SIEMENS

OpenAir™

Air damper actuators

GDB..1E/102

Electronic motor driven actuators for open-close, three-position and modulating control

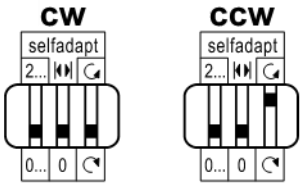
- Nominal torque 5 Nm
- Operating voltage AC 24 V ~ / DC 24...48 V ⎓
- Mechanically adjustable span between 0...90°
- Pre-wired with 0.9 m long connection cables
- Position indication: mechanical and electrical
- Self-adaptation of rotary angle range and adjustable auxiliary switches for supplementary functions

Use

The rotary actuators are used in ventilation and air conditioning plants to regulate and shut off air dampers:

- For damper areas up to 0.8 m^2 (guideline; always observe damper manufacturer's data).
- Suitable for use with modulating controllers (DC 0/2...10 V), open-close or three-position controllers for air dampers or air throttles.
- We recommend a minimum pulse length of 500 ms on rotary actuators operated with three-position control to ensure continuous and accurate operation.

Functions

GDB..	AC 24 V ~ / DC 24...48 V ⎓	141.1E/102, 146.1E/102	161.1E/102
Control type		Open-close / three-position	Modulating control (0/2...10 V)
Rotary direction		Clockwise or counter-clockwise direction depends on...	
		• ...the type of control; • ...the setting of the rotary direction switch: With no power applied, the actuator remains in the reached position.	• ...the setting of the rotary direction DIL switch:  • ...the positioning signal. The actuator remains in the reached position if...: • ...the control signal is maintained at a constant value; • ...operating voltage is lost.
Position indication	mechanical	Rotary angle position indication using a position indicator.	
Auxiliary switch		The switching points for auxiliary switches A and B can be set independent of each other in increments of 5° within 0...90°.	
Self-adaptation of linear span		-	When self-adaptation is active, the actuator automatically determines the mechanical end positions of the linear span and maps the characteristic function (Uo, ΔU) to the calculated linear span.
Manual adjustment		The 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 within 0...90° with a set screw.	

Technical design

Housing

The housing consists essentially of glass fiber reinforced plastic:

- flame retardant
- non-brominated
- non-chlorinated.

Actuator motor / gears

- Brushless, robust DC motors ensure reliable operation regardless of load. The damper 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.

Type summary

Type	Stock no.	Control	Operating voltage	Positioning signal Y	Position indicator U = DC 0...10 V –	Self-adap. of rotary angle range	Aux. switches	Rotary direction switch
GDB141.1E/102	S55499-D871	Open-close or three-position	AC 24 V ~ / DC 24...48 V ⎓	-	-	-	-	yes
GDB146.1E/102	S55499-D872						2	
GDB161.1E/102	S55499-D873	Modu-lating	AC 24 V ~ / DC 24...48 V ⎓	DC 0/2...10 V ⎓	yes	yes	-	
Nominal torque		5 Nm (applies to all)						

Acessories / Spare parts

Type	Docment ID
ASK..	N4698

Product documentation

Topic	Title	Document ID
Data sheet	Air damper actuators	A6V14074120
Mounting instructions	GDB..1E, GLB..1E	A6V10409478

Notes

Safety

⚠ CAUTION	
	National safety regulations Failure to comply with national safety regulations may result in personal injury and property damage. ● Observe national provisions and comply with the appropriate safety regulations. ● Use only properly trained technicians for mounting, commissioning, and servicing.

Engineering

Auxiliary switches

Cannot be added in the field.

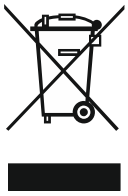
Installation

⚠ WARNING	
	No internal line protection for supply lines to external consumers Risk of fire and injury due to short-circuits! ● Adapt the line diameters as per local regulations to the rated value of the installed fuse.

Maintenance

The actuators GDB..1E/102 are maintenance-free

Disposal



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.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Power supply GDB1..1E/102			
Operating voltage (SELV/PELV)			AC 24 V ~ ±20 % (19.2...28.8 V ~) DC 24...48 V ⎓ ±20 % (19.2...57.6 V ⎓) [1]
Frequency			50/60 Hz
Power consumption	running	GDB14..1E/102	1.0 VA / 0.6 W
		GDB16..1E/102	1.3 VA / 1.0 W
	holding	GDB14..1E/102	0.7 VA / 0.4 W
		GDB16..1E/102	1.0 VA / 0.6 W

