Limit Switches

FA - FT - FT1R - Safety - FCT - Astra Series

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Terminology

DOUBLE INSULATION

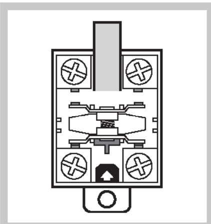
Materials of group II, according to IEC536, are made with double insulation. This consists of doubling the insulation capability by means of an additional divider in order to eliminate any electrical shock risk and avoid the need for any additional protections.

POSITIVE OPENING OPERATION

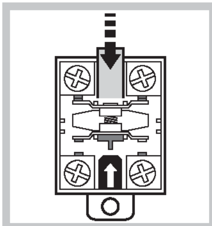
A limit switch complies to this specification when all the normally closed contact elements of the switch can be changed, with certainty, to the open position (no flexible link between the moving contacts and the operator of the switch, to which an actuating force is applied). Positive opening does not apply to NO contacts. Control switches with positive opening operation can be equipped with either slow-break or snap-action contacts.
In order to use different contacts on the same switch, it is necessary to electrically separate them; otherwise only one contact can be used. Every positive opening control switch must be marked on the external housing with the symbol .

SNAP-ACTION CONTACTS

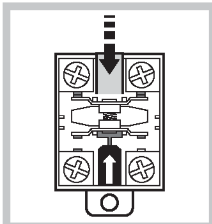
Snap action contacts are characterised by different tripping and resetting points (differential travel).
The displacement speed of the moving contacts is independent to the speed of the operator. This feature ensures satisfactory electrical performance in applications involving low speed actuators.



Unactuated state



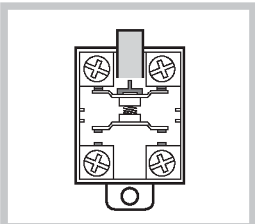
Approach travel



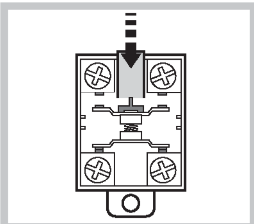
Positive opening

SLOW-BREAK CONTACTS

Slow break contacts are characterised by identical tripping and resetting points. The displacement speed of the moving contacts is equal, or proportional, to the speed of the operator. The opening distance is also dependent on the distance travelled by the operator.



Contact in stand-by

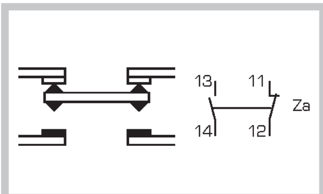


Contact activated

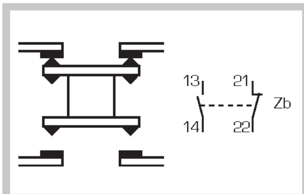
CONTACT BLOCKS CONFIGURATION

ACCORDING TO **IEC/EN60947-5-1**

Contact blocks with 4 terminals must be marked with Za or Zb symbols as shown in the picture below.



Contacts with same polarity



The two moving contacts are electrically insulated

APPLICATIONS

AC-15: control of an electromagnet on a.c., test 10 Ie/Ie.
AC-13: control of an electromagnet on d.c., test Ie/Ie.

TERMINALS

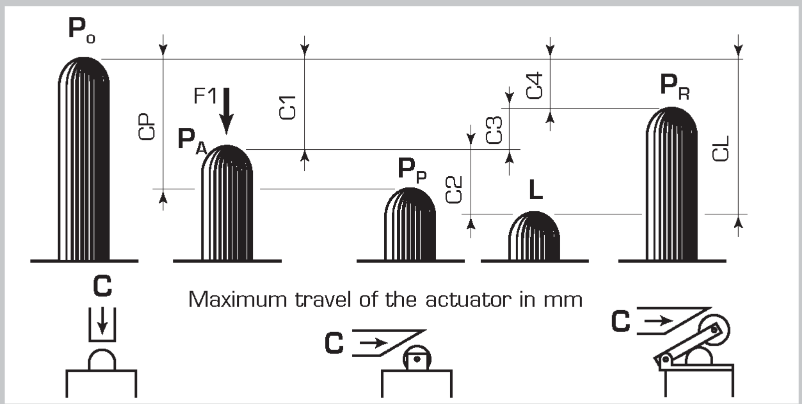
For limit switches with metal housing, the fixing point of the earth conductor must be marked and must be positioned inside the housing next to the cable entry.

