

Model DFR Valve Actuator

Technical Sales Bulletin

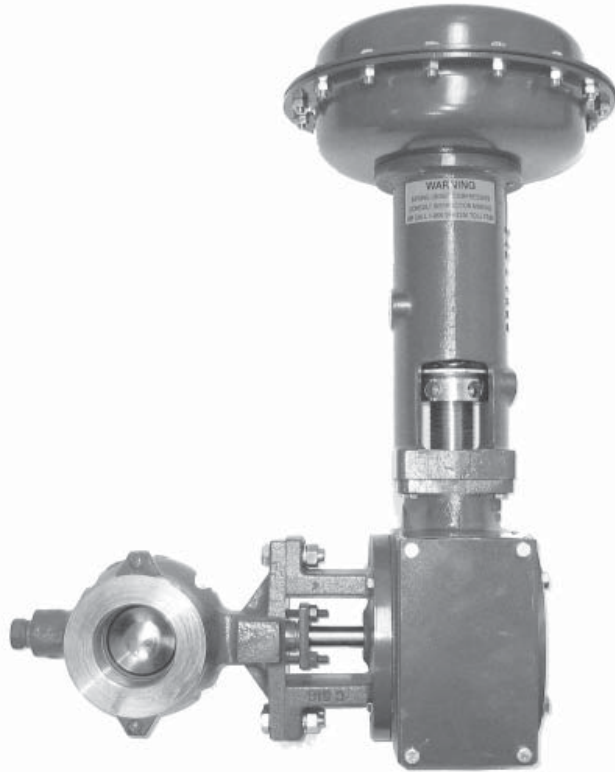


Figure 1 Model DFR Actuator

The Model DFR rotary output spring and diaphragm actuators are used in all kinds of demanding applications, including both throttling and on/off control valve operations. The DFR actuators all have spring adjusters for enhanced actuator performance.

The Model DFR, when combined with a Model 570 segmented ball control valve is a rugged control valve assembly, to which a wide variety of instruments can be attached.

The high level of quality specifications used in the manufacture of the Model DFR rotary actuators ensures superior performance and customer satisfaction.

FEATURES

Reliable Design

The low-pressure diaphragm, fail-safe spring, and splined connection make for accurate and safe operation.

Rugged Long Lasting Construction

Dyna-Flo's expert CNC machining process and superior quality parts come together to make DFR actuators a rugged, long lasting product. DFR actuators are manufactured to deliver a high level of safety and performance.

Failsafe Simplicity

A spring return design enables standard valve failsafe operation without lock-up valves and volume tanks.

Field Reversible

All valve and actuator assemblies are easily changed between valve closing or valve opening upon loss of instrument air.

Positioner Flexibility

The Model DFR is designed to accept the latest in positioners, either electronic or pneumatic, shaft drive or integrally mounted.

Output Shaft Options

The Model DFR can accept a splined shaft or square stub, making for easy automation of valves, louvers, dampers or any other quarter turn application.



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SPECIFICATIONS

Actuator Size	Maximum Casing Pressure Psig (kPag)
026	60 (414)
047	65 (448)
070	75 (517)
156	50 (345)
220	65 (448)

Material Temperature Capabilities

Standard: -40 to 180 °F (-40 to 82 °C).

Construction Materials

Refer to Table 9 for construction details.

Refer to Figures 5, 6 & 7 for Cross Sections.

Contact your Dyna-Flo sales office for more information and other options.

Valve Shaft Compatibility, inches (mm)

Size 026: 1/2 (12.7)
Size 047: 1/2 (12.7), 5/8 (15.9), 3/4 (19.1)
Size 070: 1/2 (12.7), 5/8 (15.9), 3/4 (19.1), 7/8 (22.2), 1 (25.4)
Size 156: 3/4 (19.1), 7/8 (22.2), 1 (25.4), 1-1/4 (31.8), 1-1/2 (38.1)
Size 220: 1-1/4 (31.8), 1-1/2 (38.1), 1-3/4 (44.5), 2 (50.8)

Approximate Weights

Size 026: 30 pounds (14 kg)
Size 047: 46 pounds (21 kg)
Size 070: 99 pounds (45 kg)
Size 156: 203 pounds (92 kg)
Size 220: 272 pounds (124 kg)

Actuator Dimensions

Refer to Figures 3 & 4.

Refer to Tables 2, 3, & 4 for actuator dimensions.

Output Torque

Refer to Tables 5 to 7.

Actuator Mounting Orientation Valve Applications

Refer to Figure 2.

Refer to Table 1.

Other Applications

Please specify with a sketch.

Tubing Connection Size

All sizes, 1/4 inch NPT standard. Other sizes available.

Maximum Shaft Rotation

90 degrees.

Shaft Connection Types

The standard shaft connection is a splined shaft suitable for a Dyna-Flo 570 control valve. A square stub or other connection is also available.

Options

- Manual override
- Reduced rotation output
- Increased tubing connection size
- Travel stops

Diaphragm Casing Volume

Refer to Table 8.

For more information and other options contact your Dyna-Flo sales office.

