

OpenAir™

Damper Actuator Modbus RTU

G..B111.1E/MO



Damper actuator 5 / 10 Nm with Modbus communication

- GDB111.1E/MO Operating voltage AC 24 V, 5 Nm
- GLB111.1E/MO Operating voltage AC 24 V, 10 Nm
- For air-handling units (AHU) and other ventilation applications
- Operating voltage AC 24 V
- 5 and 10 Nm nominal torque
- Modbus RTU communication
- UL listed

Functions

Function	Description
Communication	Modbus RTU (RS-485), galvanically separated
Functions	<ul style="list-style-type: none"> - Setpoint 0..100% - Actual value for position 0..100% - Override control Open / Close / Min / Max / Stop - Setpoint monitoring and backup mode
Supported baud rates	9.6, 19.2, 38.4, 57.6, 76.8, 115.2 kbaud
Supported transmission formats	1-8-E-1, 1-8-N-1-, 1-8-O-1, 1-8-N-2
Termination	120 Ω electronically switchable
Supported Modbus function codes	03 Read Holding Registers, 04 Read Input Registers, 06 Write Single Register, 16 Write Multiple registers (max. 120 registers within one message)

For a detailed description of specific functions please refer to the product documentation CE1Z4634 ¹⁾.

Type summary

Product no.	Stock no.	Operating voltage	Positioning signal	Power consumption	Posit. time	Manual adjuster	Position feedback
GDB111.1E/MO	S55499-D191	AC 24 V	Modbus RTU	1 VA / 0,5 W	150 s	Yes	Yes
GLB111.1E/MO	S55499-D199			3 VA / 2,5 W ²⁾			
Please refer to data sheet N4698 for information on accessories and spare parts.							

²⁾ Actuator rotates

Ordering (Example)

Product no.	Stock no.	Description	Amount
GDB111.1E/MO	S55499-D191	Damper actuator Modbus	1

Equipment combinations

Product no.	Stock no.	Description	Doc. type	Doc. number
AST20	S55499-D165	Handheld tool for commissioning and service	Datasheet	A6V10631836
			Operating manual	A6V10555077

Product documentation

Title	Topic	Document ID
Rotary damper actuators without spring return GDB/GLB..1	Detailed information about rotary actuators without spring return (5/10 Nm), incl. Modbus types	CE1Z4634 ¹⁾
Installation Instruction	Mounting / installation instruction for rotary actuators 5 / 10 Nm	M4634 ¹⁾

¹⁾ Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:

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

For more detailed explanations on device states, functions and error display, cf. product documentation CE1Z4634 ¹⁾.

Push-button operation

Activity	Push-button operation	Confirmation
Display current address (in reverse order)	Press button briefly (<1 s)	Current address is displayed
Enter Modbus address with push-button	Press and hold button 1...5 s	See description next page
Enter push-button addressing mode (for use with Climatix™ controllers)	Press and hold button 5...10 s	LED shines orange (release button when red LED gets dark). Timeout after 1 min.
Reset to factory settings	Press and hold button >10 s	LED flashes orange

LED colors and flashing patterns

Color	Pattern	Description
Green	steady	Start-up
	1 s on / 5 s off	Fault free operation ("heart beat")
	flashing	Bus traffic
Orange ¹⁾ / green	1 s orange / 1 s green	Device is in override control
Orange ¹⁾	1s on / 1 off	Bus parameters not yet configured
Orange	1s on / 5s off	Backup mode entered
Red	Steady	Mechanical fault / device jammed
	1s on / 5s off	Internal error
	0.1s on / 1s off	Invalid configuration, e.g. Min = Max

¹⁾ The color of the orange LED can vary depending on the viewing angle, and appear more yellow or greenish.

Resetting the device by push button


The damper actuators can be reset by push-button:

1. Press and hold button >10 s.
⇒ LED flashes **orange**.
2. Release button *while* LED is flashing.
⇒ LED flashes for another 3 s.
⇒ If the button is pressed again *during* these 3 s, **the reset is canceled**.
3. Press button *after* these 3 s.
⇒ LED is lit **red** (reset) while the device restarts.

Display current address (starting from lowest address position)

The Modbus address can be set without an extra tool using pushbutton addressing.

- ◆ Briefly press button (<1 s).
- ⇒ Current Modbus address is indicated.

Colors / blinking pattern		
1-digit: rot	10-digit: grün	100-digit: orange
Example for address 124:		
LED		
Hinweis	The address is both entered and indicated starting at the lowest digit (1st digit), see figure above. (Example: 124 starts with 4 x red)	

Set new address (digits in reverse order)

- 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.

