

# Achieve™ Compact Limit Switches

## Side Rotary Lever Actuator AEP Series

- Double insulated plastic housings
- 3.28 ft [1m] cable/5-pin M12 quick-disconnect (right exit)
- Compact size with standard 25mm [0.98 in] hole spacing
- Epoxy resin-filled for IP67 rating
- Snap-action (Z11) and (Z22) contacts are available
- N.C. contacts are positive-opening operated unless otherwise noted.

### Compact Limit Switches AEP Series Selection Chart

| Part Number                  | Price   | Drawing Link        | Actuator Type                                       | Max. Actuation Speed | Min. Actuation Force | Min. Positive Opening Force | Number of Contacts | Connection Type                         |
|------------------------------|---------|---------------------|-----------------------------------------------------|----------------------|----------------------|-----------------------------|--------------------|-----------------------------------------|
| <a href="#">AEP2G41Z11-1</a> | \$17.00 | <a href="#">PDF</a> | Side rotary lever with 14mm nylon roller            | 1.5 ms               | 0.08 N•m             | 0.28 N•m                    | 1 N.O./1 N.C.      | 3.28 ft [1m] cable (bottom exit)        |
| <a href="#">AEP2G41Z11MR</a> | \$21.00 | <a href="#">PDF</a> |                                                     |                      |                      |                             |                    | 5-pin M12 quick-disconnect (right exit) |
| <a href="#">AEP2G41Z22-1</a> | \$23.00 | <a href="#">PDF</a> |                                                     |                      |                      |                             | 2 N.O./2 N.C.      | 3.28 ft [1m] cable (bottom exit)        |
| <a href="#">AEP2G42Z11-1</a> | \$17.00 | <a href="#">PDF</a> | Side rotary lever with 14mm metal roller            | 1.5 ms               | 0.08 N•m             | 0.28 N•m                    | 1 N.O./1 N.C       | 3.28 ft [1m] cable (bottom exit)        |
| <a href="#">AEP2G42Z11MR</a> | \$21.00 | <a href="#">PDF</a> |                                                     |                      |                      |                             |                    | 5-pin M12 quick-disconnect (right exit) |
| <a href="#">AEP2G43Z11-1</a> | \$18.00 | <a href="#">PDF</a> | Side rotary lever with 14mm ball bearing roller     | 1.5 ms               | 0.08 N•m             | 0.28 N•m                    |                    | 3.28 ft [1m] cable (bottom exit)        |
| <a href="#">AEP2G43Z11MR</a> | \$22.00 | <a href="#">PDF</a> |                                                     |                      |                      |                             |                    | 5-pin M12 quick-disconnect (right exit) |
| <a href="#">AEP2G51Z11-1</a> | \$18.00 | <a href="#">PDF</a> | Side rotary adjustable lever with 18mm nylon roller | 1.5 ms               | 0.08 N•m             | 0.28 N•m                    |                    | 3.28 ft [1m] cable (bottom exit)        |
| <a href="#">AEP2G51Z11MR</a> | \$21.00 | <a href="#">PDF</a> |                                                     |                      |                      |                             |                    |                                         |
| <a href="#">AEP2G51Z22-1</a> | \$24.00 | <a href="#">PDF</a> |                                                     |                      |                      |                             | 2 N.O./2 N.C.      | 3.28 ft [1m] cable (bottom exit)        |
| <a href="#">AEP2G71Z11-1</a> | \$18.00 | <a href="#">PDF</a> | Side rotary adjustable 3mm stainless steel rod      | 1.5 ms               | 0.08 N•m             | 0.28 N•m                    | 1 N.O./1 N.C       | 3.28 ft [1m] cable (bottom exit)        |
| <a href="#">AEP2G71Z11MR</a> | \$22.00 | <a href="#">PDF</a> |                                                     |                      |                      |                             |                    | 5-pin M12 quick-disconnect (right exit) |

[AEP2G41Z22-1](#)[AEP2G42Z11-1](#)[AEP2G43Z11-1](#)[AEP2G51Z22-1](#)

