SIEMENS

OpenAir™

Air Damper Actuators Modbus RTU

GEB161.1E/MO, GIB161.1E/MO non-spring return types

Damper actuators 20 Nm / 35 Nm (non-spring return) witih Modbus communication

- Nominal torque:
  - GEB..: 20 Nm
    (Legacy type: 15 Nm)
  - GIB..: 35 Nm
- Modbus RTU communication
- Operating voltage: AC/DC 24 V
  - *(Legacy types: AC 24 V)*
- For air-handling units (AHU) and other ventilation applications

Functions

Function	Description
Communication	Modbus RTU (RS-485), not galvanically separated
Functions	• Setpoint and actual position 0...100 % • Override control Open / Close / Min / Max / Stop • Setpoint monitoring and backup mode
Supported baudrates	9.6 / 19.2 / 38.4 / 57.6 / 76.8 / 115.2 kBaud
Transmission formats	1-8-E-1 / 1-8-O-1 / 1-8-N-1 / 1-8-N-2
Bus termination	120 Ω electronically switchable

Type summary

Type	Stock no.	Operating voltage	Positioning signal	Power consumption	Positioning time	Manual adjuster	Position feedback
GEB161.1E/MO	S55499-D663	AC/DC 24 V	Modbus RTU	2.6 VA / 1.7 W max. [1]	150 s	Yes	Yes
GIB161.1E/MO	S55499-D856			3.4 VA / 2.4 W max. [1]			
Legacy types:							
GEB161.1E/MO [2]	*S55499-D298*	*AC 24 V*	*Modbus RTU*	*6 VA / 5.5 W max.* [1]	*150 s*	*Yes*	*Yes*
GIB161.1E/MO [3]	*S55499-D299*			*8 VA / 8 W max.* [1]			

[1] max. = actuator rotates

[2] Available until Sep. 2021

[3] While stocks last

Ordering (example)

Type	Stock no.	Description	Quantity
GEB161.1E/MO	S55499-D663	Air damper actuator Modbus	1
ASK74.7	BPZ:ASK74.7	Shaft extension	1
(+ additional accessories)			

Accessories / Spare parts

- GEB..: See data sheet N4697
- GIB...: See data sheet N4699

(See "Product documentation [▶ 3]")

Equipment combinations

Type	Stock no.	Description	Documentation
POL424.50/STD	S55394-C245-A100	Programmable Climatix controller	See "Product documentation [▶ 3]"
POL424.70/STD	S55394-C247-A100		
POL635.00/STD	BPZ:POL635.00/STD		
POL638.00/STD	BPZ:POL638.00/STD		
POL638.70/STD	S55396-C387-A100		

Product documentation

Title	Content	Document ID
Actuators without spring return GEB..1	Technical basics: Detailed information about rotary actuators without spring return 15 Nm	Z4621
Actuators without spring return GBB/GIB..1	Technical basics: Detailed information about rotary actuators without spring return 35 Nm	Z4626
Mounting instructions Actuators G..A161.1E/MO, G..B161.1E/MO	Mounting instructions: Installation of types with external Modbus interface	A5W00195533
Accessories and Spare Parts for Air Damper Actuators – ASC.., ASK..	Data sheet: Overview, functions and applications for GMA.. and GEB..	N4697
Accessories and Spare Parts for Air Damper Actuators – ASC.., ASK..	Data sheet: Overview, functions and applications for GCA.., GBB.. and GIB..	N4699
Climatix - Standard application for air handling units	Application description: Detailed overview of Climatix applications for air handling units	A3975
Climatix Controllers POL42..	Data sheet: Basic information about freely programmable Climatix controllers (POL42..)	Q3973
Climatix Controllers POL4..	Basic documentation: Detailed information about freely programmable Climatix controllers (POL4..)	P3973
HVAC&R controller POL63..	Data sheet: Basic information about freely programmable Climatix controllers (POL63..)	Q3230
Climatix Controllers POL6.. and I/O modules POL9..	Basic documentation: Detailed information about Climatix controllers (POL6..) and communication modules (POL9..)	P3903
Climatix range	Data sheet: Basic information about the Climatix range (POL..)	Q3900

