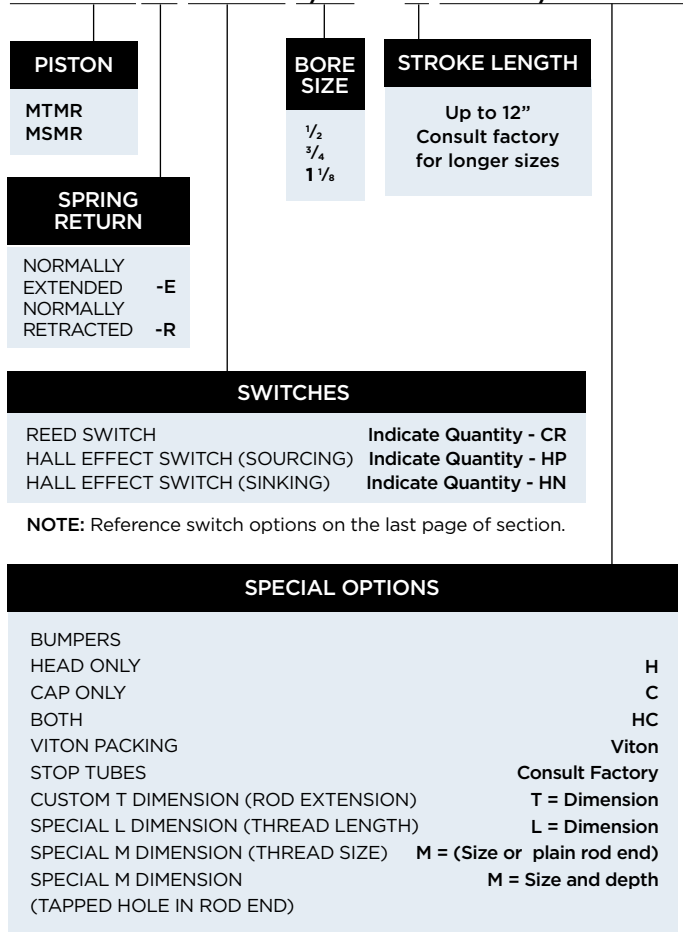
## Replacement Parts

### PK KIT FTMR-E 1/2



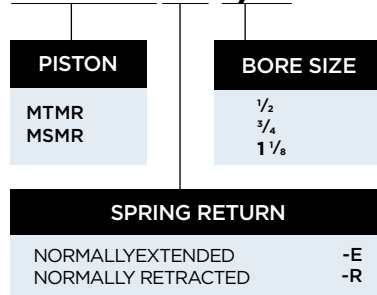
## Ordering Information

### MTMR-E 2-CR 1/2 X 3 T=5 1/2 H NT



## Replacement Parts

### PK KIT MTMR-E 1/2



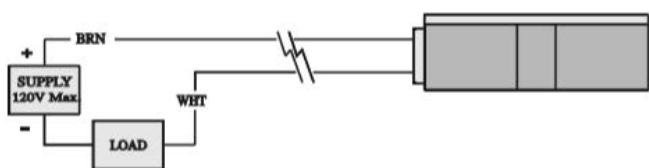
# MINIATURE (DIGIT-AIR) CYLINDERS



Series MTM, MSM, MTMR, MSMR, FTM, FSM, FTMR & FSMR

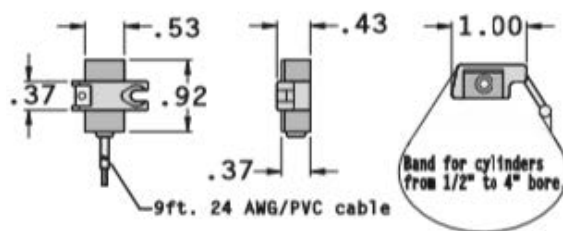
## Series MTM, MSM, MTMR & MSMR Magnetic Switch Options:

### REED SWITCH: PART NO. 43-CR

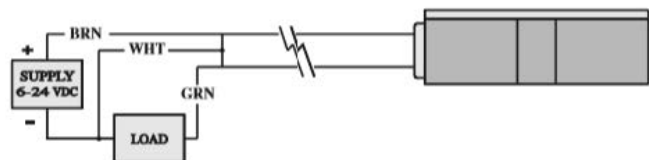


WARNING: DO NOT EXCEED RATINGS.  
Permanent damage to sensor may occur.

### MOUNTING BAND - Included with Switches

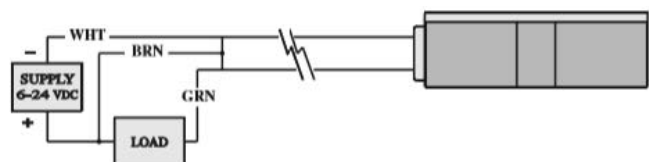


### HALL EFFECT SWITCH - SOURCING PART NO. 43-HP



WARNING: DO NOT EXCEED 24 VDC.  
Permanent damage to sensor may occur.

### HALL EFFECT SWITCH - SINKING PART NO. 43-HN



WARNING: DO NOT EXCEED 24 VDC.  
Permanent damage to sensor may occur.

## SENSOR TYPES & TECHNICAL DATA

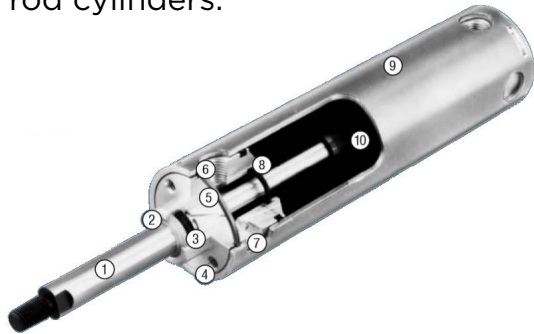
PART NO.	43-CR	43-HP	43-HN
Description	Reed Switch MOV, LED	Half Effect, LED, Sourcing	Half Effect, LED, Sinking
Function	SPTS Normally Open	Normally Open PNP Output	Normally Open NPN Output
Switching Voltage	5 - 120 VDC/VAC 50/60 Hz	6 - 24 VDC	6 - 24 VDC
Switching Current	0.5 Amp Max 0.005 Amp Min	0.5 Amp Max	0.5 Amp Max
Switching Power	10 Watts Max	2 Watts Max	2 Watts Max
Switching Speed	0.5ms operate 0.1ms release	1.5p operate 0.5p release	1.5p operate 0.5p release
Max Volt Drop	3.5 Volts	0.5 Volts	0.5 Volts
Sensitivity	85 Gauss	85 Gauss	85 Gauss

# NFPA INTERCHANGEABLE CYLINDER

**FLAIRLINE**

## Only the Tie Rods are missing

NFPA Interchangeable Cylinders are round body cylinders compatible with NFPA mounts. These cylinders offer a lightweight, low maintenance alternative to standard NFPA cylinders with tie rods. Heavy-duty features provide millions of cycles trouble-free with a reduced cost compared to standard NFPA tie rod cylinders.

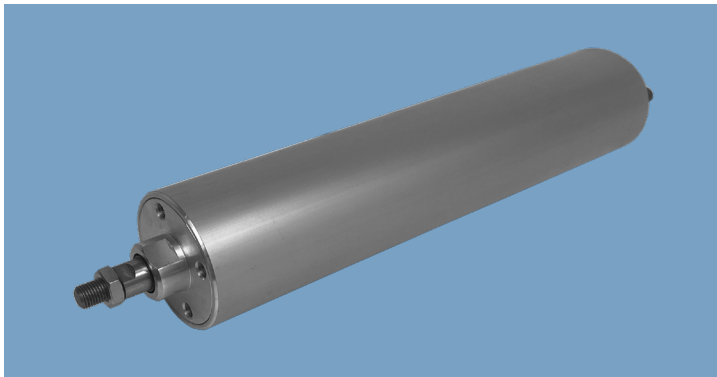


- 1 Chrome-plated, high-strength, steel **Piston Rods** are corrosion resistant, rugged and durable. Three NFPA rod end options are offered. Optional stainless steel is available upon request.
- 2 High-quality elastomer **Rod Wiper** protects **Rod Seal** by preventing contaminants from entering cylinder during retract stroke. Resilient synthetic rubber will not scratch rod.
- 3 Pressure-energized, U-cup type **Rod Seal** is wear compensating, low friction provides positive sealing.

- 4 Lightweight aluminum **Head** and **Caps** for long corrosion-resistant life.
- 5 Extra-long, low-friction nylon **Rod Bearing** ‘gives’ rather than wears under normal side loading. When necessary, service is easy; only the bearing is replaced, not the head.
- 6 **Heads** and **Caps** are held to tube by means of a **Circumflex Key**. The larger square steel locking device requires no special installation tools. Services to **Head** or **Cap** can be one without disassembling the entire cylinder.
- 7 **Adjustable Cushions** available on 2” bore and larger. Under 2” bore cylinders have fixed cushions.
- 8 **Cushion Seal** “check valve” offers fast break-away, self-aligning, positive cushioning for faster stroking and reduced cylinder wear.
- 9 Precision-drawn, lightweight aluminum **Barrels** are hard-anodized inside and out for corrosion and abrasion resistance. Fine I.D. micro-finish provides long life and positive sealing.
- 10 Several **Piston** styles are offered for various application requirements.

All Flairline cylinders are permanently lubricated for life.

# NFPA INTERCHANGEABLE DOUBLE-ACTING CYLINDERS



## Information

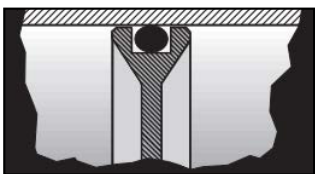
Flairline NFPA interchangeable double-acting cylinders can be used as drop-in replacements for NFPA tie-rod cylinders. Dimensions, mounting options, and performance are identical to NFPA products.

- Operating systems can be pneumatic or low pressure hydraulic
- OILF cylinders provide low friction pneumatic service for use in low-pressure applications where a low minimum breakaway is required
- OIM model feature magnetic piston cylinders with hall/reed effect switches

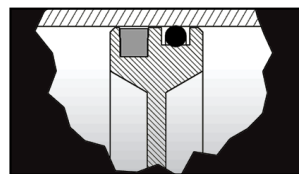
## AVAILABLE IN THREE PISTON TYPES



F TYPE



O TYPE



OIM TYPE

## Features

- Standard Bore Sizes: 1 1/2, 2, 2 1/2, 3 1/4, 4
- Stroke Sizes: Any stroke up to 130"
- Cushions available
- OIM available with magnetic switches

## Specifications

- Maximum Pressure:  
Pneumatic: 150 psi  
Hydraulic: 200 psi
- Operating Temperature:  
0-200°F (Buna Seals)  
-18-93°C (Buna Seals)  
0-275°F (Viton Seals)  
-18-135°C (Viton Seals)

**\*Note:** Viton seals are for OI series only

## FLAIRLINE WARRANTY

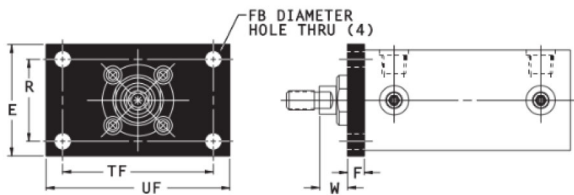
Flairline warrants each product against defects in material and workmanship for a period of one year from the date of manufacturing providing its use was in accordance with Flairline recommendations. If the product fails to perform as warranted, Flairline will, at its option, repair or replace the product free of charge. The company will not be liable for incidental or consequential damages. We make no other warranty, expressed or implied, including warranties of merchantability or fitness for a particular purpose.



