

OpenAir® Electronic Damper Actuators

GDE Series

Enhanced Non-spring Return Rotary



Description The OpenAir direct coupled enhanced non-spring return rotary electric actuators are designed for two-position/floating or modulating control of dampers.

- Features**
- Selectable modulating control signal (0 to 10 Vdc or 2 to 10 Vdc).
 - 24 Vac/dc compatible.
 - New line voltage (34x models) for 100 to 240 Vac two-position/floating control.
 - Integral 1/2-inch conduit connection.
 - Manual override.
 - Independently adjustable dual auxiliary switches available.
 - cUL and UL listed; CE certified

Application These actuators are used in constant or variable air volume installations for control of HVAC dampers requiring up to 44 lb-in (5 Nm) of torque.

Product Numbers

Table 1.

| Torque | Product Number | Control Signal | Feedback | Dual Auxiliary Switches | Pre-Cabled | Power Supply |
|--------------------|---------------------|------------------------------|----------|-------------------------|-------------|--------------|
| 44 lb-in (5 Nm) | GDE141.1U | 2-position/ Floating | — | — | Standard | 24 Vac/dc |
| | GDE141.1U/B (24 pk) | | — | — | Standard | |
| | GDE141.1P | | — | — | Plenum | |
| | GDE141.1P/B (24 pk) | | — | — | Plenum | |
| | GDE141.1Q | | — | — | 6-ft length | |
| | GDE142.1P* | | • | — | Plenum | |
| | GDE146.1P* | | — | • | Plenum | |
| | GDE341.1U | | — | — | Standard | |
| | GDE346.1U* | • | • | Standard | | |
| | GDE161.1P | Modulating 0(2) to 10 Vdc | • | — | Plenum | 24 Vac/dc |
| | GDE161.1P/B (24 pk) | | • | — | Plenum | |
| | GDE161.1Q | | • | — | 6-ft length | |
| | GDE163.1P | | • | — | Plenum | |
| | GDE164.1P* | | • | • | Plenum | |
| GDE166.1P* | • | | • | Plenum | | |

* For conduit adaption, order an ASK76.1U Conduit Adapter. See *Accessories*.

| | | |
|------------------------------------|---|---|
| Specifications | Operating voltage (G–G0) | 24 Vac/dc +/-20% 100 to 240 Vac +/-10% |
| | Power Supply | Frequency 50/60 Hz |
| | Power consumption | VA Watt |
| | GDE14x | 2.5 1 |
| | GDE34x | 5 1.6 |
| | GDE16x | 2.1 1.2 |
| Control signal | Input signal (Y–G0) | |
| | Voltage-input | 0(2) to 10 Vdc Input resistance >100K ohms |
| Feedback signal | Position output signal | (U–G0) |
| | Voltage-output | 0 to 10 Vdc Maximum output current DC 1 mA |
| Equipment rating | Rating | Class 2 according to UL, cUL Class III per EN60730 |
| Auxiliary features | Control signal adjustment | |
| | Offset (start point) | Between 0 to 5 Vdc |
| | Slope (span) | Between 2 and 30 Vdc |
| | Dual auxiliary switch contact rating | 4A resistive, 2A inductive |
| | Voltage | |
| | GDE1xxx.P | 24 Vac/24 Vdc |
| | GDE3xxx.x | 250 Vac |
| | DC rating | 12 to 30 Vdc DC 2A |
| | Switch Range | |
| | Switch A | 0° to 90° with 5° intervals |
| | Recommended range usage | 0° to 45° |
| | Factory setting | 5° |
| | Switch B | 0° to 90° with 5° intervals |
| | Recommended range usage | 45° to 90° |
| | Factory setting | 85° |
| Switching hysteresis: | 2° | |
| Feedback potentiometer (GDE142.1P) | | |
| Sliding contact (P2) | 0 to 5000 ohm <10 mA | |
| Load | <1 W | |
| Voltage | UL-Class 2 (SELV/PELV for CE) <24 Vac/dc | |
| Function | Torque | 44 lb-in (5 Nm) |
| | Runtime for 90° opening or closing | 90 sec. at 60 Hz (125 sec. at 50 Hz) |
| | Nominal angle of rotation | 90° |
| | Maximum angular rotation | 95° |
| Mounting | Shaft size: Minimum shaft length 3/4-inch (20 mm) | |

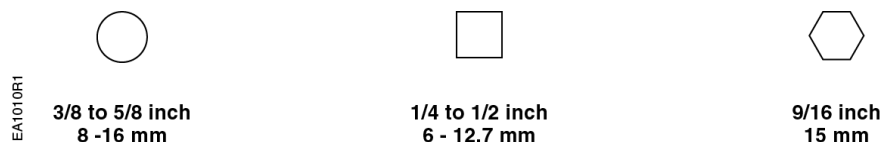


Figure 1. Acceptable Shaft Sizes.

Specifications, continued

| | | |
|----------------------|-----------------------------------|---|
| Housing | Enclosure | NEMA Type 2 IP54 according to EN60529 (Not with cable-up mounting orientation.) |
| | Material | Durable plastic |
| | Gear lubrication | Silicone-free |
| Ambient conditions | Ambient temperature | |
| | Operation | -25°F to 130°F (-32°C to 55°C) |
| | Storage and transport | -40°F to 158°F (-40°C to 70°C) |
| | Ambient humidity (non-condensing) | 95% rh |
| Agency certification | | UL listed to UL60730 cUL certified to Canadian Standard C22.2 No. 24-93 |
| | | These devices were approved for installation in plenum areas by Underwriters Laboratories, Inc., per UL 1995. |
| CE | | EN60730-1, EN60730-2-14 |
| Miscellaneous | Pre-cabled connection | 18 AWG |
| | Standard cable length | 3 ft (0.9 m) |
| | Life cycle | Designed for 100,000 full strokes and 5 million repositions at rated torque and temperature |
| | Actuator Dimensions, inches (mm) | 6.6 L x 2.8 W x 2.4 D (166.7 L x 71 W x 61 D) |
| | Packaging Dimensions, inches (mm) | 6.5 L x 10.3 W x 3.1 D (165.1 L x 261.1 W x 78.7 D) |
| | Weight | 1.35 lb (0.61 kg) |
| | (with packaging) | 1.91 lb (0.87 kg) |

Accessories

NOTE: The auxiliary switches cannot be added in the field. Order the product number that includes this option. See Table 1.

