

# Achieve™ IEC Limit Switches

## Plastic 50mm IEC Limit Switches ADP Series

- 90-degree adjustable, head, levers are adjustable 10° on the operating shaft
- Snap action contacts (1) N.O./ (1) N.C. on each unit
- Reinforced thermoplastic housing
- Wide offering of head actuators
- IP65

**Plastic 50mm IEC Limit Switches ADP Series Selection Chart**

| Part Number                         | Price   | Actuator Type  | Max. Actuation Speed | Min. Actuation Force | Min. Positive Opening Force | Travel to Operate Contacts | Total Travel        | Travel Diagram | Connection Type                                   | Drawing Link *             |
|-------------------------------------|---------|--|----------------------|----------------------|-----------------------------|----------------------------|---------------------|----------------|---|----------------------------|
| <a href="#"><u>ADP2T13Z11</u></a>   | \$17.00 | Metal plunger with metal roller                              | 0.3 ms               | 12N                  | 30N                         | 4.7 mm<br>[0.18 in]        | 9.6 mm<br>[0.37 in] | 1              | (2) PG11 cable entries with (1) 1/2in NPT adapter | <a href="#"><u>PDF</u></a> |
| <a href="#"><u>ADP2T14Z11</u></a>   | \$18.00 | Metal plunger with metal roller and dust cap                 | 0.5 ms               | 15N                  | 30N                         | 2.5 mm<br>[0.09 in]        | 5.6 mm<br>[0.22 in] | 2              |   | <a href="#"><u>PDF</u></a> |
| <a href="#"><u>ADP2T35Z11</u></a>   | \$20.00 | One-way horizontal lever with metal roller and dust cap      | 1ms                  | 7N                   | 24N                         | 9mm<br>[0.35 in]           | 21mm<br>[0.82 in]   | 3              |   | <a href="#"><u>PDF</u></a> |
| <a href="#"><u>ADP2T41Z11</u></a>   | \$18.00 | Side rotary lever with 18mm nylon roller                     | 1.5 ms               | 0.1 N•m              | 0.32 N•m                    | 31°                        | 74°                 | 4              |   | <a href="#"><u>PDF</u></a> |
| <a href="#"><u>ADP2T45Z11</u></a>   | \$19.00 | Side rotary lever inward with 18mm nylon roller              |                      |                      |                             |                            |                     |                |   | <a href="#"><u>PDF</u></a> |
| <a href="#"><u>ADP2T51Z11</u></a>   | \$19.00 | Side rotary adjustable lever with 18mm nylon roller          |                      |                      |                             |                            |                     |                |   | <a href="#"><u>PDF</u></a> |
| <a href="#"><u>ADP2T5100Z11</u></a> | \$19.00 | Side rotary 2mm step adjustable lever with 18mm nylon roller |                      |                      |                             |                            |                     |                |   | <a href="#"><u>PDF</u></a> |
| <a href="#"><u>ADP2T71Z11</u></a>   | \$20.00 | Side rotary adjustable 3mm stainless steel rod               |                      |                      |                             |                            |                     |                |   | <a href="#"><u>PDF</u></a> |

\* Weights are included on the drawing.



[ADP2T13Z11](#)



[ADP2T14Z11](#)



[ADP2T35Z11](#)



[ADP2T41Z11](#)



[ADP2T45Z11](#)



[ADP2T51Z11](#)



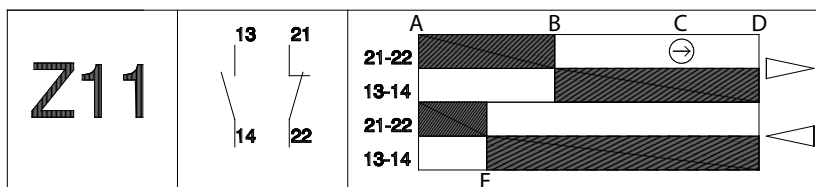
[ADP2T5100Z11](#)



