

FlowLine



Series 20/21

**Rack and Pinion Actuators
147 to 100,000 Inch Pounds**

FEATURES

Introduction

Flow Line **Series 20 doubleacting** and **Series 21 springreturn** actuators are the latest and most technically advanced rack and pinion actuators on the market today. The Series 20/21 incorporates 17 sizes ranging in torque from 147 to 100,000 inch pounds. Features such as a fine tooth rack and pinion, internal and external travel stops, lifting eyes on larger sizes, and 304 SS hardware, all come from the continuing commitment of Flow Line Controls to innovate and provide the highest quality for our customers.

Body

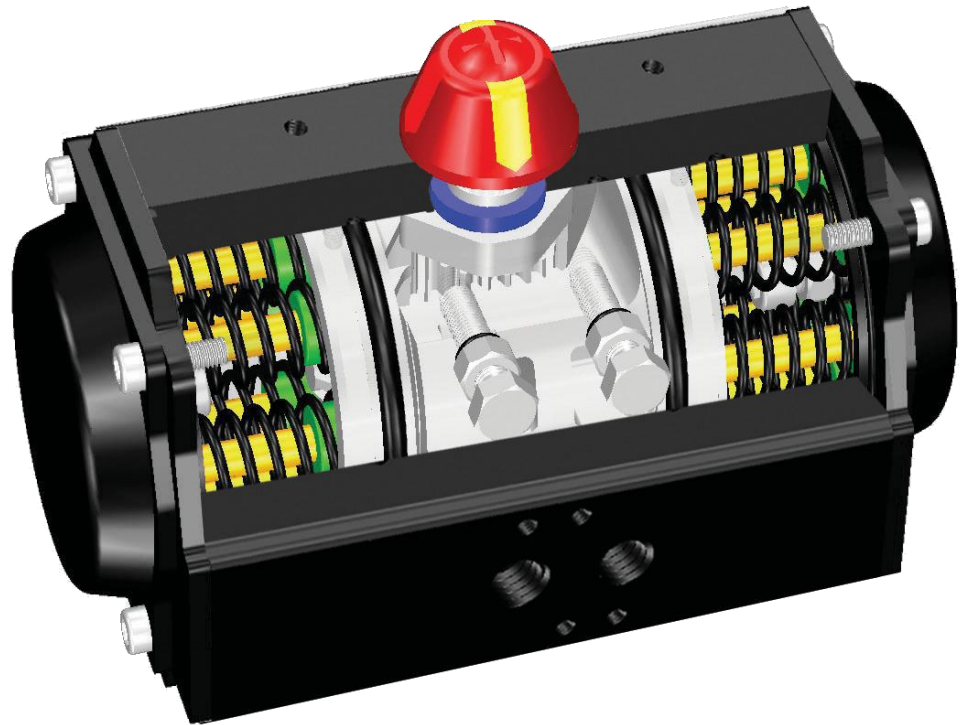
- Extruded Aluminum body is internally machined, lapped and honed to exacting tolerances
- All internal and exterior surfaces are hard anodized and 2-part polyester coated
- Internal porting is standard, eliminating any need for external tubing
- Mounting is accomplished with dual ISO drilling on all sizes and with three ISO drillings on six models
- Extra deep end cap bolt holes allow for safe spring removal and installation

Pinion

- Pinions are machined from a single piece of hardened steel
- Fine-tooth gears eliminate hysteresis and lost motion typical with wide-tooth designs
- ISO female drives are standard on all models
- Internally machined piston guide prevents vertical piston movement
- Bottom entry pinion provides anti-blowout protection
- All Pinions are electroless nickel plated

Pistons

- Die cast aluminum pistons incorporate three heavy duty wear pads
- An optional fourth wear pad is incorporated for high cycle operations
- Piston o-ring is held in place by a precisely machined groove matching the o-ring diameter
- Internal RTFE piston guide precisely aligns the piston to the pinion to prevent piston roll



EndCaps

- Die cast aluminum end caps are 2-part polyester powder coated inside and out for maximum corrosion resistance
- Precise machining of the end caps leaves no room for movement on the actuator body
- End cap o-rings are captive on all actuator models

AirSupply

- All actuator models are equipped with 1/4" NPT supply ports
- Supply pressure to all models of actuators is rated up to 120 psi air, hydraulic oil or water depending on seals used

TravelStops

- Internal travel stops are integral with the pinion and allow + or - 5 degrees adjustment at both ends of stroke
- Optional travel stops are available to limit rotation between 45 and 90 degrees

