

# Achieve™ Compact Limit Switches

## Metal Plunger Actuator AEM Series

- Die-cast metal housings
- 9.8 ft [3m] cable/5-pin M12 quick-disconnect (bottom and right)
- Compact size with standard 25mm [0.98 in] hole spacing
- Wide offering of head actuators
- Epoxy resin-filled for IP67 rating
- Snap action (Z11) and (Z22), slow make/slow-break (X11), contacts available
- N.C. contacts are positive-opening operated unless otherwise noted.

### Compact Limit Switches AEM Series Selection Chart

| Part Number                     | Price   | Drawing Link        | Actuator Type                  | Max. Actuation Speed | Min. Actuation Force | Min. Positive Opening Force | Number of Contacts | Contact Configuration | Connection Type                          | Photo |
|---------------------------------|---------|---------------------|--------------------------------|----------------------|----------------------|-----------------------------|--------------------|-----------------------|------------------------------------------|-------|
| <a href="#">AEM2G11Z11-3</a>    | \$27.50 | <a href="#">PDF</a> | Metal plunger                  | 0.5 ms               | 15N                  | 30N                         | (1) N.O./(1) N.C.  | Diagram 1             | 9.8 ft [3m] cable (bottom exit)          | A     |
| <a href="#">AEM2G11X11-3</a>    | \$27.50 | <a href="#">PDF</a> |                                |                      |                      |                             |                    | Diagram 2             |                                          |       |
| <a href="#">AEM2G1101Z11-3R</a> | \$25.50 | <a href="#">PDF</a> |                                |                      |                      |                             |                    | Diagram 1             | 9.8 ft [3m] cable (right exit)           |       |
| <a href="#">AEM2G1101Z11M</a>   | \$24.50 | <a href="#">PDF</a> |                                |                      |                      |                             |                    |                       | 5-pin M12 quick-disconnect (bottom exit) |       |
| <a href="#">AEM2G1101Z11MR</a>  | \$24.50 | <a href="#">PDF</a> |                                |                      |                      |                             |                    |                       | 5-pin M12 quick-disconnect (right exit)  |       |
| <a href="#">AEM2G1101Z22-3</a>  | \$33.00 | <a href="#">PDF</a> |                                |                      |                      |                             | (2) N.O./(2) N.C.  | Diagram 3             | 9.8 ft [3m] cable (bottom exit)          | B     |
| <a href="#">AEM2G16Z11-3</a>    | \$32.00 | <a href="#">PDF</a> | Metal plunger with dust cap    | 0.5 ms               | 15N                  | 30N                         | (1) N.O./(1) N.C.  | Diagram 1             | 9.8 ft [3m] cable (bottom exit)          | C     |
| <a href="#">AEM2G16X11-3</a>    | \$32.00 | <a href="#">PDF</a> |                                |                      |                      |                             |                    | Diagram 2             |                                          |       |
| <a href="#">AEM2G1601Z11-3R</a> | \$27.50 | <a href="#">PDF</a> |                                |                      |                      |                             |                    | Diagram 1             | 9.8 ft [3m] cable (right exit)           |       |
| <a href="#">AEM2G1601Z11M</a>   | \$25.50 | <a href="#">PDF</a> |                                |                      |                      |                             |                    |                       | 5-pin M12 quick-disconnect (bottom exit) |       |
| <a href="#">AEM2G1601Z11MR</a>  | \$25.50 | <a href="#">PDF</a> |                                |                      |                      |                             |                    |                       | 5-Pin M12 quick-disconnect (right exit)  |       |
| <a href="#">AEM2G1601Z22-3</a>  | \$35.00 | <a href="#">PDF</a> |                                |                      |                      |                             | (2) N.O./(2) N.C.  | Diagram 3             | 9.8 ft [3m] cable (bottom exit)          | D     |
| <a href="#">AEM2G18Z11-3</a>    | \$38.00 | <a href="#">PDF</a> | Metal plunger with bevel cut   | 0.5 ms               | 15N                  | 30N                         | (1) N.O./(1) N.C.  | Diagram 1             | 9.8 ft [3m] cable (bottom exit)          | E     |
| <a href="#">AEM2G21Z11-3</a>    | \$30.00 | <a href="#">PDF</a> | Metal plunger with fixing nuts | 0.5 ms               | 15N                  | 30N                         |                    | Diagram 1             | 9.8 ft [3m] cable (bottom exit)          | F     |
| <a href="#">AEM2G21X11-3</a>    | \$30.00 | <a href="#">PDF</a> |                                |                      |                      |                             |                    | Diagram 2             |                                          |       |
| <a href="#">AEM2G2101Z11-3R</a> | \$26.50 | <a href="#">PDF</a> |                                |                      |                      |                             |                    | Diagram 1             | 9.8 ft [3m] cable (right exit)           |       |
| <a href="#">AEM2G2101Z11M</a>   | \$24.50 | <a href="#">PDF</a> |                                |                      |                      |                             |                    |                       | 5-pin M12 quick-disconnect (bottom exit) |       |
| <a href="#">AEM2G2101Z11MR</a>  | \$24.50 | <a href="#">PDF</a> |                                |                      |                      |                             |                    |                       | 5-pin M12 quick-disconnect (right exit)  |       |
| <a href="#">AEM2G2101Z22-3</a>  | \$33.00 | <a href="#">PDF</a> |                                |                      |                      |                             | (2) N.O./(2) N.C.  | Diagram 3             | 9.8 ft [3m] cable (bottom exit)          | G     |

