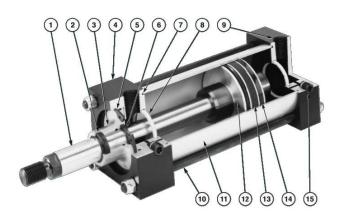
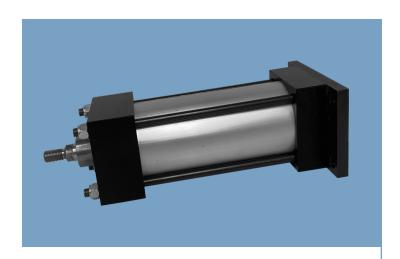
# FLAIRLINE



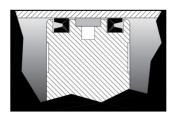
- Chrome-plated, high-strength, steel
   Piston Rods are corrosion resistant, rugged and durable.
- Urethane, double lip Rod Wiper aggressively wipes contaminants from rod protecting rod seal and cylinder.
- 3 660 bronze **Rod Bearing** provides maximum rod support and low friction for normal to high-load 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.
- Steel Retaining Ring for strength, coated for corrosion resistance, allows easy removal of rod bearing and seals without disassembly of cylinder.
- Pressure-energized, wear compensating U-cup Rod Seal provides positive sealing.

- Barrel Seals offer O-ring design for positive sealing.
- Floating Cushion Seal "check valve" offers fast break-a-way, self-aligning, positive cushioning for faster cycle time and reduced cylinder wear.
- N.P.T.F. Ports standard.
- 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.
- 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.
- Aluminum **Piston** is threaded to rod, permanently locked with aerobic adhesive and secured with lock nut. Optional magnet is installed under wear ring.
- Specially formulated acetal Wear Ring increases cylinder life by eliminating metal to metal contact.
- Pressure-energized, wear compensating, U-cup Piston Seals provide positive sealing.
- 65 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).

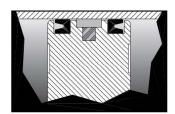
# **FL<u>air**line</u>



### AVAILABLE IN TWO PISTON TYPES



T TYPE



**TM** TYPE

# 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 AVALIBLE IN DOUBLE ENDED

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

### 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.

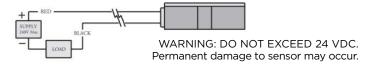
# **FLAIR**LINE

### Series TM & TSM Magnetic Switch Options:

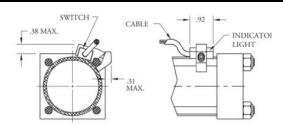
### **REED SWITCH: PART NO. 43-CRT**

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

### **REED SWITCH: PART NO. 43-CRR**

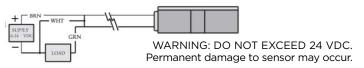


### **Mounting Clamp - Included with Switches**

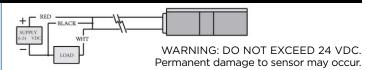


For use on 1 1/2 through 2 1/2 bore cylinders. (43-CRT, 43-HPT & 43-HNT

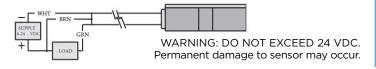
### HALL EFFECT SWITCH NO. 43-HPT



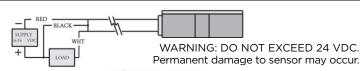
### HALL EFFECT SWITCH NO. 43-HPP



#### HALL EFFECT SWITCH NO. 43-HNT



### HALL EFFECT SWITCH NO. 43-HNN



Power Supply Polarity MUST be observed for proper operation. FAILURE TO OBSERVE POLARITY WILL CAUSE DAMAGE TO SWITCH. Temperature Range - operational from -30° to +80°C. Shock - operational up to 30G (11msec.) /Reeds only. Not applicable for Halls.

Vibration - operational up to 20G (10-55Hz) /Reeds only. Not applicable for Halls.

# **SENSOR TYPES & TECHNICAL DATA**

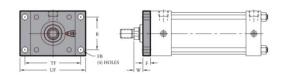
PART NO.	43-CRT	43-CRR	43-HPT	43-HNT	43-HPP	43-HNN
Description	Reed Switch MOV, LED	Reed Switch MOV, LED	Hall Effect, LED Sourcing	Hall Effect, LED Sinking	Hall Effect, LED Sourcing	Hall Effect, LED Sinking
Function	SPTS Normally Open	SPTS Normally Open	Normally Open PNP Output	Normally Open NPN Output	Normally Open PNP Output	Normally Open NPN Output
Switching Voltage	5 - 120 VDC/VAC 50/60 Hz	5 - 240 VDC/VAC 50/60 Hz	6-24 VDC	6-24 VDC	6-24 VDC	6-24 VDC
Switching Current	0.5 Amp Max 0.005 Amp Min	1 Amp Max .005 Amp Min	0.5 Amp Max	0.5 Amp Max	1 Amp Max	1 Amp Max
Switching Power	10 Watts Max	30 Watts Max	12 Watts Max	12 Watts Max	24 Watts Max	24 Watts Max
Switching Speed	0.5 ms operate 0.1 ms release	0.6 ms operate 0.05 ms release	1.5 u operate 0.5 u release			
Max Volt Drop	3.5 Volts	3 Volts	0.5 Volts	0.5 Volts	0.5 Volts	0.5 Volts
Sensitivity	85 Gauss	85 Gauss	85 Gauss	85 Gauss	85 Gauss	85 Gauss

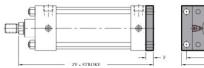
# FLAIRLINE

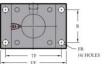
# MOUNTING STYLES for HEAVY-DUTY NFPA CYLINDERS

