

VF6000/VA300/VA200 Series

# VF6000 Series Butterfly Valve and VA300/VA200 Actuator



**On the cover**

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# VF6000 Series Butterfly Valve and VA300/VA200 Actuator

VF6000 Series butterfly valve and VA300/VA200 actuator are designed to shutoff or regulate the flow of hot or chilled water in Heating, Ventilation and Air Conditioning (HVAC) system. This series covers models from DN50 to DN600 with either on/off or modulating output via various actuators.

Actuators and valves are calibrated in the factory and are packed separately for ease of delivery and installation.



Figure 1. VF6000 Series Butterfly Valve and VA300/VA200 Actuator

## Features and Benefits

Groove-type Seat	Reliable sealing, less torque, long service life
Professionally Designed Sealing Surface	Broadside and arc design, suitable for various types of flanges
Mid-plummer-block Spliced Pole	Prevention of lower shaft disengaging from body due to frequent vibration
Manual Clutch	Automatic switching, more convenient and reliable
Safe and Protective Design	Over-torque protection, anti-condensation heater (VA300/VA200)
Precise Worm Gear Drive	High transmission torque, self-locking (VA300/VA200)
Clear Display of Valve Position	Display of valve position

# Nomenclature

Table 1: VF6000 Series Valve

V F 6 4 6 1 A A - C		Butterfly Valve	
6		Disk Type	4=Standard Disk without Weather Shield 6=Separation valve
4		Body Type	4= Two-Way
6		Connection	6= Wafer
1		Flow Characteristics	1= Equal Percentage
A		Valve Size	A= 2 in. (DN50) B= 2.5 in. (DN65) C= 3 in. (DN80) D= 4 in. (DN100) E= 5 in. (DN125) F= 6 in. (DN150) G= 8 in. (DN200) H= 10in. (DN250) J= 12in. (DN300) K= 14in. (DN350) L= 16in. (DN400) M= 18in. (DN450) N= 20in. (DN500) P= 24in. (DN600)
A		Reserve	A= None
- C		Origin	Made in China

\*VF6461PAN-C is added into DN600 series, for details, see Table 4, 5, 6

Table 2: VA300/VA200 Series Actuators

V A 3 0 3 B D C - C		Actuator			
3		Close-off pressure	3=16bar	2=10bar	
0 3		Torque	01=35Nm	02=80Nm	03=200Nm
			04=400Nm	05=600Nm	06=800Nm
			07=1000Nm	08=1500Nm	09=2000Nm
			10=3000Nm		
B		Control signal	B= On/off		
			C= Modulating		
D		Power	D= 230VAC		
C		Auxiliary switch	C= 2 switches		
- C		Origin	Made in China		

\*VA302BDCN-C is the new generation

Table 3: 1600kPa Close-off Pressure



VF6000 DN50-DN300 Butterfly Valves PN16 1600 kPa close-off				Non Spring Return																			
				M9100				VA300															
																							
On/Off, Floating 24 V				0 (2) to 10 VDC, 0 (4) to 20 mA		On/Off, Floating		0 (2) to 10 VDC, 4 to 20 mA		On/Off, Floating		On/Off, Floating		0 (2) to 10 VDC, 4 to 20 mA		On/Off, Floating		0 (2) to 10 VDC, 4 to 20 mA		On/Off, Floating		0 (2) to 10 VDC, 4 to 20 mA	
<b>Auxiliary Switch</b>																							
2 SPDT, 3.0 (1.5) A @ 24 VAC				■		■																	
2 SPST, 16 A @ 250 VAC						■		■		■		■		■		■		■					
2 SPST, 10 A @ 250 VAC								■		■		■		■		■		■					
<b>Position Feedback</b>																							
0(2)-10VDC				■		■																	
1 kohms						■		■		■		■		■		■		■		■		■	
0(2)-10VDC or 4-20mA						■				■		■		■		■		■		■		■	
<b>Power Requirement</b>																							
230 VAC +/-10% 50/60 Hz						■		■		■		■		■		■		■		■		■	
24 VAC +20%/-15% 24VDC +/- 10%				■		■		■		■		■		■		■		■		■		■	
<b>Electrical Connections</b>																							
Screw				■		■		■		■		■		■		■		■		■		■	
<b>Accessories</b>																							
Heater						■		■		■		■		■		■		■		■		■	
				<b>Close-off Pressure (kPa)</b>																			
DN	Kvs On/Off	Kvs 60°		1600		1600																	
DN50	85	39	VF6461AA-C	1600		1600																	
DN65	180	87	VF6461BA-C	1600		1600																	
DN80	295	139	VF6461CA-C					1600		1600													
DN100	560	174	VF6461DA-C					1600		1600													
DN125	873	308	VF6461EA-C									1600											
DN150	1348	474	VF6461FA-C									1600											
DN200	2692	958	VF6461GA-C									1600											
DN250	5549	1506	VF6461HA-C											1600									
DN300	7557	2088	VF6461JA-C													1600							
Linkage				M9000-618-C				No															
Actuator				M9124-AGA-2	M9124-AGC-2	M9124-GGA-2	M9124-GGC-2	VA301BDC-C	VA301CDC-C	VA302BDCN-C	VA302BDC-C	VA302CDC-C	VA303BDC-C	VA303CDC-C	VA304BDC-C	VA304CDC-C	VA305BDC-C	VA305CDC-C	VA306BDC-C	VA306CDC-C			