[ADP2T71Z11](#)

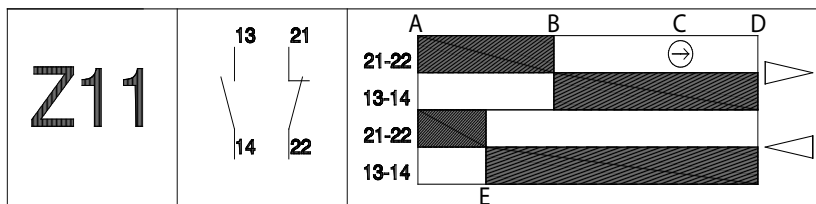
## Travel Diagrams

Diagram 1



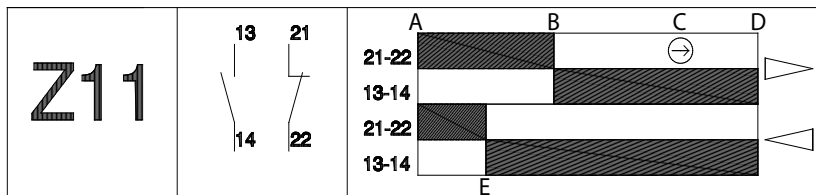
| TAG | mm  |
|-----|-----|
| A   | 0   |
| B   | 4.7 |
| C   | 7.6 |
| D   | 9.6 |
| E   | 2.5 |

Diagram 2



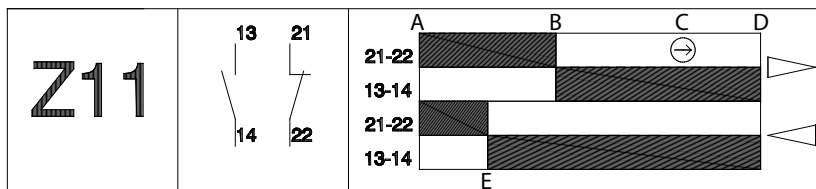
| TAG | mm  |
|-----|-----|
| A   | 0   |
| B   | 2.5 |
| C   | 4.1 |
| D   | 5.6 |
| E   | 1.3 |

Diagram 3



| TAG | mm   |
|-----|------|
| A   | 0    |
| B   | 9    |
| C   | 14.5 |
| D   | 21   |
| E   | 4.9  |

Diagram 4



| TAG | degree |
|-----|--------|
| A   | 0      |
| B   | 31     |
| C   | 47     |
| D   | 74     |
| E   | 17     |