# NFPA INTERCHANGEABLE DOUBLE-ACTING CYLINDERS

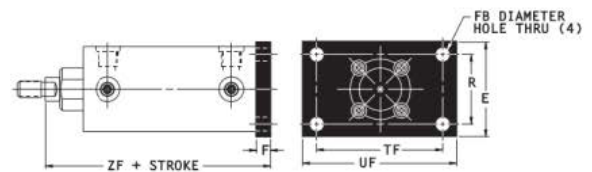


## MOUNTING STYLES FOR NFPA INTERCHANGE CYLINDERS



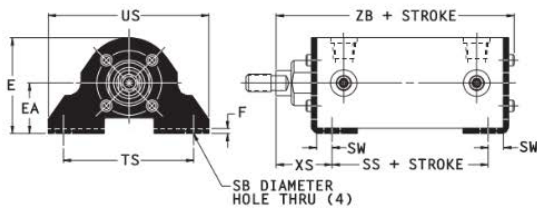
Front Flange Mount (NFPA MF1)

BORE SIZE	DIMENSIONS						
	E	F	FB	R	TF	UF	W
1 1/2	2	3/8	9/32	1.43	2.75	3 3/8	5/8
2	2 1/2	3/8	11/32	1.84	3.38	4 1/8	5/8
2 1/2	3	3/8	11/32	2.19	3.88	4 5/8	5/8
3 1/4	3 3/4	5/8	13/32	2.76	4.69	5 1/2	3/4
4	4 1/2	5/8	13/32	3.32	5.44	6 1/4	3/4



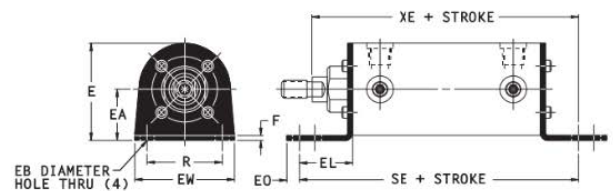
Rear Flange Mount (NFPA MF2)

BORE SIZE	DIMENSIONS						
	E	F	FB	R	TF	UF	ZF
1 1/2	2	3/8	9/32	1.43	2.75	3 3/8	5
2	2 1/2	3/8	11/32	1.84	3.38	4 1/8	5
2 1/2	3	3/8	11/32	2.19	3.88	4 5/8	5 1/8
3 1/4	3 3/4	5/8	13/32	2.76	4.69	5 1/2	3 1/2
4	4 1/2	5/8	13/32	3.32	5.44	6 1/4	4 1/4



Side Lug Mounts (NFPA MS2)

BORE SIZE	DIMENSIONS									
	E	EA	F	SB	SS	SW	TS	US	XS	ZB
1 1/2	1 7/8	1	1/8	13/32	2 7/8	3/8	2 3/4	3 1/2	1 3/8	4.92
2	2 3/8	1 1/4	1/8	13/32	2 7/8	3/8	3 1/4	4	1 3/8	4.95
2 1/2	2 7/8	1 1/2	3/16	13/32	3	3/8	3 3/4	4 1/2	1 3/8	5.19
3 1/4	3 5/8	1 7/8	1/4	17/32	3 1/4	1/2	4 3/4	5 3/4	1 7/8	6.19
4	4 3/8	2 1/4	5/16	17/32	3 1/4	1/2	5 1/2	6 1/2	1 7/8	6.25



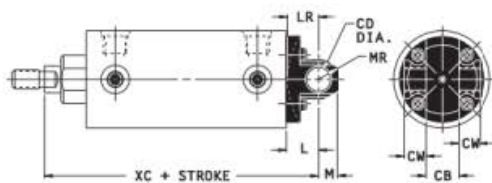
End Lug Mounts (NFPA MS7)

BORE SIZE	DIMENSIONS									
	E	EA	EB	EL	EO	EW	F	R	SE	XE
1 1/2	1 7/8	1	9/32	1 1/8	1/4	2	1/8	1.43	5 1/2	5 3/8
2	2 3/8	1 1/4	11/32	1 5/16	5/16	2 7/16	1/8	1.84	5 7/8	5 9/16
2 1/2	2 7/8	1 1/2	11/32	1 7/16	7/16	3	3/16	2.19	6 1/4	6 13/16
3 1/4	3 5/8	1 7/8	13/32	1 1/2	3/8	3 1/2	1/4	2.76	6 5/8	6 1/2
4	4 3/8	2 1/4	13/32	1 5/8	3/8	4 1/4	5/16	3.32	6 7/8	6 5/8

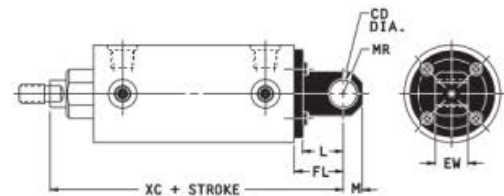
# NFPA INTERCHANGEABLE DOUBLE-ACTING CYLINDERS



## MOUNTING STYLES FOR NFPA INTERCHANGE CYLINDERS



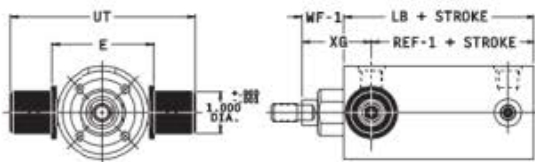
Clevis Mount (NFPA MP1)



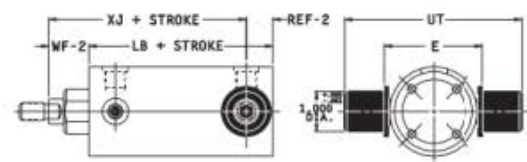
Pivot Mount (NFPA MP4)

BORE SIZE	DIMENSIONS							
	CB	CD	CW	L	LR	M	MR	XC
1½	¾	½	½	¾	9/16	7/16	½	5¾
2	¾	½	½	¾	¾	7/16	½	5¾
2½	¾	½	½	¾	¾	7/16	½	5½
3¼	1¼	¾	5/8	1¼	1⅛	5/8	¾	6⅞
4	1¼	¾	5/8	1¼	1⅛	5/8	¾	6⅞

BORE SIZE	DIMENSIONS							
	CD	EW	FL	L	M	MR	XC	
1½	½	¾	1⅛	15/16	7/16	½	5¾	
2	½	¾	1⅛	15/16	7/16	½	5¾	
2½	½	¾	1⅛	15/16	7/16	½	5¾	
3¼	¾	1¼	1⅞	1⅜	5/8	¾	5⅞	
4	¾	1¼	1⅞	1⅜	5/8	¾	7½	



Head Trunnion Mount (NFPA MT1)



Head Trunnion Mount (NFPA MT2)

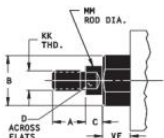
BORE SIZE	DIMENSIONS					
	E	LB	REF-1	UT	WF-1	XG
2	2½	3⅝	2.96	4½	1.08	1¾
2½	3	3¾	3.08	5	1.08	1¾
3¼	3¾	4¼	3.41	5¾	1.41	2¼
4	4½	4¼	3.41	6½	1.41	2¼

BORE SIZE	DIMENSIONS					
	E	LB	REF-2	UT	WF-2	XJ
2	2½	3⅝	.66	4½	1.16	4¼
2½	3	3¾	.66	5	1.16	4¼
3¼	3¾	4¼	.91	5¾	1.66	5
4	4½	4¼	.91	6½	1.66	5

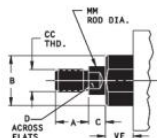
# NFPA INTERCHANGEABLE DOUBLE-ACTING CYLINDERS



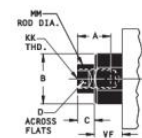
## ROD END STYLES FOR NFPA INTERCHANGE CYLINDERS



**SMALL MALE (NFPA SM)\***



**INTERMEDIATE MALE (NFPA IM)\***



**SHORT FEMALE (NFPA SF)\***

BORE SIZE	DIMENSIONS						
	A	B	C	D	KK	MM	VF
1 1/2, 2, 2 1/2	3/4	1 1/8	3/8	1/2	7/16-20	5/8	5/8
3 1/4, 4	1 1/8	1 1/2	1/2	7/8	3/4-16	1	7/8

BORE SIZE	DIMENSIONS						
	A	B	C	CC	D	MM	VF
1 1/2, 2, 2 1/2	3/4	1 1/8	3/8	1/2-20	1/2	5/8	5/8
3 1/4, 4	1 1/8	1 1/2	1/2	7/8-14	7/8	1	7/8

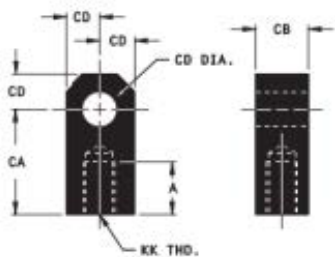
BORE SIZE	DIMENSIONS						
	A	B	C	D	KK	MM	VF
1 1/2, 2, 2 1/2	3/4	1 1/8	3/8	1/2	7/16-20	5/8	5/8
3 1/4, 4	1 1/8	1 1/2	1/2	7/8	3/4-16	1	7/8

\*Standard on all Flairline NFPA interchangeable cylinders. When ordering, if no rod end style is specified, style SM will be supplied. Rod eye and rod clevis for style SM. Rod nut included.

\*Optional. Rod Nut Included.

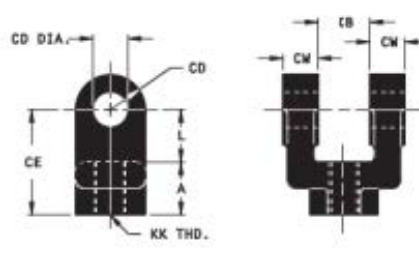
\*Optional.

## ACCESSORIES FOR NFPA INTERCHANGEABLE CYLINDERS



**ROD EYE**

BORE SIZE	DIMENSIONS					
	NO.	A	CA	CB	CD	KK
1 1/2, 2, 2 1/2	4-36-3	3/4	1 1/2	3/4	1/2	7/16-20
3 1/4, 4	4-36-65	1 1/8	2 1/16	1 1/4	3/4	3/4-16



**ROD CLEVIS\***

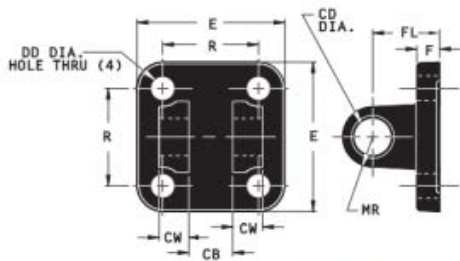
BORE SIZE	DIMENSIONS							
	NO.	A	CB	CD	CE	CW	L	KK
1 1/2, 2, 2 1/2	4-35-3	3/4	3/4	1/2	1 1/2	1/2	3/4	7/16-20
3 1/4, 4	4-35-65	1 1/8	1 1/4	3/4	2 3/8	5/8	1 3/4	3/4-16

\*Pivot Pin Included.

# NFPA INTERCHANGEABLE DOUBLE-ACTING CYLINDERS



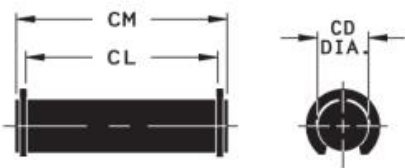
## ACCESSORIES FOR NFPA INTERCHANGEABLE CYLINDERS



CLEVIS BRACKET

BORE SIZE	DIMENSIONS									
	NO.	CB	CD	CW	DD	E	F	FL	MR	R
1 1/2, 2, 2 1/2	4-34-3	3/4	1/2	1/2	13/32	2 1/2	3/8	1 1/8	1/2	1 5/8
3 1/4, 4	4-34-65	1 1/8	3/4	5/8	17/32	3 1/2	5/8	1 7/8	3/4	2 9/16

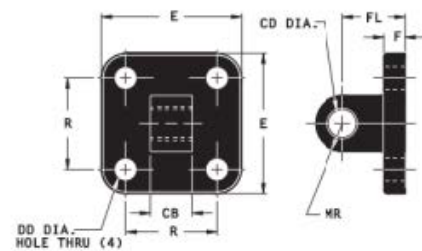
Pivot Pin included.



PIVOT PIN

BORE SIZE	DIMENSIONS			
	NO.	CD	CL	CM
1 1/2, 2, 2 1/2	BKT. PIN F 3 1/4, 4	1/2	1 7/8	2 1/16
3 1/4, 4	PIVOT PIN FI 3 1/4, 4	3/4	2 9/16	2 7/8

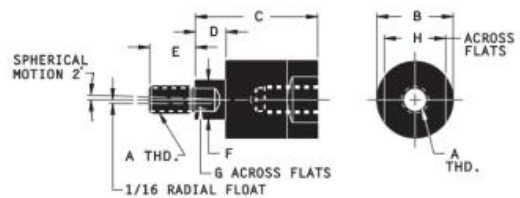
Snap Rings included.



PIVOT BRACKET

BORE SIZE	DIMENSIONS									
	NO.	CB	CD	DD	E	F	FL	MR	R	
1 1/2, 2, 2 1/2	4-37-3	3/4	1/2	13/32	2 1/2	3/8	1 1/8	1/2	1 5/8	
3 1/4, 4	4-37-65	1 1/8	3/4	17/32	3 1/2	5/8	1 7/8	3/4	2 9/16	

See Optional Pivot Pin below



ALIGNMENT COUPLER\*

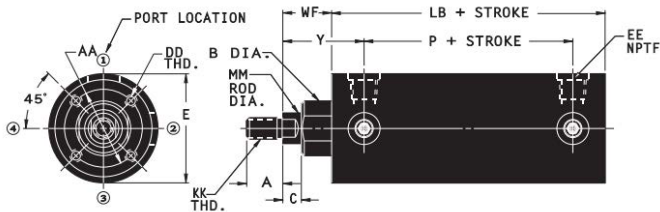
PART NO.	DIMENSIONS								Max. Pull at Yield
	A	B	C	D	E	F	G	H	
4-39-3	7/16 -20	1 1/4	2	1/2	3/4	5/8	1/2	1	10,000
4-39-3A	1/2 -20	1 1/4	2	1/2	3/4	5/8	1/2	1	14,000
4-39-65	3/4 -16	1 3/4	2 5/16	1/2	1 1/8	31/32	3/16	1 1/2	34,000
4-39-65A	7/8 -14	1 3/4	2 5/16	1/2	1 1/8	31/32	3/16	1 1/2	39,000

\*Alignment couplers improve bearing and seal life by preventing excessive binding and friction caused by misalignment. Flairline alignment couplers also allow a greater assembly tolerances than would typically be required which help simplify cylinder installation. Alignment couplers work equally well in "push or "pull" applications and are available for all Flairline cylinders.

