

OpenAir™

Air Damper Actuator Modbus RTU

GEB161.1E/MO, 20 Nm, Non-spring return type



Damper actuator 20 Nm (non-spring return) with Modbus communication

- Nominal torque 20: Nm
- Modbus RTU communication
- Operating voltage: AC/DC 24 V
- For air-handling units (AHU) and other ventilation applications

Functions

| Function | Description |
|---------------------------------------|---|
| Communication | Modbus RTU (RS-485), not galvanically separated |
| Functions | <ul style="list-style-type: none"> - 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, 78.4, 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 |

Type summary

| Product no. | Stock no. | Operating voltage | Positioning signal | Power consumption | Posit. time | Manual adjuster | Position feedback |
|--------------|-------------|-------------------|--------------------|-----------------------------------|-------------|-----------------|-------------------|
| GEB161.1E/MO | S55499-D663 | AC/DC 24 V | Modbus RTU | 2.8 VA / 1.7 W max. ¹⁾ | 150 s | Yes | Yes |

¹⁾ max. = actuator rotates

Accessories / Spare parts

Please refer to data sheet N4697.

Ordering (Example)

| Product no. | Stock no. | Description | Amount |
|-------------------------------------|-------------|------------------------|--------|
| GEB161.1E/MO | S55499-D663 | Damper actuator Modbus | 1 |
| + accessories (shaft inserts, etc.) | | | |

Equipment combinations

| Product no. | Stock no. | Doc. type | Doc. number |
|---------------|--------------------|------------------|-------------|
| POL424.50/STD | S55394-C245-A100 | Datasheet | Q3973 |
| POL424.70/STD | S55394-C247-A100 | Operating manual | P3973 |
| POL635.00/STD | BPZ:POL635.00/STD | Datasheet | Q3230 |
| | | Operating manual | P3903 |
| POL638.00/STD | BPZ: POL638.00/STD | Datasheet | Q3900 |
| POL638.70/STD | S55396-C387-A100 | Operating manual | P3903 |

Product documentation

| Title | Topic | Document ID |
|--------------------------|--|--------------|
| Climatix AHU Application | Application description | A3975 |
| Installation Instruction | Installation of types with external Modbus interface | A6V101006034 |

Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address: <http://siemens.com/bt/download>

Safety

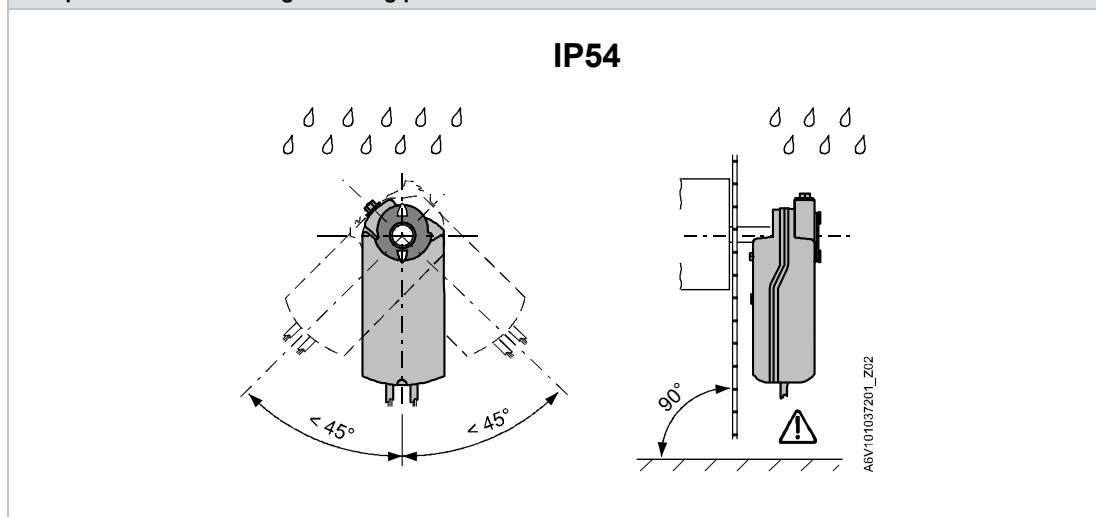

⚠ CAUTION
National safety regulations

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

Note: Do not open the damper actuators

Mounting positions
IP54 protection in following mounting positions


Commissioning

Workflow 1

The devices are especially designed for using the Climatix push-button configuration as described in document A3975 ¹⁾. The bus configuration can alternatively be parameterized by the local HMI, cf. page 5.

During commissioning check/set the following:

- Bus configuration (address, baudrate, transmission mode, and optionally termination). The default address 255 allows to mount and power multiple actuators at the same time without interfering with each other.
- Damper actuator parameters (opening direction, position limits, position adaptation etc.) can be checked via the Modbus register.

