

OpenAir™

## Air damper actuators for railway vehicles

GD..14..1E/RW



### Electronic motor driven actuators for open-close and three-position control

- Nominal torque 5 Nm
- Runtime 30 s / 90 s
- Rotary angle 0...90°
- Connection cables railway specific
- Feedback potentiometer
- Adjustable auxiliary switches
- Degree of protection IP54
- Printed circuit board, coated

## Features

Air damper actuators in difficult operational conditions; they meet the main requirements for:

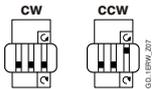
- EN 50155 (Railway applications - Electronic equipment used on rolling stock)
- EN 45545 (Railway applications - Fire protection on railway vehicles)
- EN 61373 (Railway applications - Rolling stock equipment - Shock and vibration tests).

## Use

The damper actuators are expressly suitable for air conditioning units and air distribution systems for railway vehicles.

- For damper areas up to 0.8 m<sup>2</sup>
- Suitable for use with open-close- or three-position controllers.
- We recommend a minimum pulse length of 500 ms on rotary actuators operated with 3-point control to ensure continuous and accurate operation.

## Functions

| Function                        | Description                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control type                    | Open-close-( SPST / SPDT) or three-position                                                                                                                                                                              |
| Rotary direction                | Clockwise / counter-clockwise, selectable with switch.<br>With no power applied, the actuator remains in the respective position.<br> |
| Position indication: Mechanical | Rotary angle position indication by using a position indicator.                                                                                                                                                          |
| Position indication: Electrical | The feedback potentiometer can be connected to external voltage to indicate the position.                                                                                                                                |
| Auxiliary switch                | The switching points for auxiliary switches A and B can be set independent of each other in increments of 5° within 0° to 90°.                                                                                           |
| Manual adjustment               | The actuator can be manually adjusted by pressing the gear train disengagement button.                                                                                                                                   |
| Rotary angle limitation         | The rotary angle of the shaft adapter can be limited mechanically with a set screw.                                                                                                                                      |

## Technical design

### Housing

The housing consists essentially of glass fibre reinforced plastic:

- flame retardant
- non brominated
- non chlorinated.

### Actuator motor / 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 up on reaching the end stop.
- The gears are maintenance free and low noise.

## Type summary

| Type         | Stock no.   | Operating voltage | Runtime [s] | Feedback potentiometer 5 kΩ | Auxiliary switch (adjustable) | Weight [g] | Cable length [m] | Rotary direction switch |
|--------------|-------------|-------------------|-------------|-----------------------------|-------------------------------|------------|------------------|-------------------------|
| GDD141.1E/RW | S55499-D208 | DC 24 V =         | 30          | –                           | –                             | 570        | 0.9              | yes                     |
| GDD142.1E/RW | S55499-D210 |                   | 30          | yes                         | –                             | 640        |                  |                         |
| GDD146.1E/RW | S55499-D209 |                   | 30          | –                           | 2                             | 750        |                  |                         |
| GDD146.1G/RW | S55499-D274 |                   | 30          | –                           | 2                             | 1100       | 3.0              |                         |
| GDA141.1E/RW | S55499-D212 |                   | 90          | –                           | –                             | 570        | 0.9              |                         |
| GDA142.1E/RW | S55499-D214 |                   | 90          | yes                         | –                             | 640        |                  |                         |
| GDA146.1E/RW | S55499-D213 |                   | 90          | –                           | 2                             | 750        |                  |                         |

## Accessories

| Type     | Description                            | Use                                                                                       |
|----------|----------------------------------------|-------------------------------------------------------------------------------------------|
| ASK78.6  | Centering insert, square profile 8 mm  | To center a shaft with square profile 8 x 8 mm in the coupling bushing of the actuator.   |
| ASK78.7  | Centering insert, square profile 10 mm | To center a shaft with square profile 10 x 10 mm in the coupling bushing of the actuator. |
| ASK78.9  | Centering insert, round 10 mm          | To center a shaft with round dia. 10 mm in the coupling bushing of the actuator.          |
| ASK78.10 | Centering insert, round 12 mm          | To center a shaft with dia. 12 mm in the coupling bushing of the actuator.                |

## Product documentation

| Topic                 | Title                                     | Document ID        |
|-----------------------|-------------------------------------------|--------------------|
| Data sheet            | Air damper actuators for railway vehicles | A6V10636280_en--_a |
| Mounting instructions | GD..1E/RW, GD..1G/RW, GL..1E/RW           | A6V10636275_----_a |

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

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

## Notes

## Safety

|                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>⚠ Caution</b></p>                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                     | <p><b>National safety regulations</b></p> <p>Failure to comply with national safety regulations may result in personal injury and property damage.</p> <ul style="list-style-type: none"> <li>• Observe national provisions and comply with the appropriate safety regulations.</li> <li>• Use only properly trained technicians for mounting, commissioning, and servicing.</li> </ul> |

**Potentiometer and auxiliary switches**

Potentiometer and auxiliary switches cannot be added in the field. For this reason, order the type that includes the required options.

