V-9000 Series Rotary Motion Rack and Pinion Pneumatic Actuators for Butterfly Valves

Description

The V-9000 Series Rack and Pinion Pneumatic Actuators are designed for direct mounting on Johnson Controls® VF Series Butterfly Valves. The actuators are available in eight sizes with torque output capacities capable of automating VF Series Butterfly Valves up to 20 in. (508 mm) in size.

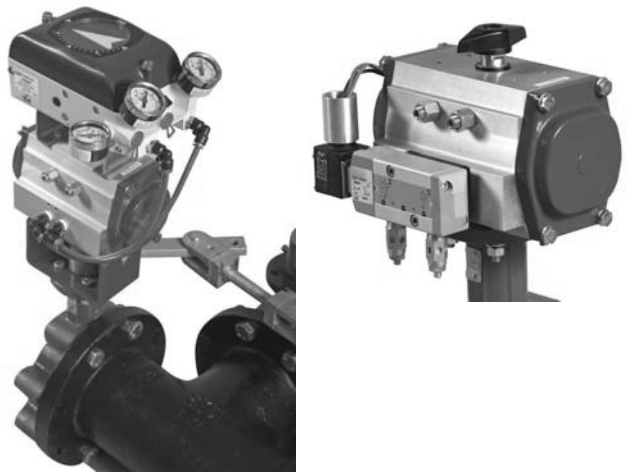
Refer to the *V-9000 Series Rotary Motion Rack and Pinion Pneumatic Actuators for Butterfly Valves (LIT-977260)* for important product application information.

Features

- compact modular design
- low-friction piston guides and rings
- built-in shaft position indicator and travel stops
- full range of modular add-on control accessories

Repair Information

If the V-9000 Series Pneumatic Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls representative.



V-9000 Series Rotary Motion Rack and Pinion Pneumatic Actuators for Butterfly Valves

Selection Charts

V-909x Series Actuator Torque Data (lb·in) and Ordering Data (Double Acting)

Code Number	Supply Pressure, psig (kPa)					VF Series Code Number[1]	Actuator Air Volume, cubic in.	Shipping Weight, lb
	40 (280)	60 (420)	80 (560)	100 (700)	120 (840)			
V-9092-1	145	221	297	373	449	-020	9.35	3.4
V-9093-1	351	536	721	906	1,091	-030	20.5	6.3
V-9094-1	493	753	1,013	1,272	1,532	-040	28.9	8.5
V-9094-2	1,058	1,615	2,171	2,728	3,285	-042	62.0	16.9
V-9096-1	2,797	4,270	5,742	7,214	8,687	-060	140.6	38.8
V-9097-1	5,783	8,826	11,870	14,914	17,957	-070	309.5	77.8
V-9098-1	14,211	21,691	29,171	36,650	44,130	-080	734.1	167.0

1. Refer to the ordering data templates in the *VF Series Standard-Pressure, Standard-Temperature Butterfly Valves Product Bulletin (LIT-977205P)* and the *VF Series High-Pressure, High-Temperature Butterfly Valves Product Bulletin (LIT-977208)* for full code numbers.

V-919x Series Actuator Torque Data (lb·in) and Ordering Data (Spring Return) (Part 1 of 2)

Code Number	Air Stroke Supply Pressure, psig (kPa)										Spring Stroke		Weight, lb
	40 (280)		60 (420)		80 (560)		100 (700)		120 (840)				
	NC[1] Start	NO[1] End	NC Start	NO End	NC Start	NO End	NC Start	NO End	NC Start	NO End	NO Start	NC End	
V-9193-12	210	167	395	352	580	537	765	722	950	907	184	141	6.0
V-9193-13	156	76	341	261	526	446	711	631	896	816	275	195	6.3
V-9193-14			281	176	466	361	651	546	836	731	360	255	6.6
V-9193-16					369	185	554	370	739	555	536	352	7.1
V-9194-12	310	232	570	492	830	752	1,089	1,011	1,349	1,271	261	183	8.0
V-9194-13	218	101	478	361	738	621	997	880	1,257	1,140	392	275	8.4
V-9194-14			386	231	646	491	905	750	1,165	1,010	522	367	8.8
V-9194-15			294	94	554	354	813	613	1,073	873	659	459	9.1
V-9194-16					462	229	721	488	981	748	784	551	9.5
V-9194-22	692	469	1,249	1,026	1,805	1,582	2,362	2,139	2,919	2,696	589	366	18.1
V-9194-23	509	174	1,066	731	1,622	1,287	2,179	1,844	2,736	2,401	884	549	18.8
V-9194-24			883	437	1,439	993	1,996	1,550	2,553	2,107	1,178	732	19.5
V-9194-25			700	142	1,256	698	1,813	1,255	2,370	1,812	1,473	915	20.3
V-9194-26					1,073	404	1,630	961	2,187	1,518	1,767	1,098	21.0
V-9195-13			1,357	733	2,099	1,475	2,841	2,217	3,583	2,959	1,419	795	22.1
V-9195-15					1,568	529	2,310	1,271	3,052	2,013	2,365	1,326	24.2

