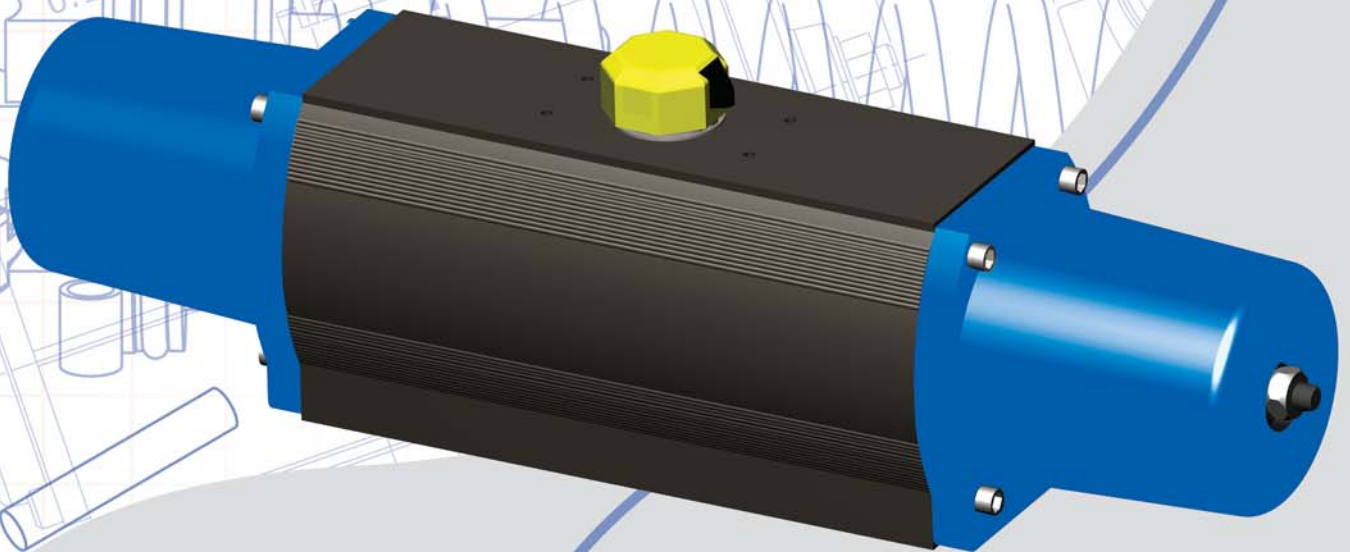


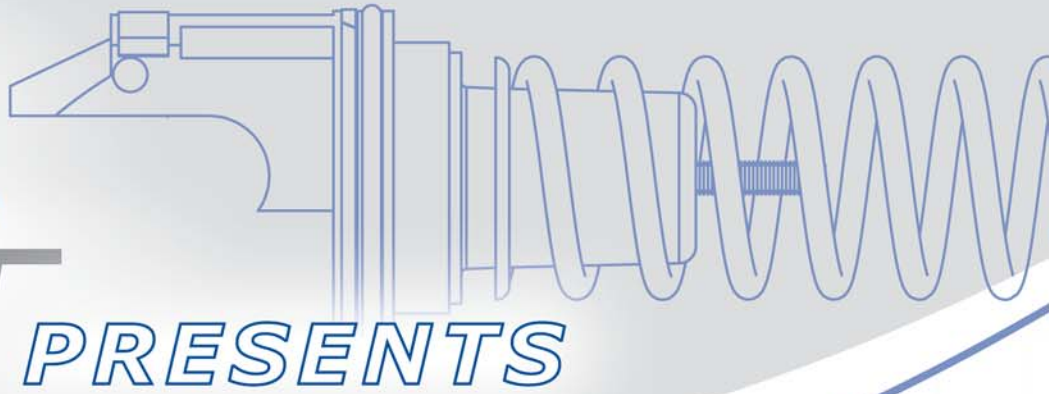


PRESENTS

# DMM FORCE

**Scotch Yoke Pneumatic Actuators**





**PRESENTS**

## FEATURES

### Configuration

D-Force actuators are available in a double acting (DDA) and spring return (DSR) configuration.

### Multiple Operating Ranges

The D-Force series of actuator provides for a multitude of operating ranges.

### Compact Design

D-Force actuators are smaller than rack and pinion actuators of the same or lower torque.

### Superior Construction

These actuators are constructed with hard anodized aluminum housing for long cylinder life and corrosion resistance.

### Splined Shaft

D-Force actuators are constructed using one piece splined drive shafts designed for blow-out prevention.

### Low and High

#### Temperature Configurations

Both the double acting (DDA) and spring return (DSR) D-Force models are available in a low and high temperature configuration.

### Externally Adjustable Travel Stops

All D-Force travel stops are easily accessible from the outside of the actuator without the need to remove a panel or cover.