Related documents such as the environmental declarations, declarations of conformity, etc., can be downloaded from the following Internet address:

www.siemens.com/bt/download

Notes

Safety

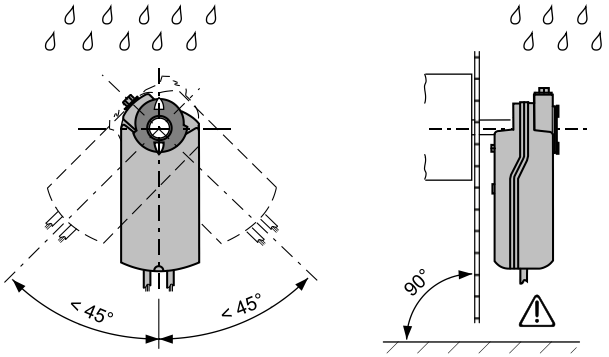
⚠ CAUTION	
	**National safety regulations** Failure to comply with national safety regulations may result in personal injury and property damage. ● Observe national provisions and comply with the appropriate safety regulations. ● Use only properly trained technicians for mounting, commissioning, and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

Mounting

NOTICE	
!	Do not open the damper actuators.

◈ **IP54** protection in the following positions:

IP54



Commissioning

Workflow 1

The devices are especially designed for using the Climatix push-button configuration as described in the document A3975 [1)].

The bus configuration can alternately be parameterized via the local HMI, see chapter "User interface [▶ 6]".

During commissioning, check/set the following:

- Bus configuration (address, baudrate, transmission mode, and optionally termination). The default address 255 allows to install and power multiple actuators at the same time without interfering with each other.
- Actuator parameters (opening direction, position limitations, position adaptation etc.). These parameters can be read out via the Modbus register.

[1)] See "Product documentation [▶ 3]".

Workflow 2

The devices can be configured over bus, if the pre-commissioning settings allow for a connection between the Modbus client/programming tool and peripheral devices (i.e. non-conflicting addresses and matching baudrate/transmission format).

- *Full configuration over bus:* If the address is unique per segment when powered up, the device can be accessed by the Modbus client/programming tool using the default settings for baudrate (or autobaud) and transmission format.
- *Partial configuration over bus:* If the address is not unique per segment when powered up, each device must receive a non-conflicting address before connecting it to the bus, either by using the address input with push-button (cf. "Push-button addressing [▶ 7]") or by setting the address to 246 by pressing the push-button >5 s and <10 s (cf. "Push-button operation [▶ 6]").

  After addressing all devices, the remaining configuration can be done over the bus using the default settings for baudrate (or autobaud) and transmission format for the Modbus client.

Once the connection is established, the bus and actuator parameters can be set over bus to the target values. When overwriting the bus configuration, a timeout is employed, so that "1 = Load" must be written into register 768 within 30 seconds. Otherwise, all changes are discarded.

Example: Table shows bus configuration registers before and after changing them over bus.

Register	Name	Pre-commissioning	New value (ex.)
764	Modbus address	246	12
765	Baudrate	0 = Auto	1 = 9600
766	Transmission format	0 = 1-8-E-1	3 = 1-8-N-2
767	Termination	0 = Off	0 = Off
768	Bus conf. command	0 = Ready	1 = Load

Maintenance

The damper actuators G..B161.1E/MO are maintenance-free.

Disconnect the electrical connections from the terminals if you need to work on the device.

