

## Limit Switches

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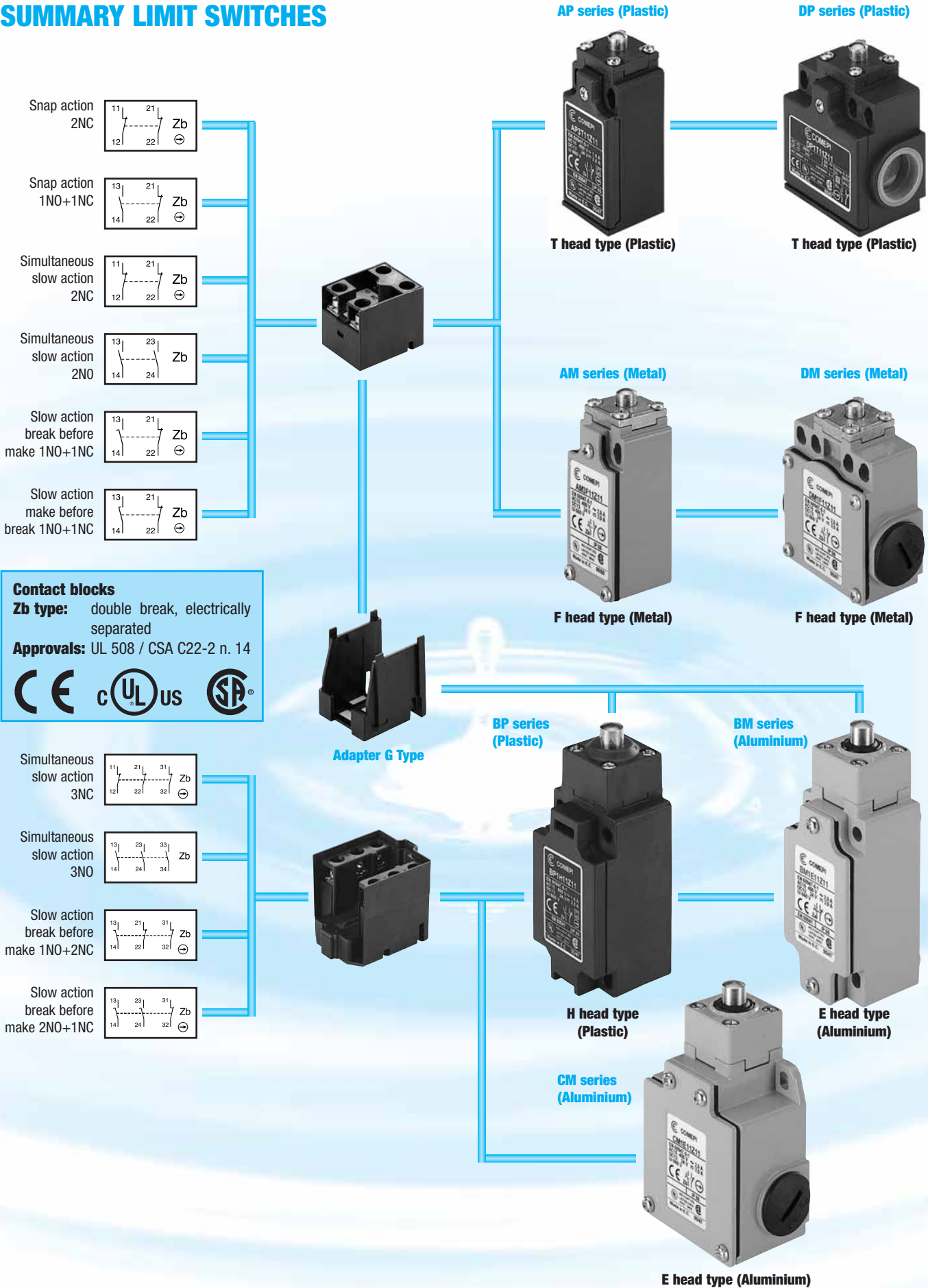
## Safety Limit Switches

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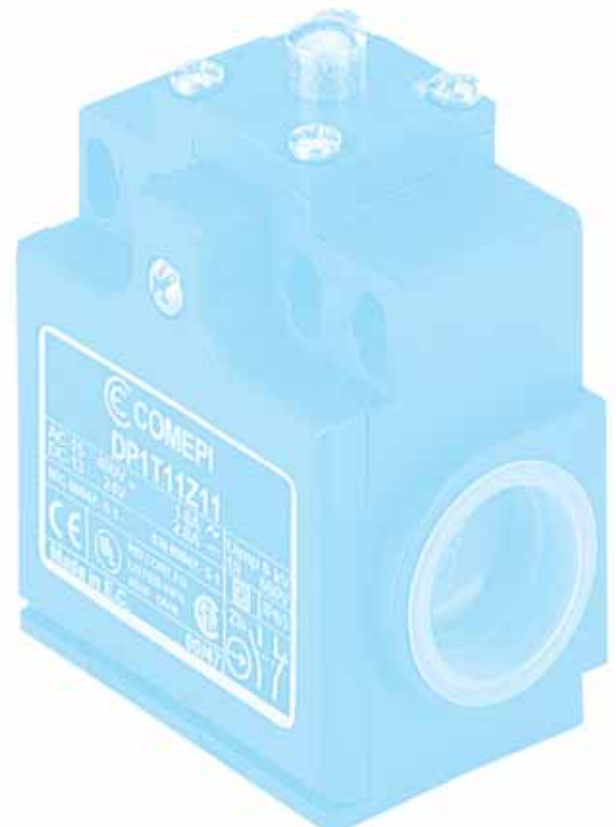
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## SUMMARY LIMIT SWITCHES





# LIMIT SWITCHES



The **Comepi** products listed in this catalogue are developed and manufactured according to the rules set out in IEC international publications and EN European standard.

### Specifications

- **International Specifications**

The International Electrotechnical Commission, IEC, which is part of the International Standards Organization, ISO, publishes IEC publications which act as a basis for the world market.

- **European Specifications**

The European Committee for Electrotechnical Standardisation (CENELEC), grouping 18 European countries, publishes EN standards for low voltage industrial apparatus.

These European standards differ very little from IEC international standards and use a similar numbering system. The same is true of national standards. Contradicting national standards are withdrawn.

- **Harmonised European Specifications**

The European Committees for Standardisation (CEN and CENELEC), grouping 18 European countries, publish EN standards relating to safety of machinery.

- **Specifications in Canada and the USA**

These are equivalent, but differ markedly from IEC, UTE, VDE and BS specifications.

**UL** Underwriters Laboratories (USA)

**CSA** Canadian Standards Association (Canada)

Remark concerning the label issued by the UL (USA). Two levels of acceptance between devices must be distinguished.

**“Recognized”** Authorised to be included in equipment, if the equipment in question has been entirely mounted and wired by qualified personnel. They are not valid for use as “General purpose products” as their possibilities are limited.