### Torque Ranges

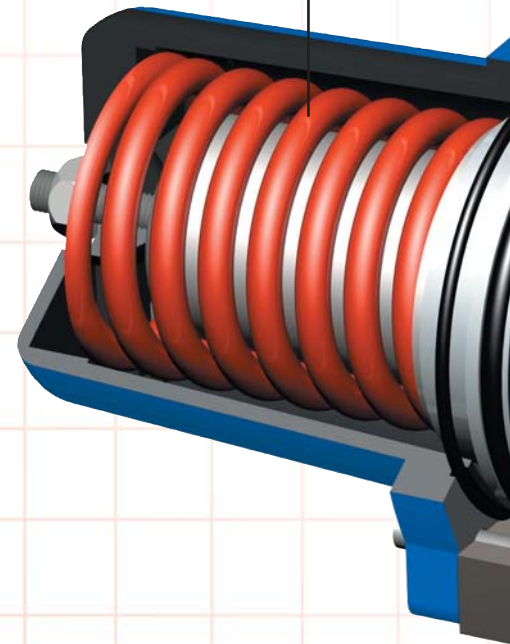
DDA and DSR model actuators offer a wide variety of torque ranges. For more information on torque ranges, see pages 5 and 6.

### High Quality Standards

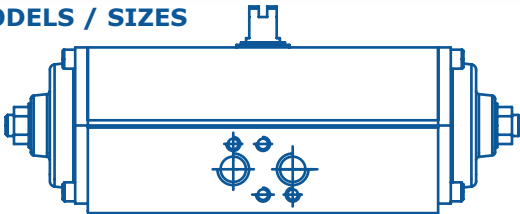
All D-Force actuators are manufactured to the same quality standards that can be expected from all Dyna-Flo products.

### Springs

Epoxy Coated  
Carbon Steel  
(Key 23)

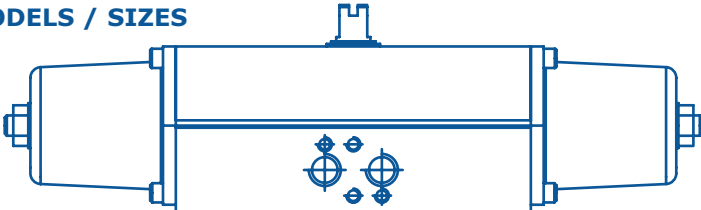


### MODELS / SIZES



Model DDA50  
Model DDA65  
Model DDA80  
Model DDA100  
Model DDA125  
Model DDA140  
Model DDA160  
Model DDA210

### MODELS / SIZES



Model DSR50  
Model DSR65  
Model DSR80  
Model DSR100  
Model DSR125  
Model DSR140  
Model DSR160  
Model DSR210

# D<sup>M</sup> FORCE

## Scotch Yoke Pneumatic Actuators

The Dyna-Flo D-Force actuator is a rugged dual piston scotch yoke actuator designed specifically for automation of quarter turn valves. The torque curve closely matches the requirements of valves that have a lower running torque with higher breakout and re-seat torques. The compact design also makes it a good choice for almost any application where space is limited. Check out the features for more details!

### SPECIFICATIONS

#### Material Temperature Capabilities

Standard: -4 - 194°F (-20 - 90°C)

Low Temperature: -40 - 230°F (-40 - 110°C)

High Temperature: 32 - 356°F (0 - 180°C)