Table 4: 1000kPa Close-off Pressure



VF6000 DN50-DN600 Butterfly Valves PN16 1000 kPa close-off				Non Spring Return																						
				M9100					VA200																	
				 																						
				On/Off, Floating 24 V	0 (2) to 10 VDC, 0 (4) to 20 mA	On/Off, Floating	0 (2) to 10 VDC, 4 to 20 mA	On/Off, Floating	On/Off, Floating	0 (2) to 10 VDC, 4 to 20 mA	On/Off, Floating	0 (2) to 10 VDC, 4 to 20 mA	On/Off, Floating	0 (2) to 10 VDC, 4 to 20 mA	On/Off, Floating	0 (2) to 10 VDC, 4 to 20 mA	On/Off, Floating	0 (2) to 10 VDC, 4 to 20 mA	On/Off, Floating	0 (2) to 10 VDC, 4 to 20 mA	On/Off, Floating	0 (2) to 10 VDC, 4 to 20 mA	On/Off, Floating	0 (2) to 10 VDC, 4 to 20 mA		
Auxiliary Switch																										
2 SPDT, 3.0 (1.5) A @ 24 VAC					■	■																				
2 SPST, 16 A @ 250 VAC							■		■	■				■	■							■				
2 SPST, 10 A @ 250 VAC								■																		
Position Feedback																										
0(2)-10VDC					■	■																				
1 kohms							■		■	■		■	■		■	■		■	■		■	■		■		
0(2)-10VDC or 4-20mA							■				■		■		■		■		■		■		■			
Power Requirement																										
230 VAC +/-10% 50/60 Hz							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
24 VAC +20%/-15% 24VDC +/- 10%				■	■	■	■																			
Electrical Connections																										
Screw				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Accessories																										
Heater							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
				Close-off Pressure (kPa)																						
DN	Kvs On/Off	Kvs 60°																								
DN50	85	39	VF6461AA-C	1600	1600																					
DN65	180	87	VF6461BA-C	1600	1600																					
DN80	295	139	VF6461CA-C	1000	1000																					
DN100	560	174	VF6461DA-C		1000																					
DN125	873	308	VF6461EA-C			1000	1000																			
DN150	1348	474	VF6461FA-C				1000																			
DN200	2692	958	VF6461GA-C					1000																		
DN250	5549	1506	VF6461HA-C						1000																	
DN300	7557	2088	VF6461JA-C							1000																
DN350	10212	3914	VF6461KA-C								1000															
DN400	14043	5383	VF6461LA-C									1000														
DN450	18700	7129	VF6461MA-C										1000													
DN500	22680	8500	VF6461NA-C											1000												
DN600	29500	11500	VF6461PAN-C												1000											
Linkage				M9000-618-C					No																	
Actuator				M9124-AGA-2	M9124-AGC-2	M9124-GGA-2	M9124-GGC-2	VA201BDC-C	VA201CDC-C	VA202BDCN-C	VA202BDC-C	VA202CDC-C	VA203BDC-C	VA203CDC-C	VA204BDC-C	VA204CDC-C	VA205BDC-C	VA205CDC-C	VA206BDC-C	VA206CDC-C	VA207BDC-C	VA207CDC-C	VA208BDC-C	VA208CDC-C	VA209BDC-C	VA209CDC-C

