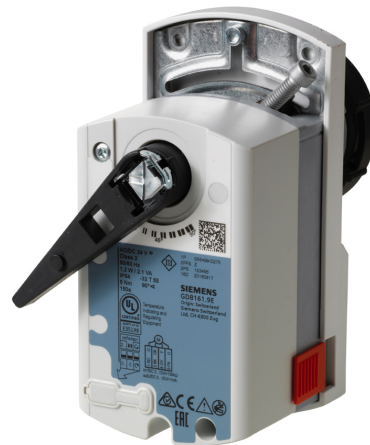


ACVATIX™

## Rotary actuators for ball valves

GDB..9E




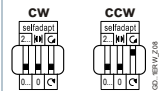


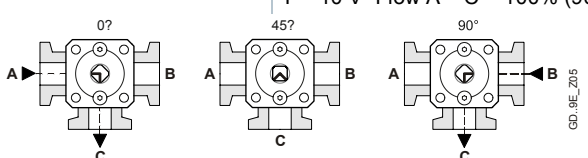
**Electromotoric rotary actuators for open-close, three-position or modulating control. Used in heating, ventilation and air conditioning plants.**

- For 2-port and 3-port control ball valves, internally threaded connections (VAI61.. and VBI61..) or externally threaded connections (VAG61.. and VBG61..), DN15 to DN25
- For 6-port control ball valves VWG41.. with externally threaded connections, DN10 to DN20
- Nominal torque 5 Nm
- Operating voltage AC 24 V ~ / DC 24...48 V = or AC 100...240 V ~
- Positioning signal DC 0/2...10 V =
- Pre-wired with 0.9 m long connection cables

## Features

- Brushless, robust DC motors ensure reliable operation regardless of load.
- The rotary actuators do not require an end position switch, are overload proof, and remain in place upon reaching the end stop.
- The gears are maintenance free and low noise.
- Suitable for use with modulating controllers (DC 0/2...10 V), open-close or three-position controllers.
- We recommend a minimum pulse length of 500 ms on rotary actuators operated with 3-point control to ensure continuous and accurate operation.

## Functions

GDB..	AC 24 V ~ / DC 24...48 V ==	141.9E	161.9E
	AC 100...240 V ~	341.9E	—
Control type		Open-close / three-position	Modulating control (0/2...10 V)
Rotary direction		<p>Clockwise (cw) or counter-clockwise (ccw) direction depends ...</p> <p>... on the type of control.</p> <p>With no power applied, the actuator remains in the respective position.</p> <p>... on the setting of the rotary direction DIL switch</p> 	<p>... on the setting of the rotary direction DIL switch</p>  <p>... on the positioning signal</p> <p>The actuator remains in the achieved position:</p> <p>... if the control signal is maintained at a constant value</p> <p>... for loss of operating voltage.</p>
Combination with 2-port or 3-port control ball valves	NC (normally closed) ball valve	<p>Basic setting: </p> <p>Y1: Opening</p> <p>Y2: Closing</p>	<p>DIL 3 set to "counter-clockwise"</p> <p>Flow = 0% at Y = 0 V</p> <p>Flow = 100% at Y = 10 V</p>
	NO (normally open) ball valve	<p>Basic setting: </p> <p>Y1: Closing</p> <p>Y2: Opening</p>	<p>DIL 3 set to "clockwise"</p> <p>Flow = 100% at Y = 0 V</p> <p>Flow = 0% at Y = 10 V</p>
Combination with 6-port control ball valves			<p>Rotary direction "counter-clockwise" (ccw)</p> <p>Y = 0 V Flow A – C = 100% (0°)</p> <p>Y = 5 V closed (45°)</p> <p>Y = 10 V Flow B – C = 100% (90°)</p>
			<p>Rotary direction "clockwise" (cw)</p> <p>Y = 0 V Flow B – C = 100% (0°)</p> <p>Y = 5 V closed (45°)</p> <p>Y = 10 V Flow A – C = 100% (90°)</p> 
Position indication: Mechanical		Rotary angle position indication by a position indicator/hand lever.	