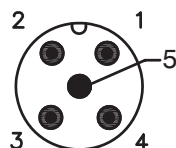
## Housing style

3.28 ft [1m] cable,  
bottom exit5-pin M12 quick-disconnect  
(right)[AEP2G71Z11-1](#)

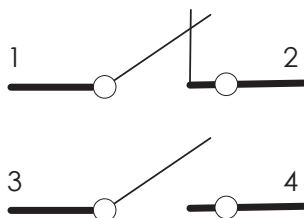


# Compact Limit Switches

## Connector

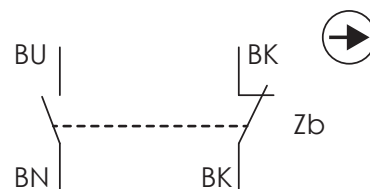


## Contact Configuration



Note: Pin 5 is not connected

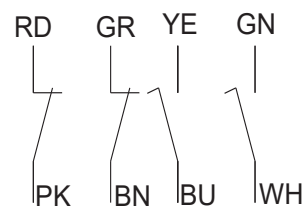
## Z11 Snap-action contacts 1 N.O. and 1 N.C.



## AEP2G41Z22-1 and AEP2G51Z22-1

| Z4    |    | A B C D |       |       |       | TAG | degree |
|-------|----|---------|-------|-------|-------|-----|--------|
|       |    | 11-12   | 21-22 | 33-34 | 43-44 |     |        |
| 11-12 | 12 |         |       |       |       | A   | 0      |
|       | 21 |         |       |       |       | B   | 30     |
|       | 33 |         |       |       |       | C   | 55     |
|       | 43 |         |       |       |       | D   | 75     |
| 21-22 | 12 |         |       |       |       | E   | 10     |
|       | 22 |         |       |       |       |     |        |
|       | 34 |         |       |       |       |     |        |
|       | 44 |         |       |       |       |     |        |
| 33-34 | 12 |         |       |       |       |     |        |
|       | 22 |         |       |       |       |     |        |
|       | 34 |         |       |       |       |     |        |
|       | 44 |         |       |       |       |     |        |
| 43-44 | 12 |         |       |       |       |     |        |
|       | 22 |         |       |       |       |     |        |
|       | 34 |         |       |       |       |     |        |
|       | 44 |         |       |       |       |     |        |

## Z22 Snap-action contacts 2 N.O. and 2 N.C.





# Compact Limit Switch Specifications

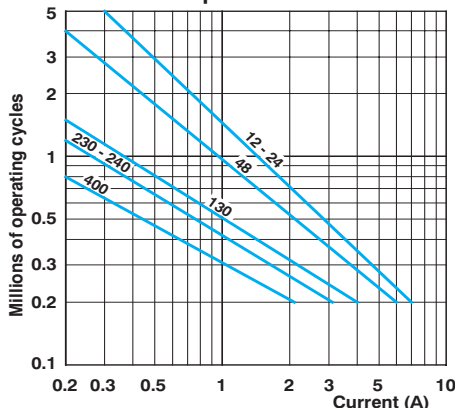
| Compact Limit Switches AEP Series Specifications    |       |                                                                                                                                          |                                                                         |
|-----------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| 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 G11,G12,G41,G42,G43,G51,G71<br>5 million operations. Models G16, G92, G93                                  | 10 million operations                                                   |
| Enclosure Material                                  |       | Reinforced Thermoplastic                                                                                                                 |                                                                         |
| Contact Blocks Rating                               |       |                                                                                                                                          |                                                                         |
| Positive Opening                                    |       | All models except 92 and 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 | 2.8A @ 24VDC; 0.55A @ 125VDC; 0.27A@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="#">AEP2G93Z22-1</a> 10A @ <500VAC |
| Contact Resistance                                  |       | 25mΩ                                                                                                                                     |                                                                         |
| Head Rotation                                       |       | 180 Degree Only                                                                                                                          |                                                                         |
| Rated Insulation Voltage                            |       | B300, R300 according to UL508<br>400V (degree of pollution: 3) according to IEC 60947-1                                                  | C300 - R300 according to UL508, 250V (degree of pollution 3)            |
| Connection Type                                     |       | Cable: 1m [3.28 ft] PVC cable, 4 x 0.75mm² (18 AWG).<br>Overall cable diameter: 7mm [0.275 in.]<br>Connector: 5-pin M12 quick disconnect | Pigtail 1m [3.28 ft], PVC, 0.5 mm² [20AWG]                              |
| Wiring Terminal Markings                            |       | Cable Models: N.C. Black/Black, N.O. Blue/Brown<br>M12 Models: N.C. Pin 1-2, N.O. Pin 3-4                                                | N.C. Gray/Brown Red/Pink<br>N.O. Blue/Yellow Green/White                |
| Electrical Protection                               |       | Class II according to IEC60536-1                                                                                                         |                                                                         |
| Contact Blocks Performance                          |       |                                                                                                                                          |                                                                         |
| Operation Frequency                                 |       | 3600 ops/h                                                                                                                               |                                                                         |
| Electrical Durability<br>(according to IEC 947-5-1) |       | Utilization categories AC-15 and DC-13; load factor of 0.5                                                                               |                                                                         |
| Torque                                              |       | 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.