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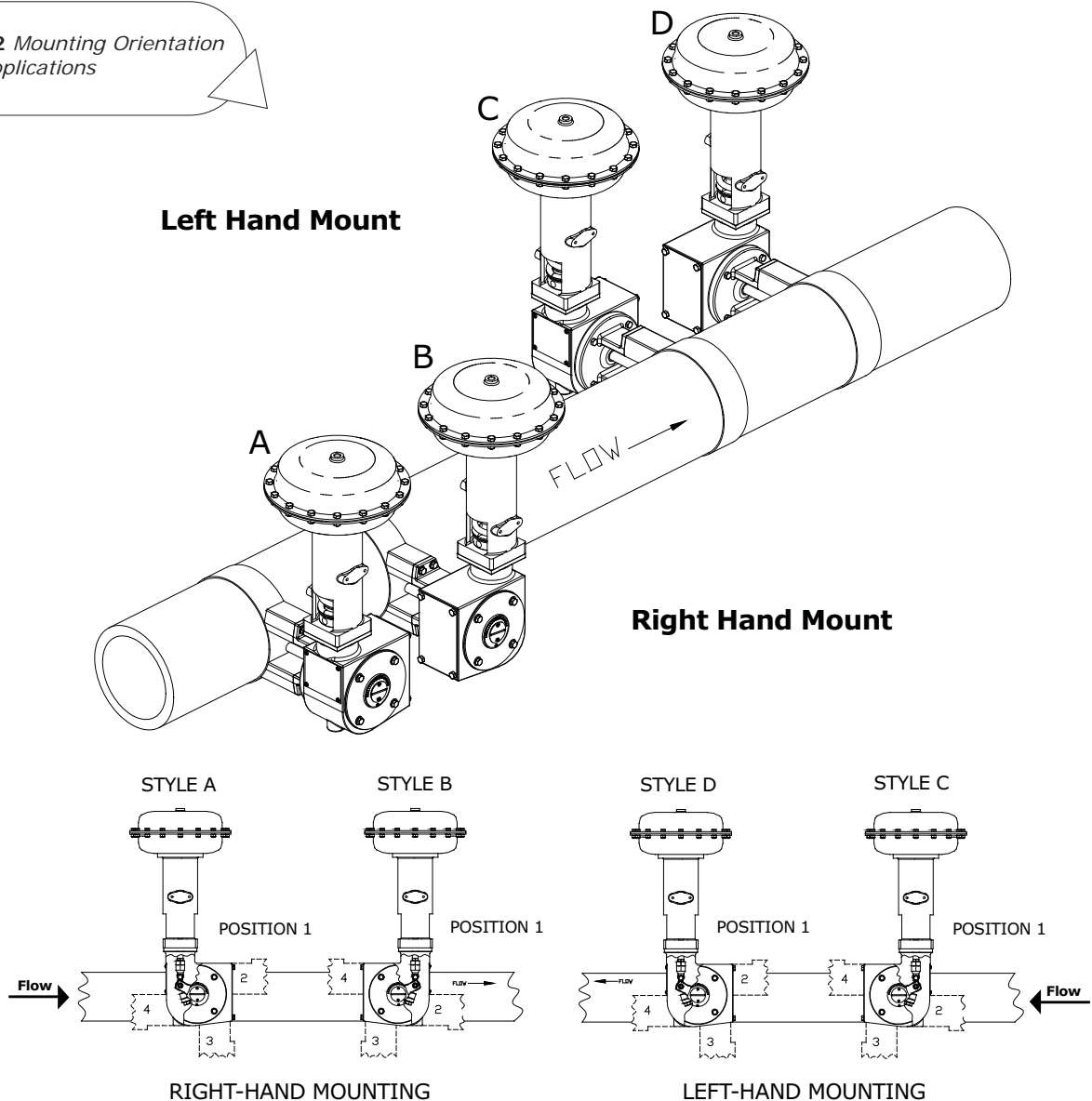


Table 1

Model DFR Mounting Styles and Positions

Mounting	Action	Model 560 / 570 Valve	Model 660 Butterfly Valve
Right Hand	Fail Open	Style A	Style B
Right Hand	Fail Close	Style B	Style A
Left Hand	Fail Open	Style C	Style C
Left Hand	Fail Close	Style D	Style D

Figure 2 Mounting Orientation Valve Applications





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Table 2

Model DFR Actuator Dimensions - Inch (mm)

Dimensions	Actuator Size				
	DFR026	DFR047	DFR070	DFR156	DFR220
A	10.13 (257)	13.31 (338)	23.94 (608)	34.50 (876)	33.44 (849)
B	3.00 (76)	4.56 (116)	4.50 (114)	4.75 (121)	4.75 (121)
C	9.94 (252)	11.44 (291)	13.13 (334)	18.63 (473)	21.13 (537)
D	0.75 (19.1)	1.31 (33.3)	2.13 (54.1)	2.50 (63.5)	2.50 (63.5)
E	2.06 (52)	3.62 (92)	6.88 (175)	7.31 (186)	7.31 (186)
F	2.32 (59)	2.56 (65)	2.88 (73)	3.00 (76)	3.00 (76)
Assembly Weight - lb (kg)	30 (14)	46 (21)	99 (45)	203 (92)	272 (124)

Envelope dimensions are + / - 0.25 inches (6.4 mm)

Table 3

Model DFR Actuator Mounting Dimensions - Inch (mm)

Dimensions	Valve Shaft Diameter			
	1/2 - 5/8 (12.7 - 15.9)	3/4 - 1 (19.1 - 25.4)	1-1/4 - 1-1/2 (31.8 - 38.1)	1-3/4 - 2 (44.5 - 50.8)
G	5.38 (137)	6.30 (160)	5.80 (147)	11.30 (287)
H	4.62 (117)	6.00 (152)	9.25 (235)	10.75 (273)
I	N/A	1.25 (32)	1.81 (46)	2.00 (51)
J	0.56 (14.2)	0.56 (14.2)	0.69 (17.5)	0.81 (20.6)

Envelope dimensions are + / - 0.25 inches (6.4 mm)

VSD = Valve Shaft Diameter.