# Achieve™ Compact Limit Switches

## Metal Plunger Actuator AEM Series



A



B



C



D



E



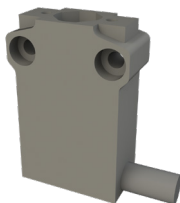
F



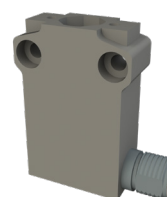
G



Cable Out (bottom)



Cable Out (right)

5-pin M12 quick-disconnect  
(bottom exit)5-pin M12 quick-disconnect  
(right exit)



# Compact Limit Switches Specifications

| Compact Limit Switches Specifications AEM Series |       |                                                                                                                                           |                                                                             |
|--------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Type                                             |       | (1) N.O./(1) N.C.                                                                                                                         | (2) N.O./(2) N.C.                                                           |
| Environmental                                    |       |                                                                                                                                           |                                                                             |
| Degree of Protection                             |       | IP67 according to IEC 60529                                                                                                               |                                                                             |
| Temperature Range                                |       | Storage: -40 to 70°C (-40 to 158°F).<br>Operating: -25 to 70°C [-13 to 158°F]                                                             |                                                                             |
| Mechanical Ratings                               |       |                                                                                                                                           |                                                                             |
| Mechanical Life                                  |       | 10 million operations. Models G16, G92, G93: 5 million operations.                                                                        |                                                                             |
| Enclosure Material                               |       | ZAMAK (zinc alloy)                                                                                                                        |                                                                             |
| Contact Blocks Rating                            |       |                                                                                                                                           |                                                                             |
| Positive Opening                                 |       | Yes, except G61, G92, G93                                                                                                                 | All models except 92, 93 operating heads                                    |
| Electrical Ratings                               | AC-15 | Make: 100A @ 24VAC; 60A @ 120VAC; 30A @ 240VAC<br>Break: 10A @ 24VAC; 6A @ 120VAC; 3A @ 240VAC                                            | 4A @ 24VDC, 3A @ 240VAC                                                     |
|                                                  | DC-13 | 2.8 A @ 24VDC; 0.55 A @ 125VDC; 0.27 A@250VDC                                                                                             | 2A @ 24VDC, 0.4 A @ 250VDC                                                  |
| Maximum Switching Frequency                      |       | Contact blocks: all one cycle per second                                                                                                  | 3600 [cycles/hour]                                                          |
| Repeat Accuracy                                  |       | 0.05 mm on the operating points at 1 million operations                                                                                   |                                                                             |