MINIMUM OPENING FORCE/MOMENTUM

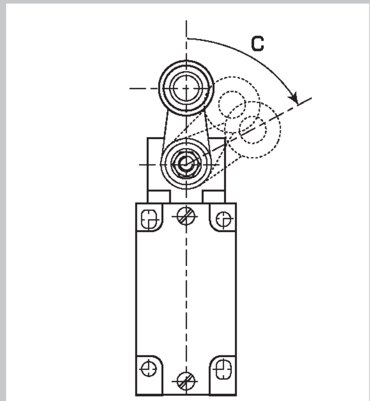
It is the minimum force/momentum that must be applied by the actuator for the contacts to trip.

MINIMUM POSITIVE OPENING FORCE/MOMENTUM

It is the minimum force/momentum that must be applied by the actuator to guarantee the positive opening of NC contacts.



Maximum travel of the actuator in mm



Maximum travel of the actuator in degrees

Po **Rest position**
Position of the actuator when no external force is applied.

PA **Tripping point of contact**
Position of the actuator, with force F1 applied, in which the contacts leave the stand-by position.

PP **Positive opening position**
Position of the actuator when there is positive opening.

L **Maximum travel position**
Maximum travel of the actuator when the force F1 is applied.

PR **Resetting position**
Position of the actuator when the contacts are back in their non actuated position.

C1 **Tripping travel**
Distance between the Po and PA positions.

CP **Positive opening tripping travel**
Minimum travel of the actuator from the Po position to guarantee positive opening of NC contacts.

C2 **Extra tripping travel**
Distance between PA and the maximum travel L.

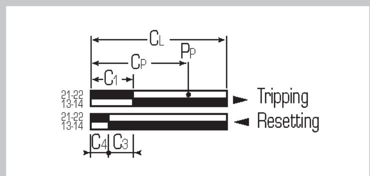
CL **Maximum travel**
Distance between Po and the maximum travel L.

C3 **Differential travel (C1-C4)**
Distance between PA and PR

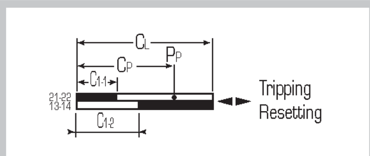
C4 **Resetting travel**
Distance between PR and Po

NOTE: for slow-break contacts, C3=01, C1-1=Tripping and resetting travel of contacts 21-22, C1-2- Tripping and resetting travel of contacts 13-14

Tripping travel for snap-action contacts

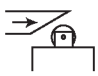


Tripping travel for slow-break contacts



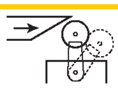
Examples

FA134Z11
(snap-action contacts)



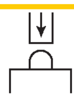
Tripping travel in mm/ cam linear movement

FA138Z11
(snap-action contacts)

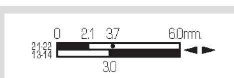


Tripping travel in degrees/ lever rotary movement

FA131X11
(slow break contacts)



Tripping travel in mm/ plunger linear movement

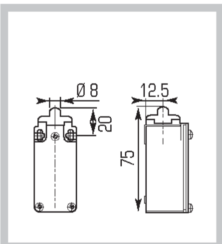
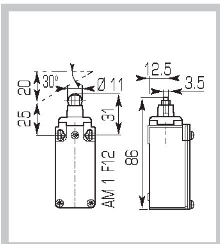
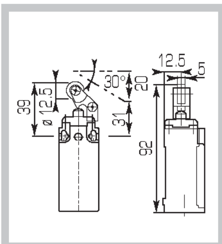
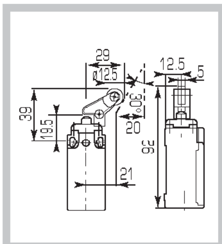


