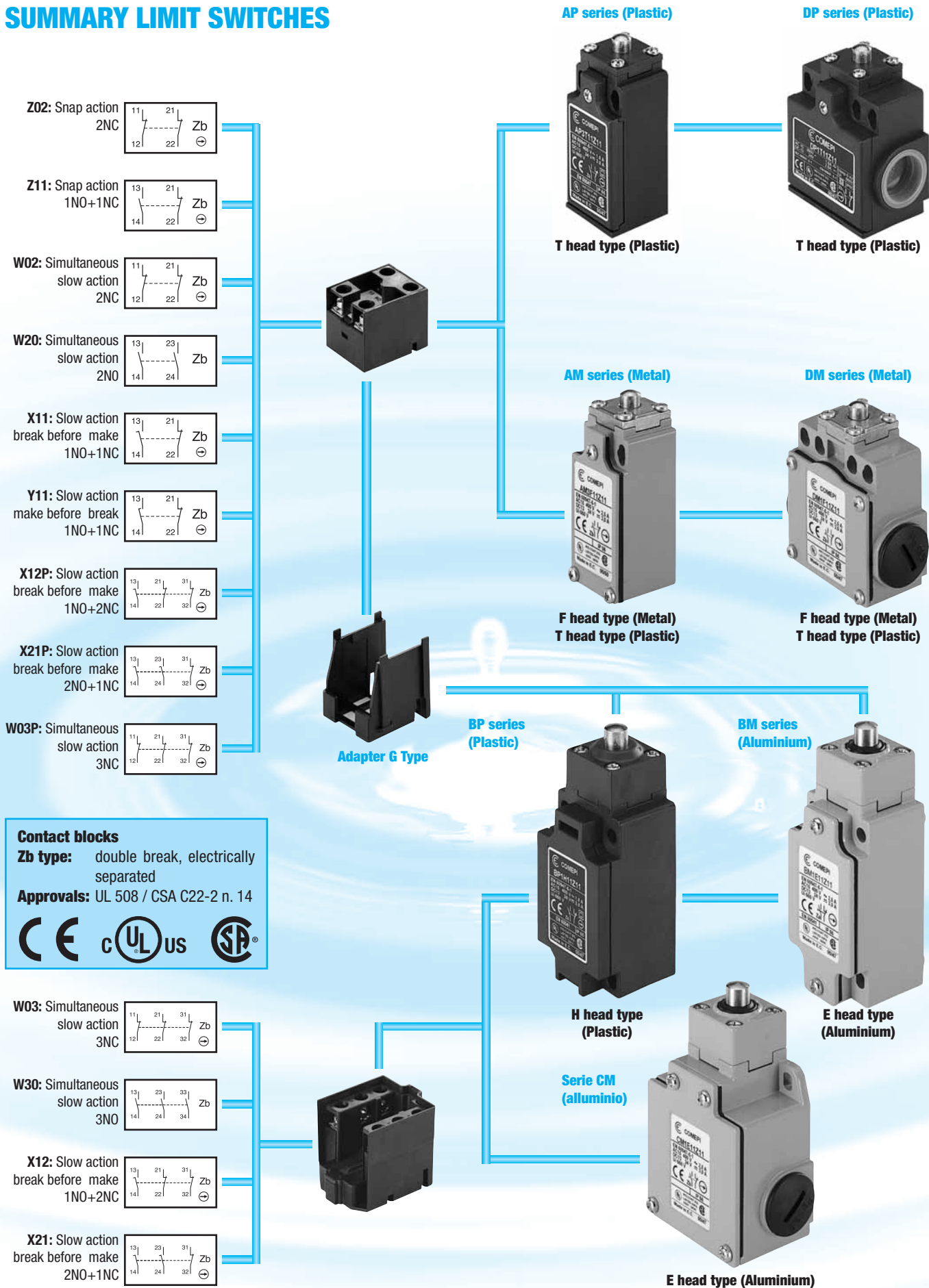


فروشگاه اینترنتی اتوماسیون ۲۴  
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## SUMMARY LIMIT SWITCHES



## 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.

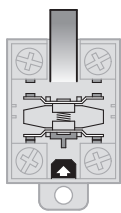
The positive opening operation does not deal with N.O. contacts.

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.

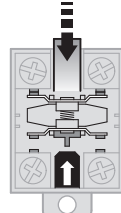
Every control switch with positive opening operation must be indelibly marked on the outside with the symbol:  .

## Snap Action

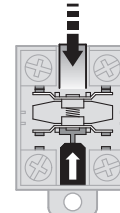
Snap action contacts are characterised by a release position that is distinct from the operating position (differential travel). Snap breaking of moving contacts is independent of the switch actuator's speed and contributes to regular electric performance even for slow switch actuator speeds.