Position indication: Electrical		Output voltage U = DC 0/2...10 V is generated proportional to the rotary angle. U depends on the rotary direction of the DIL switch setting.
Self-adaptation of linear span		When self-adaptation is active, the actuator automatically determines the mechanical end positions of the linear span.
Manual adjustment	The rotary actuator can be manually adjusted by pressing the gear train disengagement button.	
Rotary angle limitation	The rotary angle of the shaft adapter can be limited mechanically with a set screw.	

## Technical design/mechanical design

### Housing

The housing consists essentially of flame retardant, non brominated, non chlorinated glass fibre reinforced plastic.

## Type summary

Type	Stock no.	Control	Operating voltage	Positioning signal Y	Position indicator U = DC 0...10 V ==	Self-adaption of rotational angle range	Aux. switches	Rotary direction switch
GDB141.9E	S55499-D383	Open-close or three-position	AC 24 V ~ / DC 24...48 V ==	-	-	-	-	yes
GDB341.9E	S55499-D384		AC 100...240 V ~					
GDB161.9E	S55499-D397	Modulating	AC 24 V ~ / DC 24...48 V ==	DC 0/2...10 V ==	yes	yes	-	

## Accessories / Spare parts

Individual spare parts are not available. Components of the accessory kit ASK77.3 <sup>1)</sup>, available as an accessory, can however be used for spare parts.

Description	Components
ASK77.3 Accessory Kit BV for GLBxx1.9E	Mounting bracket (base plate) Axle with sleeve and spring Manual lever with locking clip

<sup>1)</sup> Can also be used as rotary actuator for ball valves together with the actuator for air dampers G..B.1E.

## Equipment combinations

### GDB..9E and VA..61.. 2-port control ball valves

Control ball valves with:						GDB..9E	
internal threads <sup>1)</sup>	Rp	external threads <sup>2)</sup>	G..B	k <sub>vs</sub> [m <sup>3</sup> /h]	DN	Δp <sub>max</sub>	Δp <sub>s</sub>
-	-	VAG61.15..	G 1 B	1...6.3	15	350	1400
VAI61.15..	Rp ½"	-	-	1...10	15		
VAI61.20..	Rp ¾"	VAG61.20..	G 1 ¼ B	4...10	20		
VAI61.25..	Rp 1"	VAG61.25..	G 1 ½ B	6.3...16	25		

## GDB.. 9E and VB..61.. 3-port control ball valves

Control ball valves with:						GDB..9E	
internal threads <sup>1)</sup>	Rp	external threads <sup>2)</sup>	G..B	k <sub>vs</sub> [m <sup>3</sup> /h]	DN	Δp <sub>max</sub>	Δp <sub>s</sub>
VBI61.15..	Rp ½"	VBG61.15..	G 1 B	1.6...6.3	15	350	–
VBI61.20..	Rp ¾"	VBG61.20..	G 1 ¼ B	4...6.3	20		
VBI61.25-10	Rp 1"	VBG61.25-10	G 1 ½ B	10	25		

<sup>1)</sup> Data sheet N4211

<sup>2)</sup> Data sheet N4212

## GDB.. 9E and VWG41.. control ball valves

Typ	DN	Used as toggle key	Used as control ball valve	Δp <sub>max</sub> [kPa]
GDB341.9E and VWG41.10.. and VWG41.20..	10	yes	–	200
	20			
GDB161.9E and VWG41.10.. and VWG41.20..	10	–	yes	
	20			

Δp<sub>max</sub> = Maximum permissible differential pressure over the ball valve control path, valid for the entire positioning range of the ball valve rotary actuator unit.

## Product documentation


Topic	Title	Document ID
Data sheet	Rotary actuators for ball valves GDB..9E	A6V10636150_enAP_d
Mounting instructions	Rotary-type actuator GDB..9E	A6V10636144_----
Mounting instructions	Ball valve VAI61.. / VBI61..	M4211
Mounting instructions	Ball valve VAG61.. / VBG61..	M4212
Mounting instructions	6-port control ball valve VWG41..	A6V10564501

Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:

<http://siemens.com/bt/download>

## Notes

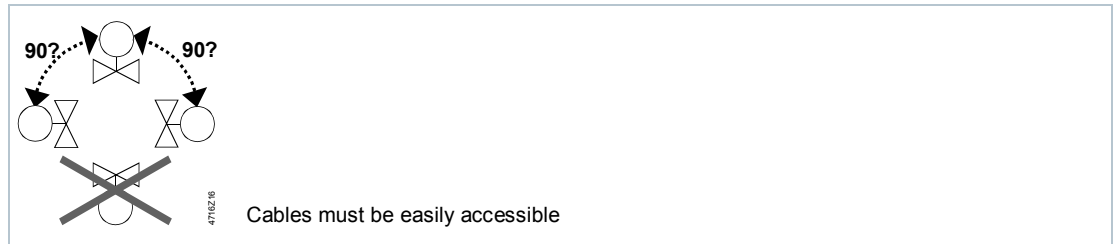
## Safety

	<p><b>⚠ Caution</b></p>
	<p><b>National safety regulations</b></p> <p>Failure to comply with national safety regulations may result in personal injury and property damage.</p> <ul style="list-style-type: none"> <li>• Observe national provisions and comply with the appropriate safety regulations.</li> <li>• Use only properly trained technicians for mounting, commissioning, and servicing.</li> </ul>

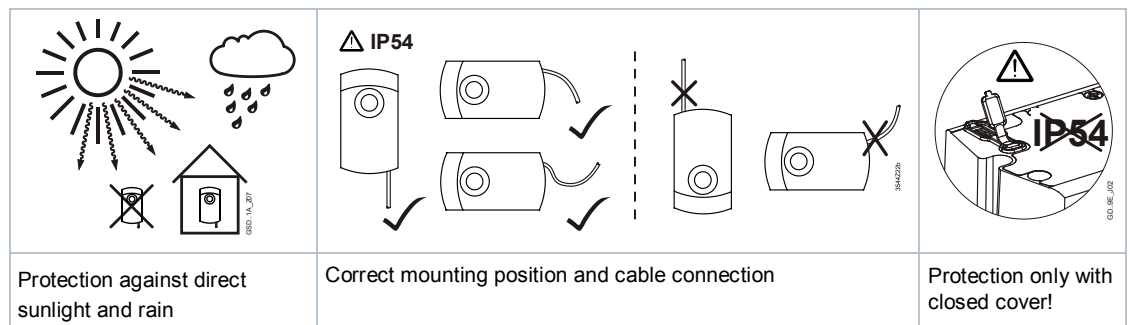
## Mounting

Both ball valve and rotary actuator can easily be assembled at the mounting location. Neither special tools nor adjustments are required.

### Orientation



### Protection against weather, humidity and dirt



## Installation

	<p><b>⚠ WARNING</b></p> <p><b>No internal line protection for supply lines to external consumers</b></p> <p>Risk of fire and injury due to short-circuits</p> <ul style="list-style-type: none"> <li>Adapt the line diameters as per local regulations to the rated value of the installed fuse.</li> </ul>
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## Commissioning

When commissioning the system, check wiring and the functions of the rotary actuator.

### Manual adjustment

The rotary actuator can be manually adjusted into any position between 0° and 90° by pushing the gear train disengagement slider.


If a control signal from the controller is present, this will take priority in determining the position after the slider is released.

For manual adjustment: Power off!

## Maintenance

The actuators GDB..9E are maintenance-free.

## Disposal

	<p>The device is considered an electronics device for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic garbage.</p> <ul style="list-style-type: none"> <li>• Dispose of the device through channels provided for this purpose.</li> <li>• Comply with all local and currently applicable laws and regulations..</li> </ul>
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## Technical data