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

Workflow 2

The devices can be configured over bus if the pre-commissioning settings allow for a connection between the Modbus master / 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 master (or programming tool) and the address and other parameters can then be set to the definitive values.
- Partial configuration over bus: If the address is not unique per segment when powered up, each device must get a non-conflicting address before connecting it to the bus, either by using the address input with push button (cf. page 6) or by setting the address to 246 with push button press > 5s und < 10s (cf. page 5). After addressing all devices, the remaining configuration can be done over the bus using the default settings for baudrate (auto-baud) and transmission mode for the Modbus master.
- Overwriting the bus configuration over bus uses a timeout. If „1 = Load“ is not written into Reg 768 within 30 seconds, all values 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 | 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 are maintenance-free.

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

Disposal

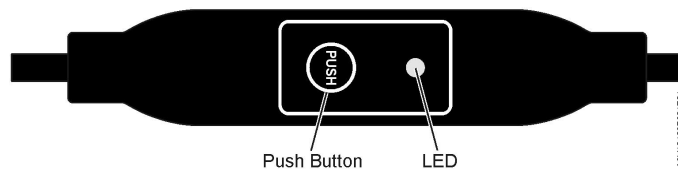


The device is considered an electronics device for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic garbage.

- 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.



Push-button operation

| Activity | Push-button operation | Confirmation |
|---|---|---|
| Display current address (starting with lowest address digit) | Press button < 1s | 1-digits: red 10-digits: green 100-digits: orange If termination is switched on, LED flashes 1x blue after address display Example: 124 = 4x red, 2x green, 1x orange |
| Turn bus termination on / off | <div>turn on</div> <ol style="list-style-type: none"> 1. press 3x 2. press 1x shortly 3. press button until LED shines red 4. release button <div>turn off</div> <ol style="list-style-type: none"> 1. press 3x 2. press button until LED shines red 3. release button | <div>LED flashing and flickering stops (termination mode)</div> <div>LED flashes 1x blue</div> <div>LED shines red (confirmation)</div> <div>LED off</div> <div>Address display</div> <div>LED flashes 1x blue after address display</div> <div>Normal operation</div> <div>LED flashing and flickering stops (termination mode)</div> <div>LED shines red (confirmation)</div> <div>Normal operation</div> |
| Enter Modbus address with push-button | Press button > 1s and < 5s | See chapter 'Push-button addressing' below |
| Enter push-button addressing mode (for use with Climatix™ controllers) | <ol style="list-style-type: none"> 1. Press button > 5s and < 10s 2. Release button | LED shines red and gets dark after 5s LED shines orange |
| Reset to factory settings | Press button > 10s | LED flashes orange |

LED colors and patterns

| Color | Pattern | Description |
|----------------|----------------------------------|---|
| Green | 1s on / 5s off | Normal operation ("life pulse") without bus traffic |
| | flashing | Normal operation ("life pulse") with bus traffic |
| Orange / green | 1s orange / 1s green | Device is in override control |
| Orange | 1s on / 1s off | Bus parameters not yet configured |
| | 1s on / 5s off | Backup mode entered |
| Red | Steady | Mechanical fault, device jammed or manual override |
| | 1s on / 5s off | Internal error |
| | 0.1s on / 1s off | Invalid configuration, e.g. Min = Max |
| Blue | Flashes 1x after address display | Bus termination is set active. |

Resetting the device by push button

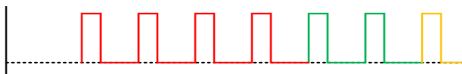
1. Press button for >10s → LED starts flashing **orange**
2. Release button while LED still flashes → LED keeps flashing for 3s
3. If the button is pressed within these 3s, the reset is cancelled.
4. After those 3s → LED shines **red** (reset), then the device restarts.

Push-button addressing

Display current address (starting with lowest address digit)

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

To display the current address, press button <1s.

| Colors | | |
|--------------------------|---|---------------------------|
| 1-digits: red | 10-digits: green | 100-digits: orange |
| Example for address 124: | | |
| LED |  | |
| Note | The address is entered and shown starting with lowest address digit, see figure above. (124 in the example is starting with 4x red) | |

Set new address (starting with lowest address digit)

1. **Enter addressing mode:** press button > 1s until LED shines **red**, then release button (before LED gets dark).
2. **Enter digits:** press button n-times → LED flashes per button press (feedback).
Colors: 1-digits: **red** / 10-digits: **green** / 100-digits: **orange**
3. **Store digits:** press button until LED shines in color of following digits – release button,
4. **Save address:** press button until LED shines **red** (confirmation) → release button.
An address can be stored at any time, i.e. after setting the 1-digits, or after setting the 1- and the 10-digits.
5. Entered address is repeated one times for confirmation.