Functional 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 GDB14..1E/102			
	Operating voltage AC 24 V ~ / DC 24...48 V ⎓	wires 1-6/G-Y1	Clockwise
		wires 1-7/G-Y2	Counter-clockwise
Positioning signal for GDB16..1E/102			
	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 ⎓ internally limited to DC 10 V ⎓
	Protected against faulty wiring		max. AC 24 V ~ / DC 24...48 V ⎓
Hysteresis	for non-adjustable characteristic		60 mV
	for adjustable characteristic		0.6 % of ΔU

Outputs				
Position indicator				
	Output signal GDB16..1E/102		wires 9-2/U-G0	
		Output voltage U		DC 0...10 V ⎓
		Max. output current		DC ±1 mA
		Protected against faulty wiring		max. AC 24 V ~ / DC 24...48 V ⎓

Auxiliary switches (GDB146.1E/102)		
Switching voltage		AC 24..250 V ~ / DC 12...30 V ⎓
Contact rating		6 A resistive, 2 A inductive, min. 10 mA @ AC 4 A resistive, 2 A inductive, min. 10 mA @ DC 30 V ⎓ 0.8 A resistive, 0.5 A inductive, min. 10 mA @ DC 60 V ⎓
Electric strength aux. switch against housing		AC 4 kV
Switching range for aux. switches		5...90°
	Setting increments	5°
Factory setting	Switch A	5°
	Switch B	85°

Connection cables	
Cable length	0.9 m
Cross section of pre-wired connection cables	0.75 mm2
Permissible length for signal lines	300 m

Degree of protection		
Insulation class		As per EN 60730
	AC 24 V / DC 24...48 V, feedback potentiometer	III
	AC 100...240 V, aux. switches	II
Housing protection		IP54 as per EN 60529

Environmental conditions		
Operation		IEC 60721-3-3
	Climatic conditions	Class 3K5
	Mounting location	interior, weather-protected
	Temperature (extended)	-32...55 °C
	Humidity (non-condensing)	<95 % r.h.
Transport		IEC 60721-3-2
	Climatic conditions	Class 2K3

Environmental conditions		
	Temperature (extended)	-32...70 °C
	Humidity (non-condensing)	<95 % r.h.
Storage		IEC 60721-3-1
	Climatic conditions	Class 1K3
	Temperature (extended)	-32...50 °C
	Humidity (non-condensing)	<95 % r.h.
Mechanical conditions		Class 2M2

Standards, directives and approvals	
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 [1)]

Environmental compatibility
The product environmental declaration A5W00026066 [2)] contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

Dimensions and weight		
Actuator W x H x D		See Dimensions [▶ 9]
Damper shaft		
	Round	8...16 mm
	Round	8...10 mm (with centering element)
	Square	6...12.8 mm
	Min. shaft length	20 mm
	Max. hardness	300 AV
Weight (without packaging)	without switches	Max. 0.49 kg
	with switches	Max. 0.63 kg

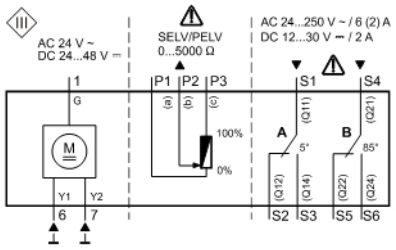
[1)] The documents can be downloaded from http://siemens.com/bt/download.

Diagrams

Internal diagrams

GDB14..1E/102: open-close, three-position control

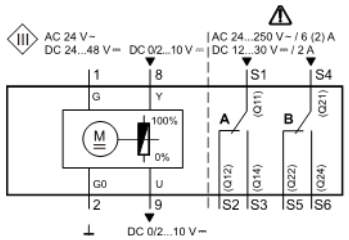
AC 24 V ~ / DC 24...48 V –



GDB16..1E/102: modulating control

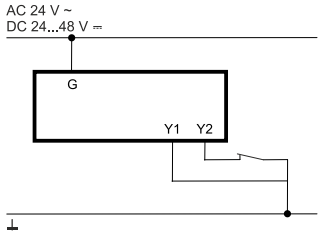
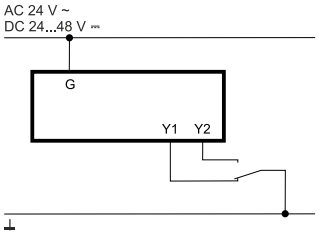
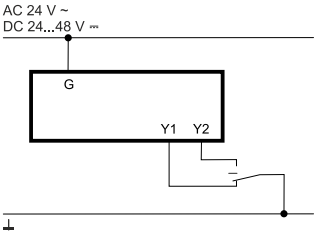
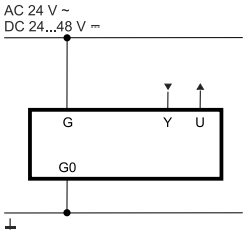
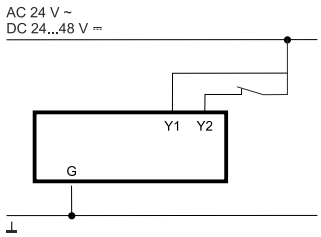
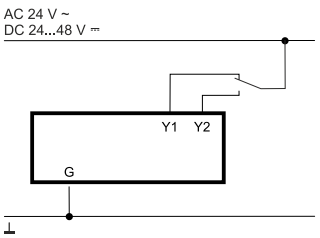
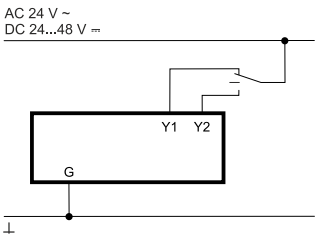
AC 24 V ~ / DC 24...48 V –