They bear the mark: 

**“Listed”** Authorised to be included in equipment and for separate sale are “General purpose products” components in the USA.

They bear the mark: 

### European Directives

The guarantee of free movement of goods within the European Community assumes elimination of any regulatory differences between the member states. European Directives set up common rules that are included in the legislation of each state while contradictory regulations are cancelled.

There are three main directives:

- **Low Voltage Directive 73/23/EEC**, amended by **Directive 93/68/EEC** concerning electrical equipment from 50 to 1000 V a.c. and from 75 to 1500 V d.c. This specifies that compliance with the requirements that it sets out **is acquired** once the equipment conforms to the standards harmonised at European level: EN 60947-1 and EN-60947-5-1 for **limit switches**.
- **Machines Directives - 89/392/EEC, 91/368/EEC, 93/44/EEC, 93/68/EEC** - defining main safety and health requirements concerning design and manufacture of the machines and other equipment including safety components in European Union countries.
- **Electromagnetic Compatibility Directive 89/336/EEC**, amended by **Directive 92/31/EEC** and **Directive 93/68/EEC** concerning all electrical devices likely to create electromagnetic disturbances.

### Signification of CE marking:

**CE marking** must not be confused with a quality label.

**CE marking** placed on a product is proof of conformity with the European Directives concerning the product.

**CE marking** is part of an administrative procedure and guarantees free movement of the product within the European Community.

### Standards

- **International Standards**

**IEC 947-1** Low-voltage switchgear and controlgear - Part 1: General Rules (CEI EN 60947-1).

**IEC 947-5-1** Low-voltage switchgear and controlgear - Part 5: Control circuit devices and switching elements - Section 1: Electromechanical control circuit devices (CEI EN 60947-5-1) - Chapter 3: Special requirements for control switches with positive opening operation.

**IEC 204-1** Electrical equipment on industrial machines - Part 1: General requirements (CEI EN 60204-1).

**IEC 204-2** Electrical equipment on industrial machines - Part 2: Item designation and examples of drawings, diagrams, tables and instructions.

**IEC 529** Degrees of protection provided by enclosure (IP code) (CEI EN 60529).

### • European Standards

<b>EN 50005</b>	Low-voltage switchgear and controlgear for industrial use - Terminal marking and distinctive number: General rules (CEI 17-17).
<b>EN 50013</b>	Low-voltage switchgear and controlgear for industrial use - Terminal marking and distinctive number for particular control switches (CEI 17-17).
<b>EN 50041</b>	Low-voltage switchgear and controlgear for industrial use - Control switches - Position switches 42,5 x 80 - Dimensions and characteristics.
<b>EN 50047</b>	Low-voltage switchgear and controlgear for industrial use - Control switches - Position switches 30 x 55 - Dimensions and characteristics.
<b>EN 60947-1</b>	Low-voltage switchgear and controlgear for industrial use - Part 1: General rules (CEI EN 60947-1).
<b>EN 60947-5-1</b>	Low-voltage switchgear and controlgear for industrial use - Part 5: Control circuit devices and switching elements - Section 1: Electromechanical control circuit devices (CEI EN 60947-5-1) - Chapter 3: Special requirements for control switches with positive opening operation.
<b>EN 60529</b>	Degrees of protection provided by enclosures (IP code).
<b>EN 61058-1</b>	Switches for appliances. Part. 1: general requirements.

### • Harmonised European Standards

These standards are common to all European Union and EFTA (European Free Trade Association) countries. They were prepared (prEN project) and written (EN final text) by the European standardisation committees CEN or CENELEC. Harmonised European standards were drawn up to allow definition of the rules and technical means to be used to satisfy the main safety requirements on machines and thus guarantee conformity with the Machines Directive. Compliance with a harmonised European standard is presumption of conformity with the relevant Directive.

European standards relating to machine safety are divided into groups (A, B and C types).

#### Type A standards:

basic standards: setting out design principles and the general aspects valid for all machine types.

<b>EN 292-1</b>	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology.
<b>EN 262-2 and EN 292-2/A1</b>	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications.
<b>EN 1050</b>	Safety of machinery - Principles for risk assessment.

#### Type B standards:

group standards:

<b>B1:</b>	dealing with specific safety aspects.
<b>EN 60204-1</b>	Safety of machinery - Electrical equipment of machines - Part 1: General requirements.
<b>EN 954-1</b>	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design.
<b>B2:</b>	dealing with components and devices determining safety.
<b>EN 1088</b>	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection

#### Type C standards:

specific standards or standards per machine family giving detailed safety specifications applicable to a machine or to a group of machines

<b>EN 81-1</b>	Safety rules for the construction and installation of lifts - Part 1: Electric lifts.
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### • American Standards

<b>UL 508</b>	Standard for safety. Industrial control equipment.
<b>CSA - C22.2 No. 14-95</b>	Industrial control equipment. Industrial products.

### Double Insulation


Class II materials, according to IEC 536, are designed with double insulation. This measure consists in doubling the functional insulation with an additional layer of insulation so as to eliminate the risk of electric shock and thus not having to protect elsewhere. No conductive part of "double insulated" material should be connected to a protective conductor.

### Positive Opening Operation

A control switch, with one or more break-contact elements, has a positive opening operation when the switch actuator ensures full contact opening of the break-contact. For the part of travel that separates the contacts, there must be a positive drive, with no resilient member (e.g. springs), between the moving contacts and the point of the actuator to which the actuating force is applied.

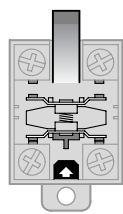
The positive opening operation does not deal with N.O. contacts.

Control switches with positive opening operation may be provided with either snap action or slow action contact elements. To use several contacts on the same control switch with positive opening operation, they must be electrically separated from each other, if not, only one may be used.

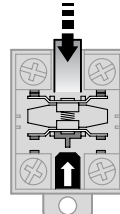
Every control switch with positive opening operation must be indelibly marked on the outside with the symbol: .

### Snap Action

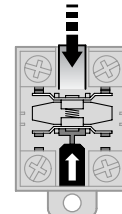
Snap action contacts are characterised by a release position that is distinct from the operating position (differential travel). Snap breaking of moving contacts is independent of the switch actuator's speed and contributes to regular electric performance even for slow switch actuator speeds.



State of rest



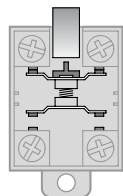
Contact change



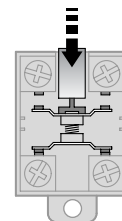
Positive opening

### Slow Action

Slow action contacts are characterised by a release position that is the same as the operating position. The switch actuator's speed directly conditions the travel speed of contacts.