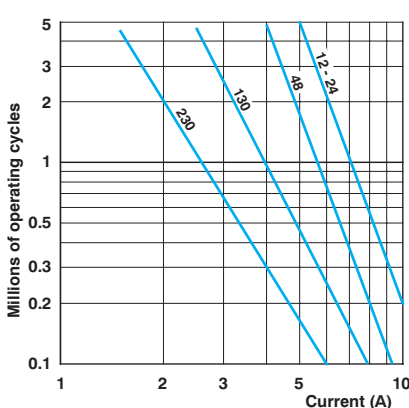
# Limit Switches Supplemental

## Electrical Durability (according to IEC 947-5-1)

### AC-15 Snap Action



### AC-15 Slow Action



#### 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.

#### Terminal identification (IEC)

Each terminal is marked with two digits. The first digit indicates the pole (circuit). The second digit indicates the type of contact.

\_1-\_2 is N.C., \_3-\_4 is N.O.  
so 11-12, 21-22 are N.C., while 13-14, 23-24 are N.O.

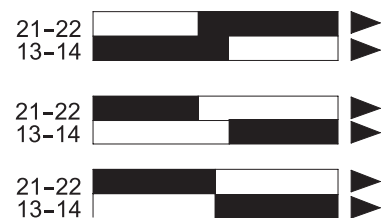
| DC-13 | Snap Action                                         | Slow Action |
|-------|-----------------------------------------------------|-------------|
|       | Power breaking for a durability of 5 million cycles |             |
| 24V   | 9.5 W                                               | 12W         |
| 48V   | 6.8 W                                               | 9W          |
| 110V  | 3.6 W                                               | 6W          |

### Terminal Markings

| European     |                                         |
|--------------|-----------------------------------------|
| Terminal No. | Type                                    |
| 11-12        | N.C. contact of pole no. 1 <sup>1</sup> |
| 13-14        | N.O. contact of pole no. 2 <sup>1</sup> |
| 21-22        | N.C. contact of pole no. 2 <sup>2</sup> |
| 23-24        | N.O. contact of pole no. 1 <sup>2</sup> |

<sup>1</sup> With non-isolated contacts    <sup>2</sup> With isolated contacts

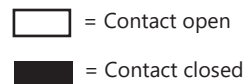
*Note: Green/yellow wire is physical earth ground.*



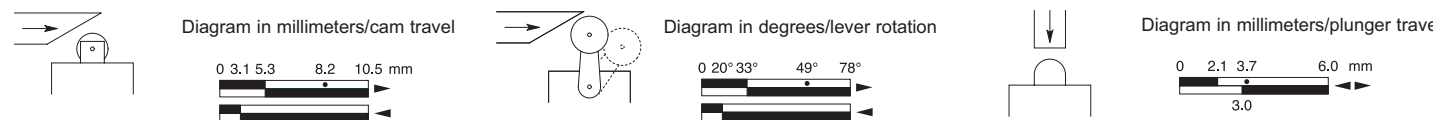
**Make-before-break (overlapping) SPDT:** the N.O. contact closes before the N.C. contact opens. (See ex: Y11)