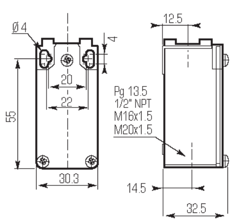
Limit Switches

FA1 Series

IP66 die-cast aluminium type

1 cable entry M16x1.5

				
	FA131	**FA134**	**FA132**	**FA133**
TYPE OF OPERATOR	**SHORT STEEL END PLUNGER**	**STEEL ROLLER PLUNGER**	**PA ROLLER LEVER PLUNGER HORIZONTAL ACTUATION**	**PA ROLLER LEVER PLUNGER VERTICAL ACTUATION**
Standard – Positive opening NC contacts	EN50047	EN50047	-	-
Minimum tripping force	15	12	7	7
Minimum positive opening force	30	30	24	24
Snap action Z11 1NC-1NO (13 21 / 14 22) Zb	FA131Z11 0 1.3 25 41 56 mm	FA134Z11 0 25 47 76 96 mm	FA132Z11 0 49 90 145 210 mm	FA133Z11 0 49 90 145 210 mm
Slow break X11 1NC-1NO (13 21 / 14 22) Zb	FA131X11 0 16 32 56 mm; 2.5	FA134X11 0 32 60 96 mm; 46	FA132X11 0 60 105 210 mm; 86	FA133X11 0 60 105 210 mm; 86
Slow break Y11 1NC-1NO overlapping (13 21 / 14 22) Zb	FA131Y11 0 29 45 56 mm; 15	FA134Y11 0 53 82 96 mm; 30	FA132Y11 0 102 146 210 mm; 54	FA133Y11 0 102 146 210 mm; 54
Snap action Z02 2NC (11 21 / 12 22) Zb	FA131Z02 0 1.3 24 40 56 mm	FA134Z02 0 2545 74 96 mm	FA132Z02 0 5186 131 210 mm	FA133Z02 0 5186 131 210 mm
Slow break W02 2NC (11 21 / 12 22) Zb	FA131W02 0 15 31 56 mm	FA134W02 0 30 59 96 mm	FA132W02 0 57 102 210 mm	FA133W02 0 57 102 210 mm
Slow break W20 2NO (13 23 / 14 24) Zb	FA131W20 0 14 56 mm	FA134W20 0 28 96 mm	FA132W20 0 5.3 210 mm	FA133W20 0 5.3 210 mm
WEIGHT gr. – MIN. PACK QTY.	168 gr. 1 pcs.	175 gr. 1 pcs.	186 gr. 1 pcs.	186 gr. 1 pcs.
DIMENSIONS				