Power supply GDB1..9E		
Operating voltage (SELV/PELV) / Frequency		AC 24 V ~ ±20 % (19,2...28,8 V ~) / 50/60 Hz DC 24...48 V = ±20 % (19,2...57,6 V =) <sup>1)</sup>
Power consumption running	GDB141.9E GDB161.9E	2 VA / 1 W 2.1 VA / 1.2 W
Power consumption holding	GDB141.9E GDB161.9E	0.5 W 0.7 W
Power supply GDB341.9E		
Operating voltage / Frequency		AC 100...240 V ~ ±10 % (90...264 V ~) / 50/60 Hz
Power consumption running		5 VA / 1.6 W
Power consumption holding		0.9 W
Function data		
Nominal torque		5 Nm
Maximum torque (blocked)		10 Nm
Minimum holding torque		5 Nm
Nominal rotary angle (with position indication)		90°
Maximum rotary angle (mechanic limitation)		95° ± 2°
Runtime for 90° rotary angle		150 s
Actuator sound power level		28 dB(A)
Inputs		
Positioning signal for GDB141.9E		
Operating voltage	(wires 1-6/G-Y1)	clockwise
AC 24 V ~ / DC 24...48 V =	(wires 1-7/G-Y2)	counterclockwise
Positioning signal for GDB341.9E		
Operating voltage	(wires 4-6/N-Y1)	clockwise
AC 100...240 V ~	(wires 4-7/N-Y2)	counterclockwise
Positioning signal for GDB161.9E		
Input voltage	(wires 8-2/Y-G0)	DC 0/2...10 V =
Current consumption		0.1 mA
Input resistance		>100 kΩ
Max. permissible input voltage		DC 35 V = limited to DC 10 V =
Protected against faulty wiring		max. AC 24 V ~ / DC 24...48 V =
Hysteresis		60 mV
Outputs		
Position indicator (GDB161.9E)		
Output signal	(wires 9-2/U-G0)	DC 0...10 V =
Output voltage U		DC ±1 mA
Max. output current		max. AC 24 V ~ / DC 24...48 V =
Protected against faulty wiring		

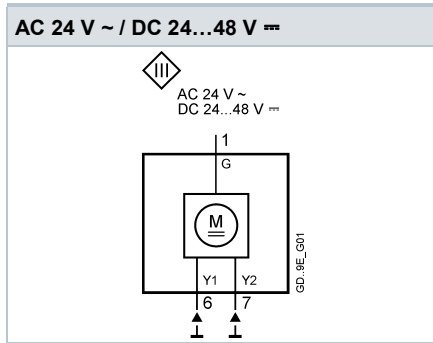
<b>Connection cables</b>	
Cable length	0.9 m
Cross section of prewired connection cables	0.75 mm <sup>2</sup>
Permissible length for signal lines	300 m
<b>Degree of protection</b>	
Insulation class AC 24 V ~ / DC 24...48 V $\equiv$ , feedback potentiometer AC 100...240 V ~, auxiliary switches	As per EN 60730 III II
Housing protection	IP 54 as per EN 60529
<b>Environmental conditions</b>	
Operation Climatic conditions Mounting location Temperature extended Humidity (non-condensing)	IEC 60721-3-3 Class 3K5 interior, weather-protected -32...+55 °C <95 % r.F.
Transport Climatic conditions Temperature extended Humidity (non-condensing)	IEC 60721-3-2 Class 2K3 -32...+70 °C <95 % r.F.
Storage Climatic conditions Temperature extended Humidity (non-condensing)	IEC 60721-3-1 Class 1K3 -32...+50 °C <95 % r.F.
Mechanical conditions	Class 2M2
<b>Standards, directives and approvals</b>	
Product standard	EN 60730 Part 2-14 / Particular requirements for electric actuators
Electromagnetic compatibility (Applications)	For use in residential, commercial, light-industrial and industrial environments
EU Conformity (CE)	A5W00003842 <sup>2)</sup>
RCM Conformity	A5W00003843 <sup>2)</sup>
EAC Conformity	Eurasian conformity
UL	UL as per UL 60730 <a href="http://ul.com/database">http://ul.com/database</a> cUL as per CSA-C22.2 No. 24-93
<b>Environmental compatibility</b>	
The product environmental declaration A5W00026068 <sup>2)</sup> contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	
<b>Dimensions</b>	
Actuator W x H x D	see „Dimensions“, p. 9
<b>Weight</b>	
Without packaging	0.69 kg

<sup>1)</sup> cUL: Permitted only to DC 30 V  $\equiv$

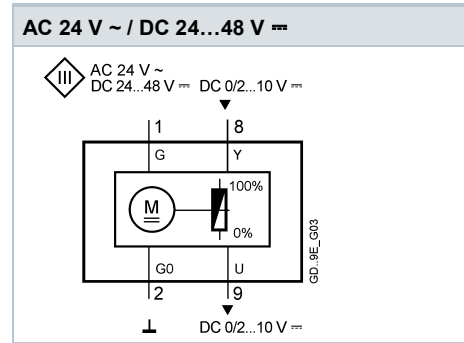
<sup>2)</sup> The documents can be downloaded from <http://siemens.com/bt/download>.