**Break-before-make (offset) SPDT:** the N.C. contact opens before the N.O. contact closes. (See ex: X11)

**Simultaneous make and break SPDT:** the N.C. contact opens at the same time as the N.O. contact closes. (See ex: Z11)



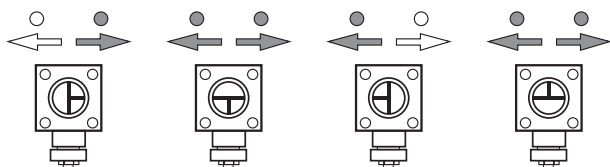
### Bar Chart Examples (cam angle is 30 degrees)



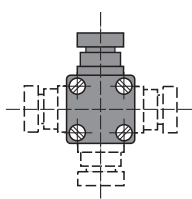
## Changeable working heads (E42, E52, E71)

**View of cam insert when looking at bottom of head once removed from switch body.**

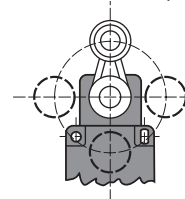
To change position, push in and twist until it locks into place



Positioning - 90° each way

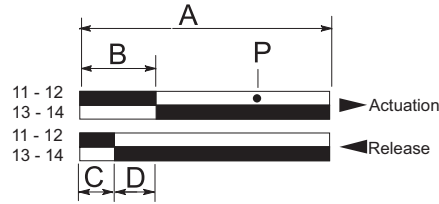
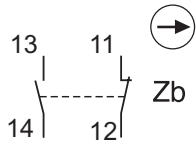


Adjustable lever from 0-360°  
(6° each increment)



## Contact Displacement Values

### Z11 Snap Action Contacts 1 N.O. and 1 N.C.



A = Max. travel of the operator in mm or degrees

B = Tripping travel of both contacts on actuation

C = Tripping travel of both contacts on release

D = Differential travel (between actuation and release)

P = Point from which positive opening is assured during actuation

| Contact Displacement Values |                                          |             |             |              |
|-----------------------------|------------------------------------------|-------------|-------------|--------------|
| Part Series                 | Displacement Values — mm [in] or degrees |             |             |              |
|                             | A                                        | B           | C           | P            |
| <b>AEM Halogen</b>          |                                          |             |             |              |
| <b>AEM2G12Z11-HF1</b>       | 8.7 [0.343]                              | 3.8 [0.150] | 2.4 [0.095] | 7.5 [0.295]  |
| <b>AEM2G16Z11-HF1</b>       | 5 [0.197]                                | 2.2 [0.867] | 1.4 [0.055] | 4.3 [0.169]  |
| <b>AEM2G42Z11-HF1</b>       | 74°                                      | 32°         | 21°         | 65°          |
| <b>AEM2G51Z11-HF1</b>       | 74°                                      | 32°         | 21°         | 65°          |
| <b>AEM2G71Z11-HF1</b>       | 74°                                      | 32°         | 21°         | 65°          |
| <b>AEM2G93Z11-HF1</b>       | —                                        | 10°         | 20°         | —            |
| <b>AAM Series</b>           |                                          |             |             |              |
| <b>AAMxF11Z11x</b>          | 5.6 [0.220]                              | 2.5 [0.098] | 1.3 [0.051] | 4.1 [0.161]  |
| <b>AAMxF12Z11x</b>          | 5.6 [0.220]                              | 2.5 [0.098] | 1.3 [0.051] | 4.1 [0.161]  |
| <b>AAMxT14Z11x</b>          | 5.6 [0.220]                              | 2.5 [0.098] | 1.3 [0.051] | 4.1 [0.161]  |
| <b>AAMxT35Z11x</b>          | 21 [0.827]                               | 9 [0.354]   | 4.5 [0.177] | 14.5 [0.571] |
| <b>AAMxF43Z11x</b>          | 74°                                      | 31°         | 17°         | 47°          |
| <b>AAMxF46Z11x</b>          | 74°                                      | 31°         | 17°         | 47°          |
| <b>AAMxF53Z11x</b>          | 74°                                      | 31°         | 17°         | 47°          |
| <b>AAMxF71Z11x</b>          | 74°                                      | 31°         | 17°         | 47°          |
| <b>AAMxT93Z11x</b>          | —                                        | 12°         | 23°         | —            |
| <b>AAP Series</b>           |                                          |             |             |              |
| <b>AAPxT10Z11x</b>          | 5.6 [0.220]                              | 2.5 [0.098] | 1.3 [0.051] | 4.1 [0.161]  |
| <b>AAPxT13Z11x</b>          | 9.6 [0.378]                              | 4.7 [0.185] | 2.5 [0.098] | 7.6 [0.299]  |
| <b>AAPxT14Z11x</b>          | 5.6 [0.220]                              | 2.5 [0.098] | 1.3 [0.051] | 4.1 [0.161]  |
| <b>AAPxT35Z11x</b>          | 21 [0.827]                               | 9 [0.354]   | 4.5 [0.177] | 14.5 [0.571] |
| <b>AAPxT41Z11x</b>          | 74°                                      | 31°         | 17°         | 47°          |
| <b>AAPxT42Z11x</b>          | 74°                                      | 31°         | 17°         | 47°          |
| <b>AAPxT45Z11x</b>          | 74°                                      | 31°         | 17°         | 47°          |
| <b>AAPxT51Z11x</b>          | 74°                                      | 31°         | 17°         | 47°          |
| <b>AAPxT5100Z11x</b>        | 74°                                      | 31°         | 17°         | 47°          |
| <b>AAPxT5200Z11x</b>        | 74°                                      | 31°         | 17°         | 47°          |
| <b>AAPxT71Z11x</b>          | 74°                                      | 31°         | 17°         | 47°          |
| <b>AAPxT93Z11x</b>          | —                                        | 12°         | 23°         | —            |