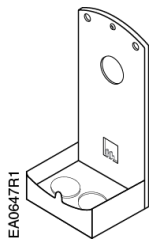


Figure 2. Conduit Adapter.

ASK76.1U: Provides a connection between the actuator and conduit for actuator models with auxiliary switches or built-in potentiometers. All other standard actuator models have built-in conduit adapters.



Figure 3. Rotary-to-Linear.

ASK71.5: Allows a direct-coupled actuator to provide an auxiliary linear drive.

Accessories, Continued

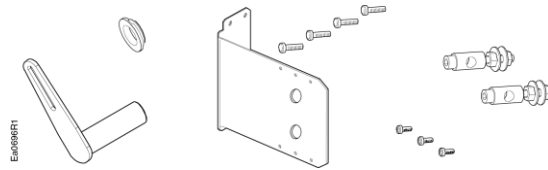


Figure 4. Rotary-to-Linear with Bracket.

ASK71.6: Allows economical mounting of an OpenAir actuator to a variety of surfaces.

Should be used in applications where the actuator can be rigid-surface mounted and a linear stroke output is needed.

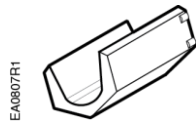


Figure 5. Shaft Insert.

ASK78.3U: Shaft inserts for use with 3/8-inch (8 to 10 mm) diameter shafts. (10/pk). Included in box with GDE/GLB Series.

NOTE: Factory-installed 1/2-inch guide must be removed prior to installation.

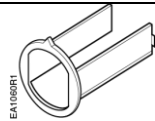


Figure 6. 1/2-inch Shaft Guide.

985-101P25: Shaft guide, 1/2-inch (25/pk). Factory-installed with GDE/GLB Series.

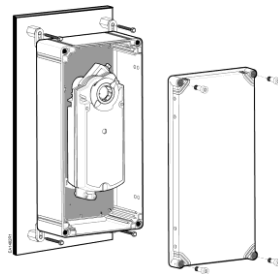
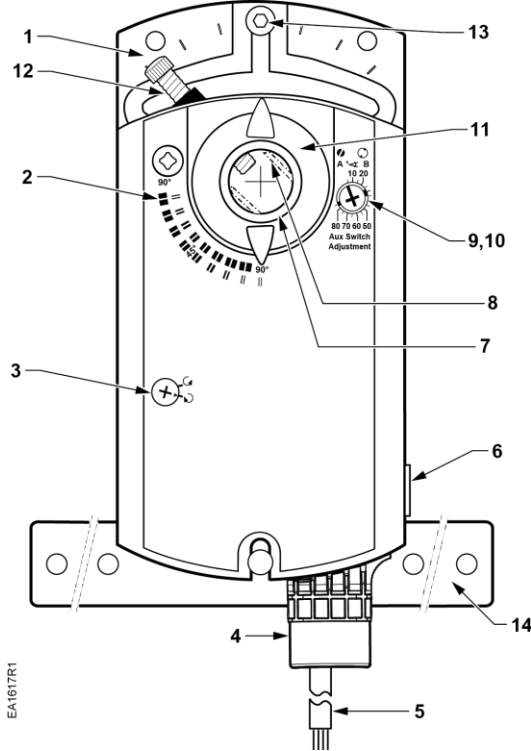


Figure 7. NEMA Type 4X Weather Shield.

ASK75.7U: GDE Actuators are UL listed to meet NEMA Type 4X requirements (a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, hose-directed water, corrosion, and damage from external ice formation) when installed with an ASK75.7U Weather Shield and outdoor-rated conduit fittings. This weather shield may be mounted in any orientation. For dimensions, see Figure 30.

Actuator Components

**2-Position/
 Floating**

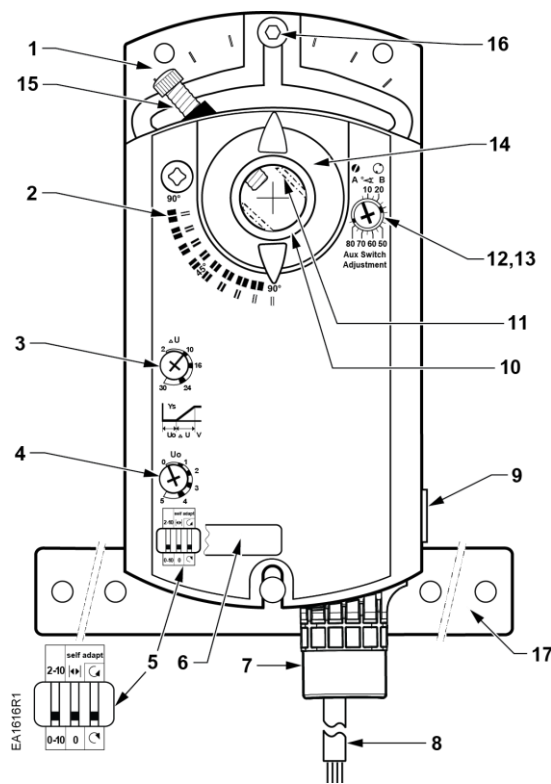


Legend

1. Base plate
2. Positioning scale for angle of rotation
3. Rotation direction adjustment
4. Conduit adapter
5. Connection cable
6. Manual override
7. Coupling bushing
8. Factory-installed 1/2-inch guide
9. Auxiliary Switch A
10. Auxiliary Switch B
11. Position indicator
12. Adjustment lever with locking screw (4 mm hex)
13. Set screw for mechanical range stop (4 mm hex)
14. Mounting bracket

Figure 8. Parts of the Actuator.

