



OpenAir™

## Air damper actuators

## GQD...1

Rotary version, AC/DC 24 V and AC 230 V

GQD...1

- Electric motor-driven actuators for two-position and three-position control as well as DC 0...10 V control
- 2 Nm nominal torque
- AC/DC 24 V or AC 230 V rated voltage
- Prewired with 0.9 m connecting cable
- Spring return
- Auxiliary switch for auxiliary functions

## Use

- For damper areas up to 0.3 m<sup>2</sup>, friction dependent.
- For directly driven zone dampers to control air flow in air ducts.

## Type summary



| Spring return rotary actuators GQD | Type      | Operating voltage      | Control signal | Cable length | Coupling  | Auxiliary switch |
|------------------------------------|-----------|------------------------|----------------|--------------|-----------|------------------|
|                                    | GQD121.1A | AC/DC 24 V             | 2-position     | 0.9 m        | 8...15 mm | -                |
|                                    | GQD126.1A | AC/DC 24 V             | 2-position     | 0.9 m        | 8...15 mm | yes              |
|                                    | GQD321.1A | AC 230 V               | 2-position     | 0.9 m        | 8...15 mm | -                |
|                                    | GQD326.1A | AC 230 V               | 2-position     | 0.9 m        | 8...15 mm | yes              |
|                                    | GQD131.1A | AC 24 V / DC 24...48 V | 3-position     | 0.9 m        | 8...15 mm | -                |
|                                    | GQD136.1A | AC 24 V / DC 24...48 V | 3-position     | 0.9 m        | 8...15 mm | yes              |
|                                    | GQD161.1A | AC 24 V / DC 24...48 V | DC 0...10 V    | 0.9 m        | 8...15 mm | -                |
|                                    | GQD166.1A | AC 24 V / DC 24...48 V | DC 0...10 V    | 0.9 m        | 8...15 mm | yes              |

## Functions

| Type                  | GQD121.1A<br>GQD126.1A<br>GQD321.1A<br>GQD326.1A   | GQD131.1A<br>GQD136.1A            | GQD161.1A<br>GQD166.1A |
|-----------------------|--|-----------------------------------|------------------------|
| Control type          | 2-position   | 3-position                        | DC 0...10 V            |
| Direction of rotation | Clockwise or counter-clockwise movement depends on the actuator's mounting position on the damper shaft...                                   |                                   |                        |
|                       | -  | ...as well as the type of control | -                      |
| Spring return         | On power failure or when the operating voltage is switched off, the spring return moves the rotary actuator to its mechanical zero position. |                                   |                        |
| Auxiliary switch      | GQD...6.1A: Set switching points at 5° or 85°.   |                                   |                        |

## Technical data

|   |  |                            |
|---|--|----------------------------|
| ⚠ Power supply<br>AC/DC 24 V                | Operating voltage AC / frequency   | AC 24 V ± 20% ; 50 / 60 Hz |
|   | Operating voltage DC   | DC 24 V ± 15%              |
| ⚠ Supply voltage<br>AC 24 V<br>DC 24...48 V | Power consumption  |                            |
|   | GQD121.1A / GQD126.1A: (running)   | 6.5 VA / 4.5 W             |
|   | (holding)  | 4 VA / 2.5 W               |
|   | Operating voltage AC / frequency   | AC 24 V ± 20% ; 50/60 Hz   |
|   | Operating voltage DC   | DC 24...48 V ± 20%         |
|   | Power consumption  |                            |
| - GQD131.1A / GQD136.1A: (running)          | 4 VA / 2.5 W   |                            |
| (holding)                                   | 3 VA / 1.5 W   |                            |
| - GQD161.1A / GQD166.1A: (running)          | 4.5 VA / 3 W   |                            |
| (holding)                                   | 3.5 VA / 2 W   |                            |
|   | Safety extra-low voltage (SELV) or<br>Protective extra-low voltage (PELV) as per<br>Requirements for external safety isolating | HD 384                     |