Table 5: On/off Summary

Size DN		Butterfly Valve	△P=10bar		△P=16bar	
(mm)	(inch)		Actuator	Linkage	Actuator	Linkage
50	2	VF6461AA-C	M9124-AGA-2	M9000-618-C	M9124-AGA-2	M9000-618-C
			VA201BDC-C	-	VA301BDC-C	-
65	2.5	VF6461BA-C	M9124-AGA-2	M9000-618-C	M9124-AGA-2	M9000-618-C
			VA201BDC-C	-	VA301BDC-C	-
80	3	VF6461CA-C	M9124-AGA-2	M9000-618-C	VA302BDCN-C	-
			VA201BDC-C	-	VA302BDC-C	-
100	4	VF6461DA-C	VA201BDC-C	-	VA302BDCN-C	-
					VA302BDC-C	-
125	5	VF6461EA-C	VA202BDCN-C	-	VA303BDC-C	-
			VA202BDC-C	-		
150	6	VF6461FA-C	VA202BDC-C	-	VA303BDC-C	-
200	8	VF6461GA-C	VA203BDC-C	-	VA304BDC-C	-
250	10	VF6461HA-C	VA204BDC-C	-	VA305BDC-C	-
300	12	VF6461JA-C	VA205BDC-C	-	VA306BDC-C	-
350	14	VF6461KA-C	VA206BDC-C	-	-	-
400	16	VF6461LA-C	VA207BDC-C	-	-	-
450	18	VF6461MA-C	VA208BDC-C	-	-	-
500	20	VF6461NA-C	VA208BDC-C	-	-	-
600	24	VF6461PAN-C	VA209BDC-C	-	-	-
		VF6461PA-C	VA310BDC-C	-	-	-

Table 6: Modulating Summary

Size DN		Butterfly Valve	△P=10bar		△P=16bar	
(mm)	(inch)		Actuator	Linkage	Actuator	Linkage
50	2	VF6461AA-C	M9124-GGA-2	M9000-618-C	M9124-GGA-2	M9000-618-C
			VA201CDC-C	-	VA301CDC-C	-
65	2.5	VF6461BA-C	M9124-GGA-2	M9000-618-C	M9124-GGA-2	M9000-618-C
			VA201CDC-C	-	VA301CDC-C	-
80	3	VF6461CA-C	M9124-GGA-2	M9000-618-C	VA302CDC-C	-
			VA201CDC-C	-		
100	4	VF6461DA-C	VA201CDC-C	-	VA302CDC-C	-
125	5	VF6461EA-C	VA202CDC-C	-	VA303CDC-C	-
150	6	VF6461FA-C	VA202CDC-C	-	VA303CDC-C	-
200	8	VF6461GA-C	VA203CDC-C	-	VA304CDC-C	-
250	10	VF6461HA-C	VA204CDC-C	-	VA305CDC-C	-
300	12	VF6461JA-C	VA205CDC-C	-	VA306CDC-C	-
350	14	VF6461KA-C	VA206CDC-C	-	-	-
400	16	VF6461LA-C	VA207CDC-C	-	-	-
450	18	VF6461MA-C	VA208CDC-C	-	-	-
500	20	VF6461NA-C	VA208CDC-C	-	-	-
600	24	VF6461PAN-C	VA209CDC-C	-	-	-
		VF6461PA-C	VA310CDC-C	-	-	-