V-9000 Series Rotary Motion Rackand Pinion Pneumatic Actuators for Butterfly Valves (Continued)

V-919x Series Actuator Torque Data (lb·in) and Ordering Data (Spring Return) (Part 2 of 2)

Code Number	Air Stroke Supply Pressure, psig (kPa)										Spring Stroke		Weight, lb
	40 (280)		60 (420)		80 (560)		100 (700)		120 (840)				
	NC[1] Start	NO[1] End	NC Start	NO End	NC Start	NO End	NC Start	NO End	NC Start	NO End	NO Start	NC End	
V-9196-12	1,819	1,118	3,292	2,591	4,764	4,063	6,236	5,535	7,709	7,008	1,679	978	39.7
V-9196-13	1,399	349	2,872	1,822	4,344	3,294	5,816	4,766	7,289	6,239	2,448	1,398	42.1
V-9196-14			2,452	1,123	3,924	2,595	5,396	4,067	6,869	5,540	3,147	1,818	44.5
V-9196-15			2,030	353	3,502	1,825	4,974	3,297	6,447	4,770	3,917	2,240	46.8
V-9196-16					3,154	1,196	4,626	2,668	6,099	4,141	4,546	2,588	49.2
V-9197-12	3,833	2,508	6,876	5,551	9,920	8,595	12,964	11,639	16,007	14,682	3,275	1,950	75.1
V-9197-13	2,859	868	5,902	3,911	8,946	6,955	11,990	9,999	15,033	13,042	4,915	2,924	80.2
V-9197-14			4,930	2,275	7,974	5,319	11,018	8,363	14,061	11,406	6,551	3,896	85.2
V-9197-15			3,949	638	6,993	3,682	10,037	6,726	13,080	9,769	8,188	4,877	90.3
V-9197-16					6,022	2,031	9,066	5,075	12,109	8,118	9,839	5,848	95.3
V-9198-12	9,487	6,747	16,967	14,227	24,447	21,707	31,926	29,186	39,406	36,666	7,464	4,724	160.2
V-9198-13	7,125	3,015	14,605	10,495	22,085	17,975	29,564	25,454	37,044	32,934	11,196	7,086	168.3
V-9198-14			12,243	6,762	19,723	14,242	27,202	21,721	34,682	29,201	14,929	9,448	176.4
V-9198-15			9,880	3,030	17,360	10,510	24,839	17,989	32,319	25,469	18,661	11,811	184.5
V-9198-16					14,998	6,778	22,477	14,257	29,957	21,737	22,393	14,173	192.6

1. N.C. is the abbreviation for Normally Closed; N.O. is the abbreviation for Normally Open.

V-919x Series Ordering Data

Code Number	VF Series Code Number[1]	Total Actuator Air Volume Required for 90° Rotation, cubic in.	Total Number of Springs in Actuator[2]
V-9193-12	-320	32.6	4
V-9193-13	-330		6
V-9193-14	-340		8
V-9193-16	-360		12
V-9194-12	-420	45.9	4
V-9194-13	-430		6
V-9194-14	-440		8
V-9194-15	-450		10
V-9194-16	-460		12
V-9194-22	-422	95.5	4
V-9194-23	-432		6
V-9194-24	-442		8
V-9195-13	-530	130.8	6
V-9195-15	-550		10
V-9196-12	-620	259.6	4
V-9196-13	-630		6
V-9196-14	-640		8
V-9196-15	-650		10
V-9196-16	-660		12
V-9197-12	-720	450	4
V-9197-13	-730		6
V-9197-14	-740		8
V-9197-15	-750		10
V-9197-16	-760		12
V-9198-12	-820	900	4
V-9198-13	-830		6
V-9198-14	-840		8
V-9198-15	-850		10
V-9198-16	-860		12