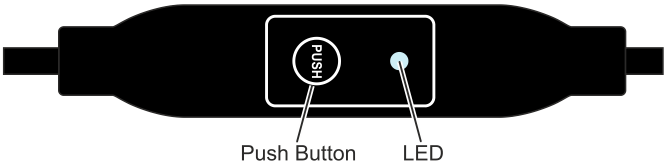
Disposal

This symbol or any other national label indicate that the product, its packaging, and, where applicable, any batteries may not be disposed of as domestic waste. Delete all personal data and dispose of the item(s) at separate collection and recycling facilities in accordance with local and national legislation.
For additional details, refer to Siemens information on disposal.

Warranty

The application-specific technical data is guaranteed only in combination with the Siemens products listed in the 'Device combinations' section. If third-party products are used, any guarantee provided by Siemens will be invalidated.

User interface



Push-button operation

Activity		Push-button operation	Feedback
Display current address (starting with lowest address digit)		Press button 1 x briefly (<1 s)	• 1-digit: red • 10-digit: green • 100-digit: orange If termination is switched on, LED flashes blue 1 x after address display. Example: 124 = 4 x red, 2 x green, 1 x orange
Turn bus termination on/off			
	Turn on	Press button 3 x	LED stops flashing and flickering (termination mode).
		Press button 1 x briefly (<1 s)	LED flashes blue 1 x.
		Press and hold button until LED lights up red	LED lights up red (confirmation).
		Release button	LED turns off. Address is displayed. LED flashes blue 1 x after address display. Device goes into normal operation.
	Turn off	Press button 3 x	LED stops flashing and flickering (termination mode).
		Press and hold button until LED lights up red	LED lights up red (confirmation).
		Release button	Device goes into normal operation.
Enter Modbus address with push-button		Press button 1...5 s	See "Push-button addressing [▶ 7]"
Enter push-button addressing mode (for use with Climatix controllers)		Press button 5...10 s	LED lights up red and turns off after 5 s.
		Release button	LED is lit up orange.
Reset to factory settings		Press button >10 s	LED flashes orange.

LED colors and patterns

Color	Pattern	Description
Green	1 s on / 5 s off	Normal operation without bus traffic
	Flickering	Normal operation with bus traffic
Orange / Green	1 s orange / 1 s green	Device is in override control
Orange	1 s on / 1 s off	Bus parameters not yet configured
	1 s on / 5 s off	Device is in backup mode
Red	Steady on	• Mechanical fault • Device jammed/blocked • Manual override • Calibration
	1 s on / 5 s off	Internal error
	0.1 s an / 1 s off	Invalid configuration, e.g. Min = Max
Blue	Flashes 1 x after address display	Bus termination is active.

Reset actuator with push-button

1. Press button >10 s.
   ⇨ LED flashes **orange**.
2. Release button *while* LED is flashing.
   ⇨ LED flashes for another 3 s.
   ⇨ If the button is pressed *during* these 3 s, **the reset is canceled**.
3. Press button *after* these 3 s.

⇨ LED is lit **red** (reset) while the device restarts.

Push-button addressing

Display current address (starting from lowest address digit)

The Modbus address can be set without a separate tool by using the push-button and LED.

◈ Press button briefly (<1 s).

⇨ Current Modbus address is displayed.

Colors / Pattern		
1-digit: **red**	10-digit: **green**	100-digit: **orange**
Example for address **124**:		
LED		
Note	The address is entered and displayed starting with lowest address digit, see figure above. (Example: 124 starts with 4 x red)	

Enter new address (starting from lowest address digit)

1. **Enter addressing mode:**
   - Press button >1 s, until LED is lit **red**.
   - Release button (before LED turns off).
2. **Enter digits: Press button n times.**
   ⇨ LED flashes 1 x per press of the button as feedback.
   Colors: 1-digit: **red** / 10-digit: **green** / 100-digit: **orange**
3. **Save digits:**
   - Press and hold button, until LED is lit the color of the following digit.
   - Release button.
4. **Save address:**
   - Press button, until LED is lit **red** (confirmation).
   - Release button.

⇨ Address is saved and repeated 1 x as confirmation.

Digits are skipped by holding the button until the LED is lit the color of the digit to be entered.

