

MANUFACTURER DOCUMENT PACKAGE

# Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

## GEB161.1E

OPENAIR 20 NM MODULATING DAMPER ACTUATOR

Used with the applicable Siemens OpenAir GEB actuators configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Official Siemens technical documentation for GEB161.1E

## Use

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

- For damper areas up to approximately 4 m<sup>2</sup> (Guideline: Always comply with the damper manufacturer's specifications).
- Suitable for use with 2-position and 3-position controllers as well as modulating controllers (DC 0/2...10 V) to control air dampers.
- We recommend a minimum pulse length of 500 ms on rotary actuators operated with 3-point control to ensure continuous and accurate operation.

## Functions

| GEB..                                          | AC 24 V ~ /<br>DC 24...48 V –                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 141.1E / 142.1E / 146.1E | 161.1E / 163.1E / 164.1E / 166.1E                                                                                                                                                                                                                                                                                        |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                | AC 100...240 V ~                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 341.1E / 346.1E          | 361.1E                                                                                                                                                                                                                                                                                                                   |
| Control type                                   | 2-position / 3-position                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                          | Modulating control (0/2...10 V)                                                                                                                                                                                                                                                                                          |
| Rotary movement,<br>rotary direction           | <p>Clockwise or counterclockwise direction depends ...</p> <p>... on the type of control</p> <p>... on the setting of the rotary direction switch.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p><b>CW</b></p>  </div> <div style="text-align: center;"> <p><b>CCW</b></p>  </div> </div> <p>The actuator remains in the respective position with no power applied.</p> <p>cw = Clockwise<br/>ccw = Counterclockwise</p> |                          |                                                                                                                                                                                                                                                                                                                          |
| Position indication<br>Mechanical              | Rotation angle position indication using a position indicator.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                                                                                                                                                                                                                                                                                                                          |
| Position indication<br>Electric                | By connecting the feedback potentiometer to external voltage, output voltage is generated proportional to rotation angle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                          | <p>Position indicator: Output voltage U = DC 0/2...10 V is generated proportional to rotation angle.</p> <p>The direction of rotation (inverted or non-inverted) for output voltage U is based on the DIL switch position.</p>                                                                                           |
| Auxiliary switch                               | The switching points for auxiliary switches A and B can be set independently in increments of 5° from 0 to 90°.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                          |
| Self-adaptation of the<br>rotation angle range | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                          | <p>The actuator automatically determines the mechanical end positions of the rotation angle range.</p> <p>The characteristic function (U<sub>0</sub>, ΔU) is mapped to the calculated rotation angle range.</p> <p>The function of DIL switch 2 (self-adaptation) is only ensured when operating voltage is applied.</p> |
| Manual adjustment                              | The actuator can be manually adjusted by pressing the gear train disengagement button.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |                                                                                                                                                                                                                                                                                                                          |
| Rotation angle limitation                      | A set screw can limit the rotation angle to between 0° and 90°.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |                                                                                                                                                                                                                                                                                                                          |

## Technical design

### Housing

- Robust and light cast aluminum housing. The housing guarantees long life, even under harsh ambient conditions.

### Actuator / 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 number | Open-loop control | Operating voltage                                                                                          | Positioning signal input Y                                                                        | Position indicator U = DC 0...10 V  | Feedback potentiometer 5 kΩ | Self-adapting rotation angle ranges | Aux. switch | Rotation direction switch |  |  |  |  |
|-----------|--------------|-------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------|-------------|---------------------------|--|--|--|--|
| GEB141.1E | S55499-D329  | 2- or 3-position  | AC 24 V ~ / DC 24...48 V  | -                                                                                                 | -                                                                                                                    | -                           | -                                   | -           | Yes                       |  |  |  |  |
| GEB142.1E | S55499-D330  |                   |                                                                                                            |                                                                                                   |                                                                                                                      | Yes                         |                                     | -           |                           |  |  |  |  |
| GEB146.1E | S55499-D331  |                   | AC 100...240 V ~                                                                                           |                                                                                                   |                                                                                                                      | -                           |                                     | 2           |                           |  |  |  |  |
| GEB341.1E | S55499-D336  |                   |                                                                                                            |                                                                                                   |                                                                                                                      |                             |                                     | -           |                           |  |  |  |  |
| GEB346.1E | S55499-D337  |                   |                                                                                                            |                                                                                                   |                                                                                                                      |                             |                                     | 2           |                           |  |  |  |  |
| GEB161.1E | S55499-D332  | Modulating        | AC 24 V ~ / DC 24...48 V  | DC 0/2...10 V    | Yes                                                                                                                  | -                           | Yes                                 | -           | Yes                       |  |  |  |  |
| GEB163.1E | S55499-D333  |                   |                                                                                                            | DC 0...35 V      |                                                                                                                      |                             |                                     | 2           |                           |  |  |  |  |
| GEB164.1E | S55499-D334  |                   |                                                                                                            | DC 0/2...10 V  |                                                                                                                      |                             |                                     |             |                           |  |  |  |  |
| GEB166.1E | S55499-D335  |                   | AC 100...240 V ~                                                                                           |                                                                                                   |                                                                                                                      |                             |                                     | -           |                           |  |  |  |  |
| GEB361.1E | S55499-D338  |                   |                                                                                                            |                                                                                                   |                                                                                                                      |                             |                                     |             |                           |  |  |  |  |