# NFPA INTERCHANGEABLE DOUBLE-ACTING CYLINDERS



## Dimensions



DIMENSION REFERENCE	CYLINDER BORE				
	1 1/2	2	2 1/2	3 1/4*	4*
A	3/4	3/4	3/4	1 1/8	1 1/8
AA	1.21	1.60	2.00	2.62	2.62
B	1 1/8	1 1/8	1 1/8	1 1/2	1 1/2
C	3/8	3/8	3/8	1/2	1/2
DD	6-32	1/4-20	5/16-18	3/8-16	3/8-16
E	1 3/4	2 1/4	2 3/4	3 1/2	4 1/4
EE-NPTF	1/4-18	1/4-18	1/4-18	1/2-14	1/2-14
KK	7/16-20	7/16-20	7/16-20	3/4-16	3/4-16
LB	3 1/2	3 5/8	3 3/4	4 1/4	4 1/4
LD	4 1/8	4 1/8	4 1/4	4 3/4	4 3/4
MM	5/8	5/8	5/8	1	1
P	2.29	2.29	2.42	2.44	2.44
PI	2.79	2.79	2.92	2.94	2.94
WF	1	1	1	1 3/8	1 3/8
Y	1.67	1.67	1.67	2.28	2.28
ZM	6 1/8	6 1/8	6 1/4	7 1/2	7 1/2

## Ordering Information

**FI 2 x 6 MF1 T = 5 1/2 H NT**

<b>PISTON</b>	<b>SPECIAL OPTIONS</b>
FI OI OILF FIDE OIDE	Cushions Head Only <span style="float: right;">H</span> Cap Only <span style="float: right;">C</span> Both <span style="float: right;">HC</span> Metal Rod Scraper <span style="float: right;">(respectively)</span> (not available on <span style="float: right;">MRS</span> 3 1/4 or 4" bore) Extra Inlet Port(s) <b>Indicate location(s)</b> <b>(PP2, PP3, PP4)</b> <b>in cap or head end</b> Inlet ports <b>Indicate location(s)</b> <b>(PP2, PP3, PP4)</b> <b>in cap or head end</b> Stainless Steel <span style="float: right;">SS Keys</span> Circumflex Keys Viton Packing (OI and OIDE only) <b>Viton</b> Stop Tubes <span style="float: right;"><b>Consult Factory</b></span> Rod End Styles <span style="float: right;"><b>IM or SF</b></span> Intermediate Male or Short Female Rod Extension "C" <span style="float: right;"><b>C = Dimension</b></span> Thread Length "A" <span style="float: right;"><b>A = Dimension</b></span> Male Thread Size <span style="float: right;"><b>XX = (size or</b></span> <span style="float: right;"><b>plain rod end)</b></span> Female Thread Size <span style="float: right;"><b>XX = (size or</b></span> <span style="float: right;"><b>depth - unless</b></span> <span style="float: right;"><b>otherwise specified,</b></span> <span style="float: right;"><b>all other dimensions</b></span> <span style="float: right;"><b>will be Short Female</b></span> Stainless Steel Rods <span style="float: right;"><b>SS Rod</b></span>
<b>BORE SIZE</b>	
1 1/2 2 2 1/2 3 1/4 4	
<b>STROKE LENGTH</b>	
Any length in inch increments or fraction thereof up to and including 130"	
<b>MOUNTING STYLES</b>	
Front Flange Mount <b>MF1</b> Rear Flange Mount <b>MF2</b> Side Lug Mount <b>MS2</b> End lug Mount <b>MS7</b> Clevis Mount <b>MP1</b> Pivot Mount <b>MP4</b> Head Trunnion Mount <b>MT1</b> Head Trunnion Mount <b>MT2</b>	

\*MT1 and MT2 not available on 1 1/2 bore cylinders.  
**Note:** See next page for OIM cylinder.

## Replacement Parts

**PK KIT FI 2**

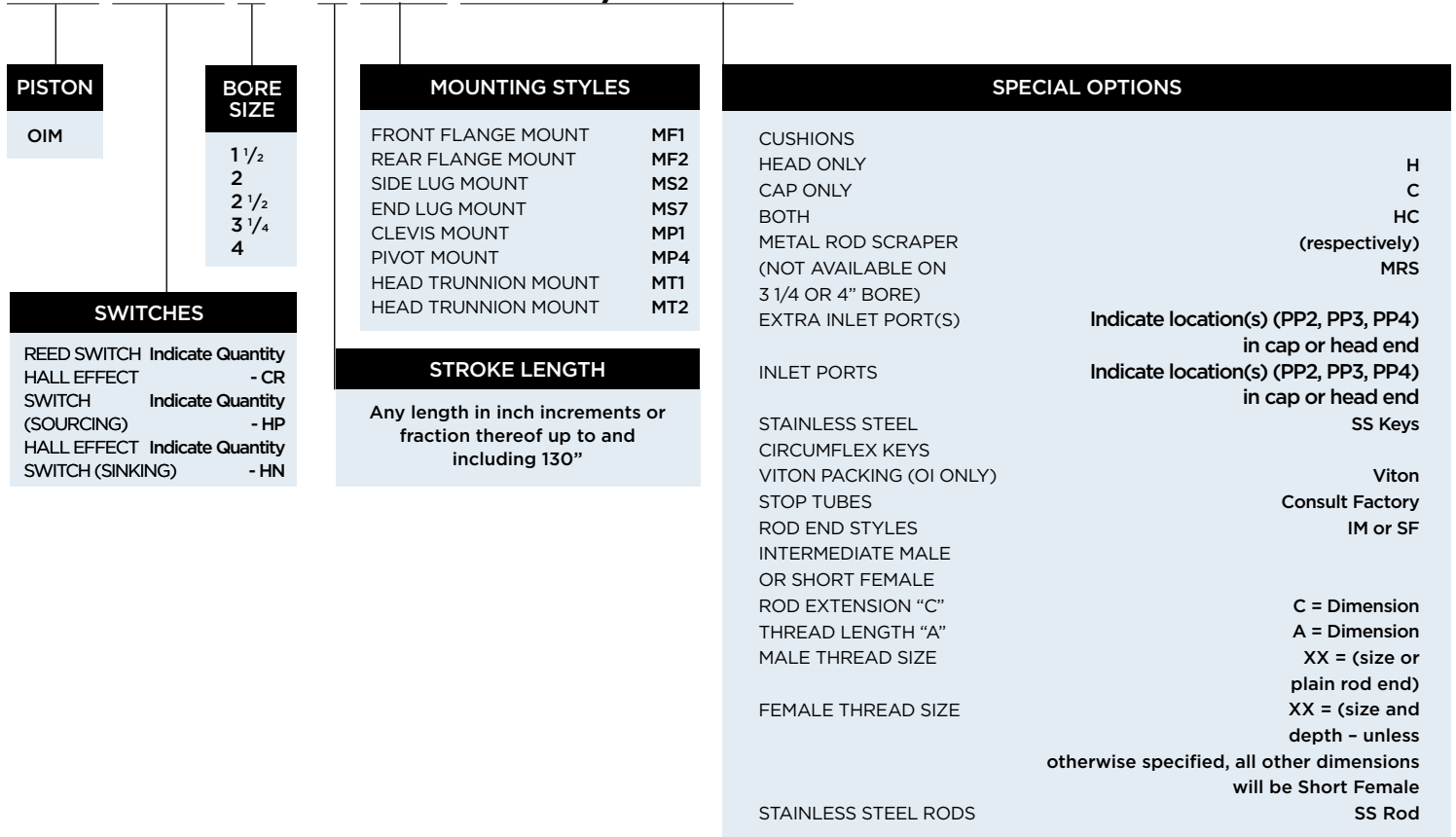
<b>PISTON</b>	<b>BORE SIZE</b>
FI OI OILF FIDE OIDE	1 1/2 2 2 1/2 3 1/4 4

# NFPA INTERCHANGEABLE DOUBLE-ACTING CYLINDERS



## Ordering Information

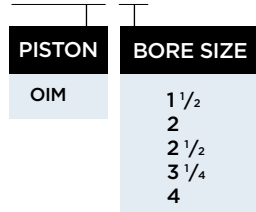
OIM 2-CR 2 x 6 MF1 T = 5 1/2 H NT



\*MT1 and MT2 not available on 1 1/2 bore cylinders.

## Replacement Parts

PK KIT OIM 2



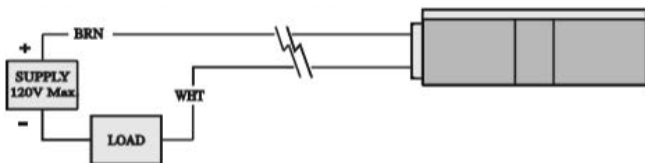
PROUD TO BE  
**MADE IN AMERICA**

# NFPA INTERCHANGEABLE DOUBLE-ACTING CYLINDERS



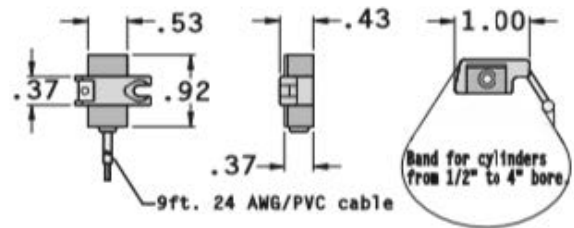
## Series FI, OI & OLF Magnetic Switch Options:

### REED SWITCH: PART NO. 43-CR

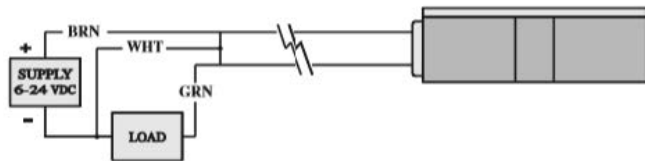


WARNING: DO NOT EXCEED RATINGS.  
Permanent damage to sensor may occur.

### MOUNTING BAND - Included with Switches

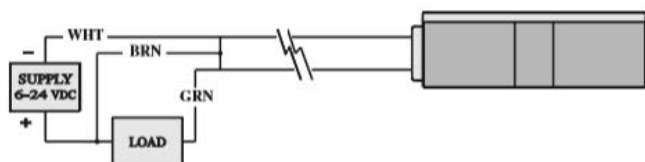


### HALL EFFECT SWITCH - SOURCING PART NO. 43-HP



WARNING: DO NOT EXCEED 24 VDC.  
Permanent damage to sensor may occur.

### HALL EFFECT SWITCH - SINKING PART NO. 43-HN



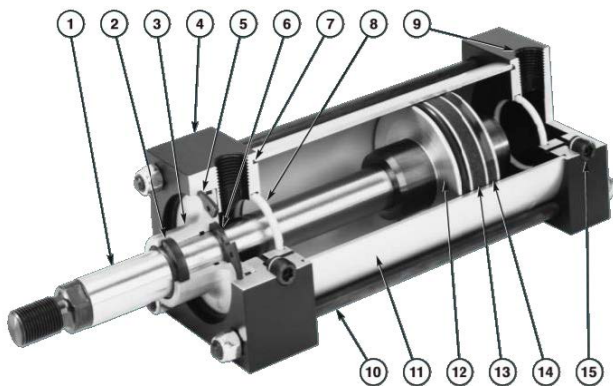
WARNING: DO NOT EXCEED 24 VDC.  
Permanent damage to sensor may occur.

## SENSOR TYPES & TECHNICAL DATA

PART NO.	43-CR	43-HP	43-HN
Description	Reed Switch MOV, LED	Half Effect, LED, Sourcing	Half Effect, LED, Sinking
Function	SPTS Normally Open	Normally Open PNP Output	Normally Open NPN Output
Switching Voltage	5 - 120 VDC/VAC 50/60 Hz	6 - 24 VDC	6 - 24 VDC
Switching Current	0.5 Amp Max 0.005 Amp Min	0.5 Amp Max	0.5 Amp Max
Switching Power	10 Watts Max	12 Watts Max	12 Watts Max
Switching Speed	0.5ms operate 0.1ms release	1.5p operate 0.5p release	1.5p operate 0.5p release
Max Volt Drop	3.5 Volts	0.5 Volts	0.5 Volts
Sensitivity	85 Gauss	85 Gauss	85 Gauss

# HEAVY DUTY NFPA CYLINDERS

FLAIRLINE

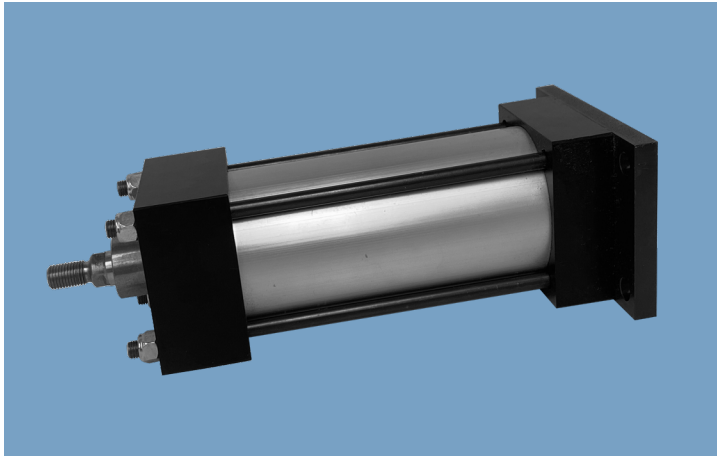


- 1 Chrome-plated, high-strength, steel **Piston Rods** are corrosion resistant, rugged and durable.
- 2 Urethane, double lip **Rod Wiper** aggressively wipes contaminants from rod protecting rod seal and cylinder.
- 3 660 bronze **Rod Bearing** provides maximum rod support and low friction for normal to high-load conditions. Lube reservoir allows longer bearing and seal life without maintenance.
- 4 **Head** and **Cap** are machined, aluminum precision blocks for accurate mounting surfaces. Black anodized for corrosion resistance.
- 5 Steel **Retaining Ring** for strength, coated for corrosion resistance, allows easy removal of rod bearing and seals without disassembly of cylinder.
- 6 Pressure-energized, wear compensating U-cup **Rod Seal** provides positive sealing.