State of rest



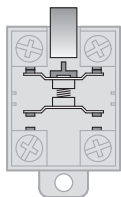
Contact change



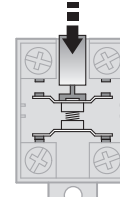
Positive opening

## 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

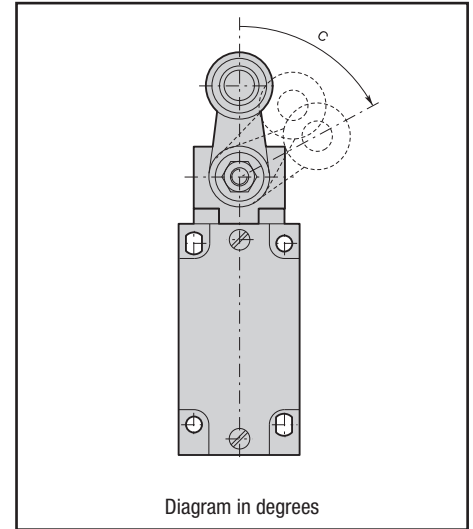
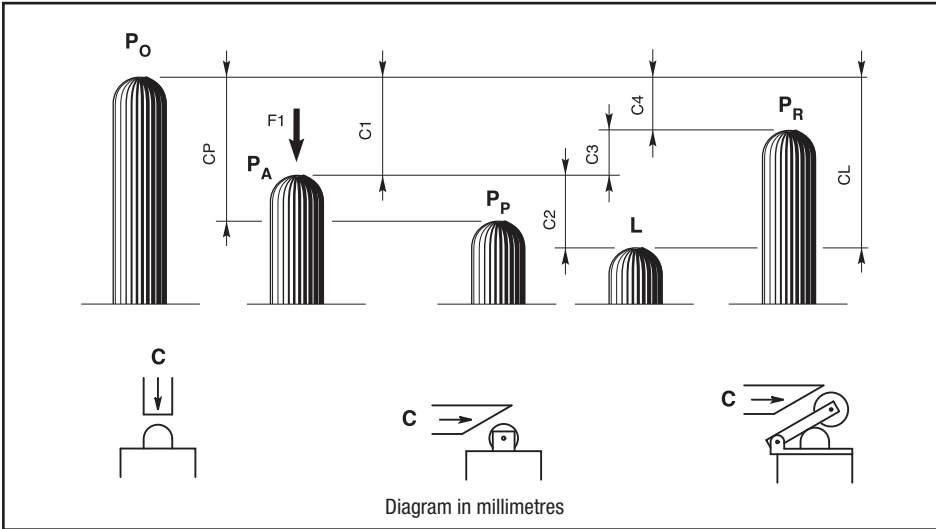
Limit switches with metal casings must have a terminal, for a protective conductor, that is placed inside the casing very close to the cable inlet and must be indelibly marked.

## 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.

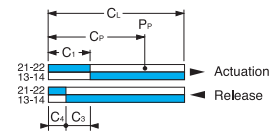
**C<sub>3</sub> Differential travel (C<sub>1</sub>-C<sub>4</sub>):**

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

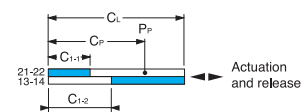
**C<sub>4</sub> Release travel:**

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)

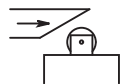
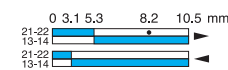


Diagram in millimetres/cam travel



**BM1E41Z11**

(snap action contacts)

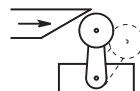
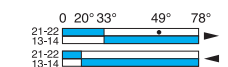


Diagram in degrees/lever rotation



**BM1E11X11**

(non-overlapping slow action contacts)

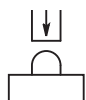
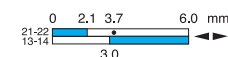


Diagram in millimetres/plunger travel





### General Technical Data

Standards		Metal Casing
Certifications - Approvals		Devices conform with international IEC 947-5-1 and European EN 60 947-5-1 standards
Air temperature near the device		UL - CSA - IMQ
- during operation	°C	- 25 ... + 70
- 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) (400 V for contacts type X12P, X21P, W03P)	
- according to IEC 947-1 and EN 60-947-1		A 600, Q 600 (A 300, Q 300 for AM... and DM... series and contacts type X12P, X21P, W03P)	
- according to UL 508 and CSA C22-2 n° 14			
Rated impulse withstand voltage $U_{imp}$	kV	6	
(according to IEC 947-1 and EN 60 947-1)			
Conventional free air thermal current $I_{th}$	A	10	
(according to IEC 947-5-1) $\theta < 40$ °C			
Short-circuit protection	A	10	
$U_e < 500$ V a.c. - gG (gl) type fuses			
Rated operational current			
$I_e$ / 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
Switching frequency	Cycles/h	3600	
Load factor		0.5	
Resistance between contacts	mΩ	25	
Connecting terminals		M3.5 (+, -) pozidriv 2 screw with cable clamp (M3 for 3 poles contacts type)	
Terminal for protective conductor		M3.5 (+, -) pozidriv 2 screw with cable clamp	
Connecting capacity	1 or 2 x mm <sup>2</sup>	0.75 ... 2.5 (0.34... 1.5 for 3 poles contact type)	
Terminal marking		According to EN 50 013	
Mechanical durability	Millions of operations	15 } AM•F/T { 11; 12; 30...34; 38	30 } BM•E { 11...13; 21...23; 31...33
		10 } DM•F/T { 41...46; 51...55; 61...75	25 } CM•E { 41...44; 51...54; 61...75
		>5 } { 14; 35; 36; 39; 91...93; 98	10 } { 91...93; 99

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

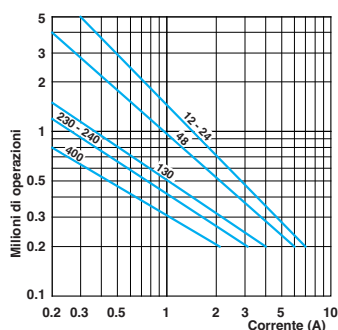
Utilization categories AC-15 and DC-13 (Load factor of 0.5 according to curves below)