Actuator Components, Continued
Modulating



Legend

1. Base plate
2. Positioning scale for angle of rotation
3. Slope adjustment
4. Offset (start point) adjustment
5. DIP switches
6. Cover for DIP switches
7. Conduit adapter
8. Connection cable
9. Manual override
10. Coupling bushing
11. Factory-installed 1/2-inch guide
12. Auxiliary Switch A
13. Auxiliary Switch B
14. Position indicator
15. Adjustment lever with locking screw (4 mm hex)
16. Set screw for mechanical range stop (4 mm hex)
17. Mounting bracket

Figure 9. Parts of the Actuator.

Operation

A continuous 0(2) to 10 Vdc signal from a controller to wire 8 (Y) operates the damper actuator. The angle of rotation is proportional to the control signal. A 0 to 10 Vdc position feedback output signal is available between wire 9 (U) and wire 2 (G0) to monitor the position of the damper motor.

In the event of a power failure, the actuator holds its position. In the event that only the control signal is lost, the actuator returns to the **0** position.

Life expectancy

An improperly tuned loop will cause excessive repositioning that will shorten the life of the actuator.

Control signal adjustment

GDE163.1P and **GDE164.1P**: For sequencing and the electronic limitation of the angle of rotation.

Use the U₀ potentiometer to set the offset (start point) between 0 to 5 Vdc.
 Use the ΔU potentiometer to set the slope (span) between 2 to 30 Vdc.

NOTE: The Y input is limited to a maximum of 10 Vdc. If the sum of the offset and slope setting is greater than 10V, the angle of rotation is reduced providing the feature of electronic limitation of the angle of rotation.

Control signal adjustment, continued

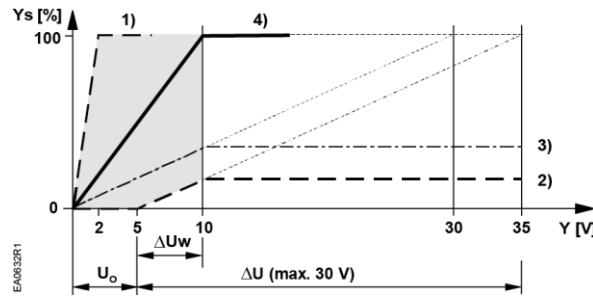
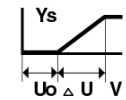


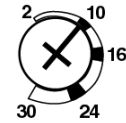
Figure 10.

- Ys Actuator position (100% = angle of rotation 90°*)
- Y Control input signal
- Uo Offset (start point)
- ΔU Slope
- ΔUw Active voltage range (Ys changes)

* When the mechanical limitation of the angle of rotation and self-adapt function are ON, 100% does not equal 90°. Also valid for control signal 0 to 10 Vdc.



SLOPE, ΔU



OFFSET, Uo



Setting for 10V slope
 0 Vdc offset

Figure 11.

Table 2.

| Examples in Figure 10 | Uo Offset Vdc | ΔU Slope Vdc | Active Voltage Range Vdc | Ys Actuator Position |
|--------------------------------|---------------|--------------|--------------------------|----------------------|
| 1. Minimum slope | 0 | 2 | 0 to 2 | 0 to 100% |
| 2. Limitation of rotation | 5 | 30 | 5 to 10 | 0 to 16.7% |
| 3. Limitation of rotation | 0 | 30 | 0 to 10 | 0 to 33.3% |
| 4. Setting shown in Figure 11. | 0 | 10 | 0 to 10 | 0 to 100% |

Control signal adjustment example:

Determine the setting needed to electronically limit the angle of rotation between 0 to 50% (0° to 45°) using a 2 to 10 Vdc input.

Calculating the value of ΔU:

$$\Delta U = \frac{100[\%]}{\text{working angle of rotation } Y_s [\%]} \times (10[Vdc] - U_o[Vdc]) = \frac{100\%}{50\%} \times (10Vdc - 2Vdc) = 16Vdc$$

Settings: Uo = 2 Vdc;
 ΔU = 16 Vdc

Electronic limitation angle of rotation Ys = 50% (45°)
 Slope ΔU = 16V
 Active voltage range ΔUw = 2 to 10 Vdc

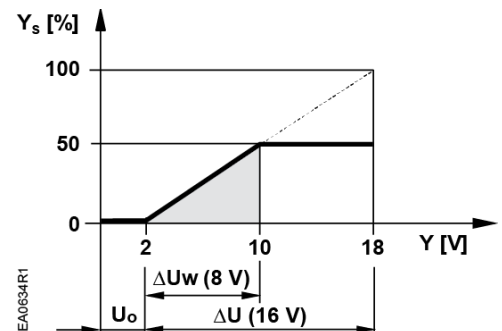


Figure 12. Example.

Auxiliary Switches GDE146.1P, GDE346.1U, GDE164.1P, GDE166.1P

Figure 13 shows the adjustable switching values for Auxiliary Switches A and B.