Contact Displacement Values tables continued on next page



# IEC Limit Switches Bar Charts

## Contacts Configuration and Bar Charts

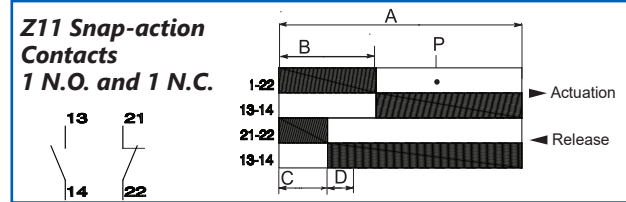
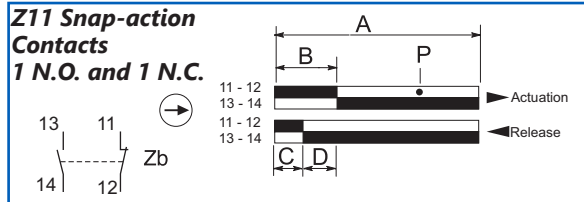
A = Max. travel of the operator in mm or degrees

B = Tripping travel of both contacts on actuation

C = Tripping travel of both contacts on release

D = Differential travel (between actuation and release)

P = Point from which positive opening is assured during actuation



### Contact Displacement Values

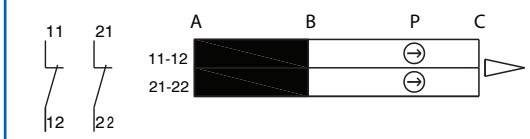
| Part Series | Displacement Values (mm [in] or degrees) |            |            |             |
|-------------|------------------------------------------|------------|------------|-------------|
|             | A                                        | B          | C          | P           |
| ABMxE11Z11  | 6.0 [0.24]                               | 3.0 [0.12] | 1.8 [0.07] | 4.6 [0.18]  |
| ABMxE13Z11  | 10.5 [0.41]                              | 5.3 [0.21] | 3.1 [0.12] | 8.2 [0.32]  |
| ABMxE32Z11  | 15.5 [0.61]                              | 6.3 [0.25] | 3.1 [0.12] | 10.8 [0.43] |
| ABMxE42Z11  | 78°                                      | 33°        | 20°        | 49°         |
| ABMxE52Z11  | 78°                                      | 33°        | 20°        | 49°         |
| ABMxE71Z11  | 78°                                      | 33°        | 20°        | 49°         |
| ABMxE92Z11  | —                                        | 21°        | 9°         | —           |
| ABMxE93Z11  | —                                        | 21°        | 21°        | —           |
| ABPxH14Z11  | 5.9 [0.23]                               | 2.2 [0.09] | 1.0 [0.04] | 3.8 [0.15]  |
| ABPxH19Z11  | 10.5 [0.41]                              | 4.6 [0.18] | 2.4 [0.09] | 7.5 [0.30]  |
| ABPxH35Z11  | 17 [0.67]                                | 6.8 [0.27] | 3.8 [0.15] | 11.3 [0.44] |
| ABPxH41Z11  | 90°                                      | 31°        | 19°        | 47°         |
| ABPxH51Z11  | 90°                                      | 31°        | 19°        | 47°         |
| ABPxH71Z11  | 90°                                      | 31°        | 19°        | 47°         |
| ABPxH92Z11  | —                                        | 27°        | 15°        | —           |
| ABPxH93Z11  | —                                        | 27°        | 15°        | —           |

### Contact Displacement Values

| Part Number   | Displacement Values (mm [in] or degrees) |            |            |             |
|---------------|------------------------------------------|------------|------------|-------------|
|               | A                                        | B          | C          | P           |