- 7 **Barrel Seals** offer O-ring design for positive sealing.
- 8 Floating **Cushion Seal** “check valve” offers fast break-a-way, self-aligning, positive cushioning for faster cycle time and reduced cylinder wear.
- 9 N.P.T.F. **Ports** standard.
- 10 **Tie Rods** are pre-stressed, high strength steel for maximum fatigue capacity and have rolled threads for added strength. Black oxide finish provides corrosion resistance.
- 11 Precision-drawn, lightweight aluminum **Barrel** is hard anodized inside and out for corrosion and abrasion resistance. Fine I.D. micro-finish provides long life and positive sealing.
- 12 Aluminum **Piston** is threaded to rod, permanently locked with aerobic adhesive and secured with lock nut. Optional magnet is installed under wear ring.
- 13 Specially formulated acetal **Wear Ring** increases cylinder life by eliminating metal to metal contact.
- 14 Pressure-energized, wear compensating, U-cup **Piston Seals** provide positive sealing.
- 15 Adjustable **Cushion Needles** have fine thread metering, are captive and flush (cushions not available on head-end of 1 1/2 bore cylinders with oversize rods).



# HEAVY DUTY NFPA CYLINDERS



## Information

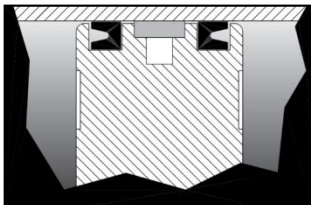
Flairline double-acting NFPA cylinders are built to NFPA standards and can be used for all types of applications where economical and durable actuators are required.

- Operating systems can be pneumatic or hydraulic
- Precision components and sealing elements permit continuous operation in any environment
- Models TS and TLS feature oversized rods with a unique seal configuration
- TL and TLS are low friction models for minimal break away force
- Models TM feature magnetic pistons cylinders

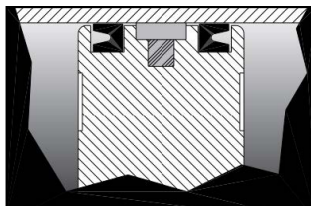
### ALSO AVAILABLE IN DOUBLE ENDED

- Rod extensions allow for work to be done at both ends because the force and speed are equal in both directions
- TSDE cylinders feature oversized rods

## AVAILABLE IN TWO PISTON TYPES



**T** TYPE



**TM** TYPE

## FLAIRLINE WARRANTY

Flairline warrants each product against defects in material and workmanship for a period of one year from the date of manufacturing providing its use was in accordance with Flairline recommendations. If the product fails to perform as warranted, Flairline will, at its option, repair or replace the product free of charge. The company will not be liable for incidental or consequential damages. We make no other warranty, expressed or implied, including warranties of merchantability or fitness for a particular purpose.

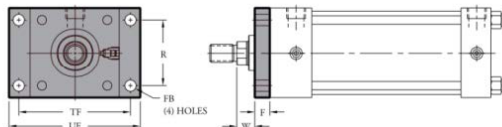


# HEAVY DUTY NFPA CYLINDERS



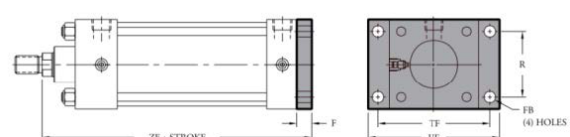
## MOUNTING STYLES for HEAVY-DUTY NFPA CYLINDERS

### Front Flange Mount (NFPA MF1)



NFPA MF1

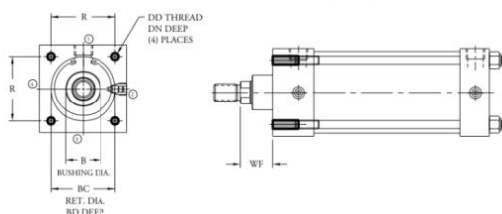
### Rear Flange Mount (NFPA MF2)



NFPA MF2

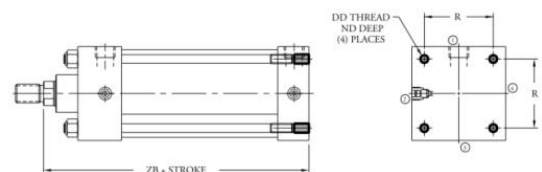
BORE SIZE	DIMENSIONS									BORE SIZE	DIMENSIONS												
	ROD DIA.	F	FB	R	TF	UF	W	ZF	ROD DIA.		F	FB	R	TF	UF	W	ZF						
1 1/2	5/8	1	3/8	5/16	1.43	2 3/4	3 3/8	5/8	1	5	5 3/8	1 1/2	5/8	1	3/8	5/16	1.43	2 3/4	3 3/8	5/8	1	5	5 3/8
2	5/8	1	3/8	3/8	1.84	3 3/8	4 1/8	5/8	1	5	5 1/2	2	5/8	1	3/8	3/8	1.84	3 3/8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

### Front Face Mount (NFPA FC1)



NFPA FC1

### Rear Face Mount (NFPA FC2)



NFPA FC2

BORE SIZE	DIMENSIONS									BORE SIZE	DIMENSIONS										
	ROD DIA.	B	BC	BD	DD	DN	R	WF	ROD DIA.		DD	ND	R	ZB							
1 1/2	5/8	1	1.124	1.499	1 5/8	NA	1/16	1/4-28	3/4	1 1/8	1.43	1	1	1 1/2	5/8	1	1/4-28	1/2	1.43	4 5/8	5
2	5/8	1	1.124	1.499	2 1/8	3/32	5/16-24	3/4	1.84	1	3/8	2	5/8	1	5/16-24	1/2	1.84	4 5/8	5		
2 1/2	5/8	1	1.124	1.499	2 1/8	3/32	5/16-24	3/4	2.19	1	3/8	2 1/2	5/8	1	5/16-24	1/2	2.19	4 3/4	5 1/8		
3 1/4	1	1 3/8	1.499	1.999	2 3/4	5/32	3/8-24	7/8	2.76	1 3/8	1 5/8	3 1/4	1	1 3/8	3/8-24	5/8	2.76	5 5/8	5 7/8		
4	1	1 3/8	1.499	1.999	2 3/4	5/32	3/8-24	7/8	3.32	1 3/8	1 5/8	4	1	1 3/8	3/8-24	5/8	3.32	5 5/8	5 7/8		
5	1	1 3/8	1.499	1.999	2 3/4	5/32	1/2-20	7/8	4.10	1 3/8	1 5/8	5	1	1 3/8	1/2-20	5/8	4.10	5 7/8	6 1/8		
6	1 3/8	1 3/4	1.999	2.374	3 1/4	3/16	1/2-20	1	4.88	1 5/8	1 7/8	6	1 3/8	1 3/4	1/2-20	3/4	4.88	6 5/8	6 7/8		
8	1 3/8	1 3/4	1.999	2.374	3 1/4	3/16	5/8-18	1	6.44	1 5/8	1 7/8	8	1 3/8	1 3/4	5/8-18	3/4	6.44	6 3/4	7		

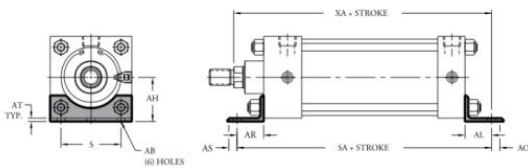
\*Includes 3/8 unthread cover plate.

# HEAVY DUTY NFPA CYLINDERS



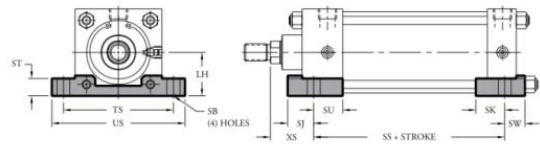
## MOUNTING STYLES for HEAVY-DUTY NFPA CYLINDERS

### Angle Mount (NFPA MS1)



NFPA MS1

### Side Lug Mount (NFPA MS2)

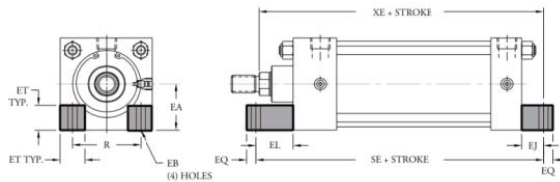


NFPA MS2

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

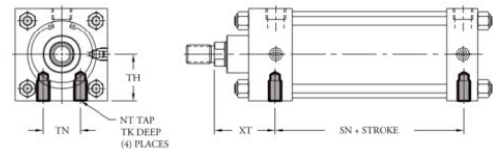
BORE SIZE	DIMENSIONS														
	ROD DIA.	LH	SB	SJ	SK	SS	ST	SU	SW	TS	US	XS			
1 1/2	5/8	1	1	7/16	3/4	1 1/8	5/8	2 7/8	1/2	15/16	9/16	2 3/4	3 1/2	1 3/8	1 3/4
2	5/8	1	1 1/4	7/16	7/8	15/16	2 7/8	1/2	15/16	3/4	3 1/4	4	1 3/8	1 3/4	
2 1/2	5/8	1	1 1/2	7/16	7/8	15/16	3	1/2	15/16	3/4	3 3/4	4 1/2	1 3/8	1 3/4	
3 1/4	1	1 3/8	1 7/8	9/16	1 1/8	1 1/4	3 1/4	3/4	1 1/4	3/4	4 3/4	5 3/4	1 7/8	2 1/8	
4	1	1 3/8	2 1/4	9/16	1 1/8	1 1/4	3 1/4	3/4	1 1/4	1	5 1/2	6 1/2	1 7/8	2 1/8	
5	1	1 3/8	2 3/4	13/16	1 7/16	1 9/16	3 3/8	1	1 9/16	1 7/16	6 7/8	8 1/4	2 1/16	2 5/16	
6	1 3/8	1 3/4	3 1/4	13/16	1 7/16	1 9/16	3 5/8	1	1 9/16	1 7/16	7 7/8	9 1/4	2 5/16	2 9/16	
8	1 3/8	1 3/4	4 1/4	13/16	1 11/16	1 9/16	3 3/4	1	1 9/16	1 11/16	9 7/8	11 1/4	2 5/16	2 9/16	

### End Lug Mount (NFPA MS7)



NFPA MS7

### Side Tapped Mounts (NFPA MS4)



NFPA MS4

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

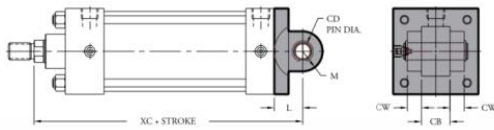
BORE SIZE	DIMENSIONS									
	ROD DIA.	NT	SN	TH	TK	TN	XT			
1 1/2	5/8	1	1/4-20	2 1/4	1	3/8	5/16	5/8	1 15/16	2 15/16
2	5/8	1	5/16-18	2 1/4	1 1/4	1/2	7/8	1 15/16	2 15/16	
2 1/2	5/8	1	3/8-16	2 3/8	1 1/2	5/8	1 1/4	1 15/16	2 15/16	
3 1/4	1	1 3/8	1/2-13	2 5/8	1 7/8	13/16	1 1/2	2 7/16	2 11/16	
4	1	1 3/8	1/2-13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

# HEAVY DUTY NFPA CYLINDERS



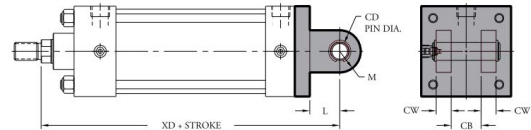
## MOUNTING STYLES for HEAVY-DUTY NFPA CYLINDERS

### Clevis Mount (NFPA MP1)



NFPA MP1

### Clevis Mount (NFPA MP2)



NFPA MP2

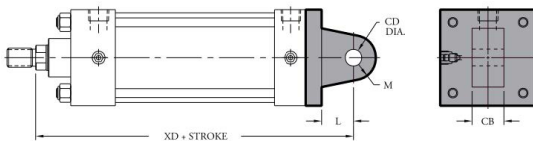
BORE SIZE	DIMENSIONS										
	ROD DIA.	CB	CD	CW	L	M	XC	XD			
1 1/2	5/8	1	3/4	1/2	1/2	3/4	5/8	5 3/8	5 3/4	5 3/4	6 1/8
2	5/8	1	3/4	1/2	1/2	3/4	5/8	5 3/8	5 3/4	5 3/4	6 1/8
2 1/2	5/8	1	3/4	1/2	1/2	3/4	5/8	5 1/2	5 7/8	5 7/8	6 1/4
3 1/4	1	1 3/8	1 1/4	3/4	5/8	1 1/4	7/8	6 7/8	7 1/8	7 1/2	7 3/4
4	1	1 3/8	1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

Pivot pin is included on MP1 and MP2. Optional pivot pin for MP4.

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

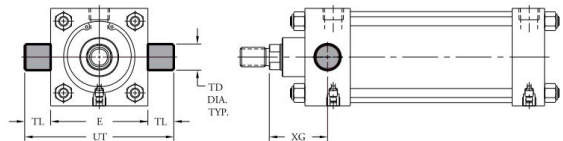
Pivot pin is included on MP1 and MP2. Optional pivot pin for MP4.