Set address "124"

1. Enter addressing mode: press button 1...5 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 1...5 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 1...5 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.

For a detailed description of specific functions please refer to the product documentation Z4634 ¹⁾.

Reg.	Addr.	Name	R/W	Unit	Scaling	Range / enumeration
Process Values						
1	0	Setpoint	RW	%	0.01	0...100 % = 0...10000
2	1	Override control	RW	--	--	0 = Off / 1 = Open / 2 = Close / 3 = Stop / 4 = GoToMin / 5 = GoToMax
3	2	Actual position	R	%	0.01	0...100 % = 0...10000
256	255	Command	RW	--		0 = Ready / 1 = Adaption / 2 = Selftest / 3 = RelnitDevice / 4 = RemoteFactory Reset

Reg.	Addr.	Name	R/W	Unit	Scaling	Range / enumeration
Parameters ¹⁾						
257	256	Opening direction	RW	--	--	0 = CW / 1 = CCW
258	257	Adaptive mode	RW	--	--	0 = Off / 1 = On
259	258	Operating mode	RW	--	--	1 = POS
260	259	MinPosition	RW	%	0.01	0...100 % = 0...10000
261	260	MaxPosition	RW	%	0.01	0...100 % = 0...10000
262	261	Actuator running time	R	s	1	150
513	512	Backup mode	RW	--	--	0 = Go to BackupPosition / 1 = Keep last position / 2 = Disabled
514	513	Backup position	RW	%	0.01	0...100 % = 0...10000
515	514	Backup timeout	RW	s	1	0..900
516	515	Startup setpoint	RW	%	0.01	0...100 % = 0...10000
764	763	Modbus address	RW	--	--	1..245 246 = On-event addressing 255 = "unassigned" ²⁾
765	764	Baud rate	RW	--	--	0 = auto / 1 = 9600 / 2 = 19200 / 3 = 38400 / 4 = 57600 / 5 = 76800 / 6 = 115200
766	765	Transmission format	RW	--	--	0 = 1-8-E-1 / 1 = 1-8-O-1 / 2 = 1-8-N-1 / 3 = 1-8-N-2
767	766	Bus termination	RW	--	--	0 = Off / 1 = On
768	767	Bus conf. command	RW	--	--	0 = Ready / 1 = Load / 2 = Discard
769	768	State	R	--	--	See below

¹⁾ Parameters may not be written cyclically!

²⁾ If the address is set to 248 or higher, it is instead automatically set to the initial address 255 as soon as Reg. 268 is set to 1 ("Load").

Reg.	Name	R/W	Meaning	Example
Statistics/Counters				
1025	Cumulated up time (HWord)	R	HWord + LWord = cumulated time device has been on (hex), i.e. the motor has been running or holding, in seconds	<ul style="list-style-type: none"> 1025 = 00 12 (hex) 1026 = A2 E1 (hex) 12A2E1 (hex) → 1221345 (dec) → Cum. up time = 1'221'345 s
1026	Cumulated up time (LWord)	R		
1027	Cumulated running time (HWord)	R	HWord + LWord = cumulated running time (hex), i.e. for how long has the motor run, in seconds	<ul style="list-style-type: none"> 1027 = 00 08 (hex) 1028 = 12 51 (hex) 81251 (hex) → 528977 (dec) → Cum. running time = 528.977 s
1028	Cumulated running time (LWord)	R		
1029	Repositioning counter (HWord)	R	HWord + LWord = how often has the positioning signal been changed	<ul style="list-style-type: none"> 1029 = 00 00 (hex) 1030 = A0 01 (hex) A001 (hex) → 40961 (dec) → Repositioned = 40.961 times
1030	Repositioning counter (LWord)	R		
1031	Power-up counter	R	How often (hex) has the device been started up	<ul style="list-style-type: none"> 1031 = 00 A2 (hex) → 162 (dec) → Powered up = 162 times
1032	Jam counter	R	How often (hex) has the device breached the valve jam tolerance (reg. 264)	<ul style="list-style-type: none"> 1032 = 00 02 (hex) → 2 (dec) → Jams counted = 2