| Short-Circuit Protection                         |       | 10A @ <500V                                                                                                                               | 4A @ <500VAC<br>Part number <a href="#">AEM2G9301Z22-3</a> is 10A @ <500VAC |
| Contact Resistance                               |       | 25mΩ                                                                                                                                      |                                                                             |
| Recommended Min Operating Speed                  |       | With snap-action contacts: 20mm per minute<br>With slow-action contacts: 500mm per minute                                                 |                                                                             |
| Rated Insulation Voltage                         |       | B300, R300 according to UL508; 400V (degree of pollution: 3) according to IEC 60947-1                                                     | C300 - R300 according to UL508, 250V (degree of pollution 3)                |
| Connection Type                                  |       | Cable: 3m [9.8 ft] PVC cable, 5 x 0.75 mm² (18AWG).<br>Overall cable diameter: 8.20 mm (0.32 in)<br>Connector: 5-pin M12 quick-disconnect | Pigtail 3m [9.8 ft], PVC, 0.5 mm² [20AWG]                                   |
| Wiring Terminal Markings                         |       | According to CENELEC EN50013                                                                                                              | N.C. Gray/Brown Red/Pink<br>N.O. Blue/Yellow Green/White                    |
| Electrical Protection                            |       | Class I according to IEC60536-1                                                                                                           |                                                                             |
| Contact Blocks Performance                       |       |                                                                                                                                           |                                                                             |
| Operation Frequency                              |       | 3600 ops/h                                                                                                                                |                                                                             |
| Electrical Durability (according to IEC 947-5-1) |       | Utilization categories AC-15 and DC-13; load factor of 0.5.                                                                               |                                                                             |
| Torque                                           |       | All: 0.5 N•m [0.8 N•m max]                                                                                                                | N/A                                                                         |
| Approvals                                        |       | UL file E191072, CE                                                                                                                       |                                                                             |

\*To obtain the most current agency approval information, see the Agency Compliance & Certifications Checklist section on the specific part number's web page.



# Compact Limit Switches Supplemental

## Limit Switch Types

**Snap action contact:** A contact element in which the contact motion is independent of the speed of the actuator. This feature ensures reliable electrical performance even in applications involving very slow moving actuators.

**Slow make/slow break contacts:** A contact element in which the contact motion is dependent on the actuator speed.

## Contact Displacement Values and Bar Charts

**Diagram 1**

**Z11 Snap-action Contacts**  
1 N.O. and 1 N.C.

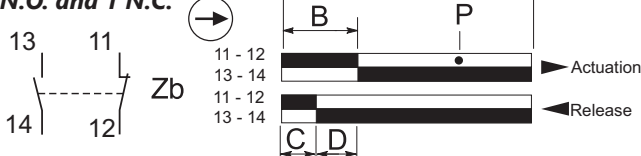


**Diagram 2**

**X11 Snap-action Contacts**  
1 N.O. and 1 N.C.

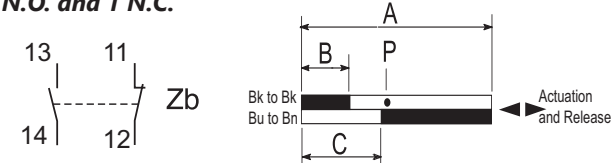
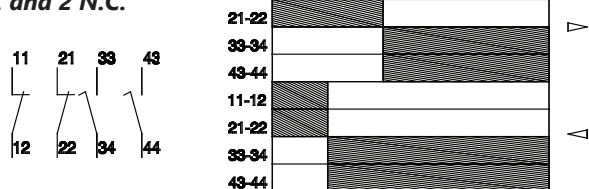