Actuator Scale:
 Clockwise

Adjustment range for
 Switches A and B
 Setting interval: 5°
 Switching hysteresis: 2°

Actuator Scale:
 Counterclockwise

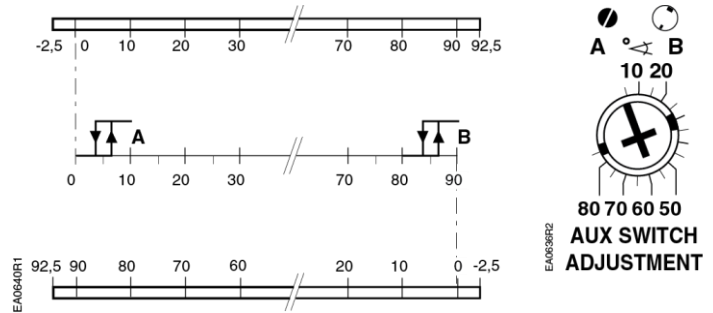


Figure 13. Adjustable Switching Values for the Dual Auxiliary Switches.

NOTE: The auxiliary switch setting shafts rotate with the actuator. The scale is valid only when the actuator is in the **0** position on clockwise motion.

Use the long arm of the † (AUX SWITCH ADJUSTMENT) to point to the position of Switch A. Use the narrower tab on the red ring to point to the position of Switch B.

**Rotation Direction
 GDE14x.1P, GDE34x.1U**

**Two-position/Floating
 Control**

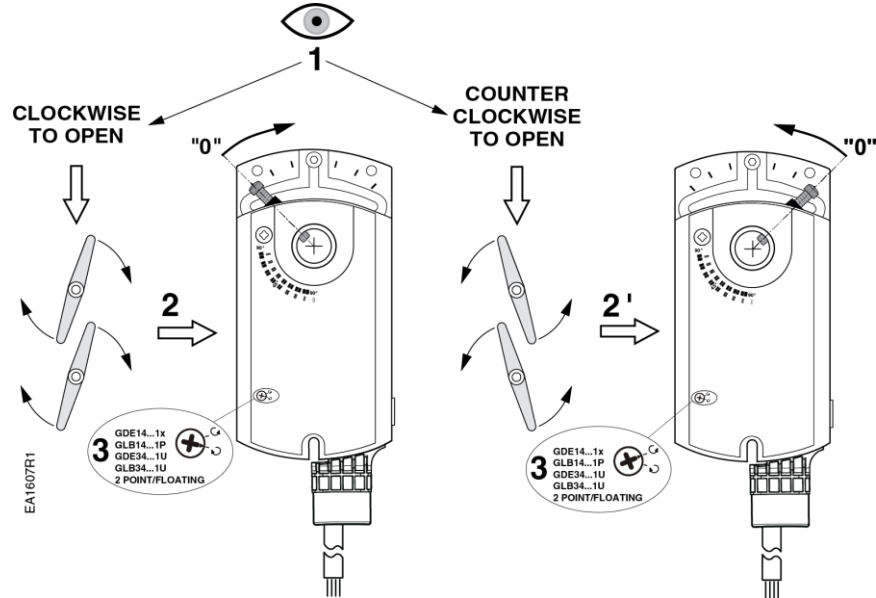


Figure 14. Setting the Rotation Direction.

Rotation Direction Switch

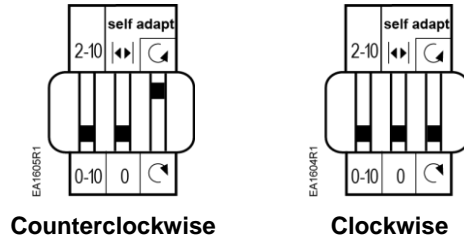


Figure 15. Direction of Rotation Switch.

The factory setting is clockwise.

The direction of rotation switch should match the damper rotation movement.

Dual in-Line Package (DIP) Switches GDE16x.1P

Raise the protective cover from left to right to locate the DIP switches. See Figure 9 for the location of the cover.

Modulating control signal selection

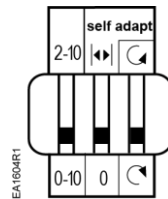


Figure 16. 0 to 10 Vdc Position (Factory Setting).

To change the control signal from the factory setting (0 to 10 Vdc), move the first DIP switch to the UP (2-10) position.

Self-adapt Switch

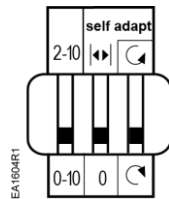


Figure 17. OFF Position (Factory Setting).

The factory setting is 0 (OFF).

When mechanical angle of rotation is limited, the self-adapt switch (middle DIP switch) may be turned ON so that the limited range will become the new 0 to 100% for the actuator logic. In this case, 0 to 100% is not equal to 90°



CAUTION:

When turning the self-adaptive feature on or after the software reset with the feature on, the actuator will enter a five-minute calibration cycle as the actuator adjusts to the rotation limits of the system. A software reset happens after power on or may be caused by electrostatic discharge (ESD) at levels of 2kV and above.

The self-adapt capability will scale the control signal selected, either a 0 to 10 Vdc or a 2 to 10 Vdc signal, within the adjusted mechanical range. The feedback signal will also reflect the control signal selected, either a 0 to 10 Vdc or a 2 to 10 Vdc.

Sizing

The type of actuator required depends on several factors.

1. Obtain damper torque ratings (ft-lb/ft² or Nm/m²) from the damper manufacturer.
2. Determine the area of the damper.
3. Calculate the total torque required to move the damper:

$$\text{Total Torque} = \frac{\text{Torque Rating} \times \text{Damper Area}}{\text{SF}^1}$$

¹Safety Factor: When determining the torque of an actuator required, a safety factor should be included for unaccountable variables such as slight misalignments, aging of the damper, and so on. A suggested safety factor is 0.80 (or 80% of the rated torque).