Table 4

Model DFR Handwheel Dimensions - Inch (mm)

Dimensions	Actuator Size			
	DFR047	DFR070	DFR156	DFR220
K	8.75 (222)	8.75 (222)	12.00 (305)	14.00 (356)
L	7.50 (190)	11.06 (281)	13.12 (333)	14.88 (378)
M	13.31 (338)	23.88 (607)	34.50 (876)	33.44 (849)
Approximate Weight - lb (kg)	11 (5.0)	16 (7.3)	24 (10.9)	47 (21.3)

Envelope dimensions are + / - 0.25 inches (6.4 mm)

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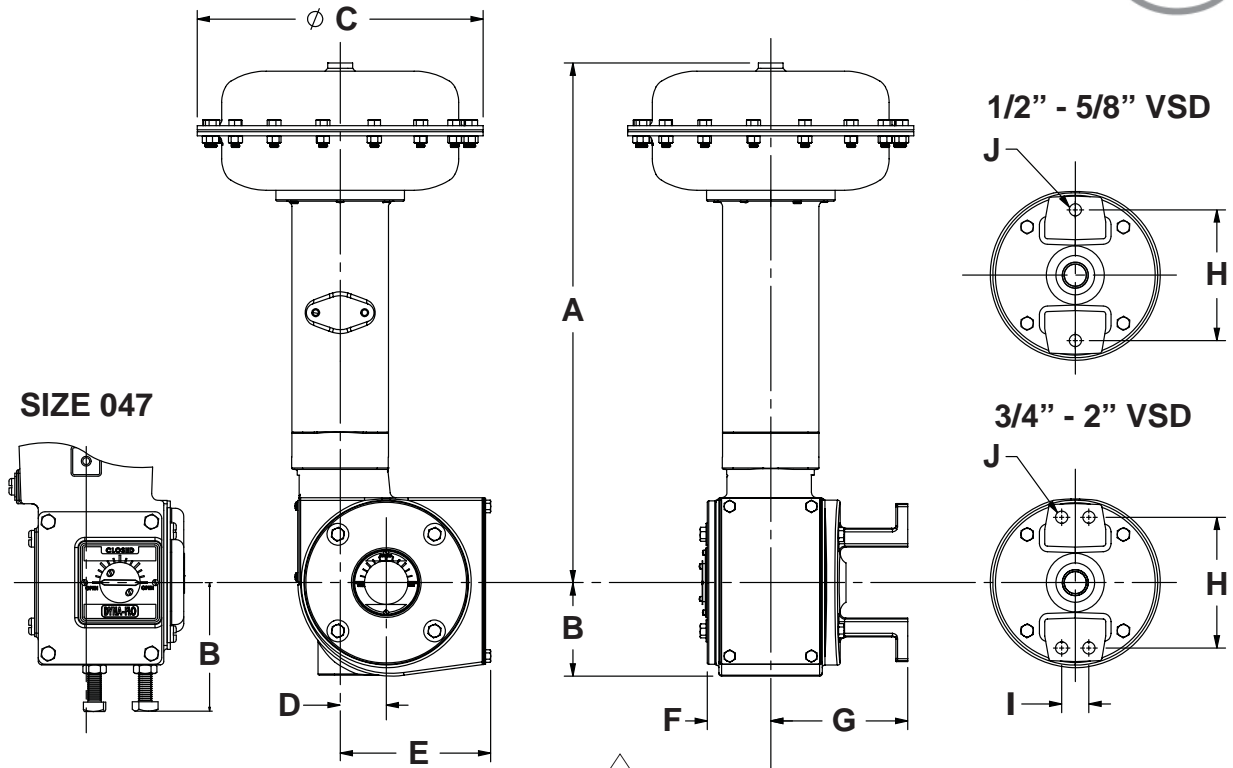