State of rest



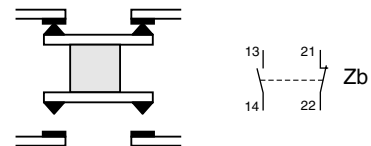
Completely closed

### Contact shape according to IEC 947-5-1.

Change-over contact elements with 4 terminals must be indelibly marked with the corresponding Za or Zb symbol as in the diagrams below.



Contacts with the same polarity



The 2 moving contacts are electrically separated

### Utilization Category

AC-15: switching of electromagnetic loads of electromagnets using an alternating current (>72 VA).

DC-13: switching of electromagnets using a direct current.

### Terminals

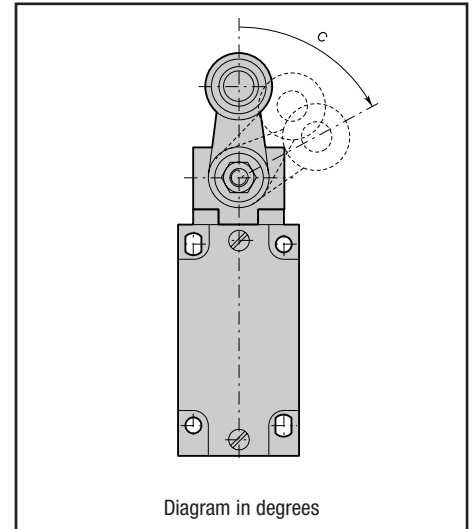
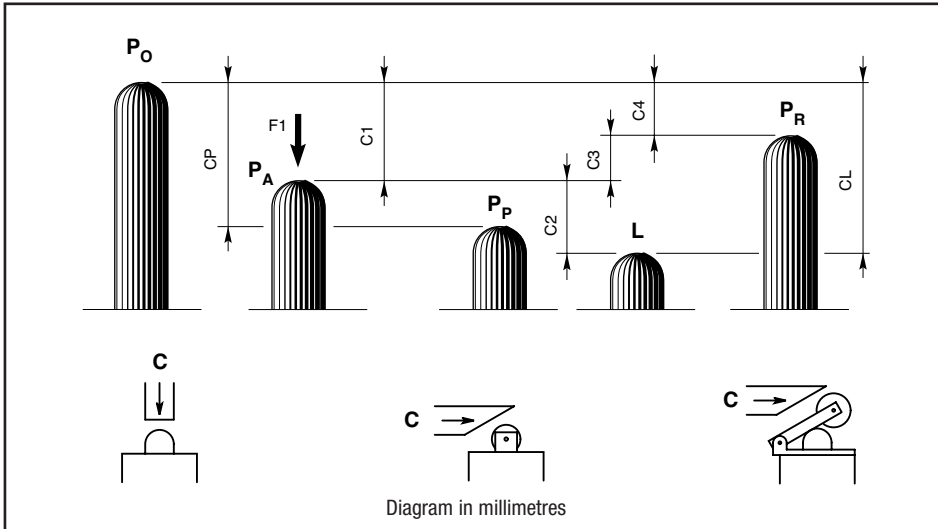
Limit switches with metal casings must have a terminal, for a protective conductor, that is placed inside the casing very close to the cable inlet and must be indelibly marked.

### Minimum Actuation Force/Torque

The minimum amount of force/torque that is to be applied to the switch actuator to produce a change in contact position.

### Minimum Force/Torque to achieve Positive Opening Operation

The minimum amount of force/torque that is to be applied to the switch actuator to ensure positive opening operation of the N.C. contact.



**P<sub>0</sub> Free position:**

position of the switch actuator when no external force is exerted on it.

**P<sub>A</sub> Operating position:**

position of the switch actuator, under the effect of force F<sub>1</sub>, when the contacts leave their initial free position.

**P<sub>P</sub> Positive opening position:**

position of the switch actuator from which positive opening is ensured.

**L Max. travel position:**

maximum acceptable travel position of the switch actuator under the effect of a force F<sub>1</sub>.

**P<sub>R</sub> Release position:**

position of the switch actuator when the contacts return to their initial free position.

**C<sub>1</sub> Pre-travel:**

distance between the free position P<sub>0</sub> and the operating position P<sub>A</sub>.

**C<sub>P</sub> Positive opening travel:**

minimum travel of the switch actuator, from the free position, to ensure positive opening operation of the normally closed contact.

**C<sub>2</sub> Over-travel:**

distance between the operating position P<sub>A</sub> and the max. travel position L.

**C<sub>L</sub> Max. travel:**

distance between the free position P<sub>0</sub> and the max. travel position L.

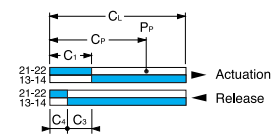
**C<sub>3</sub> Differential travel (C<sub>1</sub>-C<sub>4</sub>):**

travel difference of the switch actuator between the operating position P<sub>A</sub> and the release position P<sub>R</sub>.

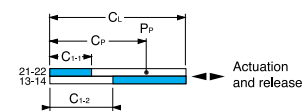
**C<sub>4</sub> Release travel:**

distance between the release position P<sub>R</sub> and the free position P<sub>0</sub>.

**Diagram for snap action contacts:**



**Diagram for non-overlapping slow action contacts:**



Note: for slow action contacts, C<sub>3</sub> = 0, C<sub>1-1</sub> = pre-travel of contact 21-22, C<sub>1-2</sub> = pre-travel of contact 13-14

**Examples:**

**BM1E13Z11**

(snap action contacts)

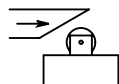
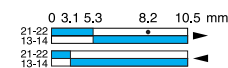


Diagram in millimetres/cam travel



**BM1E41Z11**

(snap action contacts)

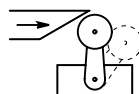
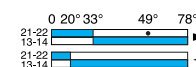


Diagram in degrees/lever rotation



**BM1E11X11**

(non-overlapping slow action contacts)

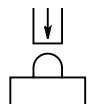


Diagram in millimetres/plunger travel



## Applications

Easy to use, electromechanical limit switches offer specific qualities:

- Visible operation.
- Able to switch strong currents (10 A conventional thermal current).
- Electrically separated contacts.
- Precise operating points (consistency).
- Immune to electromagnetic disturbances.