BoltsandFasteners

- 300 series stainless steel is standard on all actuators

AccessoriesandValve Mounting

- Namur VDI/VDE 3845 is standard throughout the size range
- ISO 5211 is standard mounting for all actuators throughout the size range
- Special order mounting is available upon request

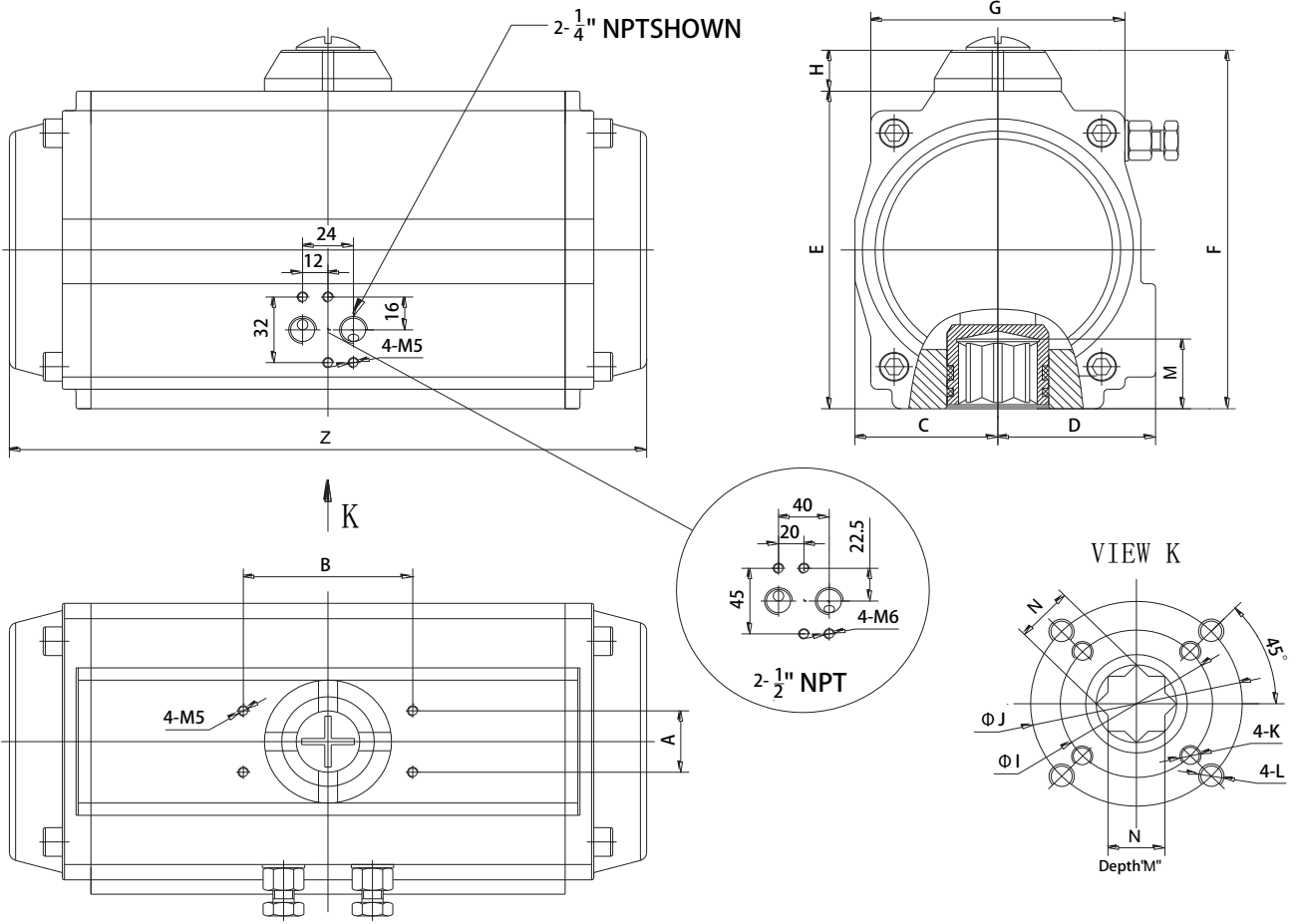
Springs

- Springs are epoxy coated for corrosion resistance
- Spring retaining rod is stainless steel with stainless steel fasteners

PositionIndicator Functions

- as an indicator for standard 2-way valves and also for 3-way applications with a simple change of built-in indicator tabs