Figure 3 Actuator Assembly Dimensions

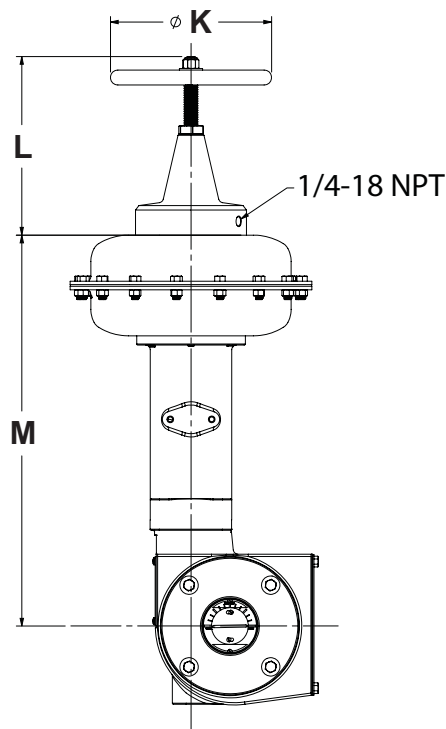


Figure 4 Typical Actuator Handwheel Dimensions



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Table 5

Model DFR Actuator Output Torque 23 Psig (159 kPag) supply

0 - 18 Psig (0 - 124 kPag) Range

Actuator Size	Spring		Action			Action		
			Fail Open		Start Stroke	Fail Closed		Start Stroke
	Code	Number	Torque lbf-in (N-m)	Psig (kPag)		Torque lbf-in (N-m)	Psig (kPag)	
026	A	16A4660X01D	130 (15)	130 (15)	3.0 (21)	90 (10)	200 (23)	3.9 (27)
047	C	10B1524X01D	172 (19)	399 (45)	3.0 (21)	336 (38)	170 (19)	4.9 (34)
070	D	1P63712708D	380 (43)	980 (111)	3.0 (21)	730 (82)	620 (70)	4.3 (30)
156	K	1K16272708D	2140 (242)	2320 (262)	3.0 (21)	1630 (184)	3160 (357)	3.7 (26)
070	I	1L21742704D	770 (87)	890 (101)	3.0 (21)	520 (59)	1290 (146)	3.0 (21)

Table 6

Model DFR Actuator Output Torque, 38 Psig (262 kPag) supply

0-33 Psig (0 to 228 kPag) range

Actuator Size	Spring		Action			Action		
			Fail Open		Start Stroke	Fail Closed		Start Stroke
	Code	Number	Torque lbf-in (N-m)	Psig (kPag)		Torque lbf-in (N-m)	Psig (kPag)	
026	B	16A4659X01D	280 (32)	160 (18)	3.0 (21)	160 (18)	370 (42)	6.8 (47)
047	C	10B1524X01D	807 (91)	555 (63)	4.9 (34)	334 (38)	1139 (129)	4.9 (34)
070	D	1P63712708D	1960 (221)	1260 (142)	4.3 (30)	730 (82)	3050 (344)	4.3 (30)
070	E	1L21732704D	1409 (159)	1174 (133)	3.0 (21)	1030 (116)	1820 (206)	6.0 (41)
156	F	1K16282708D	4160 (470)	3020 (341)	3.0 (21)	3090 (349)	4760 (538)	7.0 (48)
220	G	1R67602708D	5720 (646)	3690 (417)	3.0 (21)	4810 (543)	5540 (626)	10.1 (70)
047	H	10B1525X01D	977 (110)	521 (59)	3.0 (21)	440 (50)	1162 (131)	6.3 (43)

Table 7

Model DFR Actuator Output Torque, 32 Psig (221 kPag) supply

3-27 Psig (21 to 186 kPag) range

Actuator Size	Spring		Action			Action		
			Fail Open		Start Stroke	Fail Closed		Start Stroke
	Code	Number	Torque lbf-in (N-m)	Psig (kPag)		Torque lbf-in (N-m)	Psig (kPag)	
026	A	16A4660X01D	164 (222)	67 (91)	3.9 (27)	-	-	-
026	B	16A4659X01D	163 (221)	73 (99)	3.1 (21)	89 (121)	218 (296)	6.8 (47)
047	C	10B1524X01D	591 (801)	270 (366)	4 (28)	147 (199)	787 (1067)	4.9 (34)
047	H	10B1525X01D	364 (494)	270 (366)	3.1 (21)	249 (338)	375 (508)	6.3 (43)
070	D	1P63712708D	1432 (1942)	543 (736)	3.4 (23)	218 (296)	2082 (2823)	4.3 (30)
070	E	1L21732704D	662 (898)	644 (873)	3.1 (21)	517 (701)	845 (1146)	6 (41)
070	I	1L21742704D	1010 (1369)	364 (494)	3.1 (21)	-	-	-
156	F	1K16282708D	2153 (2919)	1649 (2236)	3.1 (21)	1776 (2408)	2135 (2895)	7 (48)
156	K	1K16272708D	2970 (4027)	1338 (1814)	3.7 (26)	-	-	-
220	G	1R67602708D	2989 (4053)	1880 (2549)	3.1 (21)	-	-	-

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Table 8

Casing Size	Clearance Volume ⁽¹⁾ Inches ³ (cm ³)	Casing Volume ⁽²⁾	
		60 Degree Rotation Inches ³ (cm ³)	90 Degree Rotation Inches ³ (cm ³)
026	40 (655)	67 (1,098)	76 (1,245)
047	38 (623)	115 (1,890)	146 (2,390)
070	64 (1,050)	250 (4,100)	330 (5,410)
156	216 (3,540)	708 (11,600)	927 (15,200)
220	213 (3,490)	850 (13,929)	1,161 (19,025)

1. Volume when the diaphragm is in the up position. 2. Includes clearance volume.

Table 9

DESCRIPTION	ACTUATOR SIZE	MATERIAL
Access Plate	026, 070, 156, 220	Steel
Actuator Stem	047	Zinc Plated Steel
Body	All Sizes	Steel
Closing Cap	All Sizes	Steel
Cover Plate	047	Steel
	070, 156, 220	Cast Iron
Diaphragm	All Sizes	Nitrile
Diaphragm Casing	All Sizes	Steel
Diaphragm Rod	026, 070, 156, 220	Zinc Plated Steel
Diaphragm Plate	026, 047	Cast Iron
	070, 156, 220	Zinc Plated Steel
Handwheel	047, 070, 156, 220	Cast Iron
Housing	All Sizes	Cast Iron
Lever	026	WCC
	047, 070, 156, 220	Cast Iron
Mounting Yoke	026, 047	Steel
	070, 156, 220	Cast Iron
Positioner Plate	047	Plastic
	070, 156, 220	Steel
Pusher Plate	All Sizes	Zinc Plated Steel
O-Ring	All Sizes	Nitrile
Spring Barrel	All Sizes	Cast Iron
Stem	026, 047, 070, 156	Bronze
	220	S17400 DH1150
Upper Diaphragm Plate	070, 156, 220	Zinc Plated Steel