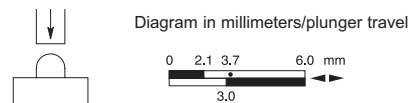
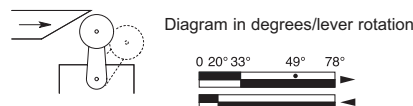
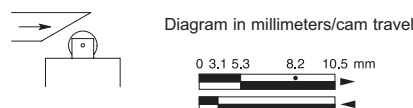
**Diagram 3**

**Z22 Snap-action Contacts**  
2 N.O. and 2 N.C.



- A = Max. travel of the operator in mm or degrees
- B = Tripping travel of the N.C. contact
- C = Tripping travel of the N.O. contact
- D = Differential travel (between actuation and release)
- P = Point from which positive opening is assured during actuation

### Bar Chart Examples (cam angle is 30 degrees)

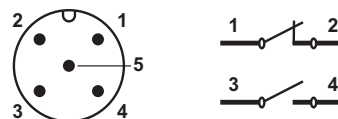


Note: Values represent travel of cam in direction of arrow.

## Contact Displacement Values

| Part Series                                                                              | Contact Configuration | Displacement Values mm [in] or degrees |            |            |                      |
|------------------------------------------------------------------------------------------|-----------------------|----------------------------------------|------------|------------|----------------------|
|                                                                                          |                       | A                                      | B          | C          | P                    |
| AEM2G11, AEM2G16, AEM2G18, AEM2G21                                                       | Z11                   | 5.0 [0.20]                             | 2.2 [0.09] | 1.4 [0.06] | 4.3 [0.17]           |
| AEM2G11, AEM2G16, AEM2G21                                                                | X11                   | 5.0 [0.20]                             | 1.9 [0.07] | 3.2 [0.13] | 3.4 [0.13]           |
| AEM2G11, AEM2G16, AEM2G21                                                                | Z22                   | 5.0 [0.20]                             | 2.1 [0.82] | 1.3 [0.05] | 4.0 [0.16]           |
| AEM2G12, AEM2G13, AEM2G14, AEM2G15, AEM2G17, AEM2G18, AEM2G22, AEM2G23, AEM2G24, AEM2G25 | Z11                   | 8.7 [0.34]                             | 3.8 [0.15] | 2.4 [0.09] | 7.5 [0.30]           |
| AEM2G12, AEM2G13, AEM2G14, AEM2G15, AEM2G22, AEM2G23, AEM2G24, AEM2G25                   | X11                   | 8.7 [0.34]                             | 3.3 [0.13] | 5.7 [0.22] | 5.9 [0.23]           |
| AEM2G12, AEM2G22                                                                         | Z22                   | 3.6 [0.14]                             | 8.7 [0.34] | 2.3 [0.09] | 7.0 [0.27]           |
| AEM2G41, AEM2G42, AEM2G43, AEM2G45, AEM2G51, AEM2G71, AEM2G72, AEM2G73, AEM2G74, AEM2G75 | Z11                   | 74°                                    | 32°        | 21°        | 65°                  |
| AEM2G41, AEM2G42, AEM2G43, AEM2G45, AEM2G51, AEM2G71, AEM2G72, AEM2G73, AEM2G74, AEM2G75 | X11                   | 74°                                    | 28°        | 48°        | 50°                  |
| AEM2G41, AEM2G51                                                                         | Z22                   | 75°                                    | 30°        | 10°        | 55°                  |
| AEM2G61                                                                                  | Z11                   | 74°                                    | 32°        | 21°        | Not positive-opening |
| AEM2G61                                                                                  | X11                   | 74°                                    | 28°        | 48°        |                      |
| AEM2G92                                                                                  | Z11                   | —                                      | 20°        | 10°        |                      |
| AEM2G93                                                                                  | Z11                   | —                                      | 20°        | 10°        | —                    |
| AEM2G93                                                                                  | Z22                   | —                                      | 19°        | 5°         |                      |

5-Pin M12 connector



Note: Green/yellow wire is physical earth ground.

