# IEC Limit Switches

**AAP series miniature DIN limit switches**

- Small body allows mounting in tight spaces
- Featuring an electrically isolated PBT body for corrosive environments
- Single conduit openings in 1/2” NPT or PG11
- Splined actuator shaft allows very fine adjustment of switch to fit all applications
- Choose from six different actuators including roller levers, plungers, and wobble sticks

<table>
<thead>
<tr>
<th>AAP Series</th>
<th>Part Number</th>
<th>Price</th>
<th>Actuator Type</th>
<th>Number of Conduit Holes</th>
<th>Conduit Threads</th>
<th>Max. Actuation Speed (m/s)</th>
<th>Min. Actuation Force (N)</th>
<th>Min. Positive Opening Force (N)</th>
<th>Min. Actuation Torque (Nm)</th>
<th>Min. Positive Opening Torque (Nm)</th>
<th>Dimensions Body / Head</th>
<th>Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AAP2T14Z11</td>
<td>$15.00</td>
<td>Mini w/ galvanized steel plunger</td>
<td>One</td>
<td>PG11 threads with a 1/2” NPT adapter</td>
<td>0.5</td>
<td>15(N)</td>
<td>30(N)</td>
<td>Figures 4, 15</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AAP2T13Z11</td>
<td>$15.00</td>
<td>Mini w/ galvanized steel plunger with polyamide plastic roller</td>
<td>One</td>
<td>PG11 threads with a 1/2” NPT adapter</td>
<td>0.5</td>
<td>12(N)</td>
<td>30(N)</td>
<td>Figures 4, 16</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AAP2T35Z11</td>
<td>$15.00</td>
<td>Mini w/ one-way lever with polyamide roller</td>
<td>One</td>
<td>PG11 threads with a 1/2” NPT adapter</td>
<td>1.0</td>
<td>7(N)</td>
<td>24(N)</td>
<td>Figures 4, 17</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AAP2T41Z11</td>
<td>$15.00</td>
<td>Mini side rotary with polyamide roller</td>
<td>One</td>
<td>PG11 threads with a 1/2” NPT adapter</td>
<td>1.5</td>
<td>0.10(Nm)</td>
<td>0.32(Nm)</td>
<td>Figures 4, 18</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AAP2T51Z11</td>
<td>$15.00</td>
<td>Mini side rotary adjustable lever with polyamide roller</td>
<td>One</td>
<td>PG11 threads with a 1/2” NPT adapter</td>
<td>1.5</td>
<td>0.10(Nm)</td>
<td>0.32(Nm)</td>
<td>Figures 4, 19</td>
<td>E</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AAP2T71Z11</td>
<td>$15.00</td>
<td>Mini side rotary with steel rod</td>
<td>One</td>
<td>PG11 threads with a 1/2” NPT adapter</td>
<td>1.5</td>
<td>0.10(Nm)</td>
<td>0.32(Nm)</td>
<td>Figures 4, 20</td>
<td>F</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the latest prices, please check AutomationDirect.com.
IEC Limit Switches Accessories

Replacement contact blocks

Easily-installed replacement contact blocks fit both heavy-duty IEC and double-insulated limit switches, including mini-DIN models.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Price</th>
<th>Contact Type</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGZ11-SWITCH</td>
<td>$5.50</td>
<td>Snap-action 1 N.C. and 2 N.O.</td>
<td>3ms change-over time</td>
</tr>
<tr>
<td>AGZ02-SWITCH</td>
<td>$5.25</td>
<td>Snap-action 2 N.C.</td>
<td>3ms change-over time</td>
</tr>
<tr>
<td>AGX11-SWITCH</td>
<td>$5.25</td>
<td>Slow-action 1 N.C. and 1 N.O.</td>
<td>Break before make</td>
</tr>
<tr>
<td>AGY11-SWITCH</td>
<td>$5.25</td>
<td>Slow-action overlay 1 N.C. and 1 N.O.</td>
<td>Make before break</td>
</tr>
<tr>
<td>AGW02-SWITCH</td>
<td>$5.75</td>
<td>Slow-action delay 2 N.C.</td>
<td>Simultaneous</td>
</tr>
<tr>
<td>AGW20-SWITCH</td>
<td>$4.00</td>
<td>Slow-action overlay 2 N.O.</td>
<td>Simultaneous</td>
</tr>
</tbody>
</table>

Additional lever arms, spare parts and accessories for ABM series

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Price</th>
<th>Dimensions</th>
<th>Actuator Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE42-LEVER</td>
<td>$5.25</td>
<td>Figure 8</td>
<td>Lever with stainless steel roller for E42 models (replacement lever)</td>
</tr>
<tr>
<td>AGE44-LEVER</td>
<td>$5.25</td>
<td>Figure 13</td>
<td>Lever with 50mm diameter rubber roller (fits E42 models)</td>
</tr>
<tr>
<td>AGE52-LEVER</td>
<td>$6.25</td>
<td>Figure 9</td>
<td>Lever with stainless steel roller for E52 models (replacement lever)</td>
</tr>
<tr>
<td>AGE54-LEVER</td>
<td>$6.25</td>
<td>Figure 14</td>
<td>Lever with 50mm diameter rubber roller (fits E52 models)</td>
</tr>
</tbody>
</table>

Note: See the Bar Charts page of this section for more information.

Replacement actuator levers for heavy-duty IEC models

Easily-replaceable actuators for E42 and E52 model limit switches.