\* 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

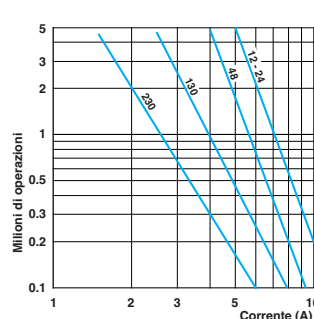
IMQ listed values

For the complete list of approved products, contact our technical department

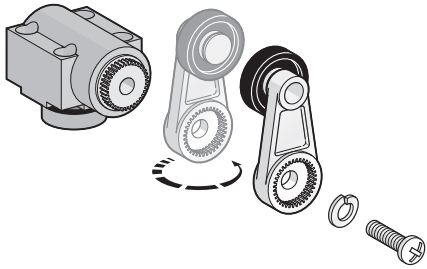
#### AC-15 - Snap action



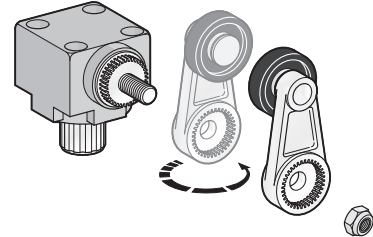
#### AC-15 - Slow action



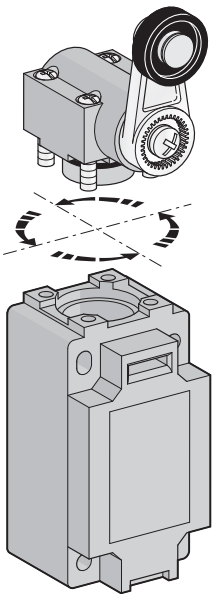
DC-13	Snap action	Slow action
	Power breaking for a durability of 5 million operating cycles	
Voltage 24 V	9.5 W	12 W
Voltage 48 V	6.8 W	9 W
Voltage 110 V	3.6 W	6 W



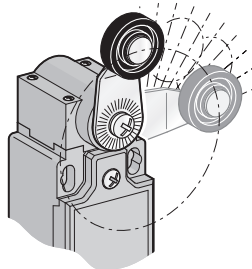
Lever round turning: AP...; BP...; DP...; AM...; DM...; EP...; EM...



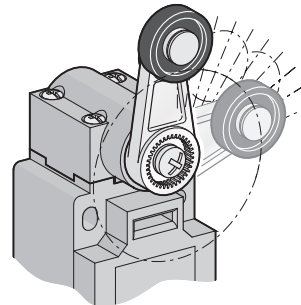
Lever round turning: BM...; CM...



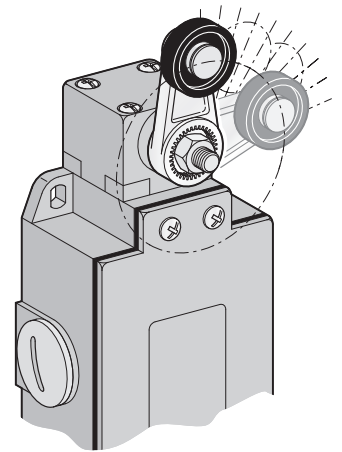
Head orientation: all series  
(EP and EM series: 180° only)



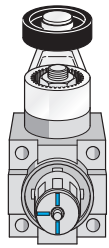
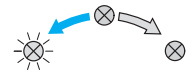
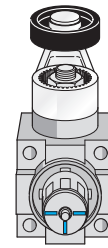
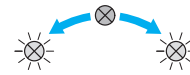
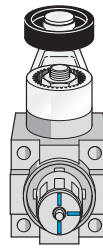
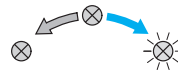
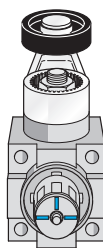
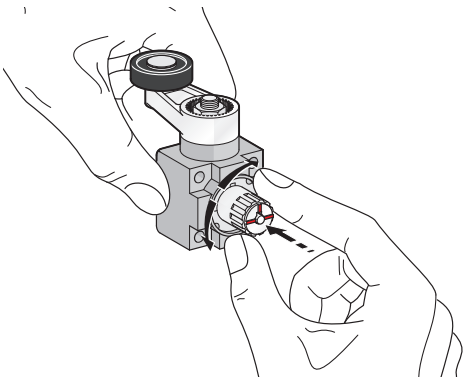
Free position adjustment 10 in 10° of lever:  
AP...; DP...; AM...; DM...; EP...; EM...



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

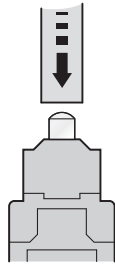


Free position adjustment 9 in 9° of lever:  
BM...; CM...