|   |   |   |
|---|---|---|
| ⚠ Supply voltage<br>AC 230 V                    | transformer (100% duty cycle)                         | EN 61 558   |
|   | Fuse for incoming supply line (fast)                  | 2 A   |
| Functional data                                 | Operating voltage / Frequency                         | AC 230 V ± 15%; 50 / 60 Hz  |
|   | Fuse for incoming supply line (fast)                  | 2 A   |
|   | Power consumption                                     |   |
|   | GQD321.1A / GQD326.1A: (running)                      | 10 VA / 4.5 W   |
|   | (holding)   | 7 VA / 3 W  |
|   | Nominal torque  | 2 Nm  |
|   | Maximum torque  | 6 Nm  |
|   | Nominal rotational angle                              | 90°   |
|   | Maximum rotational angle<br>(mechanically limited)    | 95 ± 2°   |
|   | Runtime at nominal rotational angle 90°               | 30 s  |
|   | Closing time with spring return<br>(on power failure) | 15 s  |
| Duty cycle                                      | 100%  |   |
| Direction of rotation                           | Clockwise/counter-clockwise                           |   |
| Mechanical life                                 | 60 000 cycles   |   |
| Positioning signal for<br>GQD131.1A / GQD136.1A | Contact voltage                                       | AC 24 V / DC 24...48 V<br>or AC 0 V   |
|   | Contact current                                       | 8 mA typical  |
| Positioning signal for<br>GQD161.1A / GQD166.1A | Input voltage Y (max.)                                | DC 0...35 V   |
|   | Working range Y                                       | DC 0...10 V   |
| Auxiliary switch                                | AC power  |   |
|   | – Switching voltage                                   | AC 24...230 V   |
|   | – Rated voltage resistive / inductive                 | 6 A / 2 A   |
|   | No mixed operation AC 24 V / 230 V                    |   |
|   | DC power  |   |
|   | – Switching voltage                                   | DC 12...30 V  |
|   | – Rated current                                       | DC 2 A  |
| Factory switch setting                          |   |   |
| – Switch A (set)                                | 5°  |   |
| – Switch B (set)                                | 85°   |   |
| Connection cables                               | Cable length  | 0.9 m   |
|   | Cross-section   | 0.75 mm <sup>2</sup>  |
| Housing type                                    | Protection as per EN 60 529                           | IP40  |
| Protection class                                | Insulation protective class                           | EN 60 730   |
|   | – AC 230 V  |  |
|   | – AC/DC 24 V  |  |
| Environmental conditions                        | Operation   | IEC 721-3-3   |
|   | – Climatic conditions                                 | Class 3K5   |
|   | – Mounting location                                   | Interior, weather-protected   |
|   | – Temperature (extended)                              | -32...+55 °C  |
|   | – Humidity, non-condensing                            | < r.h. 95%  |
|   | Transportation  | IEC 721-3-2   |
|   | – Climatic conditions                                 | Class 2K3   |
|   | – Temperature (extended)                              | -32...+70 °C  |
|   | – Humidity, non-condensing                            | < 95% r.h.  |
|   | Storage   | IEC 721-3-1   |
|   | – Climatic conditions                                 | Class 1K3   |
|   | – Temperature (extended)                              | -32...+50 °C  |
|   | – Humidity, non-condensing                            | < 95% r.h.  |
| Mechanical conditions                           | Class 2M2   |   |



|                     |                               |  |                              |                  |
|---------------------|-------------------------------|--|------------------------------|------------------|
| Standards           | Product safety                | Automatic electrical controls for household and similar use (Type 1) | IEC/EN 60 730-2-14           |                  |
|                     | Electromagnetic compatibility | – Immunity   | IEC/EN 61 000-6-2            |                  |
|                     |                               | – Emissions  | IEC/EN 61 000-6-3            |                  |
|                     | N474 C-tick conformity as per | – Australian EMC Framework   | Radio communication act 1992 |                  |
|                     |                               | – Radio Interference Emission Standard                               | AS/NZS 3548                  |                  |
|                     |                               | CE conformity as per   | – EMC directive              | 2004/108/EEC     |
|                     |                               |  | – Low voltage directive      | 2006/95/EEC      |
|                     | Dimensions                    | Actuator   | W × H × D                    | See "Dimensions" |
|                     |                               | Damper shaft   | – Rectangular                | 6... 11 mm       |
|                     |                               |  | Min. length                  | 20 mm            |
| – Round             |                               | Max. shaft hardness  | 300 HV                       |                  |
|                     |                               | Min. length  | 20 mm                        |                  |
| Max. shaft hardness |                               |  | 300 HV                       |                  |
|                     |                               | Weight   | Excl. packaging              |                  |
| – GQD121.1A         |                               |  | 0.480 kg                     |                  |
| – GQD126.1A         | 0.600 kg                      |  |                              |                  |
| – GQD321.1A         | 0.490 kg                      |  |                              |                  |
| – GQD326.1A         | 0.615kg                       |  |                              |                  |
| – GQD131.1A         | 0.500 kg                      |  |                              |                  |
| – GQD136.1A         | 0.620 kg                      |  |                              |                  |
| – GQD161.1A         | 0.500 kg                      |  |                              |                  |
| – GQD166.1A         | 0.620 kg                      |  |                              |                  |