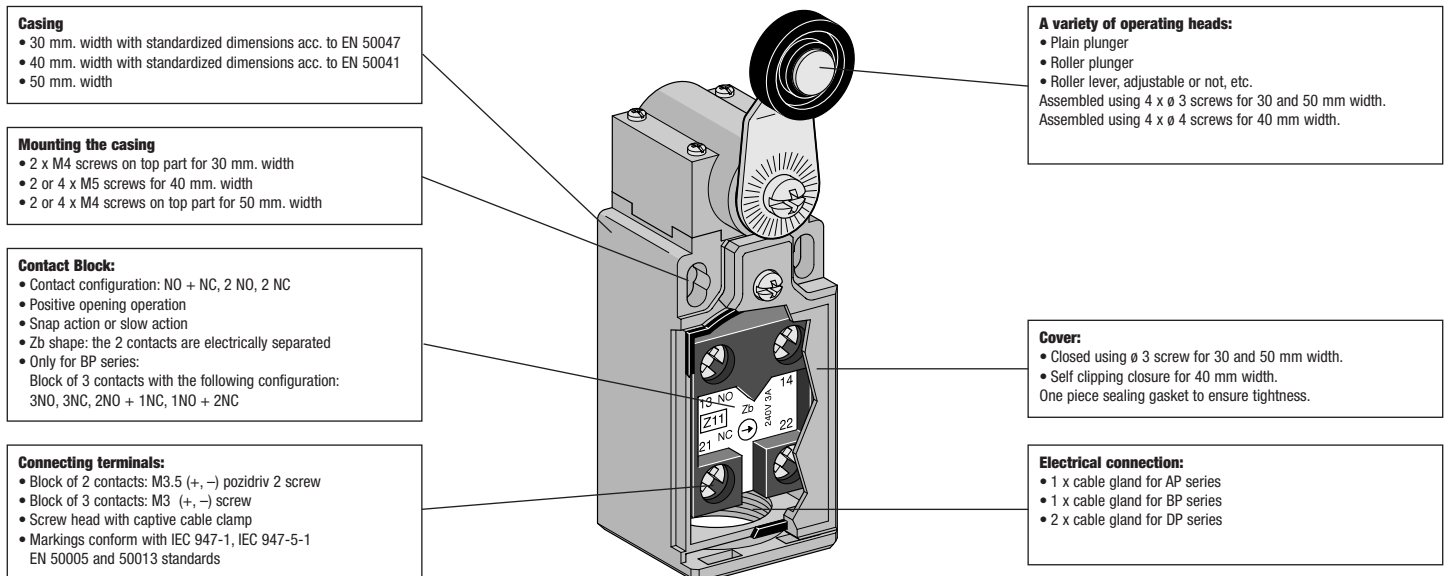
They are purpose-built detection devices thanks to these characteristics:

- Presence/absence.
- Positioning and travel limit.
- Objects passing/counting.

## Description

Limit switches, which are made of reinforced UL-V0 thermoplastic fiber-glass, offer double insulation  $\square$  and a degree of protection of IP65.

The casing come in 3 dimension: – AP... 30 mm. width – BP... 40 mm. width – DP... 50 mm. width



## Symbols

Example: 

A	P	1	T	41	Z	1	1
---	---	---	---	----	---	---	---

  
Structure: 

	P						
--	---	--	--	--	--	--	--

<p><b>Casing width:</b>  <b>A</b> = 30 mm width + 1 cable inlet  <b>B</b> = 40 mm width + 1 cable inlet  <b>D</b> = 50 mm width + 2 cable inlets</p>	
<p><b>Plastic casing</b></p>	
<p><b>Electrical connection</b>  <b>1:</b> cable inlets for PG13.5 cable gland  <b>2:</b> cable inlets for 1/2 NPT cable gland *  <b>3:</b> cable inlets for PG11 cable gland (only for AP and DP series)  <b>4:</b> cable inlets for M16 x 1,5 cable gland (only for AP and DP series)  <b>5:</b> cable inlets for M20 x 1,5 cable gland</p>	
<p><b>Plastic heads</b>  <b>T:</b> for AP and DP series  <b>H:</b> for BP series only</p>	
<p><b>Operating heads:</b> codes 10 - 9999</p>	
	<p><b>Contact block</b></p> <p><b>11:</b> 1 NO + 1 NC contacts  <b>20:</b> 2NO contacts  <b>02:</b> 2 NC contacts</p> <p><b>Only for BP series:</b>  <b>12:</b> 1 NO + 2NC contacts  <b>21:</b> 2 NO + 1 NC contacts  <b>03:</b> 3 NC contacts  <b>30:</b> 3 NO contacts</p> <p><b>Z:</b> Zb Snap action  <b>W:</b> Zb Slow action (contact dependent)  <b>X:</b> Zb Slow action non-overlapping late make  <b>Y:</b> Zb Slow action overlapping early make</p>

\* In AP... and DP... series, the 1/2" NPT thread is obtained by the use of a plastic adapter (delivered not mounted).



### General Technical Data

Standards		Plastic Casing	
<b>Certifications - Approvals</b>		UL - CSA - IMQ	
<b>Air temperature</b> near the device			
- during operation	°C	- 25 ... + 70	
- for storage	°C	- 30 ... + 80	
<b>Climatic withstand</b>		According to IEC 68-2-3 and salty mist according to IEC 68-2-11	
<b>Mounting positions</b>		All positions are authorised	
<b>Shock withstand</b> (according to IEC 68-2-27 and EN 60 068-2-27)		50g* (1/2 sinusoidal shock for 11 ms) no change in contact position	
<b>Resistance to vibrations</b> (acc. to IEC 68-2-6 and EN 60 068-2-6)		25g (10 ... 500 Hz) no change in position of contacts greater than 100 µs	
<b>Protection against electrical shocks</b> (acc. to IEC 536)		Class II	
<b>Degree of protection</b> (according to IEC 529 and EN 60 529)		IP 65	
<b>Consistency (measured over 1 million operations)</b>		0.1 mm (upon closing point)	
<b>Minimum actuation speed</b>		Slow action contacts 0.060 / Snap action contacts 0.001	

