

VA-9070 Series Electric Rotary Actuators for Two-Position and Modulating Service

The VA-9070 Series Electric Rotary Actuators are designed for direct mounting on VF Series Butterfly Valves. The VA-9070 is available in eight different sizes, for two-position and modulating service on two-way 2 through 14 in. high-pressure butterfly valves and two-way 4 through 18 in. low-pressure butterfly valves. The VA-9070 is also available for two-position and modulating service on three-way 2 through 12 in. high-pressure butterfly valves and three-way 4 through 12 in. low-pressure butterfly valves.

For more detailed information on VA-9070 Series Electric Rotary Actuators, refer to the Bray® Series 70 Electric Actuator Color Brochure (Bulletin No. B-1016) found in the Valve Product Information section of the Johnson Controls Valve and Actuator Manual (FAN 977).



**Figure 1: VA-9070 Series
Electric Rotary Actuator
Mounted on a VF Series Butterfly Valve**

Features and Benefits	
Low Profile and Light Weight Design	Reduces space requirements and provides ease of installation
Built-In Motor Overload Protection	Prevents thermal overload of motor
Pre-Wired Actuator Switches to Terminal Block; Field Configurable Power and Input Signals	Provides ease of wiring without interference from other components; enables field modification of input signal
Patented Travel Limit Switch Cam Design	Allows for simple finger or screwdriver adjustment of travel limit cams without interference
External Manual Handwheel Override	Ensures positive and fast manual operation without the need for extra tools or levers
Continued on next page . . .	

Features and Benefits (Cont.)	
Rugged, Die-Cast Aluminum NEMA 4, 4X, 1P65 Enclosure; Captive Housing Screws	Provides waterproofing and exceptional corrosion, wear, impact, and UV resistance; prevents time-consuming problems due to lost or misplaced bolts
Valve Status Display	Provides clear and convenient indication of valve position throughout full range of travel
Optional Heater/Thermostat	Prevents condensation build-up and freeze-ups
Optional Local Control Station	Includes a local and remote control switch, an open-stop-close switch, and position indicator LEDs for ease of operation

Table 1: Code Numbers and Cross-Reference Data for Electric Two-Position Models

Johnson Controls Actuator Only Code Number	Johnson Controls VF Series Butterfly Valve Assembly Actuator Sub-Code	Bray Series Number
VA-9071-02	-721	S70-003 On-Off
VA-9072-02	-722	S70-005 On-Off
VA-9073-02	-723	S70-008 On-Off
VA-9074-02	-724	S70-012 On-Off
VA-9075-02	-725	S70-020 On-Off
VA-9076-02	-726	S70-030 On-Off
VA-9077-02	-727	S70-050 On-Off
VA-9078-02	-728	S70-065 On-Off

Table 2: Code Numbers and Cross-Reference Data for Electric Modulating Models

Johnson Controls Actuator Only Code Number	Johnson Controls VF Series Butterfly Valve Assembly Actuator Sub-Code	Bray Series Number
VA-9071-01	-701	S70-003 Modulating
VA-9072-01	-702	S70-005 Modulating
VA-9073-01	-703	S70-008 Modulating
VA-9074-01	-704	S70-012 Modulating
VA-9075-01	-705	S70-020 Modulating
VA-9076-01	-706	S70-030 Modulating
VA-9077-01	-707	S70-050 Modulating
VA-9078-01	-708	S70-065 Modulating

**Table 3: Actuator Selection for Two-Way
150 or 175 psig (High) Closeoff Pressure VF Series Butterfly Valves**

Valve Size (in.)	Torque Required lb·in (N·m)	Actuator Code Number	
		For Two-Position Service	For Modulating Service
2	158 (17.9)	VA-9071-02	VA-9071-01
2-1/2	188 (21.2)	VA-9071-02	VA-9071-01
3	225 (25.4)	VA-9071-02	VA-9071-01
4	465 (52.5)	VA-9072-02	VA-9072-01
5	585 (66.1)	VA-9073-02	VA-9073-01
6	705 (79.7)	VA-9073-02	VA-9073-01
8	1,530 (172.9)	VA-9075-02	VA-9075-01
10	3,296 (372.4)	VA-9077-02	VA-9077-01
12	5,165 (583.6)	VA-9078-02	VA-9078-01
14	6,450 (728.8)	VA-9078-02	VA-9078-01

150 psig (1,034 kPa) for 14 in. valves; 175 psig (1,207 kPa) for 2 through 12 in. valves.