### Front Flange Mount (NFPA MF1)

### Rear Flange Mount (NFPA MF2)







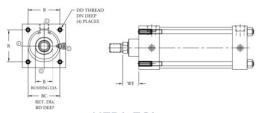
NFPA MF1

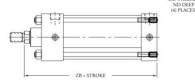
NFPA MF2

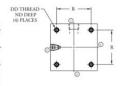
BORE				DIMEN	SIONS				BORE				DIMEN	SIONS			
SIZE	ROD DIA.	F	FB	R	TF	UF	W	ZF	SIZE	ROD DIA.	F	FB	R	TF	UF	W	ZF
11/2	<sup>5</sup> / <sub>8</sub> 1	3/8	5/16	1.43	2 3/4	<b>3</b> <sup>3</sup> / <sub>8</sub>	5/8	1 5 5 3/8	11/2	<sup>5</sup> / <sub>8</sub> 1	3/8	5/16	1.43	<b>2</b> <sup>3</sup> / <sub>4</sub>	<b>3</b> <sup>3</sup> / <sub>8</sub>	<sup>5</sup> / <sub>8</sub> <b>1</b>	5 53/8
2	<sup>5</sup> / <sub>8</sub> 1	3/8	3/8	1.84	<b>3</b> 3/8	4 1/8	5/8	1 5 51/2	2	<sup>5</sup> / <sub>8</sub> 1	3/8	3/8	1.84	<b>3</b> 3/8	4 1/8	<sup>5</sup> / <sub>8</sub> 1	5 51/2
2 1/2	<sup>5</sup> / <sub>8</sub> 1	3/8	3/8	2.19	<b>3</b>	<b>4</b> 5/8	5/8	1 51/8 51/2	21/2	<sup>5</sup> / <sub>8</sub> 1	3/8	3/8	2.19	<b>3</b>	4 1/8	<sup>5</sup> / <sub>8</sub> <b>1</b>	51/8 51/2
31/4	1 1 <sup>3</sup> / <sub>8</sub>	5/8	7/16	2.76	411/16	51/2	3/4	1 61/4 61/2	3 1/4	1 1 <sup>3</sup> / <sub>8</sub>	5/8	7/16	2.76	411/16	51/2	3/4 1	61/4 61/2
4	1 1 <sup>3</sup> / <sub>8</sub>	5/8	7/16	3.32	<b>5</b> <sup>7</sup> / <sub>16</sub>	6 1/4	3/4	1 61/4 61/2	4	1 13/8	5/8	7/16	3.32	<b>5</b> <sup>7</sup> / <sub>16</sub>	6 1/4	3/4 1	61/4 61/2
5	1 1 <sup>3</sup> / <sub>8</sub>	5/8	9/16	4.10	<b>6</b> 5/8	<b>7</b> 5/8	3/4	1 61/2 63/4	5	1 13/8	5/8	9/16	4.10	<b>6</b>	<b>7</b> 5/8	3/4 1	61/2 63/4
6	13/8 13/4	3/4	9/16	4.88	<b>7</b> 5/8	8 5/8	<sup>7</sup> /8 <b>1</b>	1/8 <b>7</b> 3/8 <b>7</b> 5/8	6	13/8 13/4	3/4	9/16	4.88	<b>7</b> 5/8	8 5/8	<sup>7</sup> /8 <b>1</b> 1/8	73/875/8

### Front Face Mount (NFPA FC1)

### Rear Face Mount (NFPA FC2)







NFPA FC1

NFPA FC2

BORE					DIMEN	SIONS					BORE				IMENSIONS	5		
SIZE		DD A.	В	ВС	BD	DD	DN	R	W	/F	SIZE	R(	OD IA.	DD	ND	R	Z	В
11/2	5/8	1	1.124 1.499	<b>1</b> 5/8 NA	1/16	1/4-28	<sup>3</sup> / <sub>4</sub> * <b>1</b> ½	1.43	1	1	11/2	5/8	1	1/4-28	1/2	1.43	<b>4</b> <sup>5</sup> / <sub>8</sub>	5
2	5/8	1	1.124 1.499	21/8	3/32	<sup>5</sup> / <sub>16</sub> <b>- 24</b>	3/4	1.84	1	3/8	2	5/8	1	<sup>5</sup> /16 <b>- 24</b>	1/2	1.84	<b>4</b> <sup>5</sup> / <sub>8</sub>	5
21/2	5/8	1	1.124 1.499	21/8	3/32	<sup>5</sup> / <sub>16</sub> <b>- 24</b>	3/4	2.19	1	3/8	21/2	5/8	1	<sup>5</sup> / <sub>16</sub> <b>- 24</b>	1/2	2.19	43/4	51/8
3 1/4	1	<b>1</b> <sup>3</sup> /8	1.499 1.999	2 3/4	5/32	3/8 <b>-24</b>	7/8	2.76	<b>1</b> <sup>3</sup> / <sub>8</sub>	<b>1</b> 5/8	3 1/4	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	<sup>3</sup> / <sub>8</sub> <b>- 24</b>	5/8	2.76	<b>5</b> 5/8	57/8
4	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	1.499 1.999	2 3/4	5/32	3/8 <b>-24</b>	7/8	3.32	13/8	<b>1</b> 5/8	4	1	13/8	<sup>3</sup> / <sub>8</sub> <b>- 24</b>	5/8	3.32	<b>5</b> 5/8	51/8
5	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	1.499 1.999	2 3/4	5/32	1/2-20	7/8	4.10	<b>1</b> 3/8	<b>1</b> 5/8	5	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	½ <b>-20</b>	5/8	4.10	<b>5</b> <sup>7</sup> / <sub>8</sub>	61/8
6	<b>1</b> 3/8	<b>1</b> <sup>3</sup> / <sub>4</sub>	1.999 2.374	3 1/4	3/16	1/2-20	1	4.88	<b>1</b> 5/8	<b>1</b> <sup>7</sup> /8	6	<b>1</b> 3/8	13/4	½ <b>-20</b>	3/4	4.88	65/8	61/8
8	<b>1</b> <sup>3</sup> / <sub>8</sub>	<b>1</b> <sup>3</sup> / <sub>4</sub>	1.999 2.374	3 1/4	3/16	<b>%-18</b>	1	6.44	<b>1</b> 5/8	<b>1</b> 7/8	8	13/8	13/4	5 <b>% - 18</b>	3/4	6.44	63/4	7

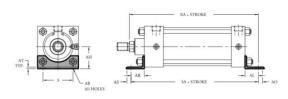
<sup>\*</sup>Includes 3/8 unthread cover plate.