Internal Diagrams

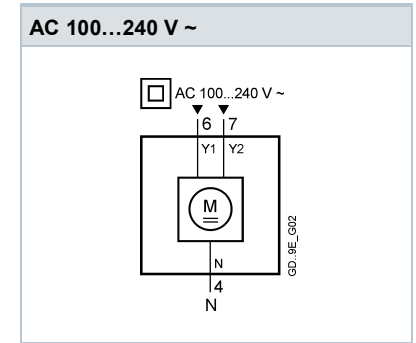
GDB141.9E (open-close, three-p.)



GDB161.9E (modulating)



GDB341.9E (open-close, three-p.)



Connection diagrams

GDB1..9E (AC 24 V ~ / DC 24...48 V ~)

Open-close, single wire control Single Pole Single Throw (SPST)	Open-close, two wire control Single Pole Double Throw (SPDT)	Three-position control	Modulating control

GDB341.9E (AC 100...240 V ~)

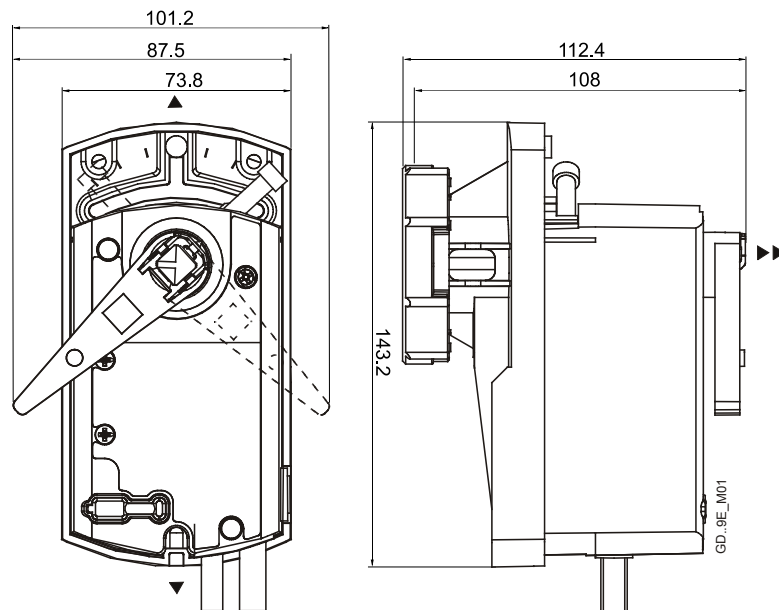
Open-close, single wire control Single Pole Single Throw (SPST)	Open-close, two wire control Single Pole Double Throw (SPDT)	Three-position control



## Cable labeling

Pin	Code	No	Color	Abbreviation	Meaning
Actuators	G	1	red	RD	System potential AC 24 V ~ / DC 24...48 V =
AC 24 V ~	G0	2	black	BK	System neutral
DC 24...48 V =	Y1	6	purple	VT	Positioning signal AC/DC 0 V, "clockwise" (GDB141.9E)
	Y2	7	orange	OG	Positioning signal AC/DC 0 V, "counter-clockwise" (GDB141.9E)
	Y	8	grey	GY	Signal in (GDB161.9E)
	U	9	pink	PK	Signal out (GDB161.9E)
	Actuators	N	4	blue	BU
AC 100...240 V ~	Y1	6	black	BK	Positioning signal AC 100...240 V ~, "clockwise" (GDB341.9E)
	Y2	7	white	WH	Positioning signal AC 100...240 V ~, "counter-clockwise" (GDB341.9E)

## Dimensions



Dimensions in mm

- ▶ = >100 mm
- ▶▶ = >200 mm

Minimum clearance from ceiling or wall for mounting, connection, operation, maintenance etc.

## Revision numbers

Type	Valid from rev. no.
GDB141.9E	..C
GDB341.9E	..C
GDB161.9E	..C

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