ENGINEERING

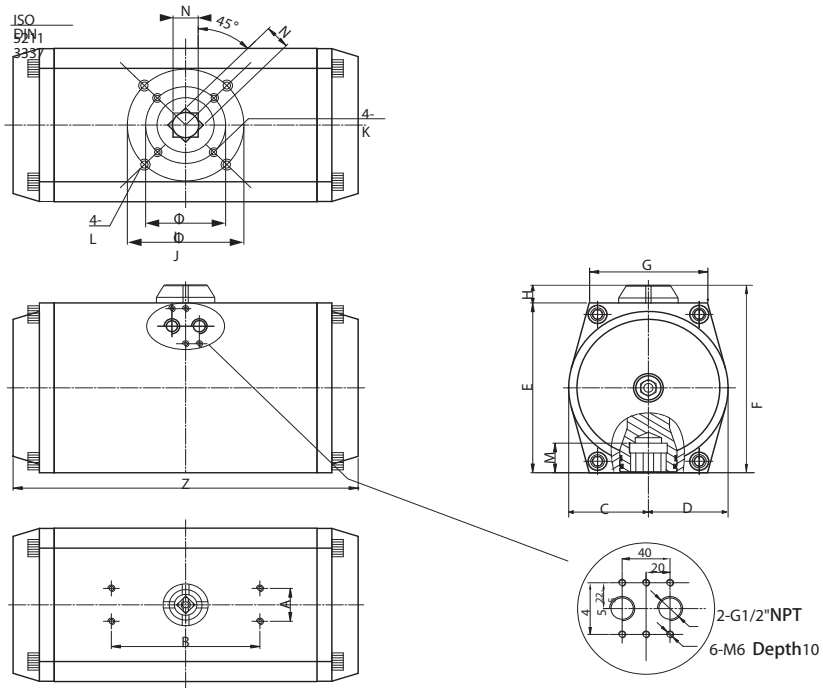


Flowline Model	A	B	C	D	E	F	G	H	I*	J*	K*	L*	M	N	Z	AIR
20-0050	1.18	3.15	1.12	1.44	2.36	2.79	2.05	0.79	1.417 (F03)	1.969 (F05)	M5x8	M6x10	0.55	0.43	4.72	1/4"NPT
20-0075	1.18	3.15	1.18	1.63	2.83	3.62	2.56	0.79	1.417 (F03)	1.969 (F05)	M5x8	M6X10	0.55	0.43	5.79	1/4"NPT
20-0075	1.18	3.15	1.18	1.63	2.83	3.62	2.56	0.79	1.65 (F04)		M5x10		0.55	0.43	5.79	1/4"NPT
20-0100	1.18	3.15	1.42	1.85	3.44	3.83	2.83	0.79	1.969 (F05)		M6x10		0.71	0.55	6.61	1/4"NPT
20-0100	1.18	3.15	1.42	1.85	3.44	3.83	2.83	0.79	1.65 (F04)	2.756 (F07)	M5x10	M8x12	0.71	0.55	6.61	1/4"NPT
20-0150	1.18	3.15	1.65	2.09	3.92	4.72	3.19	0.79	1.969 (F05)	2.756 (F07)	M6x10	M8X12	0.71	0.55	7.24	1/4"NPT
20-0200	1.18	3.15	1.81	2.24	4.28	5.09	3.62	0.79	1.969 (F05)	2.756 (F07)	M6x10	M8X12	0.83	0.67	8.03	1/4"NPT
20-0300	1.18	3.15	1.97	2.40	4.59	5.39	3.86	0.79	2.756 (F07)	4.016 (F10)	M8x12	M10X16	0.83	0.67	10.31	1/4"NPT
20-0400	1.18	3.15	2.26	2.52	5.24	6.06	4.31	0.79	2.756 (F07)	4.016 (F10)	M8x12	M10X16	1.02	0.87	10.55	1/4"NPT
20-0500	1.18	3.15	2.66	2.93	6.10	6.92	5.02	0.79	2.756 (F07)	4.016 (F10)	M8x12	M10X16	1.02	0.87	11.85	1/4"NPT
20-0600	1.18	3.15	2.95	3.03	6.77	7.59	5.41	0.79	4.016 (F10)	4.921 (F12)	M10x16	M12X20	1.22	1.06	15.51	1/4"NPT
20-0700	1.18	3.15	3.43	3.43	7.76	8.93	6.22	1.18	4.016 (F10)	4.921 (F12)	M10x16	M12X20	1.22	1.06	18.03	1/4"NPT
20-0800	1.18	5.12	4.06	4.06	9.06	10.27	7.44	1.18	4.016 (F10)	4.921 (F12)	M10x16	M12X20	1.57	1.42	20.79	1/4"NPT
20-0900	1.18	5.12	4.44	4.44	10.04	11.26	8.31	1.18	4.016 (F10)	5.512 (F14)	M10x16	M16X25	1.57	1.42	20.94	1/4"NPT
20-1000	1.18	5.12	5.12	5.12	11.38	12.67	9.65	1.18	4.016 (F10)	5.512 (F14)	M10x16	M16X25	1.97	1.81	23.70	1/4"NPT
20-2000	1.18	5.12	5.79	5.79	12.83	14.02	10.75	1.18		6.496 (F16)		M20X25	1.97	1.81	28.43	1/2"NPT