## Accessories/spare parts

See data sheet N4697.

## Product documentation

| Topic                 | Title                                              | Document ID |
|-----------------------|----------------------------------------------------|-------------|
| Data sheet            | Air damper actuators                               | A6V11449860 |
| Technical principles  | Non-spring rotary actuators GEB...1                | Z4621       |
| Mounting Instructions | GEB..1E                                            | A6V11476940 |
| Data sheet            | Accessory and spare parts for air damper actuators | N4697       |

## Maintenance

The GEB..1E actuators are maintenance-free.

## Disposal



The device is considered an electronic device for disposal in accordance with the European Guidelines 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 (GEB1..1E)       |                  |                                                                                                                    |                                  |
|-------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Operating voltage (SELV/PELV) |                  | AC 24 V ~ $\pm 20\%$ (19.2...28.8 V ~)<br>DC 24...48 V $\approx \pm 20\%$ (19.2...57.6 V $\approx$ ) <sup>1)</sup> |                                  |
| Frequency                     |                  | 50/60 Hz                                                                                                           |                                  |
| Power consumption:            | During operation | GEB14..1E<br>GEB16..1E                                                                                             | 1.7 VA / 1.1 W<br>1.9 VA / 1.2 W |
|                               | Holding          | GEB14..1E<br>GEB16..1E                                                                                             | 0.4 W<br>0.6 W                   |

| Power supply (GEB3..1E)       |                  |                                            |                                  |
|-------------------------------|------------------|--------------------------------------------|----------------------------------|
| Operating voltage (SELV/PELV) |                  | AC 100...240 V ~ $\pm 10\%$ (90...264 V ~) |                                  |
| Frequency                     |                  | 50/60 Hz                                   |                                  |
| Power consumption:            | During operation | GEB34..1E<br>GEB36..1E                     | 3.4 VA / 1.6 W<br>3.4 VA / 1.3 W |
|                               | Holding          | GEB34..1E<br>GEB36..1E                     | 0.8 W<br>0.6 W                   |

| Function data                                               |                     |
|-------------------------------------------------------------|---------------------|
| Nominal torque                                              | 20 Nm               |
| Maximum torque (when blocked)                               | 35 Nm <sup>2)</sup> |
| Minimum holding torque                                      | 20 Nm               |
| Nominal rotation angle (with position indication)           | 90°                 |
| Maximum rotation angle (mechanically limited)               | 95° $\pm 2^\circ$   |
| Runtime at nominal rotation angle 90°                       | 150 s               |
| Actuator sound power level (at a positioning time of 150 s) | <35 dB(A)           |