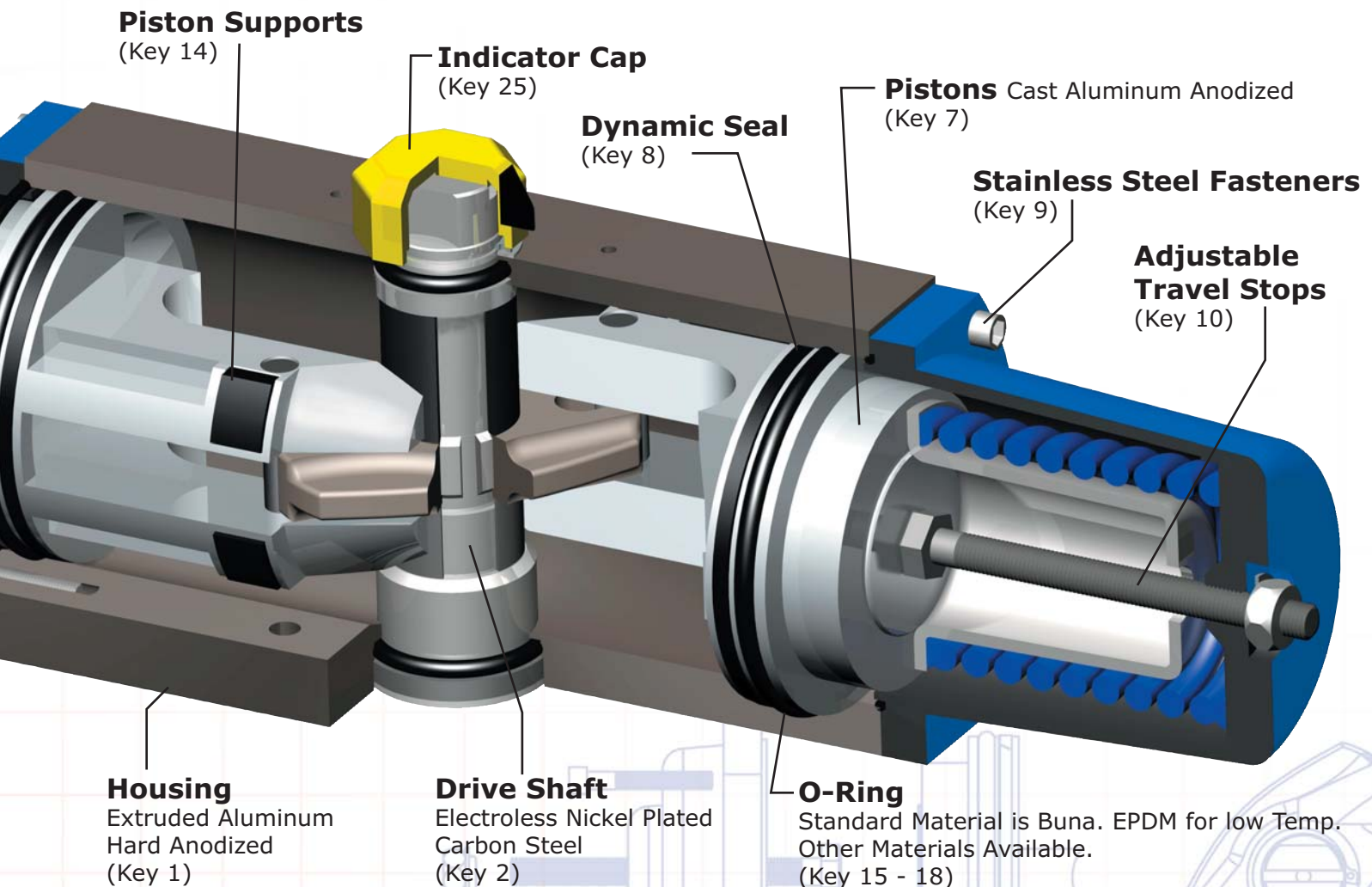
#### Pressure Range

40 Psi - 143 Psi (276 kPa - 986 kPa)

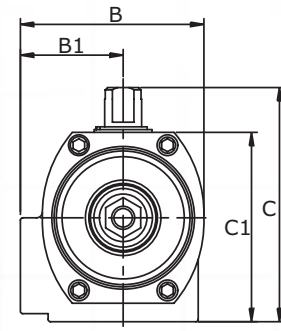
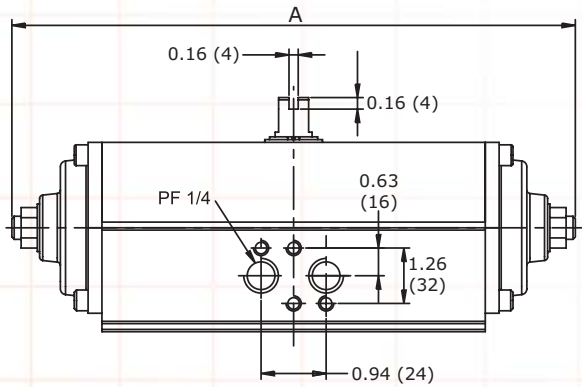
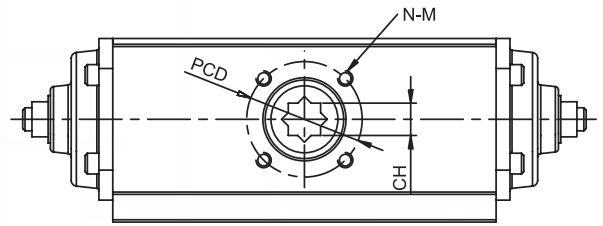
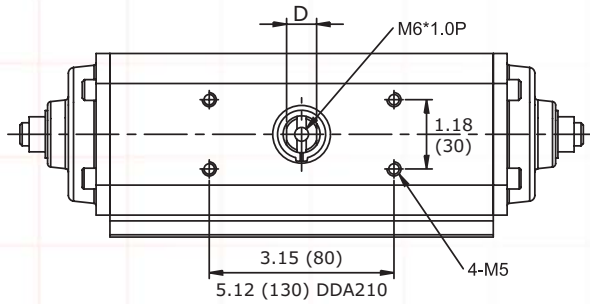
Maximum Working Pressure: 143 Psi (1000 kPa)