Torque values have already been adjusted for 25% safety factor on 2 through 12 in. valves;
10% safety factor on 14 in. valves.

**Table 4: Actuator Selection for Two-Way
50 psig (Low) Closeoff Pressure VF Series Butterfly Valves**

Valve Size (in.)	Torque Required lb·in (N·m)	Actuator Code Number	
		For Two-Position Service	For Modulating Service
4	225 (25.4)	VA-9071-02	VA-9071-01
5	390 (44.1)	VA-9072-02	VA-9072-01
6	570 (64.4)	VA-9073-02	VA-9073-01
8	705 (79.7)	VA-9073-02	VA-9073-01
10	1,410 (159.3)	VA-9075-02	VA-9075-01
12	2,595 (293.2)	VA-9076-02	VA-9076-01
14	3,300 (372.9)	VA-9077-02	VA-9077-01
16	4,268 (482.2)	VA-9077-02	VA-9077-01
18	5,267 (595.1)	VA-9078-02	VA-9078-01

50 psig (345 kPa) for 4 through 18 in. valves.

Torque values have already been adjusted for 25% safety factor on 2 through 12 in. valves;
10% safety factor on 14 through 18 in. valves.

**Table 5: Actuator Selection for Three-Way
175 psig (High) Closeoff Pressure VF Series Butterfly Valves**

Valve Size (in.)	Torque Required lb·in (N·m)	Actuator Code Number	
		For Two-Position Service	For Modulating Service
2	190 (21.5)	VA-9071-02	VA-9071-01
2-1/2	225 (25.4)	VA-9071-02	VA-9071-01
3	270 (30.5)	VA-9071-02	VA-9071-01
4	558 (63.0)	VA-9073-02	VA-9073-01
5	702 (79.3)	VA-9073-02	VA-9073-01
6	846 (95.6)	VA-9074-02	VA-9074-01
8	1,836 (207.4)	VA-9075-02	VA-9075-01
10	3,955 (446.9)	VA-9077-02	VA-9077-01
12	6,198 (700.3)	VA-9078-02	VA-9078-01

175 psig (1,207 kPa) for 2 through 12 in. valves.

Torque values have already been adjusted for 25% safety factor for all sizes.

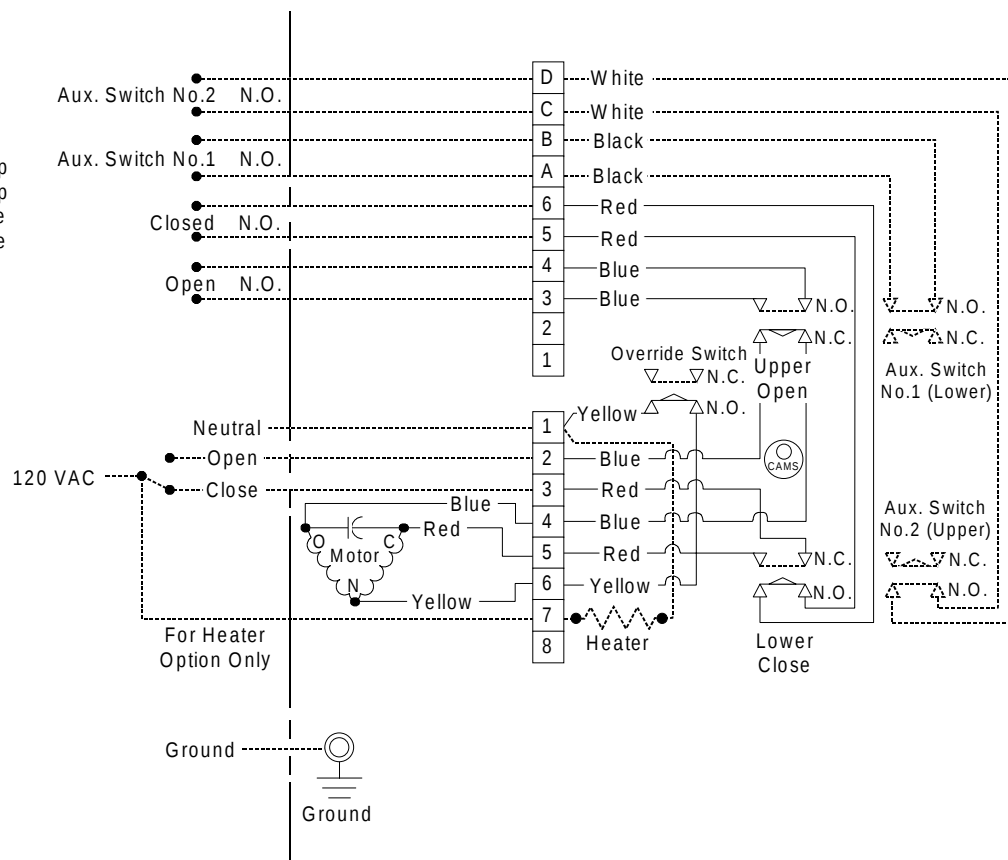
**Table 6: Actuator Selection for Three-Way
50 psig (Low) Closeoff Pressure VF Series Butterfly Valves**