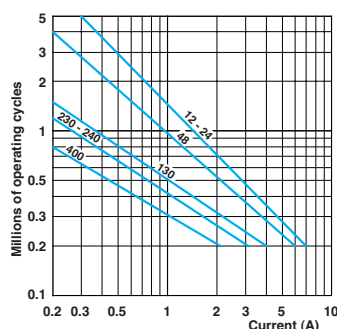
### Electrical Data

<b>Rated insulation voltage <math>U_i</math></b>		500 V (degree of pollution 3) A 600, Q 600																					
- according to IEC 947-1 and EN 60-947-1 - according to UL 508 and CSA C22-2 n° 14																							
<b>Rated impulse withstand voltage <math>U_{imp}</math></b> (according to IEC 947-1 and EN 60 947-1)		kV	6																				
<b>Conventional free air thermal current <math>I_{th}</math></b> (according to IEC 947-5-1) $\theta < 40$ °C		A	10																				
<b>Short-circuit protection</b> $U_e < 500$ V a.c. - gG (gl) type fuses		A	10																				
<b>Rated operational current</b>																							
$I_e$ / AC-15 (according to IEC 947-5-1)	24 V - 50/60 Hz	A	10																				
	120 V - 50/60 Hz	A	6																				
	230 V - 50/60 Hz	A	3.1																				
	240 V - 50/60 Hz	A	3																				
	400 V - 50/60 Hz	A	1.8																				
$I_e$ / DC-13 (according to IEC 947-5-1)	24 V - d.c.	A	2.8																				
	125 V - d.c.	A	0.55																				
	250 V - d.c.	A	0.27																				
<b>Switching frequency</b>		Cycles/h	3600																				
<b>Load factor</b>			0.5																				
<b>Resistance between contacts</b>		mΩ	25																				
<b>Connecting terminals</b>		M3.5 (+, -) pozidriv 2 screw with cable clamp																					
<b>Terminal for protective conductor</b>		-																					
<b>Connecting capacity</b>		1 or 2 x mm <sup>2</sup>	0.75 ... 2.5																				
<b>Terminal marking</b>		According to EN 50 013																					
<b>Mechanical durability</b>		Millions of operations	<table border="0"> <tr> <td>15</td> <td rowspan="2">AP•T</td> <td rowspan="2">{</td> <td>10...12; 30...34; 38</td> <td rowspan="2">30</td> <td rowspan="2">BP•H</td> <td rowspan="2">{</td> <td>11...13; 31...33</td> </tr> <tr> <td>10</td> <td>13; 41...48; 51...55; 61...75</td> <td>25</td> <td>41...44; 51...54; 61...75</td> </tr> <tr> <td>&gt;5</td> <td></td> <td></td> <td>14; 35; 36; 91; 92; 98</td> <td>10</td> <td></td> <td></td> <td>14; 19; 35...37; 91...93</td> </tr> </table>	15	AP•T	{	10...12; 30...34; 38	30	BP•H	{	11...13; 31...33	10	13; 41...48; 51...55; 61...75	25	41...44; 51...54; 61...75	>5			14; 35; 36; 91; 92; 98	10			14; 19; 35...37; 91...93
15	AP•T	{	10...12; 30...34; 38	30			BP•H				{	11...13; 31...33											
10			13; 41...48; 51...55; 61...75		25	41...44; 51...54; 61...75																	
>5			14; 35; 36; 91; 92; 98	10			14; 19; 35...37; 91...93																
<b>Electrical durability</b> (according to IEC 947-5-1)		Utilization categories AC-15 and DC-13 (Load factor of 0.5 according to curves below)																					

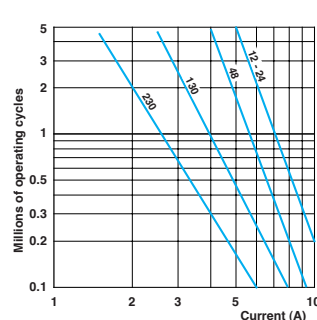
\* except for AP/DP•T42, T52, T5200, T55 and T5500: 25 g.

IMQ listed values

#### AC-15 - Snap action



#### AC-15 - Slow action



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



### General Technical Data

Standards		Metal Casing	
		Devices conform with international IEC 947-5-1 and European EN 60 947-5-1 standards	
Certifications - Approvals		UL - CSA - IMQ	
Air temperature near the device		- 25 ... + 70	
- during operation	°C		
- for storage	°C	- 30 ... + 80	
Climatic withstand		According to IEC 68-2-3 and salty mist according to IEC 68-2-11	
Mounting positions		All positions are authorised	
Shock withstand (according to IEC 68-2-27 and EN 60 068-2-27)		50g* (1/2 sinusoidal shock for 11 ms) no change in contact position	
Resistance to vibrations (acc. to IEC 68-2-6 and EN 60 068-2-6)		25g (10 ... 500 Hz) no change in position of contacts greater than 100 µs	
Protection against electrical shocks (acc. to IEC 536)		Class I	
Degree of protection (according to IEC 529 and EN 60 529)		IP 66**	
Consistency (measured over 1 million operations)		0.05 mm (upon closing point)	
Minimum actuation speed		m/s Slow action contacts 0.060 / Snap action contacts 0.001	

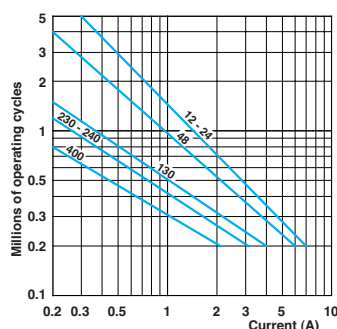
### Electrical Data

Rated insulation voltage $U_i$		500 V (degree of pollution 3)	
- according to IEC 947-1 and EN 60-947-1		A 600, Q 600 (A 300, Q 300 for AM... and DM... series)	
Rated impulse withstand voltage $U_{imp}$		6	
(according to IEC 947-1 and EN 60 947-1)		kV	
Conventional free air thermal current $I_{th}$		10	
(according to IEC 947-5-1) $\theta < 40$ °C		A	
Short-circuit protection		10	
$U_e < 500$ V a.c. - gG (gl) type fuses		A	
Rated operational current		10	
$I_e$ / AC-15 (according to IEC 947-5-1)		24 V - 50/60 Hz A	
		120 V - 50/60 Hz A	
		230 V - 50/60 Hz A	
		240 V - 50/60 Hz A	
		400 V - 50/60 Hz A	
		6	
		3.1	
		3	
		1.8	
$I_e$ / DC-13 (according to IEC 947-5-1)		24 V - d.c. A	
		125 V - d.c. A	
		250 V - d.c. A	
		2.8	
		0.55	
		0.27	
Switching frequency		3600	
Load factor		0.5	
Resistance between contacts		25	
Connecting terminals		M3.5 (+, -) pozidriv 2 screw with cable clamp	
Terminal for protective conductor		M3.5 (+, -) pozidriv 2 screw with cable clamp	
Connecting capacity		0.75 ... 2.5	
Terminal marking		According to EN 50 013	
Mechanical durability		Millions of operations	
		15 } AM•F { 11; 12	
		10 } DM•F { 41...46; 51...55; 61...75	
		>5 } { 14; 35; 36; 91; 92; 98	
		30 } BM•E { 11...13; 21...23; 31...33	
		25 } CM•E { 41...44; 51...54; 61...75	
		10 } { 91...93; 99	
Electrical durability (according to IEC 947-5-1)		Utilization categories AC-15 and DC-13 (Load factor of 0.5 according to curves below)	

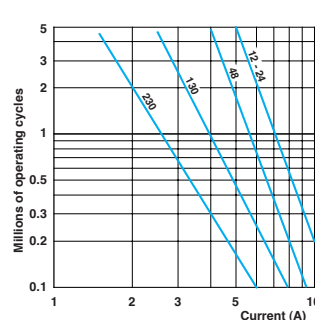
\* except for AM/DM•F42, F52, F55: 25 g. - \*\* except for AM/DM•F52, F55, F73, F74 and BM/CM•E54, P92, P93, E92, E93: the degree of protection is IP65

IMQ listed values

#### AC-15 - Snap action



#### AC-15 - Slow action



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

## Applications

**Easy to use, electromechanical limit switches offer specific qualities:**

- Visible operation.
- Able to switch strong currents (5 A conventional thermal current).
- Electrically separated contacts.
- Precise operating points (consistency).
- Immune to electromagnetic disturbances.