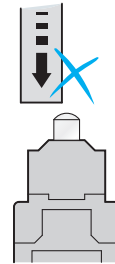


BP...; BM...; CM... operating mode selection only

**Plain Plunger**

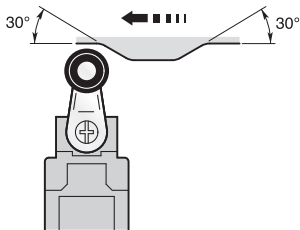


Correct

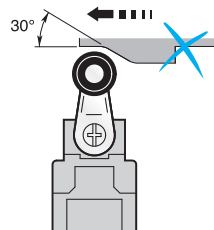


Incorrect

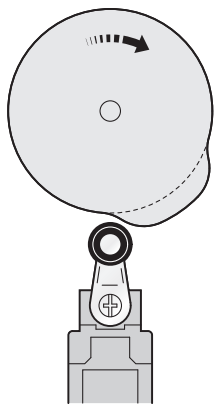
**Roller Plunger or Roller Lever**



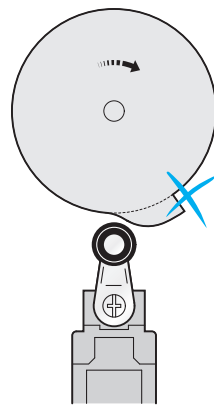
Correct



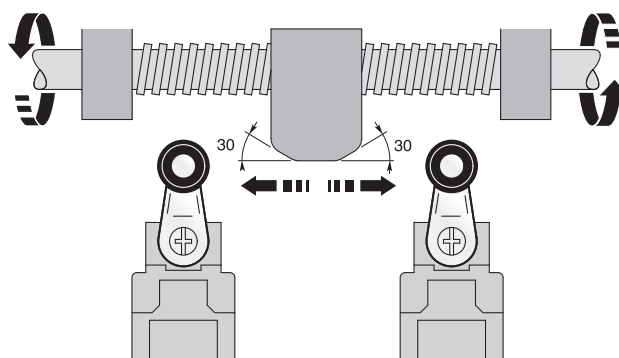
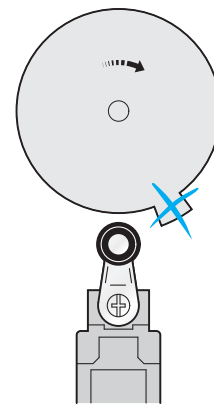
Incorrect



Correct



Incorrect



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

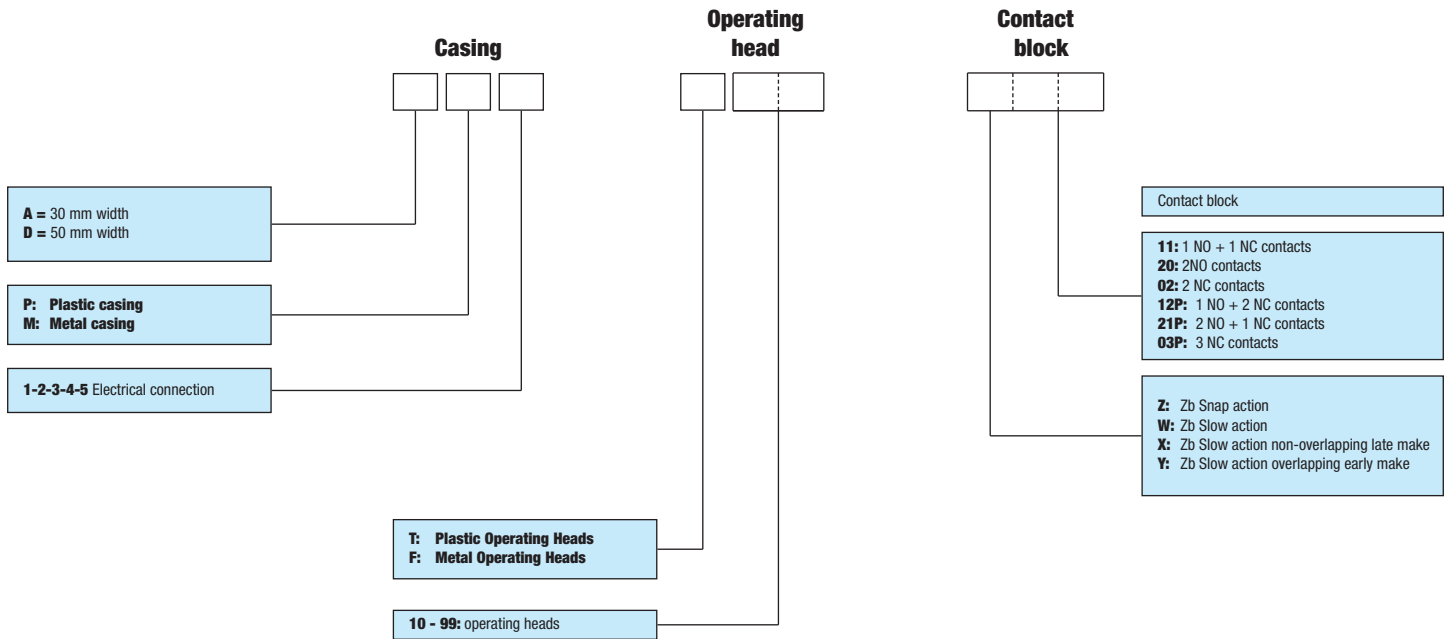


## AP... / AM... / DP... / DM... special versions

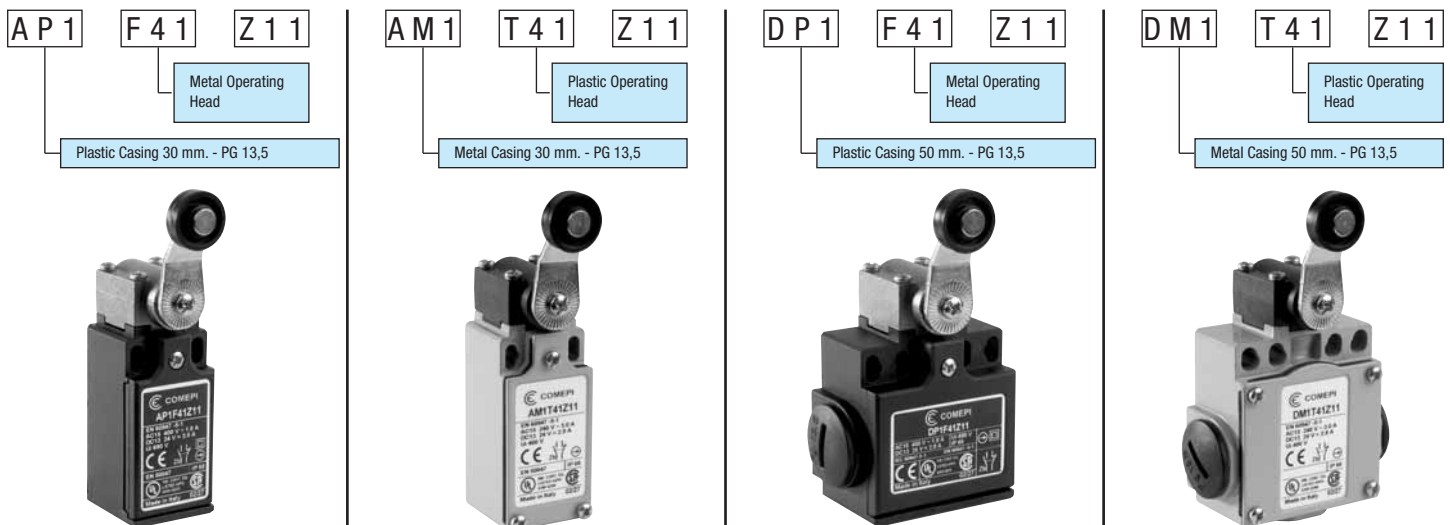
The operating heads used in plastic limit switches AP and DP series have the same dimensions of the ones used in the corresponding metal AM and DM series. It is therefore possible to supply "mixed" versions, that is:

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

These "mixed" versions can be demanded as follows



## Esempi:



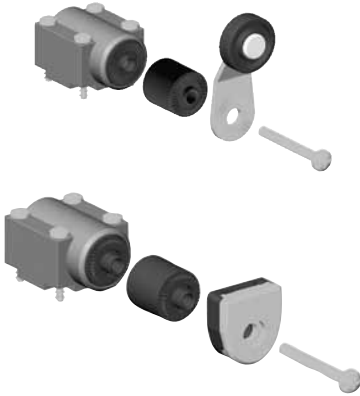
For further information, please contact our technical department.

## 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 ÷ T46 F41 ÷ F46 G41 ÷ G45
<b>PL 1532 PI</b> 	T51 ÷ T75 F51 ÷ F75 G51 ÷ G75

In order to install this accessory a longer screw is needed (delivered along with their 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	ø 7-12
	<b>XX 1028 CO</b>	PG 11 Plastic Cable Gland	22	-	PG 11	10	23-28	ø 5-10
	<b>XX 1032 CO</b>	M 16 x 1,5 Plastic Cable Gland	19	-	M 16 x 1,5	8	23-28	ø 7-10
	<b>XX 1033 CO</b>	M20 x 1,5 Plastic Cable Gland	25	-	M 20 x 1,5	9	24-29	ø 8-13
	<b>XX 1020 CO</b>	PG 16 Plastic Cable Gland	27	-	PG 16	10	26-31	ø 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

### Electrical Connection

- DM1:** three cable inlets for PG 13,5 Cable Gland
- DM2:** three cable inlets for 1/2" NPT Cable Gland
- DM3:** three cable inlets for PG11 Cable Gland
- DM4:** three cable inlets for M16 x 1,5 Cable Gland
- DM5:** three cable inlets for M20 x 1,5 Cable Gland



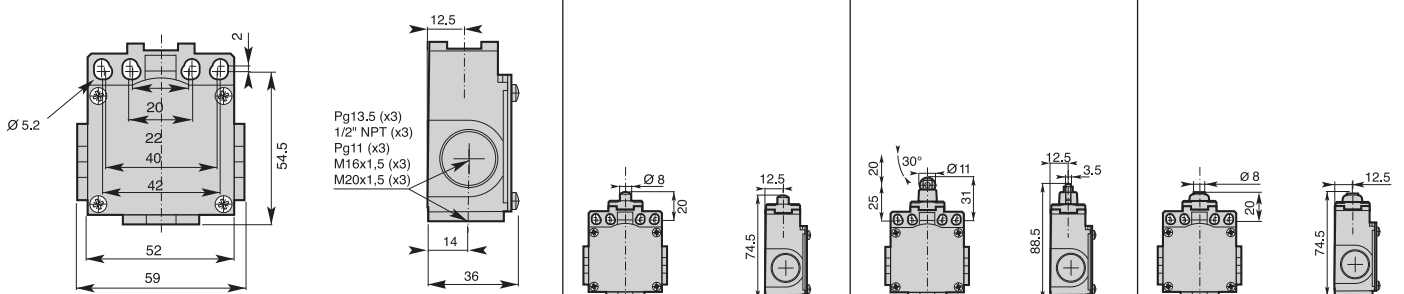
### Operating Head Type

	F11 - Plain Metal plunger	F12 - Metal roller plunger	T14 - Metal plunger with dust protection cup
Conformity /  (N.C. contact with positive opening operation)			
Max actuation speed [m/s]	0,5	0,3	0,5
Min. force [N] or torque [Nm]: actuation / positive opening operation	15 / 30	12 / 30	15 / 30

### Additional Technical Datas

		DM-F11Z11	DM-F12Z11	DM-T14Z11
<b>Z11</b> Snap Action Contacts (1NO + 1NC)				
<b>X11</b> Non overlapping Slow Action Contacts (1NO + 1NC)				
<b>Y11</b> Overlapping Slow Action Contacts (1NO + 1NC)				
<b>W02</b> Slow Action Contacts (2NC)				
<b>W20</b> Slow Action Contacts (2NO)				
<b>Z02</b> Snap Action Contacts (2NC)				
<b>X12P</b> Non overlapping Slow Action Contacts (1NO + 2NC)				
<b>X21P</b> Non overlapping Slow Action Contacts (2NO + 1NC)				
<b>W03P</b> Slow Action Contacts (3NC)				
<b>Weight (packing per unit)</b>	<b>[kg]</b>	<b>0,270</b>	<b>0,280</b>	<b>0,255</b>