An address can be saved at any point, i.e. already after setting the 1-digit, or after setting the 1- and 10-digits.

If after entering the address, the button is released before the LED is lit red, the entered address is discarded.

Examples

Set address "124"

1. Enter addressing mode: press button 5...10 s.
2. Enter 1-digit: press button 4 x.
   ⇨ LED flashes **red** 1 x per press of the button.
3. Save 1-digit: press and hold button.
   ⇨ LED is lit **green**.
4. Release button.
5. Enter 10-digit: press button 2 x.
   ⇨ LED flashes **green** 1 x per press of the button.
6. Save 10-digit: press and hold button.
   ⇨ LED is lit **orange**.
7. Release button.
8. Enter 100-digit: press button 1 x.
   ⇨ LED flashes **orange** 1 x per press of the button.
9. Save address: press and hold button.
   ⇨ LED is lit **red**.
10. Release button.

⇨ Address is saved and repeated 1 x as confirmation.

Set address "50"

1. Enter addressing mode: press button 5...10 s.
2. Skip 1-digit: press and hold button.
   ⇨ LED is lit **green**.
3. Release button.
4. Enter 10-digit: press button 5 x.
   ⇨ LED flashes **green** 1 x per press of the button.
5. Save 10-digit: press and hold button.
   ⇨ LED is lit **orange**.
6. Release button.
7. Save address (skip 100-digit): press and hold button.
   ⇨ LED is lit **red**.
8. Release button.

⇨ Address is saved and repeated 1 x as confirmation.

Set address "7"

1. Enter addressing mode: press button 5...10 s.
2. Enter 1-digit: press button 7 x.
   ⇨ LED flashes **red** 1 x per press of the button.
3. Save address (skip 10- and 100-digits): press and hold button.
   ⇨ LED is lit **red**.
4. Release button.

⇨ Address is saved and repeated 1 x as confirmation.

Modbus registers

Process values					
Reg.	**Name**	**R/W**	**Unit**	**Scaling**	**Range / Enumeration**
1	Setpoint	RW	[%]	0.01	0...100
2	Override control	RW	--	--	0 = Off / 1 = Open / 2 = Close / 3 = Stop / 4 = Min / 5 = Max
3	Actual position	R	[%]	0.01	0...100
256	Command	RW	--	--	0 = Ready / 1 = Adaption / 2 = Self-test / 3 = ReInitDevice / 4 = RemoteFactoryReset

Parameters					
Reg.	**Name**	**R/W**	**Unit**	**Scaling**	**Range / Enumeration**
257	Opening direction	RW	--	--	0 = CW / 1 = CCW
258	Adaptive mode	RW	--	--	0 = Off / 1 = On
259	Operating mode	RW	--	--	1 = POS
260	MinPosition	RW	[%]	0.01	0...100
261	MaxPosition	RW	[%]	0.01	0...100

Parameters					
Reg.	**Name**	**R/W**	**Unit**	**Scaling**	**Range / Enumeration**
262	Actuator running time	R	[s]	1	150
513	Backup mode	RW	--	--	0 = Go to BackupPosition / 1 = Keep last position / 2 = Deactivated
514	Backup position	RW	[%]	0,01	0...100
515	Backup timeout	RW	[s]	1	0...65'535
516	Startup setpoint	RW	[%]	0.01	0...100
764	Modbus address	RW	--	--	1...247 / 255 = "unassigned"
765	Baudrate	RW	--	--	0 = Auto / 1 = 9600 / 2 = 19200 / 3 = 38400 / 4 = 57600 / 5 = 76800 / 6 = 115200
766	Transmission format	RW	--	--	0 = 1-8-E-1 / 1 = 1-8-O-1 / 2 = 1-8-N-1 / 3 = 1-8-N-2-
767	Bus termination	RW	--	--	0 = Off / 1 = On 120 Ω, elektronisch schaltbar
768	Bus conf. command	RW	--	--	0 = Ready / 1 = Load / 2 = Discard
769	Status	R	--	--	See "Register 769 "State" [▶ 11]" and Z4621 / Z4626 ("Product documentation [▶ 3]")