#### Tubing Connection Size

1/4 inch NPT



### Model DDA50 - DDA210 Dimensions

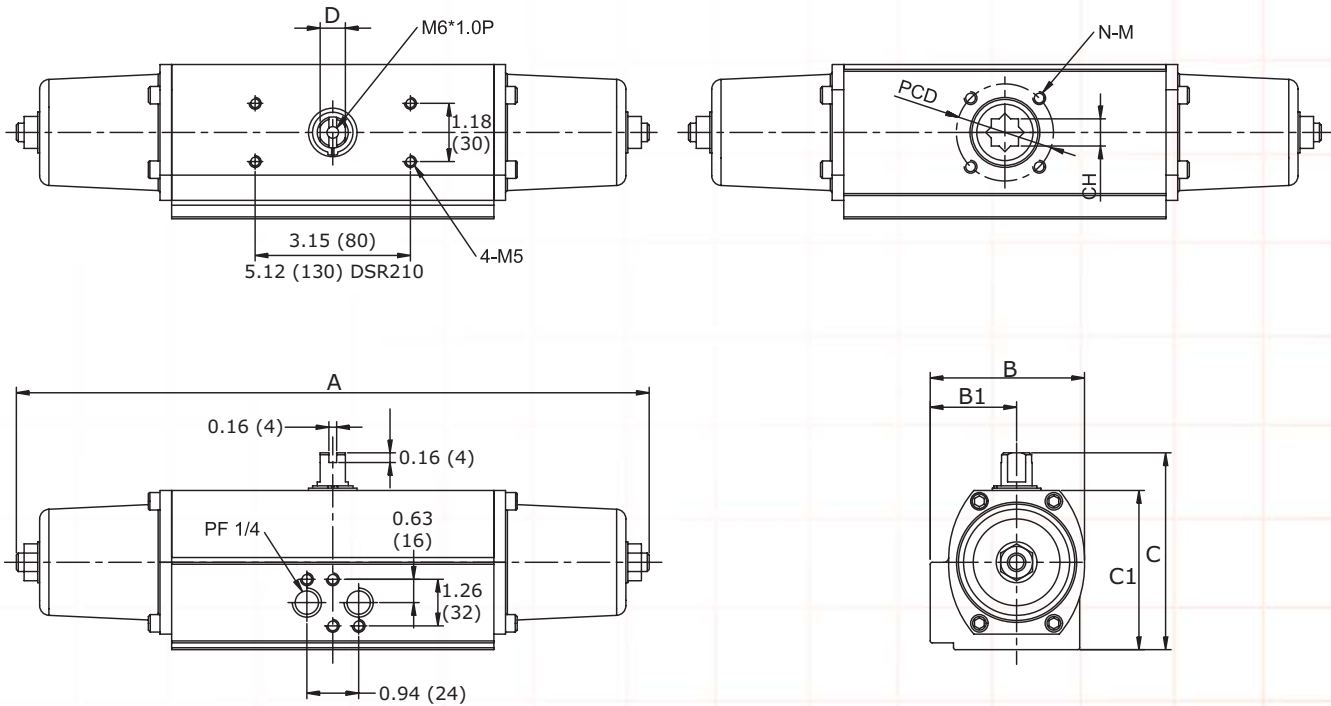


### Double Acting Type: Model DDA50 - DDA210 Dimensions and Weight

Size inch (mm)

Key	DDA50	DDA65	DDA80	DDA100	DDA125	DDA140	DDA160	DDA210
A	7.40 (188)	9.21 (234)	11.23 (286)	13.54 (344)	17.44 (443)	19.13 (486)	22.76 (578)	24.40 (620)
B	2.72 (69)	3.27 (83)	3.86 (98)	4.49 (114)	5.35 (136)	6.22 (158)	6.97 (177)	9.10 (230)
B1	1.57 (40)	1.81 (46)	2.21 (56)	2.44 (62)	2.68 (68)	3.11 (79)	3.50 (89)	4.33 (110)
C	3.43 (87)	4.25 (108)	4.84 (123)	5.63 (143)	6.46 (164)	7.09 (180)	8.27 (210)	11.02 (280)
C1	2.64 (67)	3.39 (86)	4.06 (103)	4.84 (123)	5.67 (144)	6.30 (160)	7.48 (190)	10.28 (261)
D	0.43 (11)	0.51 (13)	0.67 (17)	0.87 (22)	0.87 (22)	0.87 (22)	1.26 (32)	1.42 (36)
IOS	F03/F05	F05/F07	F07	F07/F10	F07/F10	F10/F12	F10/F12	F16
CH	0.43 X 0.43 (11 X 11)	0.55 X 0.55 (14 X 14)	0.67 X 0.67 (17 X 17)	0.87 X 0.87 (22 X 22)	0.87 X 0.87 (22 X 22)	1.06 X 1.06 (27 X 27)	1.42 X 1.42 (36 X 36)	1.42 X 1.42 (36 X 36)
DEPTH	0.51 (13)	0.67 (17)	0.78 (19)	1.02 (26)	1.02 (26)	1.18 (30)	1.65 (42)	1.97 (50)
IOS	-	-	-	-	-	-	F14	F16
CH	-	-	-	-	-	-	1.06 X 1.06 (27 X 27)	1.81 X 1.81 (46 X 46)
DEPTH	-	-	-	-	-	-	1.65 (42)	2.36 (60)
PCD	1.42/1.97 (36/50)	1.97/2.76 (50/70)	2.76 (70)	2.76/4.02 (70/102)	2.76/4.02 (70/102)	4.02/4.92 (102/125)	4.02/5.51 (102/140)	6.50 (165)
N-M	4-M5/M6	4-M6/M8	4-M8	4-M8/M10	4-M8/M10	4-M10/M12	4-M10/M16	4-M20
Weight	3 lb (2 kg)	6 lb (3 kg)	9 lb (4 kg)	15 lb (7 kg)	24 lb (11 kg)	39 lb (18 kg)	55 lb (25 kg)	98 lb (44.5 kg)