# Specification

<b>Product</b>		<b>VF6000 Series Butterfly Valve and Actuator</b>	
Application	Regulation of hot water and chilled water in HVAC system		
<b>Valve</b>			
Media and Temperature	Water	-10~100°C	for incontinuous flow, temperature can reach 120°C
Size	DN50~DN600		
Close-off Pressure	DN ≤ 300, 1.6MPa; DN ≥ 350, 1.0MPa		
Nominal Pressure	PN16		
Materials	Body	Cast Iron, GG25 or GGG40	
	Seat	EPDM	
	Stem	Stainless Steel, 410	
	Disc	Ductile Iron, GGG40, Nylon 11 Coating	
Pipe Connection	Complying to ISO 7005-2		
<b>VA300/VA200 Actuator (Please refer to M9000 catalog for M9124 information)</b>			
Power Supply	230VAC±10% 50/60Hz		
Torque	See Table 3		
Running Time	See Table 3		
Motor Power	See Table 3		
Input Signal	on/off or 4~20mA/0~10V/2~10V		
Output Signal	End Switch or 4~20mA/0~10V/2~10V		
Protective Class	IP67		
Ambient Temperature	-5~65°C		
Worm Gear	Long lubrication and self locking		
Heater	Anti-condensation		
Casing Materials	Aluminum		
Surface Coating	Epoxy resin		

**Table 7: VA300/VA200 Actuator Performance Summary**

Model (On/off)	Model (Modulating)	Torque (Nm)	Running Time (s)	Motor Power (w)
01	01	35	11	10
02BDCN	-	80	22	15
02	02	80	19	40
03	03	200	39	40
04	04	400	29	40
05	05	600	39	60
06	06	800	47	90
07	07	1000	47	120
08	08	1500	34	200
09	09	2000	47	200
10	10	3000	76	200



Table 8: Valve Performance

Size DN		Kv Value in different opening angle								Kv Value for 90° opening
(mm)	(inch)	10°	20°	30°	40°	50°	60°	70°	80°	
50	2"	1.2	3	16	21	27	39	57	75	85
65	2.5"	1.5	8	19	33	60	87	137	180	180
80	3"	2.5	21	34	51	87	139	206	278	295
100	4"	3.8	26	45	67	105	174	271	405	560
125	5"	6.5	33	60	114	186	308	503	746	873
150	6"	10	47	94	171	295	474	722	1189	1348
200	8"	19	88	212	362	619	958	1487	2366	2692
250	10"	28	108	335	590	913	1506	2370	3958	5549
300	12"	34	224	402	708	1232	2088	3616	6163	7557
350	14"	47	290	613	1327	2366	3914	6195	9292	10212
400	16"	62	398	842	1825	3254	5383	8519	12779	14043
450	18"	75	527	1116	2418	4308	7129	11284	16925	18700
500	20"	103	556	1250	2780	4980	8500	13450	19855	22680
600	24"	139	670	1554	4235	5950	11500	15500	22300	29500

# Installation

## Mechanical Installation



**NOTE:** Ensure that the pipeline and flange faces are clean. Pipe scale, metal chips, welding slag, and welding rods can obstruct disc movement and damage the disc and seat.

- Align the piping and spread the flanges apart enough to allow the valve body to be located between the flanges without actually contacting the flange surfaces
- Remove the protective cardboard shields from valve faces
- Place the valve between the flanges and center the valve
- Install all of the flange bolts or cap screws and hand pre-tighten them
- Slowly open disc to fully open position, making sure that the outside diameter of disc does not contact the inside diameter of adjacent pipe
- Tighten the flange bolts according to the sequence
- Stroke the valve fully closed and fully open while checking for proper disc clearance and proper pipe alignment

## Electric Wiring (VA300/VA200)

**NOTE:** Wiring must be conducted by qualified technical staff.  
Read Installation Manual before wiring.

**WARNING:** Risk of Electrical Shock. Disconnect the power supply before making electrical connections. Contact with components carrying hazardous voltage can cause electrical shock and may result in severe personal injury or death

-  **NOTE:**
- For IP67 actuator wiring:  
6~12mm cable for type VA301/201..  
10~14mm cable for type VA302/202-VA310/209..
  - Remove the protective cover by the screws on the cover
  - Conduct the terminal wiring according to the installation manual
  - Check wiring again and power on
  - Trail run the actuator and check the operation direction and limiter
  - Put on the protective cover again
- 