Device information				
Reg.	**Name**	**R/W**	**Description**	**Example**
1281	Factory index	R	2 bytes, each encoding an ASCII character	• 1281 = 00 5A (hex) → 0Z ➔ Device is of series "Z"
1282	Factory date (HWord)	R	2 bytes, the lower encoding the year (hex)	• 1282 = 00 18 (hex) • 1283 = 02 0F (hex)
1283	Factory date (LWord)	R	2 bytes, HByte encoding the month (hex), LByte encoding the day (hex)	➔ Device was manufactured = 15 February, 2024
1284	Serial number (HWord)	R	HWord + LWord = Serial no. (hex)	• 1284 = 00 0A (hex) • 1285 = A2 06 (hex) • → AA206 (hex) = 696838 (dec) ➔ Device has serial no. "696838"
1285	Serial number (LWord)	R		
1409...16	ASN [Characters 16...1]	R	Each register is 2 bytes, each of which encodes an ASCII character. ASN is encoded beginning with reg. 1409.	• 1409 = 47 45 (hex) → GE • 1410 = 42 31 (hex) → B1 • 1411 = 36 31 (hex) → 61 • 1412 = 2E 31 (hex) → .1 • 1413 = 45 2F (hex) → E/ • 1414 = 4D 4F (hex) → MO ➔ ASN is "GDB181.9E/MO"

	HWord		**LWord**	
	-	**YY**	**MM**	**DD**
Hex	00	18	02	0F
Dec	00	24	02	15

Register 769 "State"

Status			
Bit 00	1 = Reserved	Bit 06	1 = Adaption done
Bit 01	1 = Backup mode active	Bit 07	1 = Adaption in progress
Bit 02	1 = Reserved	Bit 08	1 = Adaption error
Bit 03	1 = Reserved	Bit 09	1 = Self-test failed
Bit 04	1 = Mechanical fault, device jammed/blocked, manual override or calibration	Bit 10	1 = Self-test passed
Bit 05	1 = Nom. lifetime exceeded	Bit 11	1 = Invalid configuration

Supported function codes

Function codes	
03 (0x03)	Read holding register
04 (0x04)	Read input registers
06 (0x06)	Write single register
16 (0x10)	Write multiple registers (Limit: Max. 120 registers within one write operation)

Technical data

Power supply			G..B161.1E/MO	*Legacy types [S55499-D298, S55499-D299]*
Operating voltage			AC/DC 24 V ± 20 % (SELV) or AC 24 V class 2 (US)	*AC 24 V ± 20 % (SELV)* *or* *AC 24 V class 2 (US)*
Frequency			50/60 Hz	
Power consumption	Running	GEB..	2.6 VA / 1.7 W	*6 VA / 5.5 W*
		GIB..	3.4 VA / 2.4 W	*8 VA / 8 W*
	Holding	GEB..	2.3 VA / 1.1 W	*1.5 W*
		GIB..	2.3 VA / 1.1 W	*1.1 W*

Function data			G..B161.1E/MO	*Legacy types [S55499-D298, S55499-D299]*
Torque	Nominal	GEB..	20 Nm	*15 Nm*
		GIB..	35 Nm	
	Maximum (blocked)	GEB..	35 Nm	*30 Nm*
		GIB..	75 Nm	

Function data			G..B161.1E/MO	*Legacy types [S55499-D298, S55499-D299]*
Rotation angle	Nominal		90°	
	Maximum		95° ± 2°	
Direction of rotation (adjustable over bus)			Clockwise (CW) / Counter-clockwise (CCW)	
Running time for rotation angle 90°			150 s	
Sound power level (at positioning time of 150 s)		GEB..	<35 dBa	--
		GIB..	<45 dBa	--