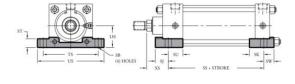
# **FLAIR**LINE

# MOUNTING STYLES for HEAVY-DUTY NFPA CYLINDERS

### **Angle Mount (NFPA MS1)**

### Side Lug Mount (NFPA MS2)





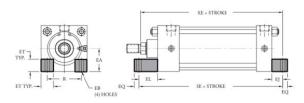
#### NFPA MS1

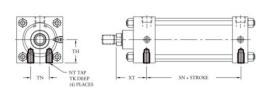
NFPA MS2

BORE						DII	MEN:	SION	IS					BORE						DI	MEN	SIOI	NS					
SIZE	R	OD IA.	AB	ΑH	AL	AO	AR	AS	AT	S	SA	X	A	SIZE	RO DI	DD A.	LH	SB	SJ	SK	SS	ST	SU	sw	TS	US	Х	S
11/2	5/8	1	7/16	<b>1</b> <sup>3</sup> / <sub>16</sub>	1	3/8	13/8	3/8	1/8	11/4	6	<b>5</b> 5/8	6	11/2	5/8	1	1	7/16	³/4 <b>1</b> 1/8	5/8	<b>2</b> <sup>7</sup> / <sub>8</sub>	1/2	15/16	9/16	<b>2</b> <sup>3</sup> / <sub>4</sub>	31/2	13/8	13/4
2	5/8	1	7/16	<b>1</b> <sup>7</sup> / <sub>16</sub>	1	3/8	13/8	3/8	1/8	13/4	6	<b>5</b> 5/8	6	2	5/8	1	11/4	7/16	7/8	15/16	<b>2</b> <sup>7</sup> / <sub>8</sub>	1/2	<sup>15</sup> / <sub>16</sub>	3/4	31/4	4	13/8	13/4
21/2	5/8	1	7/16	<b>1</b> 5/8	1	3/8	<b>1</b> <sup>3</sup> / <sub>8</sub>	3/8	1/8	21/4	<b>6</b> 1/8	53/4	<b>6</b> 1// <sub>8</sub>	21/2	5/8	1	<b>1</b> ½	7/16	7/8	15/16	3	1/2	15/16	3/4	<b>3</b> 3/ <sub>4</sub>	41/2	13/8	13/4
3 1/4	1	<b>1</b> 3/8	9/16	<b>1</b> 15/ <sub>16</sub>	11/4	1/2	<b>1</b> <sup>7</sup> / <sub>8</sub>	5/8	3/16	23/4	<b>7</b> <sup>3</sup> / <sub>8</sub>	61/8	<b>7</b> 1/8	3 1/4	1	<b>1</b> 3/8	<b>1</b> 7/8	9/16	<b>1</b> 1// <sub>8</sub>	11/4	31/4	3/4	<b>1</b> 1/ <sub>4</sub>	3/4	<b>4</b> <sup>3</sup> / <sub>4</sub>	<b>5</b> <sup>3</sup> / <sub>4</sub>	<b>1</b> <sup>7</sup> /8	<b>2</b> 1/8
4	1	<b>1</b> 3/8	9/16	21/4	11/4	1/2	<b>1</b> <sup>7</sup> / <sub>8</sub>	5/8	3/16	31/2	<b>7</b> <sup>3</sup> / <sub>8</sub>	61/8	<b>7</b> 1/8	4	1	<b>1</b> 3/8	21/4	9/16	<b>1</b> 1// <sub>8</sub>	11/4	31/4	3/4	11/4	1	<b>5</b> ½	61/2	17/8	21/8
5	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	11/16	23/4	<b>1</b> <sup>3</sup> / <sub>8</sub>	5/8	2	1	3/16	41/4	<b>7</b> <sup>7</sup> /8	71/4	71/2	5	1	<b>1</b> 3/8	23/4	<sup>13</sup> / <sub>16</sub>	<b>1</b> <sup>7</sup> / <sub>16</sub>	<b>1</b> 9/16	31/8	1	<b>1</b> 9/ <sub>16</sub>	<b>1</b> <sup>7</sup> / <sub>16</sub>	6 <sup>7</sup> /8	81/4	21/16	<b>2</b> <sup>5</sup> / <sub>16</sub>
6	<b>1</b> <sup>3</sup> /8	13/4	13/16	31/4	13/8	5/8	<b>2</b> 1/8	7/8	3/16	51/4	81/2	8	81/4	6	<b>1</b> <sup>3</sup> / <sub>8</sub>	13/4	31/4	13/16	<b>1</b> <sup>7</sup> / <sub>16</sub>	<b>1</b> 9/ <sub>16</sub>	<b>3</b> 5/8	1	<b>1</b> 9/ <sub>16</sub>	<b>1</b> <sup>7</sup> / <sub>16</sub>	<b>7</b> <sup>7</sup> /8	91/4	<b>2</b> <sup>5</sup> / <sub>16</sub>	<b>2</b> <sup>9</sup> / <sub>16</sub>
8	<b>1</b> 3/8	13/4	13/16	41/4	<b>1</b> <sup>13</sup> / <sub>16</sub>	11/16	<b>1</b> 13/16	11/16	1/4	<b>7</b> 1/8	83/4	8 %16	813/16	8	<b>1</b> 3/8	13/4	41/4	13/16	<b>1</b> <sup>1</sup> 1⁄ <sub>16</sub>	<b>1</b> %16	33/4	1	<b>1</b> %16	<b>1</b> <sup>11</sup> / <sub>16</sub>	97/8	111/4	<b>2</b> <sup>5</sup> / <sub>16</sub>	<b>2</b> <sup>9</sup> / <sub>16</sub>

### **End Lug Mount (NFPA MS7)**

### **Side Tapped Mounts (NFPA MS4)**





NFPA MS7

NFPA MS4

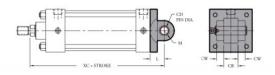
<b>BORE</b>					D	IMEN	SION	S					BORE				DIN	1ENSIO	NS		
SIZE	RC DI	DD A.	EA	EB	EJ	EL	EQ	ET	R	SE	XE		SIZE	RC DI	DD A.	NT	SN	TH	TK	TN	XT
11/2	5/8	1	1	5/16	3/4 3/4	11/8 3/4	1/4	9/16	1.43	51/2	53/8	53/4	<b>1</b> <sup>1</sup> / <sub>2</sub>	5/8	1	1/4-20	2 1/4	1	3/8 5/16	5/8	115/16 215/16
2	5/8	1	11/4	3/8	15/16	<b>1</b> 5/16	5/16	11/16	1.84	<b>5</b> <sup>7</sup> / <sub>8</sub>	5% 5	<b>5</b> 15/16	2	5/8	1	5/16 - 18	2 1/4	<b>1</b> 1/ <sub>4</sub>	1/2	7/8	115/16 215/16
21/2	5/8	1	1 1/2	3/8	1 1/16	<b>1</b> <sup>7</sup> / <sub>16</sub>	5/16	13/16	2.19	61/4	513/16	6³/ <sub>16</sub>	<b>2</b> <sup>1</sup> / <sub>2</sub>	5/8	1	3/8 <b>-16</b>	2 3/8	<b>1</b> ½	5/8	11/4	115/16 215/16
3 1/4	1	<b>1</b> 3// <sub>8</sub>	<b>1</b> <sup>7</sup> / <sub>8</sub>	7/16	7/8	1 1/2	3/8	1	2.76	<b>6</b> 5/8	61/2	6³/ <sub>4</sub>	31/4	1	13/8	½ <b>-13</b>	<b>2</b>	<b>1</b> <sup>7</sup> / <sub>8</sub>	13/16	11/2	27/16 211/16
4	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	2 1/4	7/16	1	<b>1</b> 5/8	3/8	<b>1</b> <sup>3</sup> / <sub>16</sub>	3.32	<b>6</b> <sup>7</sup> / <sub>8</sub>	65/8	6 <sup>7</sup> /8	4	1	13/8	½ <b>-13</b>	<b>2</b> 5/8	2 1/4	13/16	2 1/16	27/16 211/16
5	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	2 3/4	9/16	1 1/16	1 11/16	1/2	<b>1</b> <sup>3</sup> / <sub>8</sub>	4.10	<b>7</b> 1/ <sub>4</sub>	615/16	<b>7</b> ³/16	5	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	5 <b>% -11</b>	<b>2</b> <sup>7</sup> / <sub>8</sub>	2 3/4	1	2 11/16	27/16 211/16
6	<b>1</b> 3//8	13/4	3 1/4	9/16	1	13/4	1/2	<b>1</b> 5/8	4.88	<b>7</b> <sup>3</sup> / <sub>4</sub>	75/8	<b>7</b> <sup>7</sup> /8	6	<b>1</b> <sup>3</sup> / <sub>8</sub>	13/4	<sup>3</sup> / <sub>4</sub> <b>-10</b>	3 1/8	3 1/4	<b>1</b> <sup>3</sup> / <sub>16</sub>	3 1/4	213/16 31/16
8	<b>1</b> 3//8	13/4	4 1/4	11/16	<b>1</b> ½	<b>1</b> 1// <sub>8</sub>	5/8	2 1/16	6.44	<b>7</b> <sup>3</sup> / <sub>8</sub>	77/8	81/8	8	13/8	13/4	3/4-10	3 1/4	4 1/4	11/4	4 1/2	213/16 31/16