# Valve Dimension and Weight

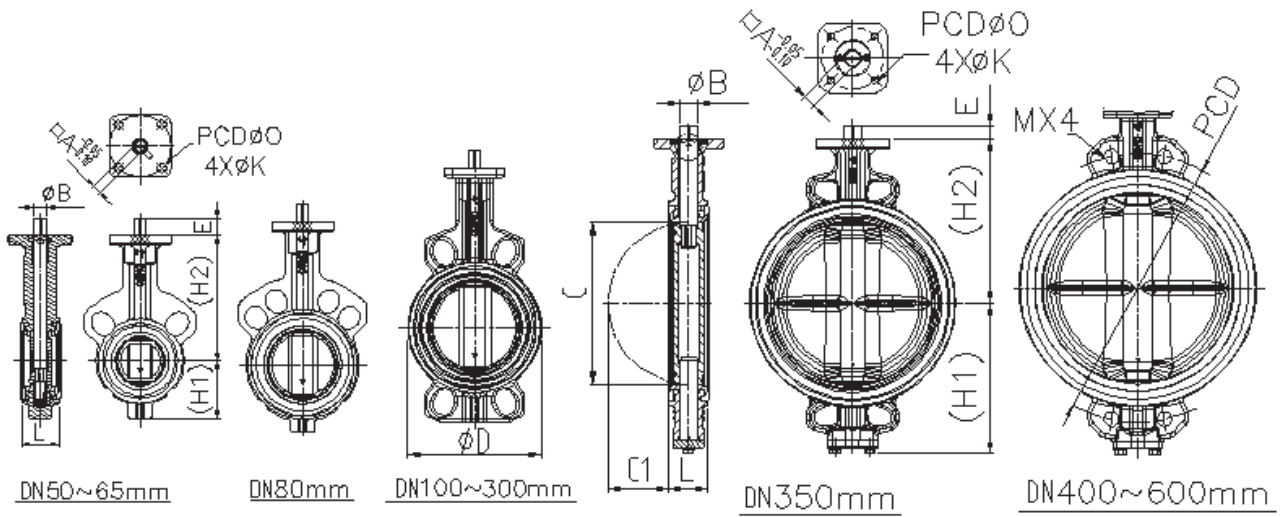


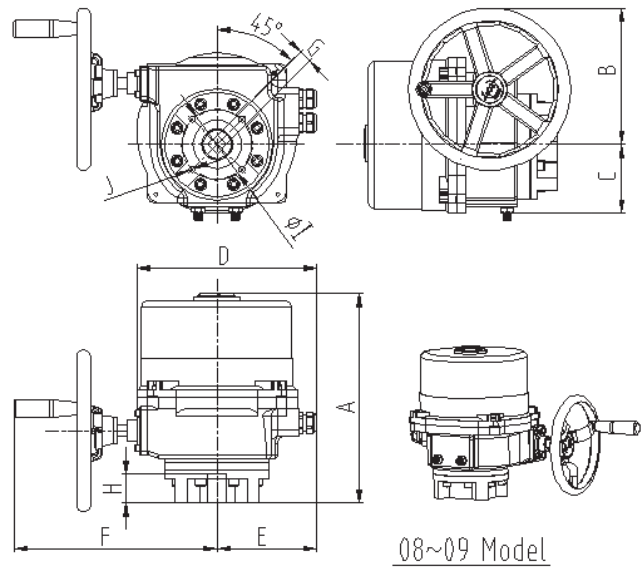
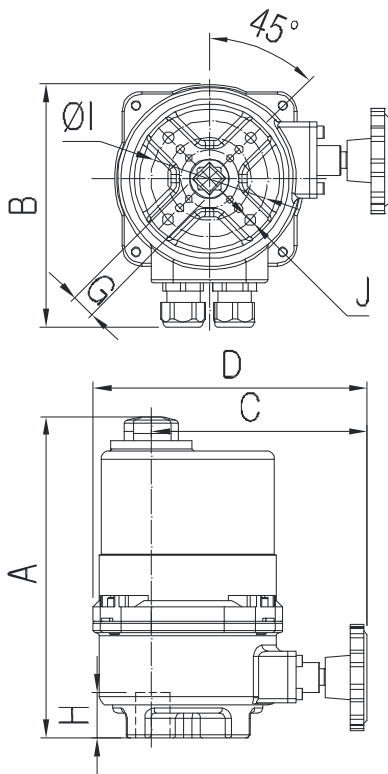
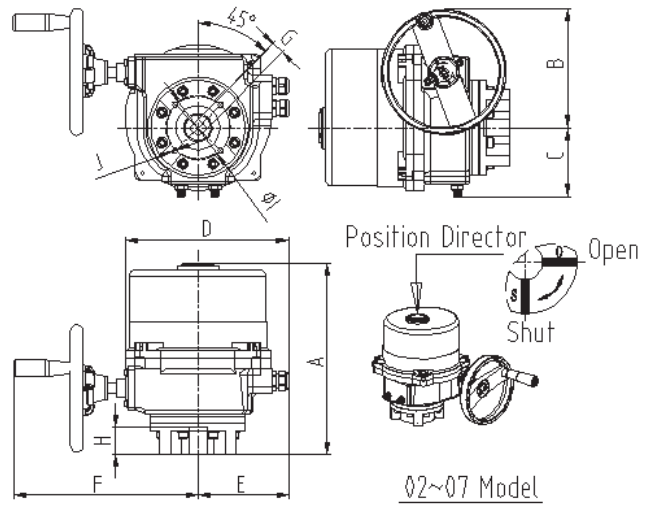
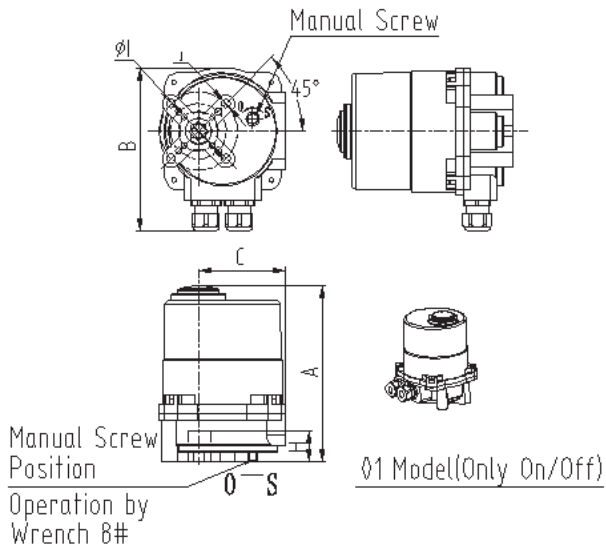
Figure 2. Valve Dimension