# IEC Limit Switches Specifications

| IEC Limit Switches Specifications                       |                       |   |  |
|---|-----------------------|---|--|
| Series  |                       | AAM, AAP, ABM, ABP  | ADM, ADP   |
| <b>Environmental</b>                                    |                       |   |  |
| <b>Degree of Protection</b>                             |                       | Plastic models: IP65 according to IEC 529<br>Metal models: IP66 according to IEC 144-CEI70-1; part number <a href="#">ADM2T93Z11</a> is IP65      |  |
| <b>Temperature Range</b> <sup>1</sup>                   | <b>Plastic Models</b> | Storage: -30 to 80°C [-22 to 176°F]<br>Operating: -25 to 70°C [-13 to 158°F];   |  |
|   | <b>Metal Models</b>   | Storage: -30 to 80°C [-22 to 176°F]<br>Operating: -10 to 70°C [14 to 158°F]; part number <a href="#">ADM2T9805Z11A</a> -40 to 70°C [-40 to 158°F] |  |
| <b>Rated Impulse Withstand Voltage</b>                  |                       | 6 kV (degree of pollution 3)  | 6 kV (degree of pollution 3)                                   |
| <b>Mechanical Ratings</b>                               |                       |   |  |
| <b>Working Positions</b> <sup>2</sup>                   |                       | All actuators can be rotated in 90° increments  |  |
| <b>Mechanical Life</b>                                  |                       | Straight line working heads: 30 million operations, side rotary heads: 25 million operations, multi directional heads: 10 million operations      | 25 million operations  |
| <b>Enclosure Material</b>                               |                       | Plastic models AAP and ABP: fiberglass-reinforced plastic-V0 class (UL94);<br>Metal models AAM and ABM: die cast aluminum                         | ADP models: Reinforced thermoplastic<br>ADM models: Zinc Alloy |
| <b>Contact Blocks Rating</b>                            |                       |   |  |
| <b>Positive Opening</b> <sup>3</sup>                    |                       | All models except 98, 92, 93 operating heads  |  |
| <b>Electrical Ratings</b>                               | <b>AC15</b>           | Make: 60A@120VAC; 30A @ 240VAC; 18A @ 400VAC<br>Break: 10A @ 24VAC; 6.5 A @130VAC; 3.1 A @ 230VAC;<br>1.8 A @ 400VAC                              | 10A @ 24VAC, 6A @ 120VAC, 4A @ 400VAC                          |
|   | <b>DC13</b>           | 2.8 A @ 24VDC; 0.5 A @ 110VDC   | 6A @ 24VDC, 0.55 A @125VDC, 0.4A @ 250VDC                      |
| <b>Maximum Switching Frequency</b>                      |                       | Contact blocks: all two cycles per second   | 3600 (Cycles/hour)   |
| <b>Repeat Accuracy</b>                                  |                       | 0.01 mm on the operating points at 1 million operations   |  |
| <b>Short-Circuit Protection</b>                         |                       | Cartridge fuses gl 10A-500V 10.3x38 1 100KA   | 10A @ < 500VAC (fuse type gG (gl))                             |
| <b>Contact Resistance</b>                               |                       | 25 mΩ   |  |
| <b>Recommended Min. Operating Speed</b>                 |                       | With snap-action contacts: 20mm per minute <sup>4</sup><br>With slow-action contacts: 500mm per minute <sup>5</sup>                               | 20mm per minute  |
| <b>Rated Insulation Voltage</b>                         |                       | 690V  | 500V   |
| <b>Terminals Marking</b>                                |                       | According to CENELEC EN 50013   | According to IEC 60947-5-1                                     |
| <b>Wiring Connections</b>                               |                       | 2 x 2.5mm <sup>2</sup> (AWG14) to 2 x 0.5mm <sup>2</sup> (AWG18)  | 18-14 AWG [0.75 to 2.5 mm <sup>2</sup> ]                       |
| <b>Wiring Terminal Type</b>                             |                       | Captive screw with self-lifting pressure plate  | M3.5 screw with cable clamp (+, -) pozidriv 2                  |
| <b>Electrical Protection</b>                            |                       | Double insulation (plastic models only)   | ADM models Class I, ADP models Class II - double insulation    |
| <b>Contact Blocks Performance</b>                       |                       |   |  |
| <b>Operation Frequency</b>                              |                       | 3600 ops/h  |  |
| <b>Electrical Durability (according to IEC 947-5-1)</b> |                       | Utilization categories AC-15 and DC-13; load factor of 0.5.   |  |
| <b>Tools Needed</b>                                     |                       | Phillips screwdriver, #1 #2 / Hex wrench, 10mm  | Pozidriv 2 screwdriver   |
| <b>Approvals</b>  |                       | UL E191072, CE  |  |

<sup>1</sup> Minimum temperatures assume that the atmosphere is free of moisture, which could cause moving parts to freeze up.

<sup>2</sup> Some types of actuators, such as a long, heavy spring with the adjustable actuator fully extended, may not work properly if installed in a horizontal position.

<sup>3</sup> Positive opening in a snap-action contact block is performed by a rigid mechanism that forces the N.C. contact to open in case the snap-action mechanism fails.

This would provide protection if, for example, the contacts became "welded" together by excessive current rush. Generally, positive opening is not considered to work properly on switches with actuators that are not a solid design (such as a spring or rubber roller), despite the fact that the contact block itself has positive opening. In order to be considered as having positive opening, a switch must not have flexible components between actuator actioning points and the electrical contact.