1. Refer to the ordering data templates in the *VF Series Standard-Pressure, Standard-Temperature Butterfly Valves Product Bulletin (LIT-977205P)* and the *VF Series High-Pressure, High-Temperature Butterfly Valves Product Bulletin (LIT-977208)* for full code numbers.
2. The numbers listed are the total number of springs in the actuator; the last digit of the code number suffix indicates the number of springs per piston. There are two pistons per actuator.

V-9000 Series Rotary Motion Rackand Pinion Pneumatic Actuators for Butterfly Valves (Continued)

Accessories

Solenoid Valves Including Mounting Hardware

Code Number and Features		Description
V-9000-146[1]		120 VAC Solenoid Air Valve, Four-Way, for New Style V-9092 to V-9094-1 and V-9193 to V-9194-1 Series Actuators
V-9000-147[1]		120 VAC Solenoid Air Valve, Four-Way, for New Style V-9094-2 to V-9098 and V-9194-2 to V-9198 Series Actuators
Features	**Voltage Requirements**	120 VAC
	Power Consumption	AC: 5.6 VA; DC: 7.2 W
	Maximum Pressure	140 psig (980 kPa)
	Ambient Temperature Limits	0 to 180°F (-18 to 82°C)
	Air Connections	1/4 in. NPT (Internal)
	Electrical Connections	18 AWG Leads, 24 in. (61 cm) Long
	Enclosure Materials	Die-Cast Aluminum Body with NEMA 4 Coil Housing

1. For actuators manufactured after April 1, 1992

Speed Controls

Code Number	Description
V-9000-311	Brass Speed Controls (Two) for New Style[1] V-9192 to V-9194-2 Series Actuators
V-9000-312	Brass Speed Controls (Two) for New Style[1] V-9194-2 to V-9198 Series Actuators

1. For actuators manufactured after April 1, 1992

Plastic Position Indicators

Actuator Series	Code Number[1]
V-9x92	V-9092-611
V-9x93	V-9093-611
V-9x94-1x	V-9094-6111
V-9x94-2x	V-9094-6112
V-9x95	V-9095-611
V-9x96	V-9096-611
V-9x97	V-9097-611
V-9x98	V-9098-611

1. For actuators manufactured after April 1, 1992

Positioners

Code Number and Specifications		Description
Models		V-9000-500 Pneumatic Positioner for All Old and New Style V-9000 Series Actuators (Includes Three Gauges)
Mounting Kits	**V-9000-502**[1]	Positioner Mounting Kit for Old-Style V-9x94 and V-9x95 Series Actuators
	V-9000-511[2]	Positioner Mounting Kit for New Style V-9x92 to V-9x94-1 Series Actuators
	V-9000-512[2]	Positioner Mounting Kit for New Style V-9x94-2 and V-9x95 Series Actuators
	V-9000-513[2]	Positioner Mounting Kit for New Style V-9x96 to V-9x98 Series Actuators
Air Specifications	**Supply Pressure**	40 to 140 psig (280 to 980 kPa) Air Supply Must be Clean (Filtered), Dry, and Oil Free.
	Output Flow Capacity	2,000 scim (546 mL/s) at 60 psig (420 kPa)
	Air Consumption	1,200 scim (328 mL/s) at 60 psig (420 kPa)
	Control Action	Direct or Reverse; Field Selectable
	Operating Range	Factory Set at 3 to 15 psig (21 to 105 kPa) for 90° Rotation; Field Selectable at 3 to 15 psig for 65° Rotation or 3 to 9 psig (21 to 63 kPa) or 9 to 15 psig (63 to 105 kPa) for 65° Rotation
	Starting Point	Factory Set at Approximately 3 psig (21 kPa)
	Ambient Temperature Limits	-5 to 160°F (-21 to 71°C)
Air Connections	**Supply**	1/4 in. NPT (Internal)
	Control Input	1/8 in. NPT (Internal)
	Outputs	1/8 in. NPT (Internal)
Materials	**Body**	Aluminum, Anodized
	Diaphragm	Buna-N Rubber
	Spool	Stainless Steel
	Cover	Polycarbonate