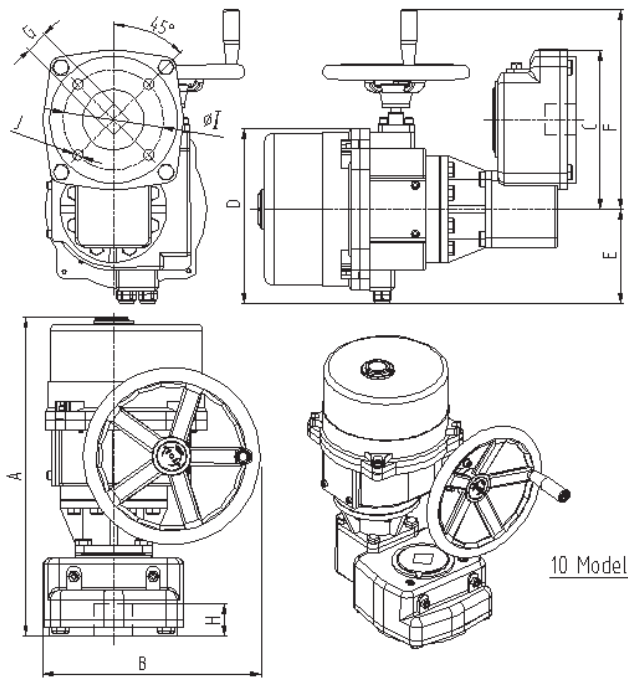
Table 9: Valve dimension (mm) and weight (kg)