Limit Switches

FA1 Series

IP66 die-cast aluminium type

TECHNO-CONTROL EQUIPMENT

1 cable entry
M16x1.5


FA138

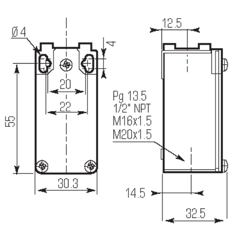

FA141

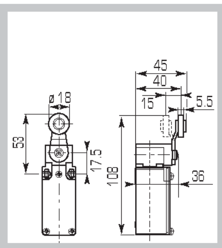

FA139

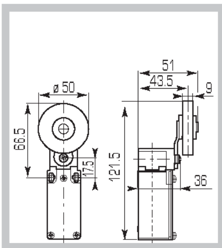

FA140

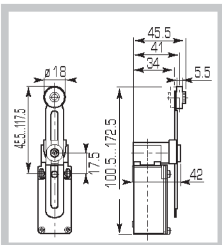
TYPE OF OPERATOR	18 Ø PA ROLLER LEVER	50 Ø RUBBER ROLLER LEVER	VARIABLE LENGTH 18 Ø PA ROLLER LEVER	VARIABLE LENGTH 50 Ø RUBBER ROLLER LEVER
Standard – Positive opening NC contacts	-	-	-	-
Minimum tripping force	0.10	0.10	0.10	0.10
Minimum positive opening force	0.32	-	-	-
Snap action Z11 1NC-1NO Zb (13 21 / 14 22)	FA138Z11 (0 17° 31° 47° 74°)	FA141Z11 (0 17° 31° 74°)	FA139Z11 (0 17° 31° 74°)	FA140Z11 (0 17° 31° 74°)
Slow break X11 1NC-1NO Zb (13 21 / 14 22)	FA138X11 (0 21° 37° 74°; 30°)	FA141X11 (0 21° 74°; 30°)	FA139X11 (0 21° 74°; 30°)	FA140X11 (0 21° 74°; 30°)
Slow break Y11 1NC-1NO overlapping Zb (13 21 / 14 22)	FA138Y11 (0 35° 51° 74°; 18°)	FA141Y11 (0 35° 74°; 18°)	FA139Y11 (0 35° 74°; 18°)	FA140Y11 (0 35° 74°; 18°)
Snap action Z02 2NC Zb (11 21 / 12 22)	FA138Z02 (0 17 30 46 74)	FA141Z02 (0 17 30 74)	FA139Z02 (0 17 30 74)	FA140Z02 (0 17 30 74)
Slow break W02 2NC Zb (11 21 / 12 22)	FA138W02 (0 19 37 74)	FA141W02 (0 19 74)	FA139W02 (0 19 74)	FA140W02 (0 19 74)
Slow break W20 2NO Zb (13 23 / 14 24)	FA138W20 (0 18° 74°)	FA141W20 (0 18° 74°)	FA139W20 (0 18° 74°)	FA140W20 (0 18° 74°)
WEIGHT gr. – MIN. PACK QTY.	235 gr. 1 pcs.	255 gr. 1 pcs.	245 gr. 1 pcs.	265 gr. 1 pcs.

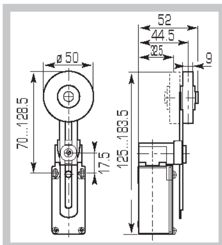
DIMENSIONS











Limit Switches

FA1 Series

IP66 die-cast aluminium type

1 cable entry
M16x1.5

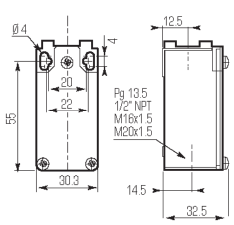
FA135

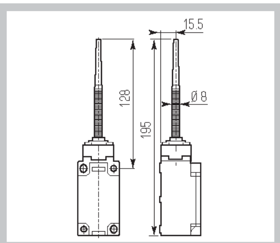
FA136

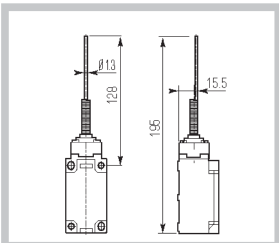
FA137

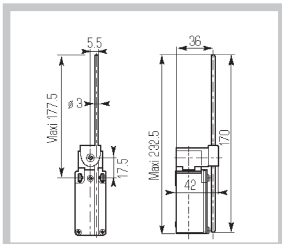
TYPE OF OPERATOR	SPRING LEVER WITH TIP IN PA	"CAT'S WHISKER"	3 Ø STEEL ROD LEVER
Standard – Positive opening NC contacts	-	-	-
Minimum tripping force	0.10	0.10	0.10
Minimum positive opening force	-	-	-
Z11 1NC-1NO — Snap action — Zb	FA135Z11	FA136Z11	FA137Z11
X11 1NC-1NO — Slow break — Zb	FA135X11	FA136X11	FA137X11
Y11 1NC-1NO overlapping — Slow break — Zb	FA135Y11	FA136Y11	FA137Y11
Z02 2NC — Snap action — Zb	FA135Z02	FA136Z02	FA137Z02
W02 2NC — Slow break — Zb	FA135W02	FA136W02	FA137W02
W20 2NO — Slow break — Zb	FA135W20	FA136W20	FA137W20
WEIGHT gr. – MIN. PACK QTY.	235 gr. 1 pcs.	255 gr. 1 pcs.	245 gr. 1 pcs.