Communication		
Communication protocol	Modbus RTU	RS-485, not galvanically separated
	Number of nodes	Max. 32
	Address range	1...247 / 255
	Default	255
	Transmission formats	1-8-E-1 / 1-8-O-1 / 1-8-N-1 / 1-8-N-2
	Default	1-8-E-1
	Baudrates (kBaud)	Auto / 9.6 / 19.2 / 38.4 / 57.6 / 76.8 / 115.2 kBaud
	Default	Auto
	Bus termination	120 Ω electronically switchable
	Default	Off

Connection cables		
Cable length		0.9 m
No. of wires x cross-section	Power supply and communication	5 x 0.75 mm^2

Degree of protection	
Degree of protection	IP54 as per EN 60529 (see "Mounting [▶ 4]")
Safety class	III as per EN 60730

Environmental conditions		
Operation		IEC 60721-3-3
	Climatic conditions	Class 3K5
	Mounting location	Indoors
	Temperature	-32...55 °C
	Humidity, non-condensing	<95 % r. h.

Environmental conditions		
Transport		IEC 60721-3-2
	Climatic conditions	Class 2K2
	Temperature	-32...70 °C
	Humidity, non-condensing	<95 % r. h.
Storage		IEC 60721-3-1
	Climatic conditions	Class 1K3
	Temperature	-5...45 °C
	Humidity, non-condensing	<95 % r. h.

Directives and Standards		G..B161.1E/MO	*Legacy types [S55499-D298, S55499-D299]*
Product standard		EN60730-x	
Electromagnetic compatibility (Application)		For residential, commercial and industrial environments	
EU conformity (CE)	GEB..	A5W00004376 [1)]	
	GIB..	A5W00004368 [1)]	
UK conformity (UKCA)	GEB..	A5W00198170A [1)]	--
	GIB..	A5W00198153A [1)]	
RCM conformity	GEB..	A5W00004377 [1)]	
	GIB..	A5W00004369 [1)]	
EAC compliance		Eurasian compliance	
UL, cUL approbation		--	UL 873 http://ul.com/database

Environmental compatibility		G..B161.1E/MO	*Legacy types [S55499-D298, S55499-D299]*
The following product environmental declarations [1)] contain data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).			
	GEB..	A5W00055607	*CE1E4621en*
	GIB..	A5W00712474	*CE1E4626en*
	External Modbus interface	A6V101083254	

Dimensions / Weight		G..B161.1E/MO	*Legacy types [S55499-D298, S55499-D299]*
Weight (w/o packaging)	GEB..	1.2 kg	
	GIB..	2.2 kg	
Dimensions B x H x T (w/o ext. bus interface) See "Dimensions [▶ 15]"	GEB..	81 x 192 x 63 mm	
	GIB..	100 x 300 x 67.5 mm	

Dimensions / Weight			G..B161.1E/MO	*Legacy types [S55499-D298, S55499-D299]*
Suitable damper shafts	Round / square	GEB..	8...20.5 mm / 8...14.5 mm	*6.4...20.5 mm / 6.4...13 mm*
		GIB..	8.0...25.6 mm / 6.0...18 mm	
	Min. length		20 mm	

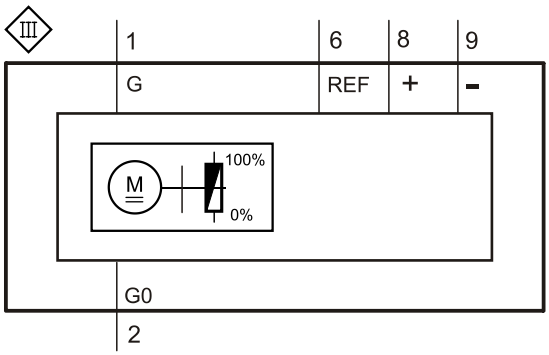
[1] The documents can be downloaded from http://siemens.com/bt/download.

Diagram

Internal diagram / Connecting cables

The damper actuators are supplied with a prewired connecting and communication cable. All interconnected devices must be connected to the same neutral conductor G0.