| ADP2T13Z11    | 9.6 [0.37]                               | 4.7 [0.19] | 2.5 [0.10] | 7.6 [0.29]  |
| ADP2T14Z11    | 5.6 [0.22]                               | 2.5 [0.10] | 1.3 [0.05] | 4.1 [0.16]  |
| ADP2T35Z11    | 21 [0.82]                                | 9.0 [0.35] | 4.9 [0.19] | 14.5 [0.57] |
| ADP2T41Z11    | 74°                                      | 31°        | 17°        | 47°         |
| ADP2T45Z11    | 74°                                      | 31°        | 17°        | 47°         |
| ADP2T51Z11    | 74°                                      | 31°        | 17°        | 47°         |
| ADP2T5100Z11  | 74°                                      | 31°        | 17°        | 47°         |
| ADP2T71Z11    | 74°                                      | 31°        | 17°        | 47°         |
| ADM2F11Z11    | 5.6 [0.22]                               | 2.5 [0.10] | 1.3 [0.05] | 4.1 [0.16]  |
| ADM2F12Z11    | 9.6 [0.37]                               | 4.7 [0.19] | 2.5 [0.10] | 7.6 [0.29]  |
| ADM2T35Z11    | 21 [0.82]                                | 9.0 [0.35] | 4.9 [0.19] | 14.5 [0.57] |
| ADM2F43Z11    | 74°                                      | 31°        | 17°        | 47°         |
| ADM2F46Z11    | 74°                                      | 31°        | 17°        | 47°         |
| ADM2F53Z11    | 74°                                      | 31°        | 17°        | 47°         |
| ADM2F71Z11    | 74°                                      | 31°        | 17°        | 47°         |
| ADM2T93Z11    | 23°                                      | 23°        | 12°        | —           |
| ADM2T9805Z11A | 5.6 [0.22]                               | 2.0 [0.07] | 0.9 [0.03] | —           |

### J02 Snap-action Contacts

2 N.C.



### Contact Displacement Values

| Part Number      | Displacement Values (mm [in] or degrees) |            |   |             |
|------------------|------------------------------------------|------------|---|-------------|
|                  | A                                        | B          | C | P           |
| AHP2R002J02-024  | —                                        | 2.4 [0.09] |   | 4 [0.15]    |
| AHP2T11J02-024   | —                                        | 2.4 [0.09] |   | 4 [0.15]    |
| AHP2T12J02-024   | —                                        | 4.5 [0.17] |   | 7.4 [0.29]  |
| AHP2T30J02-024   | —                                        | 8.6 [0.33] |   | 13.1 [0.51] |
| AHP2T32J02-024   | —                                        | 8.6 [0.33] |   | 13.1 [0.51] |
| AHP2T41J02-024   | —                                        | 30°        |   | 46°         |
| AHP2T5100J02-024 | —                                        | 30°        |   | 46°         |
| AHP2T5200J02-024 | —                                        | 30°        |   | 46°         |