DN		L	ΦB	H1	H2	PCD	M×4	ΦD	C1	C	E	□A	PCDΦO	4×ΦK	Type	Weight
(mm)	(inch)															
50	2"	43	14	65	143	125	2	96	8	39	19	11	70	4×Φ9	F07	3
65	2.5"	46	14	71	155	145	2	110	13	55	19	11	70	4×Φ9	F07	3.8
80	3"	46	14	77	162	160	4	124	19	69	19	11	70	4×Φ9	F07	4
100	4"	52	14	107	181	180	4	148	27	91	19	11	70	4×Φ9	F07	5.3
125	5"	56	18	122	197	210	4	180	36	115	19	14	70	4×Φ9	F07	7.3
150	6"	56	18	150	210	240	4	206	47	140	19	14	70	4×Φ9	F07	8.2
200	8"	60	22	165	240	295	4	259	68	186	24	17	102	4×Φ11	F10	13.5
250	10"	68	25	201	286	355	4	320	90	239	24	19	102	4×Φ11	F10	21.5
300	12"	78	28	234	309	410	4	370	111	288	24	22	102	4×Φ11	F10	32.5
350	14"	78	35	301	329	470	4	412	128	325	29	27	125	4×Φ14	F12	48
400	16"	102	35	333	361	525	4	475	143	375	29	27	125	4×Φ14	F12	60
450	18"	114	48	358	393	585	4	530	162	423	38	36	140	4×Φ18	F14	80
500	20"	127	48	392	427	650	4	585	182	473	38	36	140	4×Φ18	F14	125
600	24"	154	60	454	492	770	4	687	214	560	48	36 46*	165	4×Φ22	F16	200