Note: These models have an E42 or E52 in the part number, for example, ABM1E42Z11.
General Specifications

Approvals
All: CENELEC EN 50041, CEI EN 60947-5-1 Plastic models: UL (508), CSA C22.2 No 14-M91

Environmental
Degree of Protection
Plastic models: IP65 according to IEC 529
Aluminum models: IP66 according to IEC 144-CEI70-1

Temperature Range
Plastic models: stocking: -30° to 80°C (-22° to 176° F) working: -25° to 70°C (-13° to 158°F)
Aluminum models: stocking: -30° to 80°C (-22° to 176°F) working: -10° to 70°C (14° to 158°F); minimum temperatures assume that the atmosphere is free of moisture, which could cause moving parts to freeze up

Rated Insulation Voltage
660V (degree of pollution 3)

Mechanical Ratings
Working Positions
All actuators can be rotated in 90° increments (although some types of actuator, such as a long, heavy spring with the adjustable actuator fully extended, may not work properly if installed in a horizontal position).

Mechanical Life
Straight line working heads: 30 million operations; side rotary heads: 25 million operations; multidirectional heads: 10 million operations

Enclosure Material
Plastic models: fiberglass-reinforced plastic-V0 class (UL94); aluminum models: die cast aluminum

Contact Blocks Rating
Positive Opening*
Yes, all models

Electrical Ratings
AC15
Make: 60A @ 120VAC; 30A @ 240VAC; 18A @ 400VAC
Break: 10A @ 24VAC; 6.5A @ 9130VAC; 3.1A @ 230VAC; 1.8A @ 400VAC

DC13
2.8A @ 24VDC; 0.5A @ 110VDC

Maximum Switching Frequency
Contact blocks: all two cycles per second

Repeat Accuracy
0.01mm on the operating points at 1 million operations

Short-Circuit Protection
Cartridge fuses gl 10A-500V 10.3x38 1 100KA

Contact Resistance
25 milli Ω

Recommended Minimum Operating Speed
With snap-action contacts: 20 mm per minute**
With slow-action contacts: 500 mm per minute***

Rated Insulation Voltage
660V

Terminals Marking
According to CENELEC EN 50013

Wiring Connections
2 x 2.5mm² (AWG14) to 2 x 0.5mm² (AWG18)

Wiring Terminal Type
Captive screw with self-lifting pressure plate

Wiring Terminal Markings
According to CENELEC EN50013

User Protection
Double insulation (plastic models only)

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. See table and curves below.

Tools Needed
Phillips screwdriver, #1 #2 / Hex wrench, 10mm

* 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.

** 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 1 to 3 ms from max. to min. operating speed.

*** 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.

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

![Graphs showing electrical durability](image-url)
### Limit Switches Bar Charts

**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 contact:** A contact element in which the contact motion is dependent on the actuator speed.

**Contact Configuration**

**Z11 Snap Action Contacts**

1 N.O. and 1 N.C.

### 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.

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

### Terminal Markings

<table>
<thead>
<tr>
<th>Terminal No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-12</td>
<td>N.C. contact of pole no. 1 ¹</td>
</tr>
<tr>
<td>13-14</td>
<td>N.O. contact of pole no. 2 ¹</td>
</tr>
<tr>
<td>21-22</td>
<td>N.C. contact of pole no. 2 ²</td>
</tr>
<tr>
<td>23-24</td>
<td>N.O. contact of pole no. 1 ²</td>
</tr>
</tbody>
</table>

¹ With non-isolated contacts  ² With isolated contacts

### Note:

Green/yellow wire is physical earth ground.

- With non-isolated contacts
- With isolated contacts

### Bar Chart Examples

(See ex: Z11)

### Make-before-break (overlapping) SPDT: the N.O. contact closes before the N.C. contact opens.

### Break-before-make (offset) SPDT: the N.C. contact opens before the N.O. contact closes.

### Simultaneous make and break SPDT: the N.C. contact opens at the same time as the N.O. contact closes.

### Contacts Configuration

For the latest prices, please check AutomationDirect.com.
IEC Limit Switches Dimensions

Switch body dimensions
Dimensions are in millimeters. 25.4 mm = 1 inch
For example, 30 mm to inches = 30/25.4 = 1.181 inches.

Figure 1: ABM models — single-cable entry style

Figure 2: ABM models — 3-cable entry style

Figure 3: ABP models

Figure 4: AAP (Mini DIN) models

Figure 5: Steel plunger (ABM, ABP models)

Figure 6: Plunger with roller (ABM, ABP models)

Figure 7: 1-way lever with roller (ABM, ABP models)

Figure 8: Side rotary with roller (ABM, ABP models)

Figure 9: Side rotary with adjustable lever roller (ABM, ABP models)

Actuators - ABM, ABP models

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IEC Limit Switches Dimensions

Figure 10: Side rotary with rod (ABM, ABP models)

Figure 11: Wobble-type with spring with tip (ABM, ABP models)

Figure 12: Wobble-type steel spring (ABM, ABP models)

Figure 13: Optional lever arm (ABM models) AGE44-LEVER

Figure 14: Optional lever arm (ABM models) AGE54-LEVER

Figure 15: Steel plunger (AAP models)

Figure 16: Steel plunger with roller (AAP models)

Figure 17: One-way lever with roller (AAP models)

Figure 18: Side rotary lever with roller (AAP models)

Figure 19: Side rotary lever with adj. lever roller (AAP models)

Figure 20: Side rotary lever with rod actuator (AAP models)

Dimensions are in millimeters (25.4 mm = 1 inch). For example, 30 mm to inches = 30/25.4 = 1.181 inches.