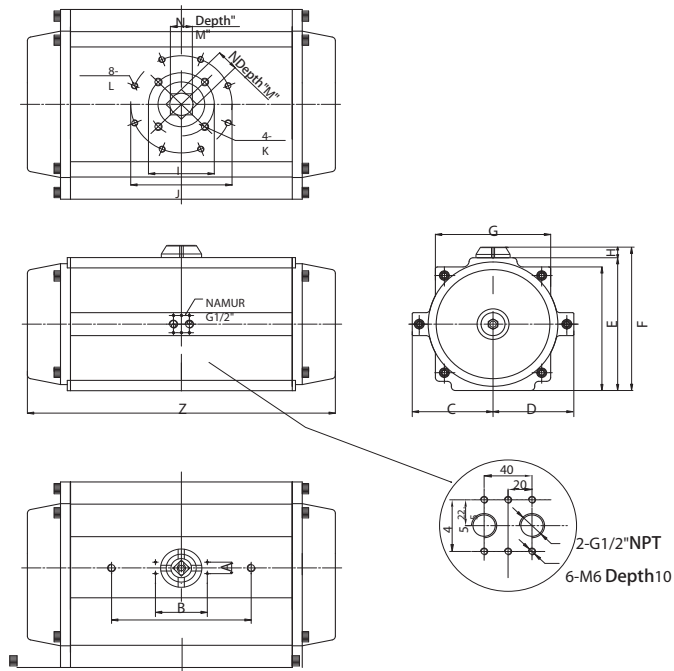
Dimension are in inches

ENGINEERING

3000 & 4000 Actuator



5000 Actuator



Flowline Model	A	B	C	D	E	F	G	H	I*	J*	K*	L*	M	N	Z	AIR
20-3000	1.18	5.12	6.39	6.39	13.70	14.88	7.72	1.18	6.496 (F16)	8.46(Φ215)	M20X25	M20X30	2.36	1.81	29.41	1/2"NPT
20-4000	1.18	5.12	7.48	7.48	16.06	17.24	8.66	1.18	6.496 (F16)	8.46(Φ215)	M20X25	M20X25	2.36	1.81	34.49	1/2"NPT
20-5000	1.18	5.12	10.16	10.16	18.33	19.51	12.99	1.18	6.496 (F16)	10.00 (F25)	M20X25	M16x25	2.36	2.17	36.30	1/2"NPT