| Inputs                                                |                  |                                                                         |
|-------------------------------------------------------|------------------|-------------------------------------------------------------------------|
| Positioning signal for GEB14..1E                      |                  |                                                                         |
| Operating voltage                                     | (wires 1-6/G-Y1) | Clockwise                                                               |
| AC 24 V ~ / DC 24...48 V $\bar{\text{—}}$             | (wires 1-7/G-Y2) | Counterclockwise                                                        |
| Positioning signal for GEB34..1E                      |                  |                                                                         |
| Operating voltage                                     | (wires 1-6/G-Y1) | Clockwise                                                               |
| AC 100...240 V ~                                      | (wires 1-7/G-Y2) | Counterclockwise                                                        |
| Positioning signal for GEB16..1E                      |                  |                                                                         |
| Input voltage                                         | (wires 8-2/Y-G0) | DC 0/2...10 V $\bar{\text{—}}$                                          |
| Power consumption                                     |                  | 0.1 mA                                                                  |
| Input resistance                                      |                  | >100 k $\Omega$                                                         |
| Max. permissible input voltage                        |                  | DC 35 V $\bar{\text{—}}$ limited internally to DC 10 V $\bar{\text{—}}$ |
| Protected against faulty wiring                       |                  | Max. AC 24 V ~ / DC 24...48 V $\bar{\text{—}}$                          |
| Hysteresis for non-adjustable characteristic function |                  | 60 mV                                                                   |
| for adjustable characteristic function                |                  | 0.6 % of $\Delta U$                                                     |
| Adjustable characteristic (GEB163.1E, GEB164.1E)      |                  |                                                                         |
| Adjustable with 2 potentiometers:                     |                  |                                                                         |
| Offset $U_0$                                          |                  | DC 0...5 V $\bar{\text{—}}$                                             |
| Span $\Delta U$                                       |                  | DC 2...30 V $\bar{\text{—}}$                                            |
| Max. input voltage                                    |                  | DC 35 V $\bar{\text{—}}$                                                |
| Protected against faulty wiring                       |                  | Max. AC 24 V ~ / DC 24...48 V $\bar{\text{—}}$                          |

<sup>1)</sup> cUL: Only to DC 30 V  $\bar{\text{—}}$  permissible

<sup>2)</sup> See notes on page 4 and page 8

| Outputs                                                 |                  |                                                 |
|---------------------------------------------------------|------------------|-------------------------------------------------|
| Position indicator                                      |                  |                                                 |
| Output signal (GEB16..1E)                               | (wires 9-2/U-G0) |                                                 |
| Output signal (GEB36..1E)                               | (wires 9-2/U-G-) |                                                 |
| Output voltage U                                        |                  | DC 0...10 V $\bar{\text{—}}$                    |
| Max. output current                                     |                  | DC $\pm 1$ mA                                   |
| Protected against faulty wiring                         |                  | Max. AC 24 V ~ / DC 24...48 V $\bar{\text{—}}$  |
| Aux. power supply (G-/G+)                               |                  |                                                 |
|                                                         | GEB36..          | DC 24 V $\bar{\text{—}}$ $\pm 20$ %, max. 10 mA |
| Feedback potentiometer (for GEB142.1E)                  |                  |                                                 |
| Change in resistance                                    | (wires P1-P2)    | 0...5000 $\Omega$                               |
| Load                                                    |                  | <0.25 W                                         |
| Max. contact current                                    |                  | <0.1 mA                                         |
| Permissible voltage at potentiometer (SELV/PELV)        |                  | AC 24 V ~ / DC 24...48 V $\bar{\text{—}}$       |
| Insulation resistance between potentiometer and housing |                  | AC 500 V ~                                      |

| Mechanical life |           |
|-----------------|-----------|
| Full cycles     | 100'000   |
| Partial cycles  | 5'000'000 |

| Auxiliary switches (GEB146.1E, GEB166.1E, GEB346.1E)        |          |                                                                                                                                                                                                 |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Switching voltage                                           |          | AC 24...250 V ~ / DC 12...30 V $\bar{\text{—}}$                                                                                                                                                 |
| Contact loading                                             |          | 6 A resistive, 2 A inductive, min. 10 mA @ AC<br>4 A resistive, 2 A inductive, min. 10 mA @ DC 30 V $\bar{\text{—}}$<br>0.8 A resistive, 0.5 A inductive, min. 10 mA @ DC 60 V $\bar{\text{—}}$ |
| Electric strength auxiliary switch against housing          |          | AC 4 kV                                                                                                                                                                                         |
| Switching range for auxiliary switches / setting increments |          | 5°...90° / 5°                                                                                                                                                                                   |
| Factory switch setting:                                     |          |                                                                                                                                                                                                 |
|                                                             | Switch A | 5°                                                                                                                                                                                              |
|                                                             | Switch B | 85°                                                                                                                                                                                             |

| Connection cables                   |                      |
|-------------------------------------|----------------------|
| Cable length                        | 0.9 m                |
| Cross-section                       | 0.75 mm <sup>2</sup> |
| Permissible length for signal wires | 300 m                |

| Protection class and degree of protection             |                                                                                      |
|-------------------------------------------------------|--------------------------------------------------------------------------------------|
| Protection class                                      | EN 60730                                                                             |
| AC 24 V ~ / DC 24...48 V ~,<br>feedback potentiometer | III                                                                                  |
| AC 100...240 V ~, auxiliary switches                  | II                                                                                   |
| Degree of protection of housing                       | IP54 as per EN 60529 (see "Mounting", page 4, and Mounting instructions A6V11476940) |