\* 36 for VF6461PAN-C, 46 for VF6461PA-C

# VA300/VA200 Actuator Dimension





## M9000-618-C Dimension

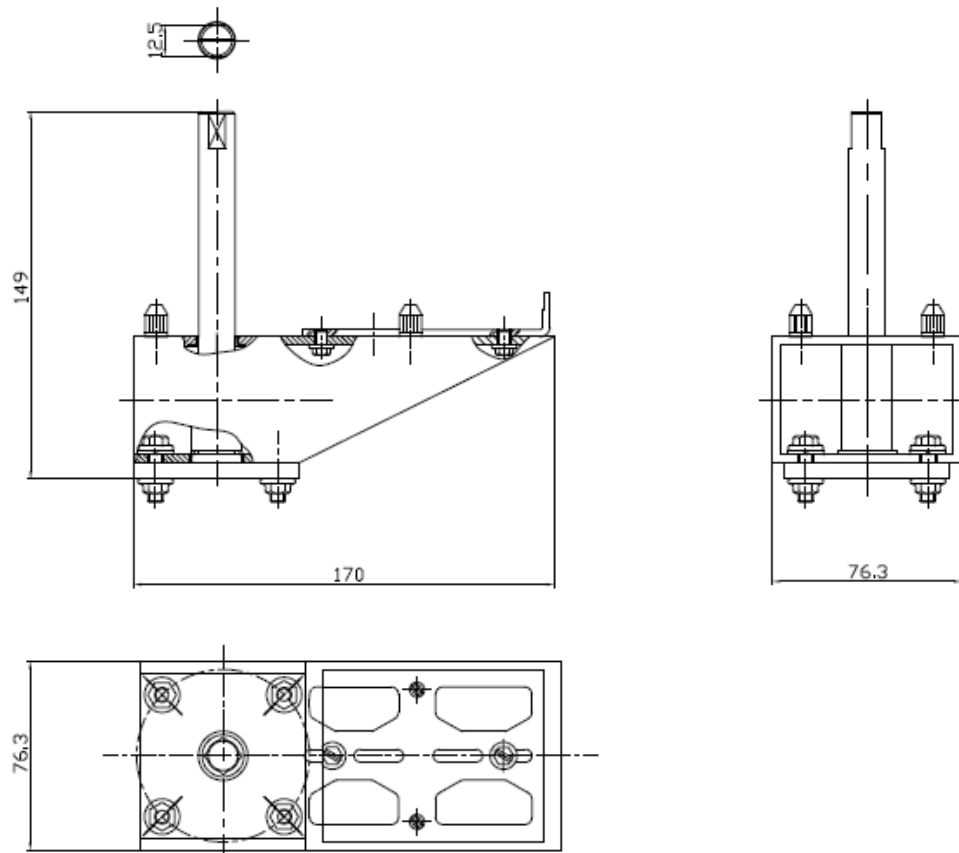


Table 10: Actuator Dimension

Model	A	B	C	D	E	F	G		H	ΦI	J	Type	Weight (kg)
							VA300	VA200					
01	151	145	78.5	-	-	-	11	11	20	70	4-M8	F07	2.3
02BDCN-C	194	145	108	165	-	-	11	14	20	70	4-M8		3.6
02	248	122.5	79	216	120	240	11	14	35	70	4-M8		10.3
03	248	122.5	79	216	120	240	14	17	35	70	4-M8		10.3
04	303	187	103	262	150	297	17	19	55	102	4-M10	F10	20.9
05	303	187	103	262	150	297	19	22	55	102	4-M10		20.9
06	303	187	103	262	150	297	22	27	55	102	4-M10	F10	20.9
07	303	187	103	262	150	297	27	27	55	125	4-M12	F12	21.7
08	363.5	241	119	293	161	346	27	36	65	125	4-M12		35.1
09	363.5	241	119	293	161	346	36	36	65	140	4-M16	F14	35.1
10	531.5	359	266	293	161	346	46	-	85	165	4-M20	F16	75.1

# VA300/VA200 Wiring Diagram

User wiring (dashed)

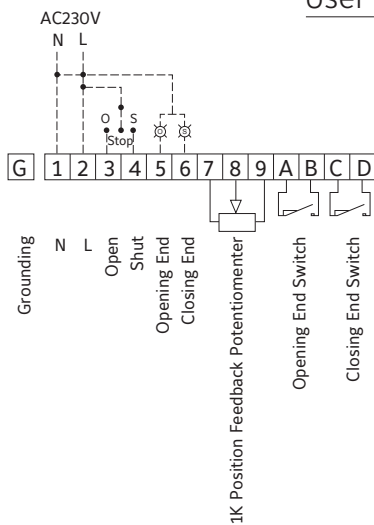


Figure 4. Wiring diagram for On/off Actuator (Model Ended with BDC)

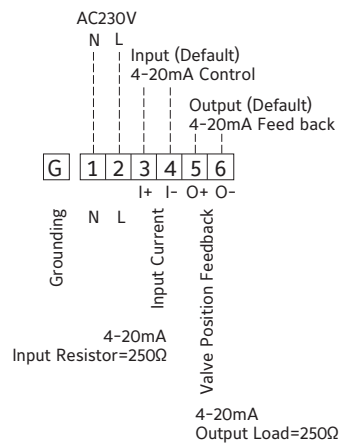
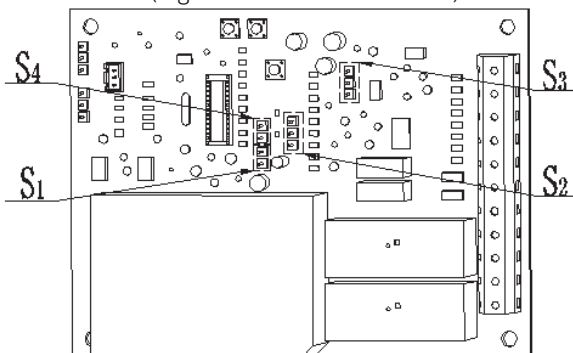


Figure 5. Wiring diagram for Modulating Actuator (Model Ended with CDC)

Control Board Chart (Signal Switch Over Position)



Note: Factory setting of signal is 4-20mA. See Fig. 6 for Signal Switch.

I/O Signal Switch Over

SIGNAL	INPUT		OUTPUT	
	S1	S2	S3	S4
4-20mA	•	•	•	•
0-10V	•	•	•	•
2-10V	•	•	•	•

DEFAULT →

Figure 6. Signal Switch Over direction

**Johnson Controls** is a global diversified technology and industrial leader serving customers in more than 150 countries. Our 168,000 employees create quality products, services and solutions to optimize energy and operational efficiencies of buildings; lead-acid automotive batteries and advanced batteries for hybrid and electric vehicles; and interior systems for automobiles. Our commitment to sustainability dates back to our roots in 1885, with the invention of the first electric room thermostat. Through our growth strategies and by increasing market share we are committed to delivering value to shareholders and making our customers successful. In 2013, Corporate Responsibility Magazine recognized Johnson Controls as the #14 company in its annual "100 Best Corporate Citizens" list. For additional information, please visit <http://www.johnsoncontrols.com>.

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