### Pivot Mount (NFPA MP4)



NFPA MP4

### Head Trunnion Mounts (NFPA MT1)



NFPA MT1

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

Pivot pin is included on MP1 and MP2. Optional pivot pin for MP4.

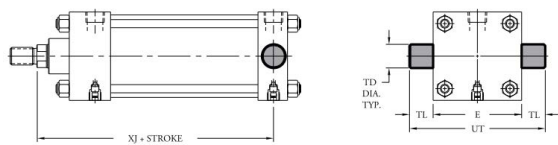
BORE SIZE	DIMENSIONS									
	ROD DIA.	E	TD	TL	UT	XG	XJ			
1 1/2	5/8	1	2	1	1	4	1 3/4	2 1/8	4 1/8	4 1/2
2	5/8	1	2 1/2	1	1	4 1/2	1 3/4	2 1/8	4 1/8	4 1/2
2 1/2	5/8	1	3	1	1	5	1 3/4	2 1/8	4 1/4	4 5/8
3 1/4	1	1 3/8	3 3/4	1	1	5 3/4	2 1/4	2 1/2	5	5 1/4
4	1	1 3/8	4 1/2	1	1	6 1/2	2 1/4	2 1/2	5	5 1/4
5	1	1 3/8	5 1/2	1	1	7 1/2	2 1/4	2 1/2	5 1/4	5 1/2
6	1 3/8	1 3/4	6 1/2	1 3/8	1 3/8	9 1/4	2 5/8	2 7/8	5 7/8	6 1/8
8	1 3/8	1 3/4	8 1/2	1 3/8	1 3/8	11 1/4	2 5/8	2 7/8	6	6 1/4

# HEAVY DUTY NFPA CYLINDERS



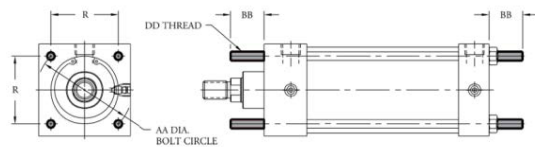
## MOUNTING STYLES for HEAVY-DUTY NFPA CYLINDERS

### Cap Trunnion Mounts (NFPA MT2)



NFPA MT2

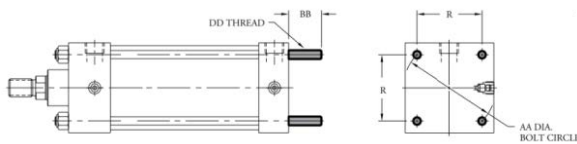
### Extended Tie Rods - Front & Rear (NFPA MX1)



NFPA MX1

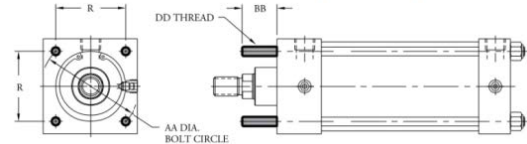
BORE SIZE	DIMENSIONS										BORE SIZE	DIMENSIONS			
	ROD DIA.	E	TD	TL	UT	XG	XJ	AA	BB	DD		R			
1 1/2	5/8	2	1	1	4	1 3/4	2 1/8	4 1/8	4 1/2	1 1/2	2.02	1	1/4-28	1.43	
2	5/8	1	2 1/2	1	1	4 1/2	1 3/4	2 1/8	4 1/8	4 1/2	2	2.6	1 1/8	5/16-24	1.84
2 1/2	5/8	1	3	1	1	5	1 3/4	2 1/8	4 1/4	4 5/8	2 1/2	3.1	1 1/8	5/16-24	2.19
3 1/4	1	1 3/8	3 3/4	1	1	5 3/4	2 1/4	2 1/2	5	5 1/4	3 1/4	3.9	1 3/8	3/8-24	2.76
4	1	1 3/8	4 1/2	1	1	6 1/2	2 1/4	2 1/2	5	5 1/4	4	4.7	1 3/8	3/8-24	3.32
5	1	1 3/8	5 1/2	1	1	7 1/2	2 1/4	2 1/2	5 1/4	5 1/2	5	5.8	1 13/16	1/2-20	4.10
6	1 3/8	1 3/4	6 1/2	1 3/8	1 3/8	9 1/4	2 5/8	2 7/8	5 7/8	6 1/8	6	6.9	1 13/16	1/2-20	4.88
8	1 3/8	1 3/4	8 1/2	1 3/8	1 3/8	11 1/4	2 5/8	2 7/8	6	6 1/4	8	9.1	2 5/16	5/8-18	6.44

### Extended Tie Rods - Rear (NFPA MX2)



NFPA MX2

### Extended Tie Rods - Front (NFPA MX3)



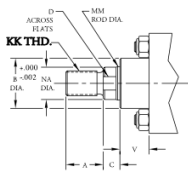
NFPA MX3

BORE SIZE	DIMENSIONS				BORE SIZE	DIMENSIONS			
	AA	BB	DD	R		AA	BB	DD	R
1 1/2	2.02	1	1/4-28	1.43	1 1/2	2.02	1	1/4-28	1.43
2	2.6	1 1/8	5/16-24	1.84	2	2.6	1 1/8	5/16-24	1.84
2 1/2	3.1	1 1/8	5/16-24	2.19	2 1/2	3.1	1 1/8	5/16-24	2.19
3 1/4	3.9	1 3/8	3/8-24	2.76	3 1/4	3.9	1 3/8	3/8-24	2.76
4	4.7	1 3/8	3/8-24	3.32	4	4.7	1 3/8	3/8-24	3.32
5	5.8	1 13/16	1/2-20	4.10	5	5.8	1 13/16	1/2-20	4.10
6	6.9	1 13/16	1/2-20	4.88	6	6.9	1 13/16	1/2-20	4.88
8	9.1	2 5/16	5/8-18	6.44	8	9.1	2 5/16	5/8-18	6.44

# HEAVY DUTY NFPA CYLINDERS

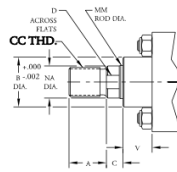


## ROD END STYLES for HEAVY-DUTY NFPA CYLINDERS



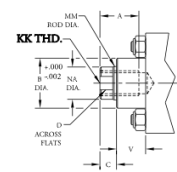
**SMALL MALE (NFPA SM)\***

\*Standard on all Flairline NFPA cylinders.  
When ordering, if no rod end style is specified, style SM will be supplied.



**INTERMEDIATE MALE (NFPA IM)\***

\*Optional



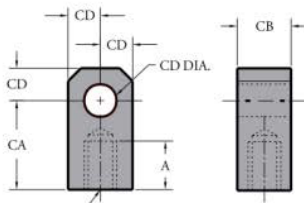
**SHORT FEMALE (NFPA SF)\***

\*Optional

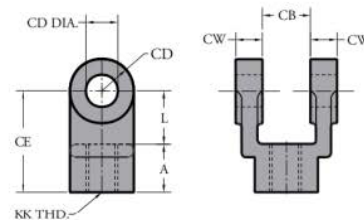
Rod Diameter	DIMENSIONS								Rod Diameter	DIMENSIONS							
	A	B	C	CC	D	KK	NA	V		A	B	C	CC	D	KK	NA	V
5/8	3/4	1.124	3/8	1/2-20	1/2	7/16-20	.593	5/8	1 3/8	1 5/8	1.999	5/8	1 1/4-12	1 1/8	1-14	1.343	1
1	1 1/8	1.499	1/2	7/8-14	7/8	3/4-16	.968	7/8*	1 3/4	2	2.374	3/4	1 1/2-12	1 1/2	1 1/4-12	1.703	1 1/8

\*1 1/2" bore, V = 1/2

## ACCESSORIES for HEAVY-DUTY NFPA CYLINDERS



**ROD EYE**



**ROD CLEVIS**

PART NO.	DIMENSIONS				
	A	CA	CB	CD	KK
4-36-3	3/4	1 1/2	3/4	1/2	7/16-20
4-36-3A	3/4	1 1/2	3/4	1/2	1/2-20
4-36-65	1 5/8	2 1/16	1 1/4	3/4	3/4-16
4-36-65A	1 5/8	2 1/16	1 1/4	3/4	7/8-14
4-36-12	1 5/8	2 13/16	1 1/2	1	1-14
4-36-12A	2	3 7/16	2	1 3/8	1 1/4-12
4-36-12B	2	3 7/16	2	1 3/8	1 1/2-12

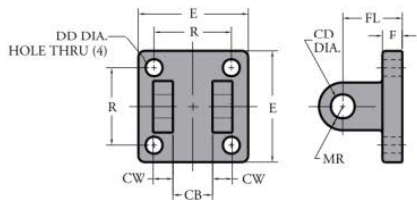
PART NO.	DIMENSIONS						
	A	CB	CD	CE	CW	L	KK
4-35-3	3/4	3/4	1/2	1 1/2	1/2	3/4	7/16-20
4-35-3A	3/4	3/4	1/2	1 1/2	1/2	3/4	1/2-20
4-35-65	1 1/8	1 1/4	3/4	2 3/8	5/8	1 1/4	3/4-16
4-35-65A	1 1/8	1 1/4	3/4	2 3/8	5/8	1 1/4	7/8-14
4-35-12	1 5/8	1 1/2	1	3 1/8	3/4	1 1/2	1-14
4-35-12A	2	2	1 3/8	4 1/8	1	2 1/8	1 1/4-12
4-35-12B	2	2	1 3/8	4 1/8	1	2 1/8	1 1/2-12

Pivot pin included.

# HEAVY DUTY NFPA CYLINDERS

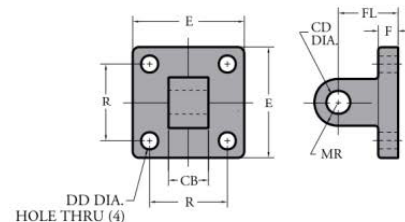


## ACCESSORIES for HEAVY-DUTY NFPA CYLINDERS



CLEVIS BRACKET

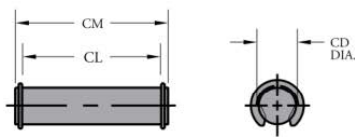
PART NO.	DIMENSIONS								
	CB	CD	CW	DD	E	F	FL	MR	R
5-34-3	3/4	1/2	1/2	13/32	2 1/2	3/8	1 1/2	1/2	1 5/8
5-34-65	1 1/4	3/4	5/8	17/32	3 1/2	5/8	1 7/8	3/4	2 9/16
5-34-12	1 1/2	1	3/4	21/32	4 1/2	3/4	2 1/4	1 1/8	3 1/4
5-34-12A	2	1 3/8	1	21/32	5	7/8	3	1 3/4	3 13/16
5-34-16	2 1/2	1 3/4	1 1/4	29/32	6 1/2	7/8	3 1/8	1 7/8	4 15/16



PIVOT BRACKET

PART NO.	DIMENSIONS								
	CB	CD	DD	E	F	FL	MR	R	
5-37-3	3/4	1/2	13/32	2 1/2	3/8	1 1/8	1/2	1 5/8	
5-37-65	1 1/4	3/4	17/32	3 1/2	5/8	1 7/8	3/4	2 9/16	
5-37-12	1 1/2	1	21/32	4 1/2	7/8	2 3/8	1 1/4	3 1/4	
5-37-12A	2	1 3/8	21/32	5	7/8	3	1 5/8	3 13/16	
5-37-16	2 1/2	1 3/4	29/32	6 1/2	1 1/8	3 3/8	2 1/8	4 15/16	

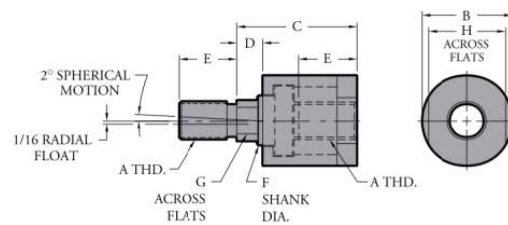
See optional pivot pin below.



PIVOT PIN

PART NO.	DIMENSIONS		
	CD	CL	CM
BKT. PIN F 3 1/4, 4	1/2	1 7/8	2 1/16
PIVOT PIN FI 3 1/4, 4	3/4	2 5/8	2 29/32
5-40-12	1	3 1/8	3 7/16
5-40-12A	1 3/8	4 1/8	4 31/64
5-40-16	1 3/4	5 3/16	5 9/16

Snap Rings included.