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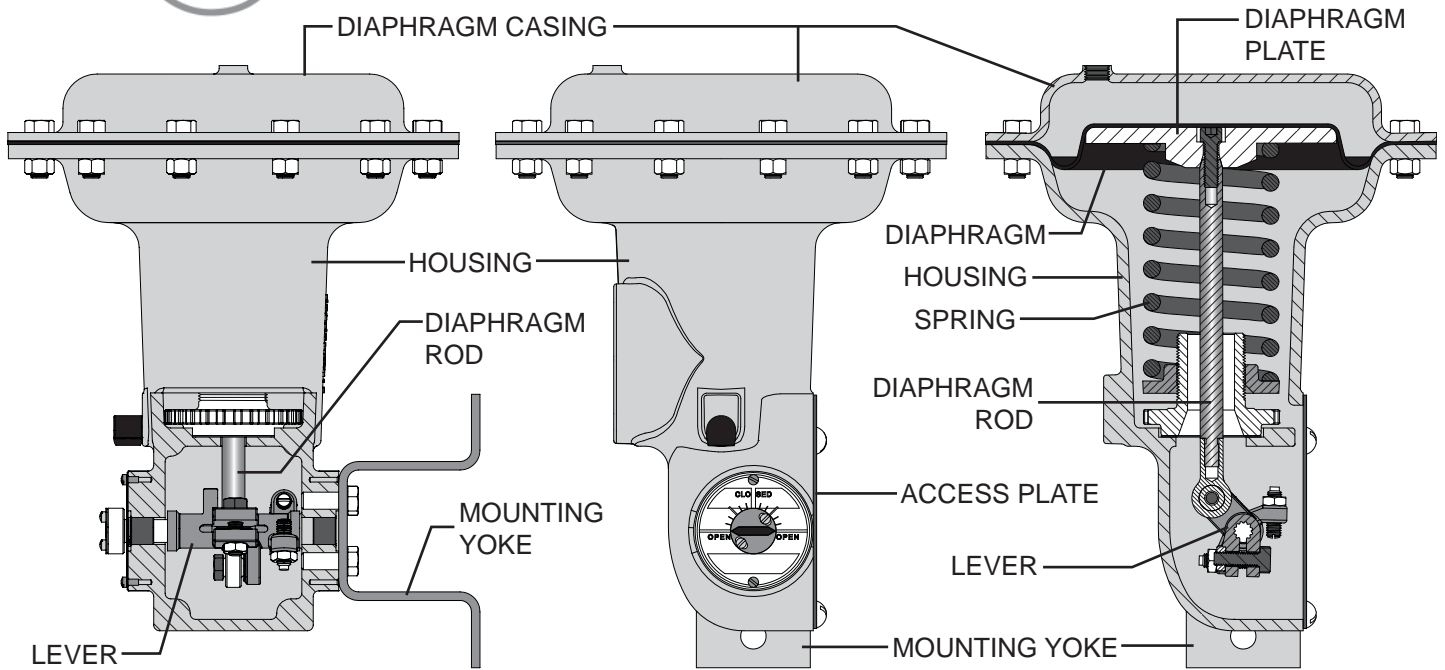