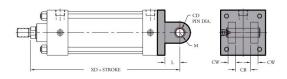
# **FLAIR**LINE

# MOUNTING STYLES for HEAVY-DUTY NFPA CYLINDERS

### **Clevis Mount (NFPA MP1)**

### **Clevis Mount (NFPA MP2)**





### NFPA MP1

NFPA MP2

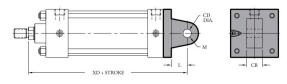
BORE					DIME	NSIO	NS					BORE					DIME	NSIO	NS				
SIZE	RC DI	DD A.	СВ	CD	cw	L	М	Х	С	Х	D	SIZE	RO D	OD IA.	СВ	CD	cw	L	М	Х	С	Х	D
11/2	5/8	1	3/4	1/2	1/2	3/4	5/8	53/8	5 3/4	53/4	61/8	11/2	5/8	1	3/4	1/2	1/2	3/4	5/8	<b>5</b> 3/8	5 3/4	53/4	<b>6</b> 1// <sub>8</sub>
2	5/8	1	3/4	1/2	1/2	3/4	5/8	53/8	<b>5</b> <sup>3</sup> / <sub>4</sub>	53/4	61/8	2	5/8	1	3/4	1/2	1/2	3/4	5/8	<b>5</b> <sup>3</sup> / <sub>8</sub>	<b>5</b> 3/ <sub>4</sub>	53/4	<b>6</b> 1/8
21/2	5/8	1	3/4	1/2	1/2	3/4	5/8	51/2	<b>5</b>	<b>5</b> ½	61/4	21/2	5/8	1	3/4	1/2	1/2	3/4	5/8	51/2	<b>5</b>	57/8	61/4
3 1/4	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	1 1/4	3/4	5/8	1 1/4	7/8	<b>6</b> 7/8	<b>7</b> 1/8	71/2	73/4	3 1/4	1	13/8	1 1/4	3/4	5/8	1 1/4	7/8	<b>6</b> 7/8	<b>7</b> 1/8	71/2	73/4
4	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	1 1/4	3/4	5/8	1 1/4	7/8	<b>6</b> 7/8	<b>7</b> 1/8	71/2	73/4	4	1	<b>1</b> 3/8	1 1/4	3/4	5/8	1 1/4	7/8	<b>6</b> ½	<b>7</b> 1/8	71/2	73/4
5	1	13/8	1 1/4	3/4	5/8	1 1/4	7/8	<b>7</b> 1/8	<b>7</b> <sup>3</sup> / <sub>8</sub>	<b>7</b> <sup>3</sup> / <sub>4</sub>	8	5	1	13/8	1 1/4	3/4	5/8	1 1/4	7/8	<b>7</b> 1/8	<b>7</b> <sup>3</sup> / <sub>8</sub>	<b>7</b> <sup>3</sup> / <sub>4</sub>	8
6	13/8	13/4	1 1/2	1	3/4	1 1/2	1 1/4	81/8	83/8	81/8	91/8	6	13/8	13/4	1 ½	1	3/4	1 1/2	1 1/4	81/8	83/8	81/8	91/8
8	<b>1</b> <sup>3</sup> / <sub>8</sub>	13/4	1 1/2	1	3/4	1 1/2	1 1/4	81/4	81/2	NA	NA	8	13/8	13/4	1 ½	1	3/4	1 1/2	1 1/4	81/4	81/2	NA	NA

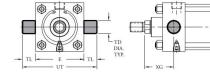
Pivot pin is included on MP1 and MP2. Optional pivot pin for MP4.

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

#### **Pivot Mount (NFPA MP4)**

#### **Head Trunnion Mounts (NFPA MT1)**





NFPA MP4

NFPA MT1

BORE					DIME	ENSIO	NS					BORE				DI	MENSI	ONS				
SIZE	RC DI	DD A.	СВ	CD	cw	L	М	X	С	Х	D	SIZE	RO DI	OD IA.	Е	TD	TL	UT	Х	G	>	(J
11/2	5/8		3/4	1/2	1/2	3/4	5/8	<b>5</b> <sup>3</sup> / <sub>8</sub>	<b>5</b> <sup>3</sup> / <sub>4</sub>	53/4	61/8	11/2	5/8	1	2	1	1	4	13/4	2 1/8	<b>4</b> 1/ <sub>8</sub>	4 1/2
2	5/8	1	3/4	1/2	1/2	3/4	5/8	<b>5</b> <sup>3</sup> / <sub>8</sub>	<b>5</b> 3/ <sub>4</sub>	53/4	<b>6</b> 1/8	2	5/8	1	<b>2</b> ½	1	1	41/2	13/4	2 1/8	<b>4</b> 1// <sub>8</sub>	4 1/2
21/2	5/8	1	3/4	1/2	1/2	3/4	5/8	51/2	<b>5</b>	<b>5</b> <sup>7</sup> /8	61/4	<b>2</b> <sup>1</sup> / <sub>2</sub>	5/8	1	3	1	1	5	13/4	2 1/8	41/4	<b>4</b> 5/8
31/4	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	1 1/4	3/4	5/8	1 1/4	7/8	<b>6</b> <sup>7</sup> / <sub>8</sub>	<b>7</b> 1/8	<b>7</b> ½	73/4	31/4	1	1 <sup>3</sup> / <sub>8</sub>	3 3/4	1	1	53/4	21/4	2 1/2	5	<b>5</b> 1⁄ <sub>4</sub>
4	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	1 1/4	3/4	5/8	1 1/4	7/8	<b>6</b> ½	<b>7</b> 1/8	71/2	73/4	4	1	13/8	41/2	1	1	61/2	21/4	2 1/2	5	<b>5</b> 1⁄4
5	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	1 1/4	3/4	5/8	1 1/4	7/8	<b>7</b> 1/8	<b>7</b> <sup>3</sup> / <sub>8</sub>	73/4	8	5	1	13/8	<b>5</b> ½	1	1	71/2	21/4	21/2	51/4	<b>5</b> ½
6	13/8	13/4	1 1/2	1	3/4	1 1/2	1 1/4	81/8	83/8	8 1/8	91/8	6	<b>1</b> <sup>3</sup> / <sub>8</sub>	<b>1</b> <sup>3</sup> / <sub>4</sub>	61/2	<b>1</b> <sup>3</sup> / <sub>8</sub>	<b>1</b> <sup>3</sup> / <sub>8</sub>	91/4	<b>2</b> 5/8	<b>2</b> <sup>7</sup> / <sub>8</sub>	<b>5</b>	<b>6</b> 1/8
8	13/8	13/4	1 1/2	1	3/4	1½	11/4	81/4	81/2	NA	NA	8	13//8	13/4	81/2	<b>1</b> 3/8	13/8	111/4	<b>2</b>	<b>2</b>	6	61/4

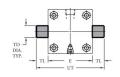
# **FLAIR**LINE

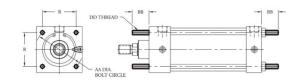
# MOUNTING STYLES for HEAVY-DUTY NFPA CYLINDERS