## Mechanical design

### Basic components

|            |                               |
|------------|-------------------------------|
| Housing    | Fiberglass-reinforced plastic |
| Gear train | Maintenance-free, noise-free  |

### Engineering notes

|   |  |
|---|--|
| <b>STOP</b>   | This section explains general and system-specific regulations for mains and operating voltages. It also contains important information on your own safety and that of your plant.  |
| Intended use  | Use these actuators as described in the basic system documentation for the applied control systems. In addition, take account of all actuator-specific features and conditions as described in the brief description on the front page of this data sheet (bold print) as well as the sections "Use", "Engineering notes", and "Technical data". |
|                    | Sections flagged with the warning symbol to the left contain safety-related requirements and restrictions that must be adhered to at all times to prevent physical injury and equipment damage.  |
|  AC/DC 24 V supply | Operate the actuators only on safety extra-low voltage (SELV) or protective extra-low voltage (PELV) as per HD 384.  |

⚠ AC 230 V supply

The actuators are double-insulated and there is no connection for the protective ground.

⚠ Auxiliary switch

Apply only mains voltage or protective extra-low voltage to the switching outputs of the auxiliary switch. Mixed operation is not allowed. Operation at various phases is not allowed.

## CAUTION

### Do not open the actuators!

- The actuators are maintenance-free.
- Only the manufacturer may carry out repair work.
- Opening the actuator will void the warranty.
- Spring-return actuators contain pretensioned springs. Only trained staff may open this type of actuator (special tools required).

Electric, parallel connection of actuators

Up to 10 actuators of the same type can be electrically wired in parallel; cable length and cable cross-sections must be observed.

Required actuator type

Selection of the actuator depends on several torque factors. After obtaining the damper torque rating (Nm/m<sup>2</sup>) from the manufacturer and determining the damper area, calculate the total torque required to move the damper as follows:

Spring return damper actuators:

| IF total torque (SF <sup>1</sup> ): | Use type:                       |
|-------------------------------------|---------------------------------|
| ≤ 2 Nm                              | GQD...1.1A / GQD...6.1.A (2 Nm) |
| ≤ 7 Nm                              | GMA...1 (7 Nm)                  |
| ≤ 18 Nm                             | GCA...1 (18 Nm)                 |

<sup>1</sup> Safety factor SF: When calculating the required torque, non-definable variables such as slight misalignment, damper age, etc. must be included as a safety factor. We recommend a safety factor of 0.8 (or 80 % of the torque characteristic).

Transformer sizing for AC 24 V

Use safety insulating transformers as per EN 61 558 with double insulation designed for 100 % duty to supply SELV or PELV circuits..

Observe all local safety rules and regulations pertaining to the sizing and protection of transformers.

Determine the transformer power consumption by adding up the power consumption in VA for all actuators used.

Wiring and commissioning

Refer to the sections "Commissioning notes" and "Wiring diagrams" in this data sheet as well as to the HVAC job drawings.

## Mounting notes

Mounting instructions

All information and steps to properly prepare and mount the actuator are listed in the mounting instructions supplied with the actuator.

Mounting position

Mount the actuator in a position which ensures easy access to the cables and to the shaft adapter. See "Dimensions".

Damper shafts

Information on minimum length and diameter for the damper shaft is available in the "Technical data" section.