**They are purpose-built detection devices thanks to these characteristics:**

- Presence/absence.
- Positioning and travel limit.
- Objects passing/counting.

## Description

These limit switches, made in thermoplastic material (EP... series) or diecast zinc alloy (EM... series), sealed with epoxy resin at the base on the box, offer a degree of protection IP67

The casing come in 2 dimensions:

- EP1... / EM1... 30 mm. width
- EP2... / EM2... 35 mm. width



## Symbols

**Example:**

EM1	G12	Z
-----	-----	---

  
**Structure:**

--	--	--

**Casing:**  
EP1 = plastic casing 30 mm width  
EP2 = plastic casing 35 mm width  
EM1 = metal casing 30 mm width  
EM2 = metal casing 35 mm width

**Operating heads:** codes G11 - G9999

**Contact block**  
**Z:** Zb Snap action 1NO + 1NC  
**X:** Zb Slow action non-overlapping late make 1NO + 1NC

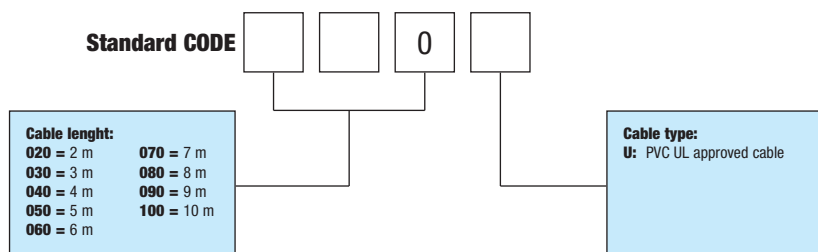
### General Technical Data

	Plastic Casing	Metal Casing
<b>Standards</b>	Devices conform with international IEC 947-5-1 and European EN 60 947-5-1 standards	
<b>Certifications - Approvals</b>	UL (upon request)	
<b>Air temperature</b> near the device		
– during operation	°C	– 25 ... + 70
– for storage	°C	– 40 ... + 70
<b>Mounting positions</b>	All positions are authorised	
<b>Protection against electrical shocks</b> (acc. to IEC 536)	Class II	Class I
<b>Degree of protection</b> (according to IEC 529 and EN 60 529)	IP 67	
<b>Degree of protection</b> (according to UL50)	Type 1 enclosure (“indoor use only”)	Type 4 - 4X - 6 enclosure (“outdoor use - raintight - watertight corrosion resistant”)
<b>Electrical Data</b>		
<b>Rated insulation voltage <math>U_i</math></b> - according to IEC 947-1 and EN 60-947-1 - according to UL 508 and CSA C22-2 n° 14	400 V (degree of pollution 3) B 300, R 300	
<b>Rated impulse withstand voltage <math>U_{imp}</math></b> (according to IEC 947-1 and EN 60 947-1)	kV	4
<b>Conventional free air thermal current <math>I_{th}</math></b> (according to IEC 947-5-1) $\theta < 40$ °C	A	5
<b>Short-circuit protection</b> $U_e < 500$ V a.c. - gG (gl) type fuses	A	6
<b>Rated operational current</b> $I_e$ / AC-15 (according to IEC 947-5-1)	24 V - 50/60 Hz A 120 V - 50/60 Hz A 240 V - 50/60 Hz A	5.0 3.0 1.5
$I_e$ / DC-13 (according to IEC 947-5-1)	24 V - d.c. A 125 V - d.c. A 250 V - d.c. A	1.1 0.22 0.1
<b>Switching frequency</b>	Cycles/h	3600
<b>Load factor</b>		0.5
<b>Resistance between contacts</b>	mΩ	25
<b>Mechanical durability</b>	10 Millions of operations	

### Electrical connection:

**Standard:** 1 m. PVC cable 4 x 0,75 mm<sup>2</sup> (EP... series)  
1 m. PVC cable 5 x 0,75 mm<sup>2</sup> (EM... series)

**On request:** All EP.../EM... limit switches can be supplied with different cable types and lengths according to the following ordering details

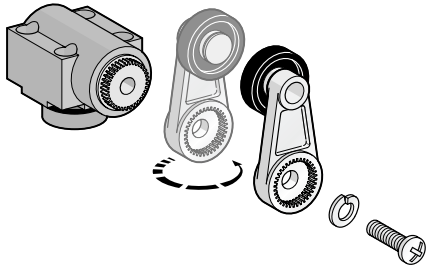


### Examples

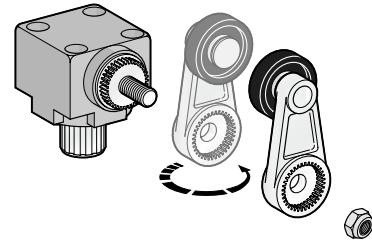
**EM1G11Z030:** 30 mm. width limit switch - plain plunger - snap action contact block - 3 m. standard cable.

**EM1G11ZU:** 30 mm. limit switch - plain plunger - snap action contact block - 1 m. UL cable.

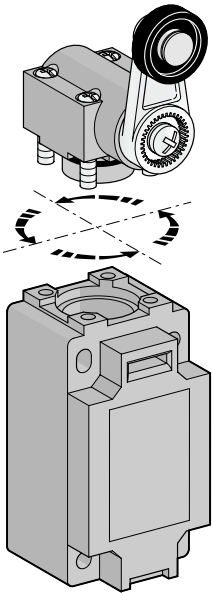
**EM1G11Z040U:** 30 mm. width limit switch - plain plunger - snap action contact block - 4 m. UL cable.



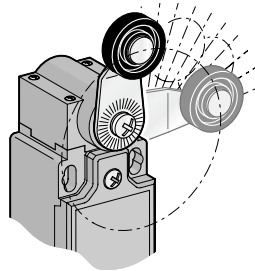
Lever round turning: AP...; BP...; DP...; AM...; DM...; EP...; EM...



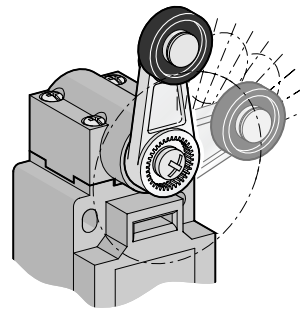
Lever round turning: BM...; CM...