## Model DSR50 - DSR210 Dimensions



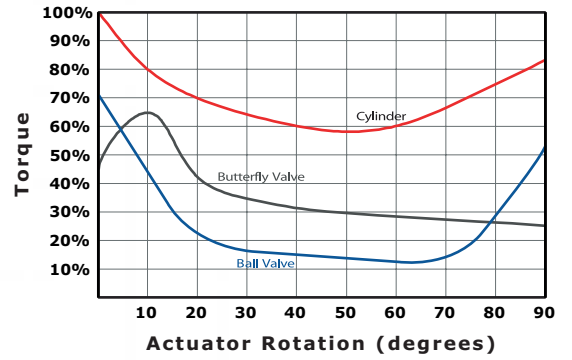
## Fail Safe Type: Model DSR50 - DSR210 Dimensions and Weight

Size inch (mm)

Key	DSR50	DSR65	DSR80	DSR100	DSR125	DSR140	DSR160	DSR210
A	10.16 (258)	12.60 (320)	16.46 (418)	19.92 (506)	27.32 (694)	28.19 (716)	32.13 (816)	38.59 (980)
B	2.72 (69)	3.27 (83)	3.86 (98)	4.49 (114)	5.35 (136)	6.22 (158)	6.97 (177)	9.10 (230)
B1	1.57 (40)	1.81 (46)	2.21 (56)	2.44 (62)	2.68 (68)	3.11 (79)	3.50 (89)	4.33 (110)
C	3.43 (87)	4.25 (108)	4.84 (123)	5.63 (143)	6.46 (164)	7.09 (180)	8.27 (210)	11.02 (280)
C1	2.64 (67)	3.39 (86)	4.06 (103)	4.84 (123)	5.67 (144)	6.30 (160)	7.48 (190)	10.28 (261)
D	0.43 (11)	0.51 (13)	0.67 (17)	0.87 (22)	0.87 (22)	0.87 (22)	1.26 (32)	1.42 (36)
IOS	F03/F05	F05/F07	F07	F07/F10	F07/F10	F10/F12	F10/F12	F16
CH	0.43X0.43 (11 X 11)	0.55X0.55 (14 X 14)	0.67X0.67 (17 X 17)	0.87X0.87 (22 X 22)	0.87X0.87 (22 X 22)	1.06X1.06 (27 X 27)	1.42X1.42 (36 X 36)	1.42 X 1.42 (36 X 36)
DEPTH	0.51 (13)	0.67 (17)	0.78 (19)	1.02 (26)	1.02 (26)	1.18 (30)	1.65 (42)	1.97 (50)
IOS	-	-	-	-	-	-	F14	F16
CH	-	-	-	-	-	-	1.42 X 1.42 (36 X 36)	1.81 X 1.81 (46 X 46)
DEPTH	-	-	-	-	-	-	1.65 (42)	2.36 (60)
PCD	1.42/1.97 (36/50)	1.97/2.76 (50/70)	2.76 (70)	2.76/4.02 (70/102)	2.76/4.02 (70/102)	4.02/4.92 (102/125)	4.02/5.51 (102/140)	6.50 (165)
N-M	4-M5/M6	4-M6/M8	4-M8	4-M8/M10	4-M8/M10	4-M10/M12	4-M10/M16	4-M20
Weight	4 lb (2 kg)	7 lb (3 kg)	12 lb (5 kg)	21 lb (10 kg)	38 lb (17 kg)	52 lb (24 kg)	79 lb (36 kg)	160 lb (72.5 kg)