ALIGNMENT COUPLER

PART	DIMENSIONS									Max. Pull at Yield
	A	B	C	D	E	F	G	H		
4-39-3	7/16 -20	1 1/4	2	1/2	3/4	5/8	1/2	1	10,000	
4-39-3A	1/2 -20	1 1/4	2	1/2	3/4	5/8	1/2	1	14,000	
4-39-65	3/4 -16	1 3/4	2 5/16	1/2	1 1/8	31/32	3/16	1 1/2	34,000	
4-39-65A	7/8 -14	1 3/4	2 5/16	1/2	1 1/8	31/32	3/16	1 1/2	39,000	
4-39-12	1-14	2 1/2	2 15/16	1/2	1 5/8	1 3/8	1 5/32	2 1/4	64,000	
4-39-12A	1 1/4 -12	2 1/2	2 15/16	1/2	1 5/8	1 3/8	1 5/32	2 1/4	78,000	
4-39-16	1 1/2 -12	3 1/4	4 3/8	13/16	2 1/4	1 3/4	1 1/2	3	134,000	

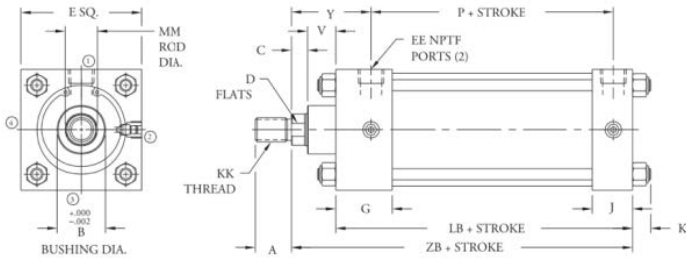
Alignment couplers improve bearing and seal life by preventing excessive binding and friction caused by misalignment. Flairline alignment couplers also allow a greater assembly tolerances than would typically be required which help simplify cylinder installation. Alignment couplers work equally well in "push or "pull" applications and are available for all Flairline cylinders.



# HEAVY DUTY NFPA CYLINDERS



## Dimensions



## Specifications

- Maximum Pressure:  
Pneumatic: 250 psi  
Hydraulic: 400 psi  
(non-shock)
  - Operating Temperature:  
0-200°F (Buna Seals)  
-18-93°C (Buna Seals)  
0-275°F (Viton Seals)  
-18-135°C (Viton Seals)
- \*Note: Viton seals for T and TS series only

## Features

- Standard Bore Sizes:  
1 1/2, 2, 2 1/2, 3 1/4, 4, 5, 6, 8
- Stroke Sizes: Any stroke up to 130"
- Cushions available: either/both ends
- Double-acting cylinders with pressure energized, wear compensating U-cup piston seals (Buna N standard; Viton available for Series T and TS)

DIM.	CYLINDER BORE																
	1 1/2	2	2 1/2	3 1/4	4	5	6	8									
A	3/4	1 1/8	3/4	1 1/8	3/4	1 1/8	1 1/8	1 5/8	2	1 5/8	2						
B	1.124	1.499	1.124	1.499	1.124	1.499	1.499	1.999	1.499	1.999	2.374	1.999	2.374				
C	3/8	1/2	3/8	1/2	3/8	1/2	1/2	5/8	1/2	5/8	5/8	3/4	5/8	3/4			
D	1/2	7/8	1/2	7/8	1/2	7/8	7/8	1 1/32	7/8	1 1/32	7/8	1 1/2	1 1/2	1 1/8	1 1/2		
E	2	2 1/2	3	3 3/4	4 1/2	5 1/2	6 1/2	8 1/2									
EE	1/4*	1/4*	1/4*	1/2	1/2	1/2	3/4	3/4									
G	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4	2	2									
J	1	1	1	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2									
K	7/16	15/32	15/32	9/16	9/16	3/4	3/4	7/8									
KK	7/16 -20	3/4 -16	7/16 -20	3/4 -16	7/16 -20	3/4 -16	1 -14	3/4 -14	1 -16	3/4 -14	1 -14	1 1/4 -14	1 1/4 -12	1 1/4 -14	1 1/4 -12		
LB	3 5/8	3 5/8	3 3/4	4 1/4	4 1/4	4 1/2	5	5 1/8									
LD	4 1/8	4 1/8	4 1/4	4 3/4	4 3/4	4 3/2	5 1/2	5 5/8									
MM (Rod Dia.)	5/8	1	5/8	1	5/8	1	1	1 3/8	1	1 3/8	1	1 3/8	1 3/8	1 3/4	1 3/8	1 3/4	
P	2 5/16	2 5/16	2 7/16	2 9/16	2 9/16	2 13/16	3 3/16	3 5/16									
V	5/8	7/8	5/8	7/8	5/8	7/8	7/8	1	7/8	1	7/8	1	1	1 1/8	1	1 1/8	
Y	1 29/32	2 9/32	1 29/32	2 9/32	1 29/32	2 9/32	2 15/32	2 23/32	2 15/32	2 23/32	2 15/32	2 23/32	2 23/32	3 1/32	2 25/32	3 1/32	
ZB	4 5/8	5	4 5/8	5	4 3/4	5 1/8	5 5/8	5 7/8	5 5/8	5 7/8	5 5/8	5 7/8	6 1/8	6 5/8	6 7/8	6 3/4	7
ZM	6 1/8	6 7/8	6 1/8	6 7/8	6 1/4	7	7 1/2	8	7 1/2	8	7 3/4	8 1/4	8 3/4	9 1/4	8 7/8	9 3/8	

\*3/8 ports optional on 1 1/2, 2 and 2 1/2 bore cylinders.

# HEAVY DUTY NFPA CYLINDERS



## Ordering Information

T 2 x 6 MF1 T = 5 1/2 H NT

PISTON		MOUNTING STYLES		SPECIAL OPTIONS	
STANDARD	T	FRONT FLANGE MOUNT	MF1	CUSHIONS	
OVERSIZED ROD	TS	REAR FLANGE MOUNT	MF2	HEAD ONLY	H
LOW FRICTION	TL	FRONT FACE MOUNT	FC1	CAP ONLY	C
STANDARD		REAR FACE MOUNT	FC2	BOTH	HC
LOW FRICTION	TLS	ANGLE MOUNT	MS1	METAL ROD SCRAPER	MRS
OVERSIZED ROD		SIDE LUG MOUNT	MS2	3/8" INLET PORTS	Ports 3/8
		END LUG MOUNT	MS7	EXTRA INLET PORT(S)	Indicate location(s) (PP2, PP3, PP4) in cap or head end
		SIDE TAPPED MOUNT	MS4	NON-STANDARD INLET PORTS	Indicate location(s) (PP2, PP3, PP4) in cap or head end
		CLEVIS MOUNT	MP1	VITON PACKING	Viton
		CLEVIS MOUNT	MP2	STOP TUBES	Consult Factory
		PIVOT MOUNT	MP4	ROD END STYLES	Small Male Standard
		HEAD TRUNNION MOUNT	MT1	INTERMEDIATE MALE	IM
		CAP TRUNNION MOUNT	MT2	OR SHORT FEMALE	SF
		EXTENDED TIE RODS - FRONT & REAR	MX1	ROD EXTENSION "C"	C = Dimension
		EXTENDED TIE RODS - REAR	MX2	THREAD LENGTH "A"	A = Dimension
		EXTENDED TIE RODS - FRONT	MX3	MALE THREAD SIZE	XX = (size or plain rod end)
		BLANK	No Mount	FEMALE THREAD SIZE	XX = (size and depth - unless otherwise specified, all other dimensions will be Short Female)
				STAINLESS STEEL RODS	SS Rod

BORE SIZE	
1 1/2	
2	
2 1/2	
3 1/4	
4	
5	
6	
8	

STROKE LENGTH	
Any length in inch increments or fraction thereof up to and including 130"	

**Note:** All mounting options are on pages 51 - 54.

## Replacement Parts

PK KIT T 2

PISTON		BORE SIZE	
STANDARD	T	1 1/2	
OVERSIZED ROD	TS	2	
LOW FRICTION	TL	2 1/2	
STANDARD		3 1/4	
LOW FRICTION	TLS	4	
OVERSIZED ROD		5	
		6	
		8	



PROUD TO BE  
MADE IN AMERICA

\*\*MF1, MF2, MP2, and MP4 are not available on 8" bore cylinders

**Note:** Longer lead times may be required for strokes longer than 18". Strokes over 40" may require oversized rods and/or stop tube. Cushions not available on head-end of 1 1/2 bore cylinders with oversized rods.

# HEAVY DUTY NFPA MAGNETIC SWITCH CYLINDERS



## Ordering Information

### TM 2-CRT 2 x 6 MF1 T = 5 1/2 H NT

PISTON		BORE SIZE		MOUNTING STYLES		SPECIAL OPTIONS	
STANDARD TM OVERSIZED TSM		1 1/2 2 2 1/2 3 1/4 4 5 6 8		FRONT FLANGE MOUNT MF1 REAR FLANGE MOUNT MF2 FRONT FACE MOUNT FC1 REAR FACE MOUNT FC2 ANGLE MOUNT MS1 SIDE LUG MOUNT MS2 END LUG MOUNT MS7 SIDE TAPPED MOUNT MS4 CLEVIS MOUNT MP1 CLEVIS MOUNT MP2 PIVOT MOUNT MP4 HEAD TRUNNION MOUNT MT1 CAP TRUNNION MOUNT MT2 EXTENDED TIE RODS - FRONT & REAR MX1 EXTENDED TIE RODS - REAR MX2 EXTENDED TIE RODS - FRONT MX3 BLANK No Mount		CUSHIONS HEAD ONLY H CAP ONLY C BOTH HC METAL ROD SCRAPER MRS 3/8" INLET PORTS Ports 3/8 EXTRA INLET PORT(S) Indicate location(s) (PP2, PP3, PP4) in cap or head end NON-STANDARD INLET PORTS Indicate location(s) (PP2, PP3, PP4) in cap or head end VITON PACKING Viton STOP TUBES Consult Factory ROD END STYLES Small Male Standard INTERMEDIATE MALE IM OR SHORT FEMALE SF ROD EXTENSION "C" C = Dimension THREAD LENGTH "A" A = Dimension MALE THREAD SIZE XX = (size or plain rod end) FEMALE THREAD SIZE XX = (size and depth - unless otherwise specified, all other dimensions will be Short Female STAINLESS STEEL RODS SS Rod	
SWITCHES							
TM: REED SWITCH Indicate Quantity-CRT HALL EFFECT SWITCH Indicate Quantity-HPT HALL EFFECT SWITCH Indicate Quantity-HNT TSM: REED SWITCH Indicate Quantity-CRR HALL EFFECT SWITCH Indicate Quantity-HPP HALL EFFECT SWITCH Indicate Quantity-HNN				<b>Note:</b> All mounting options are on pages 51 - 54.			
				STROKE LENGTH			
				Any length in inch increments or fraction thereof up to and including 130"			

## Replacement Parts PK KIT TM 2

PISTON	BORE SIZE
TM TSM	1 1/2 2 2 1/2 3 1/4 4 5 6 8

PROUD TO BE  
MADE IN AMERICA

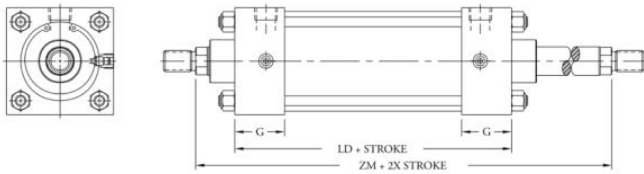
\*\*MF1, MF2, MP2, and MP4 are not available on 8" bore cylinders

**Note:** Longer lead times may be required for strokes longer than 18". Strokes over 40" may require oversized rods and/or stop tube. Cushions not available on head-end of 1 1/2 bore cylinders with oversized rods.

# HEAVY DUTY NFPA DOUBLE-ENDED CYLINDERS



## Dimensions



Series TSDE features oversized rods

## Specifications

- Maximum Pressure:  
Pneumatic: 250 psi  
Hydraulic: 400 psi  
(non-shock)
  - Operating Temperature:  
0-200°F (Buna Seals)  
-18-93°C (Buna Seals)  
0-275°F (Viton Seals)  
-18-135°C (Viton Seals)
- \*Note:** Viton seals for T and TS series only

## Features

- Standard Bore Sizes:  
1 1/2, 2, 2 1/2, 3 1/4, 4, 5, 6, 8
- Stroke Sizes: Any stroke up to 130"
- Cushions available: either/both ends
- Double-acting double-ended cylinders with pressure energized, wear compensating U-cup piston seals (Buna N standard; Viton available)

DIM.	CYLINDER BORE															
	1 1/2		2		2 1/2		3 1/4		4		5		6		8	
A	3/4	1 1/8	3/4	1 1/8	3/4	1 1/8	1 1/8	1 5/8	1 1/8	1 5/8	1 1/8	1 5/8	1 5/8	2	1 5/8	2
B	1.124	1.499	1.124	1.499	1.124	1.499	1.499	1.999	1.499	1.999	1.499	1.999	1.999	2.374	1.999	2.374
C	3/8	1/2	3/8	1/2	3/8	1/2	1/2	5/8	1/2	5/8	1/2	5/8	5/8	3/4	5/8	3/4
D	1/2	7/8	1/2	7/8	1/2	7/8	7/8	1 1/32	7/8	1 1/32	7/8	1 1/32	1 1/8	1 1/2	1 1/8	1 1/2
E	2	2 1/2	3	3 3/4	4 1/2	5 1/2	6 1/2	8 1/2								
EE	1/4*	1/4*	1/4*	1/2	1/2	1/2	3/4	3/4								
G	1 1/2	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4	2	2								
J	1	1	1	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2								
K	7/16	15/32	15/32	9/16	9/16	3/4	3/4	7/8								
KK	7/16-20	3/4-16	7/16-20	3/4-16	7/16-20	3/4-16	3/4-16	1-14	3/4-16	1-14	3/4-16	1-14	1-14	1 1/4-12	1-14	1 1/4-12
LB	3 5/8	3 5/8	3 3/4	4 1/4	4 1/4	4 1/2	5	5 1/8								
LD	4 1/8	4 1/8	4 1/4	4 3/4	4 3/4	4 3/2	5 1/2	5 5/8								
MM (Rod Dia.)	5/8	1	5/8	1	5/8	1	1	1 3/8	1	1 3/8	1	1 3/8	1 3/8	1 3/4	1 3/8	1 3/4
P	2 5/16	2 5/16	2 7/16	2 9/16	2 9/16	2 13/16	3 3/16	3 5/16								
V	5/8	7/8	5/8	7/8	5/8	7/8	7/8	1	7/8	1	7/8	1	1	1 1/8	1	1 1/8
Y	1 29/32	2 9/32	1 29/32	2 9/32	1 29/32	2 9/32	2 15/32	2 23/32	2 15/32	2 23/32	2 15/32	2 23/32	2 25/32	3 1/32	2 25/32	3 1/32
ZB	4 5/8	5	4 5/8	5	4 3/4	5 1/8	5 5/8	5 7/8	5 5/8	5 7/8	5 5/8	5 7/8	6 1/8	6 5/8	6 7/8	6 3/4
ZM	6 1/8	6 7/8	6 1/8	6 7/8	6 1/4	7	7 1/2	8	7 1/2	8	7 3/4	8 1/4	8 3/4	9 1/4	8 7/8	9 3/8

\*3/8 ports optional on 1 1/2, 2 and 2 1/2 bore cylinders.