1. For actuators manufactured before April 1, 1992
2. For actuators manufactured after April 1, 1992

V-9000 Series Rotary Motion Rackand Pinion Pneumatic Actuators for Butterfly Valves (Continued)

Travel Switches

Code Number and Specifications		Description
Travel Limit Switch Models	**V-9000-400**[1]	For All V-9000 Series Actuators
Mounting Kits	**V-9000-401**[1]	For V-9x92 and V-9x93 Series Actuators
	V-9000-402[1]	For V-9x94 and V-9x95 Series Actuators
	V-9000-403[1]	For V-9x96 and V-9x97 Series Actuators
	V-9000-404[2]	For V-9x96, V-9x97, and V-9x98 Series Actuators[3]
Features	**Switches**	Two Single-Pole, Double-Throw (SPDT)
	Electrical Rating	5 A at 120/250 VAC; 5 A at 24 VDC
	Body Materials	Die-Cast Aluminum, NEMA 4, 4x Housing

1. For actuators manufactured before April 1, 1992
2. For actuators manufactured after April 1, 1992
3. Mounting kits are not required for smaller size actuators (V-9x92 through V-9x95).

Pneumatic Rack and Pinion Actuator Adapter Sleeves[1]

Valve Size, in.	V-9x92-xx	V-9x93-xx	V-9x94-1x	V-9x94-2x	V-9x95-xx	V-9x96-xx	V-9x97-xx	V-9x98-xx
2	Not Required	V-9094-300	V-9094-300	V-9095-300	V-9095-300			
2-1/2	Not Required	V-9094-300	V-9094-300	V-9095-300	V-9095-300			
3	Not Required	V-9094-300	V-9094-300	V-9095-300	V-9095-300			
4		V-9094-400	V-9094-400	V-9095-400	V-9095-400			
5		Not Required	Not Required	V-9095-600	V-9095-600	V-9096-600		
6		Not Required	Not Required	V-9095-600	V-9095-600	V-9096-600		
8				V-9095-800	V-9095-800	V-9096-800	V-9097-800	
10				Not Required	Not Required	Not Required	V-9097-120	
12				Not Required	Not Required	Not Required	V-9097-120	
14							V-9097-160	V-9098-100
16							V-9097-160	V-9098-100
18							Not Required	V-9098-200
20							Not Required	V-9098-200

1. Adapter sleeves are required to field mount rack and pinion actuators to VFM valves.

Technical Specifications

V-9000 Series Rotary Motion Rack and Pinion Pneumatic Actuators for Butterfly Valves		
Models	**V-909x Series**	Rack and Pinion Double Acting Actuators; See *V-909x Series Actuator Torque Data (lb·in) and Ordering Data (Double Acting)* Table for Full Code Numbers.
	V-919x Series	Rack and Pinion Spring-Return Actuators; See *V-919x Series Actuator Torque Data (lb·in) and Ordering Data (Spring Return)* Table for Full Code Numbers.
Output Torque	**V-909x Series**	See *V-909x Series Actuator Torque Data (lb·in) and Ordering Data (Double Acting)*.
	V-919x Series	See *V-919x Series Actuator Torque Data (lb·in) and Ordering Data (Spring Return)*.
Supply Pressure		Nominal 60 to 80 psig (420 to 560 kPa); Minimum 40 psi (280 kPa), Maximum 140 psi (980 kPa). Air Supply Must be Clean (Filtered), Dry, and Oil Free.
Ambient Temperature Limits		-13 to 200°F (-25 to 93°C)
Materials	**Body**	Extruded Aluminum, Anodized
	End Caps	Die Cast Aluminum, Polyester Coated
	Pistons	Die Cast Aluminum
	Output Shaft	Carbon Steel, Zinc Plated
	Piston Guides	Acetal
	Spring Cartridges	Coated Spring Steel, Zinc Plated Hardware
	O-Ring Seals	Buna-N Rubber