Note: If button is released before LED shines red, the address is discarded.

Examples

Set address “124”:

1. Enter addressing mode
2. Set 1-digits: Press button 4-times → LED flashes **red** per button press
3. Store 1-digits: press button until LED shines **green** – release button
4. Set 10-digits: Press button 2-times → LED flashes **green** per button press
5. Store 10-digits: press button until LED shines **orange** – release button
6. Set 100-digits: Press button 1-times → LED flashes **orange** per button press
7. Store address: press button until LED shines **red** – release button
→ address is stored and displayed 1x for confirmation

Set address "50":

1. Enter addressing mode
2. Skip 1-digits: Hold button pressed until LED shines **green** – release button
3. Set 10-digits: Press button 5-times → LED flashes **green** per button press
4. Store address (skip 100-digits): hold button pressed until LED shines **red**
– release button
→ address is stored and displayed 1x for confirmation

Set address "5":

1. Enter addressing mode
2. Set 1-digits: Press button 5-times → LED flashes **green** per button press
Store address: press button until LED shines **red**
→ address is stored and displayed 1x for confirmation

Modbus registers

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

| | | | | | |
|-------------------|-----------------------|----|----|------|--|
| Parameters | | | | | |
| 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 |
| 262 | Actuator Running Time | R | s | 1 | 150 |
| 513 | Backup Mode | RW | -- | -- | 0 = Go to BackupPosition 1 = Keep last position 2 = Disabled |
| 514 | Backup Position | RW | % | 0.01 | 0..100 |
| 515 | Backup Timeout | RW | s | 1 | 0..65535 |
| 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 |
| 768 | Bus Conf. Command | RW | -- | -- | 0 = Ready / 1 = Load / 2 = Discard |
| 769 | Status | R | -- | -- | See below, Register 769 "Status" |

| Device information | | | | | |
|--------------------|----------------------|---|----|----|---|
| 1281 | Factory Index | R | -- | -- | Cf. product documentation Z4621 / Z4626 ¹⁾ |
| 1282-83 | Factory Date | R | -- | -- | |
| 1284-85 | Factory SeqNo | R | -- | -- | |
| 1409-16 | TypeASN [Char_16..1] | R | -- | -- | |

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

Register 769 "Status"

| 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 = Selftest failed |
| Bit 04 | 1 = Mechanical fault, device jammed or manual override | Bit 10 | 1 = Selftest passed |
| Bit 05 | 1 = Nom. lifetime exceeded | Bit 11 | 1 = Invalid configuration |

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) |

Technical data

| Power supply | | |
|--|--|---|
| Operating voltage | | AC/DC 24 V \pm 20 % (SELV) or AC 24 V class 2 (US) |
| Frequency | | 50/60 Hz |
| Power consumption | at 50 Hz | |
| | Actuator holds | 0.7 W |
| | Actuator rotates | 2.8 VA / 1.7 W |
| Function data | | |
| Running time for rotary angle 90°(motor operation) | | 150 s |
| Nominal torque | | 20 Nm |
| Maximum torque (blocked) | | 35 Nm |
| Nominal / maximum rotation angle | | 90° / 95° \pm 2° |
| Direction of rotation | Adjustable over bus | Clockwise (CW) / Counter-clockwise (CCW) |
| 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 Default: Auto |
| | Termination | 120 Ω electronically switchable Default: Off |
| Connection cables | | |
| Cable length | | 0.9 m |
| Power supply / Communication | Number of cores and cross-sectional area | 5 x 0.75 mm ² |
| Degree of protection | | |
| Degree of protection | Degree of protection acc. to EN 60529 (see also chapter 'Mounting' above) | IP54 |
| Safety class | Safety class acc. to EN 60730 | III |
| Environmental conditions | | |
| Applicable standard | | IEC 60721-3-x |
| Operation | Climatic conditions | Class 3K5 |
| | Mounting location | Indoors |
| | Temperature general | -32...55 °C |
| | Humidity (non condensing) | < 95 % r. h. |
| Transport | Climatic conditions | Class 2K2 |
| | Temperature | -32...70 °C |
| | Humidity | < 95 % r. h. |
| Storage | Climatic conditions | Class 1K3 |
| | Temperature | -5...45 °C |
| | Humidity | < 95 % r. h. |

| Directives and Standards | |
|---|--|
| Product standard | EN60730-x |
| Electromagnetic compatibility (Application) | For residential, commercial and industrial environments |
| EU Conformity (CE) | A5W00004376 ¹⁾ |
| RCM Conformity | A5W00004377 ¹⁾ |
| EAC Conformity | Eurasia conformity for all G..B variants |
| UL, cUL | UL 873 http://ul.com/database |

| Environmental compatibility |
|---|
| The product environmental declarations A5W00055607 (GEB) ¹⁾ , and A6V101083254en (external Modbus interface) ¹⁾ contain data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal). |