# HEAVY DUTY NFPA DOUBLE-ENDED CYLINDERS



## Ordering Information

### TDE 2 x 6 MF1 T = 5 1/2 H NT

BORE SIZE	MOUNTING STYLES	SPECIAL OPTIONS																																																																				
<ul style="list-style-type: none"> <li>1 1/2</li> <li>2</li> <li>2 1/2</li> <li>3 1/4</li> <li>4</li> <li>5</li> <li>6</li> <li>8</li> </ul>	<table border="0"> <tr><td>FRONT FLANGE MOUNT</td><td><b>MF1</b></td></tr> <tr><td>REAR FLANGE MOUNT</td><td><b>MF2</b></td></tr> <tr><td>FRONT FACE MOUNT</td><td><b>FC1</b></td></tr> <tr><td>REAR FACE MOUNT</td><td><b>FC2</b></td></tr> <tr><td>ANGLE MOUNT</td><td><b>MS1</b></td></tr> <tr><td>SIDE LUG MOUNT</td><td><b>MS2</b></td></tr> <tr><td>END LUG MOUNT</td><td><b>MS7</b></td></tr> <tr><td>SIDE TAPPED MOUNT</td><td><b>MS4</b></td></tr> <tr><td>CLEVIS MOUNT</td><td><b>MP1</b></td></tr> <tr><td>CLEVIS MOUNT</td><td><b>MP2</b></td></tr> <tr><td>PIVOT MOUNT</td><td><b>MP4</b></td></tr> <tr><td>HEAD TRUNNION MOUNT</td><td><b>MT1</b></td></tr> <tr><td>CAP TRUNNION MOUNT</td><td><b>MT2</b></td></tr> <tr><td>EXTENDED TIE RODS - FRONT &amp; REAR</td><td><b>MX1</b></td></tr> <tr><td>EXTENDED TIE RODS - REAR</td><td><b>MX2</b></td></tr> <tr><td>EXTENDED TIE RODS - FRONT</td><td><b>MX3</b></td></tr> <tr><td>BLANK</td><td><b>No Mount</b></td></tr> </table> <p><b>Note:</b> All mounting options are on pages 51 - 54.</p>	FRONT FLANGE MOUNT	<b>MF1</b>	REAR FLANGE MOUNT	<b>MF2</b>	FRONT FACE MOUNT	<b>FC1</b>	REAR FACE MOUNT	<b>FC2</b>	ANGLE MOUNT	<b>MS1</b>	SIDE LUG MOUNT	<b>MS2</b>	END LUG MOUNT	<b>MS7</b>	SIDE TAPPED MOUNT	<b>MS4</b>	CLEVIS MOUNT	<b>MP1</b>	CLEVIS MOUNT	<b>MP2</b>	PIVOT MOUNT	<b>MP4</b>	HEAD TRUNNION MOUNT	<b>MT1</b>	CAP TRUNNION MOUNT	<b>MT2</b>	EXTENDED TIE RODS - FRONT & REAR	<b>MX1</b>	EXTENDED TIE RODS - REAR	<b>MX2</b>	EXTENDED TIE RODS - FRONT	<b>MX3</b>	BLANK	<b>No Mount</b>	<table border="0"> <tr><td>CUSHIONS</td><td></td></tr> <tr><td>HEAD ONLY</td><td>H</td></tr> <tr><td>CAP ONLY</td><td>C</td></tr> <tr><td>BOTH</td><td>HC</td></tr> <tr><td>METAL ROD SCRAPER</td><td>MRS</td></tr> <tr><td>3/8" INLET PORTS</td><td>Ports 3/8</td></tr> <tr><td>EXTRA INLET PORT(S)</td><td>Indicate location(s) (PP2, PP3, PP4) in cap or head end</td></tr> <tr><td>NON-STANDARD INLET PORTS</td><td>Indicate location(s) (PP2, PP3, PP4) in cap or head end</td></tr> <tr><td>VITON PACKING</td><td>Viton</td></tr> <tr><td>STOP TUBES</td><td>Consult Factory</td></tr> <tr><td>ROD END STYLES</td><td>Small Male Standard</td></tr> <tr><td>INTERMEDIATE MALE OR SHORT FEMALE</td><td>IM</td></tr> <tr><td>ROD EXTENSION "C"</td><td>SF</td></tr> <tr><td>THREAD LENGTH "A"</td><td>C = Dimension</td></tr> <tr><td>MALE THREAD SIZE</td><td>A = Dimension</td></tr> <tr><td>FEMALE THREAD SIZE</td><td>XX = (size or plain rod end) XX = (size and depth - unless otherwise specified, all other dimensions will be Short Female</td></tr> <tr><td>STAINLESS STEEL RODS</td><td>SS Rod</td></tr> </table>	CUSHIONS		HEAD ONLY	H	CAP ONLY	C	BOTH	HC	METAL ROD SCRAPER	MRS	3/8" INLET PORTS	Ports 3/8	EXTRA INLET PORT(S)	Indicate location(s) (PP2, PP3, PP4) in cap or head end	NON-STANDARD INLET PORTS	Indicate location(s) (PP2, PP3, PP4) in cap or head end	VITON PACKING	Viton	STOP TUBES	Consult Factory	ROD END STYLES	Small Male Standard	INTERMEDIATE MALE OR SHORT FEMALE	IM	ROD EXTENSION "C"	SF	THREAD LENGTH "A"	C = Dimension	MALE THREAD SIZE	A = Dimension	FEMALE THREAD SIZE	XX = (size or plain rod end) XX = (size and depth - unless otherwise specified, all other dimensions will be Short Female	STAINLESS STEEL RODS	SS Rod
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EXTENDED TIE RODS - FRONT	<b>MX3</b>																																																																					
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<p><b>STROKE LENGTH</b></p> <p>Any length in inch increments or fraction thereof up to and including 130"</p>																																																																						

## Replacement Parts

### PK KIT TDE 2

PISTON	BORE SIZE
TDE TSDE	<ul style="list-style-type: none"> <li>1 1/2</li> <li>2</li> <li>2 1/2</li> <li>3 1/4</li> <li>4</li> <li>5</li> <li>6</li> <li>8</li> </ul>



\*\*MF1, MF2, MP2, and MP4 are not available on 8" bore cylinders

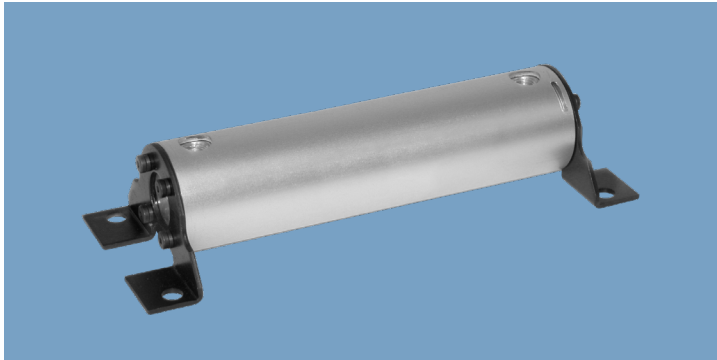
**Note:** Longer lead times may be required for strokes longer than 18". Strokes over 40" may require oversized rods and/or stop tube. Cushions not available on head-end of 1 1/2 bore cylinders with oversized rods.





# VOLUME CHAMBERS

**FLAIRLINE**



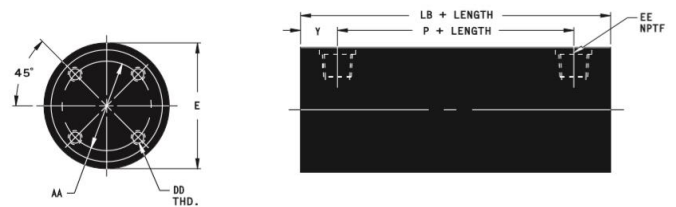
## Operating Specifications

- Standard Bore Sizes: 1 1/2", 2, 2 1/2", 3 1/4", 4
- Maximum Pressure:  
Pneumatic: 150 psi  
Hydraulic: 200 psi
- Barrels are hard-anodized for corrosion resistance

## Features

- Constructed of lightweight aluminum caps and barrels
- Optional mountings are NFPA interchangeable and are made of anodized aluminum or oxidized steel

## Dimensional Data



## Volume Data

BORE SIZE	CAPACITY	
	BASIC VOLUME (Add to total)	Add per 1.0 inch of length
1 1/2	1.95 IN <sup>3</sup>	1.77 IN <sup>3</sup>
2	3.35 IN <sup>3</sup>	3.14 IN <sup>3</sup>
2 1/2	4.14 IN <sup>3</sup>	4.91 IN <sup>3</sup>
3 1/4	8.45 IN <sup>3</sup>	8.30 IN <sup>3</sup>
4	11.29 IN <sup>3</sup>	12.57 IN <sup>3</sup>

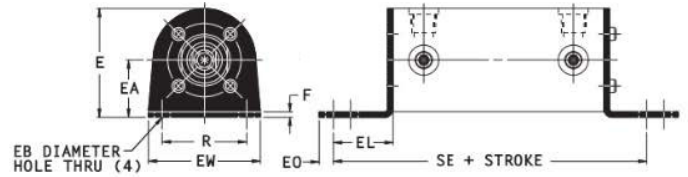
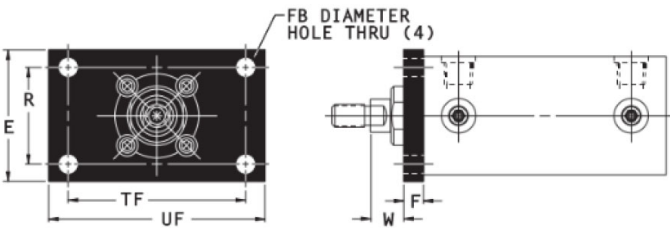
BORE SIZE	DIMENSIONS						
	AA	E	DD	EE	LB	P	Y
1 1/2	1.21	1 3/4	#6 - 32X 1/2	1/4 - 18	3 5/8	2.29	.67
2	1.60	2 1/4	1/4 - 20X 5/8	1/4 - 18	3 5/8	2.29	.67
2 1/2	2.00	2 3/4	5/16 - 18X 3/4	1/4 - 18	3 3/4	2.42	.67
3 1/4	2.62	3 1/2	3/8 - 16X 7/8	1/2 - 14	4 1/2	2.44	.91
4	2.62	4 1/4	3/8 - 16X 7/8	1/2 - 14	4 1/4	2.44	.91



# VOLUME CHAMBERS

FLAIRLINE

## MOUNTING STYLES

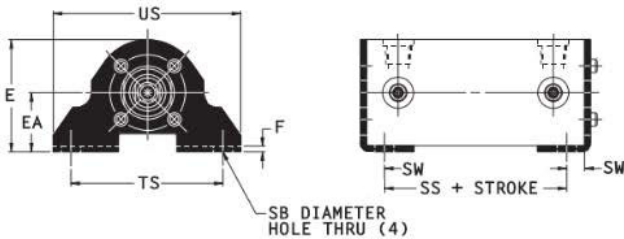


Front Flange Mount (NFFPA MF1)

BORE SIZE	DIMENSIONS						
	E	F	FB	R	TF	UF	W
1 1/2	2	3/8	9/32	1.43	2.75	3 3/8	5/8
2	2 1/2	3/8	11/32	1.84	3.38	4 1/8	5/8
2 1/2	3	3/8	11/32	2.19	3.88	4 5/8	5/8
3 1/4	3 3/4	5/8	13/32	2.76	4.69	5 1/2	3/4
4	4 1/2	5/8	13/32	3.32	5.44	6 1/4	3/4

End Lug Mounts (NFFPA MS7)

BORE SIZE	DIMENSIONS									
	E	EA	EB	EL	EO	EW	F	R	SE	XE
1 1/2	1 7/8	1	9/32	1 1/8	1/4	2	1/8	1.43	5 1/2	5 3/8
2	2 3/8	1 1/4	11/32	1 5/16	5/16	2 7/16	1/8	1.84	5 7/8	5 9/16
2 1/2	2 7/8	1 1/2	11/32	1 7/16	7/16	3	3/16	2.19	6 1/4	6 13/16
3 1/4	3 5/8	1 7/8	13/32	1 1/2	3/8	3 1/2	1/4	2.76	6 5/8	6 1/2
4	4 3/8	2 1/4	13/32	1 5/8	3/8	4 1/4	5/16	3.32	6 7/8	6 5/8