### Dimensions (in mm)



### Electrical Connection

- DM1:** three cable inlets for PG 13,5 Cable Gland
- DM2:** three cable inlets for 1/2" NPT Cable Gland
- DM3:** three cable inlets for PG11 Cable Gland
- DM4:** three cable inlets for M16 x 1,5 Cable Gland
- DM5:** three cable inlets for M20 x 1,5 Cable Gland



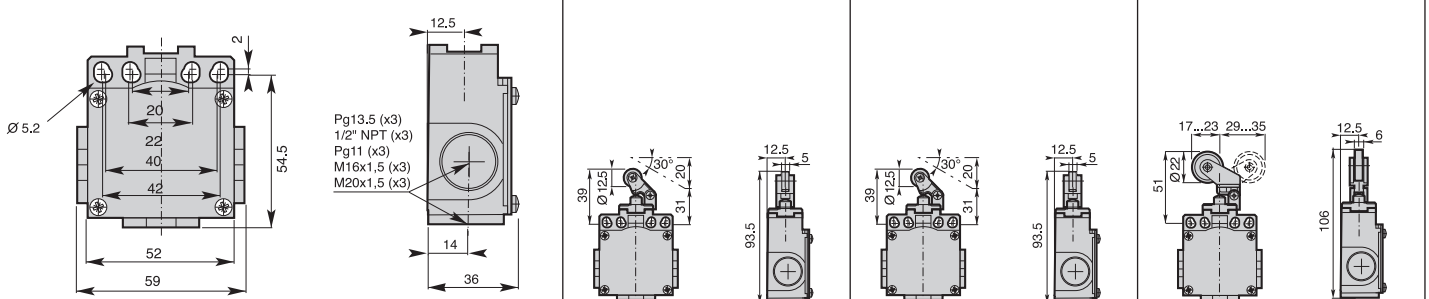
### Operating Head Type

	<b>T30 - Plastic roller lever</b> T30: on plastic plunger T31: on metal plunger	<b>T35 - Plastic roller lever on metal plunger with dust protection cup</b>	<b>T38 - Adjustable plastic roller lever on metal plunger</b> T39 - Same as above with dust protection cup
Conformity /			
Max actuation speed [m/s]	1,0	1,0	1,0
Min. force [N] or torque [Nm]: actuation / positive opening operation	7 / 24	7 / 24	7 / 24

### Additional Technical Datas

		<b>DM-T3-Z11</b>	<b>DM-T35Z11</b>	<b>DM-T3-Z11</b>
<b>Z11</b> Snap Action Contacts (1NO + 1NC)				
<b>X11</b> Non overlapping Slow Action Contacts (1NO + 1NC)				
<b>Y11</b> Overlapping Slow Action Contacts (1NO + 1NC)				
<b>W02</b> Slow Action Contacts (2NC)				
<b>W20</b> Slow Action Contacts (2NO)				
<b>Z02</b> Snap Action Contacts (2NC)				
<b>X12P</b> Non overlapping Slow Action Contacts (1NO + 2NC)				
<b>X21P</b> Non overlapping Slow Action Contacts (2NO + 1NC)				
<b>W03P</b> Slow Action Contacts (3NC)				
<b>Weight (packing per unit)</b>	<b>[kg]</b>	<b>0,260</b>	<b>0,260</b>	<b>0,265</b>

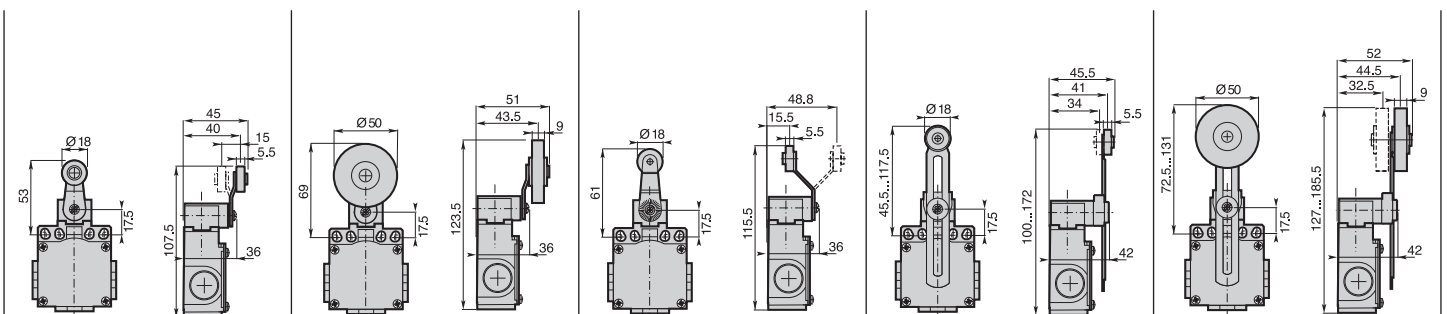
### Dimensions (in mm)





<p><b>F4• - Ø 18 roller lever</b> F41: nylon roller F43: metal roller</p>	<p><b>F42 - Ø 50 rubber roller lever</b></p>	<p><b>F4• - Ø 18 roller lever</b> F45: nylon roller F46: metal roller</p>	<p><b>F5• - Adjustable lever with Ø 18 roller</b> F51: nylon roller F53: metal roller</p>	<p><b>F52 - Adjustable lever with Ø 50 rubber roller</b></p>
1,5 0,10 / 0,32	1,5 0,10 / 0,32	1,5 0,10 / 0,32	1,5 0,10 / 0,32	1,5 0,10 / 0,32