| Environmental conditions |                             |
|--------------------------|-----------------------------|
| Operation                | IEC 60721-3-3               |
| Climatic conditions      | Class 3K5                   |
| Mounting location        | interior, weather-protected |
| Temperature              | -32...55 °C                 |
| Humidity, non-condensing | <95 % r.h.                  |
| Transportation           | IEC 60721-3-2               |
| Climatic conditions      | Class 2K3                   |
| Temperature              | -32...70 °C                 |
| Humidity, non-condensing | <95 % r.h.                  |
| Storage                  | IEC 60721-3-1               |
| Climatic conditions      | Class 1K3                   |
| Temperature              | -32...50 °C                 |
| Humidity, non-condensing | <95 % r.h.                  |
| Mechanical conditions    | Class 2M2                   |

| Standards, directives and approvals          |                                                                      |
|----------------------------------------------|----------------------------------------------------------------------|
| Product standards                            | EN60730<br>Part 2-14: Particular requirements for electric actuators |
| Electromagnetic compatibility (field of use) | For residential, commercial, and industrial environments             |
| EU conformity (CE)                           | A5W00004376 <sup>3)</sup>                                            |
| RCM conformity                               | A5W00004377 <sup>3)</sup>                                            |
| UKCA conformity                              | A5W00198170A <sup>3)</sup>                                           |
| EAC compliance                               | Eurasian conformity                                                  |
| UL<br>Federal Communications Commission      |                                                                      |

| Environmental compatibility                                                                                                                                                                                                      |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| The product environmental declaration A5W00055607 <sup>3)</sup> contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal). |  |

| Dimensions           |                            |
|----------------------|----------------------------|
| Actuator (W x H x D) | See "Dimensions" (page 11) |
| Damper shaft         |                            |
| Round                | 8...20.5 mm                |
| Square (diagonal)    | 8...14.5 mm                |
| Min. length          | 20 mm                      |
| Max. shaft hardness  | <300 HV                    |

| Weight          |                                                                                 |
|-----------------|---------------------------------------------------------------------------------|
| Excl. packaging | Max. 1.1 kg, without auxiliary switches<br>Max. 1.3 kg, with auxiliary switches |

|          |                                                                                                                                                                                                                                                                                                                                                                      |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>!</b> | <b>NOTICE</b>                                                                                                                                                                                                                                                                                                                                                        |
|          | <b>Shaft connection – Important notes for the manufacturer / installer</b><br>Use of unsuitable damper shafts may damage the damper or damper shaft. <ul style="list-style-type: none"> <li>• Use only damper shafts with diameters suitable for the damper surface.</li> <li>• Use only quality materials typical for the sector for damper shafts/rods.</li> </ul> |

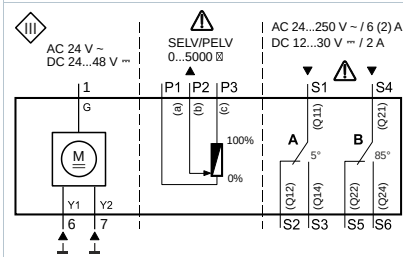
## Connection diagrams

### Internal Diagrams

#### GEB14..1E

(open-close, 3-position control)

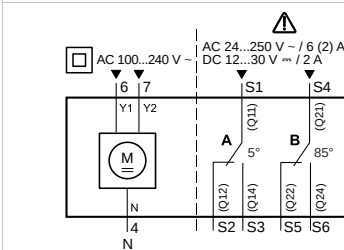
##### AC 24 V ~ / DC 24...48 V –



#### GEB34..1E

(open-close, 3-position control)

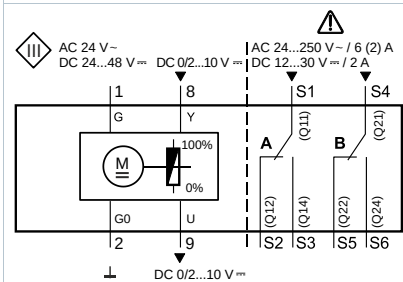
##### AC 100...240 V ~



#### GEB16..1E

(modulating, Y = DC 0/2...10 V –)

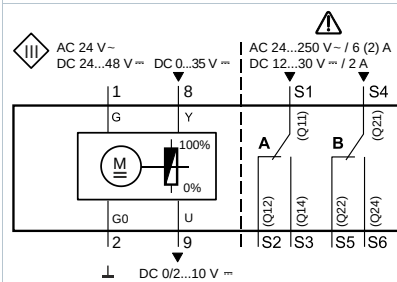
##### AC 24 V ~ / DC 24...48 V –



#### GEB16..1E

(modulating, Y = DC 0...35 V –)