Dimension are in inches

SPECIFICATIONS

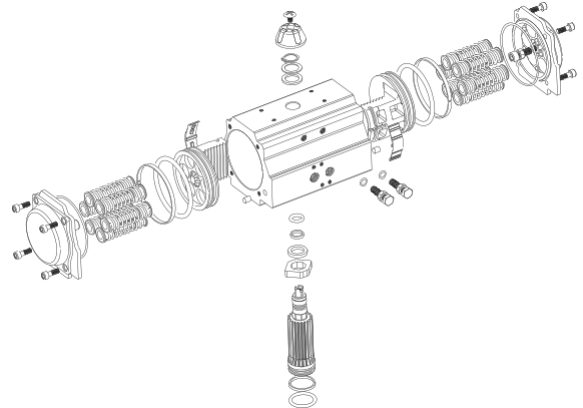
HOW TO ORDER

<p>Series</p> <p>20 - Double Act 21 - Spring Ret</p> <p>Size</p> <table border="0"> <tr><td>0050</td><td>0700</td></tr> <tr><td>0075</td><td>0800</td></tr> <tr><td>0100</td><td>0900</td></tr> <tr><td>0150</td><td>1000</td></tr> <tr><td>0200</td><td>2000</td></tr> <tr><td>0300</td><td>3000</td></tr> <tr><td>0400</td><td>4000</td></tr> <tr><td>0500</td><td>5000</td></tr> <tr><td>0600</td><td></td></tr> </table> <p>Rotation</p> <p>4 - 90° 6 - 120° 7 - 180°</p> <p>Direction</p> <p>1 - Standard Rotation 2 - Reverse Rotation 3 - 90 x 90 Position</p>	0050	0700	0075	0800	0100	0900	0150	1000	0200	2000	0300	3000	0400	4000	0500	5000	0600		<p>Seals</p> <p>1 - Standard +30°F to 176°F 2 - High Temperature -5°F to +300°F 3 - Low Temperature -80°F to +176°F</p> <p>Coatings</p> <p>0 - Standard (Black) 1 - FL-1 (Consult Factory for Optional Coatings) 2 - FL-2 (Consult Factory for Optional Coatings)</p> <p>Travel Stops</p> <p>0 - Standard + or -5° 1 - Extended 45° 2 - Extended 90°</p> <p>Mounting</p> <p>1 - "ISO" 2 - "K" 3 - "B"</p>	<p>Springs (total per actuator)</p> <p>0 - None (20 Series Only) 1 - 2 Springs 2 - 4 Springs 3 - 6 Springs 4 - 8 Springs 5 - 10 Springs 6 - 12 Springs 7 - Special</p>
0050	0700																			
0075	0800																			
0100	0900																			
0150	1000																			
0200	2000																			
0300	3000																			
0400	4000																			
0500	5000																			
0600																				

Example 800 inch lbs, 90 Degree Rotation, Std. Coating, Double Acting: Part Number 20-0600-4110010

Specifications

The actuator shall be rack and pinion design with two pistons and linear output torque throughout its rotation. The output shaft must travel a minimum of 90 degrees and have external adjustments for a minimum of 5 degrees of additional rotation at each end of travel. Additional internal factory-preset stops set to limit maximum travel if the external stops are not adjusted thus preventing damage to the actuator. The actuator piston and pinion gear shall be "fine tooth" construction with a three tooth engagement throughout the rotation. The output shaft and pinion shall be one-piece hardened steel with female drive conforming to ISO5211 square/star dimensions and the shaft accessory end conforming to Namur VDI/VDE 3845 dimensions. The actuator surface at the drive shaft shall have dimensions conforming to ISO5211 "F" flange sizes and the actuator's accessory mounting surface shall have dimensions conforming to Namur VDI/VDE 3845 specifications. The actuator shall be provided with a solenoid valve mounting surface conforming to Namur VDI/VDE 3845 dimensions. The actuator shall be provided with a 3-D visual indicator that does not have to be removed for the installation of monitoring equipment and control accessories. The actuator housing shall be hard coat anodized and polyester powder coated for corrosion resistance and durability. All trim/hardware shall be stainless steel. Springs shall be spring steel and coated for corrosion resistance. The springs shall be restrained in bobbins to prevent bending during operation and shall fit into pockets in the actuator end caps and pistons.



Description	Qty.	Material
Body	1	Extruded aluminum
End Caps	2	Die Cast Aluminum
Pinion	2	4140 Carbon Steel
Pistons	2	Die Cast Aluminum
Springs	8*	Spring Steel
Travel Stops	2	304 Stainless Steel
Position Indicator	1	Plastic ABS
Air Supply	2	Namur 1/4" & 1/2" NPT
Travel Stop	1	Steel alloy
Piston Guide Bearing	2	Plastic Polyoxymethylene
Piston Bearing	2	Plastic Polyoxymethylene
Piston O-ring	2	NBR, Silicon, Viton
Pinion Bearing	2	NBR, Silicon, Viton
Pinion O-ring	2	NBR, Silicon, Viton
Stop Screw	2	Stainless Steel 304
End Cap O-ring	2	NBR, Silicon, Viton

*All fasteners, washers, and clips are 304 stainless steel

* 8 springs, 4 per piston standard. Size 5000 has 12 springs

VERSATILITY



Series 21 spring return actuators are available through out the size range.



Series 50 solenoid valves are available in 1/8", 1/4", and 1/2"NPT.



Series 52 and 53 limit switches provide local and remote valve position.



Series 55 and 56 positioners are available with either a 3-15 psi or 4-20 MADC signal.



Series 20 and 21 actuators mount directly to ball valves conforming to ISO 5211. Bracket and couplers are available for other patterns.



Series 20 and 21 actuators mount directly to butterfly valves conforming to ISO 5211. Other mounting patterns are available.

Warranty

All products manufactured by Flow Line Controls are warranted against defects in material and workmanship for a period of 2 years from day of startup.

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Flow Line

PO Box 677, 110 Main Project Rd.
Schriever, LA 70395
Phone (985) 414-6004 fax (985) 414-6072
www.flowlinecontrols.com

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