Valve Size (in.)	Torque Required lb·in (N·m)	Actuator Code Number	
		For Two-Position Service	For Modulating Service
4	270 (30.5)	VA-9071-02	VA-9071-01
5	468 (52.9)	VA-9072-02	VA-9072-01
6	684 (77.3)	VA-9073-02	VA-9073-01
8	846 (95.6)	VA-9074-02	VA-9074-01
10	1,692 (191.2)	VA-9075-02	VA-9075-01
12	3,114 (351.8)	VA-9077-02	VA-9077-01

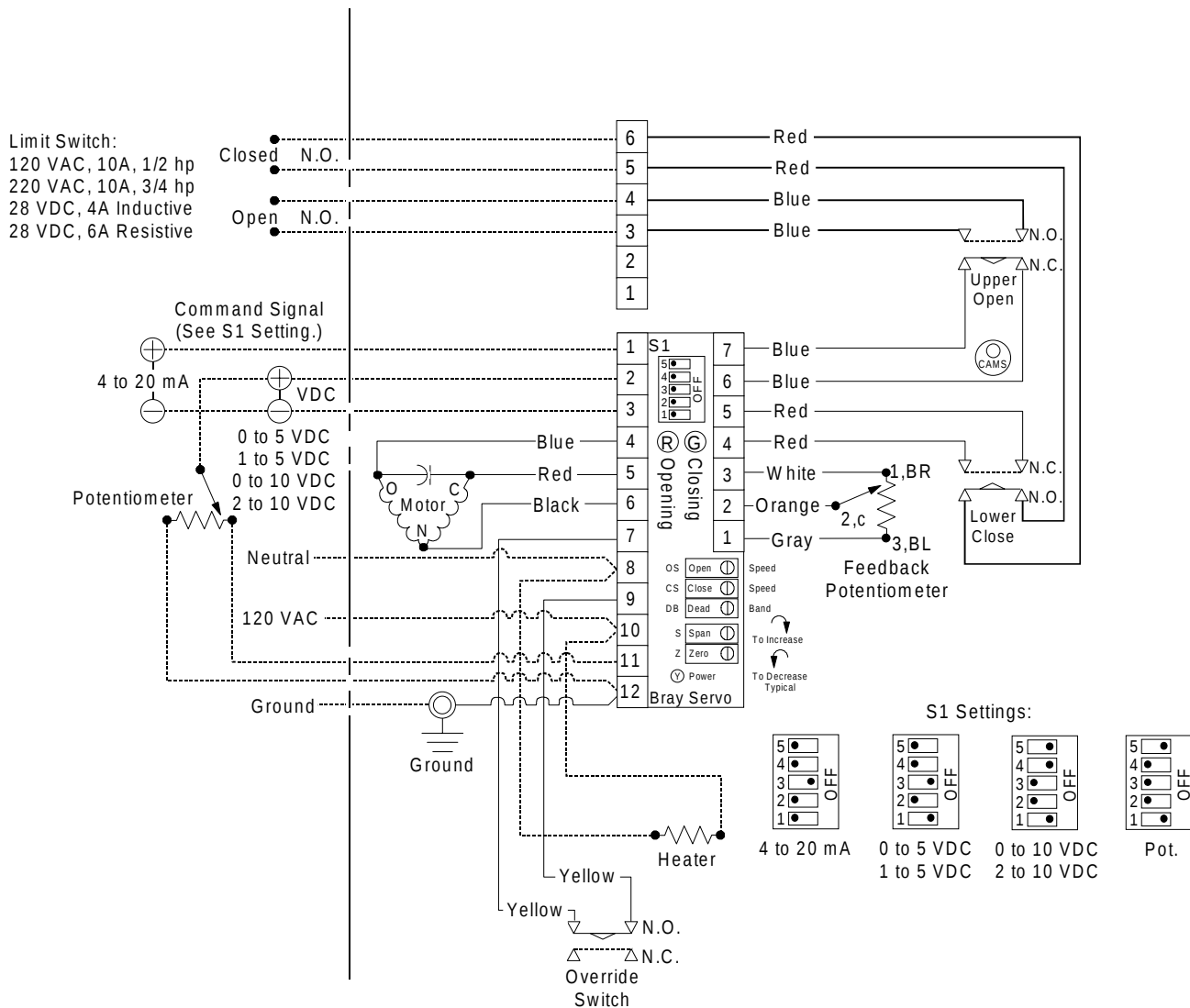
50 psig (345 kPa) for 4 through 12 in. valves.