## Commissioning notes

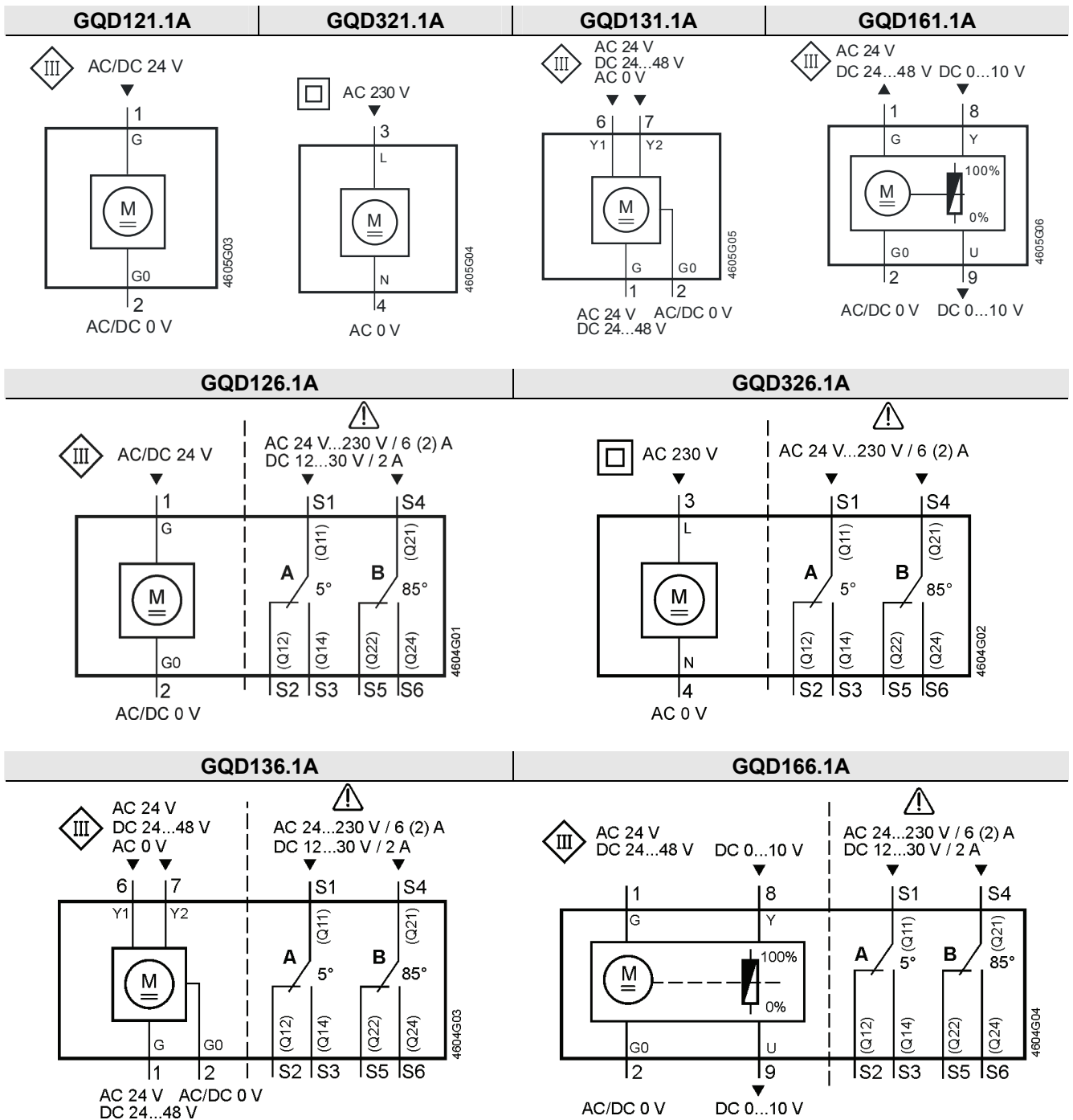
---

|                          |  |
|--------------------------|--|
| Reference                | For commissioning, the following reference documentation must be available:: <ul style="list-style-type: none"><li>• This data sheet.</li><li>• HVAC job diagram.</li></ul>  |
| Environmental conditions | Check to ensure that all permissible values as contained in the section "Technical data" have been observed.   |
| Mechanical check         | <ul style="list-style-type: none"><li>• Check for proper mounting and ensure that all mechanical settings correspond to the plant-specific requirements. Additionally, ensure that the dampers are tightly closed when in the closed position.</li><li>• Check the direction of rotation.</li><li>• Fasten the actuator securely to avoid twisting and blocking of the actuator.</li></ul> |
| Electrical check         | <ul style="list-style-type: none"><li>• Check to ensure that the cables are connected in accordance with the plant wiring diagram (see "Wiring diagrams").</li><li>• The operating voltage AC/DC 24 V (SELV/PELV) or AC 230 V must be within the tolerance values.</li></ul>   |