Reg.	Name	R/W	Meaning	Example																								
Device information																												
1281	Factory index	R	Two bytes, each encoding an ASCII character	<ul style="list-style-type: none">1281 = 00 5A (hex) → 0Z → Device is of series = "Z"																								
1282	Factory date (HWord)	R	Two bytes, the lower encoding the year (hex)	<ul style="list-style-type: none">1282 = 00 18 (hex)1283 = 02 0F (hex) <table><tr><td></td><td></td><td colspan="2">HWord</td><td colspan="2">LWord</td></tr><tr><td></td><td></td><td>-</td><td>YY</td><td>MM</td><td>DD</td></tr><tr><td></td><td>Hex</td><td>00</td><td>18</td><td>02</td><td>0F</td></tr><tr><td></td><td>Dec</td><td>00</td><td>24</td><td>02</td><td>15</td></tr></table>			HWord		LWord				-	YY	MM	DD		Hex	00	18	02	0F		Dec	00	24	02	15
		HWord		LWord																								
		-	YY	MM	DD																							
	Hex	00	18	02	0F																							
	Dec	00	24	02	15																							
1283	Factory date (LWord)	R	Two bytes, HByte encoding the month (hex), LByte encoding the day (hex)	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td>Hex</td><td>00</td><td>18</td><td>02</td><td>0F</td></tr><tr><td></td><td>Dec</td><td>00</td><td>24</td><td>02</td><td>15</td></tr></table> → Device was manufactured = February 15, 2024								Hex	00	18	02	0F		Dec	00	24	02	15						
	Hex	00	18	02	0F																							
	Dec	00	24	02	15																							
1284	Serial number (HWord)	R	HWord + LWord = Serial no. (hex)	<ul style="list-style-type: none">1284 = 00 0A (hex)1285 = A2 06 (hex)→ AA206 (hex) = 696838 (dec) → Device has serial no. = "696838"																								
1285	Serial number (LWord)	R																										
1289	Firmware version (HWord)	R	Two bytes, HByte corresponds to the major version, LByte corresponds to the minor version	<ul style="list-style-type: none">1289 = 03 01 (hex)1290 = 03 07 (hex) → 775 (dec) → Firmware version = "03.01.0775"																								
1290	Firmware revision (LWord)	R	Two bytes, encoding the patch version (hex)																									

Reg.	Name	R/W	Meaning	Example
Device information				
1291	Hardware version	R	Two bytes, each encoding an ASCII character	<ul style="list-style-type: none"> 1291 = 42 00 (hex) → Hardware version = "B"
1409...16	ASN [characters 16...1]	R	Two bytes per register, each of which encodes an ASCII character. First characters encoded in Reg. 1409.	<ul style="list-style-type: none"> 1409 = 47 4C (hex) → GL 1410 = 42 31 (hex) → B1 1411 = 31 31 (hex) → 11 1412 = 2E 31 (hex) → .1 1413 = 45 2F (hex) → E/ 1414 = 4D 4F (hex) → MO → ASN = "GLB111.1E/MO"

Register 769 "State"

Service flags			
Bit 00	1 = Reserved	Bit 06	1 = Not available
Bit 01	1 = Backup mode active	Bit 07	1 = Not available
Bit 02	1 = Not available	Bit 08	1 = Not available
Bit 03	1 = Not available	Bit 09	1 = Self-test failed
Bit 04	1 = Mechanical fault, device jammed or manual override ¹⁾ or calibrating ¹⁾	Bit 10	1 = Self-test successful
Bit 05	1 = Not available	Bit 11	1 = Not available

¹⁾ After 10 seconds

Supported function codes

Function codes	
03 (0x03)	Read Holding Registers
04 (0x04)	Read Input Registers
06 (0x06)	Write Single Register
16 (0x10)	Write Multiple registers (Limitation: Max. 120 registers within one message)

Notes

Safety

Caution

National safety regulations

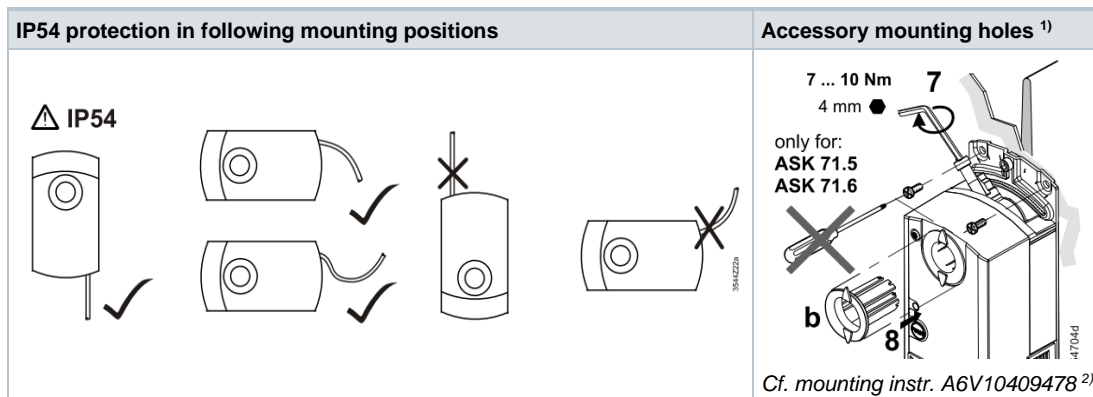
Failure to comply with national safety regulations may result in personal injury and property damage.