Side Lug Mounts (NFFPA MS2)

BORE SIZE	DIMENSIONS									
	E	EA	F	SB	SS	SW	TS	US	XS	ZB
1 1/2	1 7/8	1	1/8	13/32	2 7/8	3/8	2 3/4	3 1/2	1 3/8	4.92
2	2 3/8	1 1/4	1/8	13/32	2 7/8	3/8	3 1/4	4	1 3/8	4.95
2 1/2	2 7/8	1 1/2	3/16	13/32	3	3/8	3 3/4	4 1/2	1 3/8	5.19
3 1/4	3 5/8	1 7/8	1/4	17/32	3 1/4	1/2	4 3/4	5 3/4	1 7/8	6.19
4	4 3/8	2 1/4	5/16	17/32	3 1/4	1/2	5 1/2	6 1/2	1 7/8	6.25

## Ordering Information

VC 2 10 MF1

BORE SIZE

1 1/2  
2  
2 1/2  
3 1/4  
4

MOUNTING OPTIONS

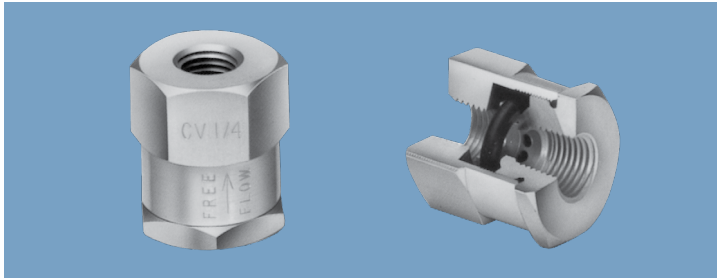
FRONT FLANGE MOUNT MF1  
SIDE LUG MOUNT MS2  
END LUG MOUNT MS7

STROKE LENGTH

Any length in inch increments or fraction thereof up to and including 130"

# CHECK VALVES

**FLAIRLINE**



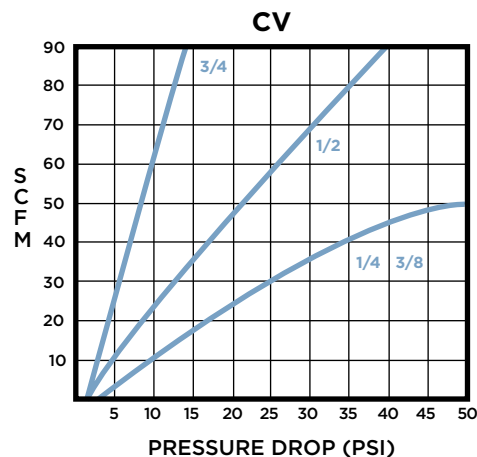
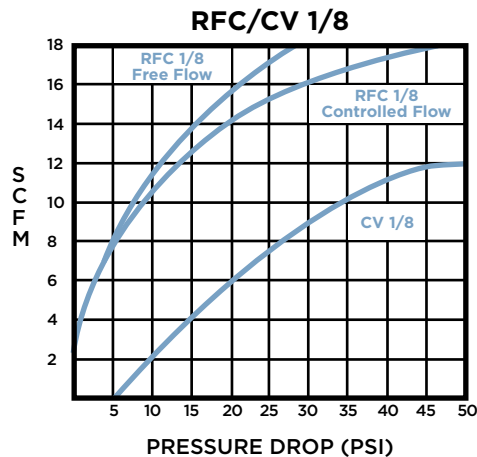
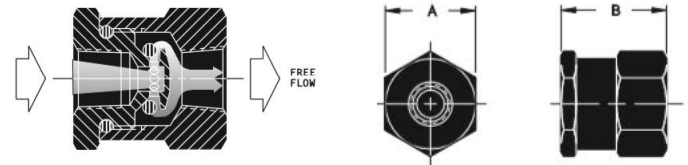
## Operating Specifications

- Standard pipe sizes: 1/8", 1/4", 3/8", 1/2", 3/4"
- Operating pressure: 250 psi
- Orifices available for fixed flow control applications
- Operating temperature range: -40°F - 225°F
- Standard valve body material: Aluminum
- Standard needle material: Brass
- Standard swivel connector material: Black oxidized steel

## Features

- Quick to open, quick to close
- Dilating O-ring as the only moving part
- 'Out-flows' the competition
- Bubble-tight sealing
- Last millions of cycles (factory tests to 50 million cycles show no discernible wear)

## Dimensional Data



Model No.	Pipe Thread	A	B
CV - 1/8	1/8 - 27	3/4	15/16
CV - 1/4	1/4 - 18	1 1/8	1 5/16
CV - 3/8	3/8 - 18	1 1/8	1 5/16
CV - 1/2	1/2 - 14	1 5/8	1 9/16
CV - 3/4	3/4 - 14	1 7/8	2 5/16

## Ordering Information

**CV 1/2 031 V**

**PIPE SIZE**

1/8  
1/4  
3/8  
1/2  
3/4

**SEALS**

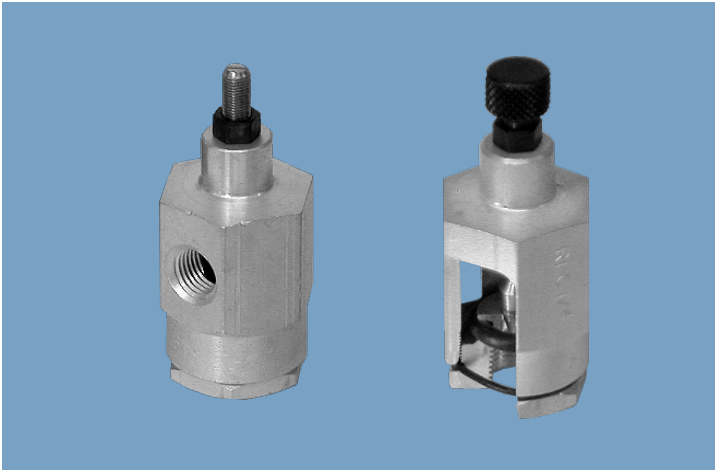
BUNA-N Standard  
FLOUROCARBON V

**OPTIONS**

1/32 ORIFICE 031  
1/16 ORIFICE 063  
3/32 ORIFICE 094  
1/8 ORIFICE 125

# FLOW CONTROLS

FLAIRLINE



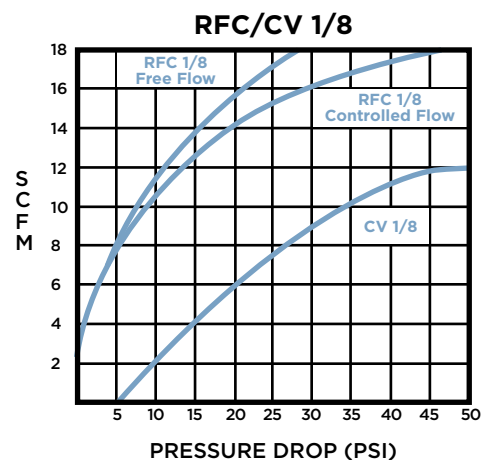
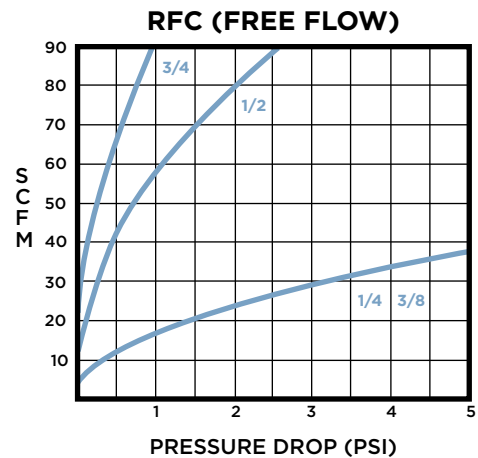
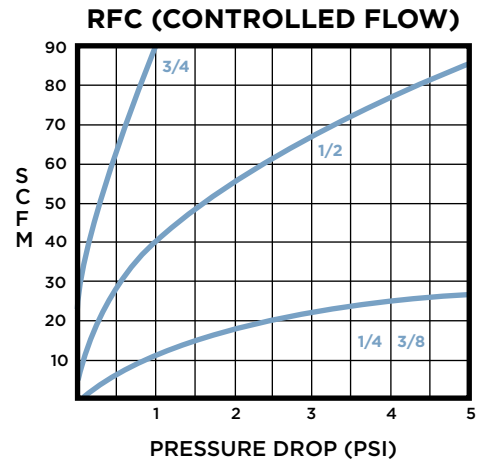
## Features

- Permits full free flow in one direction and metered flow in the opposite direction
- Positive sealing (no bubble leakage)
- Last millions of cycles (factory tests to 50 million cycles show no discernible wear)
- Fine adjustment screw threads and compound needle taper provide precise flow control
- Now available with lock and key tamper-resistant capability

## Specifications

- Standard NPTF sizes: 1/8", 1/4", 3/4", 1" & 2"
- Operating pressure: 250 psi
- Orifices available for fixed flow control applications
- Operating temperature range: -40° - +225°F
- Standard valve body material: Aluminum
- Standard needle material: Brass
- Standard swivel connector material: Black oxidized steel

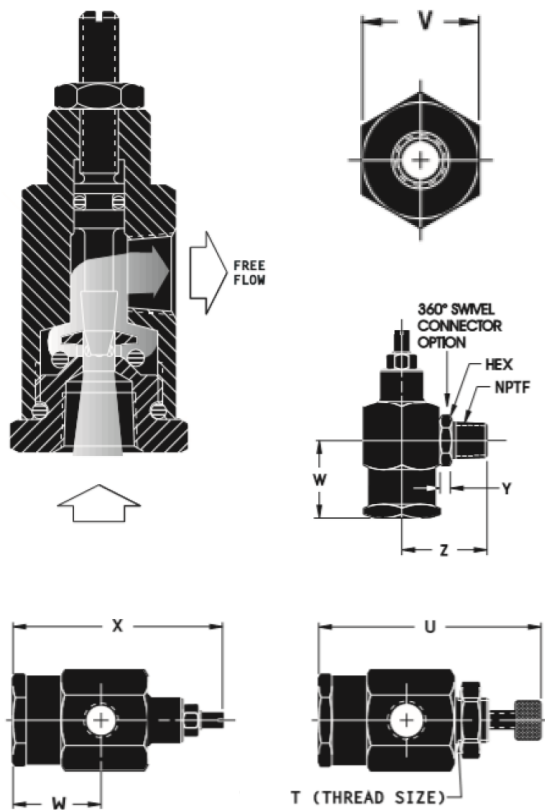
## Flow Charts



# FLOW CONTROLS

**FLAIRLINE**

## Dimensional Data



## Ordering Information

**RFC 1/2 K V**

**PIPE SIZE**

1/8  
1/4  
3/8  
1/2  
3/4

**SEALS**

BUNA-N Standard  
FLOUROCARBON V

**OPTIONS**

KNOB K  
PANEL MOUNT PM  
KNOB AND  
PANEL MOUNT PK  
SWIVEL S  
SWIVEL AND  
KNOB SK  
TAMPER PROOF T

**RIGHT ANGLE FLOW CONTROL**  
Model RFC (NPTF)

NPTF	T	U	V	W	X	Y	Z	HEX
1/8	1/8 - 20	2 7/16	3/4	7/8	2 1/8	.13	.91	1/2
1/4	5/8 - 18	3 3/16	1 1/4	1 1/4	3	.15	1.34	3/4
3/8	5/8 - 18	3 3/16	1 1/4	1 1/4	3	.15	1.34	3/4
1/2			1 5/8	1 5/8	3 3/4	.28	1.84	7/8
3/4			2	1 1/4	3 3/4			

# BORETTI PNEUMATIC SILENCERS

FLAIRLINE



## Information

Long lasting silencers to quiet noisy, air-operated devices and prolong the life of your air tools. Offers 30 million cycles of clean compressed air.

- Eight models - 1/8"- 1" NPT

## Specifications

- Maximum operating pressure 300 psi (20.7 bars)
- Maximum operating temperature 160°F (71°C)

## Ordering Information

Pipe Size	Model Number Female Thread	Model Number Male Thread	Flow Coefficient CV	Diameter IN.	Overall Length IN.
1/8		1000-1	1.0	3/4"	1"
1/4	1000-2-F	1000-2-M	2.3	1/8"	2"
3/8	1000-3-F	1000-3-M	5.5	1-1/4"	2-61/64"
1/2	1000-34-F	1000-34-M	6.6	1-1/4"	2-61/64"
1/2	1000-4-F	1000-4-M	7.0	1-1/2"	3-25/32"
3/4	1000-46-F	1000-46-M	8.0	1-1/2"	3-25/32"
3/4	1000-86-F	1000-86-M	19.0	2"	4-53/64"
1	1000-8-F	1000-8-M	19.8	2"	4-53/64"

**FLAIR**LINE

The logo for FLAIRLINE features the word "FLAIR" in a bold, white, sans-serif font, followed by "LINE" in a lighter blue, sans-serif font. A white horizontal line with a slight upward curve at the left end is positioned below the text.