Torque values have already been adjusted for 25% safety factor for all sizes.

Limit Switch:
 120 VAC, 10A, 1/2 hp
 220 VAC, 10A, 3/4 hp
 28 VDC, 4A Inductive
 28 VDC, 6A Resistive



**Figure 2: Typical Wiring Diagram of
 VA-9070 Series Two-Position Electric Rotary Actuator
 (Shown with Optional Torque Limit Switches, Heater, and Auxiliary Switches)**



**Figure 3: Typical Wiring Diagram of
 VA-9070 Series Modulating Electric Rotary Actuator
 (Shown with Optional Torque Limit Switches and Heater)**

Note: The handwheel spinner shown in this drawing is available as an option; contact your local Johnson Controls representative for more details.

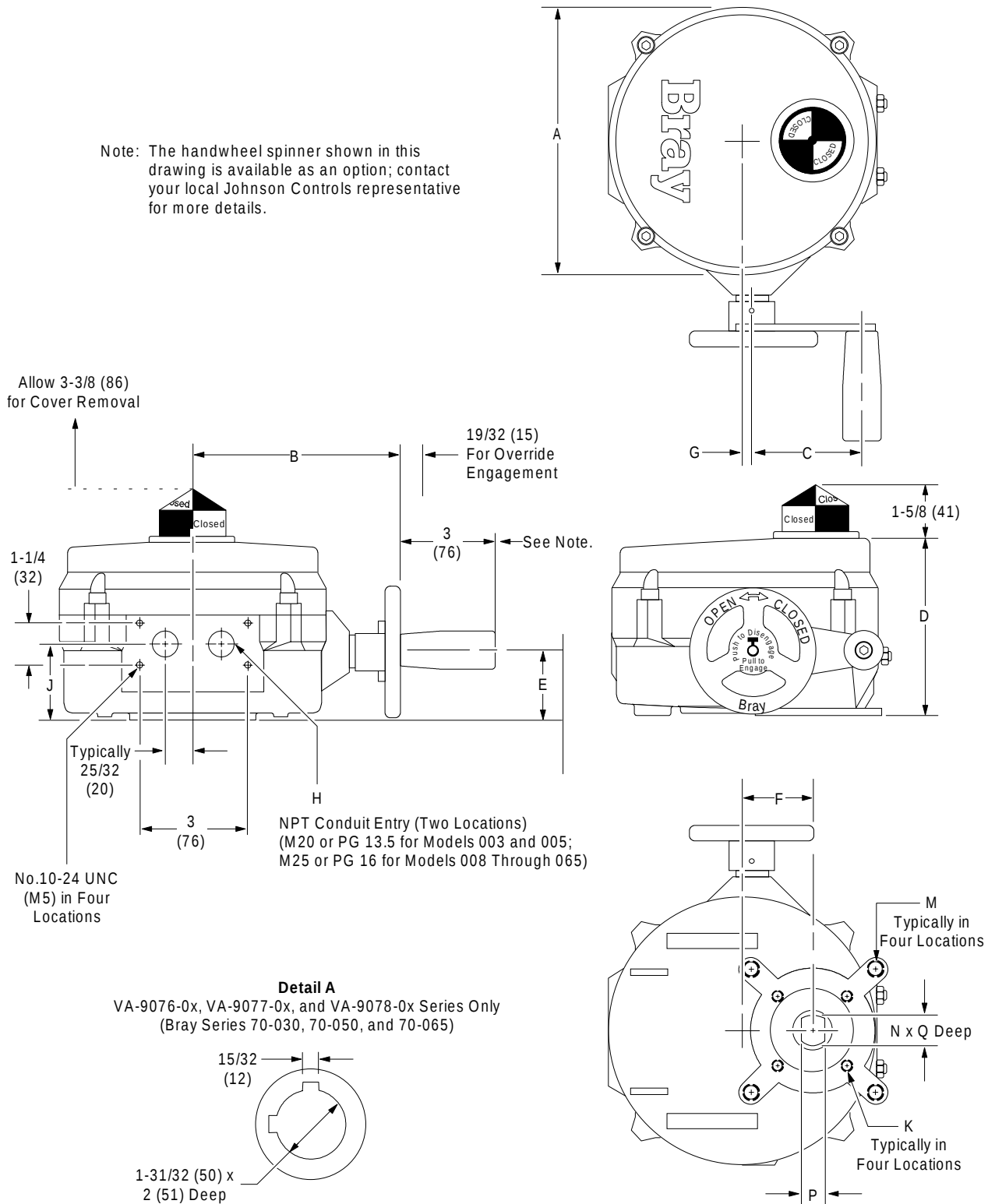


Figure 4: VA-9070 Series Electric Rotary Actuator Dimensions, in. (mm)
(Refer to Table 7.)

Table 7: VA-9070 Series Electric Rotary Actuator Dimensions, in. (mm)

Dimension	Actuator Series: Johnson Controls Code Number (Bray Series Number)							
	VA-9071 (S70-003)	VA-9072 (S70-005)	VA-9073 (S70-008)	VA-9074 (S70-012)	VA-9075 (S70-020)	VA-9076 (S70-030)	VA-9077 (S70-050)	VA-9078 (S70-065)
A	7-1/2 (191)	7-1/2 (191)	10-3/32 (256)	10-3/32 (256)	10-3/32 (256)	12-3/32 (307)	12-3/32 (307)	12-3/32 (307)
B	5-19/32 (142)	5-19/32 (142)	7-13/16 (198)	7-13/16 (198)	7-13/16 (198)	9-1/2 (241)	9-1/2 (241)	9-1/2 (241)