- Observe national provisions and comply with the appropriate safety regulations.

Mounting

- Do not open the damper actuators.
- Do not use the accessory mounting holes for fixation of the damper actuators. For this purpose, use the shaft fixation screw and the enclosed anti-rotation bracket.

Mounting positions



⚠ ¹⁾ Not to be used for fixation of the actuator, use anti-rotation-bracket instead.

²⁾ Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following internet address:

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

Commissioning

Parameterization

The following parameters must be checked or set prior to commissioning:

Parameter	Range	Description	Factory setting
Opening direction	CW (R) / CCW (L)	Opening direction of air damper	CW (R)
Adaptive positioning	Off / On	Adaption of actual opening range to position feedback Off = No adaption / mapping 0°..90° → 0..100 % On = Pos. adaption / mapping e.g. 0°..60° → 0..100 %	Off

Commissioning workflow 1: Full or partial configuration by tool

When using the AST20 handheld tool, all bus and actuator parameters can be set.

- Connect the AST20 to the damper actuator and navigate to the bus configuration menu.
- Set bus parameters as desired.
- Optionally make changes on actuator parameters.

Note

With AST20, all parameters can be set using the mass configuration function. The bus parameters are included in the mass configuration function. It can be selected that the address is automatically incremented with each programmed damper actuator.

Commissioning workflow 2: Full or partial configuration via bus

The devices can be configured via 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 baud rate / transmission format).

- *Full configuration over bus:* Given a unique Modbus address, the client/programming tool can establish a connection after start-up using the presets for transmission format and baud rate (or auto-baud).
- *Partial configuration over bus:* Given a non-unique Modbus address, the address must first be set to a unique value, e.g. by inputting it with the pushbutton. Subsequently, the client/programming tool can establish a connection after start-up using the presets for transmission format and baud rate (or auto-baud).

Once a connection is established, the bus and actuator parameters can be set via bus to the intended values. When writing to the bus parameters, "1 = Load" must be written to Reg. 768 within 30 seconds; otherwise, the changes are discarded.

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

Reg.	Name	Pre-commissioning	New value (ex.)
764	Modbus address	46	12
765	Baud rate	0 = auto	1 = 9600
766	Transmission Mode	0 = 1-8-E-1	3 = 1-8-N-2
767	Termination	0 = Off	0 = Off
768	BusConfigCmd	0 = Ready	1 = Load

Maintenance

The damper actuators are maintenance-free.

Disconnect the electrical connections from the terminals if you want to work at the device.

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.

Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

Technical data

Power supply		
Operating voltage	G..B111.1E/..	AC 24 V \pm 20 % (SELV) or AC 24 V class 2 (US)
Frequency		50/60 Hz
Power consumption	at 50 Hz	
	Actuator holds	1 VA / 0.5 W
	Actuator rotates	3 VA / 2.5 W
Function data		
Positioning time for nominal rotation angle	G..B111.1E/..	150 s (50 Hz) 120 s (60 Hz)
Nominal torque	GDB..	5 Nm
	GLB..	10 Nm
Maximum torque	GDB..	< 7 Nm
	GLB..	< 14 Nm
Nominal / maximum rotation angle		90° / 95° \pm 2°
Direction of rotation	Adjustable by tool or over bus	Clockwise (CW) / Counter-clockwise (CCW)
Connection cables		
Cable length		0.9 m
Power supply / Communication	Number of cores and cross-sectional area	5 x 0.75 mm ²
Service interface	Terminal strip	7-pin, grid 2.00 mm
Communication		
Communication protocol	Modbus RTU	RS-485, galvanically separated
	Number of nodes	Max. 32
	Address range	1...245 / 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
	Baud rates (kBaud)	Auto / 9.6 / 19.2 / 38.4 / 57.6 / 76.8 / 115.2 Default: Auto
	Termination	120 Ω electronically switchable Default: Off
Degree of protection		
Degree of protection	Degree of protection acc. to EN 60529 (see mounting instruction)	IP54
Safety class	Safety class acc. to EN 60730	III

Environmental conditions		
Applicable standard		IEC 60721-3-x
Operation	Climatic conditions	Class 3K6
	Mounting location	Indoors
	Temperature general	-32...55 °C
	Humidity (non condensing)	5...95 % r. h.
Transport	Climatic conditions	Class 2K3
	Temperature	-25...70 °C
	Humidity	5...95 % r. h.
Storage	Climatic conditions	Class 1K3
	Temperature	-5...45 °C
	Humidity	5...95 % r. h.