**Installation**

|                                                                                   |                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  <b>WARNING</b>                                                                                                                                                                                                  |
|                                                                                   | <p><b>No internal line protection for supply lines to external consumers</b><br/>                 Risk of fire and injury due to short-circuits</p> <ul style="list-style-type: none"> <li>Adapt the line diameters as per local regulations to the rated value of the installed fuse.</li> </ul> |

**Maintenance**

The actuators GD..14..1E/RW are maintenance-free.

**Disposal**

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.</p> <ul style="list-style-type: none"> <li>Dispose of the device through channels provided for this purpose.</li> <li>Comply with all local and currently applicable laws and regulations.</li> </ul> |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

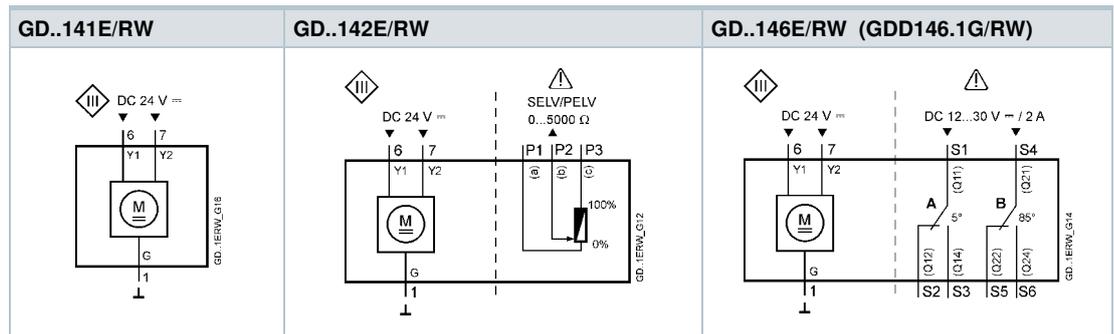
**Technical data**

| Power supply                                                         |         | GDD1..1E/RW                                                                                                      | GDA1..1E/RW |
|----------------------------------------------------------------------|---------|------------------------------------------------------------------------------------------------------------------|-------------|
| Operating voltage                                                    |         | DC 24...45 V = +25 % / -30 % (16.8...56.3 V =)                                                                   |             |
| Power consumption                                                    | Running | 1.5 W                                                                                                            | 1.0 W       |
|                                                                      | Holding | 0.5 W                                                                                                            | 0.5 W       |
| Functional data                                                      |         | GDD1..1E/RW                                                                                                      | GDA1..1E/RW |
| Nominal torque                                                       |         | 5 Nm                                                                                                             |             |
| Maximum torque (blocked)                                             |         | 7 Nm                                                                                                             |             |
| Nominal rotary angle                                                 |         | 90°                                                                                                              |             |
| Max. rotary angle                                                    |         | 95° ± 2°                                                                                                         |             |
| Runtime for 90° rotary angle                                         |         | 30 s                                                                                                             | 90 s        |
| Actuator sound power level                                           |         | 32 dB(A)                                                                                                         | 30 dB(A)    |
| Feedback potentiometer<br>Change of resistance (wires P1-P2)<br>Load |         | GD..142.1E/RW (only):<br>0...5000 Ω<br><0,25 W                                                                   |             |
| Auxiliary switches (GD..146.1E/RW only)                              |         |                                                                                                                  |             |
| Contact rating                                                       |         | 4 A resistive, 2 A inductive, min. 10 mA @ DC 30 V =<br>0.8 A resistive, 0.5 A inductive, min. 10 mA @ DC 60 V = |             |
| Switching voltage                                                    |         | DC 12...60 V =                                                                                                   |             |
| Switching range for auxiliary switches                               |         | 5°...90°                                                                                                         |             |
| Setting increments                                                   |         | 5°                                                                                                               |             |