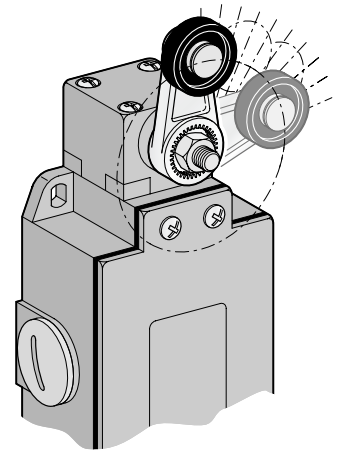
Head orientation: all series  
(EP and EM series: 180° only)



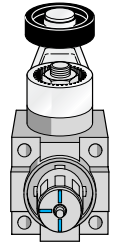
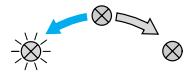
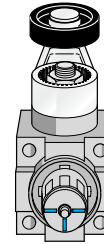
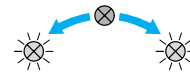
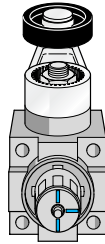
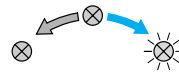
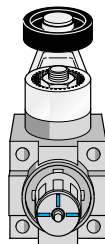
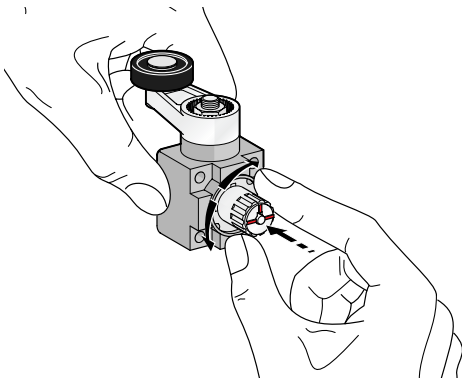
Free position adjustment 10 in 10° of lever:  
AP...; DP...; AM...; DM...; EP...; EM...



Free position adjustment 9 in 9° of lever:  
BP...

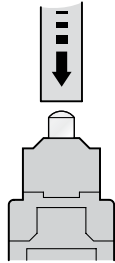


Free position adjustment 9 in 9° of lever:  
BM...; CM...

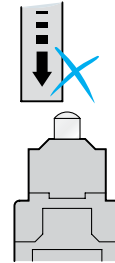


BP...; BM...; CM... operating mode selection only

**Plain Plunger**

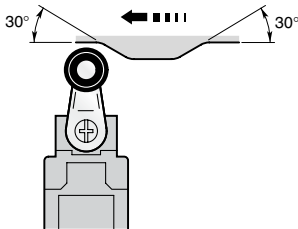


Correct

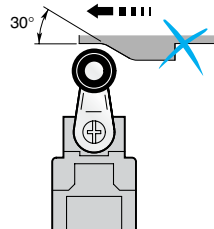


Incorrect

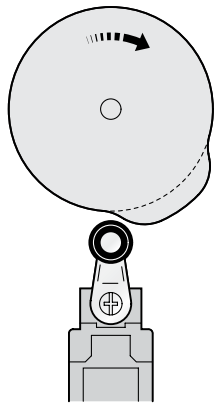
**Roller Plunger or Roller Lever**



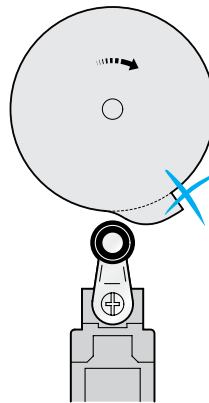
Correct



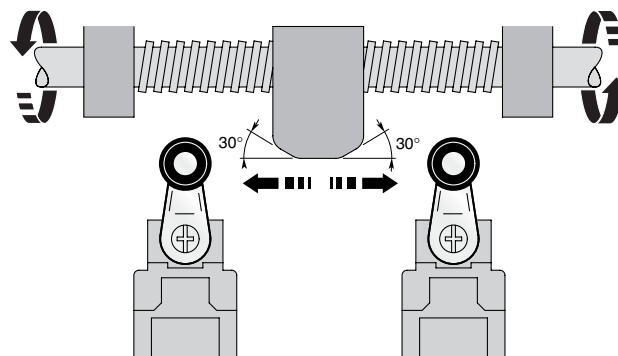
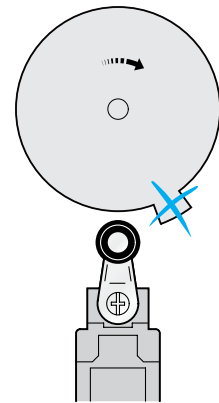
Incorrect



Correct



Incorrect



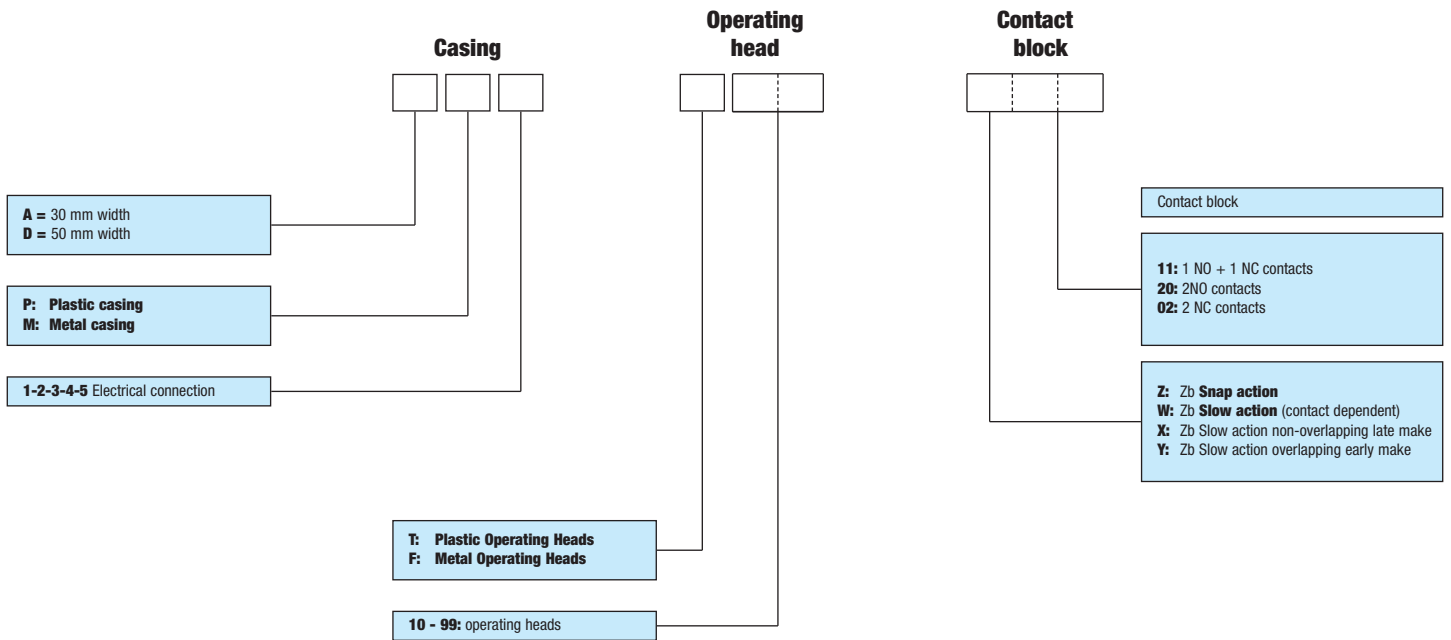
For a relatively slow movement of the switch actuator, a limit switch with a snap action contact block is preferred.