<p><b>DM•F4•Z11</b> 0 17° 31° 47° 74° 21-22 13-14 21-22 13-14</p>	<p><b>DM•F42Z11</b> 0 17° 31° 47° 74° 21-22 13-14 21-22 13-14</p>	<p><b>DM•F4•Z11</b> 0 17° 31° 47° 74° 21-22 13-14 21-22 13-14</p>	<p><b>DM•F5•Z11</b> 0 17° 31° 47° 74° 21-22 13-14 21-22 13-14</p>	<p><b>DM•F52Z11</b> 0 17° 31° 47° 74° 21-22 13-14 21-22 13-14</p>
<p><b>DM•F4•X11</b> 0 21° 37° 74° 21-22 13-14 30°</p>	<p><b>DM•F42X11</b> 0 21° 37° 74° 21-22 13-14 30°</p>	<p><b>DM•F4•X11</b> 0 21° 37° 74° 21-22 13-14 30°</p>	<p><b>DM•F5•X11</b> 0 21° 37° 74° 21-22 13-14 30°</p>	<p><b>DM•F52X11</b> 0 21° 37° 74° 21-22 13-14 30°</p>
<p><b>DM•F4•Y11</b> 0 35° 51° 74° 21-22 13-14 18°</p>	<p><b>DM•F42Y11</b> 0 35° 51° 74° 21-22 13-14 18°</p>	<p><b>DM•F4•Y11</b> 0 35° 51° 74° 21-22 13-14 18°</p>	<p><b>DM•F5•Y11</b> 0 35° 51° 74° 21-22 13-14 18°</p>	<p><b>DM•F52Y11</b> 0 35° 51° 74° 21-22 13-14 18°</p>
<p><b>DM•F4•W02</b> 0 19° 37° 74° 11-12 21-22</p>	<p><b>DM•F42W02</b> 0 19° 37° 74° 11-12 21-22</p>	<p><b>DM•F4•W02</b> 0 19° 37° 74° 11-12 21-22</p>	<p><b>DM•F5•W02</b> 0 19° 37° 74° 11-12 21-22</p>	<p><b>DM•F52W02</b> 0 19° 37° 74° 11-12 21-22</p>
<p><b>DM•F4•W20</b> 0 18° 74° 13-14 23-24</p>	<p><b>DM•F42W20</b> 0 18° 74° 13-14 23-24</p>	<p><b>DM•F4•W20</b> 0 18° 74° 13-14 23-24</p>	<p><b>DM•F5•W20</b> 0 18° 74° 13-14 23-24</p>	<p><b>DM•F52W20</b> 0 18° 74° 13-14 23-24</p>
<p><b>DM•F4•Z02</b> 0 17° 30° 46° 74° 11-12 21-22 11-12 21-22</p>	<p><b>DM•F42Z02</b> 0 17° 30° 46° 74° 11-12 21-22 11-12 21-22</p>	<p><b>DM•F4•Z02</b> 0 17° 30° 46° 74° 11-12 21-22 11-12 21-22</p>	<p><b>DM•F5•Z02</b> 0 17° 30° 46° 74° 11-12 21-22 11-12 21-22</p>	<p><b>DM•F52Z02</b> 0 17° 30° 46° 74° 11-12 21-22 11-12 21-22</p>
<p><b>DM•F4•X12P</b> 0 24° 40° 74° 31-32 13-14 38°</p>	<p><b>DM•F42X12P</b> 0 24° 40° 74° 31-32 13-14 38°</p>	<p><b>DM•F4•X12P</b> 0 24° 40° 74° 31-32 13-14 38°</p>	<p><b>DM•F5•X12P</b> 0 24° 40° 74° 31-32 13-14 38°</p>	<p><b>DM•F52X12P</b> 0 24° 40° 74° 31-32 13-14 38°</p>
<p><b>DM•F4•X21P</b> 0 24° 40° 74° 31-32 13-14 23-24 38°</p>	<p><b>DM•F42X21P</b> 0 24° 40° 74° 31-32 13-14 23-24 38°</p>	<p><b>DM•F4•X21P</b> 0 24° 40° 74° 31-32 13-14 23-24 38°</p>	<p><b>DM•F5•X21P</b> 0 24° 40° 74° 31-32 13-14 23-24 38°</p>	<p><b>DM•F52X21P</b> 0 24° 40° 74° 31-32 13-14 23-24 38°</p>
<p><b>DM•F4•W03P</b> 0 24° 40° 74° 11-12 9-12 36</p>	<p><b>DM•F42W03P</b> 0 24° 40° 74° 11-12 9-12 36</p>	<p><b>DM•F4•W03P</b> 0 24° 40° 74° 11-12 9-12 36</p>	<p><b>DM•F5•W03P</b> 0 24° 40° 74° 11-12 9-12 36</p>	<p><b>DM•F52W03P</b> 0 24° 40° 74° 11-12 9-12 36</p>
<b>0,325</b>	<b>0,345</b>	<b>0,340</b>	<b>0,335</b>	<b>0,355</b>



### Electrical Connection

- DM1:** three cable inlets for PG 13,5 Cable Gland
- DM2:** three cable inlets for 1/2" NPT Cable Gland
- DM3:** three cable inlets for PG11 Cable Gland
- DM4:** three cable inlets for M16 x 1,5 Cable Gland
- DM5:** three cable inlets for M20 x 1,5 Cable Gland



### Operating Head Type

**F55 - Adjustable lever with adjustable Ø 50 rubber roller**

**F61 - Nylon actuator with stainless steel spring**

**F7 - Adjustable rod lever**  
F71: stainless steel rod Ø3  
F72: fiberglass rod Ø3  
F75: square steel rod 3x3

Conformity / (N.C. contact with positive opening operation)  
Max actuation speed [m/s]  
Min. force [N] or torque [Nm]: actuation / positive opening operation