Figure 5 Size 026 Actuator Cross Section

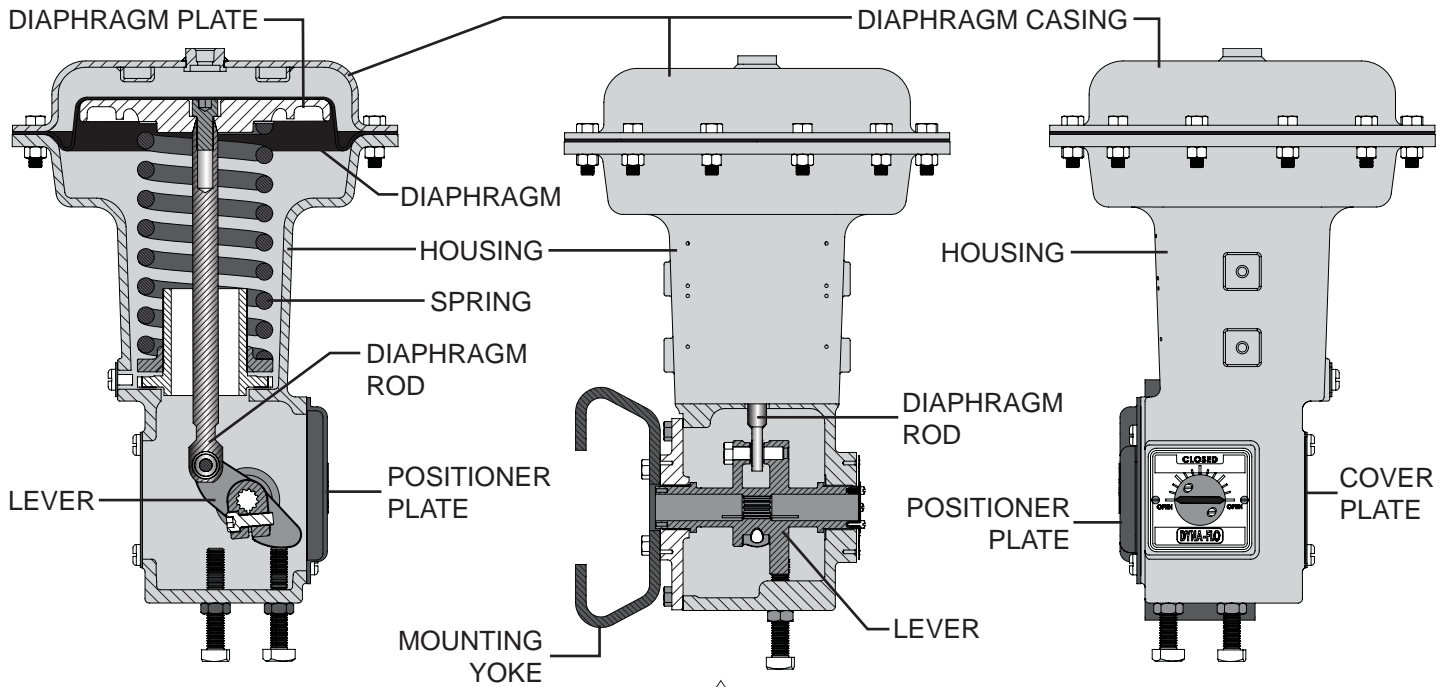


Figure 6 Size 047 Actuator Cross Section

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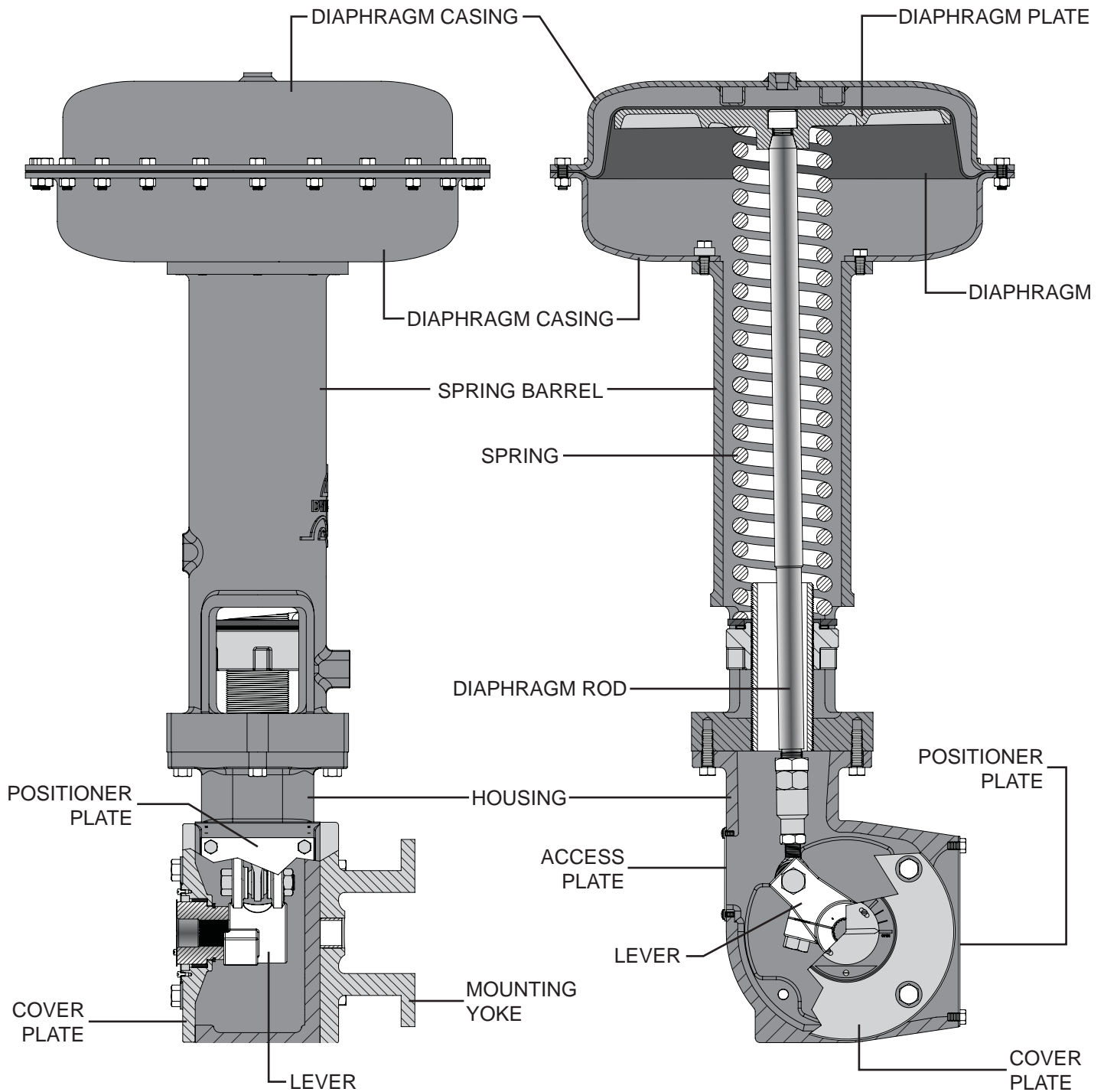