### Torque Curve Chart



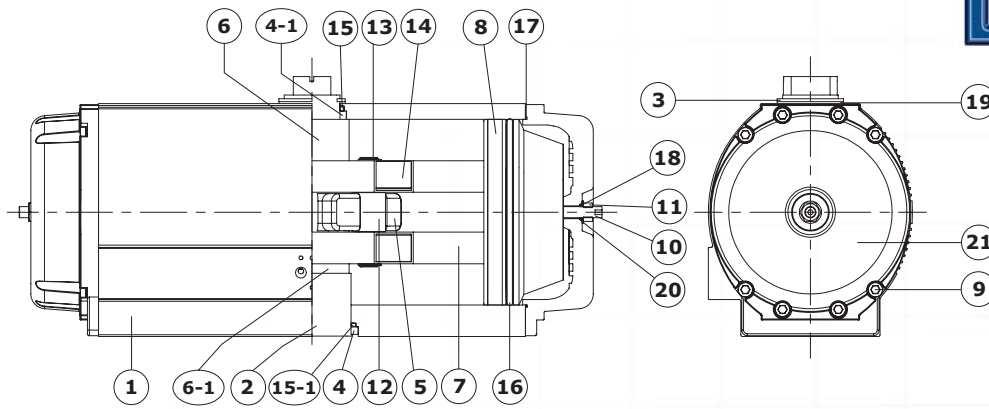
#### Model DDA50 - DDA210 Torque Table lbf-in (N-m)

Model Number	Air	40 Psi / 300 kPa	60 Psi / 400 kPa	80 Psi / 500 kPa	100 Psi / 600 kPa	110 Psi / 700 kPa	120 Psi / 800 kPa
DDA50	Start	257 (29)	381 (43)	513 (58)	655 (74)	717 (81)	779 (88)
	End	195 (22)	292 (33)	389 (44)	487 (55)	531 (60)	584 (66)
DDA65	Start	513 (58)	779 (88)	1,036 (117)	1,301 (147)	1,434 (162)	1,558 (176)
	End	389 (44)	584 (66)	779 (88)	974 (110)	1,788 (202)	1,168 (132)
DDA80	Start	1,027 (116)	1,558 (176)	2,080 (235)	2,584 (292)	2,868 (324)	3,115 (352)
	End	726 (82)	1,097 (124)	1,549 (175)	1,956 (221)	2,151 (243)	2,345 (265)
DDA100	Start	2,071 (234)	3,115 (352)	4,133 (467)	5,231 (591)	5,744 (649)	8,072 (912)
	End	1,549 (175)	2,345 (265)	3,115 (352)	3,921 (443)	4,726 (534)	4,682 (529)
DDA125	Start	3,372 (381)	5,142 (581)	6,443 (728)	7,921 (895)	8,674 (980)	9,444 (1,067)
	End	3,036 (343)	4,549 (514)	5,824 (658)	7,302 (825)	7,992 (903)	8,709 (984)
DDA140	Start	5,036 (569)	6,514 (736)	8,532 (964)	11,550 (1,305)	12,072 (1,364)	13,241 (1,496)
	End	3,903 (441)	5,603 (633)	6,983 (789)	10,488 (1,185)	10,851 (1,226)	11,533 (1,303)
DDA160	Start	7,886 (891)	10,214 (1,154)	13,373 (1,511)	18,109 (2,046)	18,914 (2,137)	20,737 (2,343)
	End	6,125 (692)	8,789 (993)	10,940 (1,236)	16,427 (1,856)	17,002 (1,921)	18,100 (2,045)
DDA210	Start	15,949 (1,802)	25,526 (2,884)	32,013 (3,617)	39,899 (4,508)	-	-
	End	13,453 (1,520)	19,604 (2,215)	27,163 (3,069)	34,101 (3,853)	-	-

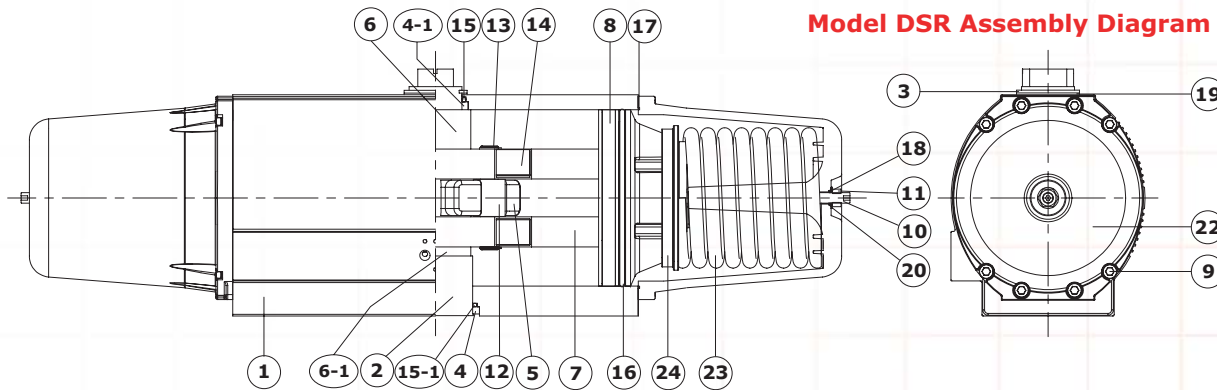
#### Model DSR50 - DSR210 Torque Table lbf-in (N-m)