| <b>Wiring connections (specific for railway vehicles)</b>                                                                                                                                                                        |                                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cable length                                                                                                                                                                                                                     | 0.9 m (GDD146.1G/RW: 3.0 m)                                                                                                                                                   |
| Cross-section                                                                                                                                                                                                                    | 0.75 mm <sup>2</sup>                                                                                                                                                          |
| <b>Degree of protection</b>                                                                                                                                                                                                      |                                                                                                                                                                               |
| Insulation class<br>GD..142.1E/RW (Feedback potentiometer)<br>GD..146.1E/RW (Auxiliary switches)                                                                                                                                 | As per EN 60730<br>III<br>III                                                                                                                                                 |
| Housing protection                                                                                                                                                                                                               | IP 54 as per EN 60529                                                                                                                                                         |
| <b>Environmental conditions</b>                                                                                                                                                                                                  |                                                                                                                                                                               |
| Temperature                                                                                                                                                                                                                      | -40...+70 °C                                                                                                                                                                  |
| Overtemperature (max.10 min / 15 °C)                                                                                                                                                                                             | ...+85 °C                                                                                                                                                                     |
| Humidity                                                                                                                                                                                                                         | <95 % r.F.                                                                                                                                                                    |
| Condensation                                                                                                                                                                                                                     | permitted                                                                                                                                                                     |
| <b>Standards, directives and approvals</b>                                                                                                                                                                                       |                                                                                                                                                                               |
| Product standard                                                                                                                                                                                                                 | EN60730<br>Part 2-14 / Particular requirements for electric actuators                                                                                                         |
| Railway applications                                                                                                                                                                                                             | EN 50155<br>Railway applications - Electronic equipment used on rolling stock<br><br>EN 61373<br>Shock and vibration<br><br>EN 45545-2<br>Fire prevention in railway vehicles |
| Electromagnetic compatibility (Application area)                                                                                                                                                                                 | For railway applications<br>Residential, commercial, light-industrial and industrial environments                                                                             |
| EU Conformity (CE)<br>GDD1..1E/RW<br>GDA1..1E/RW                                                                                                                                                                                 | A5W00026942 <sup>1)</sup><br>A5W00026943 <sup>1)</sup>                                                                                                                        |
| RCM Conformity<br>GDD1..1E/RW<br>GDA1..1E/RW                                                                                                                                                                                     | A5W00026946 <sup>1)</sup><br>A5W00026947 <sup>1)</sup>                                                                                                                        |
| EAC Conformity                                                                                                                                                                                                                   | Eurasian conformity                                                                                                                                                           |
| <b>Environmental compatibility</b>                                                                                                                                                                                               |                                                                                                                                                                               |
| The product environmental declaration A5W00026066 <sup>1)</sup> contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal). |                                                                                                                                                                               |
| <b>Dimensions</b>                                                                                                                                                                                                                |                                                                                                                                                                               |
| Actuator W x H x D                                                                                                                                                                                                               | see „Dimensions“, p. 7                                                                                                                                                        |
| Damper shaft:                                                                                                                                                                                                                    |                                                                                                                                                                               |
| – square                                                                                                                                                                                                                         | 6...12.8 mm                                                                                                                                                                   |
| Min. shaft length                                                                                                                                                                                                                | 20 mm                                                                                                                                                                         |
| Shaft hardness                                                                                                                                                                                                                   | 300 HV                                                                                                                                                                        |
| – round                                                                                                                                                                                                                          | 8...16 mm                                                                                                                                                                     |
| Min. shaft length                                                                                                                                                                                                                | 30 mm                                                                                                                                                                         |
| Shaft hardness                                                                                                                                                                                                                   | 300 HV                                                                                                                                                                        |
| <b>Weight</b>                                                                                                                                                                                                                    |                                                                                                                                                                               |
| Without packaging                                                                                                                                                                                                                | see „Type summary“, p. 3                                                                                                                                                      |

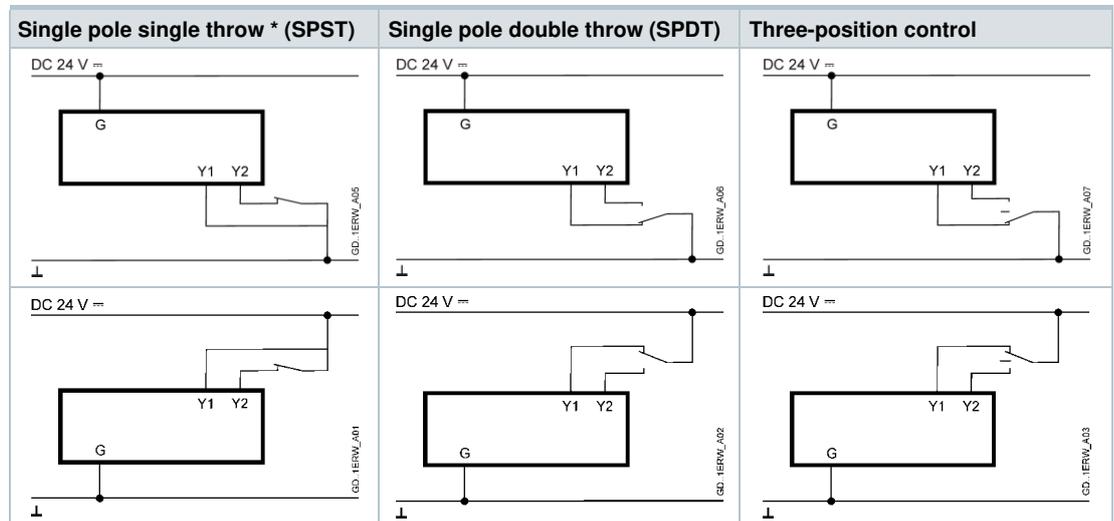
<sup>1)</sup> The documents can be downloaded from <http://siemens.com/bt/download>.