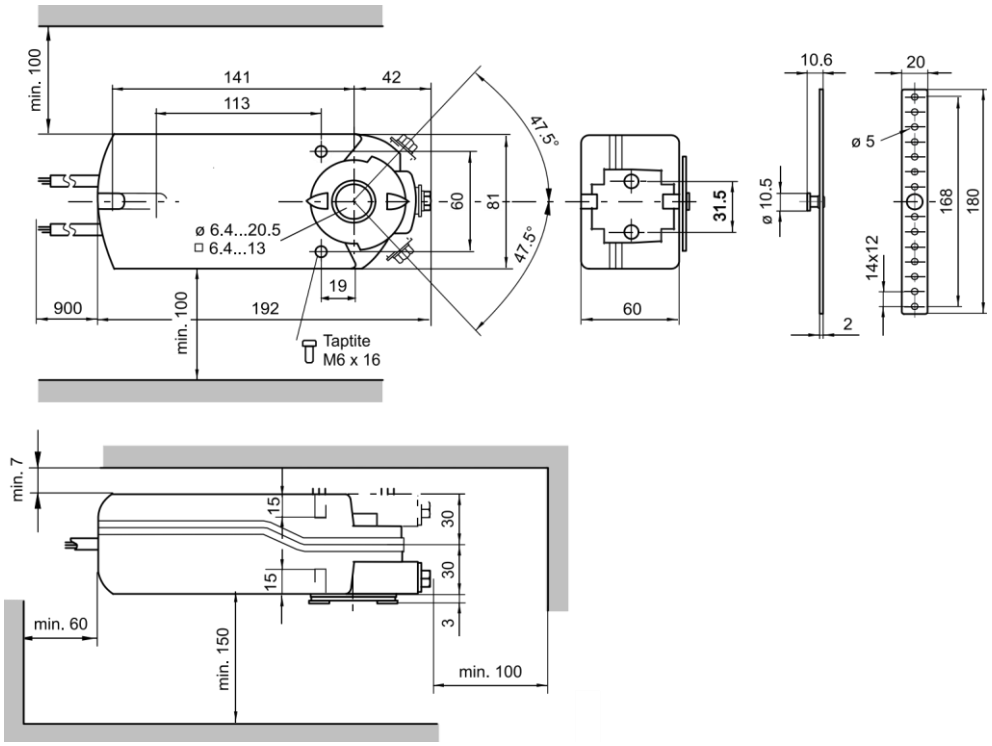
Wire code	Wire color		Terminal code	Meaning		
					G..B161.1E/MO	*Legacy types [S55499-D298, S55499-D299]*
1	red	RD	G	System voltage	AC/DC 24 V	*AC 24 V*
2	black	BK	G0	System neutral	AC/DC 24 V	*AC 24 V*
6	purple	VT	REF	Reference (Modbus RTU)		
8	gray	GY	+	Bus + (Modbus RTU)		
9	pink	PK	-	Bus - (Modbus RTU)		



NOTICE	
!	The operating voltage at terminals G and G0 must comply with the requirements under SELV or PELV. Safety transformers with twofold insulation as per EN 61558 are required; they must be designed to be on 100 % of the time.