Model Number		40 Psi / 280 kPa		60 Psi / 420 kPa		80 Psi / 560 kPa	
		Spring	Air	Spring	Air	Spring	Air
DSR50	Start	133 (15)	133 (15)	195 (22)	195 (22)	266 (30)	266 (30)
	End	89 (10)	89 (10)	133 (15)	133 (15)	177 (20)	177 (20)
DSR65	Start	266 (30)	266 (30)	398 (45)	398 (45)	531 (60)	531 (60)
	End	177 (20)	177 (20)	266 (30)	266 (30)	354 (40)	354 (40)
DSR80	Start	531 (60)	531 (60)	797 (90)	797 (90)	1,062 (120)	1,062 (120)
	End	354 (40)	354 (40)	531 (60)	531 (60)	708 (80)	708 (80)
DSR100	Start	1,062 (120)	1,062 (120)	1,593 (180)	1,593 (180)	2,124 (240)	2,124 (240)
	End	708 (80)	708 (80)	1,062 (120)	1,062 (120)	1,416 (160)	1,416 (160)
DSR125	Start	2,478 (280)	2,478 (280)	3,009 (340)	3,009 (340)	4,248 (480)	4,248 (480)
	End	1,151 (130)	1,151 (130)	1,770 (200)	1,770 (200)	2,390 (270)	2,390 (270)
DSR140	Start	3,186 (360)	3,186 (360)	4,602 (520)	4,602 (520)	6,019 (680)	6,019 (680)
	End	2,478 (280)	2,478 (280)	4,248 (480)	4,248 (480)	4,248 (480)	4,248 (480)
DSR160	Start	4,992 (564)	4,992 (564)	7,213 (815)	7,213 (815)	9,435 (1,066)	9,435 (1,066)
	End	3,885 (439)	3,885 (439)	6,656 (752)	6,656 (752)	6,656 (752)	6,656 (752)
DSR210	Start	10,621 (1,200)	10,621 (1,200)	14,338 (1,620)	14,338 (1,620)	19,206 (2,170)	19,206 (2,170)
	End	5,930 (670)	5,930 (670)	9,293 (1,050)	9,293 (1,050)	12,568 (1,420)	12,568 (1,420)

## Model DDA Assembly Diagram



## Model DSR Assembly Diagram



### Air Consumption Formulas

Double Acting Cylinder (DDA Series)

$$V = (B + A) \times \left(\frac{P+1}{1}\right) \times N$$

Spring Return Cylinder (DSR Series)

$$V = B \times \left(\frac{P+1}{1}\right) \times N$$

V = Air Consumption (Liter)

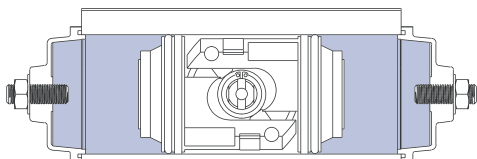
P = Supply Air Pressure (kgf/cm<sup>2</sup>)

A, B = Cylinder Volume (Liters)

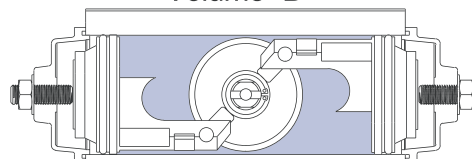
N = Operation Time

### Model DDA and DSR Cylinder Volume Diagrams

Volume "A"