1,5  
0,10 / 0,32

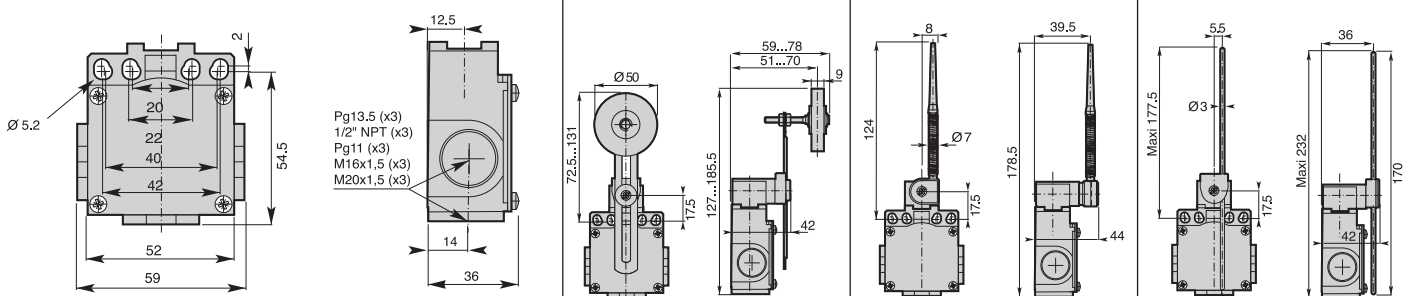
1,5  
0,10 / -

1,5  
0,10 / 0,32

### Additional Technical Datas

Order Code	DM-F55Z11	DM-F61Z11	DM-F7-Z11
<b>Z11</b> Snap Action Contacts (1NO + 1NC)			
<b>X11</b> Non overlapping Slow Action Contacts (1NO + 1NC)			
<b>Y11</b> Overlapping Slow Action Contacts (1NO + 1NC)			
<b>W02</b> Slow Action Contacts (2NC)			
<b>W20</b> Slow Action Contacts (2NO)			
<b>Z02</b> Snap Action Contacts (2NC)			
<b>X12P</b> Non overlapping Slow Action Contacts (1NO + 2NC)			
<b>X21P</b> Non overlapping Slow Action Contacts (2NO + 1NC)			
<b>W03P</b> Slow Action Contacts (3NC)			
<b>Weight (packing per unit) [kg]</b>	<b>0,355</b>	<b>0,305</b>	<b>0,380</b>

### Dimensions (in mm)





<b>F7 - Adjustable</b> <b>Ø 6 rod lever</b> F73: nylon rod F74: fiberglass rod	<b>T91: Stainless steel spring multidirectional actuator</b>	<b>T92: Multidirectional nylon actuator with stainless steel spring</b>	<b>T93: Stainless steel spring multidirectional actuator</b>	<b>T98: Pull action with ring</b>
1,5 0,10 / 0,32	1,0 0,12 / -	1,0 0,12 / -	1,0 0,12 / -	0,5 30 / -

<b>DM-F7-Z11</b> 0 17° 31° 47° 74° 	<b>DM-T91Z11</b> 0 12° 23° 	<b>DM-T92Z11</b> 0 12° 23° 	<b>DM-T93Z11</b> 0 12° 23° 	<b>DM-T98Z11A</b> 0 0,9 2,0 5,6 mm 
<b>DM-F7-X11</b> 0 21° 37° 74° 30° 	<b>DM-T91X11</b> 0 14° 21° 	<b>DM-T92X11</b> 0 14° 21° 	<b>DM-T93X11</b> 0 14° 21° 	<b>DM-T98X11A</b> 0 1,0 5,6 mm 1,9 
<b>DM-F7-Y11</b> 0 35° 51° 74° 16° 	<b>DM-T91Y11</b> 0 25° 12° 	<b>DM-T92Y11</b> 0 25° 12° 	<b>DM-T93Y11</b> 0 25° 12° 	<b>DM-T98Y11A</b> 0 2,0 5,6 mm 0,6 
<b>DM-F7-W02</b> 0 19° 37° 74° 	<b>DM-T91W02</b> 0 14° 	<b>DM-T92W02</b> 0 14° 	<b>DM-T93W02</b> 0 14° 	<b>DM-T98W02A</b> 0 2,0 5,6 mm 
<b>DM-F7-W20</b> 0 18° 74° 	<b>DM-T91W20</b> 0 13° 	<b>DM-T92W20</b> 0 13° 	<b>DM-T93W20</b> 0 13° 	<b>DM-T98W20A</b> 0 1,8 5,6 mm 
<b>DM-F7-Z02</b> 0 17° 30° 46° 74° 	<b>DM-T91Z02</b> 0 12° 22° 	<b>DM-T92Z02</b> 0 12° 22° 	<b>DM-T93Z02</b> 0 12° 22° 	
<b>DM-F7-X12P</b> 0 24° 40° 74° 38° 	<b>DM-T91X12P</b> 0 16° 26° 	<b>DM-T92X12P</b> 0 16° 26° 	<b>DM-T93X12P</b> 0 16° 26° 	
<b>DM-F7-X21P</b> 0 24° 40° 74° 38° 	<b>DM-T91X21P</b> 0 16° 26° 	<b>DM-T92X21P</b> 0 16° 26° 	<b>DM-T93X21P</b> 0 16° 26° 	
<b>DM-F7-W03P</b> 0 24° 40° 74° 	<b>DM-T91W03P</b> 0 16° 	<b>DM-T92W03P</b> 0 16° 	<b>DM-T93W03P</b> 0 16° 	
<b>0,390</b>	<b>0,265</b>	<b>0,270</b>	<b>0,275</b>	<b>0,300</b>