#### Cap Trunnion Mounts (NFPA MT2)

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







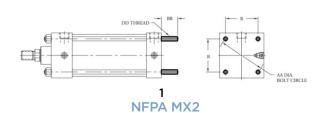
NFPA MT2

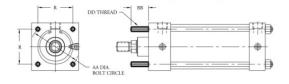
NFPA MX1

BORE				DII	MENSI	ONS					BORE		DIME	NSIONS	
SIZE	RO Di	DD A.	E	TD	TL	UT	Х	G	X	(J	SIZE	AA	ВВ	DD	R
11/2	5/8		2	1	1	4	13/4	2 1/8	<b>4</b> 1// <sub>8</sub>	4 1/2	11/2	2.02	1	<sup>1</sup> / <sub>4</sub> <b>- 28</b>	1.43
2	5/8	1	21/2	1	1	41/2	13/4	2 1/8	41/8	4 1/2	2	2.6	11/8	<sup>5</sup> / <sub>16</sub> <b>- 24</b>	1.84
2 1/2	5/8	1	3	1	1	5	13/4	<b>2</b> 1/8	<b>4</b> ½	<b>4</b> 5/8	21/2	3.1	<b>1</b> ½	<sup>5</sup> / <sub>16</sub> <b>- 24</b>	2.19
3 1/4	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	3 3/4	1	1	53/4	21/4	2 1/2	5	51/4	3 1/4	3.9	<b>1</b> <sup>3</sup> / <sub>8</sub>	<sup>3</sup> / <sub>8</sub> <b>- 24</b>	2.76
4	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	41/2	1	1	61/2	21/4	2 1/2	5	51/4	4	4.7	<b>1</b> <sup>3</sup> / <sub>8</sub>	3/8 <b>-24</b>	3.32
5	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	<b>5</b> ½	1	1	<b>7</b> ½	21/4	2 1/2	51/4	5 1/2	5	5.8	<b>1</b> 13/16	1/2-20	4.10
6	<b>1</b> 3/8	13/4	61/2	<b>1</b> <sup>3</sup> / <sub>8</sub>	<b>1</b> <sup>3</sup> / <sub>8</sub>	91/4	<b>2</b> 5/8	<b>2</b> <sup>7</sup> / <sub>8</sub>	<b>5</b>	<b>6</b> 1/8	6	6.9	<b>1</b> <sup>13</sup> / <sub>16</sub>	½ <b>-20</b>	4.88
8	<b>1</b> 3/8	13/4	81/2	<b>1</b> <sup>3</sup> / <sub>8</sub>	<b>1</b> 3/8	111/4	<b>2</b> 5/8	<b>2</b>	6	61/4	8	9.1	<b>2</b> <sup>5</sup> / <sub>16</sub>	5 <b>% -18</b>	6.44

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

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





### NFPA MX3

BORE		DIME	NSIONS		BORE		DIME	NSIONS	
SIZE	AA	ВВ	DD	R	SIZE	AA	ВВ	DD	R
11/2	2.02	1	1/4-28	1.43	11/2	2.02	1	1/4-28	1.43
2	2.6	11//8	<sup>5</sup> /16 <b>- 24</b>	1.84	2	2.6	<b>1</b> ½	<sup>5</sup> /16 <b>- 24</b>	1.84
21/2	3.1	11/8	<sup>5</sup> / <sub>16</sub> <b>- 24</b>	2.19	21/2	3.1	11//8	<sup>5</sup> / <sub>16</sub> <b>- 24</b>	2.19
3 1/4	3.9	<b>1</b> <sup>3</sup> / <sub>8</sub>	<sup>3</sup> / <sub>8</sub> - 24	2.76	3 1/4	3.9	13/8	<sup>3</sup> /8 <b>- 24</b>	2.76
4	4.7	<b>1</b> 3/8	<sup>3</sup> / <sub>8</sub> -24	3.32	4	4.7	13/8	<sup>3</sup> / <sub>8</sub> <b>- 24</b>	3.32
5	5.8	<b>1</b> <sup>13</sup> / <sub>16</sub>	½ <b>-20</b>	4.10	5	5.8	<b>1</b> <sup>13</sup> / <sub>16</sub>	½ <b>-20</b>	4.10
6	6.9	<b>1</b> <sup>13</sup> / <sub>16</sub>	1/2-20	4.88	6	6.9	<b>1</b> <sup>13</sup> / <sub>16</sub>	1/2-20	4.88
8	9.1	<b>2</b> <sup>5</sup> / <sub>16</sub>	5 <b>% - 18</b>	6.44	8	9.1	<b>2</b> <sup>5</sup> / <sub>16</sub>	5% <b>- 18</b>	6.44

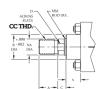
# **FLAIR**LINE

# ROD END STYLES for HEAVY-DUTY NFPA CYLINDERS



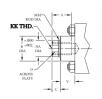
SMALL MALE (NFPA SM)\*

\*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



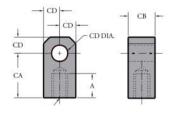
SHORT FEMALE (NFPA SF)\*

\*Optional

Rod				DIMEN	SIONS				Rod				DIMEN	SIONS			
Diameter	Α	В	С	СС	D	KK	NA	٧	Diameter	Α	В	С	СС	D	KK	NA	٧
5/8	3/4	1.124	3/8	1/2-20	1/2	<sup>7</sup> / <sub>16</sub> - <b>20</b>	.593	5/8	1 <sup>3</sup> /8	<b>1</b> 5/8	1.999	5/8	11/4-12	<b>1</b> ½	1-14	1.343	1
1	<b>1</b> ½	1.499	1/2	<sup>7</sup> /8 - <b>14</b>	7/8	3/4-16	.968	7/8*	1 <sup>3</sup> / <sub>4</sub>	2	2.374	3/4	11/2-12	11/2	11/4-12	1.703	<b>1</b> ½

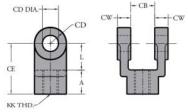
\*1 $\frac{1}{2}$ " bore, V =  $\frac{1}{2}$ 

# ACCESSORIES for HEAVY-DUTY NFPA CYLINDERS



**ROD EYE** 

PART			DIMENSION	S	
NO.	Α	CA	СВ	CD	KK
4-36-3	3/4	11/2	3/4	1/2	<sup>7</sup> / <sub>16</sub> <b>- 20</b>
4-36-3A	3/4	11/2	3/4	1/2	1/2 - 20
4-36-65	15/8	21/16	11/4	3/4	<sup>3</sup> / <sub>4</sub> - 16
4-36-65A	<b>1</b> <sup>5</sup> / <sub>8</sub>	21/16	11/4	3/4	<sup>7</sup> / <sub>8</sub> <b>- 14</b>
4-36-12	<b>1</b> <sup>5</sup> / <sub>8</sub>	2 13/16	11/2	1	1 - 14
4-36-12A	2	<b>3</b> <sup>7</sup> / <sub>16</sub>	2	13/8	1 1/4 - 12
4-36-12B	2	<b>3</b> <sup>7</sup> / <sub>16</sub>	2	13/8	1 1/2 - 12



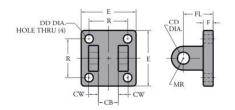
**ROD CLEVIS** 

PART			DI	MENSIO	NS		
NO.	Α	СВ	CD	CE	cw	L	KK
4-35-3	3/4	3/4	1/2	11/2	1/2	3/4	<sup>7</sup> / <sub>16</sub> <b>- 20</b>
4-35-3A	3/4	3/4	1/2	11/2	1/2	3/4	1/2 - 20
4-35-65	<b>1</b> ½	11/4	3/4	23/8	5/8	11/4	<sup>3</sup> / <sub>4</sub> <b>-</b> 16
4-35-65A	<b>1</b> ½	11/4	3/4	23/8	5/8	11/4	<sup>7</sup> / <sub>8</sub> <b>- 14</b>
4-35-12	<b>1</b> 5/8	11/2	1	31/8	3/4	11/2	1-14
4-35-12A	2	2	<b>1</b> <sup>3</sup> / <sub>8</sub>	41/8	1	21/8	11/4-12
4-35-12B	2	2	1 3/8	41/8	1	21/8	11/2-12

Pivot pin included.