DIMENSIONS









Limit Switches

FA3 Series

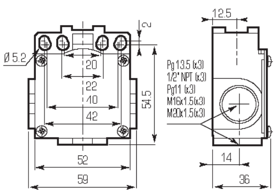
IP66 die-cast aluminium type

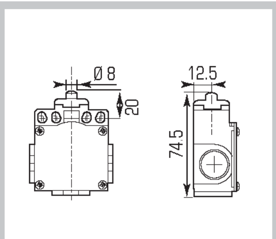
TECHNO-CONTROL EQUIPMENT

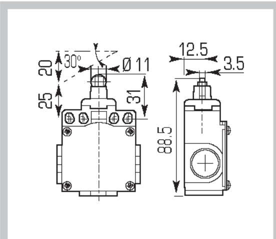
3 cable entries M16x1.5

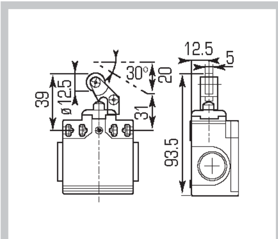
	 FA331	 FA334	 FA332
TYPE OF OPERATOR	**SHORT STEEL END PLUNGER**	**SHORT STEEL ROLLER PLUNGER**	**PA ROLLER LEVER PLUNGER HORIZONTAL ACTUATION**
Standard – Positive opening NC contacts	-	-	-
Minimum tripping force	15	12	7
Minimum positive opening force	30	30	24
Z11 1NC-1NO Snap action (13 21 / 14 22) Zb	FA331Z11 21-22 13-14: 0 13 25 41 56 mm	FA334Z11 21-22 13-14: 0 25 47 76 96mm	FA332Z11 21-22 13-14: 0 49 90 145 210 mm
X11 1NC-1NO Slow break (13 21 / 14 22) Zb	FA331X11 21-22 13-14: 0 16 32 56 mm; 2.5	FA334X11 21-22 13-14: 0 32 60 96mm; 46	FA332X11 21-22 13-14: 0 60 105 210 mm; 86
Y11 1NC-1NO overlapping Slow break (13 21 / 14 22) Zb	FA331Y11 21-22 13-14: 0 29 45 56 mm; 1.5	FA334Y11 21-22 13-14: 0 53 82 96 mm; 30	FA332Y11 21-22 13-14: 0 102 146 210 mm; 54
Z02 2NC Snap action (11 21 / 12 22) Zb	FA331Z02 11-12 21-22: 0 13 24 40 56 mm	FA334Z02 11-12 21-22: 0 25 45 74 96 mm	FA332Z02 11-12 21-22: 0 51 86 131 210 mm
W02 2NC Slow break (11 21 / 12 22) Zb	FA331W02 11-12 21-22: 0 15 31 56 mm	FA334W02 11-12 21-22: 0 30 59 96 mm	FA332W02 11-12 21-22: 0 57 102 210 mm
W20 2NO Slow break (13 23 / 14 24) Zb	FA331W20 13-14 23-24: 0 14 56 mm	FA334W20 13-14 23-24: 0 28 96 mm	FA332W20 13-14 23-24: 0 5.3 210 mm
WEIGHT gr. – MIN. PACK QTY.	270 gr. 1 pcs.	280 gr. 1 pcs.	290 gr. 1 pcs.