Figure 7 Size 070 - 220 Actuator Cross Section



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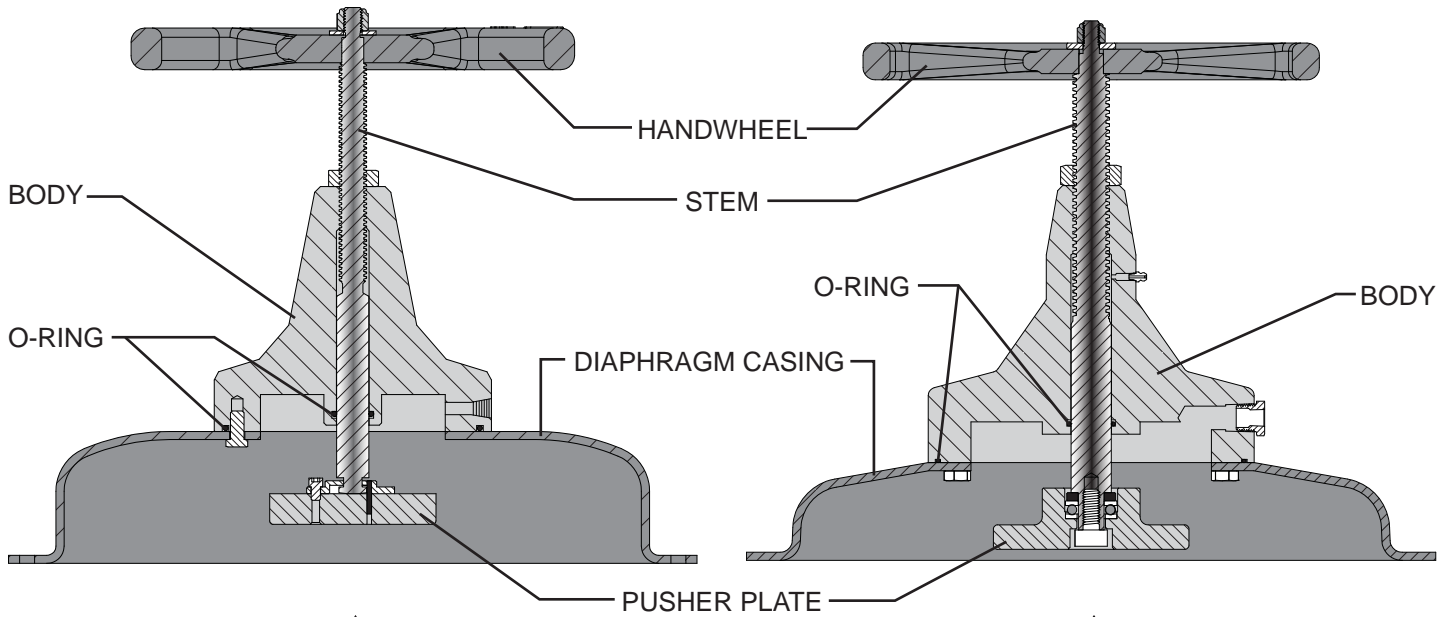