C	3 (76)	3 (76)	3-23/32 (94)	3-23/32 (94)	3-23/32 (94)	5-19/32 (142)	5-19/32 (142)	5-19/32 (142)
D	5-3/32 (129)	5-3/32 (129)	6-1/2 (165)	6-1/2 (165)	6-1/2 (165)	7-3/16 (183)	7-3/16 (183)	7-3/16 (183)
E	1-29/32 (48)	1-29/32 (48)	2-1/2 (64)	2-1/2 (64)	2-1/2 (64)	2-29/32 (74)	2-29/32 (74)	2-29/32 (74)
F	1-15/16 (49)	1-15/16 (49)	2-11/16 (68)	2-11/16 (68)	2-11/16 (68)	3-3/16 (81)	3-3/16 (81)	3-3/16 (81)
G	3/16 (5)	3/16 (5)	9/16 (14)	9/16 (14)	9/16 (14)	9/16 (14)	9/16 (14)	9/16 (14)
H	1/2 (13)	1/2 (13)	3/4 (19)	3/4 (19)	3/4 (19)	3/4 (19)	3/4 (19)	3/4 (19)
J	2 (51)	2 (51)	2-19/32 (66)	2-19/32 (66)	2-19/32 (66)	3-3/32 (79)	3-3/32 (79)	3-3/32 (79)
K (UNC) x B.C.	5/16-18 x 2-3/4	5/16-18 x 2-3/4	5/16-18 x 2-3/4	5/16-18 x 2-3/4	5/16-18 x 2-3/4	1/2-13 x 4-15/16	1/2-13 x 4-15/16	1/2-13 x 4-15/16
M (UNC) x B.C.	---	---	1/2-13 x 4-29/32	1/2-13 x 4-29/32	1/2-13 x 4-29/32	5/8-11 x 6-1/2	5/8-11 x 6-1/2	5/8-11 x 6-1/2
N	3/4 (19)	3/4 (19)	1-3/16 (30)	1-3/16 (30)	1-3/16 (30)	See Detail "A."	See Detail "A."	See Detail "A."
P	1/2 (13)	1/2 (13)	7/8 (22)	7/8 (22)	7/8 (22)	See Detail "A."	See Detail "A."	See Detail "A."
Q	1-15/32 (37)	1-15/32 (37)	1-13/16 (46)	1-13/16 (46)	1-13/16 (46)	See Detail "A."	See Detail "A."	See Detail "A."