DIMENSIONS







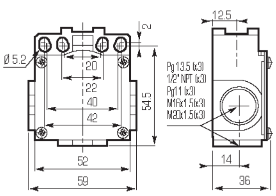
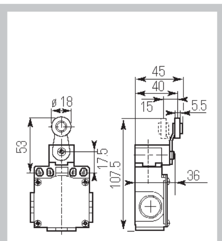
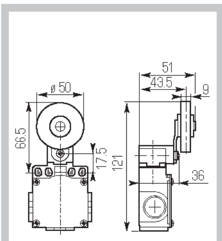
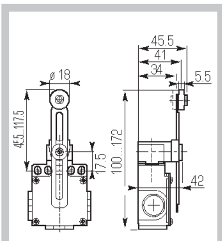
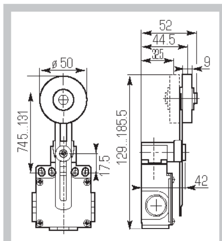


Limit Switches

FA3 Series

IP66 die-cast aluminium type

3 cable entries M16x1.5

	 FA338	 FA341	 FA339	 FA340
TYPE OF OPERATOR	**18 Ø PA ROLLER LEVER**	**50 Ø RUBBER ROLLER LEVER**	**VARIABLE LENGTH 18 Ø PA ROLLER LEVER**	**VARIABLE LENGTH 50 Ø RUBBER ROLLER LEVER**
Standard – Positive opening NC contacts ➔	- ➔	-	-	-
Minimum tripping force	0.10	0.10	0.10	0.10
Minimum positive opening force	0.32	-	-	-
Snap action Z11 1NC-1NO Zb	FA338Z11	FA341Z11	FA339Z11	FA340Z11
Slow break X11 1NC-1NO Zb	FA338X11	FA341X11	FA339X11	FA340X11
Slow break Y11 1NC-1NO overlapping Zb	FA338Y11	FA341Y11	FA339Y11	FA340Y11
Snap action Z02 2NC Zb	FA338Z02	FA341Z02	FA339Z02	FA340Z02
Slow break W02 2NC Zb	FA338W02	FA341W02	FA339W02	FA340W02
Slow break W20 2NO Zb	FA338W20	FA341W20	FA339W20	FA340W20
WEIGHT gr. – MIN. PACK QTY.	325 gr. 1 pcs.	345 gr. 1 pcs.	335 gr. 1 pcs.	355 gr. 1 pcs.
DIMENSIONS 				

Limit Switches

FA3 Series

IP66 die-cast aluminium type

TECHNO-CONTROL EQUIPMENT

3 cable entries
M16x1.5

	FA335	FA336	FA337
			

TYPE OF OPERATOR	SPRING LEVER WITH TIP IN PA	"CAT'S WHISKER"	VARIABLE LENGTH 3 Ø STEEL ROD LEVER
Standard – Positive opening NC contacts	-	-	-
Minimum tripping force	0.10	0.10	0.10
Minimum positive opening force	-	-	-
Z11 1NC-1NO, Snap action, 13 21 / 14 22, Zb	FA335Z11	FA336Z11	FA337Z11
X11 1NC-1NO, Slow break, 13 21 / 14 22, Zb	FA335X11	FA336X11	FA337X11
Y11 1NC-1NO overlapping, Slow break, 13 21 / 14 22, Zb	FA335Y11	FA336Y11	FA337Y11
Z02 2NC, Snap action, 11 21 / 12 22, Zb	FA335Z02	FA336Z02	FA337Z02
W02 2NC, Slow break, 11 21 / 12 22, Zb	FA335W02	FA336W02	FA337W02
W20 2NO, Slow break, 13 23 / 14 24, Zb	FA335W20	FA336W20	FA337W20
WEIGHT gr. – MIN. PACK QTY.	305 gr. 1 pcs.	320 gr. 1 pcs.	380 gr. 1 pcs.

DIMENSIONS