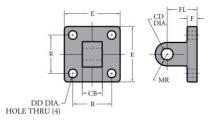
# FLAIRLINE

### ACCESSORIES for HEAVY-DUTY NFPA CYLINDERS



**CLEVIS BRACKET** 

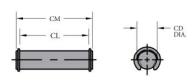
PART	DIMENSIONS									
NO.	СВ	CD	cw	DD	Е	F	FL	MR	R	
5-34-3	3/4	1/2	1/2	13/32	21/2	3/8	11/2	1/2	<b>1</b> 5/8	
5-34-65	11/4	3/4	5/8	17/32	31/2	5/8	<b>1</b> <sup>7</sup> / <sub>8</sub>	3/4	<b>2</b> <sup>9</sup> / <sub>16</sub>	
5-34-12	11/2	1	3/4	21/32	4 1/2	3/4	21/4	<b>1</b> ½	31/4	
5-34-12A	2	13/8	1	21/32	5	7/8	3	13/4	<b>3</b> <sup>13</sup> / <sub>16</sub>	
5-34-16	21/2	13/4	11/4	<sup>29</sup> / <sub>32</sub>	61/2	7/8	31/8	<b>1</b> <sup>7</sup> / <sub>8</sub>	<b>4</b> <sup>15</sup> / <sub>16</sub>	



**PIVOT BRACKET** 

PART		DIMENSIONS									
NO.	СВ	CD	DD	Е	F	FL	MR	R			
5-37-3	3/4	1/2	13/32	21/2	3/8	<b>1</b> ½	1/2	<b>1</b> <sup>5</sup> / <sub>8</sub>			
5-37-65	11/4	3/4	17/32	31/2	5/8	<b>1</b> <sup>7</sup> /8	3/4	<b>2</b> <sup>9</sup> / <sub>16</sub>			
5-37-12	11/2	1	21/32	41/2	7/8	23/8	11/4	3 1/4			
5-37-12A	2	13/8	21/32	5	7/8	3	<b>1</b> <sup>5</sup> / <sub>8</sub>	<b>3</b> <sup>13</sup> / <sub>16</sub>			
5-37-16	21/2	13/4	<sup>29</sup> / <sub>32</sub>	6 1/2	<b>1</b> ½	<b>3</b> <sup>3</sup> / <sub>8</sub>	21/8	<b>4</b> <sup>15</sup> / <sub>16</sub>			

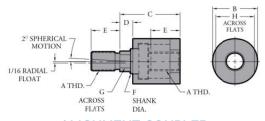
See optional pivot pin below.



**PIVOT PIN** 

PART NO.	DIMENSIONS							
PART NO.	CD	CL	CM					
BKT. PIN F 31/4, 4	1/2	17/8	2 1/16					
PIVOT PIN FI 3 1/4, 4	3/4	<b>2</b> <sup>5</sup> / <sub>8</sub>	2 <sup>29</sup> / <sub>32</sub>					
5-40-12	1	31/8	<b>3</b> <sup>7</sup> / <sub>16</sub>					
5-40-12A	13/8	<b>4</b> 1/8	<b>4</b> 31/64					
5-40-16	13/4	<b>5</b> <sup>3</sup> / <sub>16</sub>	<b>5</b> <sup>9</sup> / <sub>16</sub>					

Snap Rings included.



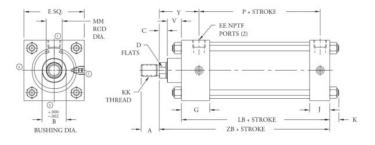
**ALIGNMENT COUPLER** 

PART		DIMENSIONS										
	Α	В	С	D	E	F	G	Н	Pull at Yield			
4-39-3	<sup>7</sup> / <sub>16</sub> - <b>20</b>	1 1/4	2	1/2	3/4	5/8	1/2	1	10,000			
4-39-3A	1/ <sub>2</sub> - 20	1 1/4	2	1/2	3/4	5/8	1/2	1	14,000			
4-39-65	<sup>3</sup> / <sub>4</sub> - 16	1 3/4	<b>2</b> <sup>5</sup> / <sub>16</sub>	1/2	1 1/8	31/32	3/16	1 1/2	34,000			
4-39-65A	<sup>7</sup> / <sub>8</sub> - <b>14</b>	1 3/4	<b>2</b> <sup>5</sup> / <sub>16</sub>	1/2	1 1/8	31/32	3/16	1 1/2	39,000			
4-39-12									64,000			
4-39-12A	1 ½ - 12	2 1/2	<b>2</b> <sup>15</sup> / <sub>16</sub>	1/2	<b>1</b> 5/8	<b>1</b> <sup>3</sup> / <sub>8</sub>	1 5/32	2 1/4	78,000			
4-39-16									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 then 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.

# **FLAIR**LINE

# **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:
 1½, 2, 2½, 3¼, 4, 5, 6, 8

Stroke Sizes: Any stroke up to 130"

Cushions available: either/both ends

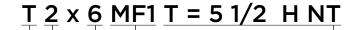
 Double-acting cylinders with pressure energized, wear compensating U-cup piston seals (Buna N standard; Viton available for Series T and TS)

DIM.						CY	LIN	NDE	ΞR	ВО	RE					
	11	/2	2	2	2	/2	3	1/4	4	1	į	5	6	5	8	3
А	3/4	<b>1</b> ½	3/4	<b>1</b> ½	3/4	<b>1</b> ½	<b>1</b> ½	<b>1</b> 5/8	<b>1</b> ½	<b>1</b> 5/8	<b>1</b> ½	<b>1</b> 5/8	<b>1</b> 5/8	2	<b>1</b> 5/8	2
В	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
С	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	17/32	7/8	<b>1</b> <sup>7</sup> / <sub>32</sub>	7/8	17/32	11/8	11/2	<b>1</b> ½	<b>1</b> ½
E	2	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/	/ <sub>2</sub>	1/	/ <sub>2</sub>	1/	/ <sub>2</sub>	3/	<b>/</b> <sub>4</sub>	3/	/ <sub>4</sub>
G	1 1	1/2	1 1	//2	1 1	/2	13	3/4	1 3	5/4	13	5/4	2	2	2	2
J	•	1		1	•	ı	11	/4	11	/4	11	/4	1¹	/2	11	/2
K	7/	16	15/	/ <sub>32</sub>	15/	/ <sub>32</sub>	9/	<b>1</b> 6	9/	<b>1</b> 6	3/	/ <sub>4</sub>	3/	/ <sub>4</sub>	7/	/ <sub>8</sub>
KK	<sup>7</sup> / <sub>16</sub> - <b>20</b>	³/₄ -16	<sup>7</sup> / <sub>16</sub> - <b>20</b>	³/₄ -16	<sup>7</sup> / <sub>16</sub> - <b>20</b>	³/₄ -16	³/₄ -16	1 14	³/₄ -16	1 14	³/₄ -16	1 ·14	1 14	1½ -12	1 14	1½ -12
LB	3	5/8	3	5/8	3	3/4	4	1/4	4	1/4	4	1/2	Ę	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	<b>1</b> <sup>3</sup> /8	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	1	<b>1</b> <sup>3</sup> /8	<b>1</b> <sup>3</sup> /8	13/4	<b>1</b> <sup>3</sup> /8	13/4
Р	2 5	5/16	2 5	/16	2	//16	2 <sup>9</sup>	/16	2 <sup>s</sup>	/16	2 <sup>13</sup>	3/16	3 <sup>3</sup>	/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	<b>1</b> ½	1	<b>1</b> ½
Υ	1 <sup>29</sup> / <sub>32</sub>	<b>2</b> %32	1 <sup>29</sup> /32	<b>2</b> <sup>9</sup> / <sub>32</sub>	1 <sup>29</sup> / <sub>32</sub>	<b>2</b> %32	<b>2</b> <sup>15</sup> / <sub>32</sub>	<b>2</b> <sup>23</sup> / <sub>32</sub>	<b>2</b> <sup>15</sup> / <sub>32</sub>	<b>2</b> <sup>23</sup> / <sub>32</sub>	<b>2</b> 15/32	<b>2</b> <sup>23</sup> / <sub>32</sub>	<b>2</b> <sup>25</sup> / <sub>32</sub>	<b>3</b> ¹/₃₂	<b>2</b> <sup>25</sup> / <sub>32</sub>	<b>3</b> ¹/₃₂
ZB	<b>4</b> 5/8	5	<b>4</b> 5/8	5	<b>4</b> <sup>3</sup> / <sub>4</sub>	<b>5</b> ½	<b>5</b> 5/8	<b>5</b>	<b>5</b> ½	<b>5</b> 5/8	5 ½	6 ½	<b>6</b> 5/8	6 <sup>7</sup> /8	6³/ <sub>4</sub>	7
ZM	6½	6 <sup>7</sup> /8	6½	6 <sup>7</sup> /8	61/4	7	<b>7</b> ½	8	<b>7</b> ½	8	<b>7</b> ³/4	8 1/4	8 ³/ <sub>4</sub>	91/4	<b>8</b>	9³/8