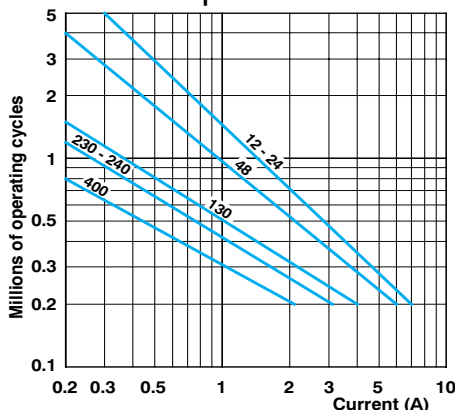
<sup>4</sup> This is the speed at which snap-action contact blocks are tested. There is no minimum operating speed for snap-action contacts because the speed has no influence on the switch action. When using spring actuators, the changeover time may vary from 1ms to 3ms from maximum to minimum operating speed.

<sup>5</sup> Slow-action contacts must not be operated at very low speeds because of the tendency to maintain the arc if contacts are not rapidly separated.

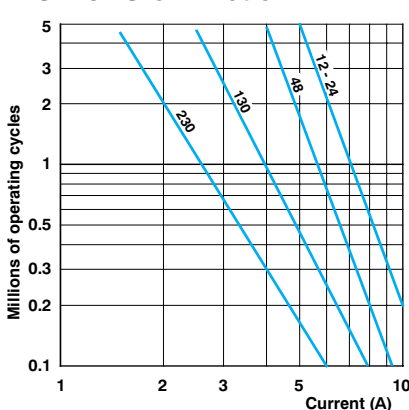
# Limit Switches Supplemental

## 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)

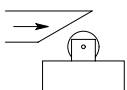


Diagram in millimeters/cam travel

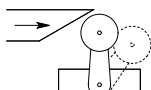
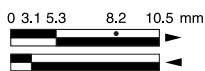


Diagram in degrees/lever rotation

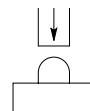
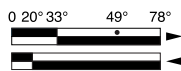
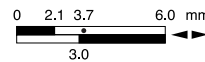


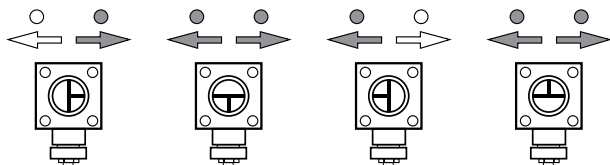
Diagram in millimeters/plunger travel



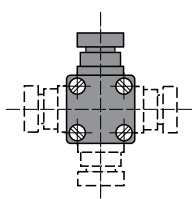
## Changeable working heads (E42, E52, E71)

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

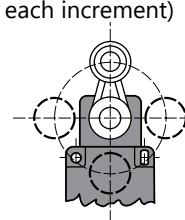
To change position, push in and twist until it locks into place



Positioning - 90° each way



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



## Contacts Configuration and Bar Charts

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

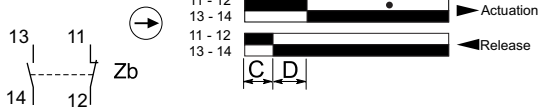
B = Tripping travel of both contacts on actuation

C = Tripping travel of both contacts on release

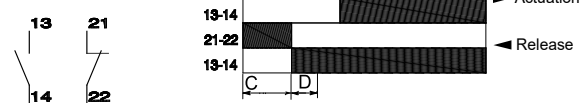
D = Differential travel (between actuation and release)

P = Point from which positive opening is assured during actuation

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



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



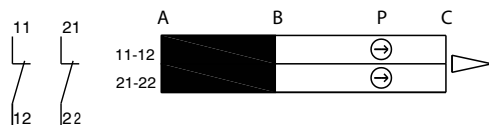
### Contact Displacement Values

| 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°         |