### Functional check

|                        |   |
|------------------------|---|
| GQD121.1A<br>GQD126.1A | Power supply AC/DC 24 V wires red (1), black (2) <ul style="list-style-type: none"><li>• Supply ON: Actuator turns clockwise</li><li>• Supply OFF: Actuator runs counter-clockwise (mechanical, via spring)</li></ul>   |
| GQD321.1A<br>GQD326.1A | Power supply AC 230 V wires brown (3), blue (4) <ul style="list-style-type: none"><li>• Supply ON: Actuator turns clockwise</li><li>• Supply OFF: Actuator runs counter-clockwise (mechanical, via spring)</li></ul>  |
| GQD131.1A<br>GQD136.1A | Power supply AC 24 V / DC 24...48 V wires red (1), black (2)<br>Positioning signal AC 24 V / DC 24...48 V or AC 0 V <ul style="list-style-type: none"><li>• Wire violet (6) ON: Actuator turns clockwise</li><li>• Wire orange (7) ON: Actuator turns counter-clockwise</li><li>• Wire violet (6) and wire orange (7) ON: Actuator turns counter-clockwise</li><li>• Wire violet (6) and wire orange (7) OFF: Actuator stops</li><li>• Supply OFF: Actuator runs counter-clockwise (mechanical, via spring)</li></ul> |
| GQD161.1A<br>GQD166.1A | Power supply AC 24 V / DC 24...48 V wires red (1), black (2)<br>Positioning signal DC 10 V <ul style="list-style-type: none"><li>• Wire gray (8) ON: Actuator turns clockwise</li><li>• Wire gray (8) OFF: Actuator turns counter-clockwise (electric)</li><li>• Supply OFF: Actuator runs counter-clockwise (mechanical, via spring)</li></ul>   |

## Wiring diagrams



## Cable labeling

| Connection                     | Cable |     |       |       | Description                 |
|--------------------------------|-------|-----|-------|-------|-----------------------------|
|                                | Code  | No. | Color | Abbr. |                             |
| <b>GQD121.1A</b>               | G     | 1   | red   | RD    | System potential AC/DC 24 V |
| <b>GQD126.1A</b><br>AC/DC 24 V | G0    | 2   | black | BK    |                             |
| <b>GQD321.1A</b><br>AC 230 V   | L     | 3   | brown | BN    | Phase AC 230 V              |
|                                | N     | 4   | blue  | BU    | Neutral conductor           |

|                    |     |    |            |      |  |
|--------------------|-----|----|------------|------|--|
| <b>GQD131.1A</b>   | G   | 1  | red        | RD   | System potential AC 24 V / DC 24...48 V                          |
| <b>GQD136.1A</b>   | G0  | 2  | black      | BK   | System neutral   |
| AC 24 V            | Y1  | 6  | violet     | VT   | Positioning signal clockwise AC 24 V / DC 24...48 V<br>or AC 0 V |
| DC 24...48 V       | Y2  | 7  | orange     | OG   | Positioning signal clockwise AC 24 V / DC 24...48 V<br>or AC 0 V |
| <b>GQD161.1A</b>   | G   | 1  | red        | RD   | System potential AC 24 V / DC 24...48 V                          |
| <b>GQD166.1A</b>   | G0  | 2  | black      | BK   | System neutral   |
| AC 24 V            | Y   | 8  | gray       | GY   | Positioning signal DC 0...10 V                                   |
| DC 24...48 V       | U   | 9  | pink       | PK   | Position indication DC 0 ... 10 V                                |
| <b>Aux. switch</b> | Q11 | S1 | gray/red   | GYRD | Switch A input   |
|                    | Q12 | S2 | gray/blue  | GYBU | Switch A NC contact  |
|                    | Q14 | S3 | gray/pink  | GYPK | Switch A NO contact  |
|                    | Q21 | S4 | black/red  | BKRD | Switch B input   |
|                    | Q22 | S5 | black/blue | BKBU | Switch B NC contact  |
|                    | Q24 | S6 | black/pink | BKPK | Switch B NO contact  |

## Dimensions