Figure 8 DFR 047-156 Top-Mounted Handwheel

Figure 9 DFR 220 Top-Mounted Handwheel

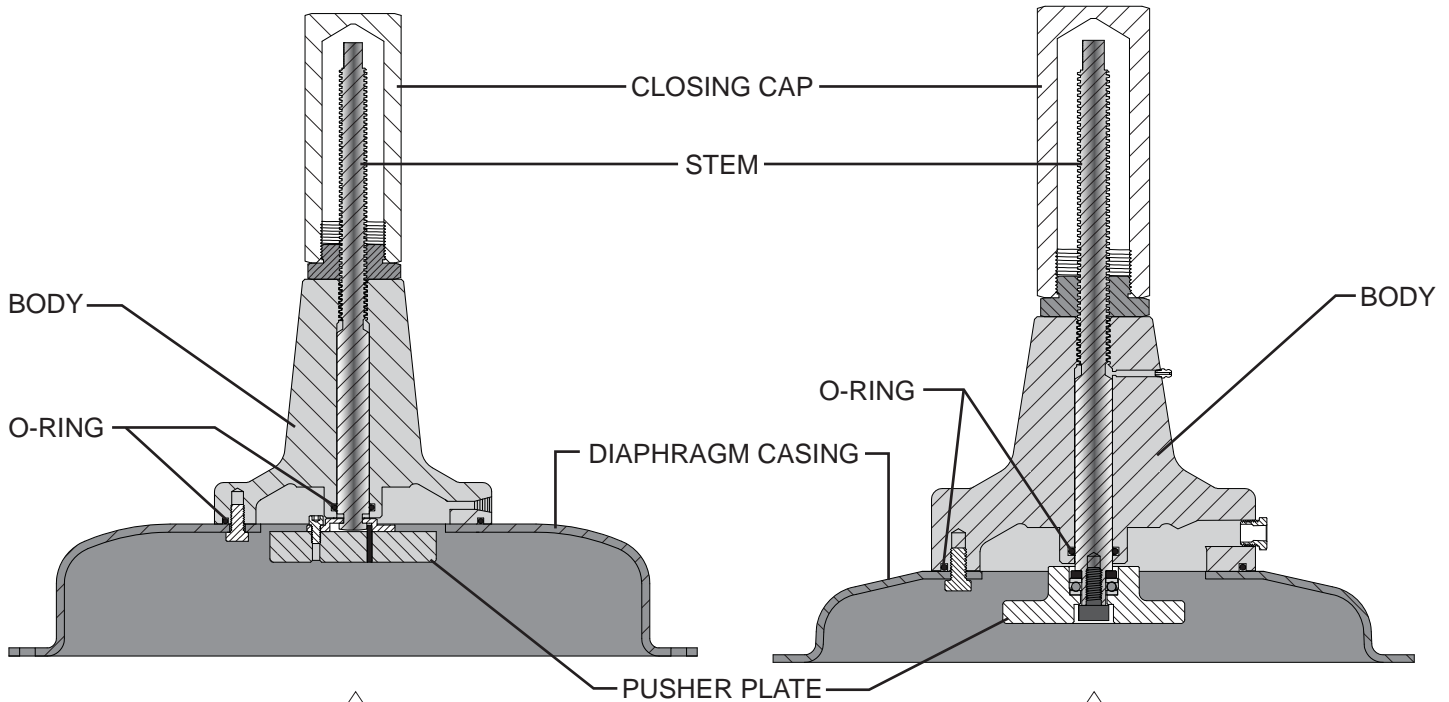


Figure 10 DFR 070-156 Adjustable Up Travel Stop

Figure 11 DFR 220 Adjustable Up Travel Stop

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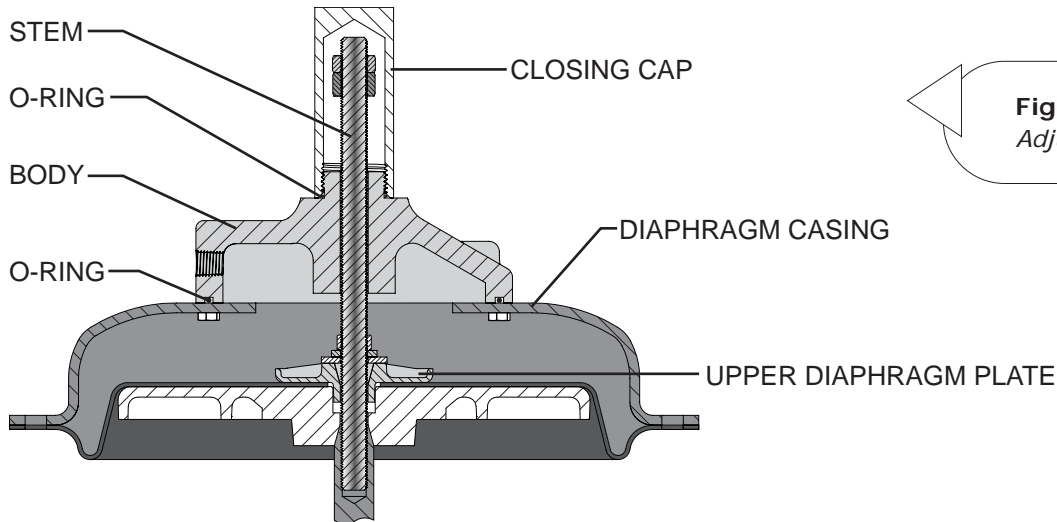


Figure 12 DFR 070-220
Adjustable Down Travel Stop

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Model DFR Valve Actuator

MODEL NUMBERING SYSTEM

SAMPLE PART NUMBER: DFR-070-C-06S1-D-RA1

ACTUATOR						070		
026	SIZE 026	047	SIZE 047	070	SIZE 070		156	SIZE 156
220	SIZE 220							
FAIL POSITION						C		
C	FAIL CLOSED	O	FAIL OPEN	N	NOT APPLICABLE			
PAINT						-		
-	DFPS-01 (STANDARD PAINT)			2	DFPS-02 (SEVERE SERVICE PAINT)			
3	DFPS-03 (HI-TEMP PAINT)							
SHAFT CONNECTION SIZE						06		
04	1/2 INCH	05	5/8 INCH	06	3/4 INCH		07	7/8 INCH
08	1 INCH	10	1-1/4 INCH	12	1-1/2 INCH		14	1-3/4 INCH
16	2 INCH							
SHAFT CONNECTION TYPE						S		
S	SPLINED (STANDARD)							
OPERATING PRESSURE RANGE / CASING NPT CONNECTION SIZE						1		
1	0-18 PSIG / 1/4" NPT	6	0-18 PSIG / 1/2" NPT	5	0-18 PSIG / 3/4" NPT		3	0-33 PSIG / 1/4" NPT
9	0-33 PSIG / 1/2" NPT	7	0-33 PSIG / 3/4" NPT	0	3-27 PSIG / 1/4" NPT		A	3-27 PSIG / 1/2" NPT
B	3-27 PSIG / 3/4" NPT							
OPTIONS						-		
-	STANDARD			S	SST BOLTING			
SPRING (REFER TO TABLES 5-7 FOR RANGE AND FAIL POSITION)						D		
A	16A4660X01D			B	16A4659X01D			
C	10B1524X01D			D	1P63712708D			
E	1L21732704D			F	1K16282708D			
G	1R67602708D			H	10B1525X01D			
I	1L21742704D			K	1K16272708D			
HANDWHEELS / TRAVEL STOPS						-		
-	NONE (STANDARD)			D	ADJUSTABLE DOWN STOP (DFR 070-220)			
U	ADJUSTABLE UP STOP (DFR 070-220)			T	TOP-MOUNTED HANDWHEEL (DFR 047-220)			
MOUNTING						RA1		
R	RIGHT HAND MOUNT			L	LEFT HAND MOUNT			
A	STYLE A, B, C, D - REFER TO FIGURE 12							
1	POSITION A, B, C, D - REFER TO FIGURE 12 (RIGHT HAND POSITION 1 IS STANDARD)							
N	NOT APPLICABLE							

DFR -

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