Directives and Standards		
Product standard		EN60730-x
Electromagnetic compatibility (Application)		For residential, commercial and industrial environments
EU Conformity (CE)		GDB111.1E/MO
		GLB111.1E/MO
	A5W00003842 ¹⁾	A5W00000176 ¹⁾
	A5W00198029A ¹⁾	A5W00198019A ¹⁾
UK Conformity (UKCA)		
RCM Conformity		
UL, cUL	AC 24 V	UL 873 http://ul.com/database

Environmental compatibility	
The product environmental declaration A6V10209938 ¹⁾ contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	

Dimensions / Weight		
Weight	Without packaging	0.6 kg
Dimensions		71 x 158 x 61 mm
Suitable drive shafts	Round shaft (with centering element)	8...16 mm (8...10 mm)
	Square shaft	6...12.8 mm
	Min. drive shaft length	30 mm
	Max. shaft hardness	<300 HV

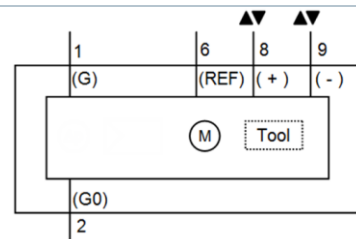
¹⁾ The documents can be downloaded from <http://siemens.com/bt/download>

Diagrams

Internal diagrams

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

Core desig.	Core color	Terminal code	Description
1	red (RD)	G	System voltage AC 24 V
2	black (BK)	G0	System neutral AC 24 V
6	violet (VT)	REF	Reference
8	grey (GY)	+	Bus (Modbus RTU)
9	pink (PK)	-	Bus (Modbus RTU)

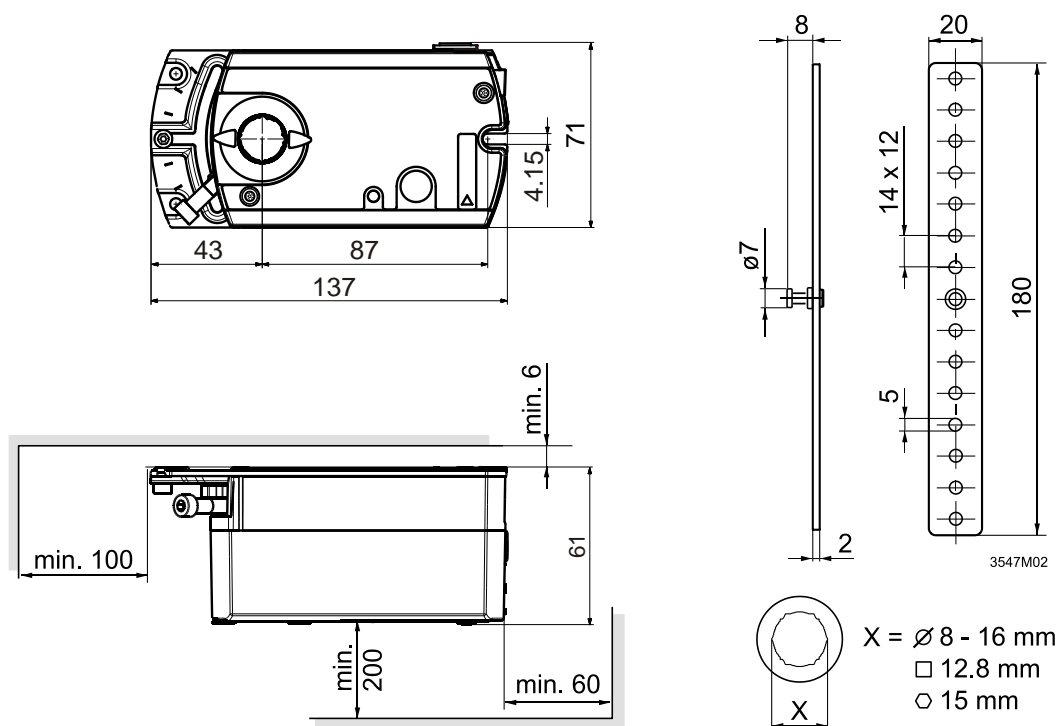


Note

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 required; they must be designed to be on 100 % of the time.

Dimensions

G..B111.1E/..



Measurements in mm

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