4. Select the non-spring return actuator type from Table 3.

Table 3.

| Total Torque | Actuator |
|---|--|
| <44 lb-in (5 Nm) | GDE |
| <88 lb-in (10 Nm) | GLB |
| <132 lb-in (15 Nm) | GEB |
| <221 lb-in (25 Nm) | GBB |
| <310 lb-in (35 Nm) | GIB |
| >310 lb-in >620 lb-in (35 Nm to 70 Nm) | Use tandem mounting bracket ASK73.1 with any GIB1x actuator. |

Mounting and Installation

- Place the actuator on the damper shaft so that the front of the actuator is accessible. The label is on the front side. A mounting bracket is included with the actuator.
- The minimum damper drive shaft length is 3/4-inch (20 mm).
- Observe the service envelope around the actuator as shown in Figure 31.
- Detailed mounting instructions are included with each actuator.

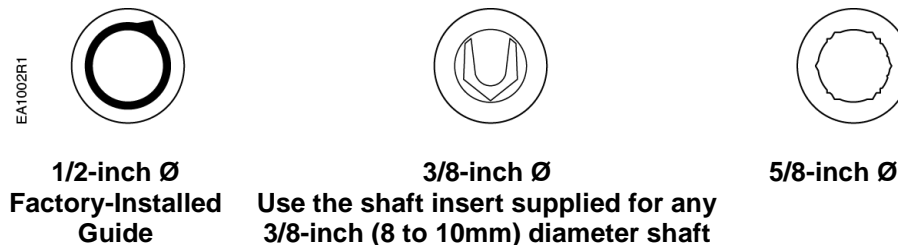


Figure 18. Damper Shaft Sizes.

NOTE: For all damper shafts with the exception of the 1/2-inch round shaft: Remove 1/2-inch Ø factory-installed guide before installation.

Manual Override

To move the damper blades and lock the position with no power present:

1. Slide the red manual override knob toward the back of the actuator.
2. Make adjustments to the damper position.
3. Slide the red manual override knob toward the front of the actuator.

Once power is restored, the actuator returns to automated control.

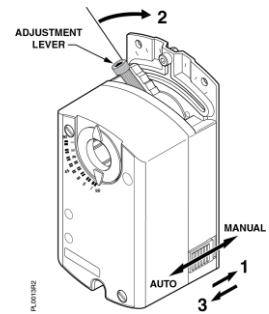


Figure 19.
Manual Override.

Mechanical Range Adjustment

To mechanically limit the range of the damper blade, do the following:

1. Loosen the stop set screw.
2. Move the screw along the track to the desired position, and fasten it in place.

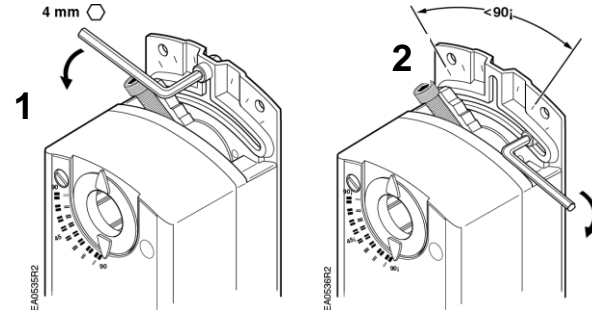


Figure 20. Moving the Mechanical Range Stop.

To use the entire 0(2) to 10V input signal to control the mechanically limited range, see Figure 17 for setting self-adaptive features.

Example:

Stop set screw at 70°
Self-adapt switch ON
Input signal Y = 5 Vdc
The damper will be at 35° (50% of the adjusted range.)

NOTE: On versions with the slope and offset features, this example assumes
Offset $U_0 = 0$ Vdc
Slope $\Delta U = 10$ Vdc

Wiring

- All wiring must conform to NEC and local codes and regulations.
- Use earth ground isolating step-down Class 2 transformers. Do not use autotransformers.
- The sum of the VA ratings of all actuators and all other components powered by one transformer must not exceed the rating of the transformer.
- It is recommended that one transformer power no more than 10 actuators.

**WARNING:**

All six outputs of the dual auxiliary switch (A and B) must only be connected to:

- Class 2 voltage (UL/CSA).
- Separated Extra-Low Voltage (SELV) or Protective Extra Low Voltage (PELV) (according to HD384-4-41) for installations requiring CE conformance.

**Wiring,
 continued**



WARNINGS:

Installations requiring CE Conformance:

- All wiring for CE certified actuators must be SELV or PELV rated per HD384-4-41.
- Use safety-isolating transformers (Class III transformer) per EN61558. They must be rated for 100% duty cycle.
- Over current protection for supply lines is maximum 10A.

Each wire has the standard symbol printed on it. See Table 4.

GDE14x
 24 Vac/dc Power Supply, 2-Position/Floating Control

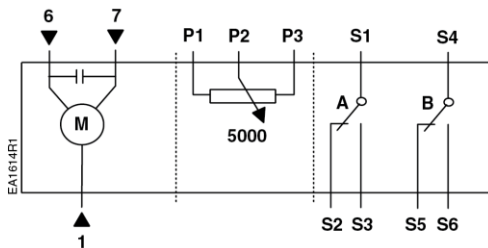


Figure 21. GDE14x Wiring Diagram.

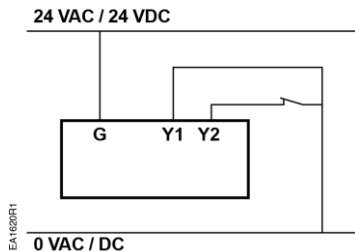


Figure 22. 2-Position, SPST (Single-Pole, Single-Throw).