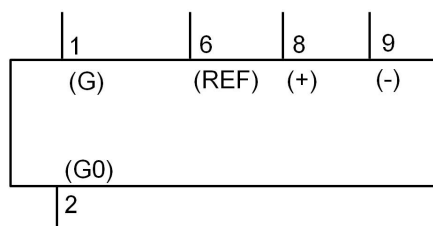
| Dimensions / Weight | |
|--------------------------------|---------------------------|
| Weight (w/o packaging) | 1.2 kg |
| Dimensions (w/o bus interface) | 82 x 192 x 63 mm |
| Suitable drive shafts | Round / square shaft |
| | 8...20.5 mm / 8...14.5 mm |
| | Min. drive shaft length |
| | 20 mm |

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

Internal diagrams

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

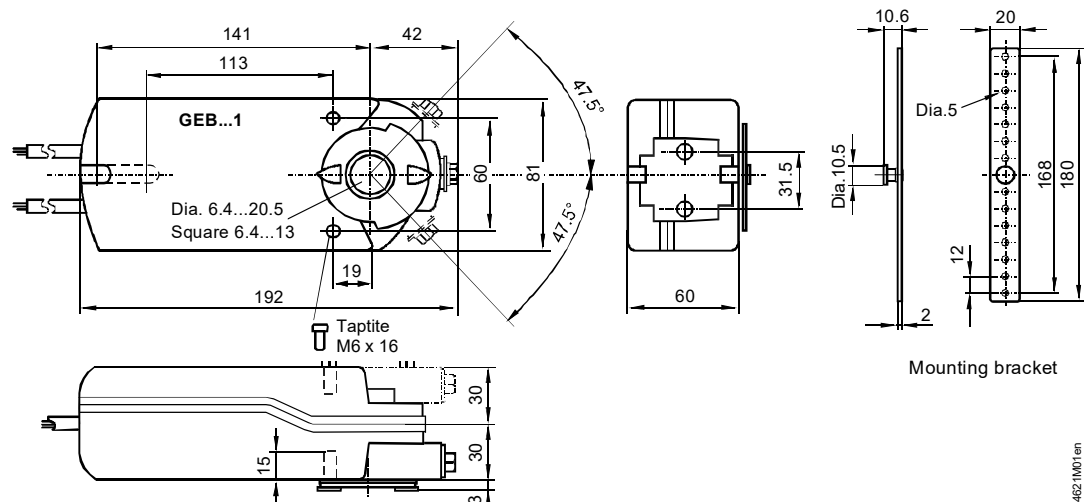
| Core desig. | Core color | Terminal code | Description |
|-------------|-------------|---------------|------------------------|
| 1 | red (RD) | G | System voltage AC 24 V |
| 2 | black (BK) | G0 | System neutral AC 24 V |
| 6 | violet (VT) | REF | Reference (Modbus RTU) |
| 8 | grey (GY) | + | Bus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



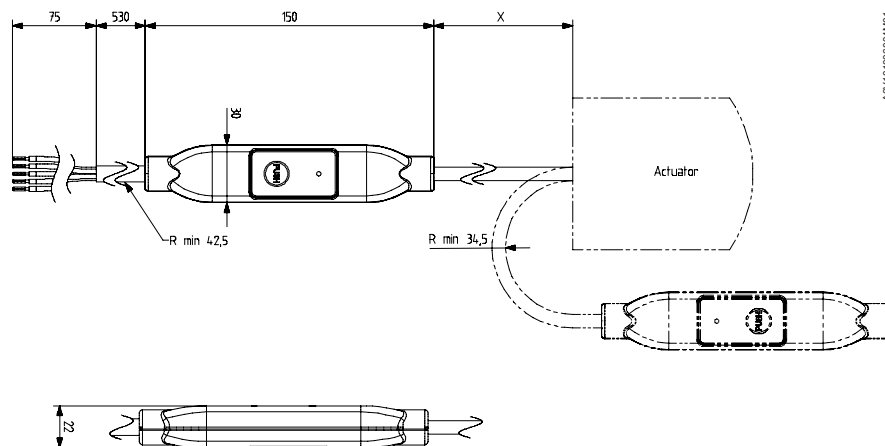
Note

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.

Actuator



External Modbus Interface


$$X = 220 \text{ mm}$$

Dimensions in mm