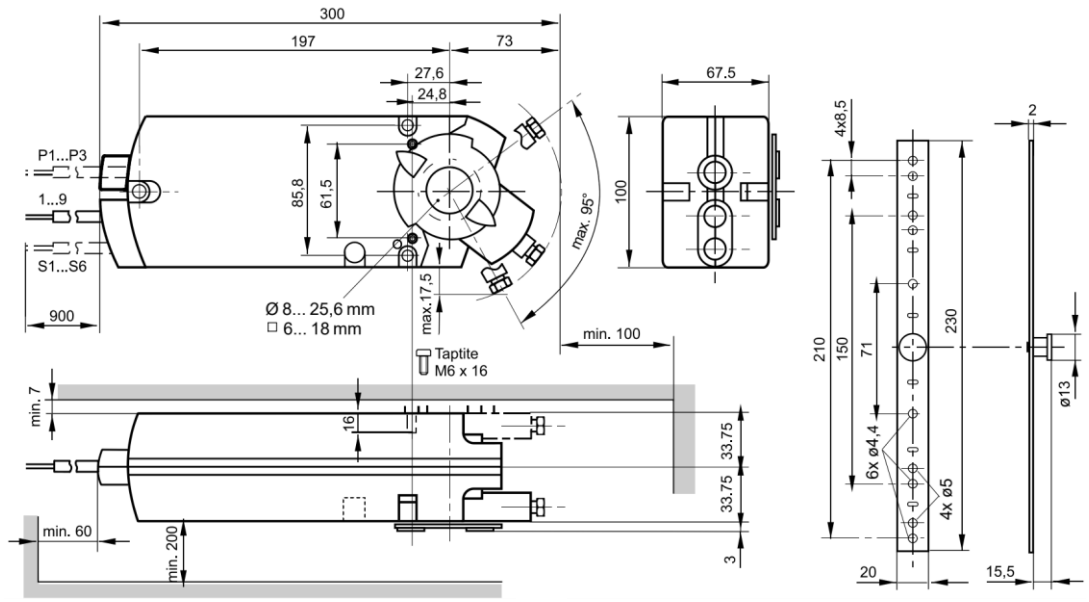
Actuators

GEB161.1E/MO



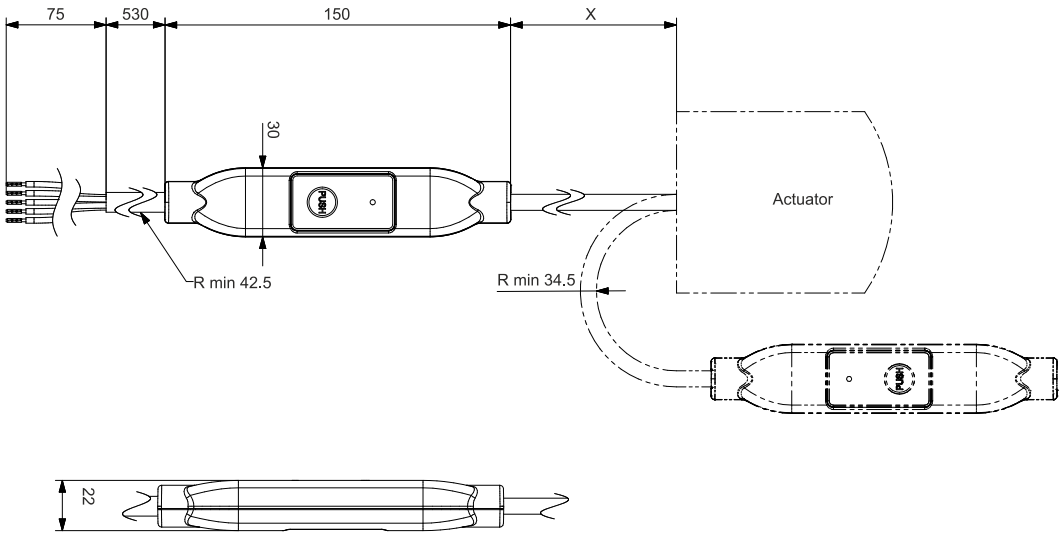
Dimensions in mm

GIB161.1E/MO



Dimensions in mm

External Modbus interface



Dimensions in mm

	X [mm]	[kg]
	250	0.15

Revision numbers

Type	Stock no.	Valid from rev. no.
GEB161.1E/MO	S55499-D663	..B
GIB161.1E/MO	S55499-D856	..A
Legacy types		
GEB161.1E/MO [1)]	*S55499-D298*	*..C*
GIB161.1E/MO [2)]	*S55499-D299*	*..C*

[1)] available until Sep. 2021

[2)] while stocks last

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