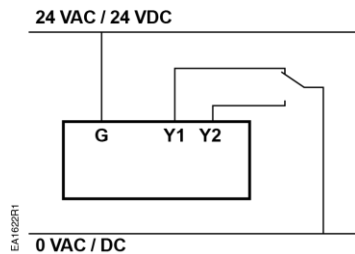


Figure 23. 2-Position, SPDT (Single-Pole, Double-Throw).

Table 4. 2-Position/Floating Control 24 Vac/dc.

| Standard Symbol | Function | Terminal Designation | Color |
|-----------------|---------------------------------|----------------------|--------|
| 1 | Supply (SP) | G | Red |
| 6 | Control signal clockwise | Y1 | Violet |
| 7 | Control signal counterclockwise | Y2 | Orange |

Factory-installed Options

| | | | |
|----|--|-----|------------|
| S1 | Switch A Common | Q11 | Gray/red |
| S2 | Switch A N.C. | Q12 | Gray/blue |
| S3 | Switch A N.O. | Q14 | Gray/pink |
| S4 | Switch B Common | Q21 | Black/red |
| S5 | Switch B N.C. | Q22 | Black/blue |
| S6 | Switch B N.O. | Q24 | Black/pink |
| P1 | Feedback Potentiometer 0 to 100% P1 - P2 (0 to 5,000 ohms) | a | Black |
| P2 | Feedback Potentiometer Common | b | Black |
| P3 | Feedback Potentiometer 100 to 0% P3 - P2 (5,000 to 0 ohms) | c | Black |

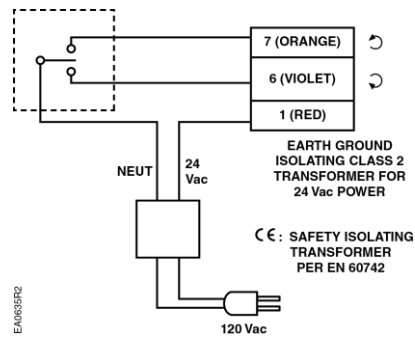


Figure 24. Floating Control 24 Vac/dc.

Wiring, continued

GDE34x

100 to 240 Vac Power Supply, Two-Position Floating Control

Each wire has the standard symbol printed on it. See Table 5.

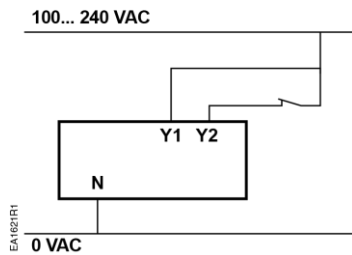


Figure 25. 2-Position, SPST (Single-Pole, Single-Throw).

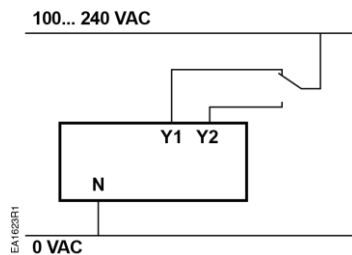


Figure 26. 2-Position, SPDT (Single-Pole, Double-Throw).

Table 5. Two-Position, Floating Control, 100 to 240 Vac.

| Standard Symbol | Function | Terminal Designation | Color |
|-----------------|---------------------------------|----------------------|------------|
| 4 | Supply (SP) | N | Light Blue |
| 6 | Control signal clockwise | Y1 | Black |
| 7 | Control signal counterclockwise | Y2 | White |

Factory-installed Options

| | | | |
|----|-------------------|-----|------------|
| S1 | Switch A Common | Q11 | Gray/Red |
| S2 | Switch A – NC | Q12 | Gray/Blue |
| S3 | Switch A – NO | Q14 | Gray/Pink |
| S4 | Switch B – Common | Q21 | Black/Red |
| S5 | Switch B – NC | Q22 | Black/Blue |
| S6 | Switch B – NO | Q24 | Black/Pink |

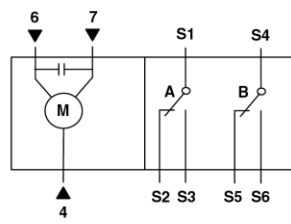


Figure 27. GDE34x Wiring Diagram

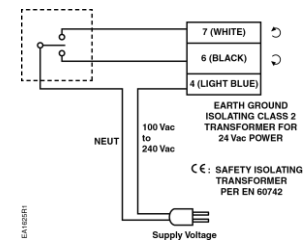


Figure 28. Floating Control 100 to 240 Vac.

GDE 16x

24 Vac/dc Power Supply, 0(2) to 10V Modulating Control

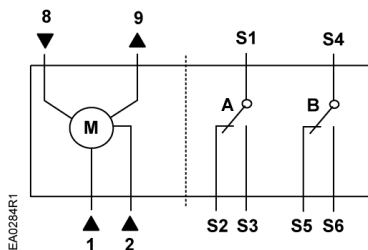


Figure 29. GDE16x Wiring Diagram.

Table 6. Modulating Control, 24 Vac/dc.

| Standard Symbol | Function | Terminal Designation | Color |
|-----------------|---|----------------------|-------|
| 1 | Supply (SP) | G | Red |
| 2 | Neutral (SN) | G0 | Black |
| 8 | 0(2) to 10V input signal | Y | Gray |
| 9 | Output for 0(2) to 10 Vdc position indication | U | Pink |

Factory-installed Options

| | | | |
|----|-------------------|-----|------------|
| S1 | Switch A Common | Q11 | Gray/Red |
| S2 | Switch A - NC | Q12 | Gray/Blue |
| S3 | Switch A - NO | Q14 | Gray/Pink |
| S4 | Switch B - Common | Q21 | Black/Red |
| S5 | Switch B - NC | Q22 | Black/Blue |
| S6 | Switch B - NO | Q24 | Black/Pink |

**Start-Up/
Commissioning**

24 Vac/dc

1. Connect a Digital Multimeter (DMM) to the supply voltage wires.
2. Verify that the supply voltage is between 19.2 and 28.8 Vac/dc.
3. Turn off the power supply.