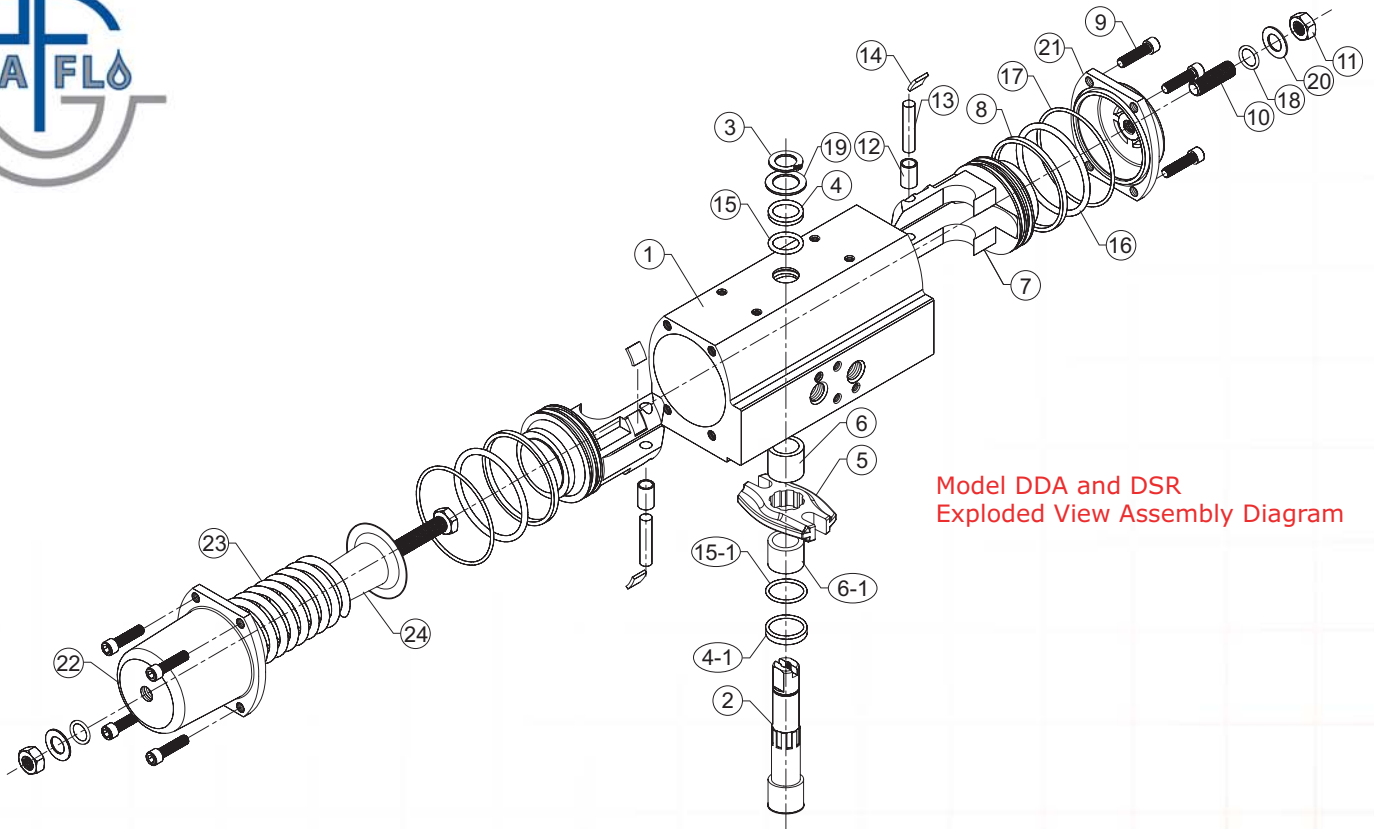


Volume "B"



### D-Force Model Sizes and Cylinder Volumes (see figure above)

Model and Size		Cylinder Volume in <sup>3</sup> (Liters)	
		Volume "A"	Volume "B"
DDA50	DSR50	7.9 (0.13)	6.7 (0.11)
DDA65	DSR65	15.3 (0.25)	14.6 (0.24)
DDA80	DSR80	33.0 (0.54)	29.3 (0.48)
DDA100	DSR100	59.2 (0.97)	52.5 (0.86)
DDA125	DSR125	108.6 (1.78)	102.5 (1.68)
DDA140	DSR140	167.2 (2.74)	149.5 (2.45)
DDA160	DSR160	257.5 (4.22)	228.2 (3.74)
DDA210	DSR210	608.4 (9.97)	377.7 (6.19)



Model DDA and DSR  
Exploded View Assembly Diagram

### Model DDA and DSR Parts and Materials List

Key	Description	Material	Key	Description	Material
1	Housing	Extruded Aluminum Alloy	13	Pin	Carbon Steel
2	Shaft	Nickel Plated Carbon Steel	14	Piston Support	PTFE
3	C-Ring	Stainless Steel	15	O-Ring #1	NBR (Buna) / EPDM / Viton
4	Upper Oilless Bearing	Sintered Oilless Bearing	15-1	O-Ring #2	NBR (Buna) / EPDM / Viton
4-1	Lower Oilless Bearing	Sintered Oilless Bearing	16	O-Ring #3	NBR (Buna) / EPDM / Viton
5	Crank	Carbon Steel	17	O-Ring #4	NBR (Buna) / EPDM / Viton
6	Upper Guide Ring	PTFE	18	O-Ring #5	NBR (Buna) / EPDM / Viton
6-1	Lower Guide Ring	PTFE	19	Washer #1	Stainless Steel
7	Piston	Nylon / Die Cast Aluminum Alloy	20	Washer #2	Stainless Steel
8	Dynamic Seal	PTFE	21	End Cover (DDA Model)	Die Cast Aluminum Alloy
9	Socket Screw	Stainless Steel	22	End Cover (DSR Model)	Die Cast Aluminum Alloy
10	Adjuster Bolt	Stainless Steel	23	Spring (DSR Model)	High Alloy Spring Steel
11	Adjuster Nut	Stainless Steel	24	Spring Pocket (DSR Model)	Zinc Plated Carbon Steel
12	Bearing Bushing	Sintered Oilless Bearing	25	Indicator Cap	Plastic

### Our Commitment of Quality

Dyna-Flo is committed to continuous improvement. All efforts have been taken to maximize the accuracy of this information. Without notification, product specifications and designs may be modified at any time. The issue of this document is for information only, and does not imply suitability, a warranty, or guarantee for a specific service.



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April 2008 Edition

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