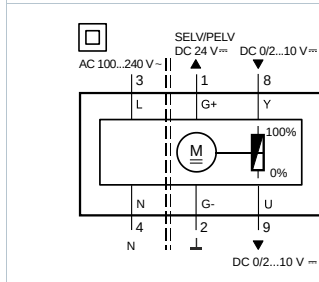
##### AC 24 V ~ / DC 24...48 V –



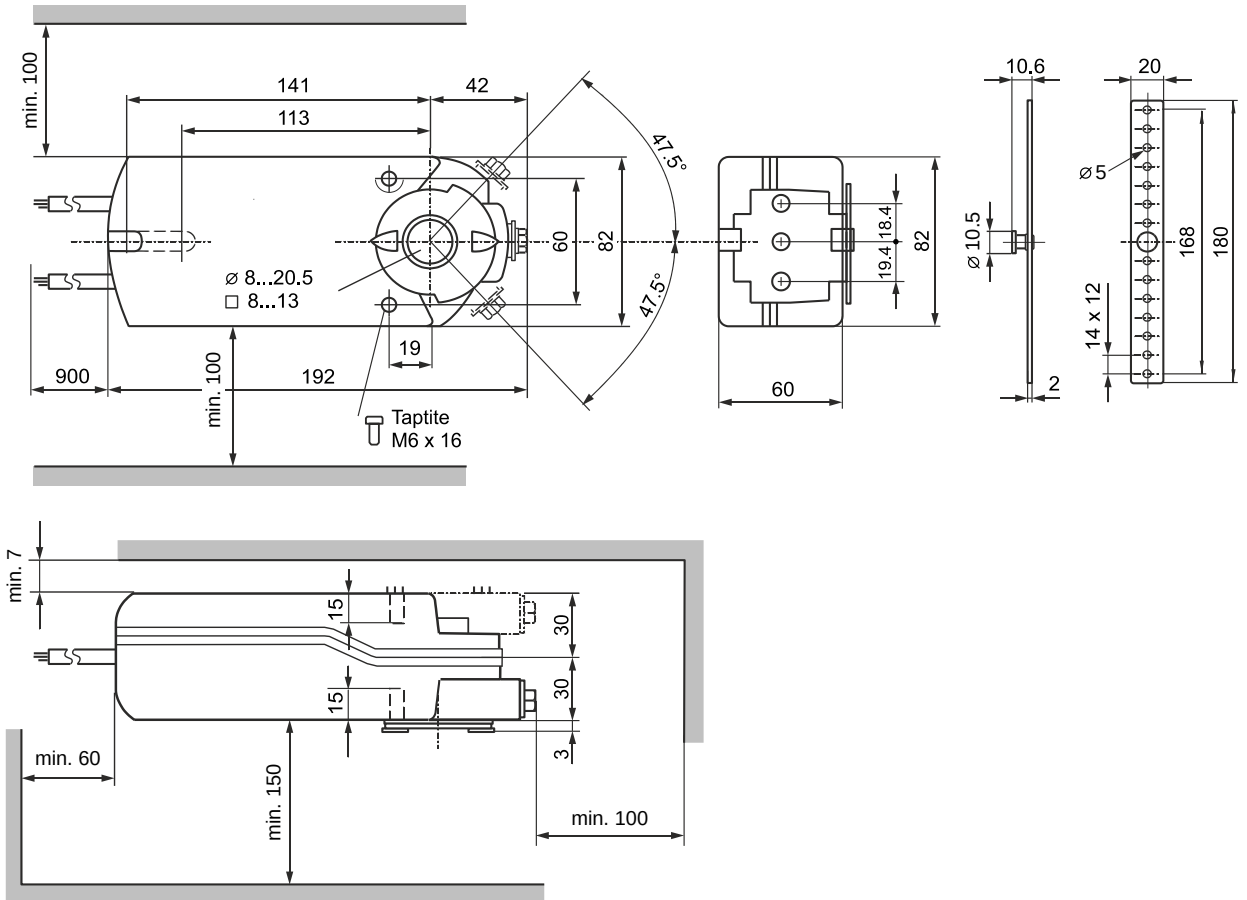
#### GEB361.1E

(modulating, Y = DC 0/2...10 V –)

##### AC 100...240 V ~



## Dimensions



Dimensions in mm