**Two-position/ Floating
24 Vac/dc**

GDE14x

Check Operation:

1. Connect all wires per Figure 21.
2. Apply a control signal (24 Vac) to wires 1 (red) and 6 (violet).
3. Allow the actuator shaft coupling to rotate from 0° to 90°.
4. Stop applying the control signal to wires 1 (red) and 6 (violet).
5. Apply a control signal (24 Vac) to wires 1 (red) and 7 (orange).
6. Allow the actuator shaft coupling to rotate from 90° to 0°.

Check Feedback:

1. Set the DMM dial to ohms.
2. Connect wires P1 and P2 to the DMM. The DMM should indicate a resistive value.
3. Apply a control signal (24 Vac) to wires 1 (red) and 6 (violet). The reading of the DMM should increase.
4. Connect wires P2 and P3 to the DMM. The DMM should indicate a resistive value.
5. Apply a control signal (24 Vac) to wires 1 (red) and 7 (orange). The reading of the DMM should increase.

Check Auxiliary Switch A:

1. Set the DMM dial to ohms (resistance) or continuity check.
2. Connect wires S1 and S3 to the DMM. The DMM should indicate open circuit or no resistance.
3. Apply a control signal (24 Vac) to wires 1 (red) and 6 (violet). The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of Switch A.
4. Stop applying the control signal to wires 1 (red) and 6 (violet).
5. Connect wires S1 and S2 to the DMM. The DMM should indicate open circuit or no resistance.
6. Apply a control signal (24 Vac) to wires 1 (red) and 7 (orange). The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of Switch A.

Check Auxiliary Switch B:

1. Set the DMM dial to ohms (resistance) or continuity check.
 2. Connect wires S4 and S6 to the DMM. The DMM should indicate open circuit or no resistance.
 3. Apply a control signal (24 Vac) to wires 1 (red) and 6 (violet). The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of Switch B.
 4. Stop applying the control signal to wires 1 (red) and 6 (violet).
 5. Connect wires S4 and S5 to the DMM. The DMM should indicate an open circuit or no resistance.
 6. Apply a control signal to wires 1 (red) and 7 (orange). The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of Switch B.
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**Start-Up/
Commissioning**

1. Connect a Digital Multimeter (DMM) to the supply voltage wires.
2. Verify that the supply voltage is between 100 and 240 Vac.
3. Turn off the power supply.

**Two-position/ Floating
100 to 240 Vac****GDE34x**

Check Operation:

1. Connect all wires per Figure 27.
2. Apply a control signal (100 to 240 Vac) to wires 4 (light blue) and 6 (black).
3. Allow the actuator shaft coupling to rotate from 0° to 90°.
4. Stop applying the control signal to wires 4 (light blue) and 6 (black).
5. Apply a control signal (100 to 240 Vac) to wires 4 (light blue) and 7 (white).
6. Allow the actuator shaft coupling to rotate from 90° to 0°.

Check Auxiliary Switch A:

1. Set the DMM dial to ohms (resistance) or continuity check.
2. Connect wires S1 and S3 to the DMM.
The DMM should indicate open circuit or no resistance.
3. Apply a control signal (100 to 240 Vac) to wires 4 (light blue) and 6 (black). The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of Switch A.
4. Stop supplying the control signal to wires 4 (light blue) and 6 (black).
5. Connect wires S1 and S2 to the DMM. The DMM should indicate open circuit or no resistance.
6. Apply a control signal (100 to 240 Vac) to wires 4 (light blue) and 7 (white). The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of Switch A.

Check Auxiliary Switch B:

1. Set the DMM dial to ohms (resistance) or continuity check.
 2. Connect wires S4 and S6 to the DMM. The DMM should indicate open circuit or no resistance.
 3. Apply a control signal (100 to 240 Vac) to wires 4 (light blue) and 6 (black). The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of Switch B.
 4. Stop applying the control signal to wires 4 (light blue) and 6 (black).
 5. Connect wires S4 and S5 to the DMM. The DMM should indicate open circuit or no resistance.
 6. Apply a control signal (100 to 240 Vac) to wires 4 (light blue) and 7 (white). The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of Switch B.
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**Start-Up/
Commissioning**

1. Connect a Digital Multimeter (DMM) to the supply voltage wires.
2. Verify that the supply voltage is between 19.2 and 28.8 Vac/dc.
3. Turn off the power supply.

**24 Vac/dc
Modulating
GDE16x**

Check operation:

1. Connect all wires per Figure 29.
2. Set the DMM dial to Vdc.
3. Connect wires 2 (black) and 8 (gray) to the DMM.
4. Apply a full-scale input signal (10 Vdc) to wire 8 (gray).
5. Allow the actuator shaft coupling to rotate from 0° to 90°.
6. Disconnect wire 8 (gray) and the shaft coupling returns to the **0** position.

Check Feedback:

1. Set the DMM dial to Vdc.
2. Attach wires 2 (black) and 9 (pink) to the DMM.
3. Apply a full-scale input signal to wire 8 (gray). The reading at the DMM should increase.
4. Remove the signal from wire 8 (gray). The reading at the DMM should decrease and the actuator shaft coupling returns to the **0** position.

Check Auxiliary Switch A:

1. Set the DMM dial to ohms (resistance) or continuity check.
2. Connect wires S1 and S3 to the DMM.
The DMM should indicate open circuit or no resistance.
3. Apply a full-scale input signal to wire 8 (gray). The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of Switch A.
4. Connect wires S1 and S2 to the DMM. The DMM should indicate open circuit or no resistance.
5. Stop the signal to wire 8 (gray). The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of Switch A.