## Contact Displacement Values (continued)

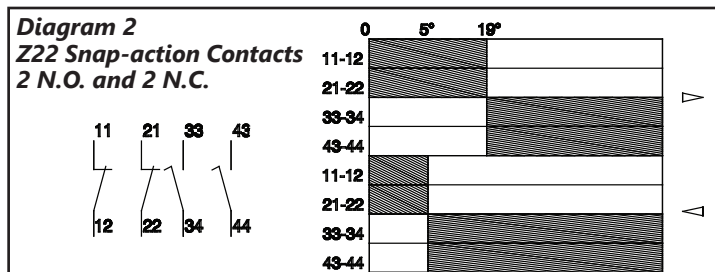
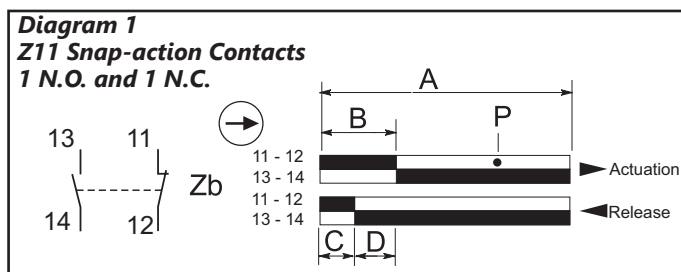
A = Max. travel of the operator in mm or degrees

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



| Contact Displacement Values |                       |                                        |            |            |            |
|-----------------------------|-----------------------|----------------------------------------|------------|------------|------------|
| Part Series                 | Contact Configuration | Displacement Values mm [in] or degrees |            |            |            |
|                             |                       | A                                      | B          | C          | P          |
| AEP2G11                     | Z11                   | 5.0 [0.20]                             | 2.2 [0.09] | 1.4 [0.06] | 4.3 [0.17] |
| AEP2G11                     | Z22                   | 5.0 [0.20]                             | 2.1 [0.82] | 1.3 [0.05] | 4.0 [0.16] |
| AEP2G12                     | Z11                   | 8.7 [0.34]                             | 3.8 [0.15] | 2.2 [0.09] | 7.5 [0.30] |
| AEP2G12                     | Z22                   | 8.7 [0.34]                             | 3.8 [0.15] | 2.3 [0.09] | 7.0 [0.27] |
| AEP2G16                     | Z11                   | 5.0 [0.20]                             | 2.2 [0.09] | 1.4 [0.06] | 4.3 [0.17] |
| AEP2G16                     | Z22                   | 5.0 [0.20]                             | 2.1 [0.82] | 1.3 [0.05] | 4.0 [0.16] |
| AEP2G21                     | Z22                   | 5.0 [0.20]                             | 2.1 [0.82] | 1.3 [0.05] | 4.0 [0.16] |
| AEP2G22                     | Z22                   | 8.7 [0.34]                             | 3.8 [0.14] | 2.3 [0.09] | 7.0 [0.27] |
| AEP2G41                     | Z11                   | 74°                                    | 32°        | 21°        | 65°        |
| AEP2G41                     | Z22                   | 75°                                    | 30°        | 10°        | 55°        |
| AEP2G42                     | Z11                   | 74°                                    | 32°        | 21°        | 65°        |
| AEP2G43                     | Z11                   | 74°                                    | 32°        | 21°        | 65°        |
| AEP2G51                     | Z11                   | 74°                                    | 32°        | 21°        | 65°        |
| AEP2G51                     | Z22                   | 75°                                    | 30°        | 10°        | 55°        |
| AEP2G71                     | Z11                   | 74°                                    | 32°        | 21°        | 65°        |
| AEP2G92                     | Z11                   | —                                      | 20°        | 10°        | —          |
| AEP2G93                     | Z11                   | —                                      | 20°        | 10°        | —          |
| AEP2G93                     | Z22                   | —                                      | 19°        | 5°         | —          |