**Table 8: VA-9070 Series Electric Rotary Actuators
Motor Ratings and Operating Speeds**

Actuator Series: Johnson Controls Code Number (Bray Series Number)	Single Phase Motors: Current Rating in Amps at All Speeds			Two-Position and Modulating Speeds for 90° Operation in Seconds* (Total Gear Ratio)
	VAC	Hz	Amperes	
VA-9071 (S70-003)	120	50/60	2.0	30 sec (5,070:1)
	120	50/60	1.0	
VA-9072 (S70-005)	120	50/60	2.0	30 sec (5,070:1)
	120	50/60	1.0	
VA-9073 (S70-008)	120	50/60	2.3	30 sec (3,340:1)
	120	50/60	1.4	
VA-9074 (S70-012)	120	50/60	2.3	30 sec (3,340:1)
	120	50/60	1.4	
VA-9075 (S70-020)	120	50/60	2.3	30 sec (3,340:1)
	120	50/60	1.4	
VA-9076 (S70-030)	120	50/60	3.1	30 sec (3,340:1)
	120	50/60	1.7	
VA-9077 (S70-050)	120	50/60	3.1	30 sec (3,340:1)
	120	50/60	1.7	
VA-9078 (S70-065)	120	50/60	3.1	30 sec (3,340:1)
	120	50/60	1.7	

* The duty cycle for two-position and modulating operation is 100% at a maximum ambient temperature of 104°F (40°C).

**Table 9: VA-9070 Series Electric Rotary Actuators
Output Torque Values, Rim Pull, and Mounting Data**

Actuator Series: Johnson Controls Code Number (Bray Series Number)	Output Torque lb·in (N·m)	Rim Pull lb (kg)	Valve Sizes for Direct Mount	Net Weight lb (kg)
VA-9071 (S70-003)	300 (34)	11.4 (5.2)	2 Through 6 in.	12.0 (5.4)
VA-9072 (S70-005)	500 (57)	19.0 (8.6)	2 Through 6 in.	12.0 (5.4)
VA-9073 (S70-008)	800 (90)	13.0 (5.9)	2 Through 12 in.	28.0 (12.7)
VA-9074 (S70-012)	1,200 (136)	20.0 (9.1)	2 Through 12 in.	28.0 (12.7)
VA-9075 (S70-020)	2,000 (226)	33.0 (15.0)	2 Through 12 in.	28.0 (12.7)
VA-9076 (S70-030)	3,000 (339)	33.0 (15.0)	8 Through 20 in.	48.0 (21.8)
VA-9077 (S70-050)	5,000 (565)	55.0 (25.0)	8 Through 20 in.	48.0 (21.8)
VA-9078 (S70-065)	6,500 (734)	72.0 (32.7)	8 Through 20 in.	48.0 (21.8)

Table 10: Accessories and Repair Parts*

Description	Code Number
Servo Control Kits:	
With Potentiometer for VA-9071 and VA-9072 Series Two-Position and Modulating Electric Actuators	VA-9072-601
With Potentiometer for VA-9073, VA-9074, and VA-9075 Series Two-Position and Modulating Electric Actuators	VA-9075-601
With Potentiometer for VA-9076, VA-9077, and VA-9078 Series Two-Position and Modulating Electric Actuators	VA-9078-601
Thermostat/Heater Kit: For All Models of VA-9070 Series Two-Position and Modulating Electric Actuators	VA-907X-609
Local Control Station: For All Models of VA-9070 Series Modulating Electric Actuators; Kit Includes Local and Remote Control Switch, Open-Stop-Close Switch, and Two LEDs for Position Indication (Green for Open and Red for Closed)	VA-907X-620
Continued on next page . . .	

* For non-standard accessories and repair parts, contact your local Johnson Controls representative.