Check Auxiliary Switch B:

1. Set the DMM dial to ohms (resistance) or continuity check.
2. Connect wires S4 and S6 to the DMM. The DMM should indicate open circuit or no resistance.
3. Apply a full-scale input signal to wire 8 (gray). The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of Switch B.
4. Connect wires S4 and S5 to the DMM. The DMM should indicate open circuit or no resistance.
5. Stop the signal to wire 8 (gray). The DMM should indicate contact closure as the actuator shaft coupling reaches the setting of Switch B.

Troubleshooting



WARNING:

Do not open the actuator.
If the actuator is inoperative, replace the unit.

Dimensions

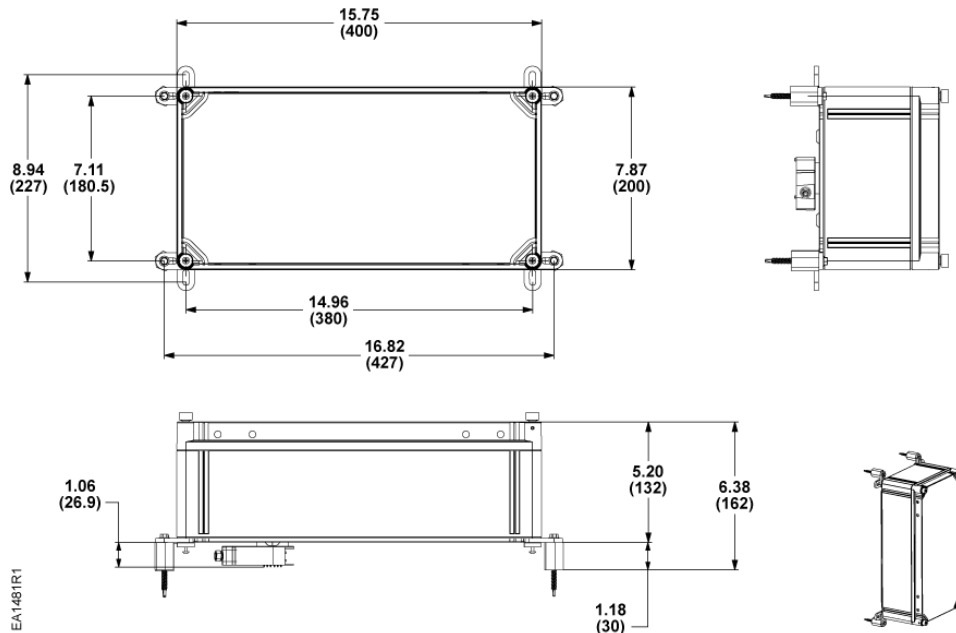


Figure 30. Dimensions of the ASK75.7U Weather Shield in Inches (Millimeters).

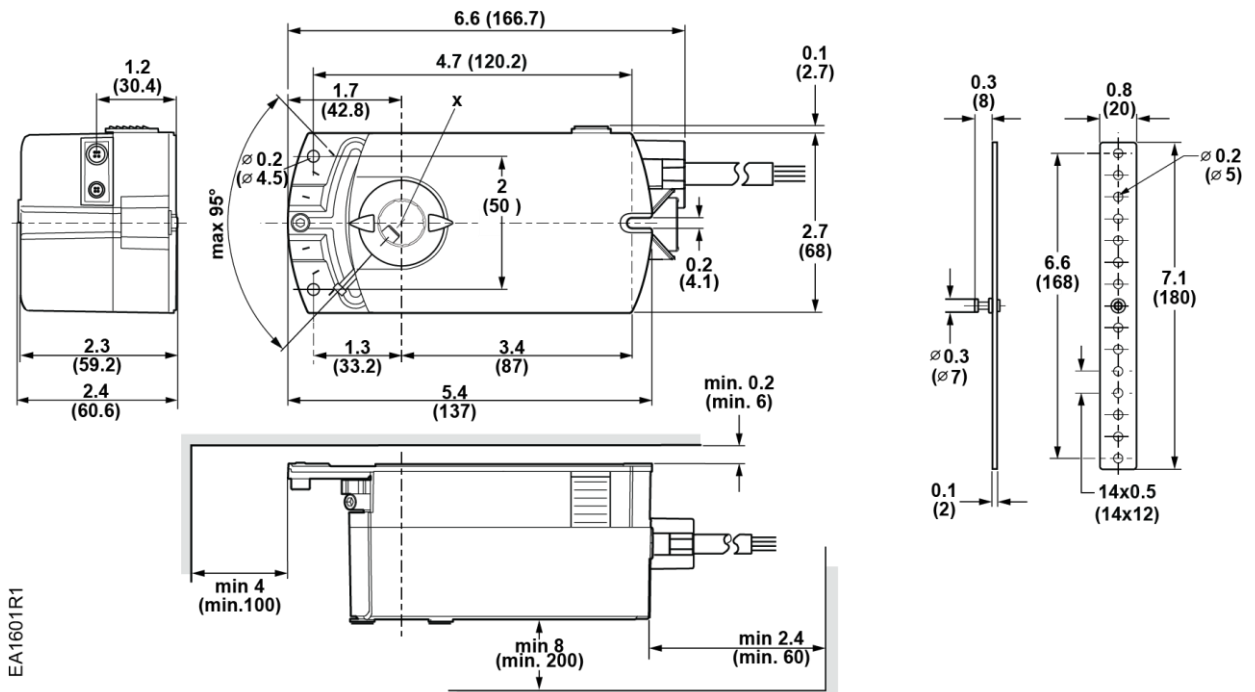


Figure 31. GDE Actuator and Mounting Bracket Dimensions in Inches (mm).

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