**AP... / AM... / DP... / DM... special versions**

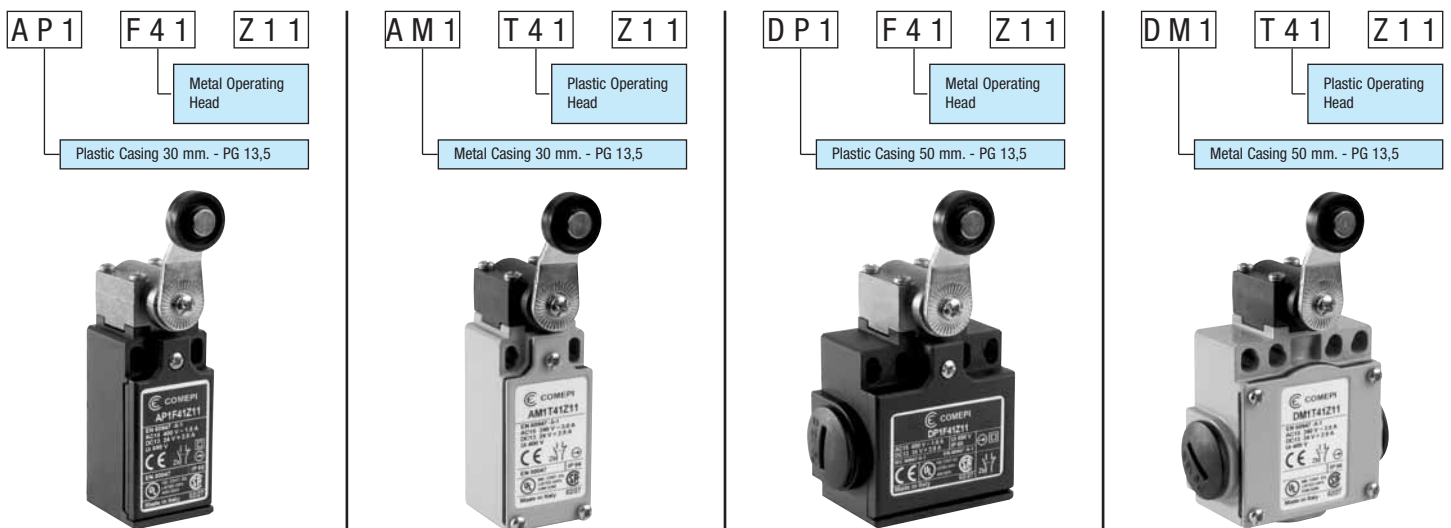
The operating heads used in plastic limit switches AP and DP series have the same dimensions of the ones used in the corresponding metal AM and DM series. It is therefore possible to supply "mixed" versions, that is:

- plastic operating head on metal casing
- metal operating head on plastic casing

These "mixed" versions can be demanded as follows



**Examples:**



For further information, please contact our technical department.

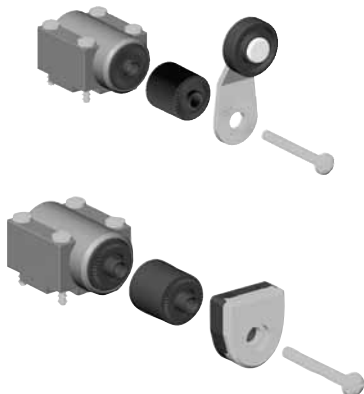
**Spare parts**

Spare components can be supplied upon request.



## Spacers

This accessory, made of polymer glass-reinforced resin, allows the lever to operate with a different offset.



Order Code	Compatible Heads
<b>PL 1531 PI</b> 	T41 - T42 - T43 - T45 - T46 F41 - F42 - F43 - F45 - F46 G41 - G42 - G43
<b>PL 1532 PI</b> 	T51 - T52 - T53 - T55 - T71 T72 - T73 - T74 F51 - F52 - F53 - F55 - F71 F72 - F73 - F74 G51

In order to install this accessory a longer screw is needed (delivered along with ther spacer).

## Cable glands - Blanking plugs - Thread adapters



The use of correct cable gland (or blanking plug in case of unused cable inlets) is recommended if the product is installed in an environmental place in which a protection degree against water or dust is needed. Comepi's cable glands and blanking plugs are realized to guarantee protection degree of IP 66.

Thread adapters are available in order to reach the customers' request. The adapters must always be used in case a conduit connection directly on the limit switch is needed. Different adapters can be supplied upon request.

	Order Code	Description	Dimensions					
			A	B	C	D	E	F
<b>Cable Gland</b> 	<b>XX 1029 CO</b>	PG 13.5 Plastic Cable Gland	24	-	PG 13.5	10	24-29	$\phi$ 7-12
	<b>XX 1028 CO</b>	PG 11 Plastic Cable Gland	22	-	PG 11	10	23-28	$\phi$ 5-10
	<b>XX 1032 CO</b>	M 16 x 1,5 Plastic Cable Gland	19	-	M 16 x 1,5	8	23-28	$\phi$ 7-10
	<b>XX 1033 CO</b>	M20 x 1,5 Plastic Cable Gland	25	-	M 20 x 1,5	9	24-29	$\phi$ 8-13
	<b>XX 1020 CO</b>	PG 16 Plastic Cable Gland	27	-	PG 16	10	26-31	$\phi$ 10-14
<b>Blanking Plug</b> 	<b>PL 2029 PI</b>	PG 13.5 Plastic Blanking Plug	25	PG 13.5	6	3,5	-	-
	<b>XT 007</b>	PG 11 Plastic Blanking Plug	22	PG 11	6	3	-	-
	<b>XX 1030 CO</b>	M 16 x 1,5 Plastic Blanking Plug	20	M 16 x 1,5	6	3	-	-
	<b>XX 1031 CO</b>	M 20 x 1,5 Plastic Blanking Plug	24	M 20 x 1,5	6	3,5	-	-
	<b>XX 1019 CO</b>	PG 16 Plastic Blanking Plug	27	PG 16	6	3,5	-	-
<b>Thread Adapters</b> 	<b>PL 2000 PI</b>	PG 11 1/2" NPT Plastic Adapter	24	26	1/2" NPT	17	8	PG 11
	<b>TO 2000 PE</b>	Brass Intermediary Connection 1/2" NPT - 1/2" NPT	24	26	1/2" NPT	17	6	1/2" NPT