Y = DC 0/2...48 V –



Connection diagrams

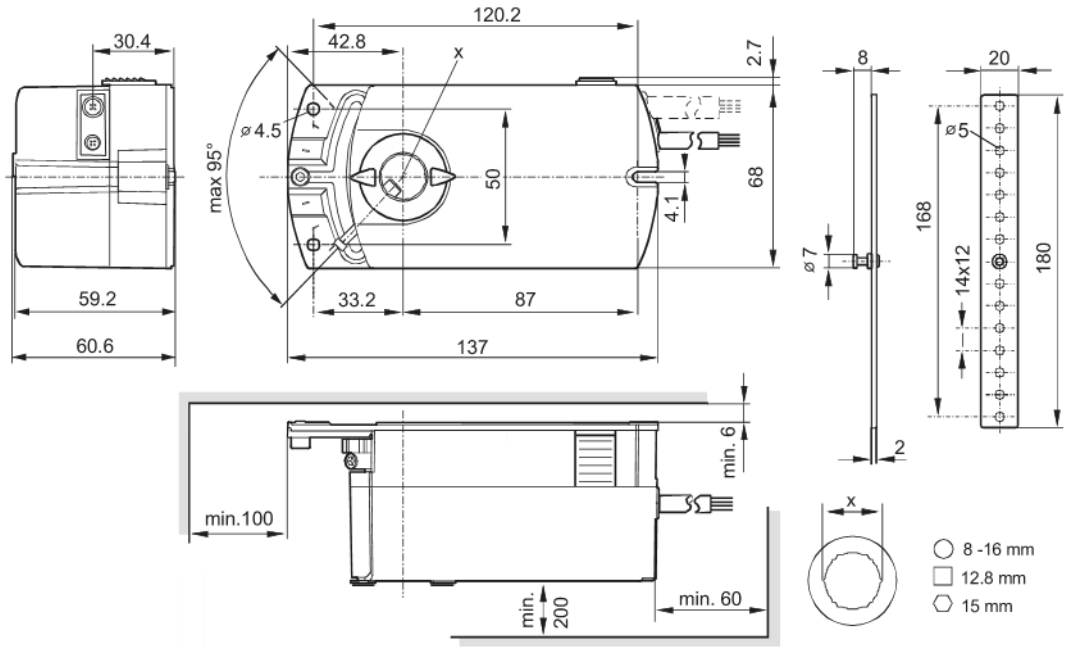
GDB1..1E/102 (AC 24 V ~ / DC 24...48 V –)

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**
			
			

Cable labeling

Connection	Code	No.	Color	Abbreviation	Meaning
Actuators AC 24 V ~ DC 24...48 V ⎓	G	1	red	RD	System potential AC 24 V ~ / DC 24...48 V ⎓
	G0	2	black	BK	System neutral
	Y1	6	purple	VT	Positioning signal AC/DC 0 V "clockwise" (GDB14..1E/102)
	Y2	7	orange	OG	Positioning signal AC/DC 0 V "counter-clockwise" (GDB14..1E/102)
	Y	8	gray	GY	Signal in (GDB16..1E/102)
	U	9	pink	PK	Signal out (GDB16..1E/102)
Auxiliary switches	Q11	S1	gray/red	GY RD	Switch A input
	Q12	S2	gray/blue	GY BU	Switch A normally closed contact
	Q14	S3	gray/pink	GY PK	Switch A normally open contact
	Q21	S4	black/red	BK RD	Switch B input
	Q22	S5	black/blue	BK BU	Switch B normally closed contact
	Q24	S6	black/pink	BK PK	Switch B normally open contact

Dimensions



Dimensions in mm

Revision numbers

Type	Valid from rev. no.
GDB141.1E/102	..B
GDB146.1E/102	..B
GDB161.1E/102	..B

Issued by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
CH-6300 Zug
+41 58 724 2424
www.siemens.com/buildingtechnologies

© Siemens Switzerland Ltd, 2023
Technical specifications and availability subject to change without notice.

Document ID A6V14074120_en--_a

Edition 2023-04-13