Description (Cont.)*	Code Number*
Auxiliary Switch Kits: Single Auxiliary Switch for VA-9073, VA-9074, and VA-9075 Series Modulating Electric Actuators Single Auxiliary Switch for VA-9076, VA-9077, and VA-9078 Series Modulating Electric Actuators Single Auxiliary Switch for VA-9073, VA-9074, and VA-9075 Series Two-Position Electric Actuators Single Auxiliary Switch for VA-9076, VA-9077, and VA-9078 Series Two-Position Electric Actuators Two Auxiliary Switches for VA-9073, VA-9074, and VA-9075 Series Two-Position Electric Actuators Two Auxiliary Switches for VA-9076, VA-9077, and VA-9078 Series Two-Position Electric Actuators	VA-907X-601 VA-907X-602 VA-907X-603 VA-907X-604 VA-907X-605 VA-907X-606
Feedback Potentiometer Kits: 5000 Ohm Gear Driven, For VA-9071 and VA-9072 Series Modulating Electric Actuators 5000 Ohm Gear Driven, For VA-9073, VA-9074, and VA-9075 Series Modulating Electric Actuators 5000 Ohm Gear Driven, For VA-9076, VA-9077, and VA-9078 Series Modulating Electric Actuators	VA-907X-612 VA-907X-613 VA-907X-614
Mounting and Adaptor Kits (Two-Way Valves): Used when Mounting VA-9071 and VA-9072 Series Two-Position and Modulating Electric Actuators on 2 Through 3 in. VF Series Butterfly Valves Used when Mounting VA-9071 and VA-9072 Series Two-Position and Modulating Electric Actuators on 4 in. VF Series Butterfly Valves Used when Mounting VA-9071 and VA-9072 Series Two-Position and Modulating Electric Actuators on 5 and 6 in. VF Series Butterfly Valves Used when Mounting VA-9073, VA-9074, and VA-9075 Series Two-Position and Modulating Electric Actuators on 4 in. VF Series Butterfly Valves Used when Mounting VA-9073, VA-9074, and VA-9075 Series Two-Position and Modulating Electric Actuators on 5 and 6 in. VF Series Butterfly Valves Used when Mounting VA-9073, VA-9074, and VA-9075 Series Two-Position and Modulating Electric Actuators on 8 in. VF Series Butterfly Valves Used when Mounting VA-9073, VA-9074, and VA-9075 Series Two-Position and Modulating Electric Actuators on 10 and 12 in. VF Series Butterfly Valves Used when Mounting VA-9076, VA-9077, and VA-9078 Series Two-Position and Modulating Electric Actuators on 8 in. VF Series Butterfly Valves Used when Mounting VA-9076, VA-9077, and VA-9078 Series Two-Position and Modulating Electric Actuators on 10 and 12 in. VF Series Butterfly Valves Used when Mounting VA-9076, VA-9077, and VA-9078 Series Two-Position and Modulating Electric Actuators on 14 and 16 in. VF Series Butterfly Valves Used when Mounting VA-9076, VA-9077, and VA-9078 Series Two-Position and Modulating Electric Actuators on 18 in. VF Series Butterfly Valves	VA-9072-300 VA-9072-400 VA-9072-600 VA-9075-400 VA-9075-600 VA-9075-800 VA-9075-1200 VA-9078-800 VA-9078-1200 VA-9078-1600 VA-9078-2000

* For non-standard accessories and repair parts, contact your local Johnson Controls representative.

Specifications

Product		VA-9070 Series Electric Rotary Actuators
Code Numbers and Cross-Reference Data	Two-Position	VA-907x-02 Series (Refer to Table 1.)
	Modulating	VA-907x-01 Series (Refer to Table 2.)
Dimensions		Refer to Figure 4 and Table 7.
Motor Ratings and Operating Speeds		Refer to Table 8.
Output Torque Values, Rim Pull, and Mounting Data		Refer to Table 9.
Supply Voltage		120 VAC, 50/60 Hz
Limit Switches		Two SPDT-DB (Single-Pole, Double-Throw, Double-Brake)
Control Signal*		Factory Set for 4 to 20 mA DC into 250 Ohms; Field Configurable (Refer to Figure 3.)
Feedback Potentiometer*		Internal, 5000 Ohm Gear Driven
Ambient Temperature Limits		-40 to 150°F (-40 to 66°C); Heater/Thermostat Kit Required Below 32°F (0°C)
Indicators	Power	Yellow LED
	Open Drive	Green LED
	Close Drive	Red LED
Accessories and Repair Parts		Refer to Table 10.

* VA-907x-01 Series Modulating Actuators only.

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.



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Printed in U.S.A.