\*3/8 ports optional on 11/2, 2 and 21/2 bore cylinders.

# **FLAIR**LINE

# **Ordering Information**



**PISTON** STANDARD OVERSIZED ROD TS LOW FRICTION TL STANDARD LOW FRICTION TLS **OVERSIZED ROD** 

> 2 2 1/2

MOUNTING STYLES FRONT FLANGE MOUNT MF1 MF2 REAR FLANGE MOUNT FC1 FRONT FACE MOUNT FC2 REAR FACE MOUNT ANGLE MOUNT MS1 SIDE LUG MOUNT MS2 **END LUG MOUNT** MS7 MS4 SIDE TAPPED MOUNT MP1 **CLEVIS MOUNT** CLEVIS MOUNT MP2 PIVOT MOUNT MP4 HEAD TRUNNION MOUNT MT1 CAP TRUNNION MOUNT MT2 **EXTENDED TIE RODS - FRONT & REAR** MX1 MX2 EXTENDED TIE RODS - REAR **EXTENDED TIE RODS - FRONT** MX3 No Mount **BI ANK** 

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

SPECIAL OPTIONS

**CUSHIONS HEAD ONLY** н 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

VITON PACKING **Consult Factory** STOP TUBES **ROD END STYLES** Small Male Standard INTERMEDIATE MALE IM OR SHORT FEMALE SE **ROD EXTENSION "C"** C = Dimension THREAD LENGTH "A" A = Dimension

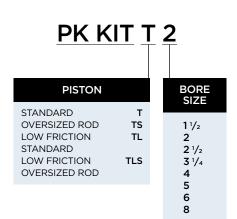
MALE THREAD SIZE XX = (size or plain rod end) FEMALE THREAD SIZE XX = (size and depth - unless otherwise specified, all other

dimensions will be Short Female STAINLESS STEEL RODS SS Rod

#### STROKE LENGTH

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

# **Replacement Parts**





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

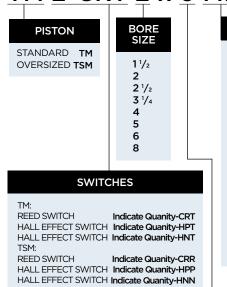
Note: Longer lead times may be required for strokes longer than 18". Strokes over 40" may require oversized rods and/or stop tube. Cushions not available on head-end of 11/2 bore cylinders with oversized rods.

# HEAVY DUTY NFPA MAGNETIC SWITCH CYLINDERS



# **Ordering Information**

TM 2-CRT 2 x 6 MF1 T =  $5 \frac{1}{2}$  H NT



Note: The switch options are on page 63.

#### MOUNTING STYLES 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 Note: All mounting options are on pages 51 - 54.

STROKE LENGTH

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

SPECIA	AL OPTIONS
CUSHIONS	
HEAD ONLY	н
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)
NON-STANDARD	in cap or head end
	Indicate location(s) (DD2_DD7_DD4)
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

# **Replacement Parts** PK KIT TM 2

**PISTON TSM** 

BORE SIZE

# PROUD TO BE **MADE IN AMERICA**

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

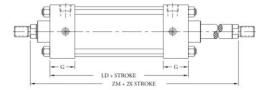
Note: Longer lead times may be required for strokes longer than 18". Strokes over 40" may require oversized rods and/or stop tube. Cushions not available on head-end of 11/2 bore cylinders with oversized rods.

# HEAVY DUTY NFPA DOUBLE-ENDED CYLINDERS

# **FL<u>AIR**LINE</u>

# **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:
   1½, 2, 2½, 3¼, 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)

						CV	1 IN	JDE	=D	во	DE					
DIM.	11	/2	2					1/4		4		5	6		8	 3
A	3/4	11/8	3/4	11/8	3/4	11/8	<b>1</b> ½8	15/8	<b>1</b> ½8	15/8	<b>1</b> ½	15/8	15/8	2	<b>1</b> 5/8	2
В	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
С	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	17/32	7/8	<b>1</b> <sup>7</sup> / <sub>32</sub>	7/8	<b>1</b> <sup>7</sup> / <sub>32</sub>	<b>1</b> ½	11/2	<b>1</b> ½	<b>1</b> ½
Е	2	2	2	1/2	3	3	3	3/4	4	1/2	5	1/2	6	1/2	8	1/2
EE	1/	<b>,</b> * <b>4</b>	1/	4*	1/	' * 4	1/	/ <sub>2</sub>	1/	/ <sub>2</sub>	1/	/ <sub>2</sub>	3/	/ <sub>4</sub>	3/	/ <sub>4</sub>
G	1	1/2	11	/2	1 1	/2	13	3/4	1 3/4		1 3/4		2		2	
J	•	1	1	1	•	1	1 1	/4	1 1	/4	1 1	/4	11	/2	11	/2
K	Í	<b>1</b> 6								<b>1</b> 6					7/	
KK										1 -14						
LB	3	5/8	3 !	5/8	3	3/4	4	1/4	4	1/4	4	1/2	Ę	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
(Rod Dia.)	5/8	1	5/8	1	5/8	1	1	<b>1</b> <sup>3</sup> /8	1	<b>1</b> 3/8	1	<b>1</b> <sup>3</sup> / <sub>8</sub>	<b>1</b> <sup>3</sup> /8	13/4	<b>1</b> <sup>3</sup> / <sub>8</sub>	13/4
Р	2 5	5/16	2 5	/16	2	7/16	2 <sup>9</sup>	/16	2 <sup>9</sup>	/16	2 <sup>1:</sup>	<sup>3</sup> /16	3 <sup>3</sup>	/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	11/8	1	<b>1</b> ½
Y	1 <sup>29</sup> / <sub>32</sub>	<b>2</b> %32	<b>1</b> <sup>29</sup> / <sub>32</sub>	<b>2</b> <sup>9</sup> / <sub>32</sub>	1 <sup>29</sup> / <sub>32</sub>	<b>2</b> %32	<b>2</b> <sup>15</sup> / <sub>32</sub>	<b>2</b> <sup>23</sup> / <sub>32</sub>	<b>2</b> 15/32	<b>2</b> <sup>23</sup> / <sub>32</sub>	<b>2</b> <sup>15</sup> / <sub>32</sub>	<b>2</b> <sup>23</sup> / <sub>32</sub>	<b>2</b> <sup>25</sup> / <sub>32</sub>	<b>3</b> <sup>1</sup> / <sub>32</sub>	<b>2</b> <sup>25</sup> / <sub>32</sub>	<b>3</b> <sup>1</sup> / <sub>32</sub>
ZB	<b>4</b> 5/8	5	<b>4</b> 5/8	5	<b>4</b> <sup>3</sup> / <sub>4</sub>	<b>5</b> 1/8	<b>5</b> 5/8	<b>5</b> 7/8	<b>5</b> 7/8	<b>5</b> 5/8	<b>5</b> 7/8	<b>6</b> 1/8	65/8	6 7/8	6³/ <sub>4</sub>	7
ZM	61/8	<b>6</b> 7/8	61/8	6 <sup>7</sup> /8	61/4	7	<b>7</b> ½	8	<b>7</b> ½	8	<b>7</b> <sup>3</sup> / <sub>4</sub>	8 1/4	8 ³/ <sub>4</sub>	91/4	<b>8</b>	93/8