Internal Diagrams



Connection diagrams

Control

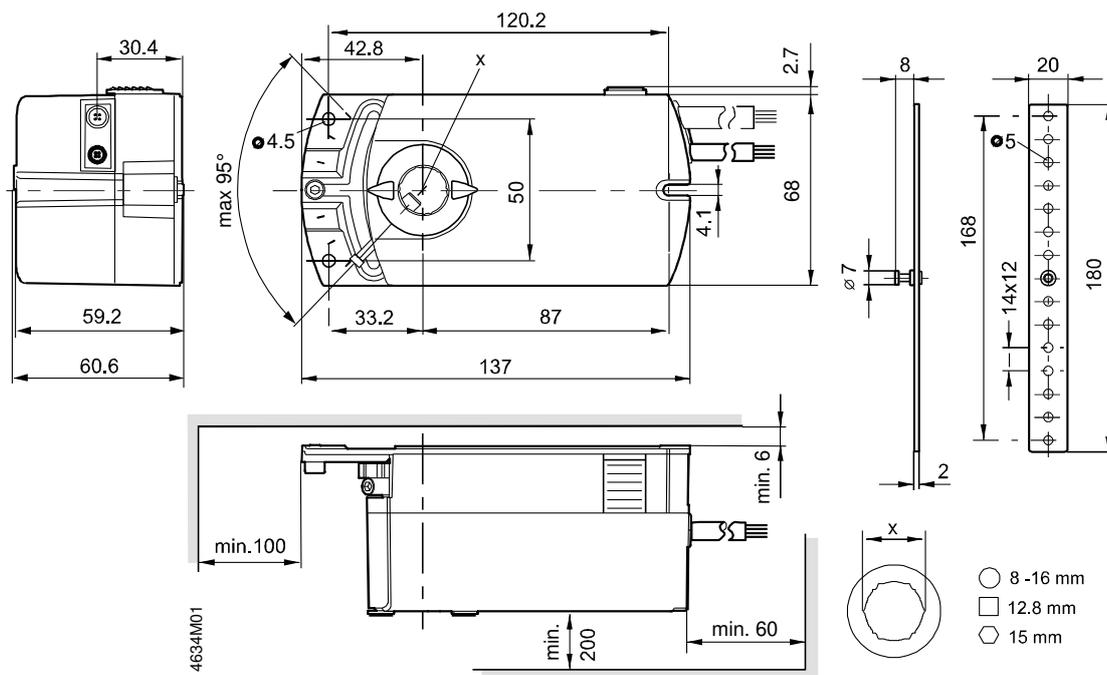


\* Forced control (Y1+Y2 are permanently under current → Actuator drives to the 0 position)

Cable labeling

| Connection                | Code | No | Color      | Abbreviation | Meaning                                         |
|---------------------------|------|----|------------|--------------|-------------------------------------------------|
| DC 24 V =<br>Actuators    | G    | 1  | red        | RD           | System potential DC 24 V =                      |
|                           | Y1   | 6  | purple     | VT           | Positioning signal DC 24 V, "clockwise"         |
|                           | Y2   | 7  | orange     | OG           | Positioning signal DC 24 V, "counter-clockwise" |
| Feedback<br>potentiometer | a    | P1 | white/red  | WHRD         | Potentiometer 0...100 % (P1-P2)                 |
|                           | b    | P2 | white/blue | WHBU         | Potentiometer pick-off                          |
|                           | c    | P3 | white/pink | WHPK         | Potentiometer 100...0 % (P3-P2)                 |
| Auxiliary switch          | Q11  | S1 | grey/red   | GYRD         | Switch A input                                  |
|                           | Q12  | S2 | grey/blue  | GYBU         | Switch A normally closed contact                |
|                           | Q14  | S3 | grey/pink  | GYPK         | Switch A normally open contact                  |
|                           | Q21  | S4 | black/red  | BKRD         | Switch B input                                  |
|                           | Q22  | S5 | black/blue | BKBU         | Switch B normally closed contact                |
|                           | Q24  | S6 | black/pink | BKPK         | Switch B normally open contact                  |

# Dimensions



Dimensions in mm