\*3/8 ports optional on 11/2, 2 and 21/2 bore cylinders.

# HEAVY DUTY NFPA DOUBLE-ENDED CYLINDERS

# **FLAIR**LINE

# **Ordering Information**

TDE  $2 \times 6$  MF1 T =  $5 \frac{1}{2}$  H NT

# PISTON

STANDARD TDE OVERSIZED TSDE ROD

# MOUNTING STYLES FRONT FLANGE MOUNT

MF1 REAR FLANGE MOUNT MF2 FRONT FACE MOUNT FC1 REAR FACE MOUNT FC2 ANGLE MOUNT MS<sub>1</sub> SIDE LUG MOUNT MS2 END LUG MOUNT MS7 SIDE TAPPED MOUNT MS4 CLEVIS MOUNT MP1 **CLEVIS MOUNT** MP2 PIVOT MOUNT MP4 HEAD TRUNNION MOUNT CAP TRUNNION MOUNT MT2 EXTENDED TIE RODS - FRONT & REAR MX1 EXTENDED TIE RODS - REAR MX2 **EXTENDED TIE RODS - FRONT** MX3 **BLANK** No Mount

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

### STROKE LENGTH

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

#### SPECIAL OPTIONS

 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)
VITON PACKING in cap or head end
Viton

 Viton

 STOP TUBES
 Consult Factory

 ROD END STYLES
 Small Male Standard

 INTERMEDIATE MALE
 IM

 OR SHORT FEMALE
 SF

 ROD EXTENSION "C"
 C = Dimension

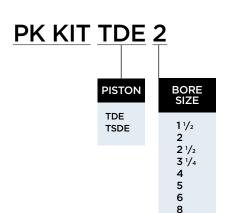
 THREAD LENGTH "A"
 A = Dimension

FEMALE THREAD SIZE XX = (size and depth - unless otherwise specified, all other dimensions will

XX = (size or plain rod end)

be Short Female
STAINLESS STEEL RODS
SS Rod

# **Replacement Parts**



# PROUD TO BE MADE IN AMERICA

MALE THREAD SIZE

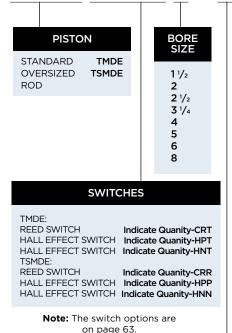
\*\*MF1, MF2, MP2, and MP4 are not available on 8" bore cylinders

**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.



# **Ordering Information**

TMDE 2-CRT 2 x 6 MF1 T =  $5 \frac{1}{2}$  H NT



MOUNTING STYLES	
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

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

SPECIAL	OPTIONS
CUSHIONS	
HEAD ONLY	н
CAP ONLY	С
BOTH	HC
METAL ROD SCRAPER	MRS
3/8" INLET PORTS	Ports 3/8
EXTRA INLET PORT(S)	Indicate location(s)
	(PP2, PP3, PP4)
NON-STANDARD INLET	in cap or head end PORTS Indicate location(s)
NON-STANDARD INLET	(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	
STAINLESS STEEL RODS	5 55 KOU

# STROKE LENGTH

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

# **Replacement Parts**



PISTON TMDE TSMDE BORE SIZE

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

5

6

8



\*\*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

# **FLAIR**LINE

### Series TMDE & TSMDE Magnetic Switch Options:

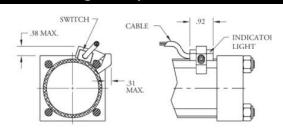
### **REED SWITCH: PART NO. 43-CRT**

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

### **REED SWITCH: PART NO. 43-CRR**

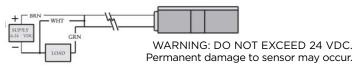


### **Mounting Clamp - Included with Switches**

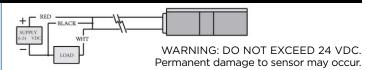


For use on 11/2 through 21/2 bore cylinders. (43-CRT, 43-HPT & 43-HNT

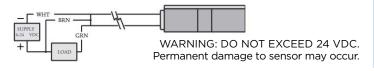
### HALL EFFECT SWITCH NO. 43-HPT



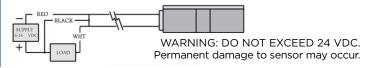
### HALL EFFECT SWITCH NO. 43-HPP



#### HALL EFFECT SWITCH NO. 43-HNT



### HALL EFFECT SWITCH NO. 43-HNN



Power Supply Polarity MUST be observed for proper operation. FAILURE TO OBSERVE POLARITY WILL CAUSE DAMAGE TO SWITCH. Temperature Range - operational from -30° to +80°C. Shock - operational up to 30G (11msec.) /Reeds only. Not applicable for Halls.

Vibration - operational up to 20G (10-55Hz) /Reeds only. Not applicable for Halls.

# **SENSOR TYPES & TECHNICAL DATA**

PART NO.	43-CRT	43-CRR	43-HPT	43-HNT	43-HPP	43-HNN
Description	Reed Switch MOV, LED	Reed Switch MOV, LED	Hall Effect, LED Sourcing	Hall Effect, LED Sinking	Hall Effect, LED Sourcing	Hall Effect, LED Sinking
Function	SPTS Normally Open	SPTS Normally Open	Normally Open PNP Output	Normally Open NPN Output	Normally Open PNP Output	Normally Open NPN Output
Switching Voltage	5 - 120 VDC/VAC 50/60 Hz	5 - 240 VDC/VAC 50/60 Hz	6-24 VDC	6-24 VDC	6-24 VDC	6-24 VDC
Switching Current	0.5 Amp Max 0.005 Amp Min	1 Amp Max .005 Amp Min	0.5 Amp Max	0.5 Amp Max	1 Amp Max	1 Amp Max
Switching Power	10 Watts Max	30 Watts Max	12 Watts Max	12 Watts Max	24 Watts Max	24 Watts Max
Switching Speed	0.5 ms operate 0.1 ms release	0.6 ms operate 0.05 ms release	1.5 u operate 0.5 u release			
Max Volt Drop	3.5 Volts	3 Volts	0.5 Volts	0.5 Volts	0.5 Volts	0.5 Volts
Sensitivity	85 Gauss	85 Gauss	85 Gauss	85 Gauss	85 Gauss	85 Gauss